Draft Plan Bay Area

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Strategy for a Sustainable Region

Association of Bay Area Governments

Metropolitan Transportation Commission

Environmental Impact Report Plan Bay Area Draft

State Clearinghouse No. 2012062029

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PLAN BAY AREA

DRAFT ENVIRONMENTAL IMPACT REPORT

STATE CLEARINGHOUSE NO. 2012062029

Prepared for

Metropolitan Transportation Commission and Association of Bay Area Governments

by

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Glossary of Terms

AB 32	Assembly Bill 32 – Law that requires that the State's global warming emissions be reduced to 1990 levels by 2020
ABAG	Association of Bay Area Governments – The regional agency responsible for assigning housing allocations and performing demographic analysis
BAAQMD	Bay Area Air Quality Management District
Bay Area	The nine-county region adjacent to the San Francisco Bay and the area covered by Plan Bay Area and this EIR
BCDC	Bay Conservation and Development Commission
BMP	Best Management Practice
BRT	Bus Rapid Transit
Caltrans	California Department of Transportation
CARB	California Air Resources Board – State agency responsible for attaining and maintaining healthy air quality through setting and enforcing emissions standards, conducting research, monitoring air quality, providing education and outreach, and overseeing/assisting local air quality districts
CCR	California Code of Regulations
CEQA	California Environmental Quality Act – State law requiring review of physical environmental impacts potentially caused by plans and projects
CFR	Code of Federal Regulations
CMAs	Congestion Management Agencies - County-level transportation agencies tasked with managing and reducing traffic congestion on major regional roadways
GHG	Greenhouse Gases – Components of the atmosphere that contribute to the greenhouse effect. The principal greenhouse gases that enter the atmosphere because of human activities are carbon dioxide, methane, nitrous oxide, and fluorinated gases
GIS	Geographic Information System – Mapping software that links spatial information to quantitative and qualitative attributes
HOT	High Occupancy Toll – An HOV lane that single-occupant drivers can pay to drive in
HOV	High Occupancy Vehicle – A lane restricted to vehicles with a certain number of occupants to encourage carpooling
JHCS	Jobs-Housing Connection Strategy - The land use development strategy developed by ABAG that is the preferred approach employed in the proposed Plan
MTC	Metropolitan Transportation Commission, the transportation agency for the Bay Area
NOP	Notice of Preparation

NPDES	National Pollutant Discharge Elimination System - A federal program that regulates the amount and quality of discharge into bodies of water
OBAG	OneBayArea Grant – Program of grants distributed to local jurisdictions by MTC and ABAG to pay for planning and infrastructure investments in accordance with Plan Bay Area
Plan Bay Area	The name given to the SCS developed by MTC and ABAG. It also serves as the Bay Area's Regional Transportation Plan through the year 2040.
PM	Particulate Matter – A mixture of solid particles and liquid droplets found in the air
Proposed Plan	The preferred alternative (#2) of Plan Bay Area evaluated in this EIR
RHNA	Regional Housing Needs Allocation – Quantifies the need for housing within each jurisdiction of a region based on population growth projections. ABAG assigns these targets within the Bay Area. Communities then address this need through the process of completing the housing elements of their general plans
PCA	Priority Conservation Area - Regionally significant open spaces for which there exists broad consensus for long-term protection
PDA	Priority Development Area - Existing neighborhood served by transit and nominated by its local jurisdiction as a location to focus future development
RTP	Regional Transportation Plan – Federally required 20-year plan prepared by metropolitan planning organizations and updated every four or five years. Includes projections of population growth and travel demand, along with a specific list of proposed projects to be funded.
RWQCB	Regional Water Quality Control Board
TAC	Toxic Air Contaminant – Air pollutants that may cause or contribute to an increase in mortality or in serious illness, or that may pose a present or potential hazard to human health
TIS	Transportation Investment Strategy – The transportation strategy developed by MTC that is the preferred approach employed in the proposed Plan
TPP	Transit Priority Project – A land use development that, based on its type and location, may be eligible for CEQA streamlining under SB 375
SB 375	Law that requires CARB to set regional targets for per-capita GHG emission reduction targets and mandates the SCS
SCS	Sustainable Communities Strategy - An integrated regional transportation and land use plan that must hit State mandated GHG emissions reductions targets while also accommodating anticipated population growth
SWRCB	State Water Resources Control Board
VMT	Vehicle Miles Traveled – A measurement of the total miles traveled by all vehicles in the area for a specified time period

Executive Summary

This program Environmental Impact Report (EIR) has been prepared on behalf of the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) in accordance with the California Environmental Quality Act (CEQA). This EIR analyzes the potential significant impacts of the adoption and implementation of the proposed Plan Bay Area (proposed Plan), which is the update to the 2009 Regional Transportation Plan (RTP) and the new Sustainable Communities Strategy (SCS) for the San Francisco Bay Area.

MTC, ABAG, and Plan Bay Area

MTC is the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area (which includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties). Created by the State Legislature in 1970, MTC functions as both the regional transportation planning agency (RTPA)—a state designation—and for federal purposes, as the region's metropolitan planning organization (MPO).

As required by State legislation (Government Code Section 65080 et seq.) and by federal regulation (Title 23 USC Section 134), MTC is responsible for preparing the RTP for the San Francisco Bay Area Region. An RTP is a long-range plan that identifies the strategies and investments to maintain, manage, and improve the region's ground transportation network. In 2009, MTC adopted its most recent RTP, known as the Transportation 2035 Plan for the San Francisco Bay Area. Development and environmental analysis of regional airport and seaport plans occur in separate processes.

ABAG is a joint powers agency formed in 1961 pursuant to California Government Code §§ 6500, et seq., and is the council of governments (COG) for the San Francisco Bay Area. ABAG conducts regional population and employment projections and the regional housing needs allocation (RHNA) processes (Government Code Section 65584 et seq.). Plan Bay Area is a joint effort led by MTC and ABAG and completed in partnership with the Bay Area's other two regional government agencies, the Bay Area Air Quality Management District (BAAQMD), and the Bay Conservation and Development Commission (BCDC). It meets the requirements of the Sustainable Communities and Climate Protection Act of 2008, Senate Bill 375 (SB 375; Steinberg, 2008), which requires California's 18 metropolitan planning organizations to develop an SCS as a new element of their federally mandated RTP. The SCS demonstrates how the region will meet its greenhouse gas (GHG) reduction targets established by the California Air Resources Board (ARB) through integrated land use, housing and transportation planning, a planning effort requiring the authority and powers vested in both MTC and ABAG.

Plan Bay Area, which covers the period through 2040, is the first Bay Area RTP that is subject to the requirements of SB 375. SB 375 requires that the SCS be integrated into the MPO's RTP and once adopted will be reviewed by ARB to determine whether it would, if implemented, achieve the GHG emission reduction target for its region. If the combination of measures in the SCS will not meet the region's target, the MPO must then prepare an alternative planning strategy (APS) that will do so.

Plan Bay Area is the region's first integrated long-range land use and transportation plan. Plan Bay Area calls for focused housing and job growth around high-quality transit corridors, particularly within areas identified by local jurisdictions as Priority Development Areas (PDAs). This land use strategy is intended to enhance mobility and economic growth by linking housing/jobs with transit, thus offering a more efficient land use pattern around transit and a greater return on existing and planned transit investments. The proposed Plan specifies the strategies and investments to maintain, manage, and improve the region's transportation network – which includes bicycle and pedestrian facilities, local streets and roads, public transit systems, and highways. The Plan proposes a set of transportation projects and programs that will be implemented with reasonably anticipated revenue available for the planning period. The proposed Plan must be updated every four years, ensuring a constantly evolving plan through regular updates throughout the planning period.

Introduction to the EIR

PURPOSE

This environmental assessment of the proposed Plan Bay Area—which may also be referred to as the "proposed Plan" throughout this document—has been prepared in compliance with CEQA and the CEQA Guidelines. It is designed to:

- Analyze the potential environmental effects of the adoption and implementation of the proposed Plan;
- Inform decision-makers, responsible and trustee agencies, and members of the public as to the range of the environmental impacts of the proposed Plan;
- Recommend a set of feasible measures to mitigate any significant adverse impacts; and
- Analyze a range of reasonable alternatives to the proposed Plan.

The EIR process also provides an opportunity to identify environmental benefits of the proposed Plan that might balance some potentially significant adverse environmental impacts. The final EIR will include a Mitigation Monitoring Program that identifies who will be responsible for implementing the measures.

As the joint lead agencies for preparing this EIR, MTC and ABAG will rely on the EIR analysis of potential environmental effects in their review of the proposed Plan prior to taking action on Plan Bay Area.

SCOPE

This is a program EIR, defined in Section 15168 of the CEQA Guidelines as: "[An EIR addressing a] series of actions that can be characterized as one large project and are related either: (1) Geographically; (2) As logical parts in the chain of contemplated actions; (3) In connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program; or (4) As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental impacts which can be mitigated in similar ways."

Program EIRs can be used as the basic, general environmental assessment for an overall program of projects developed over a multi- year planning horizon. A program EIR has several advantages. For example, it provides a basic reference document to avoid unnecessary repetition of facts or analysis in subsequent project-specific assessments. It also allows the lead agency to consider the broad, regional impacts of a program of actions before its adoption and eliminates redundant or contradictory approaches to the consideration of regional and cumulative impacts.

As a programmatic document, this EIR presents a region-wide assessment of the potential impacts of the proposed Plan Bay Area. It focuses on the entire set of projects and programs contained in the proposed Plan. Individual transportation and development project impacts are not addressed in detail, although the impacts of some possible projects are discussed as appropriate; rather the focus of this EIR is to address the impacts of a program of projects, which, individually or in the aggregate, may be regionally significant. However, it does not evaluate subcomponents of the proposed Plan nor does it assess project-specific impacts of individual projects. For example, the general physical impacts of major regional transportation expansion projects are addressed, while potential impacts on specific wetlands or a specific species habitat by an individual interchange reconstruction project is not discussed, unless information currently exists or it can be surmised that the effect would be large or otherwise regionally significant. This approach does not relieve local jurisdictions of the responsibility for evaluating project-specific, locally significant impacts. All impacts of individual projects will be evaluated in future environmental review, as relevant, by the appropriate implementing agency as required under CEQA and/or NEPA prior to each project being considered for approval, as applicable.

This EIR evaluates potentially significant environmental impacts, and cumulative impacts, and includes mitigation measures to offset potentially significant effects. This EIR provides the basis for subsequent tiered CEQA documents for project-specific or site-specific environmental reviews that will be conducted by implementing agencies as land use and transportation projects in the proposed Plan are more clearly defined and more detailed studies prepared. Specific analysis of localized impacts in the vicinity of individual projects is not included in this program level EIR.

EIR Organization

The EIR is organized into four parts, outlined below. This Executive Summary outlines the proposed Plan and alternatives and includes a review of the potentially significant adverse regional environmental impacts of the proposed Plan Bay Area and the measures recommended to mitigate those impacts. The executive summary also indicates whether or not those measures mitigate the significant impacts to a less than significant level. The executive summary also identifies the environmentally superior alternative among the alternatives analyzed.

PART ONE: INTRODUCTION AND PROJECT DESCRIPTION

Part One includes two chapters. Chapter 1.1 describes the relationship between the proposed Plan Bay Area and the EIR, the organization of the EIR, and the basic legal requirements of a program level EIR. It discusses the level of analysis and the alternatives considered as well as how this EIR is related to other environmental documents and the EIR's intended uses. Chapter 1.2 introduces the purpose and objectives of the proposed Plan Bay Area and summarizes specific information to describe the proposed Plan and complete the EIR analysis. This includes a description of the existing regional setting, an outline of the Bay Area's projected population and employment growth rates and proposed development patterns through the 2040 planning horizon year, and all proposed transportation projects and programs. State and federal planning regulations guiding the development of the RTP and SCS are also described.

PART TWO: SETTING, IMPACTS, AND MITIGATION MEASURES

Part Two describes the existing physical and regulatory settings for each of the environmental issue areas analyzed in the EIR, the potential impacts of the proposed Plan on these environmental issue areas, and measures to mitigate the potential impacts identified. Each issue area is analyzed in a separate chapter. Each chapter is organized as follows:

- Physical Setting;
- Regulatory Setting;
- Impact Significance Criteria;
- Method of Analysis;
- Summary of Impacts; and
- Impacts and Mitigation Measures.

PART THREE: ALTERNATIVES AND CEQA REQUIRED CONCLUSIONS

Part Three includes a description of the alternatives to the proposed Plan and an assessment of their potential to achieve the objectives of the proposed Plan while reducing potentially significant adverse regional environmental impacts. Part Three also includes a comparison summary table of regional environmental impacts associated with the alternatives. As required by CEQA, an environmentally superior alternative is identified. Finally, Part Three includes an assessment of the impacts of the proposed Plan and alternatives in several subject areas required by CEQA, including:

- Significant irreversible environmental changes;
- Significant unavoidable impacts;
- Growth-inducing impacts;
- Cumulative impacts; and
- Impacts found to be not significant.

PART FOUR: BIBLIOGRAPHY AND APPENDICES

Part Four includes a bibliography and the EIR appendices. Appendix A includes the Notice of Preparation (NOP) of this EIR and Appendix B provides reference to the comments received on the NOP and at the scoping meetings (a full set of comments can be found on the project website, www.onebayarea.org). Appendix C includes detailed lists of the transportation projects included in the proposed Plan and the alternatives studied in the EIR. Appendix D summarizes scoping comments received on the alternatives. Appendix E outlines the Air Quality analysis methodology and mitigation measure effectiveness. Appendices F through I include detailed supporting data on impact analyses for geology, water, biology and hazards, respectively.

Plan Bay Area Regional Setting

The Bay Area region consists of nine counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. In a ranking of Combined Statistical Areas (CSAs), the San José-San Francisco-Oakland CSA population was the sixth largest in the nation in 2010, behind New York-Newark-Bridgeport, Los Angeles-Long Beach-Riverside, Chicago-Naperville-Michigan City, Washington-Baltimore-Northern Virginia, and Boston-Worcester-Manchester CSAs.[1] In 2010, the San Francisco Bay Area population was nearly 7.2 million according to the 2010 Census. According MTC, as of 2010 only about 18 percent of the region's approximately 4.4 million acres of land has been developed. The Bay Area transportation network includes interstate and state freeways, county expressways, local streets and roads, bike paths, sidewalks, and a wide assortment of transit technologies (heavy rail, light rail, intercity rail, buses, trolleys and ferries).

Plan Bay Area Overview

The proposed Plan Bay Area meets the requirements of SB 375 by developing an integrated transportation and land use plan and attains the per-capita GHG emission reduction targets of -7 percent by year 2020 and -15 percent by year 2035 from 2005 levels. Under the proposed Plan, emission reductions continue on a downward trajectory through 2050. The proposed Plan reinforces land use and transportation integration per SB 375 and presents a vision of what the Bay Area's land use patterns and transportation networks might look like in 2040. The adopted goals of the proposed Plan are:

- Climate Protection
- Adequate Housing
- Healthy and Safe Communities
- Open Space and Agricultural Preservation
- Equitable Access
- Economic Vitality
- Transportation System Effectiveness

The Plan objectives are reflected in the following performance targets that measure the region's progress towards meeting these goals and are consistent with the requirements of SB 375:

- Reduce per-capita CO_2 emissions from cars and light-duty trucks by 15 percent.

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[1] Census 2010. A Combined Statistical Area is a census defined metropolitan region that consists of two or more adjacent Core Based Statistical Areas (CBSAs) that have substantial employment interchange. The CBSAs that combine to create a CSA retain separate identities within the larger CSA.

- House 100 percent of the region's projected 25-year growth by income level without displacing current low-income residents.

These goals and performance targets are more fully explored in Chapter 1.2. An alternative that performs substantially worse than the proposed Plan with respect to meeting the plan goals and these performance targets would not achieve even the basic objectives of the proposed Plan.

FORECASTED GROWTH

Looking ahead to 2040, the horizon year for the proposed Plan, it is forecast by ABAG that the Bay Area's population will grow another 30 percent from the 2010 level (over 2.1 million more residents) and employment will increase by 33 percent (over 1.1 million additional jobs). To house the future population, it is estimated that 660,000 new housing units would be built in the same timeframe. Forecasted growth from 2010 through 2040 is shown in **Table ES-1**.

TABLE ES-1: TOTAL PROJECTED GROWTH FOR THE BAY AREA, 2010-2040

	2010	*2040*	*Growth 2010 - 2040*	*% Change*	*Annual Growth Rate*
Population	7,151,000	9,299,000	2,148,000	30%	0.9%
Households	2,608,000	3,308,000	700,000	27%	0.8%
Housing Units	2,786,000	3,446,000	660,000	24%	0.7%
Jobs	3,385,000	4,505,000	1,120,000	33%	1.0%

Source: Association of Bay Area Governments, Plan Bay Area Jobs-Housing Connection Strategy, revised May 16, 2012.

LAND USE STRATEGY

To plan for this future growth, the proposed Plan calls for focused housing and job growth around high-quality transit corridors, particularly within areas identified by local jurisdictions as Priority Development Areas (PDAs). Opportunities for focused growth development in Transit Priority Project (TPP)-eligible areas, as defined by SB 375 in Public Resources Code section 21155, which often overlap with PDAs, are also encouraged and facilitated by the proposed Plan. This land use strategy enhances mobility and economic growth by linking housing/jobs with transit and existing transportation infrastructure, thus offering a more efficient land use pattern around transit and a greater return on existing and planned transit investments. Beyond the emphasis on transit-oriented development, the proposed Plan's land use strategy broadly calls for new housing and jobs in locations that expand existing communities and build off of all existing transportation investments.

TRANSPORTATION

The proposed Plan includes a financially constrained transportation investment plan as required by State and federal planning regulations. It includes transportation projects and programs that would be funded through existing and future revenues that are projected to be reasonably available to the region over the timeframe covered by the proposed Plan. A total of $289 billion in revenues is available for the financially constrained Plan Bay Area. That is, the proposed Plan and alternatives evaluated in the EIR are financially constrained to be within the $289 billion envelope.

A more detailed description of the proposed Plan is included in *Chapter 1.2: Overview of the Proposed Plan Bay Area.*

Alternatives

A full description of the alternatives analyzed in this EIR and the alternative selection process is provided in Part 3. The alternatives are as follows:

ALTERNATIVE 1: NO PROJECT

The No Project alternative consists of two elements: (a) the existing 2010 land uses plus continuation of existing land use policy as defined in adopted general plans, zoning ordinances, etc. from all jurisdictions in the region and (b) the existing 2010 transportation network plus highway, transit, local roadway, bicycle and pedestrian projects that have either already received full funding or are scheduled for full funding and received environmental clearance by May 1, 2011.

ALTERNATIVE 2: PROPOSED PLAN

Alternative 2 is the proposed Plan analyzed in this EIR. This alternative assumes a land use development pattern that concentrates future household and job growth into Priority Development Areas (PDAs) identified by local jurisdictions. It pairs this land development pattern with MTC's Preferred Transportation Investment Strategy, which dedicates nearly 90 percent of future revenues to operating and maintaining the existing road and transit system. A more detailed overview of the proposed Plan is in Chapter 1.2.

ALTERNATIVE 3: TRANSIT PRIORITY FOCUS

This alternative includes the potential for more efficient land uses in Transit Priority Project (TPP) areas, as defined by Senate Bill 375 (PRC section 21155), and would be developed at higher densities than existing conditions to support high quality transit. The transportation investment strategy in this alternative tests a slightly reduced express lane network that focuses on HOV lane conversions and gap closures, as well as increased funding for the implementation of recommendations from the Comprehensive Operations Analysis of BART and AC Transit above what is included in the Preferred Transportation Investment Strategy. This alternative also includes a Regional Development Fee based on development in areas that generate high levels of vehicle miles travelled, and a higher peak period toll on the San Francisco-Oakland Bay Bridge.

ALTERNATIVE 4: ENHANCED NETWORK OF COMMUNITIES

This alternative seeks to provide sufficient housing for all people employed in the Bay Area with no in-commuters from other regions and allows for more dispersed growth patterns than the proposed Plan, although development is still generally focused around PDAs. The transportation investment strategy is consistent with the Preferred Transportation Investment Strategy, also used in the proposed Plan, and includes a higher peak period toll on the San Francisco-Oakland Bay Bridge.

ALTERNATIVE 5: ENVIRONMENT, EQUITY AND JOBS

This alternative seeks to maximize affordable housing in opportunity areas in both urban and suburban areas through incentives and housing subsidies. The suburban growth is supported by increased transit service to historically disadvantaged communities and a reduced roadway network. This alternative includes imposing a Vehicle Miles Traveled (VMT) tax and a higher peak period toll on the San Francisco-Oakland Bay Bridge to fund transit operations.

Key EIR assumptions

The following key assumptions were used in the impact analysis:

- The base year or existing conditions for the land use and transportation impact analysis is 2010, as this year provides the most recent best data available for land use, transportation, and demographics. The only exception appears in *Chapter 2.5: Greenhouse Gases and Climate Change*, which uses a 2005 baseline per the CARB target setting process to determine impacts under Criterion 1 related to achieving the requirements of SB 375.
- The total amount of growth projected for the Bay Area through 2040 is based on ABAG's Plan Bay Area Forecast of Jobs, Population and Housing (the forecasts used to develop the Jobs-Housing Connection) that is available for review on the project website (http://www.onebayarea.org); this amount of growth is assumed in the proposed Plan, which identifies a land use pattern to accommodate the projected growth.
- This analysis does not consider phasing of improvements or interim stages of the proposed Plan Bay Area between 2010 and 2040, as the purpose of the analysis is to evaluate the Plan as a whole. The one exception to this approach appears in *Chapter 2.5: Greenhouse Gases and Climate Change*, which includes an examination of impacts in 2020 and 2035 as compared to a 2005 baseline per the ARB target setting process to determine impacts relating to achieving the statutory requirements of Senate Bill 375.
- As a program-level EIR, individual project impacts are not addressed; rather, this analysis focuses on the aggregate impacts of the proposed Plan that may be regionally significant.

CUMULATIVE IMPACT ASSUMPTIONS

Section 15130 of the CEQA Guidelines requires that an EIR evaluate potential environmental impacts that are individually limited but cumulatively significant. CEQA defines cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines § 15355). "'Cumulatively considerable' means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (CEQA Guidelines § 15065(a)(3)). This means that cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Plan Bay Area, which includes region-wide transportation improvements and land use development patterns in the Bay Area to accommodate projected regional growth through 2040, is a cumulative plan by definition. As such, the environmental analysis included in this EIR throughout Part Two is a cumulative analysis compliant with the requirements of CEQA and the CEQA Guidelines. Furthermore, this EIR contains analysis of cumulative regional impacts, as differentiated from more generalized localized impacts for every identified impact area.

Plan Impacts

The analysis emphasizes the impacts of the proposed Plan Bay Area as a complete program, rather than as detailed analysis of the individual transportation improvements and land use strategy included in the proposed Plan. Individual improvements and development projects must still independently comply with the requirements of CEQA. As required by CEQA, this EIR identifies three types of impacts:

- Short-term impacts;
- Long-term impacts; and
- Cumulative impacts.

The EIR addresses regional impacts as well as generalized localized impacts. It also, to the extent feasible, distinguishes between impacts caused by transportation improvements and impacts related to proposed land use patterns.

Table ES-2 summarizes the impact conclusions and recommended mitigation measures identified in this EIR. The impacts are organized by environmental impact issue area in the order in which they appear in Part Two.

Environmentally Superior Alternative

CEQA Guidelines require each EIR to identify the environmentally superior alternative among the alternatives analyzed. If the No Project alternative is identified as the environmentally superior alternative, then the EIR must identify another alternative from among the alternatives analyzed. According to the analysis in Chapter 3.1, Alternative 5 would result in the lowest level of environmental impacts, but only marginally lower, as compared to all alternatives (including the proposed Plan), and therefore is identified as the environmentally superior alternative. Alternative 3 results in similar impacts to the proposed Plan, and Alternative 4 and the No Project alternative have mixed environmental outcomes. Overall, variations in environmental impacts among alternatives are minor. This determination does not factor in other benefits of the proposed Plan outside of environmental effects. More specifically:

- In **Transportation**, Alternative 3 has the least environmental impact as it features shorter commute travel times (three percent shorter than the proposed Plan) and a lesser amount of congested VMT (14 percent fewer VMT at LOS F as compared to the proposed Plan) and the least potential for transit vehicle crowding (30 percent utilization of public transit systems, the same as the No Project alternative, and three percent less than the proposed Plan). These results are due to shifting regional growth to the Transit Priority Project eligible areas, with the greatest emphasis on growth in the urban core close to high-frequency transit.

- In **Air Quality,** Alternative 5 has the least environmental impact as it results in the lowest criteria pollutant emissions (1.7 percent fewer criteria pollutant emissions as compared to the proposed Plan) as well as lowest TAC emissions of all of the alternatives (1.9 percent fewer TAC emissions as compared to the proposed Plan). This is a result of placing a greater emphasis than the other alternatives on aligning compact land use development with transit service and increasing transit capacity.
- In **Energy,** Alternative 4 would result in the lowest per capita energy use (3.3 percent less than the proposed Plan and 2.7 percent less than Alternative 5), and would therefore have the least environmental impact.
- In **Greenhouse Gas Emissions,** the proposed Plan and Alternative 5 perform equally in regard to meeting SB 375 emission reduction targets in 2035 (both achieving a 16.4 percent reduction, one percent better than Alternative 3, 1.6 percent better than Alternative 4, and 9.6 percent better than the No Project alternative). Alternative 5 performs slightly better in terms of total emissions reductions (achieving a 17 percent reduction from 2010 to 2040, one percent better than Alternative 3 and two percent better than the proposed Plan).
- In **Sea Level Rise**, the No Project alternative includes the fewest transportation projects exposed to midcentury sea level rise inundation (the No Project alternative includes 15 projects, Alternative 5 includes 21 projects, and the proposed Plan, Alternative 3, and Alternative 4 include 32 projects exposed to midcentury sea level rise inundation). Alternative 5 includes the fewest residents (12 percent less than the proposed Plan), and new residential development (10 percent less than under the proposed Plan) exposed to midcentury sea level rise inundation because it distributes growth to areas farther from the Bay.
- In **Land Use (conversion of agricultural and forest land),** Alternative 4 results in the fewest acres of important agricultural and open space land converted to urbanized use, as well as the fewest acres of forest and timberland converted to urbanized use.
- In **Noise** the No Project alternative has the fewest environmental impacts since it results in the lowest number of roadway miles exposed to noise levels at or above 66 dBA. It also includes the fewest transit extension projects, resulting in the smallest increase in transit noise and vibration compared to other alternatives.
- In **Biological Resources, Water Resources, Cultural Resources, and Visual Resources,** Alternative 5 combines compact development with low transportation infrastructure development, resulting in fewer physical impacts tied to these resources. It is noted that in terms of land use development-related impacts alone (excluding transportation projects), the proposed Plan is the most compact and would have the least impact on these resources.
- In **Geology, Public Utilities, Public Services, and Hazardous Materials,** Alternatives 1, 2 (proposed Plan), 3 and 5 are comparable and have fewer impacts than Alternative 4. Alternative 4 includes the most growth, thereby inherently exposing the most people to geologic and hazards risks, and resulting in the greatest impacts on existing public service, recreation, and utility systems. One exception to this is in regard to wastewater treatment, where Alternative 4 has the least impact because of limited growth in San Francisco, which has likely inadequate wastewater treatment capacity under all other alternatives.
- For **Historic Resources and Land Use (community disruption or displacement, alteration and separation)**, all alternatives perform similarly. Since all alternatives include growth in

urbanized areas where historic resources are likely to exist, impacts on historic resources would be similar. For land use, impacts related to community disruption or displacement and alteration and separation would be highly localized and similar across the alternatives.

While Alternative 5 is the environmentally preferred alternative due to its overall GHG emissions reductions and estimated reduction in criteria and TAC emissions, the proposed Plan does include some benefits over Alternative 5. For instance, the proposed Plan results in the lowest VMT per capita (the same as Alternative 4), with one percent fewer daily VMT per capita than Alternative 5. Alternative 5 also exhibits congested VMT levels 18 percent higher in the AM peak, seven percent higher in the PM peak, and 11 percent higher over the course of a typical weekday as compared to the proposed Plan. Finally, the proposed Plan results in fewer acres of agricultural and open space conversion as compared to Alternative 5 (though more than Alternative 4), and the fewest acres of important farmland (excluding grazing land) of all alternatives.

Another important consideration is that the proposed Plan was developed through extensive coordination with local jurisdictions. Alternative 5 assumes residential growth at levels that some local jurisdictions may be unlikely to implement, since it includes growth in areas that local jurisdictions have not planned for or do not currently anticipate.

In addition, there are some important unanswered questions about the feasibility of Alternative 5 that the ABAG Board and the MTC Commissioners will address during deliberations on this EIR. Specifically, implementation of the VMT tax, which is a key component of Alternative 5, may prove to be infeasible because it would require legislative approval and, in light of Proposition 26 (the "Stop Hidden Taxes" initiative), may require approval by a two-thirds supermajority vote of the Legislature. While there is currently a large majority of Democrats in the Legislature, and authorizing legislation may therefore be easier to achieve at this time, the difficulty of predicting whether new legislation will actually be enacted may make Alternative 5 infeasible.

Policy makers will be required to judge the relative importance of the various issue areas in making their final decision.

Areas of Known Controversy

Section 15123 of the CEQA Guidelines requires that an EIR identify areas of controversy which are known to the Lead Agency, including issues raised by other agencies and the public. Areas of controversy associated with the proposed Plan are made known through comments received during the Notice of Preparation (NOP) process, as well as input solicited during public scoping meetings and an understanding of the community issues in the study area. Some areas of known controversy, including issues raised by some members of the community, related to the proposed Plan Bay Area and EIR include:

- Whether the proposed Plan's assumptions of future land use development patterns are feasible given that MTC and ABAG cannot regulate land uses at a regional or local level.
- Concerns about whether the degree and scale of growth proposed within existing communities would alter their appearance, quality of life, and affordability, and whether it would conflict with the existing plans and regulations of the local jurisdiction.

- Determining whether the proposed Plan's emphasis on maintaining and sustaining the existing regional transportation system will be adequate to serve the Bay Area's anticipated population and employment growth.
- Assessing whether the proposed transportation investment strategy can reduce GHG emissions and exposure to air pollutants even as the region's population and economic base continue to grow.
- Determining whether and where sea level rise impacts will occur and how best to minimize those impacts.
- Concerns that increased concentrations of population in focused areas would overwhelm existing public services and utilities, such as parks, police and fire services, water supply, etc.

This EIR acknowledges these known controversies as reported during the NOP scoping period and ongoing agency consultation. To the extent these areas of controversy relate to environmental impacts, they are analyzed at the regional level in Part Two of this EIR.

Issues to be Resolved

CEQA Guidelines section 15123(b)(3) requires that an EIR contain a discussion of issues to be resolved and whether or how to mitigate significant effects. Issues to be resolved include:

- How to address potential impacts from the proposed land development pattern that must be mitigated by the local land use authority, since neither MTC nor ABAG have jurisdiction over land use regulations.
- The degree to which MTC and ABAG can provide adequate incentives for implementation of changes to land use policy.
- How best to require mitigations that can be enacted by project sponsors and/or implementing agencies in a manner to ensure CEQA streamlining for qualifying projects, per SB 375, can occur.

When adopting the proposed Plan Bay Area, the MTC Commission and ABAG Board must decide whether specific overriding economic, legal, social, technological or other benefits of the project outweigh the significant environmental impacts that cannot be feasibly avoided or substantially reduced through implementation of feasible mitigation or alternatives. If so, they would adopt a Statement of Overriding Considerations.

Summary Table of Impacts and Mitigation Measures

Table ES-2 summarizes impacts, mitigation measures, and significance conclusions after mitigation (far right column), by issue area. Note that implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified in the table below. For more details, please see *Part Two: Settings, Impacts, and Mitigation Measures.*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
Transportation			
2.1-1	Implementation of the proposed Plan could result in a substantial increase in per-trip travel time for commute travel by any mode over existing conditions. A substantial increase in per-trip travel time is defined as greater than 5 percent.	None required.	*Less than Significant*
2.1-2	Implementation of the proposed Plan could result in a substantial increase in per-trip travel time for non-commute travel by any mode over existing conditions. A substantial increase in per-trip travel time is defined as greater than 5 percent.	None required.	*Less than Significant*
2.1-3	Implementation of the proposed Plan could result in a substantial increase in per capita VMT on facilities experiencing level of service (LOS) F compared to existing conditions during AM peak periods, PM peak periods, or during the day as a whole (LOS F defines a condition on roads where traffic substantially exceeds capacity, resulting in stop-and-go conditions for extended periods of time). A substantial increase in LOS F-impacted per capita VMT is defined as greater than 5 percent.	**2.1(a)** MTC, in its role as the Bay Area Toll Authority (BATA), shall pursue an additional peak period bridge toll on the San Francisco Oakland Bay Bridge to discourage vehicle travel during weekday peak periods, shifting travelers to other times of day or other modes. **2.1(b)** MTC and the BAAQMD shall proceed with implementation of the region’s commute benefit ordinance authorized by Senate Bill 1339, which affects all major employers (with more than 50 employees), and discourages auto-based commute travel. **2.1(c)** MTC shall pursue a policy that requires the implementation of ramp metering throughout the region's highway network as a condition of discretionary funding.	*Significant and Unavoidable*
2.1-4	Implementation of the proposed Plan could result in a substantial increase in per capita VMT compared to existing conditions. A substantial increase in per capita VMT is defined as greater than 5 percent.	None required.	*No Adverse Impact*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
2.1-5	Implementation of the proposed Plan could result in increased percent utilization of regional transit supply resulting in an exceedance of transit capacity at AM peak hours, at PM peak hours, or for the day. An exceedance is defined as passenger seat-mile demand for any transit technology being greater than 80 percent of passenger seat-miles supplied by transit operators.	None required.	*No Adverse Impact*
Air Quality			
2.2-1(a)	Implementation of the proposed Plan could conflict with or obstruct implementation of the primary goals of an applicable air quality plan.	None required.	*Less than Significant*
2.2-1(b)	Implementation of the proposed Plan could conflict with or obstruct implementation of applicable control measures of an applicable air quality plan.	None required.	*Less than Significant*
2.2-1(c)	Implementation of the proposed Plan could conflict with or obstruct implementation of any control measures in an applicable air quality plan.	None required.	*Less than Significant*
2.2-2	Implementation of the proposed Plan could result in a substantial net increase in construction-related emissions.	**2.2(a)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to best management practices (BMPs), such as the following:[2]	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation*

[2] Adapted from BAAQMD, CEQA Air Quality Guidelines (May 2011)

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		Construction Best Practices for Exhaust • The applicant/general contractor for the project shall submit a list of all off-road equipment greater than 25 hp that will be operating for more than 20 hours over the entire duration of the construction activities at the site, including equipment from subcontractors, to BAAQMD for review and certification. The list shall include all of the information necessary to ensure the equipment meets the following requirement: – All off-road equipment shall have: 1) engines that meet or exceed either USEPA or ARB Tier 2 off-road emission standards; and 2) engines are retrofitted with an ARB Level 3 Verified Diesel Emissions Control Strategy (VDECS), if one is available for the equipment being used.[3] • Idling time of diesel powered construction equipment and trucks shall be limited to no more than two minutes. Clear signage shall be provided for construction workers at all access points. • All construction equipment shall be maintained and properly tuned in accordance with the manufacturers' specifications. • Portable diesel generators shall be prohibited. Grid power electricity should be used to provide power at construction sites; or propane and natural gas generators may be used when grid power electricity is not feasible. **Construction Best Practices for Dust** • All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. For projects over 5 acres of size, soil moisture	*Measures: Less than Significant with Mitigation*

[3] Equipment with engines meeting Tier 4 Interim or Tier 4 Final emission standards automatically meet this requirement, therefore a VDECS would not be required.

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		should be maintained at 12 percent. Moisture content can be verified by lab samples or moisture probe. • All haul trucks transporting soil, sand, or other loose material off-site shall be covered. • All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping should be done in conjunction with thorough watering of the subject roads. • All vehicle speeds on unpaved roads shall be limited to 15 mph. • All roadway, driveway, and sidewalk paving shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading. • All construction sites shall provide a posted sign visible to the public with the telephone number and person to contact at the Lead Agency regarding dust complaints. The recommended response time for corrective action shall be within 48 hours. BAAQMD's Complaint Line (1-800 334- 6367) shall also be included on posted signs to ensure compliance with applicable regulations. • All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph. • Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity. • Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		• The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time. • All trucks and equipment, including their tires, shall be washed off prior to leaving the site. • Site accesses to a distance of 100 feet from the paved road shall be treated with a six- to 12-inch compacted layer of wood chips, mulch, or gravel. • Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than 1 percent.	
2.2-3(a)	Implementation of the proposed Plan could cause a net increase in emissions of criteria pollutants ROG, NO_x, CO, and $PM_{2.5}$ from on-road mobile sources compared to existing conditions.	None required.	*No Adverse Impact*
2.2-3(b)	Implementation of the proposed Plan could cause a net increase in emissions of PM_{10} from on-road mobile sources compared to existing conditions.	**2.2(b)** MTC and ABAG, in partnership with BAAQMD, and other partners who would like to participate, shall work to leverage existing air quality and transportation funds and seek additional funds to continue to implement BAAQMD and ARB programs aimed at retrofits and replacements of trucks and locomotives. **2.2(c)** MTC and ABAG, in partnership with BAAQMD and the Port of Oakland, and other partners who would like to participate, shall work together to secure incentive funding that may be available through the Carl Moyer Memorial Air Quality Standards Attainment Program to reduce port-related emissions. Mitigation Measures 2.1 (a), 2.1(b), and 2.1 (c) (included in Chapter 2.1, Transportation) as well as 2.2 (d) and 2.2 (e) (included below	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		under Impacts 2.2-5(b) and 2.2-6) could help reduce the increase in PM10.	
2.2-4	Implementation of the proposed Plan could cause a cumulative net increase in emissions of diesel PM, 1,3-butadiene, and benzene (toxic air contaminants) from on-road mobile sources compared to existing conditions.	None required.	*No Adverse Impact*
2.2-5(a)	Implementation of the proposed Plan could cause a localized net increase in sensitive receptors located in Transit Priority Project (TPP) corridors where TACs or fine particulate matter ($PM_{2.5}$) concentrations result in a cancer risk greater than 100/million or a concentration of $PM_{2.5}$ greater than 0.8 μg/m.[3]	Implement Mitigation Measure 2.2(d) under Impact 2.2-5(b).	*Significant and Unavoidable*
2.2.5(b)	Implementation of the proposed Plan could cause a localized net increase in sensitive receptors located in Transit Priority Project (TPP) corridors within set distances (Table 2.2-10) to mobile or stationary sources of TAC or $PM_{2.5}$ emissions.	**2.2(d)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to best management practices (BMPs), such as the following: • Installation of air filtration to reduce cancer risks and PM exposure for residents, and other sensitive populations, in buildings that are in close proximity to freeways, major roadways, diesel generators, distribution centers, railyards, railroads or rail stations, and ferry terminals. Air filter devices shall be rated MERV-13 or higher. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required. • Phasing of residential developments when proposed within 500 feet of freeways such that homes nearest the freeway are built last, if feasible.	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		• Sites shall be designed to locate sensitive receptors as far as possible from any freeways, roadways, diesel generators, distribution centers, and railyards. Operable windows, balconies, and building air intakes shall be located as far away from these sources as feasible. If near a distribution center, residents shall not be located immediately adjacent to a loading dock or where trucks concentrate to deliver goods. • Limiting ground floor uses in residential or mixed-use buildings that are located within the set distance of 500 feet to a non-elevated highway or roadway. Sensitive land uses, such as residential units or day cares, shall be prohibited on the ground floor. • Planting trees and/or vegetation between sensitive receptors and pollution source, if feasible. Trees that are best suited to trapping PM shall be planted, including one or more of the following: Pine (Pinus nigra var. maritima), Cypress (X Cupressocyparis leylandii), Hybrid popular (Populus deltoids X trichocarpa), and Redwoods (Sequoia sempervirens). • Within developments, sensitive receptors shall be separated as far away from truck activity areas, such as loading docks and delivery areas, as feasible. Loading dock shall be required electrification and all idling of heavy duty diesel trucks at these locations shall be prohibited. • If within the project site, diesel generators that are not equipped to meet ARB's Tier 4 emission standards shall be replaced or retrofitted. • If within the project site, emissions from diesel trucks shall be reduced through the following measures:	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		– Installing electrical hook-ups for diesel trucks at loading docks. – Requiring trucks to use Transportation Refrigeration Units (TRU) that meet Tier 4 emission standards. – Requiring truck-intensive projects to use advanced exhaust technology (e.g. hybrid) or alternative fuels. – Prohibiting trucks from idling for more than two minutes as feasible. • Establishing truck routes to avoid residential neighborhoods or other land uses serving sensitive populations. A truck route program, along with truck calming, parking and delivery restrictions, shall be implemented to direct traffic activity at non permitted sources and large construction projects.	
2.2-5(c)	Implementation of the proposed Plan could cause a localized net increase in sensitive receptors located in Transit Priority Project (TPP) corridors where TACs or fine particulate matter ($PM_{2.5}$) concentrations result in noncompliance with an adopted Community Risk Reduction Plan.	None required.	*Less than Significant*
2.2-6	Implementation of the proposed Plan could result in a localized larger increase or smaller decrease of TACs and or $PM_{2.5}$ emissions in disproportionally impacted communities compared to the remainder of the Bay Area communities.	**2.2(e)** MTC/ABAG shall partner with BAAQMD to develop a program to install air filtration devices in existing residential buildings, and other buildings with sensitive receptors, located near freeways or sources of TACs and $PM_{2.5}$. **2.2(f)** MTC/ABAG shall partner with BAAQMD to develop a program to provide incentives to replace older locomotives and trucks in the region to reduce TACs and $PM_{2.5}$. In addition, Mitigation Measures 2.1 (a), 2.1(b), and 2.1 (c) (included in *Chapter 2.1, Transportation*) and 2.2 (d) (included under Impact	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		2.2-5(b)) could help reduce TAC and $PM_{2.5}$ emissions.	
Land Use and Physical Development			
2.3-1	Implementation of the proposed Plan could result in residential or business disruption or displacement of substantial numbers of existing population and housing.	**2.3(a)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Regulating construction operations on existing facilities to minimize traffic disruptions and detours, and to maintain safe traffic operations. • Ensuring construction operations are limited to regular business hours where feasible. • Controlling construction dust and noise. See "Construction Best Practices for Dust" under Mitigation Measure 2.2(a) in *Chapter 2.2: Air Quality*. • Controlling erosion and sediment transport in stormwater runoff from construction sites. See "Construction Best Practices for Dust" under Mitigation Measure 2.2(a) in *Chapter 2.2: Air Quality*. • Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce short-term disruption and displacement. Mitigation Measure 2.2(a) in *Chapter 2.2: Air Quality* includes additional applicable measures related to this impact, and is included here by reference. **2.3(b)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		• Developing pedestrian and bike connectors across widened sections of roadway; • Using sidewalk, signal, and signage treatments to improve the pedestrian connectivity across widened sections of roadway; • Using site redesign or corridor realignment, where feasible, to avoid land use disruption; and • Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce long-term disruption and displacement. **2.3(c)** Through regional programs, such as MTC/ABAG's Priority Development Area (PDA) Planning Program, MTC/ABAG shall continue to support the adoption of local zoning and design guidelines that encourage pedestrian and transit access, infill development, and vibrant neighborhoods.	
2.3-2	Implementation of the proposed Plan could result in permanent alterations to an existing neighborhood or community by separating residences from community facilities and services, restricting access to commercial or residential areas, or eliminating community amenities.	**2.3(d)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. All new transportation projects shall be required to incorporate design features such as sidewalks, bike lanes, and bike/pedestrian bridges or tunnels that maintain or improve access and connections within existing communities and to public transit. Implementing agencies shall require project sponsors to comply with existing local regulations and policies that exceed or reasonably replace measures that reduce community separation. **2.3(e)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. New development projects shall be required to provide connectivity for all modes such that new development does not separate existing uses, and improves access	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		where needed and/or feasible, by incorporating 'complete streets' design features such as pedestrian-oriented streets and sidewalks, improved access to transit, and bike routes where appropriate. Implementing agencies shall require project sponsors to comply with existing local regulations and policies that exceed or reasonably replace measures that reduce community separation. **2.3(f)** Through regional programs such as the OneBayArea Grants (OBAG), MTC/ABAG shall continue to support planning efforts for locally sponsored traffic calming and alternative transportation initiatives, such as paths, trails, overcrossings, bicycle plans, and the like that foster improved neighborhoods and community connections. Mitigation Measures 2.3(a), 2.3(b), and 2.3(c) outlined for Impact 2.3-1 would also reduce community separation impacts.	
2.3-3	Implementation of the proposed Plan could conflict substantially with the land use portion of adopted local general plans or other applicable land use plans, including specific plans, existing zoning, or regional plans such as coastal plans or the Bay Plan.	None required.	*Less than Significant*
2.3-4	Implementation of the proposed Plan could convert substantial amounts of important agricultural lands and open space or lands under Williamson Act contract to non-agricultural use.	**2.3(g)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Requiring project relocation or corridor realignment, where feasible, to avoid farmland, especially Prime Farmland; • Acquiring conservation easements on land at least equal in quality and size as partial compensation for the direct loss of agricultural land;	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		• Maintain and expand agricultural land protections such as urban growth boundaries; • If a Williamson Act contract is terminated, a ratio greater than 1:1 of land equal in quality shall be set aside in a conservation easement, as recommended by the Department of Conservation; • Instituting new protection of farmland in the project area or elsewhere in the County through the use of less than permanent long-term restrictions on use, such as 20-year Farmland Security Zone contracts (Government Code Section 51296 et seq.) or 10-year Williamson Act contracts (Government Code Section 51200 et seq.); • Assessing mitigation fees that support the commercial viability of the remaining agricultural land in the project area, County, or region through a mitigation bank that invests in agricultural infrastructure, water supplies, marketing, etc.; • Minimizing severance and fragmentation of agricultural land by constructing underpasses and overpasses at reasonable intervals to provide property access; • Requiring agricultural enhancement investments such as supporting farmer education on organic and sustainable practices, assisting with organic soil amendments for improved production, and upgrading irrigation systems for water conservation; • Requiring berms, buffer zones, setbacks, and fencing to reduce use conflicts between new development and farming uses and to protect the functions of farmland; and • Requiring other conservation tools available from the California Department of Conservation's Division of Land Resource Protection.	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		• Requiring compliance with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce farmland conversion. **2.3(h)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Requiring project relocation or corridor realignment, where feasible, to avoid protected open space. • Requiring conservation easements on land at least equal in quality and size as partial compensation for the direct loss of protected open space. • Maintain and expand open space protections such as urban growth boundaries. • Requiring compliance with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce open space conversion.	
2.3-5	Implementation of the proposed Plan could result in the loss of forest land, conversion of forest land to non-forest use, or conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production.	**2.3(i)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project- and site-specific considerations include, but are not limited to: • Requiring project relocation or corridor realignment, where feasible, to avoid timberland or forest land. • Requiring conservation easements on land at least equal in quality and size as partial compensation for the direct loss of timberland or forest land. • Requiring compliance with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce forest land conversion.	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
Energy			
2.4-1	Implementation of the proposed Plan could result in an increase in per-capita direct and indirect energy consumption compared to existing conditions.	None required.	*Less than Significant*
2.4-2	Implementation of the proposed Plan could be inconsistent with adopted plans or policies related to energy conservation.	None required.	*No Adverse Impact*
Climate Change and Greenhouse Gases			
2.5-1	Implementation of the proposed Plan could fail to reduce per capita passenger vehicle and light duty truck CO_2 emissions by 7 percent by 2020 and by 15 percent by 2035 as compared to 2005 baseline, per SB 375.	None required.	*No Adverse Impact*
2.5-2	Implementation of the proposed Plan could result in a net increase in direct and indirect GHG emissions in 2040 when compared to existing conditions.	None required.	*No Adverse Impact*
2.5-3	Implementation of the proposed Plan could substantially impede attainment of goals set forth in Executive Order S-3-05 and Executive Order B-16-2012.	None required.	*Less than Significant*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
2.5-4	Implementation of the proposed Plan could substantially conflict with any other applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.	None required.	*No Adverse Impact*
2.5-5	Implementation of the proposed Plan may result in a net increase in transportation investments within areas regularly inundated by sea level rise by midcentury.	**2.5(a)** MTC and ABAG shall continue coordinating with BCDC, in partnership with the Joint Policy Committee and regional agencies and other partners who would like to participate, to conduct vulnerability and risk assessments for the region's transportation infrastructure. These assessments will build upon MTC and BCDC's Adapting to Rising Tides Transportation Vulnerability and Risk Assessment Pilot Project focused in Alameda County. Evaluation of regional and project-level vulnerability and risk assessments will assist in the identification of the appropriate adaptation strategies to protect transportation infrastructure and resources, as well as land use development projects, that are likely to be impacted and that are a priority for the region to protect. The Adaptation Strategy sub-section found at the end of this section includes a list of potential adaptation strategies that can mitigate the impacts of sea level rise. In most cases, more than one adaptation strategy will be required to protect a given transportation project or land use development project, and the implementation of the adaptation strategy will require coordination with other agencies and stakeholders. As MTC and ABAG conduct vulnerability and risk assessments for the region's transportation infrastructure, the Adaptation Strategy sub-section should serve as a guide for selecting adaptation strategies, but the list should not be considered all inclusive of all potential adaptation strategies as additional strategies not included in this list may also have the potential to reduce significant impacts. **2.5(b)** MTC and ABAG shall work with the Joint Policy Committee to create a regional sea level rise adaptation strategy for the Bay Area.	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below. **2.5(c)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. The project sponsors and implementing agencies shall coordinate with BCDC, Caltrans, local jurisdictions (cities and counties), and other transportation agencies to develop Transportation Asset Management Plans (TAMPs) that consider the potential impacts of sea level rise over the asset's life cycle. **2.5(d)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Executive Order S-13-08 requires all state agencies, including Caltrans, to incorporate sea level rise into planning for all new construction and routine maintenance projects; however, no such requirement exists for local transportation assets and development projects. Implementing agencies shall require project sponsors to incorporate the appropriate adaptation strategy or strategies to reduce the impacts of sea level rise on specific transportation and land use development projects where feasible based on project- and site-specific considerations. Potential adaptation strategies are included in the Adaptation Strategy sub-section found at the end of this section.	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
2.5-6	Implementation of the proposed Plan may result in a net increase in the number of people residing within areas regularly inundated by sea level rise by midcentury.	Implement Mitigation Measures 2.5(b) and 2.5(d).	*Significant and Unavoidable*
2.5-7	Implementation of the proposed Plan may result in an increase in land use development within areas regularly inundated by sea level rise by midcentury.	Implement Mitigation Measures 2.5(b) and 2.5(d).	*Significant and Unavoidable*
Noise			
2.6-1	Implementation of the proposed Plan could result in exposure of persons to or generation of temporary construction noise levels and/or groundborne vibration levels in excess of standards established by local jurisdictions or transportation agencies.	**2.6(a)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Implementing agencies shall require one or more of the following set of noise attenuation measures under the supervision of a qualified acoustical consultant: • Restricting construction activities to permitted hours as defined under local jurisdiction regulations;(e.g.; Alameda County Code restricts construction noise to between 7:00 am and 7:00 pm on weekdays and between 8:00 am and 5:00 pm on weekends) • Properly maintaining construction equipment and outfitting construction equipment with the best available noise suppression devices (e.g. mufflers, silencers, wraps); • Prohibiting idling of construction equipment for extended periods of time in the vicinity of sensitive receptors; • Locating stationary equipment such as generators, compressors, rock crushers, and cement mixers as far from sensitive receptors as possible;	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		• Erecting temporary plywood noise barriers around the construction site when adjacent occupied sensitive land uses are present within 75 feet; • Implementing "quiet" pile-driving technology (such as pre-drilling of piles and the use of more than one pile driver to shorten the total pile driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions; • Using noise control blankets on building structures as buildings are erected to reduce noise emission from the site; and • Using cushion blocks to dampen impact noise from pile driving. **2.6(b)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following vibration attenuation measures under the supervision of a qualified acoustical consultant if pile-driving and/or other potential vibration-generating construction activities are to occur within 60 feet of a historic structure. • The project sponsors shall engage a qualified geotechnical engineer and qualified historic preservation professional and/or structural engineer to conduct a pre-construction assessment of existing subsurface conditions and the structural integrity of nearby (within 60 feet) historic structures subject to pile-driving activity. If recommended by the pre-construction assessment, for structures or facilities within 60 feet of pile-driving activities, the project sponsors shall require groundborne vibration monitoring of nearby historic structures. Such methods and technologies shall be based on the specific conditions at the construction site such as, but not limited to, the pre-construction surveying of	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		potentially affected historic structures and underpinning of foundations of potentially affected structures, as necessary. • The pre-construction assessment shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of pile-driving activities and identify corrective measures to be taken should monitored vibration levels indicate the potential for building damage. In the event of unacceptable ground movement with the potential to cause structural damage, all impact work shall cease and corrective measures shall be implemented to minimize the risk to the subject, or adjacent, historic structure. **2.6(c)** To mitigate pile-driving vibration impacts related to human annoyance, the implementing agency shall require project sponsors to implement Mitigation Measure 2.6(a) above where feasible based on project- and site-specific considerations.	
2.6-2	Implementation of the proposed Plan could result in increased traffic volumes that could result in roadside noise levels that approach or exceed the FHWA Noise Abatement Criteria.	**2.6(d)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Adjustments to proposed roadway or transit alignments to reduce noise levels in noise sensitive areas. For example, below-grade roadway alignments can effectively reduce noise levels in nearby areas. • Techniques such as landscaped berms, dense plantings, reduced-noise paving materials, and traffic calming measures in the design of their transportation improvements. • Contributing to the insulation of buildings or construction of noise barriers around sensitive receptor properties adjacent to the transportation improvement;	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		• Use land use planning measures, such as zoning, restrictions on development, site design, and buffers to ensure that future development is noise compatible with adjacent transportation facilities and land uses; • Construct roadways so that they are depressed below-grade of the existing sensitive land uses to create an effective barrier between new roadway lanes, roadways, rail lines, transit centers, park-n-ride lots, and other new noise generating facilities; and • Maximize the distance between noise-sensitive land uses and new noise-generating facilities and transportation systems.	
2.6-3	Implementation of the proposed Plan could result in increased noise exposure from transit sources that exceed FTA exposure thresholds.	**2.6(e)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. When finalizing a development project's site plan, the implementing agency shall require that project sponsors locate noise-sensitive outdoor use areas away from adjacent noise sources and shield noise-sensitive spaces with buildings or noise barriers whenever possible to reduce the potential significant impacts with regard to exterior noise exposure for new sensitive receptors. **2.6(f)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. When finalizing a land use development's site plan or a transportation project's design, the implementing agency shall ensure that sufficient setback between occupied structures and the railroad tracks is provided. **2.6(g)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		not limited to the following. Prior to project approval, the implementing agency for a transportation project shall ensure that the transportation project sponsor applies the following mitigation measures to achieve a site-specific exterior noise performance standard as indicated in Figure 2.6-6 at sensitive land uses, as applicable for rail extension projects: • Using sound reduction barriers such as landscaped berms and dense plantings; • Locating rail extension below grade; • Using methods to resilient damped wheels; • Using vehicle skirts; • Using under car acoustically absorptive material; and • Installing sound insulation treatments for impacted structures.	
2.6-4	Implementation of the proposed Plan could result in increased vibration exposure from transit sources that exceed FTA exposure thresholds.	**2.6(h)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. When finalizing a development or transportation project's site plan, the implementing agency shall ensure that sufficient setback between occupied structures and the railroad tracks is provided. To meet the 72 VdB limit for the maximum measured train vibration level, residential buildings should be setback a minimum of 65 feet from the center of the nearest track. Alternatively, a reduced setback may be attainable if the project sponsor can demonstrate a project-specific vibration exposure meeting a performance standard of 72 VdB. Depending on specific project conditions, this standard may be attainable without additional mitigation measures or may require applied mitigation such as use of elastomeric pads in the building foundation.	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		2.6(i) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project- and site-specific considerations include, but are not limited to the following. Prior to project approval the implementing shall ensure that project sponsors apply the following mitigation measures to achieve a vibration performance standard of 72 VdB at residential land uses, as feasible, for rail extension projects: • Using high resilience (soft) direct fixation fasteners for embedded track; • Installing Ballast mat for ballast and tie track.	
2.6-5	Implementation of the proposed Plan could result in increased noise exposure from aircraft or airports.	None required.	*Less than Significant*
Geology and Seismicity			
2.7-1	Implementation of the proposed Plan may expose people or structures to substantial risk of property loss, injury or death related to fault rupture.	**2.7(a)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce impacts related to fault rupture, implementing agencies shall require project sponsors to comply with provisions of the Alquist-Priolo Act (Act) for project sites located within or across an Alquist-Priolo Hazard Zone. Project sponsors shall prepare site-specific fault identification investigations conducted by licensed geotechnical professionals in accordance with the requirements of the Act as well as any existing local or Caltrans regulations and policies that exceed or reasonably replace any of the Act requirements. Structures intended for human occupancy (defined as a structure that might be occupied a minimum of 2,000 hours per year) shall be located a minimum distance of 50 feet from any identified active fault traces. For the purposes of this mitigation, less than significant means consistent	*Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		with federal, state, and local regulations and laws related to development in an Alquist-Priolo Hazard Zone.	
2.7-2	Implementation of the proposed Plan may expose people or structures to substantial risk related to ground shaking.	**2.7(b)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce impacts related to ground shaking, implementing agencies shall require project sponsors to comply with the most recent version of the California Building Code (CBC). Proposed improvements shall comply with Chapter 16, Section 1613 of the CBC which provides earthquake loading specifications for every structure and associated attachments that must also meet the seismic criteria of Associated Society of Civil Engineers (ASCE) Standard 07-05. In order to determine seismic criteria for proposed improvements, geotechnical investigations shall be prepared by state licensed engineers and engineering geologists to provide recommendations for site preparation and foundation design as required by Chapter 18, Section 1803 of the CBC. Geotechnical investigations shall also evaluate hazards such as liquefaction, lateral spreading, landslides, and expansive soils in accordance with CBC requirements and Special Publication 117A, where applicable. Recommended corrective measures, such as structural reinforcement and replacing native soils with engineered fill, shall be incorporated into project designs. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to building construction.	*Less than Significant with Mitigation*
2.7-3	Implementation of the proposed Plan may expose people or structures to substantial risk from seismic-related ground failure, including liquefaction.	Implement Mitigation Measure 2.7(b).	*Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
2.7-4	Implementation of the proposed Plan may expose people or structures to substantial risk related to landslides.	Implement Mitigation Measure 2.7(b).	*Less than Significant with Mitigation*
2.7-5	Implementation of the proposed Plan may result in substantial soil erosion or the loss of topsoil.	**2.7(c)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce the risk of soil erosion, implementing agencies shall require project sponsors to comply with National Pollution Discharge Elimination System (NPDES) General Construction Permit requirements. Implementing agencies shall require project sponsors, as part of contract specifications with contractors, to prepare and implement best management practices (BMPs) as part of a Storm Water Pollution Prevention Plan that include erosion control BMPs consistent with California Stormwater Quality Association Handbook for Construction. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to construction practices.	*Less than Significant with Mitigation*
2.7-6	Implementation of the proposed Plan may locate a subsequent development project on a geologic unit or soil that is unstable, contains expansive properties, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.	Implement Mitigation Measure 2.7(b).	*Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
Water Resources			
2.8-1	Implementation of the proposed Plan may violate water quality standards or waste or stormwater discharge requirements.	**2.8(a)** To reduce the impact associated with potential water quality standards violations or waste or stormwater discharge requirement violations, implementing agencies shall require project sponsors to comply with the State, and federal water quality regulations for all projects that would alter existing drainage patterns in accordance with the relevant regulatory criteria including but not limited to the National Pollution Discharge Elimination System (NPDES) program, Provision C.3, and any applicable Stormwater Management Plans. Erosion control measures shall be consistent with NPDES General Construction Permit requirements including preparation and implementation of a Stormwater Pollution Prevention Plan, and final drainage plans shall be consistent with the San Francisco Regional MS4 NPDES permit or any applicable local drainage control requirements that exceed or reasonably replace any of these measures to project receiving waters from pollutants. Implementing agencies shall require project sponsors to commit to best management practices (BMPs) that would minimize or eliminate existing sources of polluted runoff during both construction and operational phases of the project. Implementing agencies shall require projects to comply with design guidelines established in the Bay Area Stormwater Management Agencies Association's Using Start at the Source to Comply with Design Development Standards and the California Stormwater Quality Association's California Stormwater Best Management Practice Handbook for New Development and Redevelopment to minimize both increases in the volume and rate of stormwater runoff, and the amount of pollutants entering the storm drain system. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to water quality or stormwater management.	*Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project- and site-specific considerations include, but are not limited to: **Construction** • Limiting excavation and grading activities to the dry season (April 15 to October 15) to the extent possible in order to reduce the chance of severe erosion from intense rainfall and surface runoff, as well as the potential for soil saturation in swale areas. • Regulating stormwater runoff from the construction area through a stormwater management/erosion control plan that may include temporary on-site silt traps and/or basins with multiple discharge points to natural drainages and energy dissipaters if excavation occurs during the rainy season. This control plan should include requirements to cover stockpiles of loose material, divert runoff away from exposed soil material, locate and operate sediment basin/traps to minimize the amount of offsite sediment transport, and removing any trapped sediment from the basin/ trap for placement at a suitable location on-site, away from concentrated flows, or removal to an approved disposal site. • Providing temporary erosion control measures until perennial revegetation or landscaping is established and can minimize discharge of sediment into receiving waterways. • Providing erosion protection on all exposed soils either by revegetation or placement of impervious surfaces after completion of grading. Revegetation shall be facilitated by mulching, hydroseeding, or other methods and initiated as soon as possible after completion of grading and prior to the onset of the rainy season (by October 15).	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		• Using permanent revegetation/landscaping, emphasizing drought-tolerant perennial ground coverings, shrubs, and trees. • Ensuring BMPs are in place and operational prior to the onset of major earthwork on the site. The construction phase facilities shall be maintained regularly and cleared of accumulated sediment as necessary. • Storing hazardous materials such as fuels and solvents used on the construction sites in covered containers and protected from rainfall, runoff, and vandalism. A stockpile of spill cleanup materials shall be readily available at all construction sites. Employees shall be trained in spill prevention and cleanup, and individuals should be designated as responsible for prevention and cleanup activities. **Operation** • Designing drainage of roadway and parking lot runoff, wherever possible to run through grass median strips which are contoured to provide adequate storage capacity and to provide overland flow, detention, and infiltration before runoff reaches culverts, or into detention basins. Facilities such as oil and sediment separators or absorbent filter systems should be designed and installed within the storm drainage system to provide filtration of stormwater prior to discharge and reduce water quality impacts whenever feasible. • Implementing an erosion control and revegetation program designed to allow re-establishment of native vegetation on slopes in undeveloped areas as part of the long-term sediment control plan. • Using alternate discharge options to protect sensitive fish and wildlife populations in areas where habitat for fish and other wildlife would be threatened by transportation facility discharge.	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		Maintenance activities over the life of the project shall include use of heavy-duty sweepers, with disposal of collected debris in sanitary landfills to effectively reduce annual pollutant loads where appropriate. Catch basins and storm drains shall be cleaned and maintained on a regular basis. • Using Integrated Pest Management techniques (methods that minimize the use of potentially hazardous chemicals for landscape pest control and vineyard operations) in landscaped areas. The handling, storage, and application of potentially hazardous chemicals shall take place in accordance with all applicable laws and regulations.	
2.8-2	Implementation of the proposed Plan may substantially interfere with or reduce rates of groundwater recharge due to the increased amount of impervious surfaces, such that there would be a net deficit in aquifer volume or a lowering of the groundwater table.	None required.	*Less than Significant*
2.8-3	Implementation of the proposed Plan may increase erosion by altering the existing drainage patterns of a site, contributing to sediment loads of streams and drainage facilities, and thereby affecting water quality.	Implement Mitigation Measure 2.8(a)	*Less than Significant with Mitigation*
2.8-4	Implementation of the proposed Plan may increase non-point pollution of stormwater runoff due to litter, fallout from airborne particulate emissions, or discharges of vehicle residues, including petroleum hydrocarbons and metals that would impact the quality of receiving waters.	Implement Mitigation Measure 2.8(a)	*Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
2.8-5	Implementation of the proposed Plan may increase non-point-source pollution of stormwater runoff from construction sites due to discharges of sediment, chemicals, and wastes to nearby storm drains and creeks.	Implement Mitigation Measure 2.8(a)	*Less than Significant with Mitigation*
2.8-6	Implementation of the proposed Plan may increase rates and amounts of runoff due to additional impervious surfaces, higher runoff values for cut-and-fill slopes, or alterations to drainage systems that could cause potential flood hazards and effects on water quality.	Implement Mitigation Measure 2.8(a)	*Less than Significant with Mitigation*
2.8-7	Implementation of the proposed Plan may place within a 100-year flood hazard area structures which would impede or redirect flows.	**2.8(b)** To reduce the impact of flood hazards, implementing agencies shall conduct or require project-specific hydrology studies for projects proposed to be constructed within floodplains to demonstrate compliance with Executive Order 11988, the National Flood Insurance Program, National Flood Insurance Act, Caltrans Highway Design Manual, Cobey-Alquist Floodplain Management Act, as well as any further Federal Emergency Management Agency (FEMA) or State requirements that are adopted at the local level. These studies shall identify project design features or mitigation measures that reduce impacts to either floodplains or flood flows to a less than significant level such as requiring minimum elevations for finished first floors, typically at least one foot above the 100-year base flood elevation, where feasible based on project- and site-specific considerations. For the purposes of this mitigation, less than significant means consistent with these federal, State, and local regulations and laws related to development in the floodplain. Local jurisdictions shall, to the extent feasible, appropriate, and consistent with local policies, prevent development in flood hazard areas that do not have demonstrable protections.	*Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
2.8-8	Implementation of the proposed Plan may expose people to a significant risk of loss, injury, or death involving flooding (including flooding as a result of the failure of a levee or dam), seiche, tsunami, or mudflow.	None required.	*Less than Significant*
Biological Resources			
2.9-1a	Implementation of the proposed Plan could have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.	**2.9(a)** Implementing agencies shall require project sponsors to prepare biological resources assessments for specific projects proposed in areas containing, or likely to contain, habitat for special-status plants and wildlife. The assessment shall be conducted by qualified professionals pursuant to adopted protocols and agency guidelines. Where the biological resources assessment establishes that mitigation is required to avoid direct and indirect adverse effects on special-status plant and wildlife species, mitigation shall be developed consistent with the requirements of CEQA, USFWS, and CDFW regulations and guidelines, in addition to requirements of any applicable and adopted HCP/NCCP or other applicable plans developed to protect species or habitat. Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • In support of CEQA, NEPA, CDFW and USFWS permitting processes for individual Plan Bay Area projects, biological surveys shall be conducted as part of the environmental review process to determine the presence and extent of sensitive habitats and/or species in the project vicinity. Surveys shall follow established methods and shall be undertaken at times when the subject species is most likely to be identified. In cases where impacts to State- or federal-listed plant or wildlife species are possible, formal protocol-level surveys may be required on a species-by-species basis to determine the local distribution of these species. Consultation with the USFWS and/or CDFW shall	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		be conducted early in the planning process at an informal level for projects that could adversely affect federal or State candidate, threatened, or endangered species to determine the need for further consultation or permitting actions. Projects shall obtain incidental take authorization from the permitting agencies as required prior to project implementation. • Project designs shall be reconfigured, whenever practicable, to avoid special-status species and sensitive habitats. Projects shall minimize ground disturbances and construction footprints near sensitive areas to the extent practicable. • Where habitat avoidance is infeasible, compensatory mitigation shall be implemented through preservation, restoration, or creation of special-status wildlife habitat. Loss of habitat shall be mitigated at an agency approved mitigation bank or through individual mitigation sites as approved by USFWS and/or CDFW. Compensatory mitigation ratios shall be negotiated with the permitting agencies. Mitigation sites shall be monitored for a minimum of five consecutive years after mitigation implementation or until the mitigation is considered to be successful. All mitigation areas shall be preserved in perpetuity through either fee ownership or a conservation easement held by a qualified conservation organization or agency, establishment of a preserve management plan, and guaranteed long-term funding for site preservation through the establishment of a management endowment. • Project activities in the vicinity of sensitive resources shall be completed during the period that best avoids disturbance to plant and wildlife species present (e.g., May 15 to October 15 near salmonid habitat and vernal pools) to the extent feasible.	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		• Individual projects shall minimize the use of in-water construction methods in areas that support sensitive aquatic species, especially when listed species could be present. • In the event that equipment needs to operate in any watercourse with flowing or standing water, a qualified biological resource monitor shall be present at all times to alert construction crews to the possible presence of California red-legged frog, nesting birds, salmonids, or other aquatic species at risk during construction operations. • If project activities involve pile driving or vibratory hammering in or near water, interim hydroacoustic threshold criteria for fish shall be adopted as set forth by the Interagency Fisheries Hydroacoustic Working Group, as well as other avoidance methods to reduce the adverse effects of construction to sensitive fish, piscivorous birds, and marine mammal species. • Construction shall not occur during the breeding season near riparian habitat, freshwater marshlands, and salt marsh habitats that support nesting bird species protected under the Endangered Species Act, Migratory Bird Treaty Act, or California Fish and Game Code (e.g., yellow warbler, tricolored blackbird, California clapper rail, etc.). • A qualified biologist shall locate and fence off sensitive resources before construction activities begin and, where required, shall inspect areas to ensure that barrier fencing, stakes, and setback buffers are maintained during construction. • For work sites located adjacent to special-status plant or wildlife populations, a biological resource education program shall be provided for construction crews and contractors (primarily crew and construction foremen) before construction activities begin.	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		• Biological monitoring shall be particularly targeted for areas near identified habitat for federal- and state-listed species, and a "no take" approach shall be taken whenever feasible during construction near special-status plant and wildlife species. • Efforts shall be made to minimize the negative effects of light and noise on listed and sensitive wildlife. • Compliance with existing local regulations and policies, including applicable HCP/NCCPs, that exceed or reasonably replace any of the above measures protective of special-status species.	
2.9-1b	Implementation of the proposed Plan could have substantial adverse impacts on designated critical habitat for federally listed plant and wildlife species.	**2.9(b)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Informal consultation with the USFWS and/or NMFS shall be conducted early in the environmental review process to determine the need for further mitigation, consultation, or permitting actions. Formal consultation is required for any project with a federal nexus. • Project designs shall be reconfigured to avoid or minimize adverse effects on the primary constituent elements of designated critical habitats when they are present in a project vicinity. • Compliance with existing local regulations and policies, including applicable HCP/NCCPs. that exceed or reasonably replace any of the above measures protective of critical habitat. Additionally, implementation of Mitigation Measure 2.9(a), above, which includes an initial biological resource assessment and, if	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		necessary, compensatory mitigation for loss of habitat, is expected to reduce impacts on critical habitat.	
2.9-1c	Implementation of the proposed Plan could result in construction activities that could adversely affect non-listed nesting raptor species considered special-status by CDFW under CDFW Code 3503.5 and non-listed nesting bird species considered special-status by the USFWS under the federal Migratory Bird Treaty Act, and by CDFW under CDFW Code 3503 and 3513.	**2.9(c)** Implementing agencies shall require project sponsors to conduct a pre-construction breeding bird surveys for specific projects proposed in areas containing, or likely to contain, habitat for nesting birds. The survey shall be conducted by appropriately trained professionals pursuant to adopted protocols agency guidelines. Where a breeding bird survey establishes that mitigation is required to avoid direct and indirect adverse effects on nesting raptors and other protected birds, mitigation will be developed consistent with the requirements of CEQA, USFWS, and CDFW regulations and guidelines, in addition to requirements of any applicable and adopted HCP/NCCP or other applicable plans developed to protect species or habitat. Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Perform preconstruction surveys not more than two weeks prior to initiating vegetation removal and/or construction activities during the breeding season (i.e., February 1 through August 31). • Establish a no-disturbance buffer zone around active nests during the breeding season until the young have fledged and are self-sufficient, when no further mitigation would be required. Typically, the size of individual buffers ranges from a minimum of 250 feet for raptors to a minimum of 50 feet for other birds but can be adjusted based on an evaluation of the site by a qualified biologist in cooperation with the USFWS and/or CDFW. • Provide buffers around nests that are established by birds after construction starts. These birds are assumed to be habituated to and tolerant of construction disturbance. However, direct take of nests, eggs, and nestlings is still prohibited and a buffer must be	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		established to avoid nest destruction. If construction ceases for a period of more than two weeks, or vegetation removal is required after a period of more than two weeks has elapsed from the preconstruction surveys, then new nesting bird surveys must be conducted. • Comply with existing local regulations and policies, including applicable HCP/NCCPs, that exceed or reasonably replace any of the above measures protective of nesting birds.	
2.9-2	Implementation of the proposed Plan could have a substantial adverse effect on riparian habitat, federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.), or other sensitive natural communities identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service, through direct removal, filling, hydrological interruption, or other means.	**2.9(d)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Implementing agencies shall require project sponsors to prepare biological resource assessments for specific projects proposed in areas containing, or likely to contain, jurisdictional waters and/or other sensitive or special-status communities. The assessment shall be conducted by qualified professionals in accordance with agency guidelines and standards. The assessment shall identify specific mitigation measures for any impact that exceeds significant impact thresholds and said measures shall be implemented. Mitigation measures shall be consistent with the requirements of CEQA and wetland permitting agencies, and/or follow an adopted HCP/NCCP or other applicable plans promulgated to protect jurisdictional waters or other sensitive habitats. • In keeping with the “no net loss” policy for wetlands and other waters, project designs shall be configured, whenever possible, to avoid wetlands and other waters and avoid disturbances to wetlands and riparian corridors in order to preserve both the habitat and the overall ecological functions of these areas.	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		Projects shall minimize ground disturbances and construction footprints near such areas to the extent practicable. • Where avoidance of jurisdictional waters is not feasible, project sponsors shall minimize fill and the use of in-water construction methods, and only place fill with express permit approval from the appropriate resources agencies (e.g., Corps, RWQCB, CDFW, BCDC, and CCC) and in accordance with applicable existing regulations, such as the Clean Water Act or local stream protection ordinances. • Project sponsors shall arrange for compensatory mitigation in the form of mitigation bank credits, on-site or off-site enhancement of existing waters or wetland creation in accordance with applicable existing regulations and subject to approval by the Corps, RWQCB, CDFW, BCDC, and CCC. If compensatory mitigation is required by the implementing agency, the project sponsor shall develop a restoration and monitoring plan that describes how compensatory mitigation will be achieved, implemented, maintained, and monitored. At a minimum, the restoration and monitoring plan shall include clear goals and objectives, success criteria, specifics on restoration/creation/enhancement (plant palette, soils, irrigation, etc.), specific monitoring periods and reporting guidelines, and a maintenance plan. The following minimum performance standards (or other standards as required by the permitting agencies) shall apply to any wetland compensatory mitigation: – Compensation shall be provided at a *minimum* 1:1 ratio for restoration and preservation, but shall in all cases be consistent with mitigation ratios set forth in locally applicable plans (e.g., general plans, HCP/NCCPs, etc.), or in project-specific permitting documentation. Compensatory mitigation may be a combination of onsite restoration/creation/enhancement, offsite restoration,	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		preservation and/or enhancement, or purchase of mitigation credits. Compensatory mitigation may also be achieved through Regional Advance Mitigation Planning (RAMP) banking, as deemed appropriate by the permitting agencies. – In general, any compensatory mitigation shall be monitored for a minimum of five years and will be considered successful when at least 75 percent cover (or other percent cover considered appropriate for the vegetation type) of installed vegetation has become successfully established. • In accordance with CDFW guidelines and other instruments protective of sensitive or special-status natural communities, project sponsors shall avoid and minimize impacts on sensitive natural communities when designing and permitting projects. Where applicable, projects shall conform to the provisions of special area management or restoration plans, such as the Suisun Marsh Protection Plan or the East Contra Costa County HCP, which outline specific measures to protect sensitive vegetation communities. • If any portion of a special-status natural community is permanently removed or temporarily disturbed, the project sponsor shall compensate for the loss. If such mitigation is required by the implementing agency, the project sponsor shall develop a restoration and monitoring plan that describes how compensatory mitigation will be achieved, implemented, maintained, and monitored. At a minimum, the restoration and monitoring plan shall include clear goals and objectives, success criteria, specifics on restoration/creation/enhancement (plant palette, soils, irrigation, etc.), specific monitoring periods and reporting guidelines, and a maintenance plan. The following minimum performance standards (or other standards as required by the permitting agencies) shall apply to any compensatory mitigation for special-status natural communities:	

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#	Impact	Mitigation Measures	Significance After Mitigation
		– Compensation shall be provided at a *minimum* 1:1 ratio for restoration and preservation, but shall in all cases be consistent with mitigation ratios set forth in locally applicable plans (e.g., general plans, HCP/NCCPs, etc.) or in project-specific permitting documentation. Compensatory mitigation may be a combination of onsite restoration/creation/enhancement, offsite restoration, preservation and/or enhancement, or purchase of mitigation credits. Compensatory mitigation may also be achieved through Regional Advance Mitigation Planning (RAMP) banking, as deemed appropriate by the permitting agencies. – In general, any compensatory mitigation shall be monitored for a minimum of five years and will be considered successful when at least 75 percent cover (or other percent cover considered appropriate for the vegetation type) of installed vegetation has become successfully established. • Compliance with existing local regulations and policies, including applicable HCP/NCCPs. that exceed or reasonably replace any of the above measures protective of jurisdictional wetlands or special-status natural communities.	
2.9-3	Implementation of the proposed Plan could interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites.	**2.9(e)** Mitigation measures to reduce impacts on wildlife corridors that shall be required by implementing agencies where feasible based on project- and site- specific considerations include, but are not limited to the following. Implementing agencies shall require project sponsors to prepare detailed analyses for specific projects affecting ECA lands within their sphere of influence to determine what wildlife species may use these areas and what habitats those species require. Projects that would not affect ECA lands but that are located within or adjacent to open lands, including wildlands and agricultural lands, shall also assess whether or not significant wildlife corridors are present, what wildlife species may use them, and what	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		habitat those species require. The assessment shall be conducted by qualified professionals and according to any applicable agency standards. Mitigation shall be consistent with the requirements of CEQA and/or follow an adopted HCP/NCCP or other relevant plans developed to protect species and their habitat, including migratory linkages. Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project- and site-specific considerations include, but are not limited to: • Constructing wildlife friendly overpasses and culverts; • Fencing major transportation corridors in the vicinity of identified wildlife corridors; • Using wildlife friendly fences that allow larger wildlife such as deer to get over, and smaller wildlife to go under; • Limiting wildland conversions in identified wildlife corridors; and • Retaining wildlife friendly vegetation in and around developments. • Compliance with existing local regulations and policies, including applicable HCP/NCCPs. that exceed or reasonably replace any of the above measures protective of jurisdictional wetlands or special-status natural communities.	
2.9-4	Implementation of the proposed Plan could conflict with adopted local conservation policies, such as a tree protection ordinance, or resource protection and conservation plans, such as a Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other adopted local, regional, or state habitat	**2.9(f)** Implementing agencies shall require project sponsors to prepare biological resources assessments for specific projects proposed in areas containing, or likely to contain, protected trees or other locally protected biological resources. The assessment shall be conducted by qualified professionals in accordance with adopted protocols, and standards in the industry. Mitigation shall be consistent with the requirements of CEQA and/or follow applicable ordinances or plans developed to protect trees or other locally	*Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
	conservation plan.	significant biological resources. Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Mitigation shall be implemented when significance thresholds are exceeded. Mitigation shall be consistent with the requirements of CEQA and/or follow applicable ordinances orb plans developed to protect trees or other locally significant biological resources. • Implementing agencies shall design projects such that they avoid and minimize direct and indirect impacts to protected trees and other locally protected resources where feasible. • At a minimum, qualifying protected trees (or other resources) shall be replaced at 1:1, or as otherwise required by the local ordinance or plan, in locally approved mitigation sites. • As part of project-level environmental review, implementing agencies shall ensure that projects comply with the most recent general plans, policies, and ordinances, and conservation plans. Review of these documents and compliance with their requirements shall be demonstrated in project-level environmental documentation. **2.9(g)** During the design and CEQA review of individual projects under Plan Bay Area, implementing agencies and project sponsors shall modify project designs to ensure the maximum feasible level of consistency with the policies in adopted HCPs, NCCPs, or other approved local, regional, or state conservation plans, in areas where such plans are applicable. These measures apply to projects covered by the plans in question (i.e., projects assessed during plan environmental review), as well as non-covered projects within the Plan area. Mitigation measures that shall be considered by	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • If the project results in impacts on covered species habitat, or other habitat protected under the plan, the project sponsor shall coordinate with USFWS, CDFW, and the appropriate local agency to provide full compensation of acreage and preserve function. Projects shall follow adopted procedures to process an amendment to the conservation plan(s) if necessary. In addition, all habitat based mitigation required by the conservation plans shall be provided at ratios or quantities specified in the plans. • Project design and implementation shall minimize impacts on covered species through implementation of Mitigation Measures 2.9(a), 2.9(b), 2.9(c), 2.9(d), and 2.9(e). • Avoidance, minimization, and mitigation measures for covered species, consistent with adopted HCP and/or NCCPs, shall also be implemented as specified during project-specific environmental review and permitting. Avoidance and minimization measures to covered species and their habitats shall include adherence to land use adjacency guidelines as outlined in adopted HCP and/or NCCPs. **2.9(h)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Implementing agencies and project sponsors whose projects are located within the Coastal Zone or within BCDC jurisdiction shall carefully review the applicable local coastal program or San Francisco Bay Plan for potential conflicts, and involve the California Coastal Commission or BCDC as early as possible in the project-level EIR process.	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
Visual Resources			
2.10-1	Implementation of the proposed Plan could affect visual resources by blocking panoramic views or views of significant landscape features or landforms (mountains, oceans, rivers, or significant man-made structures) as seen from a transportation facility or from public viewing areas.	**2.10(a)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Reduce the visibility of construction staging areas by fencing and screening these areas with low contrast materials consistent with the surrounding environment, and by revegetating graded slopes and exposed earth surfaces at the earliest opportunity. • Site or design projects to minimize their intrusion into important viewsheds. • Use see-through safety barrier designs (e.g. railings rather than walls) when feasible. • Develop interchanges and transit lines at the grade of the surrounding land to limit view blockage wherever possible. • Design landscaping along highway corridors in rural and open space areas to add significant natural elements and visual interest to soften the hard edged, linear travel experience that would otherwise occur. • Identify, preserve, and enhance scenic vistas to and from hillside areas and other visual resources. • Comply with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect visual resources.	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*
2.10-2	Implementation of the proposed Plan could affect visual resources by substantially damaging scenic resources (such as trees, rock outcroppings, and historic buildings) that would	**2.10(b)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:	*Significant and Unavoidable*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
	alter the appearance of or from state- or county-designated or eligible scenic highways.	• Project sponsors and implementing agencies shall complete design studies for projects in designated or eligible State Scenic Highway corridors. Implementing agencies shall consider the "complete" highway system and design projects to minimize impacts on the quality of the views or visual experience that originally qualified the highway for scenic designation. • Contouring the edges of major cut and fill slopes to provide a more natural looking finished profile that is appropriate to the surrounding context, using natural shapes, textures, colors, and scale to minimize contrasts between the project and surrounding areas. • Complying with existing local regulations and policies that exceed or reasonably replace measures that protect visual resources where feasible based on project- and site-specific considerations • Implementation of Mitigation Measure 2.10(a) shall also be considered to reduce impacts on scenic highways.	
2.10-3	Implementation of the proposed Plan could affect visual resources by creating significant contrasts with the scale, form, line, color, and/or overall visual character of the existing community.	**2.10(c)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Designing projects to minimize contrasts in scale and massing between the project and surrounding natural forms and development. • Requiring that the scale, massing, and design of new development provide appropriate transitions in building height, bulk, and architectural style that are sensitive to the physical and visual character of surrounding areas.	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

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#	Impact	Mitigation Measures	Significance After Mitigation
		• Contouring the edges of major cut and fill slopes to provide a finished profile that is appropriate to the surrounding context, using shapes, textures, colors, and scale to minimize contrasts between the project and surrounding areas. • Ensuring that new development in or adjacent to existing communities is compatible in scale and character with the surrounding area by: – Promoting a transition in scale and architecture character between new buildings and established neighborhoods; and – Requiring pedestrian circulation and vehicular routes to be well integrated. • Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce visual contrasts. Implementation of Mitigation Measure 2.10(a) shall also be considered to reduce impacts on visual resources created by significant contrasts in community visual character.	
2.10-4	Implementation of the proposed Plan could affect visual resources by adding a visual element of urban character to an existing rural or open space area or adding a modern element to a historic area.	**2.10(d)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Ensuring that new development in or adjacent to rural or historic areas is compatible in scale and character with the surrounding area by: – Promoting a transition in scale and architecture character between new buildings and established neighborhoods; and – Requiring pedestrian circulation and vehicular routes to be well integrated.	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

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#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		• Using soundwall construction and design methods that account for visual impacts as follows: – Use transparent panels to preserve views where soundwalls would block views from residences. – Use landscaped earth berm or a combination wall and berm to minimize the apparent soundwall height. – Construct soundwalls of materials whose color and texture complements the surrounding landscape and development. – Design soundwalls to increase visual interest, reduce apparent height, and be visually compatible with the surrounding area. – Landscape the soundwalls with plants that screen the soundwall, preferably with either native vegetation or landscaping that complements the dominant landscaping of surrounding areas. • Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce visual impacts on rural and historic areas.	
2.10-5	Implementation of the proposed Plan could adversely affect visual resources by creating new substantial sources of light and glare.	**2.10(e)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Designing projects to minimize light and glare from lights, buildings, and roadways facilities. • Minimizing and controlling glare from transportation projects through the adoption of project design features that reduce glare. These features include: – Planting trees along transportation corridors to reduce glare from the sun;	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

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#	Impact	Mitigation Measures	Significance After Mitigation
		– Landscaping off-street parking areas, loading areas, and service areas; and – Shielding transportation lighting fixtures to minimize off-site light trespass. • Minimizing and controlling glare from land use and transportation projects through the adoption of project design features that reduce glare. These features include: – Limiting the use of reflective materials, such as metal; – Using non-reflective material, such as paint, vegetative screening, matte finish coatings, and masonry; – Screening parking areas by using vegetation or trees; and – Using low-reflective glass. • Imposing lighting standards that ensure that minimum safety and security needs are addressed and minimize light trespass and glare associated with land use development. These standards include the following: – Minimizing incidental spillover of light onto adjacent private properties and undeveloped open space; – Directing luminaries away from habitat and open space areas adjacent to the project site; – Installing luminaries that provide good color rendering and natural light qualities; and – Minimizing the potential for back scatter into the nighttime sky and for incidental spillover of light onto adjacent private properties and undeveloped open space.	

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#	Impact	Mitigation Measures	Significance After Mitigation
		• Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce light and glare impacts.	
2.10-6	Implementation of the proposed Plan could cast a substantial shadow in such a way as to cause a public hazard or substantially degrade the existing visual/aesthetic character or quality of a public place for a sustained period of time.	**2.10(f)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Implementing agencies shall require project sponsors to conduct shadow studies for buildings and roadway facilities to identify and implement development strategies for reducing the impact of shadows on public open space. Study considerations shall include, but are not limited to, the placement, massing, and height of structures, surrounding land uses, time of day and seasonal variation, and reflectivity of materials. Study recommendations for reducing shadow impacts shall be incorporated into the project design as feasible based on project- and site-specific considerations. Further, implementing agencies shall require project sponsors to comply with existing local regulations and policies that exceed or reasonably replace the above measure that reduces shadow impacts where feasible based on project- and site-specific considerations.	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*
Cultural Resources			
2.11-1	The proposed Plan could have the potential to cause a substantial adverse change in the significance of a historic resource such that the significance of the resource would be materially impaired.	**2.11(a)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Realign or redesign projects to avoid impacts on known historic resources where possible. • Requiring an assessment by a qualified professional of structures greater than 45 years in age within the area of potential effect to	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

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#	Impact	Mitigation Measures	Significance After Mitigation
		determine their eligibility for recognition under State, federal, or local historic preservation criteria. • When a project has been identified as potentially affecting a historic resource, a historical resources inventory should be conducted by a qualified architectural historian. The study should comply with CEQA Guidelines section 15064.5(b), and, if federal funding or permits are required, with section 106 of the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. § 470 et seq.). Study recommendations shall be implemented. • If avoidance of a significant architectural/built environment resource is not feasible, additional mitigation options include, but are not limited to, specific design plans for historic districts, or plans for alteration or adaptive re-use of a historical resource that follows the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitation, Restoring, and Reconstructing Historic Buildings. • Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect historic resources.	
2.11-2	The proposed Plan could have the potential to cause a substantial adverse change in the significance of a unique archaeological resource.	**2.11(b)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Pursuant to Government Code Sections 65351 and 65352, in-person consultation shall be conducted with Native American tribes and individuals with cultural affiliations where the project is proposed to determine the potential for, or existence of, cultural resources, including cemeteries and sacred places, prior to project design and implementation stages.	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

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#	Impact	Mitigation Measures	Significance After Mitigation
		• Prior to construction activities, project sponsors shall retain a qualified archaeologist to conduct a record search at the appropriate Information Center of the California Archaeological Inventory to determine whether the project area has been previously surveyed and whether resources were identified. When recommended by the Information Center, project sponsors shall retain a qualified archaeologist to conduct archaeological surveys prior to construction activities. • Preparation of a research design and testing plan should be developed in advance of implementation of the construction project, in order to efficiently facilitate the avoidance of cultural sites throughout the development process. • If record searches and field surveys indicate that the project is located in an area rich with archaeological resources, project sponsors should retain a qualified archaeologist to monitor any subsurface operations, including but not limited to grading, excavation, trenching, or removal of existing features of the subject property. • Written assessments should be prepared by a qualified tribal representative of sites or corridors with no identified cultural resources but which still have a moderate to high potential for containing tribal cultural resources. • Upon “late discovery” of prehistoric archaeological resources during construction, project sponsors shall consult with the Native American tribe as well as with the “Most-Likely-Descendant” as designated by the Native American Heritage Commission pursuant to PRC 5097. • Preservation in place is the preferred manner of mitigating impacts on archeological sites because it maintains the relationship between artifacts and the archeological context, and	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		it may also avoid conflict with religious or cultural values of groups associated with the site. This may be achieved through incorporation within parks, green-space, or other open space by re-designing project using open space or undeveloped lands. This may also be achieved by following procedures for capping the site underneath a paved area. When avoiding and preserving in place are infeasible based on project- and site-specific considerations, a data recovery plan may be prepared according to CEQA Section 15126.4. A data recovery plan consists of: the documentation and removal of the archeological deposit from a project site in a manner consistent with professional (and regulatory) standards; the subsequent inventorying, cataloguing, analysis, identification, dating, and interpretation of the artifacts; and the production of a report of findings. • Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect archaeological resources.	
2.11-3	The proposed Plan could have the potential to destroy, directly or indirectly, a unique paleontological resource or site or unique geologic feature.	**2.11(c)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Prior to construction activities, project sponsors should retain a qualified paleontologist to conduct a record search using an appropriate database, such as the UC Berkeley Museum of Paleontology to determine whether the project area has been previously surveyed and whether resources were identified. As warranted, project sponsors should retain a qualified paleontologist to conduct paleontological surveys prior to construction activities. • Preparation of a research design and testing plan should be developed in advance of implementation of the construction	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		project, in order to efficiently facilitate the avoidance of cultural sites throughout the development process. • If record searches and field surveys indicate that the project is located in an area rich with paleontological, and/or geological resources, project sponsors should retain a qualified paleontologist to monitor any subsurface operations, including but not limited to grading, excavation, trenching, or removal of existing features of the subject property. • Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect paleontological or geologic resources.	
2.11-4	The proposed Plan could have the potential to disturb human remains, including those interred outside formal cemeteries.	**2.11(d)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Under Section 7050.5 of the California Health and Safety Code, as part of project oversight of individual projects, project sponsors can and should, in the event of discovery or recognition of any human remains during construction or excavation activities associated with the project, in any location other than a dedicated cemetery, cease further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until the coroner of the county in which the remains are discovered has been informed and has determined that no investigation of the cause of death is required. • Under California Public Resources Code 5097.98, if any discovered remains are of Native American origin: – The coroner shall contact the Native American Heritage Commission in order to ascertain the proper descendants	*Less than Significant with Mitigation*

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#	Impact	Mitigation Measures	Significance After Mitigation
		from the deceased individual. The coroner should make a recommendation to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods. This may include obtaining a qualified archaeologist or team of archaeologists to properly excavate the human remains; or – If the Native American Heritage Commission is unable to identify a descendant, or the descendant failed to make a recommendation within 24 hours after being notified by the commission, the landowner or their authorized representative shall obtain a Native American monitor, and an archaeologist, if recommended by the Native American monitor, and rebury the Native American human remains and any associated grave goods, with appropriate dignity, on the property and in a location that is not subject to further subsurface disturbance where the following conditions occur: – The Native American Heritage Commission is unable to identify a descendent; – The descendant identified fails to make a recommendation; or – The landowner or their authorized representative rejects the recommendation of the descendant, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to human remains.	

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#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
Public Utilities and Facilities			
2.12-1	The proposed Plan could result in insufficient water supplies from existing entitlements and resources to serve expected development.	**2.12(a)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Implementing water conservation measures which result in reduced demand for potable water. This could include reducing the use of potable water for landscape irrigation (such as through drought-tolerant plantings, water-efficient irrigation systems, the capture and use of rainwater) and the use of water-conserving fixtures (such as dual-flush toilets, waterless urinals, reduced flow faucets). • Coordinating with the water provider to identify an appropriate water consumption budget for the size and type of project, and designing and operating the project accordingly. • Using reclaimed water for non-potable uses, especially landscape irrigation. This strategy may require a project to be located in an area with existing reclaimed water conveyance infrastructure and excess reclaimed water capacity. If a location is planned for future reclaimed water service, projects should install dual plumbing systems in anticipation of future use. Large developments could treat wastewater onsite to tertiary standards and use it for non-potable uses onsite. • Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce demand for potable water. **2.12(b)** MTC shall require the construction phase of transportation projects to connect to reclaimed water distribution systems for non-potable water needs, when feasible based on project- and site-specific considerations.	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		2.12(c) MTC shall require transportation projects with landscaping to use drought-resistant plantings or connect to reclaimed water distribution systems for irrigation and other non-potable water needs when available and feasible based on project- and site-specific considerations.	
2.12-2	The proposed Plan could result in inadequate wastewater treatment capacity to serve new development.	**2.12(d)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Undertaking environmental assessments of land use plans and developments to determine whether sufficient wastewater treatment capacity exists for a proposed project. These environmental assessments must ensure that the proposed development can be served by its existing or planned treatment capacity, and that the applicable NPDES permit does not include a Cease and Desist Order or any limitations on existing or future treatment capacity. If adequate capacity does not exist, the implementing agency must either adopt mitigation measures or consider not proceeding with the project as proposed. • Complying with existing local regulations and policies that exceed or reasonably replace the above measure in a manner that reduces impacts on wastewater treatment capacity. Implementing agencies shall also require compliance with Mitigation Measure 2.12(a), and MTC shall require implementation of Mitigation Measures 2.12(b), and/or 2.12(c) listed under Impact 2.12-1, as feasible based on project- and site-specific considerations, which will help reduce water usage and, subsequently, wastewater flows. Transportation projects could only cause impacts on wastewater treatment capacity in the case of excess stormwater runoff into a	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		combined wastewater/stormwater conveyance system. Therefore, mitigation of stormwater drainage system capacity impacts will also mitigate wastewater treatment capacity impacts. Mitigation for stormwater runoff into wastewater systems from transportation projects is discussed under Impact 2.12-3; mitigation measures 2.12(f) and 2.12(g) will mitigate these impacts.	
2.12-3	Development under the proposed Plan could require and result in the construction of new or expanded stormwater drainage facilities, which could cause significant environmental impacts.	**2.12(e)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Complying with all existing applicable federal and State regulations, including Provision C.3 of the EPA's Interpretive Policy Memorandum on Reapplication Requirements for Municipal Separate Storm Sewer Systems, NPDES permit requirements, the submission of and adherence to a Storm Water Pollution Prevention Plan, Water Quality Control Policy for Siting, Design, Operation, and Maintenance of onsite Wastewater Treatment Systems, and/or other relevant current State Water Resource Control Board policy adopted for the purpose of reducing stormwater drainage impacts. • For projects less than one acre in size, reducing stormwater runoff caused by construction by implementing stormwater control best practices, based on those required for a Storm Water Pollution Prevention Plan. • To the extent possible, siting or orienting the project to use existing stormwater drainage capacity. • Constructing permeable surfaces, such as stormwater detention facilities, playing fields, landscaping, or alternative surfaces (vegetated roofs, pervious paving).	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
		• Modeling and implementing a stormwater management plan or site design that prevents the post-development peak discharge rate and quantity from exceeding pre-development rates. • Capturing rainwater for on-site re-use, such as for landscape irrigation or inside non-potable uses such as toilet flushing. • Capturing and infiltrating stormwater runoff on site with rain gardens, vegetated swales, constructed wetlands, etc. • Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures in reducing impacts on stormwater drainage facilities. **2.12(f)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Transportation projects shall incorporate stormwater control, retention, and infiltration features, such as detention basins, bioswales, vegetated median strips, and permeable paving, early into the design process to ensure that adequate acreage and elevation contours are planned. Implementing agencies shall require project sponsors to comply with existing local regulations and policies that exceed or reasonably replace measures that reduce stormwater drainage impacts. **2.12(g)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. All transportation projects constructed, operated, or funded by MTC shall adhere to Caltrans' Stormwater Management Plan, which includes best practices to reduce the volume of stormwater runoff and pollutants in the design, construction and maintenance of highway facilities.	

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	*Impact*	*Mitigation Measures*	*Significance After Mitigation*
2.12-4	Development under the proposed Plan could require and result in the construction of new or expanded water and wastewater treatment facilities, which could cause significant environmental impacts.	**2.12(h)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. For projects that could increase demand on water and wastewater treatment facilities, project sponsors shall coordinate with the relevant service provider to ensure that the existing public services and utilities could be able to handle the increase in demand. If the current infrastructure servicing the project site is found to be inadequate, infrastructure improvements for the appropriate public service or utility shall be identified in each project's CEQA documentation. The relevant public service provider or utility shall be responsible for undertaking project-level review as necessary to provide CEQA clearance for new facilities. All of the mitigation measures listed under Impact 2.12-1 and Impact 2.12-2 will help reduce water demand and wastewater generation, and subsequently help reduce the need for new or expanded water and wastewater treatment facilities. The mitigation measures listed under Impact 2.12-3 will also help mitigate the impact of additional stormwater runoff from land use and transportation projects on existing wastewater treatment facilities.	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*
2.12-5	Development under the proposed Plan could exceed wastewater treatment requirements of the RWQCBs.	None required.	*Less than Significant*
2.12-6	The proposed Plan could result in insufficient landfill capacity to serve new development while complying with applicable regulations.	**2.12(i)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Countywide Integrated Waste Management Plans and Source Reduction and Recycling Elements shall take the growth patterns projected by the proposed Plan into account in their evaluation of landfill disposal capacity and determination of strategies to implement to enhance capacity.	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		2.12(j) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Providing an easily accessible area that is dedicated to the collection and storage of non-hazardous recycling materials, where feasible. • Maintaining or re-using existing building structures and materials during building renovations and redevelopment, where feasible. • Using salvaged, refurbished or reused materials, to help divert such items from landfills, where feasible. • Diverting construction waste from landfills, where feasible, through means such as: – The submission and implementation of a construction waste management plan that identifies materials to be diverted from disposal. – Establishing diversion targets, possibly with different targets for different types and scales of development. – Helping developments share information on available materials with one another, to aid in the transfer and use of salvaged materials. • Applying the specifications developed by the Construction Materials Recycling Association (CMRA) to assist contractors and developers in diverting materials from construction and demolition projects, where feasible.[4]	*Significant with Mitigation*

[4] The CMRA specifications are available on the CalRecycle website at: www.calrecycle.ca.gov/conDemo/specs/CMRA.htm

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		• Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures in reducing impacts on landfills.	
Hazards			
2.13-1	Implementation of the proposed Plan could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	**2.13(a)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce the impacts associated with the routine transit, use, or disposal of hazardous materials, implementing agencies shall require project sponsors to comply with the Resource Conservation and Recovery Act, Title 22 of the California Code of Regulations, California Hazardous Waste Control Law, Cal/EPA requirements, HAZMAT training requirements, and any local regulations such as city or county Hazardous Materials Management Plans regulating the generation, transportation, treatment, storage, and disposal of hazardous materials and waste. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to the transport, use, or disposal of hazardous materials.	*Less than Significant with Mitigation*
2.13-2	Implementation of the proposed Plan may create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	**2.13(b)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce the impacts associated with the release of hazardous materials into the environment, implementing agencies shall require project sponsors to comply with Senate Bill 1889, Accidental Release Prevention Law/California Accidental Release Prevention Program (CalARP) regulating the generation, transportation, treatment, storage, and disposal of hazardous materials and waste. In addition, project sponsors shall comply with United States Department of Transportation regulations regarding the transport of hazardous materials and	*Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		wastes such that accidental upset conditions are minimized. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to upset and accident conditions involving the release of hazardous materials into the environment.	
2.13-3	Implementation of the proposed Plan could result in hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	**2.13(c)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce the impacts associated with handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed schools, implementing agencies shall require project sponsors to comply with DTSC School Property Evaluation and Cleanup Division regulations regarding the cleanup of existing contamination at school sites and requirements for the location of new schools that would minimize potential exposure of hazardous emissions to students, staff, and visitors to existing and planned school sites. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to hazardous materials near schools.	*Less than Significant with Mitigation*
2.13-4	Implementation of the proposed Plan could result in projects located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.	**2.13(d)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Determining whether specific land use and transportation project sites are listed as a hazardous materials and/or waste site pursuant to Government Code Section 65962.5. • Requiring preparation of a Phase I ESA in accordance with the American Society for Testing and Materials' ASTM E-1527-05 standards for any listed sites or sites with the potential of residual hazardous materials and/or waste as a result of location and/or prior uses. For work requiring any demolition or renovation, the	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		Phase I ESA shall make recommendations for any hazardous building materials survey work that shall be done. • Implementing recommendations included in a Phase I ESA prepared for a site. • If a Phase I ESA indicates the presence or likely presence of contamination, the implementing agency shall require a Phase II ESA, and recommendations of the Phase II ESA shall be fully implemented. • For work requiring any demolition or renovation, the Phase I ESA shall make recommendations for any hazardous building materials survey work that shall be done. • Requiring construction contractors to prepare and implement soil management contingency plans which provide procedural guidance on the handling, notification, and protective measures to be taken in the event of encountering suspected contamination or naturally occurring asbestos.	
2.13-5	Implementation of the proposed Plan could result in a safety hazard for people residing or working in the planning area for projects located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport.	**2.13(e)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce the impacts associated with people residing or working in the planning area for projects located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, implementing agencies shall require project sponsors to comply with any applicable Airport Land Use Compatibility Plan requirements as well as any Federal Aviation Administration (14 CFR Part 77) requirements. Projects shall not be approved by local agencies until project design plans have been reviewed and approved by the Airport Land Use Commission such that proposed projects would not adversely affect subject airport operations. For	*Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to development near a public airport.	
2.13-6	Implementation of the proposed Plan could result in a safety hazard for people residing or working in the planning area for projects within the vicinity of a private airstrip.	**2.13(f)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce impacts associated with people residing or working in the planning area for projects within the vicinity of a private airstrip implementing agencies shall require project sponsors to comply with any applicable local land use regulations and federal aviation guidelines as well as any Federal Aviation Administration (14 CFR Part 77) requirements applicable to projects located within two miles of a private airstrip. Projects shall not be approved by local agencies until project design plans can demonstrate compliance with subject airstrip, local and federal aviation requirements. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to development near a private airstrip.	*Less than Significant with Mitigation*
2.13-7	Implementation of the proposed Plan could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	None required.	*Less than Significant*
2.13-8	Implementation of the proposed Plan could expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.	**2.13(g)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce wildland fire impacts, implementing agencies shall require project sponsors to comply with safety measures that minimize the threat of fire as stated in the California Fire Code as well as compliance with Title 14 of the California Code of Regulations, Division 1.5 to minimize exposing people and structures to loss, injury, or death and damage. Projects	*Less than Significant with Mitigation*

TABLE ES-2: SUMMARY OF IMPACTS AND MITIGATION

#	Impact	Mitigation Measures	Significance After Mitigation
		shall not be approved by local agencies until project design plans can demonstrate compliance with fire safety requirements. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to wildfire hazards.	
Public Services and Recreation			
2.14-1	Implementation of the proposed Plan could result in the need for expanded facilities, the construction of which causes significant environmental impacts, in order to maintain adequate schools, emergency services, police, fire, and park and recreation services.	**2.14(a)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Ensuring that adequate public services, and related infrastructure and utilities, will be available to meet or satisfy levels identified in the applicable local general plan or service master plan prior to approval of new development projects. • Complying with existing local regulations and policies that exceed or reasonably replace measures that reduce public service impacts.	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*
2.14-2	Implementation of the proposed Plan could result in increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	**2.14(b)** Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to: • Ensuring that adequate parks and recreational facilities will be available to meet or satisfy levels identified in the applicable local general plan or service master plan prior to approval of new development. • Complying with existing local regulations and policies that exceed or reasonably replace measures that reduce impacts on recreational facilities.	*Significant and Unavoidable* **CEQA Streamlining Projects Under SB 375 That Implement All Feasible Mitigation Measures: Less than Significant with Mitigation*

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Part One

Introduction and Study Approach

1.1 Introduction and Study Approach

This program Environmental Impact Report (EIR) has been prepared on behalf of the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) in accordance with the California Environmental Quality Act (CEQA). This EIR analyzes the potential significant impacts of the adoption and implementation of the proposed Plan Bay Area composed Plan, which is the update to the 2009 Regional Transportation Plan (RTP) and the new Sustainable Communities Strategy (SCS) for the San Francisco Bay Area.

MTC, ABAG, and Plan Bay Area

MTC is the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area region (which includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties). Created by the State Legislature in 1970, MTC functions as both the regional transportation planning agency (RTPA)—a state designation—and, for federal purposes, as the region's metropolitan planning organization (MPO).

As required by State legislation (Government Code Section 65080 et seq.) and by federal regulation (Title 23 USC Section 134), MTC is responsible for preparing the RTP for the San Francisco Bay Area Region. An RTP is a long-range plan that identifies the strategies and investments to maintain, manage, and improve the region's transportation network. In 2009, MTC adopted its most recent RTP, known as the Transportation 2035 Plan for the San Francisco Bay Area.

ABAG is a joint powers agency formed in 1961 pursuant to California Government Code §§ 6500, et seq., and the council of governments (COG) for the San Francisco Bay Area. ABAG conducts regional population and employment projections and the regional housing needs allocation (RHNA) processes (Government Code Section 65584 et seq.). Plan Bay Area is a joint effort led by MTC and ABAG and completed in partnership with the Bay Area's other two regional government agencies, the Bay Area Air Quality Management District (BAAQMD), and the Bay Conservation and Development Commission (BCDC). It meets the requirements of the Sustainable Communities and Climate Protection Act of 2008 Senate Bill 375 (SB 375 Steinberg, 2008), which requires California's 18 metropolitan planning organizations to develop an SCS as a new element of their federally mandated RTP. The SCS demonstrates how the region will meet its greenhouse gas (GHG) reduction targets established by the California Air Resources Board (ARB) through integrated land use, housing and transportation planning, a planning effort requiring the authority and powers vested in both MTC and ABAG.

Plan Bay Area, which covers the period through 2040, is the first Bay Area RTP that is subject to the requirements of SB 375. SB 375 requires that the SCS be integrated into the MPO's RTP and once adopted will be reviewed by ARB to determine whether it would, if implemented, achieve the GHG emission reduction target for its region. If the combination of measures in the SCS will not meet the region's target, the MPO must then prepare an alternative planning strategy (APS) that will do so.

Plan Bay Area is a long-range plan that specifies the strategies and investments to maintain, manage, and improve the region's transportation network – which includes bicycle and pedestrian facilities, local streets and roads, public transit systems, and highways. Plan Bay Area also calls for focused housing and job growth around high-quality transit corridors, particularly within areas identified by local jurisdictions as Priority Development Areas. This land use strategy is anticipated to enhance mobility and economic growth by linking the location of housing and jobs with transit, thus offering a more efficient land use pattern around transit and a greater return on existing and planned transit investments.

Purpose of the EIR

The EIR for Plan Bay Area has been prepared in compliance with the California Environmental Quality Act (CEQA) of 1970, as amended. In general, the purpose of the EIR is to:

- Analyze the potential environmental effects of the adoption and implementation of the Plan;
- Inform decision-makers, responsible and trustee agencies, and members of the public as to the range of the environmental impacts of the Plan;
- Recommend a set of measures to mitigate any significant adverse impacts; and
- Analyze a range of reasonable alternatives to the proposed Plan.

The EIR process also provides an opportunity to identify environmental benefits of the proposed Plan that might balance some potentially significant adverse environmental impacts. The final EIR will include a Mitigation Monitoring Program that identifies who will be responsible for implementing identified mitigation measures. As the joint lead agencies for preparing this EIR, MTC and ABAG will rely on the EIR analysis of potential environmental effects in their review of the proposed Plan prior to taking action on Plan Bay Area.

This EIR represents the agencies' best effort to evaluate the potential environmental effects of the proposed Plan given its long-term planning horizon. It can be anticipated that conditions will change; however, the assumptions used are the best available at the time of preparation and reflect existing knowledge of patterns of development, travel patterns, mode of travel, and technological factors.

While MTC, along with other regional agencies, prepares Regional Airport and Seaport plans, the projects in these advisory plans do not require MTC funding or approvals. As such, these plans are separate from the proposed Plan and are subject to separate review processes. Therefore, this EIR does not analyze the environmental effects of these plans.

Notice of Preparation and Public Scoping

CEQA regulations require an early and open process for determining the scope of issues that should be addressed prior to implementation of a proposed action. The Notice of Preparation (NOP) provides formal notification to all federal, state, regional, and local agencies involved with funding or approval of the project, and to other interested organizations and members of the public, that an EIR will be prepared for the project. The NOP is intended to encourage interagency communication concerning the proposed action and to provide sufficient background information about the proposed action so that agencies, organizations, and individuals can respond with specific comments and questions on the scope and content of the EIR. A copy of the NOP is provided in Appendix A and the written comments received during the 30-day NOP period are available on the project website, www.onebayarea.org, and referenced in Appendix B.

MTC and ABAG initiated the scoping process on June 11, 2012. As required by CEQA, MTC and ABAG sent a copy of the NOP to the State Clearinghouse within the California Office of Planning and Research. The Clearinghouse is responsible for monitoring compliance of state agencies in providing timely responses. The Clearinghouse assigned state identification number SCH# 2012062029 to this EIR. The NOP was also filed with the county clerks in each of the nine Bay Area counties and posted on the Plan Bay Area website (www.onebayarea.org). State and federal resource agencies, the Bay Area Partnership (which is comprised of representatives of congestion management agencies, transit operators, public works directors, and other state and federal governmental agencies) and interested individuals and organizations were also sent either copies of the NOP via certified mail, or were notified of the availability of the NOP by postcard in the mail, or email if no mailing address was provided.

SCOPING MEETINGS

Five regional public scoping meetings were held to solicit agency and public comments on the EIR:

- Wednesday, June 20, 2012, 6:00 p.m. to 8:00 p.m., Joseph P. Bort MetroCenter, 101 Eighth Street, Oakland, CA
- Thursday, June 21, 2012, 10:00 a.m. to Noon, Dr. Martin Luther King, Jr. Library, 150 East San Fernando Street, San José, CA
- Monday, June 25, 2012, 1:30 p.m. to 3:30 p.m., Solano County Events Center, 601 Texas Street, Fairfield, CA
- Tuesday, June 26, 2012, 10:00 a.m. to Noon, San Francisco Planning + Urban Research (SPUR), 654 Mission Street, San Francisco, CA
- Wednesday, June 27, 2012, 1:30 p.m. to 3:30 p.m., Embassy Suites Hotel, 101 McInnis Parkway, San Rafael, CA

In addition, meetings with Bay Area Congestion Management Agency planning directors and local jurisdiction planning directors, business community members, and equity groups, were held during the scoping period for further input. The NOP and public scoping meetings also help to meet the MAP-21 requirements pertaining to public involvement in the development of the RTP. In particular, through the NOP and scoping process, resource agencies, public agencies, Tribal governments, transportation providers, and the public had an opportunity to provide early input on environmental issues and concerns that could be addressed as part of the environmental assessment for the proposed Plan.

Additional information about the comprehensive public involvement process for Plan Bay Area is available on the Plan Bay Area website (www.onebayarea.org) and is described in Chapter 1.2 of this EIR.

EIR Scope

PROGRAM EIR

This is a program EIR, as defined in Section 15168 of the CEQA Guidelines as: "[An EIR addressing a] series of actions that can be characterized as one large project and are related either: (1) Geographically; (2) As logical parts in the chain of contemplated actions; (3) In connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program; or (4) As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental impacts which can be mitigated in similar ways."

Program EIRs can be used as the basic, general environmental assessment for an overall program of projects developed over a multi-year planning horizon. A program EIR has several advantages. For example, it provides a basic reference document to avoid unnecessary repetition of facts or analysis in subsequent project-specific assessments. It also allows the lead agency to consider the broad, regional impacts of a program of actions before its adoption and eliminates redundant or contradictory approaches to the consideration of regional and cumulative impacts.

As a programmatic document, this EIR presents a region-wide assessment of the potential impacts of the proposed Plan. It focuses on the entire set of projects and programs contained in the proposed Plan. Individual transportation and development project impacts are not addressed in detail; rather the focus of this EIR is to address the impacts of a program of projects, which, individually or in the aggregate, may be regionally significant. Where appropriate, it also provides a county-by-county assessment. However, it does not evaluate subcomponents of the proposed Plan nor does it assess project-specific impacts of individual projects. For example, the physical impacts of major regional transportation expansion projects are addressed, while potential impacts on specific wetlands or a specific species habitat by an individual interchange reconstruction project is not discussed, unless it can be surmised that the effect would be large or otherwise regionally significant. This approach does not relieve local jurisdictions of the responsibility for evaluating project-specific, locally significant impacts; see the "Relationship to other EIRs" section below for more details. All impacts of individual projects will be evaluated in future environmental review, as relevant, by the appropriate implementing agency as required under CEQA and/or NEPA prior to each project being considered for approval, as applicable.

This EIR evaluates potentially significant environmental impacts and includes mitigation measures to offset potentially significant effects. The EIR identifies potential regional as well as generalized localized impacts. Further, the EIR distinguishes transportation and land use impacts so that a potential "hybrid" alternative can be readily selected for adoption, if appropriate. This EIR provides the basis for subsequent tiered CEQA documents for project-specific or site-specific environmental reviews that will be conducted by implementing agencies as land use and transportation projects in the Plan are more clearly defined and more detailed studies prepared. Specific analysis of localized impacts in the vicinity of individual projects is not included in this program level EIR.

ENVIRONMENTAL ISSUE AREAS

The focus of this EIR is on environmental issues and concerns identified as possibly significant by MTC and ABAG in their NOP, as well as issue areas identified as a result of scoping comments. The issues identified for analysis by this EIR include whether the proposed Plan could result in the following:

Transportation

- Increase in per-trip travel time for commute and non-commute purposes, vehicle miles traveled (VMT) on facilities experiencing level of service F, or per-capita VMT
- Exceedance of regional transit service capacity

Air Quality

- Conflict with or obstruct air quality plans
- Increase in short-term construction-related emissions
- A net increase of emissions of criteria pollutants from on-road mobile sources
- Exposure of sensitive receptors or disproportionally impacted communities to substantial toxic air contaminant concentrations

Land Use, Housing, Agriculture, and Physical Displacement

- Conversion of agricultural lands, open space, or forest land
- Conflict with locally adopted land use plans, including general plans and zoning
- Disruption of residential or business uses or displace population and housing
- Alterations in the characteristics and qualities of an existing neighborhood or community by separation

Energy

- Increase per capita energy use
- Inconsistency with adopted plans or policies related to energy conservation

Greenhouse Gases and Climate Change (including Sea Level Rise)

- Failure to reduce net and per-capita CO_2 emissions from on-road mobile sources
- A net increase in direct and indirect GHG emissions
- Impede attainment of State executive order goals
- Increased vulnerability of land uses and transportation network to sea-level rise
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases

Noise

- Exposure of people to construction, highway, transit, or airport noise levels, or ground borne vibration, in excess of established standards

Geology and Seismicity

- Increased exposure of people or structures to the risk of property loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; and/or seismic-related ground failure
- Soil erosion or topsoil loss
- Location of projects on: a geologic unit or soil that is unstable or would become unstable as a result of the project; on expansive soils; or on weak, unconsolidated soils

Water Resources

- Violation of water quality standards or waste or stormwater discharge requirements
- Interference with or reduce rates of groundwater recharge due to increased amount of impervious surfaces
- Increase in erosion by altering the existing drainage patterns of a site
- Increase in non-point pollution of stormwater runoff or rates and amounts of runoff due to additional impervious surfaces
- Placement of structures within a 100-year flood hazard area which would impede or redirect flows
- Exposure of people to significant risk of loss, injury, or death involving flooding, seiche, tsunami, or mudflow

Biological Resources

- An adverse effect on sensitive or special-status species, riparian habitat, protected wetlands, or other sensitive natural community
- Interference with the movement of any native resident, migratory fish, or wildlife species
- Conflict with adopted local conservation policies

Visual Resources

- An adverse effect on scenic vistas
- Damage to scenic resources seen from a scenic highway
- Degradation of existing visual character of communities, rural areas, or open space
- A new source of substantial light or glare
- Casting of shadows that cause a public hazard or degrade visual/aesthetic character

Cultural Resources

- An adverse change that damages the significance of a historic resource, unique archaeological resource, and/or a unique paleontological resource/site
- Disruption of any human remains

Public Utilities

- An adverse effect on water supply, wastewater/stormwater facilities, or landfill capacity

Hazardous Materials

- Creation of hazards to the public or environment due to transport, use, or disposal of hazardous materials, or reasonably foreseeable upset and accident conditions that release hazardous materials
- Emission of hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school
- Location of a project on a hazardous materials site
- Safety hazards for people in proximity to an airport
- Interference with emergency response or evacuation plans
- Exposure of people to significant risk of loss, injury, or death involving wildland fires

Public Services and Recreation

- Need for expanded facilities in order to maintain adequate schools, emergency services, police, fire, and park and recreation services
- Deterioration of existing neighborhood and regional parks or other recreational facilities

Impacts on mineral resources are not specifically addressed in this EIR. As indicated in the NOP, no significant impacts of regional importance are expected to occur in that issue area; this impact area will be addressed in project-specific environmental documents as relevant.

EIR Organization

EXECUTIVE SUMMARY

This EIR begins with an executive summary of the environmental analysis, which outlines the proposed Plan and alternatives and includes a review of the potentially significant adverse regional environmental impacts of the proposed Plan and the measures recommended to mitigate those impacts. The executive summary also indicates whether or not those measures mitigate the significant impacts to a less than significant level. Finally, the executive summary describes the alternatives and their merits as compared to the proposed Plan, identifies the environmentally superior alternative among them, and describes areas of known controversy and issues to be resolved.

PART ONE: INTRODUCTION AND PROJECT OVERVIEW

Part One includes two chapters. Chapter 1.1 (this chapter) describes the relationship between the proposed Plan and the EIR, the organization of the EIR, and the basic legal requirements of a program level EIR. It discusses the level of analysis and the alternatives considered as well as how this EIR is related to other environmental documents and the EIR's intended uses. Chapter 1.2 introduces the purpose and objectives of the proposed Plan and summarizes specific information to describe the proposed Plan and complete the EIR analysis. This includes a description of the existing project setting, an outline of the

Bay Area's projected population and employment growth rates and proposed development patterns through the 2040 planning horizon year, and all proposed transportation projects and programs. State and federal planning regulations guiding the development of the RTP and SCS are also described.

PART TWO: SETTINGS, IMPACTS, AND MITIGATION MEASURES

Part Two describes the existing physical and regulatory settings for each of the environmental issue areas analyzed in the EIR, the potential impacts of the proposed Plan on these environmental issue areas, and measures to mitigate the potential impacts identified. Each issue area is analyzed in a separate chapter. Each chapter is organized as follows:

- Physical Setting;
- Regulatory Setting;
- Impact Significance Criteria;
- Method of Analysis;
- Summary of Impacts; and
- Impacts and Mitigation Measures.

PART THREE: ALTERNATIVES AND CEQA-REQUIRED CONCLUSIONS

Part Three includes a description of the alternatives to the proposed Plan and an assessment of their potential to achieve the objectives of the proposed Plan while reducing potentially significant adverse regional environmental impacts. Part Three also includes a comparison summary table of regional environmental impacts associated with the alternatives. As required by CEQA, an environmentally superior alternative is identified. Finally, Part Three includes an assessment of the impacts of the proposed Plan and alternatives in several subject areas required by CEQA, including:

- Significant irreversible environmental changes;
- Significant unavoidable impacts;
- Growth-inducing impacts;
- Cumulative impacts; and
- Impacts found to be not significant.

PART FOUR: BIBLIOGRAPHY AND REPORT AUTHORS

Part Four includes a bibliography and a list of report authors.

APPENDICES

Appendix A includes the Notice of Preparation (NOP) of this EIR and Appendix B includes reference to the comments received on the NOP and at the scoping meetings (available in full on the project website, www.onebayarea.org). Appendix C includes detailed lists of the transportation projects included in the proposed Plan and the alternatives studied in the EIR. Appendix D summarizes scoping comments on the alternatives. Appendix E includes the Air Quality Analysis Methodology. Appendices F through I include detailed supporting data on impact analyses for geology, water, biology and hazards, respectively.

EIR Approach

TIMEFRAME

For analytic purposes in this EIR, 2010 is the base year (existing conditions), except for greenhouse gas emissions where 2005 is the base year for one criterion to demonstrate compliance with SB 375. 2040 is the horizon year (future conditions) when it is assumed that the proposed Plan will be fully implemented. The proposed Plan covers an approximately 25-year planning period, and the year 2040 represents the last year of the plan when projects/programs are anticipated to be fully implemented.

ALTERNATIVES

CEQA requires EIRs to evaluate a reasonable range of alternatives to the proposed project that could feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the significant environmental impacts. In addition, CEQA requires assessment of the likely foreseeable future condition if the proposed project were not implemented; this scenario is called the No Project alternative.

This EIR evaluates the proposed Plan and four alternatives. This EIR also identifies the environmentally superior alternative and documents the relative environmental advantages and disadvantages of the alternatives. As with the evaluation of the proposed Plan, this EIR evaluates impacts of the No Project alternative and the other alternatives in 2040, the horizon year for the proposed Plan.

The proposed Plan and four alternatives are briefly described below. A full description of each alternative is provided in Chapter 3.1. In keeping with the order of alternatives in the Notice of Preparation, the No Project alternative is Alternative 1 and the proposed Plan analyzed in this EIR is Alternative 2. The proposed Plan, No Project, and two of the alternatives are designed to accommodate projected regional growth by 2040 (see Chapter 1.2 for details). One alternative, the Enhanced Network of Communities, is designed to accommodate more growth as it intended to identify areas sufficient to allow the region to meet the housing demand to meet projected employment growth projection, thereby reducing the in-commute.

Alternative 1: No Project

The No Project alternative consists of two elements: (a) the existing 2010 land uses plus continuation of existing land use policy as defined in adopted general plans, zoning ordinances, etc. from all jurisdictions in the region and (b) the existing 2010 transportation network plus highway, transit, local roadway, bicycle and pedestrian projects that have either already received full funding or are scheduled for full funding and received environmental clearance by May 1, 2011.

Alternative 2: The Proposed Plan

Alternative 2 is the proposed Plan analyzed in this EIR. This alternative assumes a land use development pattern that concentrates future household and job growth into Priority Development Areas (PDAs) identified by local jurisdictions. It pairs this land development pattern with MTC's Preferred Transportation Investment Strategy, which dedicates nearly 90 percent of future revenues to operating and maintaining the existing road and transit system. A more detailed overview of the proposed Plan is in Chapter 1.2.

Alternative 3: Transit Priority Focus

This alternative includes the potential for more efficient land uses in Transit Priority Project (TPP) areas, as defined by Senate Bill 375 (PRC section 21155), and would be developed at higher densities than existing conditions to support high quality transit. The transportation investment strategy in this alternative tests a slightly reduced express lane network that focuses on HOV lane conversions and gap closures, as well as increased funding for the implementation of recommendations from the Comprehensive Operations Analysis of BART and AC Transit above what is included in the Preferred Transportation Investment Strategy. This alternative also includes a Regional Development Fee based on development in areas that generate high levels of vehicle miles travelled, and a higher peak period toll on the San Francisco-Oakland Bay Bridge.

Alternative 4: Enhanced Network of Communities

This alternative seeks to provide sufficient housing for all people employed in the Bay Area with no in-commuters from other regions and allows for more dispersed growth patterns than the proposed Plan, although development is still generally focused around PDAs. The transportation investment strategy is consistent with the Preferred Transportation Investment Strategy, also used in the proposed Plan, and includes a higher peak period toll on the San Francisco-Oakland Bay Bridge.

Alternative 5: Environment, Equity and Jobs

This alternative seeks to maximize affordable housing in opportunity areas in both urban and suburban areas through incentives and housing subsidies. The suburban growth is supported by increased transit service to historically disadvantaged communities and a reduced roadway network. This alternative includes imposing a Vehicle Miles Traveled (VMT) tax and a higher peak period toll on the San Francisco-Oakland Bay Bridge to fund transit operations.

CUMULATIVE IMPACT ASSUMPTIONS

Section 15130 of the CEQA Guidelines requires that an EIR evaluate potential environmental impacts that are individually limited but cumulatively significant. CEQA defines cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines § 15355). "'Cumulatively considerable' means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (CEQA Guidelines § 15065(a)(3)). This means that cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

The proposed Plan, which includes region-wide transportation improvements and land use development patterns in the Bay Area to accommodate projected regional growth through 2040, is a cumulative plan by definition. As such, the environmental analysis included in each issue area of this EIR is a cumulative analysis compliant with the requirements of CEQA and the CEQA Guidelines. Furthermore, this EIR contains analysis of cumulative regional impacts, as differentiated from more generalized localized impacts for every identified impact area as relevant. A summary of cumulative effects is included in Part 3, which addresses Alternatives and CEQA Required Conclusions.

RELATIONSHIP TO OTHER EIRS

This EIR has updated the description, analysis, and conclusions contained in EIRs for the prior Bay Area RTPs, including the Draft and Final EIRs prepared for the Transportation 2035 Plan (December 2008 and April 2009, respectively). Unlike the prior RTPs, Plan Bay Area also contains the Sustainable Communities Strategy (SCS) component for the first time, and this EIR includes analysis of impacts associated with the SCS.

As a program EIR, the preparation of this document does not relieve the sponsors of the projects listed in the proposed Plan from the responsibility of complying with the requirements of CEQA and/or NEPA for projects requiring federal funding or approvals. As appropriate, individual projects may be required to prepare a more precise, project-level analysis to fulfill CEQA and/or NEPA requirements. The lead agency responsible for reviewing these projects shall determine the level of review needed, and the scope of that analysis will depend on the specifics of the particular project. These projects may, however, use the discussion of regional impacts in this program EIR as a basis of their assessment of these regional or cumulative impacts. These projects may also be eligible for CEQA streamlining under SB 375 – see "Future Environmental Review" below for more details.

INTENDED USES OF THE EIR

The CEQA Guidelines (Section 15124(d)) require EIRs to identify the agencies that are expected to use the EIR in their decision-making, and the approvals for which the EIR will be used. This EIR will inform MTC and ABAG, in addition to other responsible agencies, persons, and the general public, of the potential environmental effects of the proposed Plan and the identified alternatives. MTC and ABAG will use the EIR as part of its review and approval of Plan Bay Area.

The lead agencies for projects analyzed in this program EIR may use it as the basis for their regional cumulative analysis of specific project impacts, together with the projected growth in the region. Cities and counties may use information in this EIR in their future housing elements. Bay Area congestion management agencies (CMAs) may incorporate information provided in this EIR into future county transportation plans such as congestion management programs, countywide transportation plans, or county bike and pedestrian plans. Other agencies expected to use the EIR include: Caltrans, transportation authorities, transit providers in the region (such as Muni, BART, AC Transit, SamTrans, Caltrain, SolTrans, WestCAT, ACE, Water Emergency Transit Authority, etc.), the Bay Conservation and Development Commission, the Bay Area Air Quality Management District, and cities and counties.

Mitigation measures described in this EIR may be incorporated into project-level environmental impact analyses by project sponsors or local agencies as appropriate to mitigate identified project-level impacts.

This EIR is also intended to help activate the CEQA streamlining benefits of SB 375 for local jurisdictions and private development, described in the "SB 375 CEQA Streamlining" section below.

APPROVALS FOR WHICH THE EIR WILL BE USED

This EIR is being prepared for use by MTC and ABAG in its review and approval of the proposed Plan Bay Area. The EIR is intended to be solely used for the approval of Plan Bay Area and should not be solely relied upon by implementing agencies for the approval of individual projects included in Plan Bay Area. However, information in this document can be referenced as applicable.

Future Environmental Review

This program EIR is a first-tier document that addresses the broad environmental issues affecting the nine-county Bay Area due to the adoption and implementation of Plan Bay Area. As such, future programs or projects may "tier off" this programmatic EIR, as stipulated in CEQA and associated legislation. Tiering means using analysis contained in a broader EIR (e.g., one prepared for a general plan) with later EIRs and negative declarations on narrower projects.

Prior to SB 375, there were already several provisions in CEQA for the exemption and streamlining of environmental analysis for subsequent projects consistent with a program for which a program EIR had been prepared. Some examples include:

- *Tiering.* Where a first-tier EIR has been certified for a policy, program, or ordinance, the scope of later EIRs need not examine those significant effects of later projects that have already been mitigated or avoided as part of the prior project approval, as evidenced in the findings adopted for the prior project; or were examined at a sufficient level of detail in the prior EIR that they can be mitigated or avoided by site-specific revisions, the imposition of conditions, or by other means in connection with the approval of the later project (PRC Section 21094). Later CEQA documents must state explicitly that the lead agency is using the tiering concept, and they must refer to this EIR and state where a copy may be examined.
- *Exemptions Similar to Tiering.* Where special rules apply to projects consistent with general plans, community plans, and zoning for which EIRs were prepared, project-specific CEQA review is limited and focused on significant effects specific to the project or its site (PRC Section 21083.3); and residential projects pursuant to a Specific Plan for which an EIR has been prepared need not prepare an EIR or negative declaration unless a subsequent EIR is required pursuant to CEQA Guidelines Section 15162 (new or changed information on significant impacts)(Government Code Section 65457 and CEQA Guidelines Section 15182).

SB 375 CEQA STREAMLINING

Pursuant to SB 375, after adoption of an SCS, projects consistent with the land use designation, density, building intensity, and applicable policies included in the SCS are exempt from CEQA if they meet certain specified criteria intended to ensure that the individual project is consistent with the SCS and will not have additional impacts not considered in the SCS EIR or, if not, may qualify to omit CEQA review of growth-inducing impacts and climate change impacts related to cars and light duty trucks. To facilitate tiering under SB 375 provisions in particular, the EIR analysis provides substantial evaluation of cumulative and growth-inducing impacts. In line with the intent of SB 375, these analyses relate to how land use and transportation program choices influence individual and household transportation behavior, and the resulting air quality, greenhouse gases, transportation, noise, and other effects that result. To the extent possible, subsequent local plans and projects consistent with the SCS should be able to rely on the analysis in this EIR of growth-inducing and cumulative effects in their environmental analyses.

SB 375 provides CEQA streamlining provisions for certain "residential/mixed use residential projects" and "transit priority projects" (TPPs) to encourage integrated land use and transportation planning. To take advantage of these CEQA streamlining provisions, projects must pre-qualify based on two criteria:

1. A project must be consistent with the land use designation, density, building intensity, and applicable policies in an approved SCS or Alternative Planning Strategy (APS) (PRC section 21155).
2. A project must be considered a Residential/Mixed Use Residential Project or a Transit Priority Project (TPP), as defined in SB 375 (PRC section 21159.28).

Residential/Mixed Use Residential Projects and Transit Priority Projects

To qualify as a residential mixed use project, at least 75 percent of the total building square footage of the project must consist of residential use (PRC section 21159.28).

To qualify as a TPP, a project must (a) contain at least 50 percent residential use, based on total building square footage, and if the project contains between 26 percent and 50 percent nonresidential uses, a floor area ratio of not less than 0.75; (b) provide a minimum net density of at least 20 dwelling units per acre; and (c) be within one-half mile of a major transit stop or high-quality transit corridor included in a regional transportation plan.

A project is considered to be within one-half mile of a major transit stop or high-quality transit corridor if all parcels within the project have no more than 25 percent of their area farther than one-half mile from the stop or corridor and if not more than 10 percent of the residential units or 100 units, whichever is less, in the project are farther than one-half mile from the stop or corridor. A *major transit stop* is defined as a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods. A *high-quality transit corridor* is defined as a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours (PRC section 21155).

TPP projects may be eligible for a Sustainable Communities Environmental Assessment (SCEA) or a Limited EIR. (PRC section 21155.2) Further, certain TPP projects that meet special criteria, outlined in **Table 1.1-1** are considered a Sustainable Communities Project and are exempt from CEQA review (PRC section 21155.1).

Streamlining Requirements

Table 1.1-1 lists the pre-requisites and qualifications for Residential/Mixed-Use Residential, TPPs, and Sustainable Communities projects and the corresponding CEQA streamlining benefits. Projects that use the SB 375 CEQA streamlining benefits will still need to obtain discretionary permits or other approvals from the lead agency and the local jurisdiction, in accordance with local codes and procedures, including any agreements related to zoning, design review, use permits, and other local code requirements. Other development projects that do not fall into any of these categories can still use this EIR for regular CEQA tiering benefits – see the following section on "Additional Tiering Opportunities."

TABLE 1.1-1: REQUIREMENTS FOR CEQA STREAMLINING RELATED TO AN SCS

Project Designation	*Mixed Use Residential Project*	*Transit Priority Project*	*Sustainable Communities Project*
Prerequisites	• MPO adopts an SCS or APS that can achieve region's GHG emissions reduction target • ARB accepts the SCS or APS • Proposed project is a residential or residential mixed-use project consistent with the general use designation, density, building intensity, and applicable policies specified for the project area in the SCS or APS • Project has incorporated applicable mitigation measures or performance standards required by a prior environmental document • Regardless of any CEQA streamlining or exemption benefits that a project receives from the SB 375 CEQA provisions, the lead agency must consider the merits of the project before moving forward with project approvals in accordance with local codes and procedures		
Qualifications	• At least 75% of total building square footage for residential use	• At least 50% of total building square footage for residential use OR • If 26% ‐ 50% of total building square footage is nonresidential, a minimum FAR of 0.75 • Minimum net density of 20 du/acre • Within 0.5 miles of major transit stop or high-quality transit corridor included in the RTP	*Everything for Transit Priority Project PLUS:* • Served by existing utilities • Applicant pays all applicable fees • Does not contain wetlands or riparian areas • Does not have significant value as a wildlife habitat and does not harm any protected species • Not on the Cortese List • No risks from hazardous substances • No impacts to historic resources • No wildfire, seismic, flood, public health risk • Not on developed open space • 15% more energy ‐ efficient than Title 24 • Uses 25% less water than average households • Site is no more than eight acres • No more than 200 housing units • No net loss of affordable housing within project area • No building greater than

TABLE 1.1-1: REQUIREMENTS FOR CEQA STREAMLINING RELATED TO AN SCS

Project Designation	*Mixed Use Residential Project*	*Transit Priority Project*	*Sustainable Communities Project*
			75,000 square feet • Does not conflict with nearby industrial uses • Meets minimum affordable housing requirements as prescribed in SB 375 OR in-lieu fee paid OR 5 acres of open space per 1,000 residents provided
Streamlining Benefits	Environmental documents are **not** required to reference, describe or discuss: • Growth-inducing impacts • Impacts from car and light-duty truck trips on global warming or the regional transportation network • A reduced-density alternative to project (EIRs only)	The Lead Agency may determine whether to pursue a Sustainable Communities Environmental Assessment (SCEA) or a Limited Environmental Review *SCEA:* • Lead agency only prepares an initial study which identifies all significant impacts, except for growth-inducing impacts and impacts from car and light-duty truck trips on global warming or the regional transportation network • Cumulative effects identified and mitigated for in previous applicable EIR's shall NOT be treated as cumulatively considerable for the project • Shall contain mitigation measures to avoid or mitigate to a level of insignificance all significant effects identified • 30 day public comment period • May be approved after the lead agency conducts a public hearing, reviews comments received, and finds that all potentially significant effects have been identified, analyzed, and mitigated to a level of insignificance • The fee to appeal a planning	**Exempt from CEQA** Lead agency may file a Notice of Exemption upon project approval

TABLE 1.1-1: REQUIREMENTS FOR CEQA STREAMLINING RELATED TO AN SCS

Project Designation	*Mixed Use Residential Project*	*Transit Priority Project*	*Sustainable Communities Project*
		commission decision to the decision-making body shall not exceed $500 • Deferential review standard – the burden of proof for legal challenge is on the petitioner/plaintiff *Limited Analysis EIR* • First two bullets of SCEA plus the EIR does not need to analyze off - site alternatives to the project	

ADDITIONAL TIERING OPPORTUNITIES

In 2010, two new bills (SB 1456 and AB 231) amended tiering provisions further to facilitate use of prior statements of overriding considerations and prior analyses of cumulative effects in order to streamline CEQA analysis of subsequent projects:

- SB 1456 (2010) allows the lead agency preparing a tiered EIR to rely on assessment of cumulative impacts in a prior EIR. If a lead agency determines that a cumulative effect has been adequately addressed in a prior EIR and provided that the later project's incremental contribution to the cumulative effect is not cumulatively considerable, that cumulative effect is not required to be examined in a later EIR, mitigated negative declaration, or negative declaration.
- AB 231 (2010) allows the lead agency to rely on a statement of overriding considerations made in a prior EIR for a later project. If a prior EIR has been certified for a program, plan, policy, or ordinance, based on a finding of overriding considerations, the lead agency for a later project that uses an EIR tiered from that program, plan, policy, or ordinance may incorporate by reference that finding of overriding considerations, subject to certain conditions.

1.2 Overview of the Proposed Plan Bay Area

The proposed Plan Bay Area serves as the 2040 Regional Transportation Plan (RTP) for the San Francisco Bay Area region as well as the region's Sustainable Communities Strategy (SCS) as required under SB 375. The "SCS" is by definition the combined land use and transportation plan. The proposed Plan represents a transportation and land use blueprint of how the Bay Area addresses its transportation mobility and accessibility needs, land development, and greenhouse gas emissions reduction requirements through the year 2040. The Plan document presents its purpose and goals, tracks trends and evaluates project performance, details financial assumptions and expenditures, profiles key investments, and sets forth actions that the region would advocate and pursue over the next several years. See the Draft Plan Bay Area and supplementary reports document for full details. These can be found at, respectively:

- http://onebayarea.org/regional-initiatives/plan-bay-area/draft-plan-bay-area.html
- http://onebayarea.org/regional-initiatives/plan-bay-area/draft-plan-bay-area/supplementary-reports.html

This chapter describes the regional setting, growth forecasts and regulatory framework to provide the context for the proposed Plan. This background information is followed by a description of the proposed Plan, including the Plan purpose and objectives, key components, growth strategy, implementation strategy, and proposed programs.

Regional Setting

STUDY AREA

The Bay Area region consists of nine counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. The total population of the region in 2010 was 7.15 million, with the most populous counties being Santa Clara (1.69 million), Alameda (1.37 million), and Contra Costa (1.05 million).[1] According to the Department of Conservation, only about 17 percent of the region's approximately 4.5 million acres was developed in 2010.[2] The remaining undeveloped area includes open space and agricultural lands as well as water bodies (excluding the San Francisco Bay) and parks. Comparatively, 28 percent of the region is identified as protected open space. **Figure 1.2-1** illustrates the

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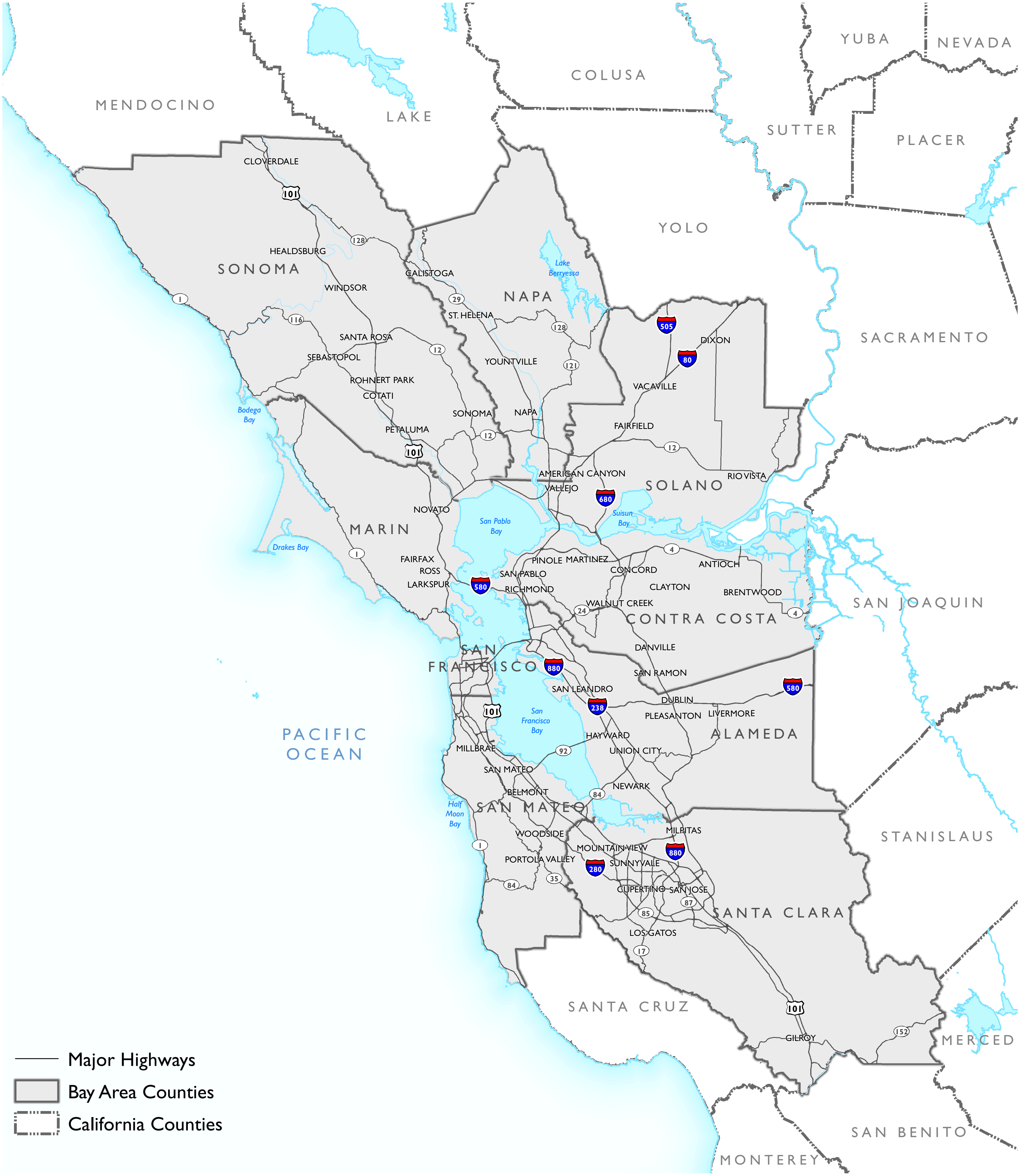
1 US Census, 2010.

2 California Department of Conservation Farmland Mapping and Monitoring Program, 2010 for Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara and Solano; data for San Francisco is from 2006.

regional location of the Bay Area. More information about the San Francisco Bay Area physical setting is provided by environmental issue area in the settings sections throughout Chapter 2 of this EIR.

Figure 1.2-1

Regional Location



Data Source: Metropolitan Transportation Commission, 2012; Cal-Atlas Geospatial Clearinghouse, 2012;
The Conservation Lands Network GIS Data Sets, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

0 5 10 20 Miles
1 in = 18 miles

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PROJECTED GROWTH

Overall Regional Growth Context and Trends

In recent years, the State of California and the Bay Area have shifted from growth rates that outpace the nation to growth more on par with the rest of the nation. This reflects the maturing of some of the industries and companies that make up the state and regional economies. Geographic constraints and policy protections for resource lands also limit spatial expansion in the region, which has fueled part of the economic growth in California in the last century. Finally, demographic changes in the region's workforce, in particular the aging and looming retirement of the Baby Boom generation, will slow labor force growth. This means that a growing share of job opportunities in the region will be through turnover and replacing retiring workers, although the number of new jobs will continue to grow.

The Bay Area in previous decades experienced a pattern of major suburban housing production and employment growth, supported by the expansion of the highway transportation network. This population provided a labor force for employment growth at suburban locations. While this decentralization of jobs combined with the growth of affordable housing options in suburban communities created new opportunities for many areas in the region, it also led to high levels of traffic congestion, increases in the cost of and time spent commuting, higher percentages of low-income families living in the outer suburbs, and the loss of agricultural lands and natural resources.

The boom years that defined and allowed for the past 40 years of housing development have passed. Today, recovering from the recession, improving housing affordability in suburban areas, and providing housing for low and moderate income households in high-demand, job-rich areas are among the region's greatest challenges.

By 2040, the region is projected to have a total of approximately 4.5 million jobs and 3.4 million housing units, or an additional 1.1 million jobs and 660,000 housing units from 2010 levels. The region's population is expected to grow from 7.15 million people in 2010 to 9.3 million in 2040.[3] **Table 1.2-1** summarizes the following key elements of the growth projections:

- The 2040 job forecast was established from an analysis of economic and demographic trends, housing production, and the Bay Area's unique role in the national and state economies. Over the long term, the region's share of national job growth is expected to increase as industries concentrated within the Bay Area grow at faster rates than elsewhere in the country. In addition to reflecting the changing dynamics of the national economy, this assumption is intended to help ensure that the region plans for adequate housing to support job growth. The forecast was informed by a study by the Center for Continuing Study of the California Economy.[4]
- The 2040 employment forecast reflects an increase of 850,000 jobs beyond pre-recession levels. Because of the high unemployment levels in the 2010 base year, a significant number of new jobs are projected to be filled by unemployed existing residents over this period.

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[3] Association of Bay Area Governments, Jobs-Housing Connection Strategy, May 16, 2012.

[4] Center for Continuing Study of the California Economy, "Bay Area Job Growth to 2040", February 2012.

- The 2040 housing forecast was based upon an analysis of past production, challenges associated with increasing the inventory of multi-family housing brought to market, and future policy supports, acknowledging that high housing costs and limited production is a factor constraining the ability of the region to accommodate future job growth. This was informed by a study from Dr. Karen Chapple of the University of California, Berkeley.[5]
- With the re-absorption of some 40,000 vacant, foreclosed units, the projected 660,000 new units will allow the region to accommodate the population growth forecast through 2040. As of 2010, the region had approximately 178,000 vacant housing units; this number will reduce to 138,000 vacant units in 2040 for a regionwide vacancy rate of 4 percent.
- These projections assume that the ratio of employed residents per job within the nine-county region remains constant. This ratio reflects the number of Bay Area residents that commute outside of the region to reach jobs, and the number of jobs within the region filled by residents from outside the Bay Area.

TABLE 1.2-1: PROJECTED REGIONAL GROWTH BY 2040

	2010	*2040*	*Growth*	*%*
Population	7,151,000	9,299,000	2,148,000	30%
Households	2,608,000	3,308,000	700,000	27%
Housing Units	2,786,000	3,446,000	660,000	24%
Jobs	3,385,000	4,505,000	1,120,000	33%

Source: Association of Bay Area Governments, Jobs-Housing Connection Strategy, May 16, 2012.

Employment

Over half of the region's employment growth of 1.1 million new jobs is expected by ABAG to occur between 2010 and 2020, which includes the recovery of close to 300,000 jobs lost since 2007. Many of these jobs will be filled by currently unemployed or underemployed individuals. From 2020 to 2040, the rate of job growth is forecast to slow down as retiring Baby Boomers exit the labor force.

The growth of 1.1 million jobs does not necessarily translate directly into new office, commercial or industrial space. About one third of these jobs could potentially be accommodated within existing offices and facilities given current vacancy rates. Overall trends suggest a transition toward a more focused employment growth pattern for the region. This focused growth takes a variety of forms across the numerous employment centers throughout the region.

- **Knowledge-based, culture, and entertainment at regional centers.** Contrary to previous trends of job decline in major regional centers, the recent growth of professional services in close proximity to urban amenities is expected to lead to an increase of job growth in Downtown San Francisco, Downtown Oakland, and Downtown San José—assuming an appropriate provision of infrastructure, transit, and access to affordable housing. The new wave of businesses and professionals' demand for building space prioritizes flexibility to adjust spaces to multiple functions

[5] Chapple, Karen, "Evaluating the effects of projected job growth on housing demand," 2012.

and requires less office space per worker relative to the early growth of traditional downtown office space.

- **Multiple activities and transit at office parks.** Office parks have and are expected to continue to accommodate a growing number of employees. However, given the limited land available for new office parks, existing vacant office space, and the preference for walkable, transit-served neighborhoods by a growing number of employers, office parks are expected to grow at a slower pace than in recent decades. Existing office parks are also using less space per worker, providing transit access, and in some cases adding housing, services and amenities. The emerging private shuttle services run by some employers, particularly in San Mateo and Santa Clara Counties, are expected to grow and improve transit access for their employees while lessening, but not fully mitigating, increased freeway traffic congestion related to employment growth.
- **Downtown areas and transit corridors serving residents.** Over the last decade, downtown areas in medium and small cities throughout the region have been expanding their services and jobs. The increase in the senior population, combined with the region's changing ethnic demographic profile, is expected to increase the need and demand for local services in downtown areas in close proximity to residential locations with greater transportation choices.
- **New vitality of industrial and agricultural land.** Manufacturing and wholesale distribution have experienced declining employment in many of the region's key industrial areas. However, in recent years a different and very diverse mix of businesses has relocated to these areas. In addition to basic services such as shuttle services, refuse collection or concrete plants, industrial lands are now occupied by a wide range of businesses from food processing to high tech product development, car repair, graphic design, and recycling among others. Because of their building and space needs, these economic sectors are coalescing in traditional industrial lands. The trends in agricultural land have paralleled those of industrial land in its increasing diversity of activities. But, in the case of agricultural land, growth is related to the addition of services and tourism. Beyond tourism, agricultural land and activity in the region is also a strong quality of life attractor for residents of the Bay Area.

Population

The forecasted population growth to 9.3 million people by 2040 is based on projected regional employment growth shaped by national economic and demographic forecasts. The relationship of jobs to population was calculated by the Center for the Continuing Study of California's Economy based upon population characteristics. The population characteristics used in the projections incorporates information from the 2010 Census and a statewide forecast produced by the California Department of Finance in 2007. The Jobs-Housing Connection Scenario used for the proposed Plan includes an adjustment of 0.7 percent more employed residents than the numbers forecast by the Center for the Continuing Study of California's Economy (CCSCE).[6] This adjustment is the result of assuming the 2010 in-commute ratio until 2040.

[6] Levy, Stephen, *Bay Area Job Growth to 2040: Projections and Analysis*, Center for Continuing Study of the California Economy, February 2012. http://www.onebayarea.org/pdf/3-9-12/CCSCE_Bay_Area_Job_Growth_to_2040.pdf.

Two major demographic changes shape the forecast of household and job growth: the increase in the senior population and the increase in Latino and Asian populations. These demographic changes lead to three major trends in the regional growth by 2040:

- **Increase in group housing.** The increase in the senior population results in an increase in the amount of residential care facilities, which is a major component of group housing. More than 66,000 additional group housing residents are forecasted by 2040. This is a conservative estimate based on current conditions.
- **Decline in labor force participation**. The overall labor force participation rate declines given the increase in the senior population, even taking into account increases in the percentage of people working beyond the age of 65. This means that, by 2040, 49.8 people out of 100 will be employed or looking for work, compared to 51.6 in 2010.
- **Increase in household size**. The number of people per household is expected to increase from 2.69 in 2010 to 2.75 in 2040 as a result of the increase in the Latino and Asian populations, which typically have larger average households, as well as the number and percentage of multi-generational households.[7]

Project Background

This section summarizes the planning context of the proposed Plan, building on MTC's most recent RTP–the Transportation 2035 Plan–the regional land use and development strategy jointly developed by MTC and ABAG–known as FOCUS–as well as other recent regional initiatives that influence Plan Bay Area. This section also outlines the major federal and state regulations that shape the proposed Plan and the planning process that led to development of the Plan.

EXISTING REGIONAL TRANSPORTATION AND LAND USE PLANS

Transportation 2035 Plan for the San Francisco Bay Area

The Transportation 2035 Plan was adopted by MTC in 2009 and pursued the following eight goals: Maintenance and Safety, Reliability, Efficient Freight Travel, Security and Emergency Management, Clean Air, Climate Protection, Equitable Access, and Livable Communities. The 2035 Plan was organized around a series of goals and performance objectives intended to improve transportation-related health and safety while being cost effective and reducing travel delays. Plan Bay Area will update this RTP by providing a new estimate of revenues likely to be available through 2040, transportation projects that fit within this budget, and adding a land use and housing element as required by SB 375.

The Transportation 2035 Plan assumed $226 billion in estimated revenue over the lifetime of the plan, with the included set of projects constrained to within that budget. Much of this revenue—$194 billion, or 86 percent—was considered already committed:

- $165 billion dedicated to maintaining and operating the existing regional transportation network, and

[7] Association of Bay Area Governments, Jobs-Housing Connection Strategy, May 16, 2012.

- $29 billion committed to expansion of the regional transportation network.

The remaining $32 billion was uncommitted discretionary revenue allocated for new projects, which included:

- $7.0 billion towards local road pavement maintenance,
- $6.4 billion towards transit vehicle replacement and 25 percent of the highest-rated transit assets,
- $6 billion for transit and roadway expansion projects,
- $2.2 billion towards the Transportation for Livable Communities Program,
- $1.6 billion towards the Freeway Performance Initiative,
- $400 million towards the Regional Bicycle Network, and
- $400 million towards the Lifeline Transportation Program.

In addition, Transportation 2035 included the development of a Regional HOT Lanes Network projected to generate revenue of $6.1 billion (net of operating, maintenance and capital expenditures) over the life of the Plan to implement other corridor improvements. Plan Bay Area will update and replace the Transportation 2035 Plan.

FOCUS

In 2008, MTC and ABAG created a regional initiative called FOCUS to support efforts by local jurisdictions and regional agencies to encourage the growth of jobs and production of housing in areas with amenities and existing infrastructure. Through FOCUS, local governments identified Priority Development Areas (PDAs) and Priority Conservation Areas (PCAs), which are keys to the implementation of Plan Bay Area. More information on PDAs and PCAs is provided later in Chapter 1.2.

Regional Housing Need Allocation

As part of the region's planning efforts, ABAG must identify areas within the region sufficient to house an eight-year projection of the regional housing need. The State periodically assigns a Regional Housing Needs Allocation (RHNA) to each region in California. Working with regional and local government, the regional housing need is allocated to individual jurisdictions, which must then show the ability to accommodate that level of additional housing. The current RHNA period for the Bay Area covers 2007-2014.

The next round of the RHNA (2014-2022) will allocate housing units within the region consistent with the development pattern included in the region's SCS.

Transit Sustainability Project

The analysis for the most recent regional transportation plan, Transportation 2035, suggested that the region's transit system is not sustainable based on current projections of transit costs and reasonably anticipated revenues. Transportation 2035 identified a region-wide transit capital deficit of $17 billion and operating budget deficits of $8 billion over the next 25 years. To add to the challenge, between 1997 and 2008, service hours and passenger trips did not keep pace with increases in operating costs, even after accounting for inflation.

MTC's Transit Sustainability Project (TSP) aimed to establish a framework and implementation plan for a more robust, financially viable transit system that is both cost-effective and customer-focused. The TSP focused on three goals:

- **Improve financial condition.** Contain costs and cover a greater percentage of operating and capital costs with a growing share of passenger fare revenues; secure more reliable streams of public funding.
- **Improve service for the customer.** Upgrade the system so that it functions as an accessible, user-friendly and coordinated network for transit riders, regardless of mode, location or jurisdiction.
- **Attract new riders to the system.** Accommodate new riders in an era of emission reduction goals, and support ridership growth through companion land use and pricing policies.

In May 2012, MTC approved the TSP recommendations, including: performance measures and targets; the Transit Performance Initiative, an investment and incentive strategy to improve public transit; and additional customer-focused service, institutional, and paratransit recommendations. These measures and targets are incorporated into the transportation investment strategy of the proposed Plan.

Coordinated Public Transit-Human Services Plan

MTC adopted a Coordinated Public Transit/Human Services Transportation Plan in 2007 that focuses on the transportation needs of the region's low-income, elderly and disabled populations. The plan also provides strategies for coordinating service for the three populations.

Community-Based Transportation Planning Program

The Community-Based Transportation Planning Program created a collaborative planning process that involves residents in low-income Bay Area communities, community- and faith-based organizations that serve them, transit operators, county congestion management agencies, and MTC. Each completed Community-Based Transportation Plan contains: demographic analysis of the area; documented community outreach strategies with results; and a listing of community-prioritized transportation gaps and barriers, strategies or solutions to address identified gaps, and potential funding sources for implementation. The Plans also identify stakeholders committed to implementing the plan. Project findings are forwarded to applicable local or county-level policy boards, as well as to MTC, for consideration in planning, funding and implementation discussions.

Countywide Transportation Plans

Each of the nine county Congestion Management Agencies within the Bay Area prepares a long-range planning and policy document that assesses transportation needs and guides transportation priorities and funding decisions for that county over a 20- to 25-year horizon. These countywide plans identify transportation projects and programs that are forwarded to MTC for consideration in the long-range RTP.

REGULATORY SETTING

The following laws and regulations form the basis for the need for the proposed Plan Bay Area. These federal and State laws authorize the RTP and SCS and guide its content.

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law in 2005 and reauthorized highway, highway safety, transit, and other surface transportation programs for five years (2005-2009) totaling $244.1 billion. Under SAFETEA-LU, the U.S. Department of Transportation (USDOT) required that Metropolitan Planning Organizations (MPOs), such as MTC, review and update the long-range transportation plan at least every four years in air quality nonattainment and maintenance areas and at least every five years in attainment areas, requiring a four year update for the Bay Area's RTP. The current RTP, Transportation 2035, was adopted under SAFETEA-LU.

Moving Ahead for Progress in the 21st Century (MAP-21)

The Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law in July 2012 and reauthorized the federal highway and public transportation programs for 2013 and 2014 for a total of $105 billion, holding funding flat relative to prior years. The bill marks a notable departure from prior surface transportation acts in several respects, most notably its short duration, elimination of earmarks, consolidation of programs, and introduction of performance measures into the federal transportation policy framework. While the bill retains many of the larger highway and transit programs of its predecessor, SAFETEA-LU, it eliminates almost 100 smaller programs and distributes a much larger share of funds by formula (93 percent compared to 83 percent under SAFETEA-LU).

Under MAP-21, the U.S. Department of Transportation requires that metropolitan planning organizations, such as MTC, prepare long-range transportation plans and update them every four years if they are in areas designated as "nonattainment" or "maintenance" for federal air quality standards. Plan Bay Area fulfills this requirement. Prior to enactment of MAP-21, the primary federal requirements regarding RTPs were included in the metropolitan transportation planning rules—Title 23 CFR Part 450 and 49 CFR Part 613. MAP-21 makes a number of changes to the statutes that underpin these regulations, and revisions to the regulations are expected to be made in early 2013. Key federal requirements for long range plans include:

- RTPs must be developed through an open and inclusive process that ensures public input; seeks out and considers the needs of those traditionally underserved by existing transportation systems; and consults with resource agencies to ensure potential problems are discovered early in the RTP planning process;
- RTPs must be developed for a period of not less than 20 years into the future;
- RTPs must reflect the most recent assumptions for population, travel, land use, congestion, employment, and economic activity;
- RTPs must have a financially constrained element, transportation revenue assumptions must be reasonable, and the long range financial estimate must take into account construction-related inflation costs;
- RTPs must include a description of the performance measures and performance targets used in assessing the performance of the transportation system;
- A system performance report evaluating the condition and performance of the system with respect to performance targets adopted by the state that details progress over time;

- RTPs may include, for illustrative purposes, additional projects that would be included in the adopted RTP if reasonable additional resources beyond those identified in the financial plan were to become available;
- RTPs may include multiple scenarios for consideration and evaluation relative to the state performance targets as well as locally-developed measures;
- RTPs must conform to the applicable federal air quality plan, called the State Implementation Plan (SIP), for ozone and other pollutants for which an area is not in attainment; and
- RTPs must consider planning factors and strategies in the local context.

California Regional Transportation Plan Guidelines

The RTP Guidelines adopted by the California Transportation Commission (CTC) state that the CTC cannot program projects that are not identified in the RTP. Section 65080 states that the RTP shall contain three distinct elements:

- A **Policy Element** that reflects the mobility goals, policies and objectives of the region;
- An **Action Element** that identifies programs and actions to implement the RTP; and
- A **Financial Element** that summarizes the cost of implementing the projects in the RTP in a financially constrained environment.

The proposed Plan covers all appropriate issues associated with each element and also serves all the specific planning purposes outlined in greater detail in the CTC RTP Guidelines, including:[8]

- Addressing no less than a 20-year planning horizon;
- Including both long-range and short-range strategies/actions;
- Addressing issues specified in the policy, action and financial elements identified in California Government Code Section 65080;
- Specifying how travel demand modeling methodology, results and key assumptions were developed as part of the RTP process;
- Containing a public involvement program that meets the requirements of Title 23, CFR part 450.316(a);
- Identifying public policy decisions by local, regional, state and federal officials regarding transportation expenditures and financing;
- Involving numerous stakeholders such as community-based organizations, Native American Tribal Governments, local elected officials, and Federal, State and local agencies early in the transportation planning process;
- Discussing intermodal and connectivity issues, highways, mass transportation, the regional airport system, regional pedestrian needs, regional bicycle needs, the California Coastal Trail, rail transportation, maritime transportation, and goods movement;

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[8] See California Transportation Commission's 2010 Regional Transportation Plan Guidelines.

- Identifying the objective criteria used for measuring the performance of the transportation system;
- Containing a list of financially constrained projects and identify any regionally significant projects; and
- Containing estimates of costs and revenue sources that are reasonably expected to be available to operate and maintain the freeways, highway and transit within the region.

MPOs, such as MTC, that are located in nonattainment areas must update their RTPs at least every four years. If the current RTP is determined to be adequate such that an update is not warranted, the MPO may re-adopt the current RTP.

Once adopted, the RTP guides the development of the Transportation Improvement Program (TIP) for the region. The TIP is a comprehensive listing of all Bay Area transportation projects that receive federal funds or that are subject to a federally required action. The TIP sets forth MTC's investment priorities for transit and transit-related improvements, highways and roadways, and other surface transportation improvements. MTC prepares and adopts the TIP every two years. The TIP covers at least a four-year period and contains a priority list of projects grouped by year. Further, the TIP is also financially constrained by year (meaning that the amount of dollars programmed must not exceed the amount of dollars estimated to be available in that year). Each project or project phase included in the TIP must be consistent with the approved RTP. MTC's own enabling statutes (State Government Code Section 66508 through Section 66513) reflect the federal and State requirements for preparation of a RTP.

Executive Order S-3-05 (Gov. Schwarzenegger, June 2005)

This Order recognizes California's vulnerability to climate change, noting that increasing temperatures could potentially reduce snow pack in the Sierra Nevada, which is a primary source of the State's water supply. Additionally, according to this Order, climate change could influence human health, coastal habitats, microclimates, and agricultural yield. The Order set the greenhouse gas reduction targets for California: By 2010, reduce GHG emissions to 2000 levels; by 2020 reduce GHG emissions to 1990 levels; by 2050 reduce GHG emissions to 80 percent below 1990 levels. This corresponds to an approximate 27 percent reduction by 2030 to 1990 levels, or 55 CO_2e in total emissions which correlates to 41 percent reduction over today's levels by 2030. These statewide GHG targets relate directly to the regional GHG reductions that an SCS must achieve.

California Global Warming Solutions Act of 2006 (AB 32) (Calif. Health & Safety Code Sections 38500 et seq.)

In September 2006, Governor Arnold Schwarzenegger signed Assembly Bill (AB) 32, the California Global Warming Solutions Act (Health and Safety Code Section 38500 et seq.). The Act requires the reduction of statewide GHG emissions to 1990 levels by the year 2020. This change, which is estimated to be a 30 percent reduction from business as usual emission levels projected for 2020, will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. The Act also directs the California Air Resources Board (ARB) to develop and implement regulations to reduce statewide GHG emissions from stationary sources and address GHG emissions from vehicles.

AB 32 required ARB to develop a Climate Change Scoping Plan outlining the State's strategy to achieve the 2020 greenhouse gas emissions limit. The Scoping Plan, finalized in December 2008, proposes a comprehensive set of actions designed to reduce overall greenhouse gas emissions and set 427 million metric tons of carbon dioxide equivalent emissions (MMTCO2e) as the 2020 statewide greenhouse gas emissions target. Reducing greenhouse gas emissions to these levels means cutting approximately 30 percent from business-as-usual emission levels projected for 2020. In addition to energy efficiency and cleaner energy programs, the Scoping Plan establishes targets for transportation-related greenhouse gas emissions for regions throughout California. These targets are those that an SCS, such as Plan Bay Area, must achieve.

SB 375

California State Senate Bill (SB) 375 went into effect in 2009 to help achieve the goal of reducing greenhouse gas (GHG) emissions to levels established by ARB and mandated under AB 32. The Bay Area's per-capita GHG emission reduction targets are -7 percent in 2020 and -15 percent in 2035 from 2005 levels.

The primary purpose of SB 375 is to integrate land-use and transportation planning to help lower GHG emissions and vehicle miles traveled through the development of an SCS. If the SCS is unable to achieve the GHG emission reduction targets, an Alternative Planning Strategy (APS) must be developed to demonstrate how the targets could be achieved. Plan Bay Area is both an RTP and SCS.

As stated in SB 375, "The Sustainable Communities Strategy shall:

1. Identify the general location of uses, residential densities, and building intensities within the region;
2. Identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan taking into account net migration into the region, population growth, household formation and employment growth;
3. Identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to Section 65584;
4. Identify a transportation network to service the transportation needs of the region;
5. Gather and consider the best practically available scientific information regarding resource areas and farmland in the region;
6. Consider the state housing goals specified in Sections 65580 and 65584;
7. Set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board; and
8. Allow the regional transportation plan to comply with Section 176 of the federal Clean Air Act (42 U.S.C. Sec. 7506)."

Plan Development Process

The process to develop the Bay Area's joint RTP and SCS that became the proposed Plan Bay Area began in March 2010. The process was shaped by the region's GHG emissions reduction target set by ARB. Public and agency involvement was a key component for each step of the planning process. The planning process for Plan Bay Area was unique in that it involved two agencies—MTC and ABAG—working together to create a strategy for two inter-related outcomes: a land use development pattern and a transportation system. The land use pattern developed is known as the Jobs-Housing Connection Strategy (JHCS) and the transportation system developed is known as the Transportation Investment Strategy (TIS). This section describes how these two components of the proposed Plan were developed; a description of the strategies included in each component is provided later in Chapter 1.2.

Development of the proposed Plan consisted of the creation and evaluation of scenarios, transportation and land development modeling, and public participation. These planning components integrated with one another to lead to the proposed Plan and its alternatives.

SCENARIO ANALYSIS

Multiple rounds of scenario analyses were conducted to inform development of Plan Bay Area. The Initial Vision Scenario, released in March 2011, provided a starting point for conversations with local governments and Bay Area residents about where new development should occur and how new long-term transportation investments can serve this new growth. The Initial Vision Scenario was developed by MTC and ABAG with input from local governments and county Congestion Management Agencies. Local jurisdictions identified places that could accommodate the region's future population and job growth as well as potential policies, strategies, and incentives to support this growth.

The local input gathered was used as the basis for creating a range of alternative land use development scenarios, with the purpose of expanding the regional dialogue on the type of development, planning strategies, and investments to define the SCS. The alternative land use patterns in the scenario analysis included:

- **Unconstrained Core Concentration**. Housing and job growth was concentrated in locations served by frequent transit service and core Bay Area locations within a 45-minute transit commute area of San Francisco, Oakland or San José.
- **Constrained Core Concentration.** Similar to the unconstrained version of this scenario, housing and job growth was distributed to selected Priority Development Areas in the inner Bay Area, focusing on major downtowns and areas along the region's core transit network.
- **Focused Growth.** The region's growth was distributed more evenly along transit corridors and job centers, with an emphasis on development in Priority Development Areas and Growth Opportunity Areas.
- **Outward Growth.** Higher levels of growth were identified in the inland Bay Area with some emphasis on focused growth near suburban transit hubs; this scenario was closer to historical trends than other land use options considered.

The Initial Vision and Unconstrained Core Concentration scenarios assumed unconstrained development, very strong employment growth, and unprecedented funding to support housing affordability. The growth rates assumed in these scenarios, and the ability of many cities to accommodate such growth, was not determined to be feasible; this finding was confirmed later through the jobs and housing forecasts that informed the JHCS. The other three scenarios used a lower figure based upon analysis of expected economic growth, financial feasibility, and reasonable planning strategies.

Two transportation network scenarios were also developed:

- **Transportation 2035 Plan Network**. This approach continued the multimodal investment strategy in Transportation 2035, with significant funding for operations and maintenance of the existing system and limited expansions of highway and transit networks.
- **Core Capacity Transit Network**. This approach significantly increased transit service frequencies along the core transit network, kept Transportation 2035 investment levels for maintenance and bike/pedestrian projects, and reduced Transportation 2035 roadway expansion investments. This scenario would require additional capital and operating funds to pay for the major expansion of the region's transit services.

The land use scenarios were matched up with the transportation network scenarios that best supported the pattern of development. The Initial Vision and Outward Growth land use scenarios were matched with the Transportation 2035 Plan Network, while the Unconstrained Core Concentration, Constrained Core Concentration, and Focused Growth land use scenarios were matched with the Core Capacity Transit Network. These combined scenarios were then measured against the performance targets adopted by MTC and ABAG (two required targets and eight voluntary targets) and five equity measures. Based upon the performance of the scenarios, additional local input, and stakeholder feedback, ABAG developed the Jobs-Housing Connection Strategy. The Strategy then went through several iterations to meet the GHG emissions reduction target mandated by AB 32 and SB 375 and to better coordinate transportation, jobs, and housing throughout the region.

With regard to the Transportation Investment Strategy, the alternative scenarios process highlighted the need to develop a constrained transportation investment package that provided greater funding for operating and maintaining the existing system, while also providing additional funds for public transit. Incorporating six primary strategies—GHG reduction, "Fix It First," OneBayArea grants, high-performing project prioritization, efficiency-focused programs, and transit sustainability initiatives—this process led to the creation of the Preferred Transportation Investment Strategy.

The Jobs-Housing Connection Strategy was then combined with the Transportation Investment Strategy to create the Preferred Land Use and Transportation Investment Strategy adopted by the ABAG Executive Board and the MTC Commission in May 2012 and evaluated as the proposed Plan Bay Area in this EIR. The alternatives evaluated in this EIR, including the proposed Plan, were approved by the ABAG Executive Board and the MTC Commission in July 2012.

METHOD OF ANALYSIS

The proposed Plan is based on transportation and land use forecasts developed using the MTC/ABAG integrated model. This forecasting tool combined the travel demand forecasting model, known as Travel Model One, with the land use forecasting model, known as UrbanSim.

Travel Demand Forecasting Model – Travel Model One

The MTC travel demand model, Travel Model One, is a regional activity-based travel model for the San Francisco Bay Area. This model is actually a set of individual models that perform different functions, leading to projections of future Bay Area travel. The models were developed from a database that consists of the MTC 2000 Bay Area Household Travel Survey (BATS 2000) and traffic and transit counts that are used to validate the model results. The model was re-validated using available American Community Survey 2005 data to reflect updated demographics; since 2010 Census data was not yet available at the beginning of this planning and modeling cycle, the model was used to forecast transportation trends to the baseline year of 2010.

Travel Model One produced all of the key outputs used in assessing the significance of transportation impacts, including outputs such as vehicle miles traveled, vehicle hours of delay, and accessibility, as well as other outputs such as volume to capacity ratios and level of service. For modeling and planning, the Bay Area was divided into 1,454 travel analysis zones (TAZs). Various transportation investment packages (known as scenarios) were analyzed using this model. To analyze the proposed Plan, the proposed transportation improvements (listed later in Chapter 1.2 and Appendix C) were implemented in the model on top of the region's existing transportation infrastructure. By coding these improvements into the model framework, it is possible to forecast the impacts of each alternative on regional travel patterns.

Land Use Forecasting Model – UrbanSim

ABAG is responsible for making long-term forecasts of population, households, and employment, as well as working with local jurisdictions on land use planning issues. As such, ABAG developed regional control totals—forecasted numbers of households and employed residents—for the time period between 2010 and 2040. These control totals were developed by examining historical trends and estimating how future economic conditions and demographic trends might affect the region's overall population.

UrbanSim, the regional land use forecasting model, relied upon these regional control totals as model inputs. Based on the assumed levels of household and job growth in the region, UrbanSim analyzed the impact of specific policy inputs, such as zoning, fees, incentives, and growth boundaries, on the regional development pattern. For each parcel in the region viable for potential development, UrbanSim conducted a pro forma analysis, meaning that it calculated the profitability of new development or redevelopment on that parcel given market demands and trends. Multiple types of development, reflecting a spectrum of allowable densities for both residential and commercial uses based on local zoning, were analyzed to determine the most profitable development type. These parcel-level simulations over the lifespan of the proposed Plan were aggregated to generate land use data at the TAZ-, PDA-, city-, and county-level. This data ranged from housing choice preferences (single-family versus multi-family) to job classifications' geographical distributions (concentrated versus distributed). This data is used in this EIR to assess the distribution and degree of future development around the Bay Area and its possible impacts.

Integration of Travel Model One and UrbanSim

In order to appropriately consider the symbiotic relationship of transportation and land use, Travel Model One and UrbanSim are unified in an integrated model framework. This allows for analysis of how transportation projects affect the surrounding land use pattern, as well as how changes to household and employment locations affect transportation demand—the evaluation required of an SCS.

From a mechanical perspective, the models integrated by exchanging data on household, employment, and mobility metrics at critical time points in the analysis. UrbanSim performed its analysis for every year through 2040, while Travel Model One performed its analysis for key horizon years (2020, 2035, etc.). For those key horizon years, the two models exchanged data—Travel Model One updated UrbanSim's understanding of regional mobility, while UrbanSim updated Travel Model One's understanding of household and job distributions. This periodic "sync" between the two models made it possible to reflect the improved mobility of a new transit station and how that might attract additional households and jobs in the station vicinity.

For calculations relying on outputs from Travel Model One and population totals (i.e., per capita VMT or per capita energy use), model-simulated population levels were used to ensure consistency. Simulated population may be slightly different than overall population forecasts for Plan Bay Area EIR and alternatives due to slight variability in modeling tools. Further clarification on this issue is in the Plan Bay Area EIR technical appendices.

References

The Summary of Predicted Traveler Responses and Summary of Predicted Land Use Responses supplemental documents, released in March 2013, provide detail regarding the modeling assumptions and outputs for Plan Bay Area. MTC and ABAG also have a large body of detailed published documentation regarding the integrated travel demand and land use model. This data and other documents can be obtained from the OneBayArea website at www.onebayarea.org.

PUBLIC PARTICIPATION

The Public Participation Plan for Plan Bay Area identified strategies to address major public comments on the draft plan, involve more Bay Area residents, simplify and demystify, build relationships in underserved communities, make the process more transparent, and provide more electronic access. The Public Participation Plan includes a set of goals and performance benchmarks used to measure the effectiveness of the Plan Bay Area public participation program.

Beginning with the Initial Vision Scenario in 2010, feedback from local jurisdictions and stakeholders helped shape the iterations that resulted in the proposed Plan. The non-profit and business community also played a key role in shaping Plan Bay Area. Business groups highlighted the need for more affordable workforce housing, removing regulatory barriers to infill development, and addressing infrastructure needs at rapidly growing employment centers. Environmental organizations emphasized the need to improve transit access, retain open space, provide an adequate supply of housing to limit the number of people commuting into the region from nearby counties, and direct discretionary transportation funding to communities building housing as proposed. Equity organizations focused on increasing access to housing and employment for residents of all income categories throughout the region and establishing policies to limit the displacement of existing residents.

The planning process also included a series of workshops and an interactive website to engage and gather input from residents throughout the region.

Stakeholder Engagement

The Public Participation program targeted government as well as the community through a variety of meetings, workshops, and committees. Outreach to local governments and public agencies included:

- A half-day local government summit to launch the SCS planning process (April 2010). Local elected officials received a briefing on the requirements of SB 375 and an introduction to the planning process to develop the SCS. The audience included a roughly equal representation of local elected officials, government staff, and representatives from a range of interest groups (business, environment and social equity).
- Meetings in each county with elected officials and the county Congestion Management Agencies (CMAs) to map out a process within each county to develop an Initial Vision Scenario (Fall 2010). This Initial Vision Scenario served as a starting point for discussions on the SCS. Each CMA was expected to work closely with elected officials, local jurisdictions and stakeholder organizations to discuss such issues as where new housing should be sited, how that new housing can be integrated to encourage sustainable growth and development, and how transportation investments should be prioritized to encourage and support sustainable development.
- ABAG staff utilized Basecamp software to provide a forum for local planners and ABAG staff to post comments, schedules, and materials for download. This Bay Area Basecamp has been used to rapidly communicate information and facilitate discussion between a large number of participants without relying on an exhaustive email listserve.
- Consultation with the region's six federally-recognized Native American governments, including a "tribal summit" and individual meetings.
- As required by SB 375 legislation, at least two informational meetings were held in each county for members of the county board of supervisors and city councils, to review and discuss the Draft SCS and consider their input and recommendations.
- MTC and ABAG created the Regional Advisory Working Group (RAWG), a new advisory committee whose primary purpose is to provide input to regional agency staff throughout the development of the SCS. The RAWG includes planning staff representatives of local government, county CMAs, transit agencies, and stakeholder representatives. Each county is represented by at least one local planning director; representatives of various stakeholder groups (including affordable housing, business, real estate developers, equity, and environmental groups) were invited to participate as well.
- A Regional Equity Working Group was created to assist in identifying and providing advice on the major equity issues in the region, such as affordable housing, public health, employment access, environmental justice, affordable transit and schools.
- Meetings with Planning Directors' organizations in each county.
- Consultation with existing advisory committees—MTC's Policy Advisory Council and ABAG's Regional Planning Committee.

MTC and ABAG also held community workshops on Plan Bay Area in each of the Bay Area's nine counties and provided online information and engagement options for the general public.

Public Engagement

To date MTC and ABAG have conducted two series of public workshops in conjunction with the development of Plan Bay Area. In spring 2011, MTC and ABAG partnered with the Silicon Valley Community Foundation on an initiative known as Envision Bay Area, which included an interactive, web-based tool to help residents understand the potential implications and trade-offs associated with different housing, transportation and land-use choices. A version of that tool was adapted for use in a series of 10 public workshops held in each of the nine Bay Area counties (two workshops were held in Alameda County to accommodate the high level of interest from the public). The 2011 workshops drew about 800 participants and gathered input on regional priorities, future housing locations, land use patterns and types, transportation investment strategies, and policies for curbing greenhouse gas emissions. Another nine public workshops, one in each county, were held in winter 2012. The 2012 workshops drew nearly 1,000 participants, who were asked to help rank transportation investment and policy options and provide comments on land use, complete communities, and general regional issues.

In addition to the workshops, two statistically valid telephone surveys were conducted. The first poll, in March and April 2011, interviewed 1,069 residents. The second poll, conducted in December 2011/January 2012, interviewed 1,610 residents. A third poll is being conducted during the public review comment period for the Draft Plan Bay Area and Draft EIR. To have a more in-depth conversation with residents, four focus groups were held in January 2012 with participants recruited from the second poll. MTC also held a virtual workshop online in January and February 2012; over 1,000 participants answered questions similar to the workshop questions.

Targeted Outreach Efforts

In addition, MTC and ABAG partnered with 14 community based organizations (CBOs) selected through a competitive process to assist with engaging low-income communities and communities of color in Plan Bay Area. Two rounds of engagement—in spring 2011 and winter 2012—involved more than 1,800 residents via public meetings, focus groups or through special community events. Each CBO was expected to (a) develop creative and effective ways of engaging their respective communities, (b) gather input from their communities through survey questions about land-use, transportation spending, and transportation policy, as well as solicit feedback on future planning, and (c) provide a summary of the results of their outreach efforts and comments they received. The CBOs utilized a wide range of grassroots, traditional and emerging engagement techniques including outreach to residents; event participation; community meetings; radio announcements; and on-site surveying at community events, at public transportation hubs and on public transportation vehicles.

The planning process was conveyed through a single website—www.OneBayArea.org—so members of the public would have a clear place to go online for current updates, and to request to receive notices and information. This website maintains a library of past workshop meeting materials including minutes and reports and offers interactive web polls and surveys.

Description of Plan Bay Area: Regional Transportation Plan and Sustainable Community Strategy

The proposed Plan Bay Area represents the transportation policy and action statement of how the Bay Area will approach the region's transportation needs through the year 2040, integrated with a land use and housing plan to accommodate anticipated population and job growth, in a manner that will attain targeted reductions in greenhouse gas emissions. This section describes the goals, objectives, and targets of the Plan, as well as the individual components of the Plan.

OVERVIEW

Plan Bay Area reinforces land use and transportation integration per SB 375 and presents a vision of what the Bay Area's land use patterns and transportation networks might look like in 2040. The plan's proposed transportation investments and programs are designed to support the land use pattern, which is itself located and planned in a manner to use the transportation system.

Plan Goals

The Plan aims to achieve focused growth by building off of locally-identified Priority Development Areas and by emphasizing strategic investments in the region's transportation network (including a strong emphasis on operating and maintaining the existing system). The Plan's goals helped guide development of the alternatives and preparation of findings and overriding considerations.

The seven goals of Plan Bay Area are:

- Climate Protection
- Adequate Housing
- Healthy and Safe Communities
- Open Space and Agricultural Preservation
- Equitable Access
- Economic Vitality
- Transportation System Effectiveness

Performance Targets

MTC and ABAG developed 10 performance targets that align with the overarching goals and support the three E's of sustainability –economy, environment, and equity. These targets were used to help evaluate alternative approaches to regional development and select the proposed Plan. Two of the targets, those related to Climate Protection and Adequate Housing, are required by SB 375. The remaining voluntary targets were the result of extensive discussion by the Ad Hoc Committee on SCS Performance Measures and were adopted by MTC and ABAG in January 2011. The Plan Bay Area performance targets are shown in **Table 1.2-2**.

TABLE 1.2-2: YEAR 2040 PERFORMANCE TARGETS FOR PLAN BAY AREA

Goal	*Recommended Target*
Climate Protection	Reduce per-capita CO_2 emissions from cars and light-duty trucks by 15% (required by SB 375)
Adequate Housing	House 100% of the region's projected growth by income level (required by SB 375) without displacing current low-income residents
Healthy and Safe Communities	Reduce premature deaths from exposure to particulate emissions: • Reduce premature deaths from exposure to fine particulates (PM2.5) by 10% • Reduce coarse particulate emissions (PM10) by 30% • Achieve greater reductions in highly impacted areas
	Reduce by 50% the number of injuries and fatalities from all collisions (including bike and pedestrian)
	Increase the average daily time walking or biking per person for transportation by 70% (for an average of 15 minutes per person per day)
Open Space and Agricultural Preservation	Direct all non-agricultural development within the Year 2010 urban footprint (existing urban development and urban growth boundaries)
Equitable Access	Decrease by 10% the share of low-income and lower-middle income residents' household income consumed by transportation and housing
Economic Vitality	Increase gross regional product (GRP) by 110% – an average annual growth rate of approximately 2% (in current dollars)
Transportation System Effectiveness	Increase non-auto mode share by 10%* (to 26% of trips) and decrease automobile vehicle miles traveled per capita by 10%
	Maintain the transportation system in a state of good repair: • Increase local road pavement condition index (PCI) to 75 or better • Decrease distressed lane-miles of state highways to less than 10% of total lane-miles • Reduce share of transit assets past their useful life to zero percent*

* = Targets updated during the scenario analysis process.

Note: The base year for targets, unless specified otherwise, is 2005. For more information see MTC Resolution 3987.

Equity Measures

Five equity performance measures were selected by MTC and ABAG to help develop the proposed Plan. These measures were based on key regional equity concerns identified by the Regional Equity Working Group: Affordability, Growing Equitably, Healthy Communities, Equitable Mobility, and Jobs-Housing Connections. The measures selected were:

- **Housing and Transportation Affordability:** Share of income spent on housing and transportation costs.
- **Displacement Risk:** Share of today's cost-burdened-renter households (those who pay more than half of their income for housing) at risk for displacement based on future growth patterns.

- **Vehicle Miles Traveled Density:** Average daily miles of vehicle travel per square kilometer in residential and commercial areas near major roadways (density of particulate matter emissions is also evaluated as a companion measure).
- **Non-Commute Travel Time:** Average travel time in minutes for shopping, visiting, recreation, etc.
- **Commute Time:** Average commute travel time in minutes.

Performance against the equity measures is assessed by measuring the Plan's impact on identified "communities of concern" and separately on the remainder of the region, in order to compare average results between the two types of communities. Communities of concern are locations with multiple overlapping populations of concern related to transportation, housing, and land use: minority residents, low-income residents, people who do not speak English very well or at all, households with no cars, seniors 75 and over, people with disabilities, single-parent households, and cost-burdened renters who pay more than half of their income for housing. Most of the communities of concern are in the region's urban core, but there are also communities of concern located in suburban areas around the region.

Primary Plan Strategies

The Plan Bay Area goals will be pursued through two kinds of primary planning activities—a recommended land use development pattern and transportation investment strategy—with integrated strategies that address legislative requirements for an RTP and an SCS. The Jobs-Housing Connection Strategy (JHCS) addresses land use in the region, in particular the development of housing and jobs. The Transportation Investment Strategy addresses transportation investments that support the JHCS. The following sections outline these two strategies.

PROPOSED LAND USE DEVELOPMENT STRATEGY

The land use development strategy of the proposed Plan is spelled out in the JHCS. This section explains the proposed Plan's strategy for the development of new housing and commercial land uses through the year 2040, as well as the intended distribution of growth, key programs that will support this pattern, and the implementation approach. Information on the location and amount of anticipated development is presented under the "Distribution of Growth" section below; maps are in the section "All Proposed Projects" at the end of Chapter 1.2.

Objectives

The JHCS sets the following objectives for land use:

- Create a network of complete communities,
- Increase the accessibility, affordability, and diversity of housing,
- Create jobs to maintain and expand a prosperous and equitable regional economy, and
- Protect the region's unique natural environment.

These four objectives are intended to leverage existing community infrastructure and transportation investments, preserve farmland and natural resource lands that Bay Area residents have prioritized for long-term protection, curtail major increases in highway congestion, and provide for shorter commutes for the region's workforce. Plan Bay Area, through its JHCS, seeks to achieve these land use-related objectives.

Complete communities. The proposed Plan recognizes the diversity of the Bay Area's communities and emphasizes investing in existing neighborhoods according to the needs and aspirations of each community. The plan seeks to provide an array of housing types and transportation choices and envisions a pattern of growth and investment tailored to each of these communities where transit, jobs, schools, services and recreation are conveniently located near people's homes. It also identifies strategies and policies beyond transportation investments and land use changes that will help foster complete communities—including support for improved public schools, healthier communities, expanded parks and recreation facilities, and efforts to make neighborhoods safer for all.

Accessibility, affordability, and diversity of housing. The region's existing neighborhoods encompass a wide variety of housing types, but affordability is a significant challenge for low and moderate-income households. In addition, young professionals and young families along with the growing senior population are driving changes in housing preferences and demanding more options closer to services. These trends are addressed in the proposed Plan by focusing on strategic investments for the production of affordable housing and the preservation of homes that are affordable to low- and moderate-income households. The proposed Plan encourages housing development—particularly affordable housing—in locations near transit and services to lower the combined housing and transportation costs for households in these neighborhoods. This allows households to spend money on other essential needs such as food, health care, or education.

Jobs and prosperity. The proposed Plan attempts to curtail major increases in highway congestion and provide for shorter commutes for the region's workforce. These issues are addressed in order to minimize and avoid constraints on economic growth and reduce negative impacts on quality of life. In addition, the proposed Plan recognizes the importance of key industrial lands and identifies strategies to ensure that they continue to support the region's economic diversity and vitality.

Protecting the environment. By concentrating new development in existing neighborhoods, the proposed Plan should help protect the region's natural resources, water supply, and open space by reducing development pressure on rural areas. This growth pattern would allow the region to consume less energy, reducing household costs and the emission of greenhouse gases. The region's greenbelt of agricultural, natural resource, and open space lands is a treasured asset that both contributes to the region's quality of life and supports regional economic development, and the proposed Plan encourages the retention of these assets by directing nearly all non-agricultural development within the urban footprint and by supporting the continuation of agricultural activities in rural communities. Details on the strategy are provided below.

Strategy

The basis for the JHCS is the growth projection developed by ABAG, as described above. These projections forecast the Bay Area adding over 2 million people, 1.1 million new jobs, and 660,000 new housing units between 2010 and 2040. To plan for this future growth, Plan Bay Area calls for focused housing and job growth around high-quality transit corridors, particularly within areas identified by local jurisdictions as Priority Development Areas. This land use strategy enhances mobility and economic growth by linking housing and jobs with transit to create a more efficient land use pattern around transit and help achieve a greater return on existing and planned transit investments. Ultimately local planning efforts and government policies as well as decisions made by private business and residents will create the region's future development pattern.

The proposed Plan's growth pattern is shaped around:

- Priority Development Areas,
- The region's core transit network,
- The Bay Area's network of open spaces and conservation land, including Priority Conservation Areas, and
- Opportunities to increase access to job centers.

Priority Development Areas (PDAs) are nominated by local jurisdictions as appropriate places to concentrate future growth. PDAs are existing neighborhoods served by transit and supported by local plans (both existing and to-be-completed) to provide a wider range of housing options along with amenities and services to meet the day-to-day needs of residents in a pedestrian-friendly environment. Under the proposed Plan, the nearly 200 PDAs would absorb about 77 percent of new housing and 63 percent of new jobs on about 5 percent of the Bay Area's total land area. Regional centers in Oakland, San Francisco, and San José will account for about 14 percent of new housing and 17 percent of job growth. Medium size cities will also play an important role by adding a mix of new housing, employment, and services in strategic locations. As a result of this focused growth, under the proposed Plan about 99 percent of new housing would be within the region's existing urban footprint, helping retain open space and agricultural land. North Bay counties would also take a very small share of growth—Napa and Marin counties will account for about 1 percent each of the total regional housing growth and Sonoma and Solano counties will account for 5 and 3 percent, respectively.

Local jurisdictions have chosen a Place Type for each PDA (such as regional center, transit neighborhood, or rural town), which provides a general set of guidelines for the character, scale, and density of future growth and best matches the community vision for the area. The level of growth in each of the region's PDAs reflects its role in achieving regional objectives. A key part of the PDA strategy is to move away from an unplanned "project-by-project" piecemeal approach, toward the creation of attractive complete communities that meet the needs of existing and new residents and workers.

Many PDAs are also Transit Priority Project (TPP)-eligible areas, and most of the TPP-eligible land in the Bay Area is within PDAs. TPPs are a key aspect of SB 375 legislation and are eligible for certain types of CEQA streamlining, as explained in *Chapter 1.1*: *Introduction and Study Approach*. TPPs must be within one-half mile of a major transit stop or high-quality transit corridor included in a regional transportation plan.

The region's core transit network (existing and planned) and the related services will provide a strong foundation upon which to distribute future growth. Many PDAs include at least one station served by the region's major heavy- and light-rail systems and will be nodes connecting the majority of the region's housing and jobs by 2040. For example, three planned heavy rail expansion projects—BART to Silicon Valley, BART to Antioch ("eBART"), and Sonoma-Marin Area Rail Transit (SMART)—provide an opportunity to more efficiently link residents to the region's major job centers. Targeted residential and commercial development around stations along these new corridors (reflecting local plans) can help ease the Bay Area's chronic housing shortage, improve the cost-effectiveness of new service, and preserve regional open space.

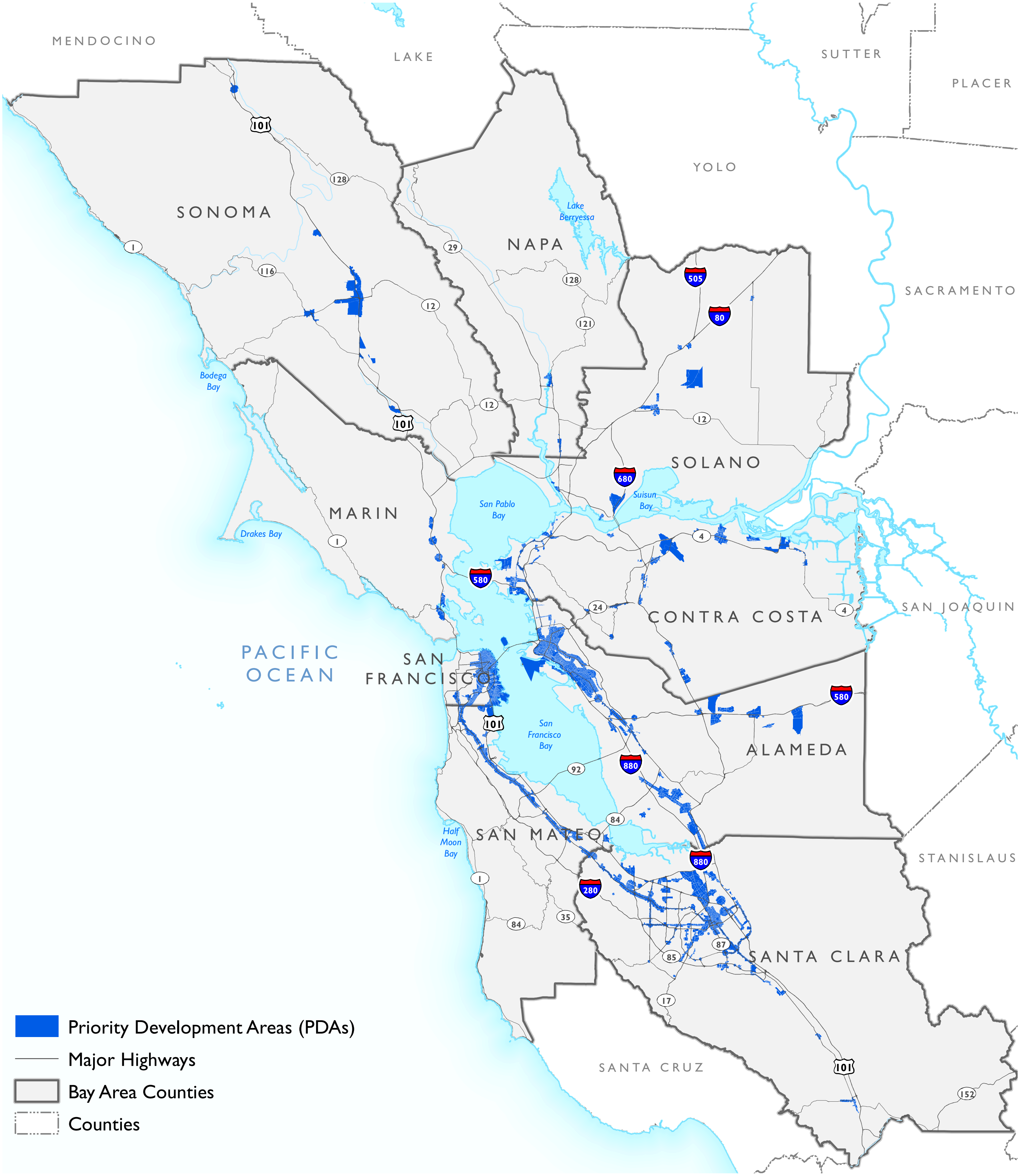
Priority Conservation Areas (PCAs) comprise over 100 regionally significant open spaces for which there exists broad consensus for long-term protection but face nearer-term development pressure. The PCAs designated in the proposed Plan will expand a regional greenbelt dedicated for preservation or protected by federal, state, and local policies. PCAs play a particularly important role in implementing the growth strategy in the North Bay—where they are central to the character and economy of many communities.

Increasing access to job centers for Bay Area residents has long been identified as a regional planning objective. To reinforce the Bay Area's existing strengths and areas of potential future growth, the strategy takes into account the location of clusters of knowledge sector industries—focusing on PDAs with excellent transit access.

Figure 1.2-2 shows the locations of the PDAs and PCAs in the Bay Area. **Figure 1.2-3** shows the existing urbanized footprint of the region and where it is expected to expand under the proposed Plan. Urbanized land was calculated as areas with more than four households per acre or more than 10 jobs per acre.

Figure 1.2-2

Priority Development Areas (PDAs)



Data Source: Metropolitan Transportation Commission, 2013; Cal-Atlas Geospatial Clearinghouse, 2012; The Conservation Lands Network GIS Data Sets, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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1 in = 16 miles

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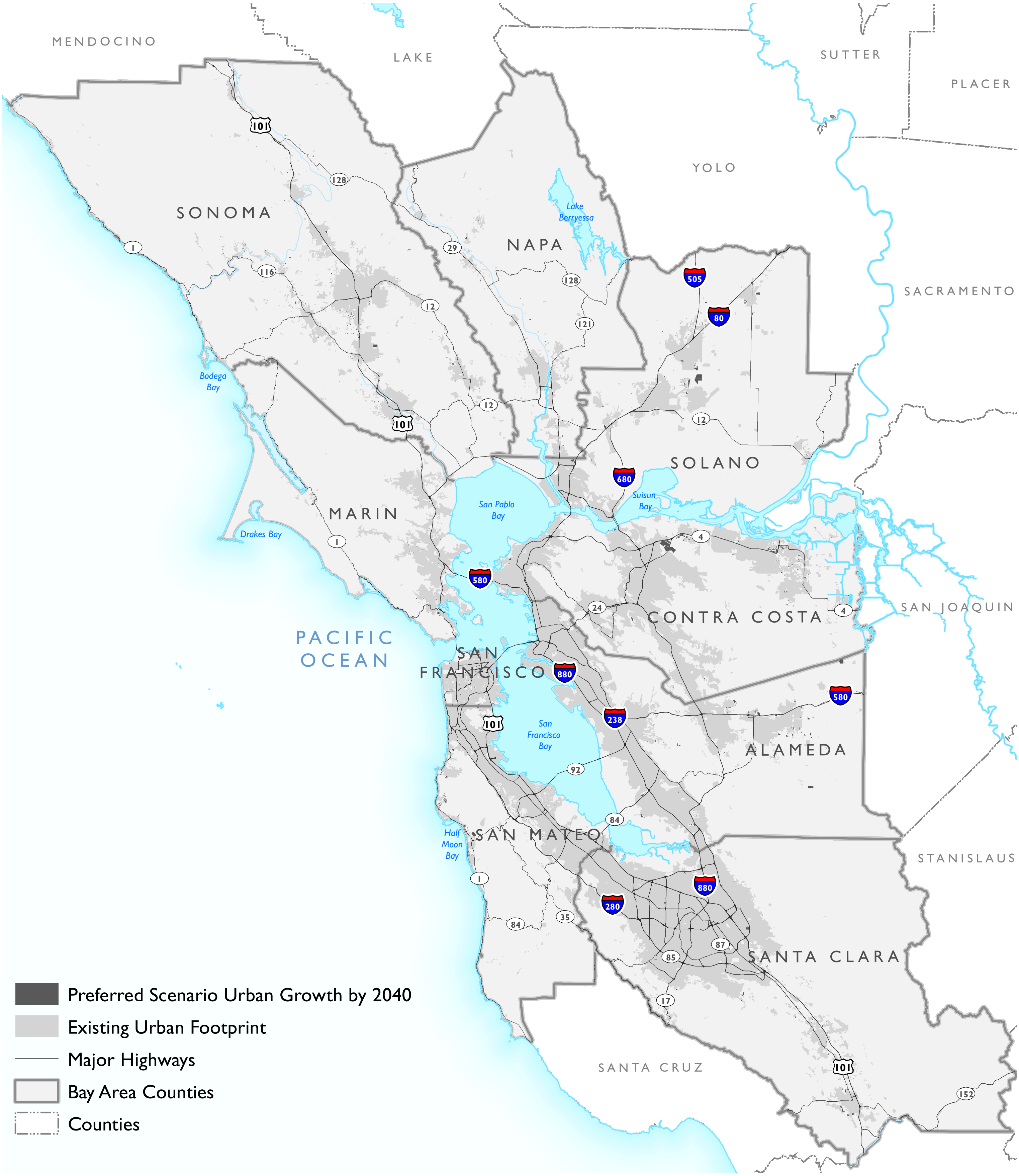
Figure 1.2-3

Urbanized Land in 2010 and 2040



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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1 in = 16 miles

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Distribution of Growth

The distribution of new employment growth is linked to transportation infrastructure and local input. Employment growth is organized under three major groups: knowledge-sector jobs, population-serving jobs, and all other jobs. Knowledge-sector jobs, such as information technology companies, legal or engineering offices, or biotechnology firms, are expected to grow based on current concentration, specialization, and past growth as well as transit service and access. Population-serving jobs, such as retail and food service positions, are expected to grow in a manner reflecting the distribution of future household growth. All other jobs, including government, agriculture and manufacturing, are expected to grow according to the existing distribution of jobs in each of these sectors.

The distribution of new housing begins with local plans at the county, city, and PDA levels. Housing growth in each place was then adjusted to ensure that regional goals were advanced based on the following five regional growth factors: (1) level of transit service; (2) vehicle-miles traveled (VMT) per household; (3) employment by 2040; (4) low-wage workers commuting from outside each place; and (5) housing value. More housing growth was directed to locations where the transit system can be utilized more efficiently, where workers can be better connected to jobs, and where residents can access high-quality services. Housing growth was next adjusted to account for anticipated levels of growth outside PDAs, including that on presently undeveloped land, and to ensure that no county or city's proposed growth substantially deviates from local plans. The distribution accounts for current high vacancy rates by city by factoring absorption of existing vacant units to accommodate future households. It also assumes an increase in group housing, reflecting the high rate of growth in the older population in the coming decades.

Growth by County

Tables 1.2-3, 4, 5, and 6 show projected housing and job growth by county under the proposed Plan. Reflecting the proposed Plan's strategic emphasis on the core regional transit network and connecting homes and jobs, San Francisco, San Mateo, Santa Clara, and Alameda counties account for the majority of housing growth (77 percent) and job growth (76 percent). Within these counties, the Bay Area's three regional centers—San Francisco, San José, and Oakland—are projected to accommodate 42 percent of the region's housing growth and 38 percent of total job growth by 2040. Counties will generally retain the same proportion of the region's housing stock, as shown in **Table 1.2-4.**

TABLE 1.2-3: HOUSING GROWTH BY COUNTY

	Housing Units				*Households*			
County	*2010*	*2040*	*Change*	*%*	*2010*	*2040*	*Change*	*%*
Alameda	582,500	730,500	148,000	25%	545,000	705,000	160,000	29%
Contra Costa	400,000	480,000	80,000	20%	375,000	463,000	88,000	23%
Marin	111,000	119,000	8,000	7%	103,000	112,000	9,000	9%
Napa	55,000	61,000	6,000	11%	49,000	56,000	7,000	14%
San Francisco	377,000	469,000	92,000	24%	346,000	447,000	101,000	29%
San Mateo	271,000	327,000	56,000	21%	258,000	316,000	58,000	22%
Santa Clara	632,000	843,000	211,000	33%	604,000	819,000	215,000	36%
Solano	153,000	175,500	22,500	15%	142,000	169,000	27,000	19%
Sonoma	204,500	236,500	32,000	16%	186,000	221,000	35,000	19%
REGION*	2,786,000	3,446,000	660,000	24%	2,608,000	3,308,000	700,000	27%

Note:

*2010 values include seasonal units; Regional 2040 and growth totals include 4,340 seasonal units that were not distributed throughout the region.

Source: ABAG, 2012.

TABLE 1.2-4: COUNTY PROPORTION OF REGIONAL HOUSING

County	*2010*	*% Region*	*2040*	*% Region*
Alameda	582,500	21%	730,500	21%
Contra Costa	400,000	14%	480,000	14%
Marin	111,000	4%	119,000	3%
Napa	55,000	2%	61,000	2%
San Francisco	377,000	14%	469,000	14%
San Mateo	271,000	10%	327,000	9%
Santa Clara	632,000	23%	843,000	24%
Solano	153,000	5%	175,500	5%
Sonoma	204,500	7%	236,500	7%
REGION	2,786,000	100%	3,446,000	100%

Source: ABAG, 2012.

Table 1.2-5 shows that job growth is expected to be more evenly distributed than housing growth, with most counties near the regional average of a 33 percent increase. As **Table 1.2-5** also shows, some counties are expected to have a difference in growth between the number of jobs and employed residents. Across the region, however, these numbers equalize. The consequence will be some shift in patterns of in- and out-commuting between Bay Area counties. The Bay Area will continue to have slightly more jobs than employed residents—by around 116,000 jobs in 2010 and 155,000 jobs in 2040. This mismatch represents in-commuting from outside the nine counties, such as from Tracy or Sacramento. The proposed Plan holds this rate of in-commuting steady at about 3.4 percent.

In part, the existing in-commute can be explained by the significant difference in the median housing costs of the counties of origin for the commuters and the Bay Area counties in which they work. For example, some workers in the Bay Area currently commute into the region from San Joaquin County where the median housing price between 2006 and 2010 was $318,600, compared to $637,000 in the Bay Area region, or half the price.[9]

It has been suggested that, if sufficient housing opportunities were provided in the Bay Area, the existing in-commute would be greatly reduced. However, it is important to acknowledge that many of the commuters that travel to the Bay Area for work may actually prefer to live outside of the Bay Area for various reasons (not just the reduced cost of housing). Thus, even if sufficient housing opportunities were provided in the Bay Area, there would still be commuting into the region.

TABLE 1.2-5: JOB GROWTH BY COUNTY

	Jobs				*Employed Residents*			
County	*2010*	*2040*	*Change*	*%*	*2,010*	*2,040*	*Change*	*%*
Alameda	694,000	948,000	254,000	37%	668,000	891,000	223,000	33%
Contra Costa	345,000	467,000	122,000	35%	442,000	579,000	137,000	31%
Marin	111,000	129,000	18,000	16%	118,500	136,500	18,000	15%
Napa	71,000	90,000	19,000	27%	57,000	69,000	12,000	21%
San Francisco	569,000	759,000	190,000	33%	414,000	560,000	146,000	35%
San Mateo	345,000	445,000	100,000	29%	347,000	446,500	99,500	29%
Santa Clara	926,000	1,230,000	304,000	33%	823,000	1,159,000	336,000	41%
Solano	132,000	180,000	48,000	36%	174,000	224,000	50,000	29%
Sonoma	192,000	257,000	65,000	34%	225,500	285,000	59,500	26%
REGION	3,385,000	4,505,000	1,120,000	33%	3,269,000	4,350,000	1,081,000	33%

Source: ABAG, 2012.

Table 1.2-6 shows the changes in the ratio of jobs to households in each county. Regionally, this ratio is expected to increase by 5 percent as a slightly higher proportion of the population works, and due to more people holding multiple jobs. All counties except Santa Clara will see an increase in this ratio, with above-average growth in the outlying counties of Contra Costa, Napa, Solano, and Sonoma.

[9] U.S. Census Bureau, 2006-2010 American Community Survey.

TABLE 1.2-6: JOBS-HOUSEHOLD RATIOS BY COUNTY

County	*2010*	*2040*	*% Change*
Alameda	1.27	1.34	5%
Contra Costa	0.92	1.01	9%
Marin	1.07	1.15	7%
Napa	1.45	1.59	10%
San Francisco	1.64	1.70	3%
San Mateo	1.34	1.41	5%
Santa Clara	1.53	1.50	-2%
Solano	0.93	1.07	14%
Sonoma	1.03	1.17	13%
REGION	1.30	1.36	5%

Source: ABAG, 2012

Concentration of Growth in PDAs

The majority of regional growth through 2040 is allocated within PDAs. PDAs are expected to accommodate 77 percent of new households and 63 percent of new jobs. As a result, small cities, single-family neighborhoods, and rural areas throughout the Bay Area have a very small share of the overall growth by 2040 and are expected to retain their scale and character.

Table 1.2-7 shows the growth in households in PDAs compared to other areas of each county and the region. The proposed Plan would direct most (77 percent) of the household growth through 2040 to PDAs, taking the proportion of the region's households within PDAs from 23 to 37 percent.

The distribution of PDA vs. non-PDA growth varies by county. In the most urban counties—Alameda, San Francisco, San Mateo, and Santa Clara—most household growth will be directed into PDAs, ranging from 78 to 92 percent. Three counties—Contra Costa, Solano, and Sonoma—will see just over half (between 55 and 61 percent) of future growth in PDAs. The two slowest growing counties, Marin and Napa, will see two-thirds of their household growth occur outside of PDAs. In every county of the Bay Area, however, the proportion of households located within a PDA will increase.

TABLE 1.2-7: HOUSEHOLD GROWTH IN PDAS

County	*2010*	*% of County*	*2040*	*% of County*	*Change*	*% of Growth*
Alameda	**545,100**		**705,300**		**160,200**	
PDAs	187,200	34%	312,400	44%	125,200	78%
Other	357,900	66%	392,900	56%	35,000	22%
Contra Costa	**375,400**		**463,100**		**87,700**	
PDAs	46,200	12%	99,800	22%	53,600	61%
Other	329,200	88%	363,300	78%	34,100	39%
Marin	**103,200**		**112,000**		**8,800**	

TABLE 1.2-7: HOUSEHOLD GROWTH IN PDAS

County	*2010*	*% of County*	*2040*	*% of County*	*Change*	*% of Growth*
PDAs	8,600	8%	11,600	10%	3,000	34%
Other	94,600	92%	100,400	90%	5,800	66%
Napa	**48,900**		**56,300**		**7,400**	
PDAs	1,100	2%	3,600	6%	2,500	34%
Other	47,800	98%	52,700	94%	4,900	66%
San Francisco	**345,800**		**447,300**		**101,500**	
PDAs	184,000	53%	277,400	62%	93,400	92%
Other	161,800	47%	169,900	38%	8,100	8%
San Mateo	**257,800**		**315,700**		**57,900**	
PDAs	59,100	23%	103,200	33%	44,100	76%
Other	198,700	77%	212,500	67%	13,800	24%
Santa Clara	**604,200**		**819,100**		**214,900**	
PDAs	160,100	26%	341,500	42%	181,400	84%
Other	444,100	74%	477,600	58%	33,500	16%
Solano	**141,800**		**168,700**		**26,900**	
PDAs	7,400	5%	22,100	13%	14,700	55%
Other	134,400	95%	146,600	87%	12,200	45%
Sonoma	**185,800**		**220,700**		**34,900**	
PDAs	25,500	14%	45,600	21%	20,100	58%
Other	160,300	86%	175,100	79%	14,800	42%
REGION	**2,608,000**		**3,308,000**		**700,000**	
PDAs	679,000	26%	1,217,000	37%	538,000	77%
Other	1,929,000	74%	2,091,000	63%	162,000	23%

Source: ABAG, 2013.

Table 1.2-8 gives the same breakdown for jobs. Regionwide just under half (45 percent) of existing jobs are located within PDAs. Under the proposed Plan, almost two-thirds (63 percent) of new jobs are expected to be located in PDAs, pushing the regional proportion of jobs in PDAs to almost one- half (49 percent). Every county will see an increase in the proportion of its jobs located within a PDA. As with household growth, the more urbanized counties will see the majority of their job growth occur in PDAs while Marin and Napa counties will see the majority of new jobs outside of PDAs.

TABLE 1.2-8: JOB GROWTH IN PDAS

County	*2010*	*% of County*	*2040*	*% of County*	*Change*	*% of Growth*
Alameda	**694,500**		**947,600**		**253,100**	
PDAs	307,700	44%	484,600	51%	176,900	70%
Other	386,800	56%	463,000	49%	76,200	30%
Contra Costa	**344,900**		**467,000**		**122,100**	
PDAs	116,900	34%	187,400	40%	70,500	58%
Other	228,000	66%	279,600	60%	51,600	42%
Marin	**110,700**		**129,100**		**18,400**	
PDAs	16,200	15%	20,300	16%	4,100	22%
Other	94,500	85%	108,800	84%	14,300	78%
Napa	**70,700**		**89,500**		**18,800**	
PDAs	12,200	17%	15,700	18%	3,500	19%
Other	58,500	83%	73,800	82%	15,300	81%
San Francisco	**568,700**		**759,500**		**190,800**	
PDAs	471,600	83%	634,400	84%	162,800	85%
Other	97,100	17%	125,100	16%	28,000	15%
San Mateo	**345,200**		**445,300**		**100,100**	
PDAs	113,800	33%	172,800	39%	59,000	59%
Other	231,400	67%	272,500	61%	41,100	41%
Santa Clara	**926,300**		**1,229,800**		**303,500**	
PDAs	401,500	43%	581,800	47%	180,300	59%
Other	524,800	57%	648,000	53%	123,200	41%
Solano	**132,400**		**179,900**		**47,500**	
PDAs	24,700	19%	40,300	22%	15,600	33%
Other	107,700	81%	139,600	78%	31,900	67%
Sonoma	**192,000**		**257,500**		**65,500**	
PDAs	60,800	32%	90,500	35%	29,700	45%
Other	131,200	68%	167,000	65%	35,800	55%
REGION	**3,385,000**		**4,505,000**		**1,120,000**	
PDAs	1,525,000	45%	2,228,000	49%	703,000	63%
Other	1,860,000	55%	2,277,000	51%	417,000	37%

Source: ABAG, 2013.

Transportation corridors in the inner Bay Area, including El Camino Real/The Grand Boulevard, San Pablo Corridor, and East 14th–International Boulevard, also represent a major share of both housing and job growth, accommodating 19 percent of regional housing and 11 percent of regional job growth. This concentrated growth pattern will help leverage the region's existing fixed guideway transit system and inner-Bay Area improvements identified in the RTP Investment Strategy, including Caltrain electrification, BART to San José, and service enhancements to existing routes.

Major suburban employment centers in Alameda and Contra Costa Counties, including Concord, Walnut Creek, and the Tri-Valley communities of Dublin, Pleasanton, Livermore, and San Ramon, account for over 8 percent of the region's new jobs and nearly 9 percent of its new homes.

With more limited transit access and fewer PDAs, North Bay Counties—Marin, Napa, Solano and Sonoma—are expected to take on a much smaller share of regional growth, accounting for 10 percent of new households and 13 percent of new jobs. Much of this growth will be focused into PDAs such as Downtown Santa Rosa, Petaluma, Fairfield, and Vallejo. In Marin, 22 percent of new jobs and 34 percent of new households are anticipated in PDAs, while the respective shares are 19 and 34 percent in Napa, 33 percent and 55 percent in Solano, and 45 percent and 58 percent in Sonoma. By concentrating growth into the inner Bay Area and communities with frequent transit service, the proposed growth strategy is intended to help North Bay communities maintain their rural and small-town character.

The section "All Proposed Projects" at the end of this chapter includes maps showing the relationship between proposed transportation project and PDAs, and the growth of households and jobs in PDAs.

PROPOSED TRANSPORTATION INVESTMENT STRATEGY

This section explains the overall strategy for investment in the Bay Area's transportation system through the year 2040, as well as the proposed distribution of expected revenues and the transportation project selection process. The transportation investments and policies in the Transportation Investment Strategy are based on available funding through 2040 and will support the proposed Plan's goals by reducing automobile dependency and promoting healthier communities through reduced pollution and cleaner air. In addition to addressing the mobility of people, the Transportation Investment Strategy acknowledges the importance of goods movement corridors and identifies investments and strategies to ensure that these essential resources continue to support the region's economic diversity and vitality.

Lists and maps of major proposed transportation programs are presented later in this chapter, in the section "All Proposed Projects." A comprehensive list of the transportation projects and programs in the proposed Plan is provided in Appendix C.

Figures 1.2-4, 5, 6, and 7 show the largest transportation projects in the proposed Plan—expansions or operational improvements with costs exceeding $50 million. **Figure 1.2-4** shows regional transit system improvements and **Figure 1.2-5** shows local transit improvements; **Figure 1.2-6** maps the locations of road pricing improvements and **Figure 1.2-7** shows highway system improvements. The projects shown on those figures are briefly described in **Table 1.2-9**.

TABLE 1.2-9: MAJOR TRANSPORTATION INVESTMENTS IN THE BAY AREA

Regional Transit System Improvements (Figure 1.2-4)	
1	BART Extension to San José/Santa Clara
2	Caltrain Electrification and Frequency Improvements
3	Caltrain Downtown Extension (4th and King to Transbay Transit Center)
4	eBART to Antioch
5	SMART Commuter Rail (Larkspur to Windsor)
6	Transbay Transit Center
7	Irvington BART Station
8	Union City Commuter Rail Station
9	Hercules Commuter Rail Station
10	New Ferry Routes: Treasure Island, Berkeley, Richmond, Hercules, Redwood City
Local Transit Improvements (Figure 1.2-5)	
1	Van Ness BRT
2	Geary BRT
3	Geneva-Harney BRT
4	East Bay BRT
5	Grand-MacArthur BRT
6	Alameda-Oakland BRT
7	El Camino BRT
8	Santa Clara-Alum Rock BRT
9	Stevens Creek BRT
10	King Road Rapid
11	Central Subway (Chinatown to Caltrain)
12	Embarcadero Streetcar (Fort Mason to Caltrain)
13	Parkmerced Light Rail Extension
14	Bayshore Light Rail Extension
15	Oakland Airport Connector
16	San José Airport People Mover
17	Vasona Light Rail Extension
18	Capitol Expressway Light Rail Extension
19	Transit Effectiveness Project
20	Dumbarton Express Bus Frequency Improvements
Road Pricing Improvements (Figure 1.2-6)	
1	MTC Express Lane Network
2	VTA Express Lane Network
3	Marin-Sonoma Narrows
4	SR-4 HOV Lanes
5	U.S. 101 HOV Lanes
6	Downtown San Francisco Congestion Pricing
7	Treasure Island Congestion Pricing

TABLE 1.2-9: MAJOR TRANSPORTATION INVESTMENTS IN THE BAY AREA

Highway System Improvements (Figure 1.2-7)	
1	Widening from Story Road to Yerba Buena Road
2	Operational Improvements along Presidio Parkway/Doyle Drive and in the Twin Cities/Greenbrae Corridor
3	New Auxiliary Lanes from Oyster Point to San Francisco county line and from Marsh Road to Embarcadero Road
4	Interchange Improvements at: Petaluma Boulevard, Greenbrae, Candlestick Point, Produce Ave, Broadway, SR-92, Woodside Road, Willow Road
5	New Interchanges at: Zanker Road/Skyport Drive and Mabury Road/Taylor St
6	Widening from I-680 to Airbase Parkway
7	Integrated Corridor Management (Emeryville to Crockett)
8	Interchange Improvements at: I-680/SR-12, San Pablo Dam Road, Ashby Ave, and Yerba Buena Island
9	Interchange Improvements at: SR-85 and Senter Road
10	Widening from Greenville Road to North Flynn Road
11	Interchange Improvements at: Vasco Road and Greenville Road
12	Interchange Improvements at: SR-84 and SR-4
13	New Interchange at: Norris Canyon Road
14	Interchange Improvements at: Jackson St, 23rd Ave, 29th Ave, A St, Industrial Parkway, Whipple Road, and SR-262 SR-4 Corridor
15	Widening from Somersville Road to SR-160 and from Lone Tree Way to Balfour Road
16	Interchange Improvements at: SR-160/Phillips Lane SR-12 Corridor
17	Jameson Canyon Widening
18	New Interchange at: Fulton Road
19	Willow Road Expressway (SR-84 to US-101)
20	SR-84 Widening (I-680 to Jack London Boulevard)
21	SR-262 Widening (I-680 to I-880)
22	SR-1 Widening (Fassler Ave to Westport Drive)
23	Redwood Parkway/Fairground Drive Widening
24	SR-238 and SR-185 Operational Improvements
25	SR-85/SR-237 Interchange Improvements
26	SR-92/Clawiter Road/Whitesell St Interchange Improvements

Source: MTC, 2013.

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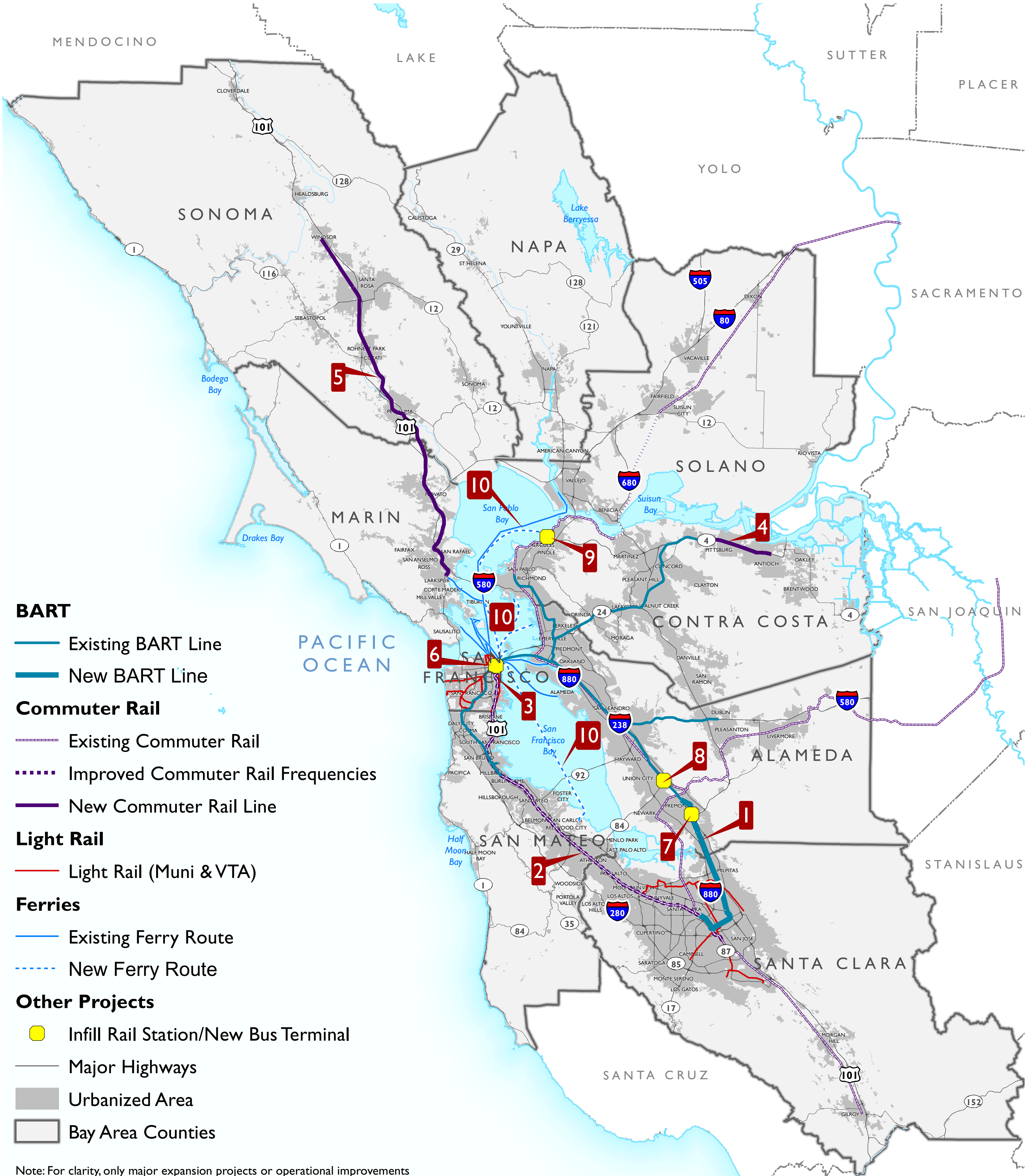
Figure 1.2-4

Regional Transit System Improvements



Note: For clarity, only major expansion projects or operational improvements with costs exceeding $50 million are depicted.

Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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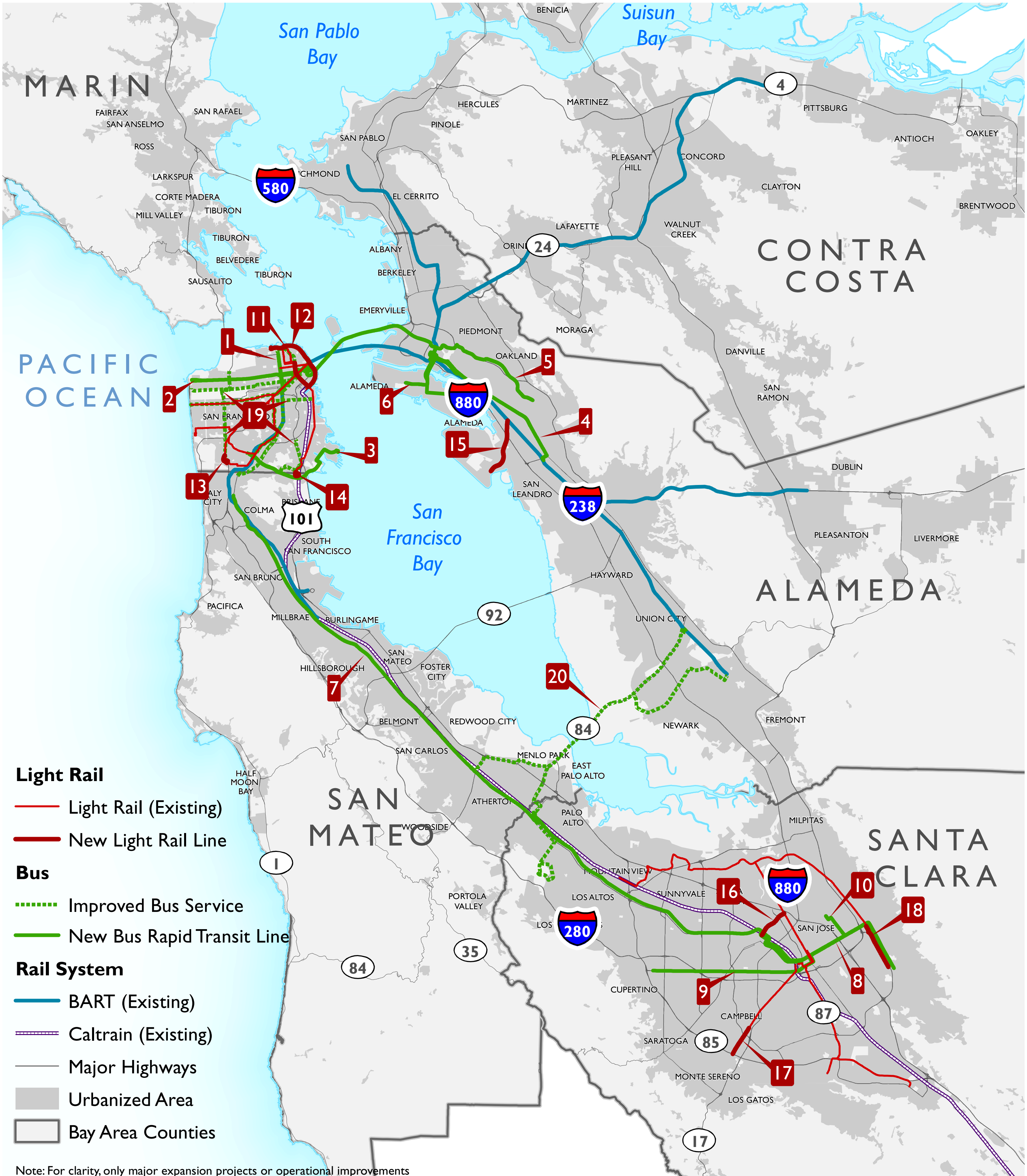
Figure 1.2-5

Local Transit Improvements



Note: For clarity, only major expansion projects or operational improvements with costs exceeding $50 million are depicted.

Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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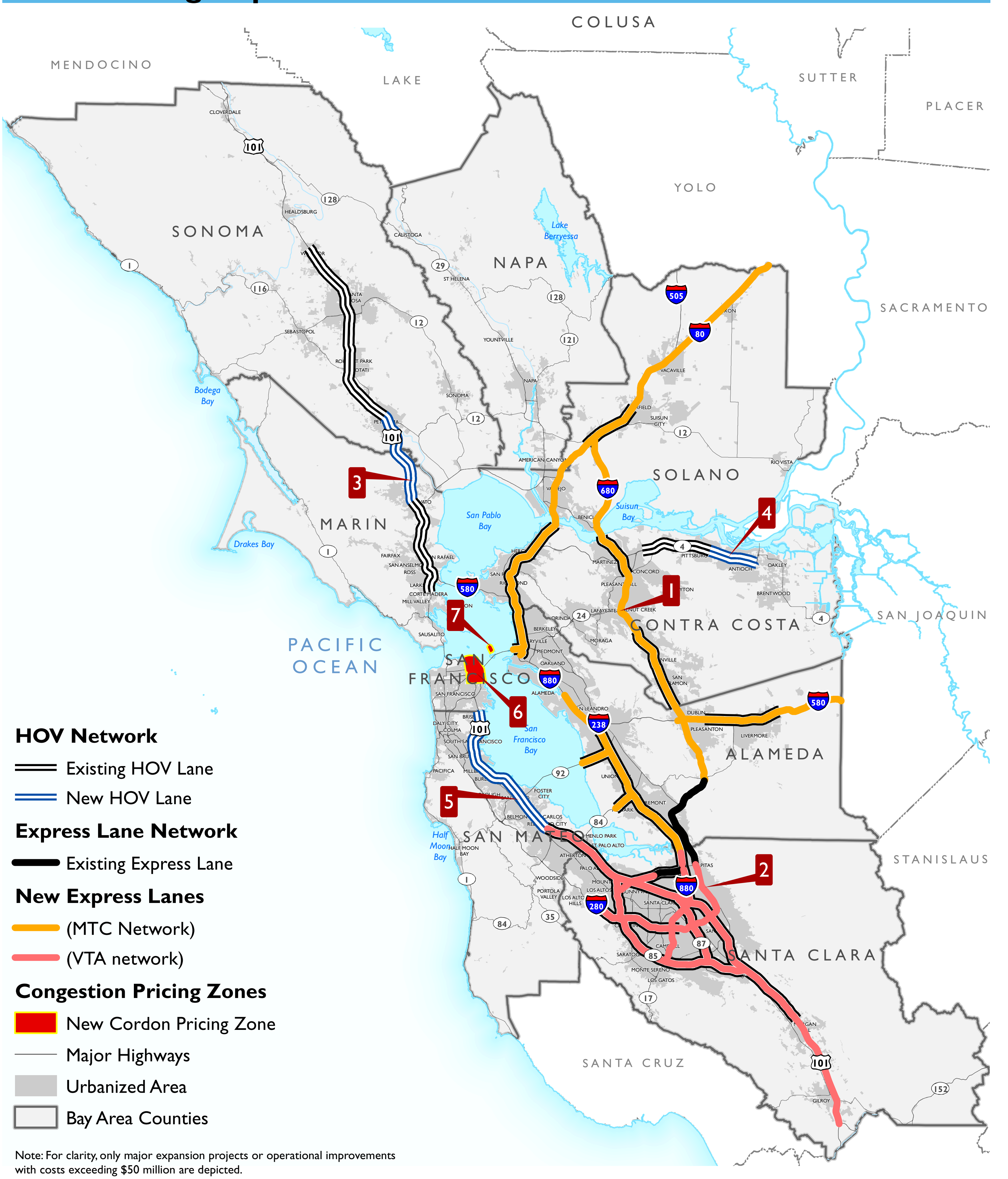
Figure 1.2-6

Road Pricing Improvements



Note: For clarity, only major expansion projects or operational improvements with costs exceeding $50 million are depicted.

Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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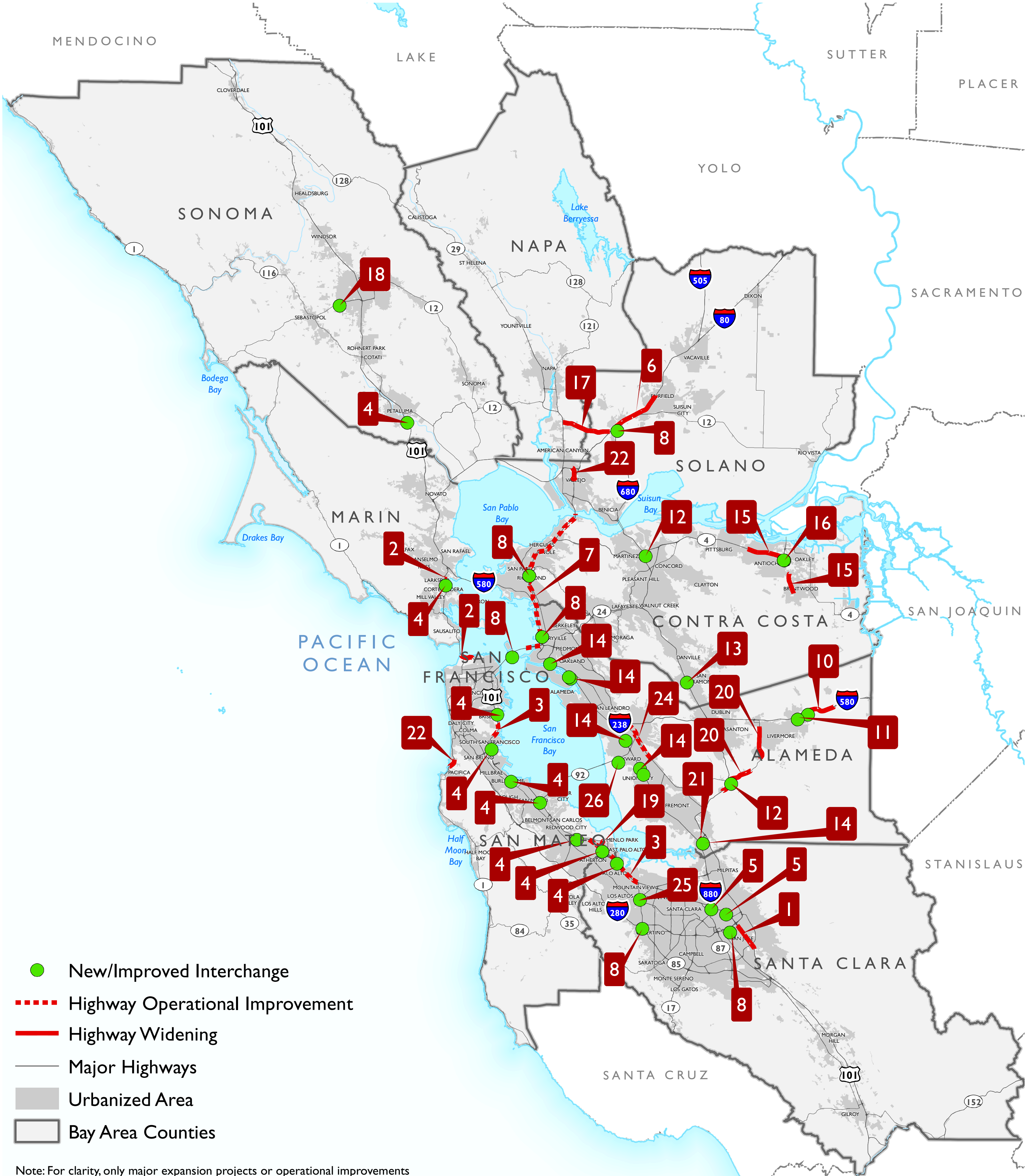
Figure 1.2-7
Highway System Improvements



Note: For clarity, only major expansion projects or operational improvements with costs exceeding $50 million are depicted.

Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

0 5 10 20 Miles
1 in = 16 miles

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Distribution of Funds

MTC estimates that it will have about $289 billion in revenues to spend on transportation in the Bay Area through the year 2040, a 28 percent increase over the Transportation 2035 Plan budget of $226 billion. These revenues are anticipated to come from the following sources:

- Federal—$33 billion (11 percent)
- State—$45 billion (16 percent)
- Regional—$43 billion (15 percent)
- Local—$154 billion (53 percent)
- Anticipated/Unspecified—$14 billion (5 percent)

Most of the expected transportation revenues through 2040 are allocated to already-committed projects and conditioned discretionary expenditures, mainly transit operations and maintenance. Around 20 percent of the available budget is available for new transportation programs and strategies. Of the $289 billion in anticipated funds for Plan Bay Area, the majority, $232 billion, is dedicated to committed projects. That leaves $57 billion in discretionary revenues available for new investments.

The Transportation Investment Strategy allocates its discretionary funds to prioritize transportation projects that support focused growth, mainly "fix it first" projects that maintain and enhance existing infrastructure and transit service. Around 88 percent of discretionary funds will go to operations and maintenance—distributed roughly 40/60 between roadways and transit, respectively—with the remainder split between expansion of road, transit, and bike/pedestrian networks. Compared to Transportation 2035, the proposed Plan Bay Area would spend a higher percentage of its budget on transit and roadway operations and maintenance, less on expansion of transit network, and roughly the same percent on road and bridge expansion.

Given the larger budget of Plan Bay Area, this actually means a significant increase in money allocated to operations and maintenance and a decline in money budgeted for expansion, as shown in **Table 1.2-10**. For example, the 4 percent increase in the proportion of funds allocated to transit operations and maintenance, when applied to a budget that is 27 percent larger, translates into a 36-percent increase in actual dollars. Measured in dollars, compared to RTP 2035 the proposed Plan would increase operations and maintenance expenditures by $69 billion (up by 37.5 percent) and decrease money for system expansion by $7 billion (down by 16 percent).

TABLE 1.2-10: TRANSPORTATION INVESTMENTS OF PLAN BAY AREA VS. RTP 2035

	Plan Bay Area		*RTP 2035*		*Change*	
	% of Revenues	*$ billion*	*% of Revenues*	*$ billion*	*% Change in Total $*	*$ billion*
O&M-Transit	55%	$159	51%	$116	+ 37%	+ $43
O&M-Roads/Bridges	33%	$94	30%	$68	+ 38%	+ $26
Expansion-Transit	7%	$21	14%	$32	- 34%	- $11
Expansion-Roads/Bridges	5%	$15	5%	$11	+ 36%	+ $4
TOTAL		**$289**		**$227**		**+$62**

Source: MTC, 2013.

Strategy

The proposed investment plan is guided by six strategies which support the "three E's" of sustainability (economy, environment and equity) that stand at the top of Plan Bay Area's goals. The estimated $57 billion in discretionary revenues will be distributed among the following strategies, plus a $2 billion reserve:

Maintain and sustain the existing system ($15 billion) by continuing the Transportation 2035 investment approach to fully fund timely transit vehicle replacement and 70 percent of the other high priority transit capital needs. Furthermore, this strategy will fully fund operating needs for existing transit services and invest in state bridge rehabilitation and retrofit. It will also strive to make the transit system sustainable by implementing the recommendations of the Transit Sustainability Project.

Build next generation transit ($5 billion) by developing a regional funding strategy to implement transit projects that receive a high performance score. These investments set the stage for the next generation of capital transit investments, identify New Starts/Small Starts candidates, and outline an early High Speed Rail investment strategy on the Peninsula Corridor. High performing transit projects include:

- BART to San José: Phase 2 – Berryessa to Santa Clara
- Irvington BART Station
- Van Ness Bus Rapid Transit
- Grand-MacArthur Bus Rapid Transit
- $660 million for future investment in transit in the East Bay

Boost transit and road efficiency ($4 billion) of the existing transportation system by improving reliability and reducing delay in congested corridors, charging drivers a fee to drive in specific congested areas and using the revenue to fund transportation improvements, maximizing the efficiency and management of existing roadway infrastructure, and limiting roadway expansion to only the most essential locations. Projects that would be funded under this strategy include a regional Express Lanes network and the Freeway Performance Initiative. System efficiency projects include:

- Caltrain Service Frequency and Electrification
- Better Market Street
- SFMTA Transit Effectiveness Project
- BART Metro: Phase 1—Bay Fair
- Congestion Pricing for San Francisco and Treasure Island

OneBayArea Grants ($14 billion) will reward jurisdictions that produce housing near transit and create healthy communities, target investments in PDAs, support planning efforts for transit-oriented development in PDAs, and support PCAs. These grants will support and leverage investments currently encompassed in existing initiatives such as the Regional Bicycle Program and Transportation for Livable Communities (TLC). Funds that support Local Streets and Roads (LS&R) operations and maintenance overlap with the "Maintain and Sustain" strategy.

County priorities ($16 billion) based on discretionary funding requests for local priority projects submitted by CMAs. The projects are heavily focused on maintenance of the existing transportation system, followed by expansion and bicycle/pedestrian investments. Many of these projects also will receive complementary funding from one of the other investment strategies.

Protect the environment ($630 million) by making modest investments to support innovative policy initiatives to help the region achieve and possibly exceed its greenhouse gas emission reduction targets. The relatively slow population growth expected in the Bay Area, in combination with relatively efficient existing travel patterns, limits the scale of transformational change in the region's GHG emissions levels through land use changes and traditional transportation investments alone. The Plan Bay Area climate policy initiatives emphasize clean vehicles and smart driving. The proposed Plan includes a suite of programs including incentives to: promote a switch to clean and electric vehicles; extend electric vehicle ranges; increase car sharing and van pools; and implement a smart driving strategy with in-vehicle fuel economy meters plus an education campaign. The initiatives also include funding to invest more in the most successful Climate Initiatives Grants funded under Transportation 2035. These grants are testing innovative and creative ways to reduce transportation emissions.

Project Selection Process

In April 2011, MTC received over 1,000 projects submitted for consideration in response to its open "call for projects" for Plan Bay Area. Each of the nine CMAs assisted MTC by coordinating project submittals for their county. In addition, CMAs were responsible for the public involvement and outreach activities related to the call for projects and to coordinate with members of the public on project ideas. Caltrans and multi-county transit operators were allowed to submit directly to MTC, but coordination with the CMAs was encouraged by MTC.

MTC staff then worked with CMA staff and local project sponsors to identify projects and programs deemed "committed" as defined by MTC's Committed Funds and Projects Policy (see MTC Resolution No. 4006), which was adopted in April 2011. The Committed Funds and Projects Policy determines which projects proposed for inclusion in the Plan are not subject to discretionary action by the Commission because the projects are fully funded and are too far along in the project development process to consider withdrawing support, and which fund sources are subject to discretionary action by the Commission for priority projects and programs. In general, "committed" projects are projects that have received environmental clearance and have full funding plans or are funded exclusively with local funds. Many projects that were considered "committed" in RTP 2035 are considered "uncommitted" in Plan Bay Area because of the more restricted definition of a committed project, resulting in many more projects undergoing performance evaluations and giving the Commission greater discretion in prioritizing projects for the investment strategy.

Approximately 900 uncommitted or "discretionary" projects were evaluated to identify high- and low-performing projects using two primary methodologies. Larger projects were evaluated individually, while smaller projects were grouped by project type. First, projects were qualitatively assessed against the 10 performance targets adopted by MTC and ABAG (see Plan Goals and Targets section above). Second, the largest projects underwent a benefit-cost assessment to compare the monetized project benefits and project costs, in order to gauge their cost-effectiveness. The benefit-cost assessment was more extensive than the approach taken in Transportation 2035, as it included a wide range of costs and benefits (travel time, CO_2 emissions, particulate emissions, ROG/NO_x emissions, health impacts from active transportation, injuries and fatalities from collisions, property damage from collisions, vehicle operating costs, vehicle ownership costs, and noise). The release of the draft performance assessment results in November 2011 allowed for feedback from MTC commissioners, CMAs, project sponsors, and other stakeholders; the final results were released by the MTC Planning Committee in January 2012.

The project performance assessment identified high-performing and low-performing projects. Thirteen high-performing projects were identified and prioritized for regional funding in Plan Bay Area; some of the most significant of these projects are listed earlier in this section under "Build Next Generation Transit." These projects were identified based on their high levels of cost-effectiveness and strong support for the Plan Bay Area targets. Thirty-two low-performing projects were also identified. Of these, twenty-eight projects appealed for inclusion in Plan Bay Area despite their low performance on cost-effectiveness or targets support and either adjusted the scope or phase of the project seeking inclusion in the Plan or changed funding sources to only local dollars. Eight of the low-performing projects were able to demonstrate compelling reasons for their inclusion in the Plan as originally submitted. Additional information on the project performance assessment can be found in the supplemental report on the OneBayArea website, www.onebayarea.org.

PROPOSED PLAN IMPLEMENTATION

Implementation of the proposed transportation investment strategy is consistent with past RTPs. The successful implementation of the proposed land use development strategy is more complex, however, since MTC and ABAG do not have land use authority. Implementation of the land use strategy will require its adoption by the local jurisdictions in the Bay Area; local governments (the nine counties and 101 cities of the region) have sole authority to create and implement land use plans.

EXPECTED PLAN PERFORMANCE VS. SB 375 TARGETS

The land use development strategy and transportation investment strategy described above combine to form the proposed Plan analyzed in this EIR. The proposed Plan is projected to hit the two targets mandated by SB 375:

- **Greenhouse Gas Emissions**. Extremely efficient growth patterns are required to meet the GHG emission reduction goal. The proposed Plan concentrates growth into walkable communities along the region's extensive transit network, provides incentives for clean vehicles and smart driving, and directs investment into operating and maintaining, rather than expanding, the region's current transportation network. As a result, by 2035, per capita greenhouse gas emissions from transportation are projected to decline by 16.4 percent from today, exceeding the region's target of 15 percent.
- **Adequate Housing**. The proposed Plan is expected to produce adequate housing within the region for all income groups, creating 660,000 new units to go along with the 40,000 existing vacant units, to accommodate 700,000 new households overall (with another 138,000 units vacant). Of these units, 26 percent will be affordable to very low income households, 17 percent to low income households, 17 percent to moderate income households, and 39 percent to above moderate income households. The level of affordable housing production does assume planning support, coordination of regulations, and increase in public funding. The proposed Plan assumes that in-commuting from outside the region will continue at 2010 levels.

ALL PROPOSED PROJECTS

This section includes detailed maps and tables that outline the major land use and transportation components of the proposed Plan. One set of maps shows both the locations of PDAs in the region and the major transportation projects to be built under the proposed Plan together, displaying the connection between these strategies. Some PDAs, such as rural town centers, are not connected to any proposed transportation projects. A second set of maps conveys the amount of housing growth expected in the region's PDAs under the proposed land use development strategy, and a third set shows job growth in the PDAs.

Major Transportation Projects

The following maps show the general locations of major transportation projects in the proposed Plan, shown by county or pair of counties. These major projects cost $10 million or more and include a direct impact on the physical environment; that is, operational and maintenance projects are not shown, but expansions and new construction projects are shown. The maps also show the locations of the region's PDAs.

Each figure is accompanied by a table listing the project ID number, type of project (committed or new commitment) and a brief description. See Appendix C for a longer description of these projects and the full list of transportation improvements in the proposed Plan.

TABLE 1.2-11: MAJOR TRANSPORTATION INVESTMENTS FOR ALAMEDA COUNTY*

Map ID	*Project ID*	*Type***	*Brief Project Description*
1	22760	NC	Construct Outer Harbor Intermodal Terminal (OHIT) on former Oakland Army Base at 7th Street/Maritime Street
2	230170	NC	Improve 42nd Avenue and High Street
3	21131	C	Build a BART Oakland Airport Connector between Coliseum BART station and Oakland International Airport
4	22100	C	Replace overcrossing structure at I-880/Davis Street interchange and add additional travel lanes on Davis Street
5	22063	C	Improve Route 238 corridor near Foothill Boulevard/I-580
6	240047	NC	Reconstruct I-880/A Street interchange
7	21093	C	Implement Route 92/Clawiter Road/Whitesell Street interchange improvements and local intersection improvements
8	240051	NC	Widen Union City Boulevard from 2-lanes to 3-lanes between Whipple Road and Industrial Parkway
9	21126	NC	Construct Route 84 westbound HOV on-ramp from Newark Boulevard
10	240272	NC	Widen Thornton Avenue from 2-lanes to 4-lanes between Gateway Boulevard and Hickory Street
11	94506	NC	Construct an east-west connector between I-880 and Route 238/Mission Boulevard
12	240263	NC	Modify Route 84/Peralta Boulevard
13	21132	C	Extend BART from Fremont to Warm Springs
14	22062	NC	Construct Irvington BART Station in Fremont
15	230114	NC	Widen Auto Mall Parkway from 4-lanes to 6-lanes between I-680 and I-880
16	240374	C	Extend BART to Berryessa
17	230110	NC	Improve Route 262 Mission Boulevard cross connector
18	22990	C	Widen Route 262 from I-880 to Warm Springs Boulevard and reconstruct Union Pacific Railroad underpasses
19	21484	NC	Widen Kato Road from Warren Avenue to Milmont Drive
20	240062	NC	Construct improvements for the Route 84/I-680 interchange, widen Route 84 from Pigeon Pass to I-680, and construct auxiliary lanes on I-680 between Andrade and Route 84
21	21116	C	Widen I-580 for HOV and auxiliary lanes eastbound from Hacienda Road to Greenville Road and westbound from Greenville Road to Foothill Road
22	230684	C	Widen I-580/I-680 interchange in each direction for express lanes
23	240038	NC	Widen Doughery Road from 4-lanes to 6-lanes between Sierra Lane and North City Limit
24	240261	NC	Extend and widen Scarlett Drive from Dougherty Road to Dublin Boulevard and relocate Iron Horse Trail along Scarlett Drive in Dublin

TABLE 1.2-11: MAJOR TRANSPORTATION INVESTMENTS FOR ALAMEDA COUNTY*

Map ID	*Project ID*	*Type***	*Brief Project Description*
25	21473	C	Construct a 4-lane arterial connecting Dublin Boulevard and North Canyons Parkway
26	240200	C	Extend Stoneridge Drive from Trevor Parkway to El Charro Road and construct six traffic signals
27	22776	NC	Widen Route 84 from 2 lanes to 4 lanes from north of Pigeon Pass to Stanley Boulevard and from 2lanes to 6 lanes from Stanley Boulevard to Jack London Boulevard
28	21100	NC	Modify I-580/Vasco Road interchange
29	240254	NC	Widen Greenville Road from 2-lanes to 4-lanes between I-580 and Patterson Pass Road
30	22013	C	Construct I-580 eastbound truck climbing lane at the Altamont Summit
31	230666	C	Widen I-580 for eastbound and westbound express lanes from Greenville Road to San Joaquin County line

Notes:

*Major projects defined as costing $10 million or more and with a physical impact on the environment (i.e., construction but not operations).

**C = Committed, NC = New Commitment

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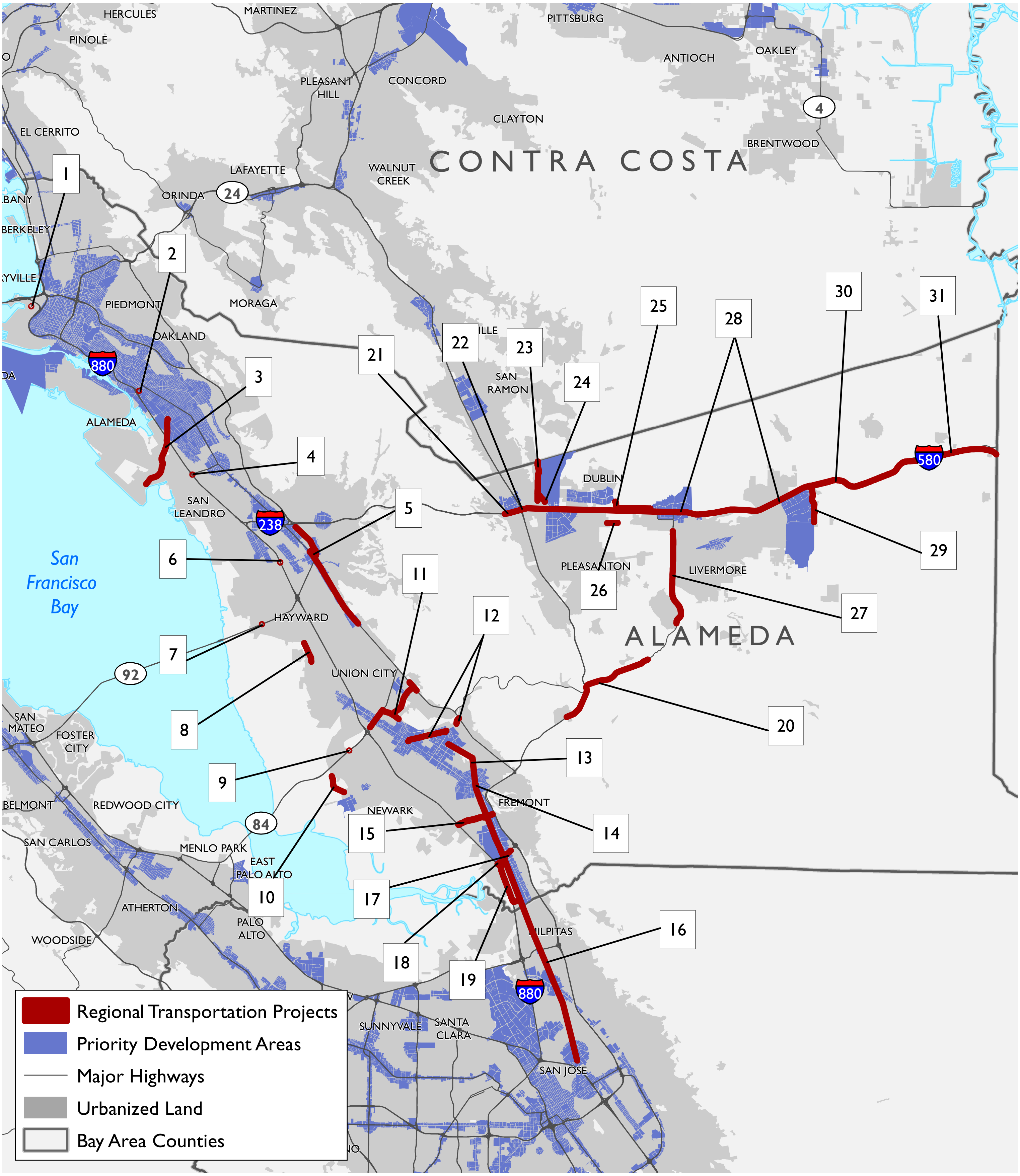
Figure 1.2-8

Proposed Transportation Projects in Alameda County



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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TABLE 1.2-12: MAJOR TRANSPORTATION INVESTMENTS FOR CONTRA COSTA COUNTY*

Map ID	*Project ID*	*Type***	*Brief Project Description*
1	230318	NC	Extend North Richmond truck route from Market Avenue to Parr Boulevard
2	21210	C	Construct Capitol Corridor train station in Hercules
3	22352	NC	Construct new HOV-only on- and off-ramps at I-680/Norris Canyon Road
4	240629	NC	Widen Bolinger Canyon Road from Alcosta to San Ramon Valley Boulevard
5	98134	C	Widen Dougherty Road to 6 lanes from Red Willow to Contra Costa County line
6	230307	NC	Widen Camino Tassajara Road from 2 lanes to 4 lanes from Windemere Parkway to County line
7	240587	C	Widen I-680 northbound for express lanes from Marina Vista Avenue to North Main Street
8	98133	C	Widen Pacheco Boulevard from 2 lanes to 4 lanes between Blum Road to Arthur Road
9	240588	C	Widen I-680 southbound for express lanes from Marina Vista Avenue to Livorna Road
10	21205	NC	Improve I-680/Route 4 interchange
11	22350	NC	Improve I-680/Route 4 interchange Phases 4 and 5
12	230216	NC	Construct a two-lane bridge over Walnut Creek connecting Waterworld Parkway with Meridan Park Boulevard
13	22388	NC	Construct on- and off-ramp for State Route 242 at Clayton Road
14	230239	C	Widen and improve Buskirk Avenue between Monument Boulevard and Hookston Road to provide 2 through lanes in each direction
15	240355	NC	Add an eastbound mixed-flow lane on Route 4 from the lane drop 1,500 feet west of Port Chicago Highway to east of Willow Pass Road (west) on-ramp
16	240584	NC	Add a westbound mixed-flow lane from east of Willow Pass Road (West) to the lane-add west of Willow Pass Road (West)
17	230237	NC	Extend West Leland Road and construct a new 4-lane arterial road with raised median, bike lanes and sidewalks from San Marco Boulevard to Willow Pass Road
18	98115	C	Widen Ygnacio Valley/Kirker Pass Roads from 4 lanes to 6 lanes from Michigan Boulevard to Cowell Road
19	230291	NC	Construct northbound truck climbing lane from Clearbrook Drive in Concord to crest of Kirker Pass Road
20	230233	NC	Extend James Donlon Boulevard to Kirker Pass Road by constructing a new 2-lane expressway
21	21211	C	Extend BART/East Contra Costa Rail (eBART) eastward from the Pittsburg/Bay Point BART station into eastern Contra Costa County
22	240625	NC	Construct eBART station in the Route 4 median at Railroad Avenue
23	230238	C	Widen California Avenue from 2 lanes to 4 lanes with 2 left-turn lanes

TABLE 1.2-12: MAJOR TRANSPORTATION INVESTMENTS FOR CONTRA COSTA COUNTY*

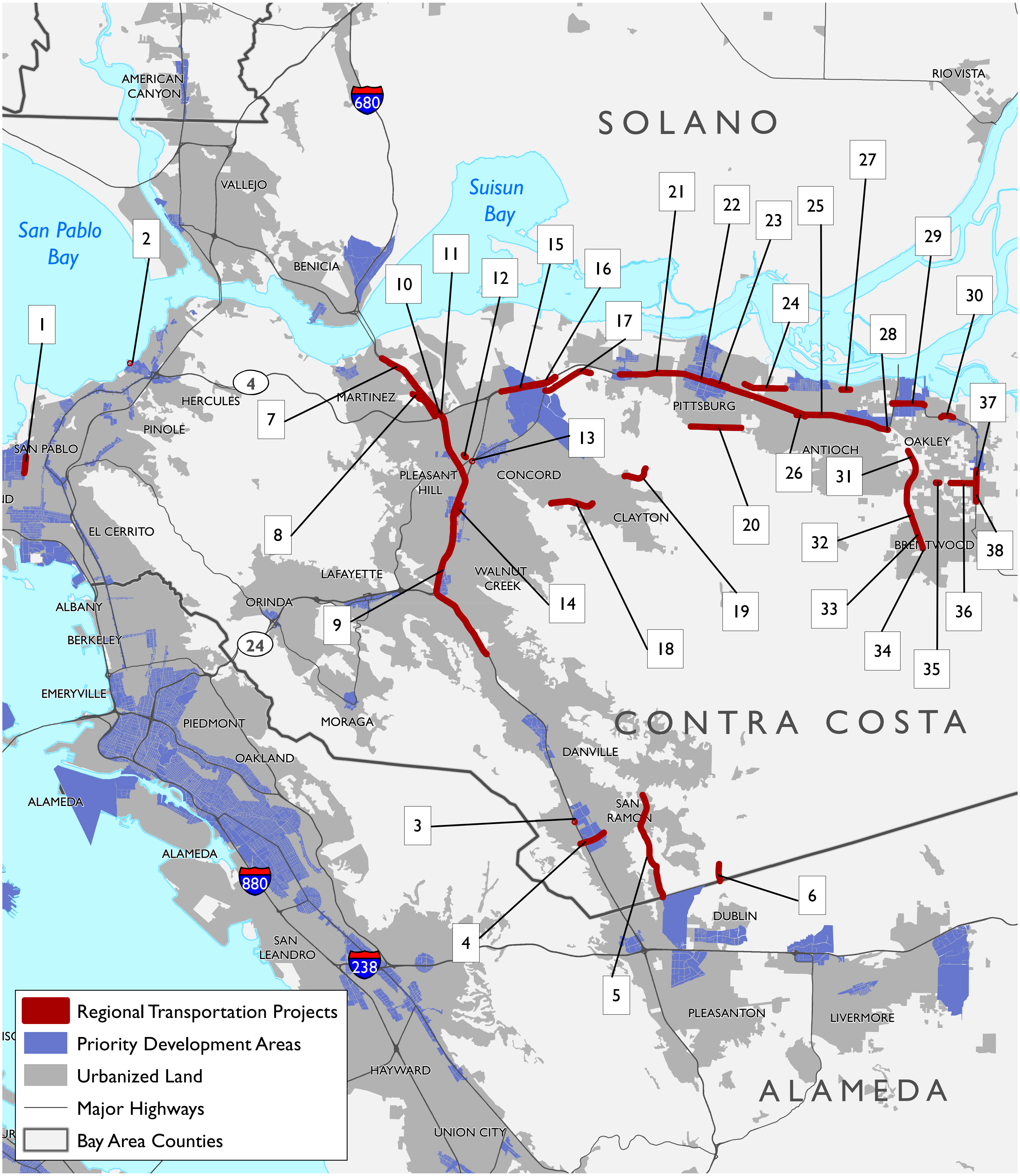
Map ID	*Project ID*	*Type***	*Brief Project Description*
24	230236	C	Widen Pittsburg-Antioch Highway from 2 lanes to 4 lanes
25	98999	C	Widen Route 4 from Somersville Road to Route 160 including improvements to interchanges
26	230253	C	Replace the old 2-lane Fitzuren Road with a new 4-lane divided arterial
27	21214	C	Widen Wilbur Avenue over Burlington Northern Santa Fe Railroad from 2 lanes to 4 lanes
28	98222	C	Construct freeway-to-freeway direct connectors between Route 4 Bypass and Route 160
29	230274	C	Widen Main Street to 6 lanes from Route 160 to Big Break Road
30	230289	NC	Create Main Street Downtown Bypass by constructing new roadway between Vintage Parkway and 2nd Street
31	230202	C	Widen Route 4 Bypass from 2 to 4 Lanes from Laurel Road to Sand Creek Road
32	230203	C	Construct Route 4 Bypass interchange at Sand Creek Road
33	230205	C	Widen Route 4 Bypass from 2 to 4 lanes from Sand Creek Road to Balfour Road
34	230206	C	Construct Route 4 Bypass interchange at Balfour Road (Phase 1)
35	230249	NC	Construct grade separation underpass at Lone Tree Way and Union Pacific Railroad
36	230247	NC	Widen Lone Tree Way to 6-lanes from O'Hara Avenue to Brentwood Boulevard
37	240167	NC	Widen Brentwood Boulevard from 2 lanes to 4 lanes from Lone Tree Way and the north city limit
38	230250	C	Widen Brentwood Boulevard from 2 lanes to 4 lanes between Marsh Creek and Delta Road

Notes:

*Major projects defined as costing $10 million or more and with a physical impact on the environment (i.e., construction but not operations).

**C = Committed, NC = New Commitment

Figure 1.2-9
Proposed Transportation Projects in Contra Costa County



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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TABLE 1.2-13: MAJOR TRANSPORTATION INVESTMENTS FOR MARIN AND SONOMA COUNTIES*

Map ID	*Project ID*	*Type***	*Brief Project Description*
1	240736	NC	Expand and enhance the SMART commuter rail system (Phase II) by constructing a one-station extension from San Rafael to Larkspur, constructing a one-station extension from North Santa Rosa to Windsor, implementing capacity improvements along the Initial Operating Segment (Sonoma County only), and completing the multi-use pathway from Larkspur to Cloverdale.
2	240668	NC	Widen Airport Boulevard from 2-lanes to 5-lanes between Ordiance Road and Aviation Boulevard
3	22191	C	US 101 North Project - Phase B- Airport Boulevard interchange improvements and Airport Boulevard
4	240524	NC	Construct an interchange with bicycle and pedestrian enhancements at Route 12/Fulton Road
5	22207	NC	Extend Farmers Lane from Bellevue Avenue to Bennett Valley Road as a 3-lane or 4-lane arterial
6	22001	C	Implement Sonoma-Marin Area Rail Transit District (SMART) Commuter Rail and Multi-Use Pathway Project (Initial Operating Segment)
7	22655	C	Widen U.S. 101 for HOV lanes (one in each direction) from Rohnert Park Expressway to Santa Rosa Avenue
8	22195	C	Improve U.S. 101/Old Redwood Highway interchange
9	21902	C	Widen U.S. 101 for HOV lanes from Pepper Road to Rohnert Park Expressway (Central Phase A)
10	98147	NC	Widen U.S. 101 in each direction with 1 HOV lane from Old Redwood Highway to the Marin/Sonoma County line
11	22656	C	Improve U.S. 101/East Washington Street interchange
12	240672	C	Implement Marin Sonoma Narrows Stage 1 (Sonoma County)
13	240039	NC	Widen Novato Boulevard between Diablo Avenue and Grant Avenue

Notes:

*Major projects defined as costing $10 million or more and with a physical impact on the environment (i.e., construction but not operations).

**C = Committed, NC = New Commitment

TABLE 1.2-14: MAJOR TRANSPORTATION INVESTMENTS FOR NAPA AND SOLANO COUNTIES*

Map ID	*Project ID*	*Type***	*Brief Project Description*
1	230392	NC	Extend Devlin Road from Airport Boulevard to Green Island Road
2	240617	NC	Create new road and transit configuration on Route 29 through American Canyon with connectivity to the Vallejo Ferry, including BRT, potential HOV, and other roadway innovations
3	94152	C	Widen Route 12 (Jameson Canyon) from 2 lanes to 4 lanes from I-80 in Solano County to Route 29 in Napa County (Phase 1)
4	230313	NC	Improve interchanges and widen roadways serving Solano County Fairgrounds, including Redwood Parkway
5	230658	C	Widen I-80 in each direction for express lanes from Route 37 to Carquinez Bridge
6	230659	C	Widen I-80 in each direction for express lanes from Red Top Road to Route 37
7	230686	C	Widen I-680 in each direction for express lanes between Martinez Bridge to I-80
8	230326	NC	Improve I-80/I-680/Route 12 Interchange (Phase 1), includes widen I-80 and I-680 and improve direct freeway to freeway connections
9	230687	C	Widen I-680/I-80 interchange in each direction for express lanes
10	230468	NC	Provide auxiliary lanes on I-80 in eastbound and westbound directions from I-680 to Airbase Parkway, add eastbound mixed-flow lane from Route 12 East to Airbase Parkway, and remove I-80/auto Mall hook ramps and C-D slip ramp
11	230322	C	Rebuild and relocate eastbound Cordelia Truck Scales Facility
12	240581	C	Widen I-80 in each direction for express lanes from Air Base Parkway to I-505
13	240213	C	Implement I-80/Lagoon Valley Road interchange improvements
14	240583	C	Widen I-80 in each direction for express lanes from I-505 to Yolo County Line
15	94151	NC	Construct 4-lane Jepson Parkway from Route 12 to Leisure Town Road at I-80
16	21341	C	Construct new Fairfield/Vacaville multimodal train station for Capitol Corridor intercity rail service (Phases 1, 2 and 3)

Notes:

*Major projects defined as costing $10 million or more and with a physical impact on the environment (i.e., construction but not operations).

**C = Committed, NC = New Commitment

Figure 1.2-10

Proposed Transportation Projects in Marin & Sonoma Counties

Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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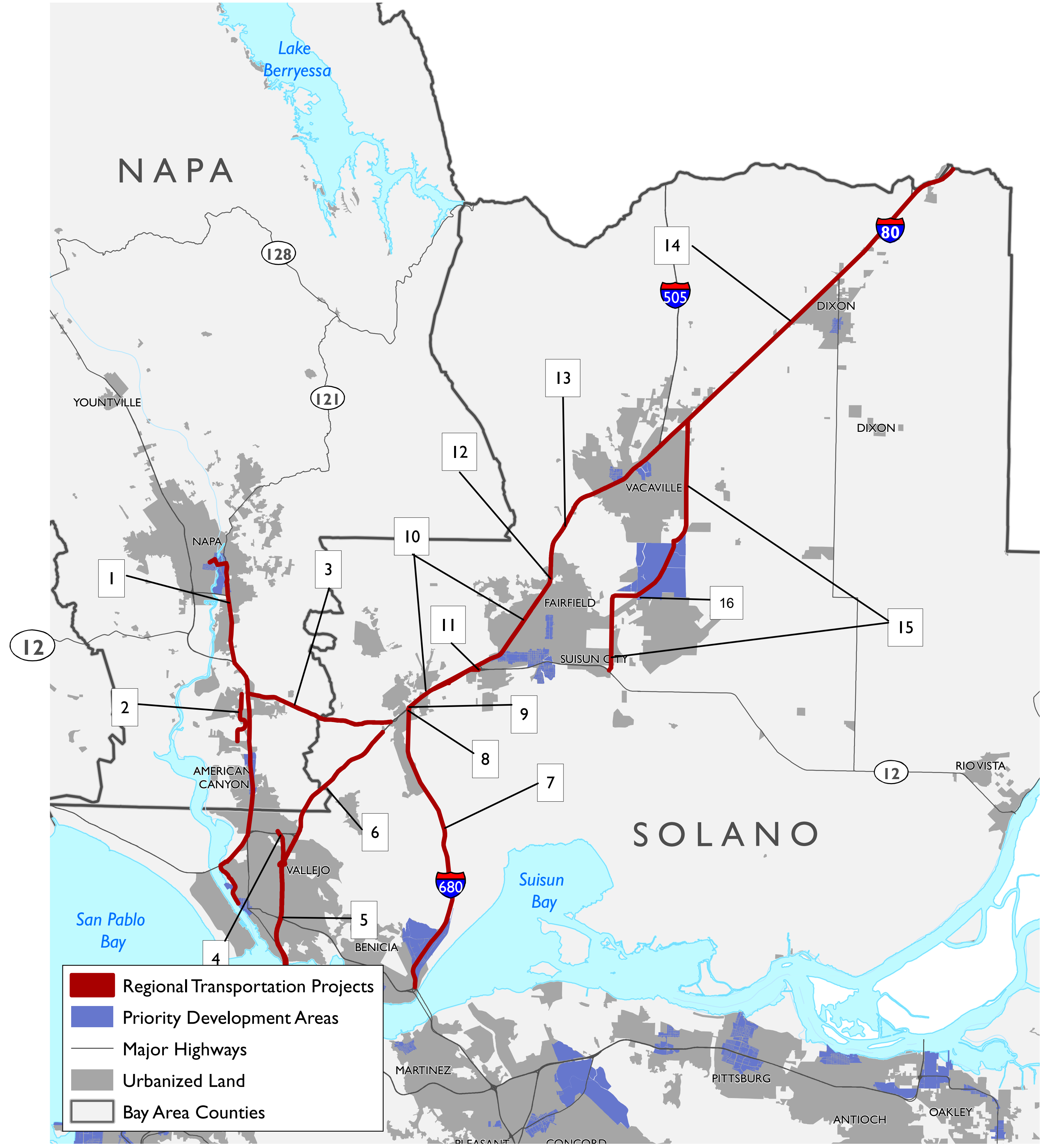
Figure 1.2-11

Proposed Transportation Projects in Napa & Solano Counties



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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TABLE 1.2-15: MAJOR TRANSPORTATION INVESTMENTS FOR SAN FRANCISCO AND SAN MATEO COUNTIES*

Map ID	*Project ID*	*Type***	*Brief Project Description*
1	240400	C	Implement Treasure Island/Yerba Buena Island Street Network
2	22415	NC	Extend historic streetcar service from Fort Mason along Fisherman's Wharf to Caltrain Station
3	21342	C	Implement Transbay Transit Center/Caltrain Downtown Extension (Phase 1 - Transbay Transit Center)
4	230290	NC	Implement Transbay Transit Center/Caltrain Downtown Extension (Phase 2 - Caltrain Downtown Extension)
5	21510	C	Extend the Third Street light Rail line from north of King Street to Clay Street in Chinatown via a new Central Subway, including the purchase of light-rail vehicles
6	240358	NC	Implement Mission Bay New Roadway Network
7	240415	NC	Establish new ferry terminal at Mission Bay 16th Street
8 / 9	240163	NC	Implement Hunters Point Shipyard and Candlestick Point Local Roads Phase 1
10	230490	NC	Re-build and widen Harney Way to 8-lanes
11	22227	NC	Construct a 6-lane arterial from Geneva Avenue/Bayshore Boulevard intersection to U.S. 101/Candlestick Point interchange
12	240334	NC	Construct Southern Intermodal Terminal and extend MUNI T-Line from Bayshore/Sunnydale to Caltrain Bayshore Station
13	240399	C	Implement Parkmerced Street Network
14	240545	C	Extend light rail corridor into Parkmerced development project, add three new light rail stations and facilities, and add tail track and operator support facilities
15	98204	NC	Construct Route 1 (Calera Parkway) northbound and southbound lanes from Fassler Avenue to Westport Drive in Pacifica
16	21613	NC	Widen Route 92 between San Mateo-Hayward Bridge to I-280, includes uphill passing lane from U.S. 101 to I-280
17	94644	NC	Construct a westbound slow vehicle lane on Route 92 between Route 35 and I-280
18	230417	C	Modify U.S. 101/Holly Street interchange
19	230428	C	Extend Blomquist Street over Redwood Creek to East Bayshore and Bair Island Road

Notes:

*Major projects defined as costing $10 million or more and with a physical impact on the environment (i.e., construction but not operations).

**C = Committed, NC = New Commitment

TABLE 1.2-16: MAJOR TRANSPORTATION INVESTMENTS FOR SANTA CLARA COUNTY*

Map ID	*Project ID*	*Type***	*Brief Project Description*
1	240374	C	Extend BART to Berryessa
2	240404	NC	Widen Calaveras Boulevard overpass from 4-lanes to 6-lanes
3	22944	C	Widen I-880 for HOV lanes in both directions from Route 237 in Milpitas to U.S. 101 in San José
4	230456	C	Widen Zanker Road from 4-lanes to 6-lanes
5	240443	NC	Extend Mary Avenue north across Route 237
6	22156	NC	Improve connector ramp at Route 85 northbound to Route 237 eastbound
7	240468	NC	Improve connector ramp at Route 237 westbound to Route 85 southbound
8	230273	NC	Widen Montague Expressway between Trade Zone and I-680
9	230267	C	Widen Montague Expressway to 8-lanes for HOV lanes between Lick Mill and Trade Zone boulevards and on Guadalupe River Bridge and Penitencia Creek Road
10	230370	NC	Improve interchange at I-680/Montague Expressway
11	230363	C	Construct interchange at I-880 and Montague Expressway
12	230457	NC	Widen Oakland Road from 4-lanes to 6-lanes between U.S. 101 and Montague Expressway
13	230449	C	Extend Charcot Avenue over I-880 as a new 2-lane roadway with bicycle and pedestrian improvements to connect to North San José employment center
14	240498	NC	Widen Brokaw Bridge over Coyote Creek
15	21722	NC	Improve interchange at U.S. 101 southbound Trimble Road/De la Cruz Boulevard/Central Expressway
16	230262	NC	Improve interchange at Montague Expressway/U.S. 101
17	22179	NC	Widen Central Expressway from 4-lanes to 6-lanes between Lawrence Expressway and San Tomas Expressway
18	22186	NC	Widen San Tomas Expressway to 8-lanes between Route 82 to Williams Road
19	21922	NC	Implement Mineta San José International Airport APM connector
20	22979	NC	Improve interchange at U.S. 101/Zanker Road/Skyport Drive/Fourth Street
21	240375	NC	Extend BART from Berryessa to San José/Santa Clara (Phase 2)
22	230201	NC	Widen Coleman Avenue from 4-lanes to 6-lanes between I-880 and Taylor Street
23	230200	NC	Extend Autumn Parkway from Julian Street to San Carlos Street and implement improvements from St. John Street to Park Avenue
24	22965	NC	Improve interchange at U.S. 101/Mabury Road/Taylor Street
25	230492	NC	Improve interchange at U.S. 101/Old Oakland Road
26	22956	NC	Extend Capitol Expressway light rail to Eastridge Transit Center - Phase II

TABLE 1.2-16: MAJOR TRANSPORTATION INVESTMENTS FOR SANTA CLARA COUNTY*

Map ID	*Project ID*	*Type***	*Brief Project Description*
27	22134	C	Construct a lane on southbound U.S. 101 using the existing median from south of Story Road to Yerba Buena Road; modify the U.S. 101/Tully road interchange to a partial cloverleaf
28	240671	NC	Improve interchange at I-280/Senter Road
28	240671	NC	Improve interchange at I-280/Senter Road
29	21786	NC	Widen interchange at U.S. 101/Hellyer Avenue
30	21785	NC	Widen interchange at U.S. 101/Blossom Hill Road
31	240636	NC	Construct 2-lane or 4-lane connection between Almaden Expressway and Winfield Boulevard
32	22175	NC	Widen Almaden Expressway from Coleman Avenue to Blossom Hill Road
33	98119	C	Extend light-rail transit from Winchester Station to Route 85 (Vasona Junction)
34	240412	NC	Extend Butterfield Boulevard South between Tennant Avenue and Watsonville Road
35	240379	NC	Extend Buena Vista Avenue from Santa Teresa Boulevard to Monterey Road
36	21702	NC	Improve interchange at U.S. 101/Buena Vista Avenue
37	240385	NC	Construct 4-lane bridge across Uvas Creek to allow the extension of Tenth Street to Santa Teresa Boulevard (Glen Loma Development)

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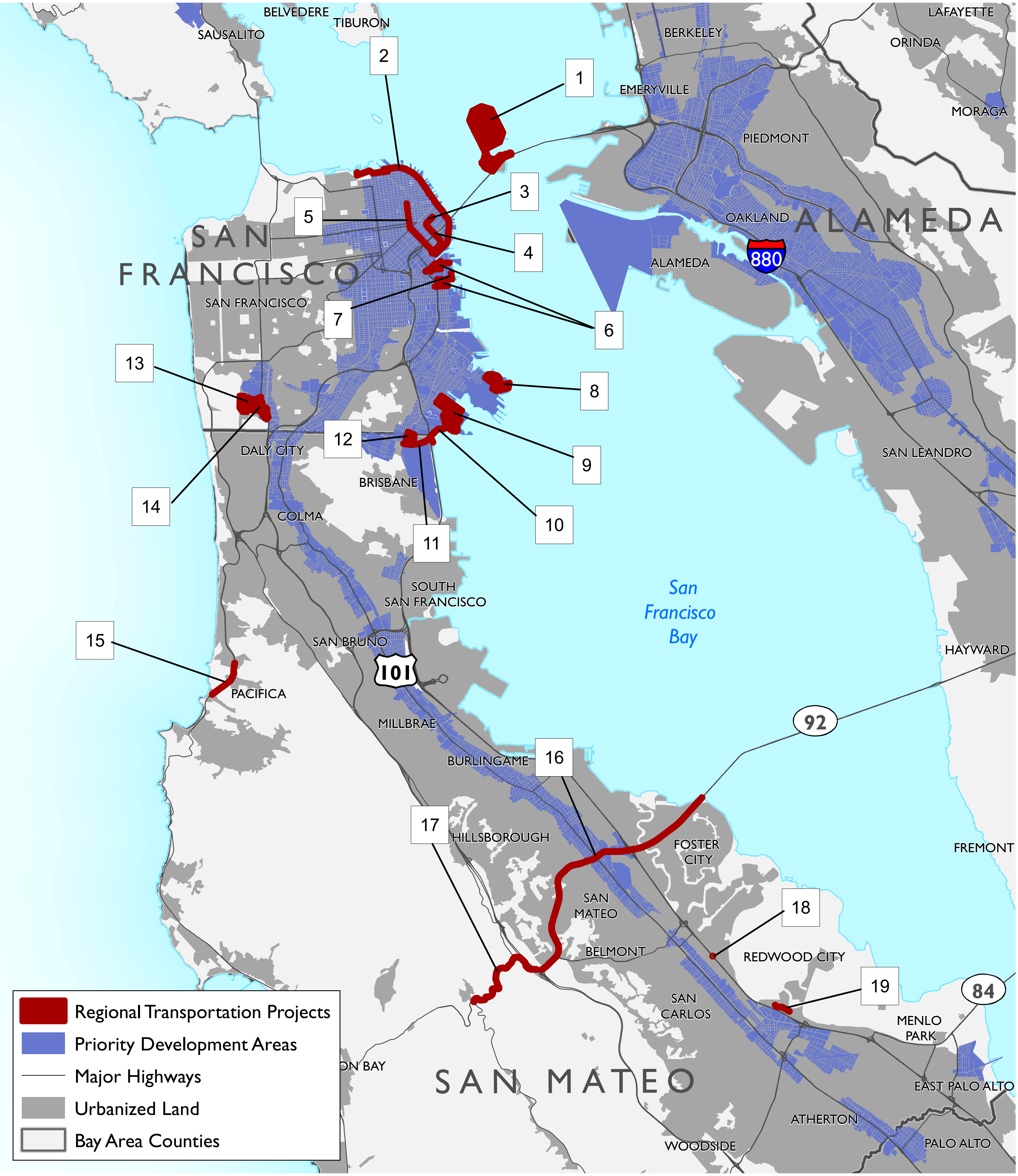
Figure 1.2-12

Proposed Transportation Projects in San Francisco & San Mateo



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

0 1 2 4 Miles

1 in = 3 miles

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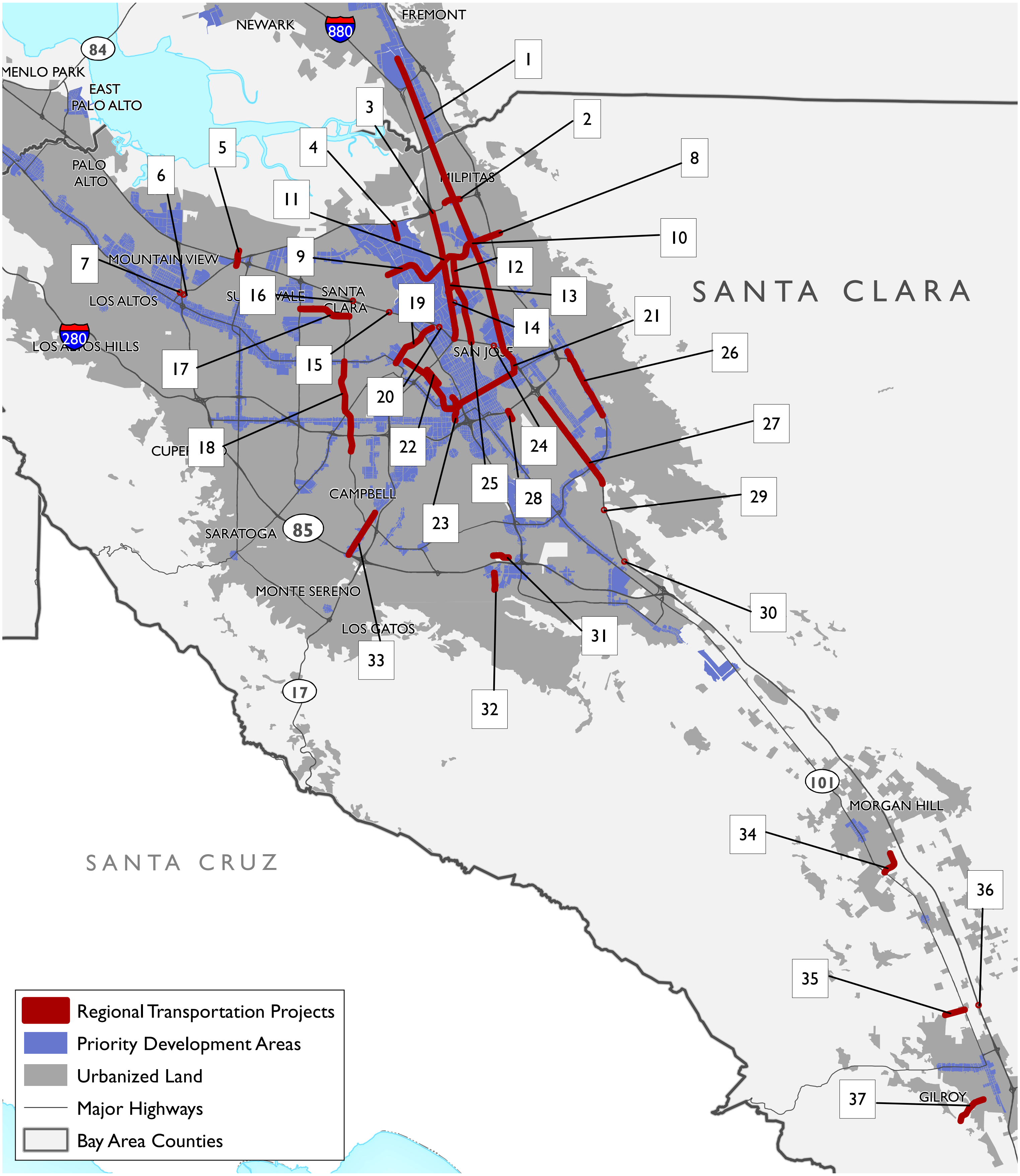
Figure 1.2-13

Proposed Transportation Projects in Santa Clara County



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

0 1.25 2.5 5 Miles
1 in = 4 miles

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PDA Growth

The following maps convey the increase of households and jobs within the region's PDAs under the proposed Plan, displayed by county or pair of counties. The majority of household and job growth from existing conditions (2010) through the time horizon of the proposed Plan (2040)—77 and 63 percent, respectively—is expected to be located within PDAs.

The first set of maps shows the increase in housing density expected for PDAs from 2010 to 2040. Housing density is measured as housing units per acre. Each PDA has its own density number, calculated as total number of housing units divided by total acreage of the PDA. These maps convey where higher density housing is expected to occur—largely existing urban centers such as central San Francisco and downtown Oakland, along with a few other locations—as well as the lesser densification of other areas.

The second set of maps shows the increase in job density expected for PDAs from 2010 to 2040. As with housing density, these maps show the increase in jobs per acre for each PDA. The greatest job intensification is expected in existing urban centers, as well as key suburban employment centers such as Walnut Creek and Palo Alto.

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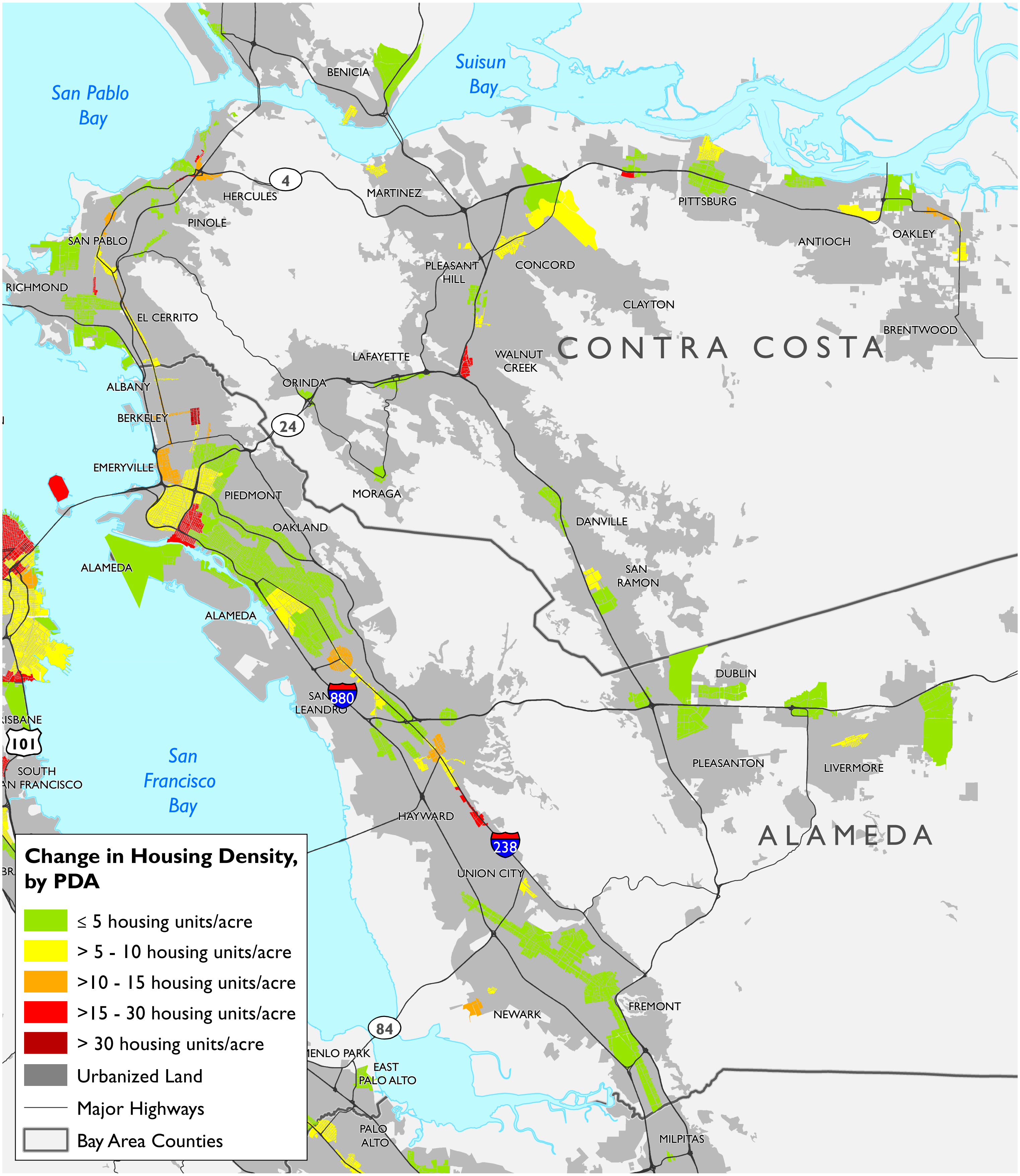
Figure 1.2-14

Change in PDA Housing Density, 2010-2040, Alameda & Contra Costa



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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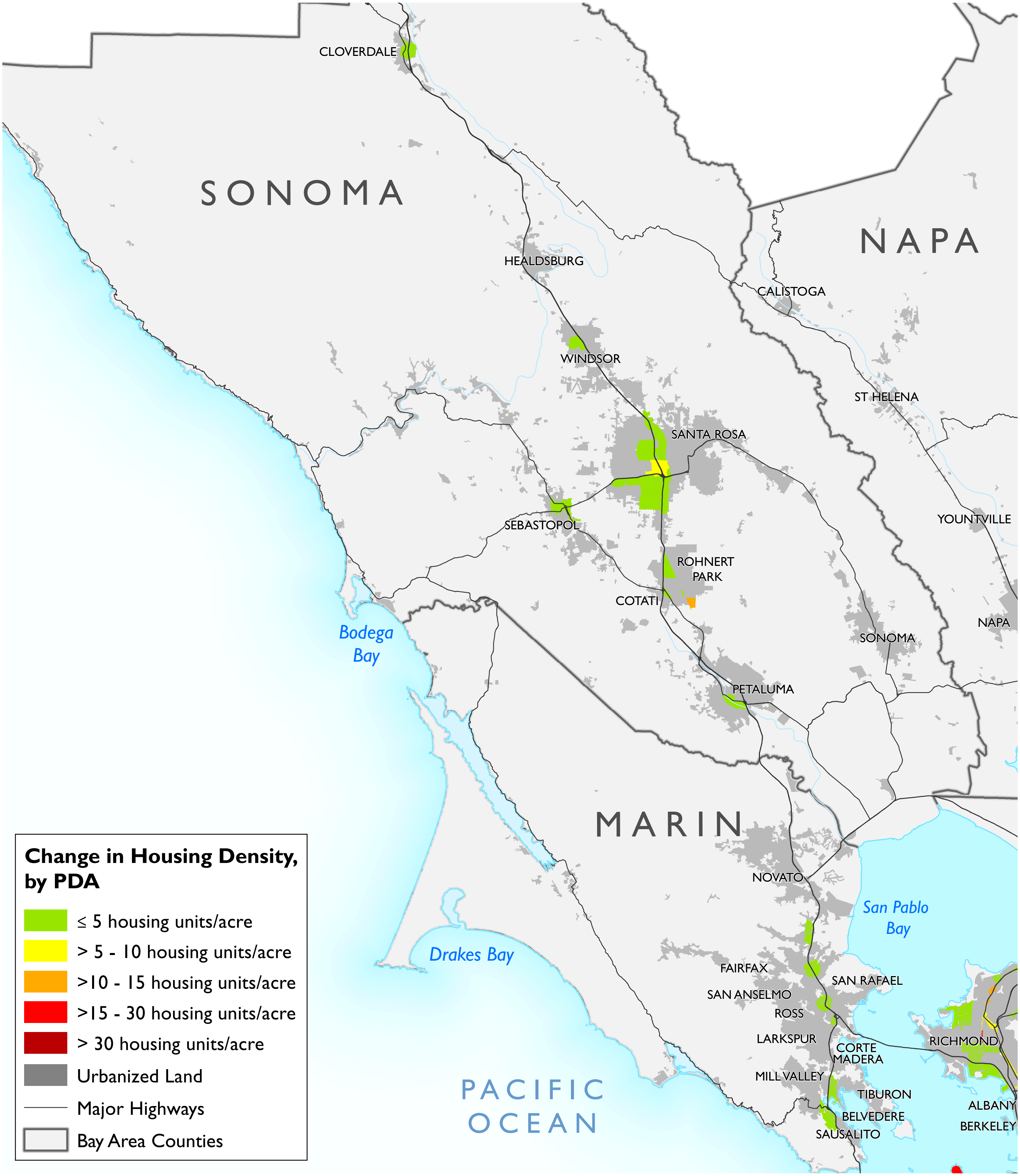
Figure 1.2-15

Change in PDA Housing Density, 2010-2040, Marin & Sonoma



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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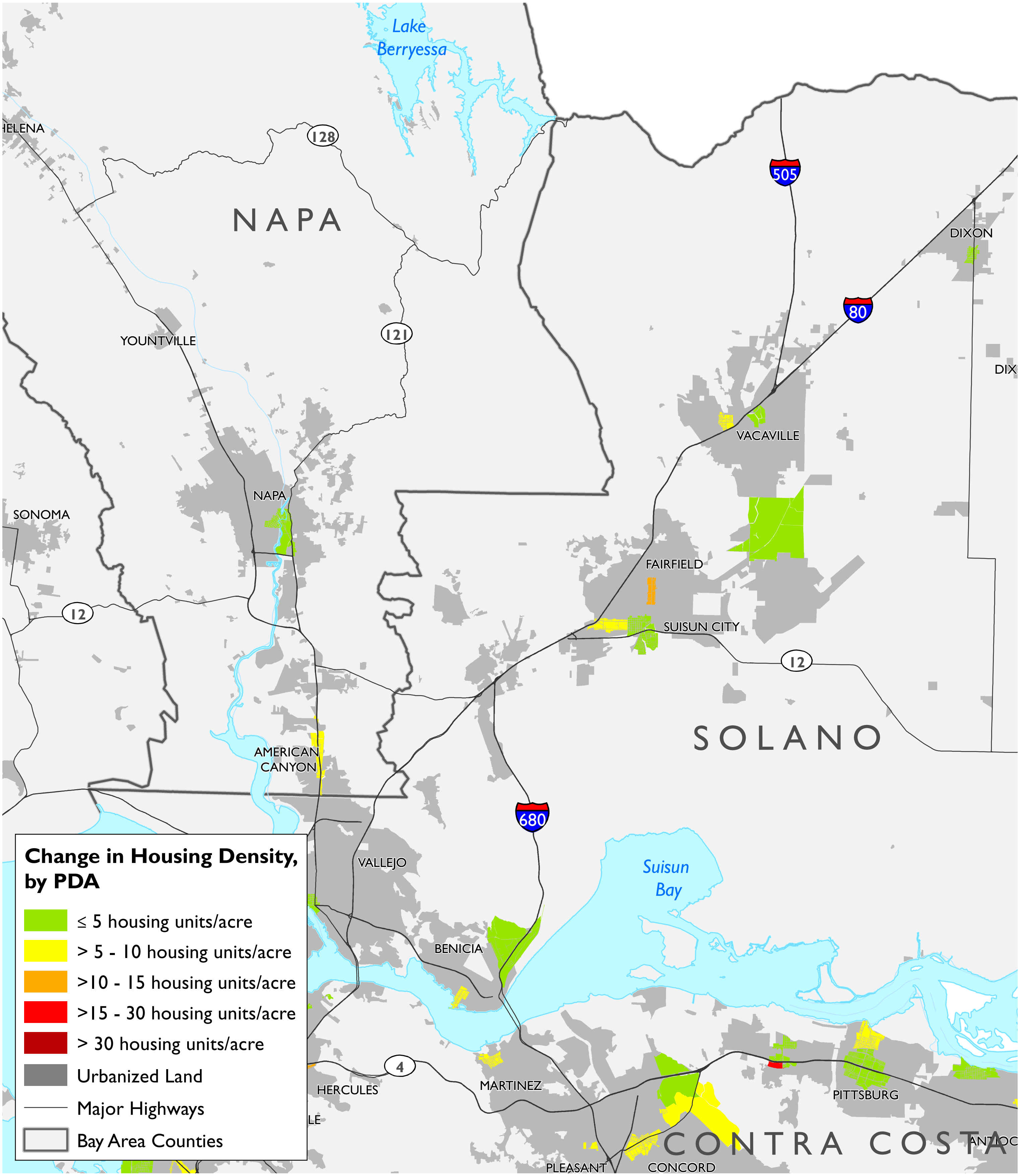
Figure 1.2-16

Change in PDA Housing Density, 2010-2040, Solano & Napa



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

0 1.25 2.5 5 Miles

1 in = 5 miles

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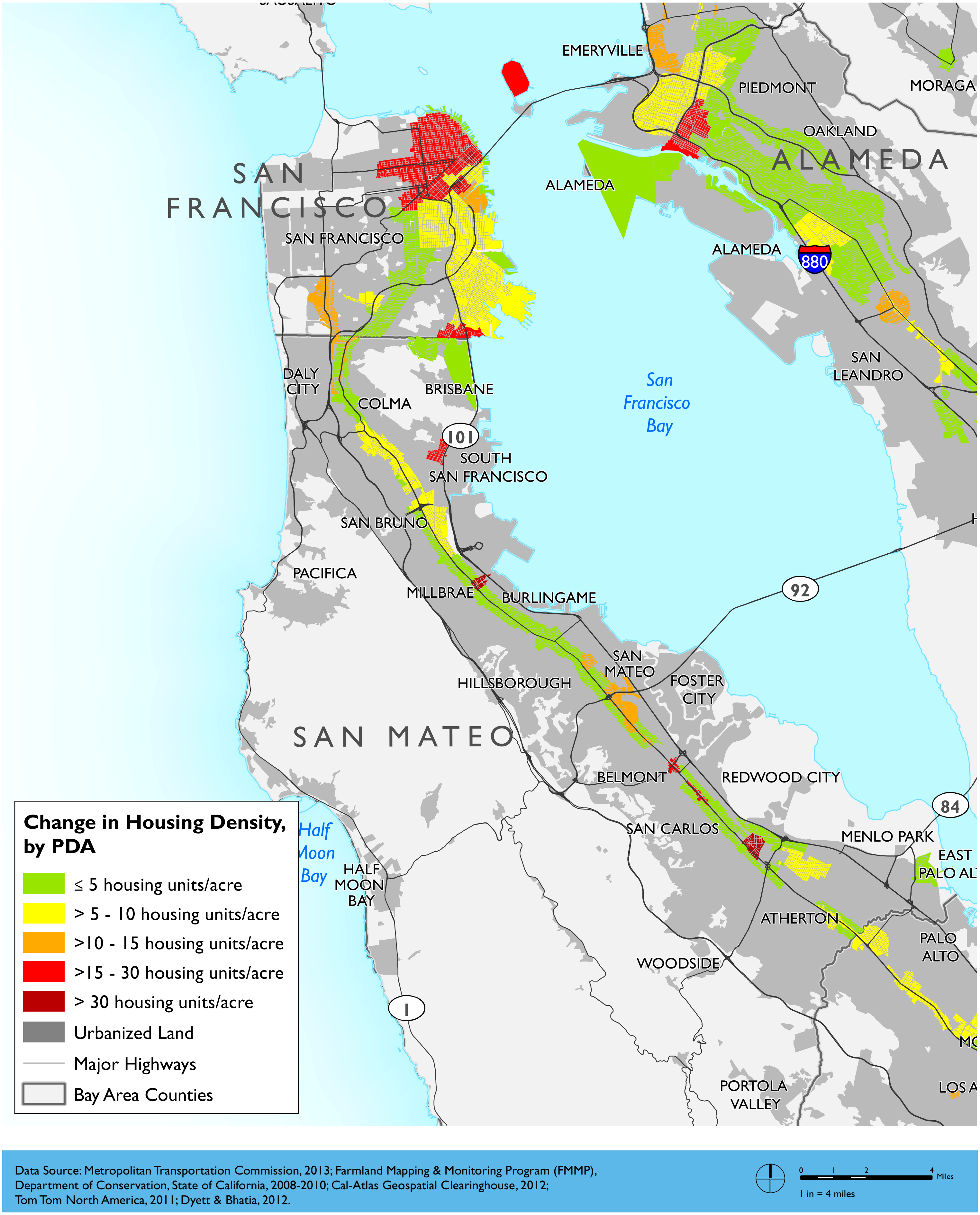
Figure 1.2-17

Change in PDA Housing Density, 2010-2040, San Francisco & San Mateo



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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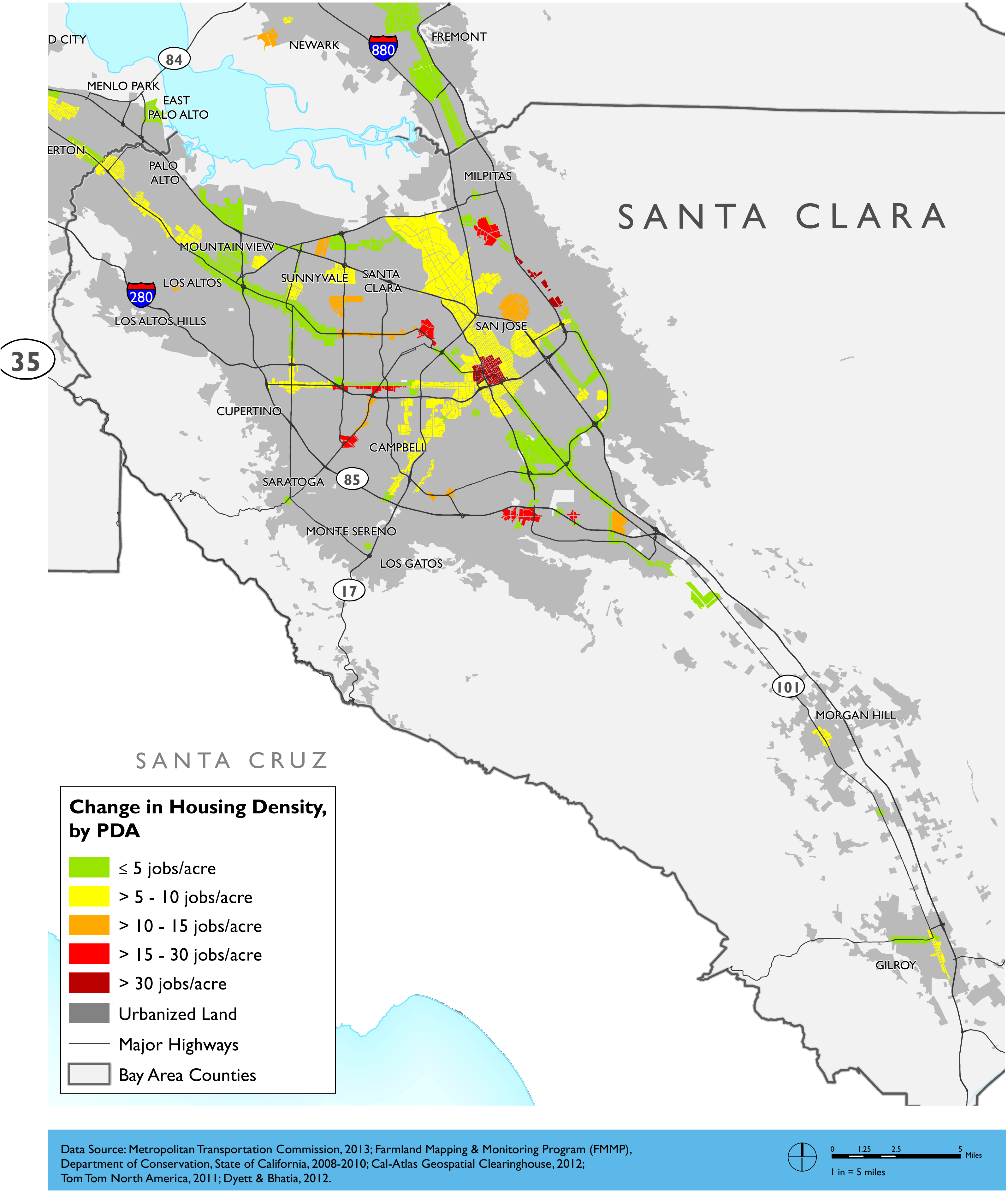
Figure 1.2-18

Change in PDA Housing Density, 2010-2040, Santa Clara County



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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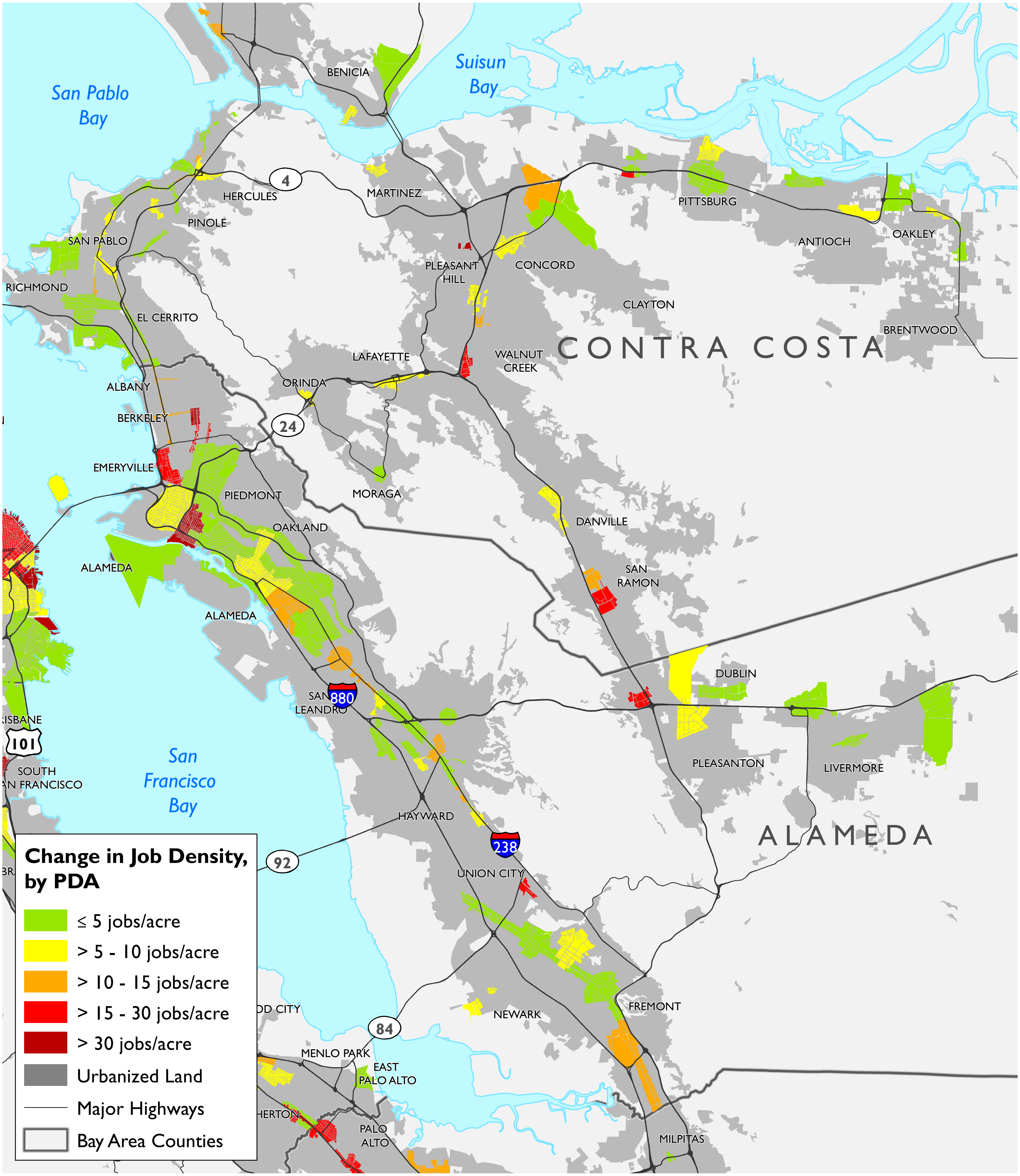
Figure 1.2-19

Change in PDA Job Density, 2010-2040, Contra Costa & Alameda



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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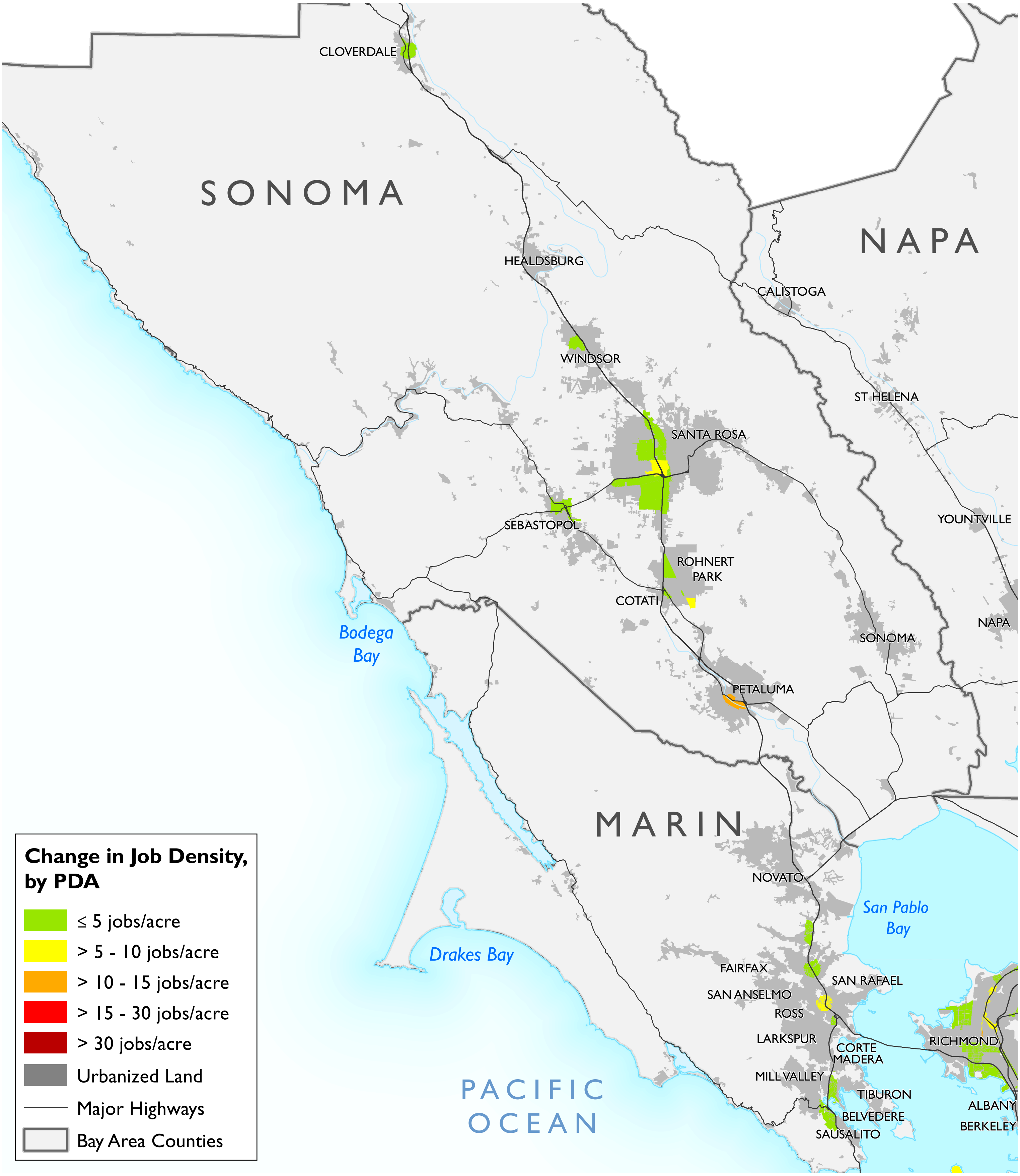
Figure 1.2-20

Change in PDA Job Density, 2010-2040, Marin & Sonoma



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

0 2.25 4.5 9 Miles

1 in = 8 miles

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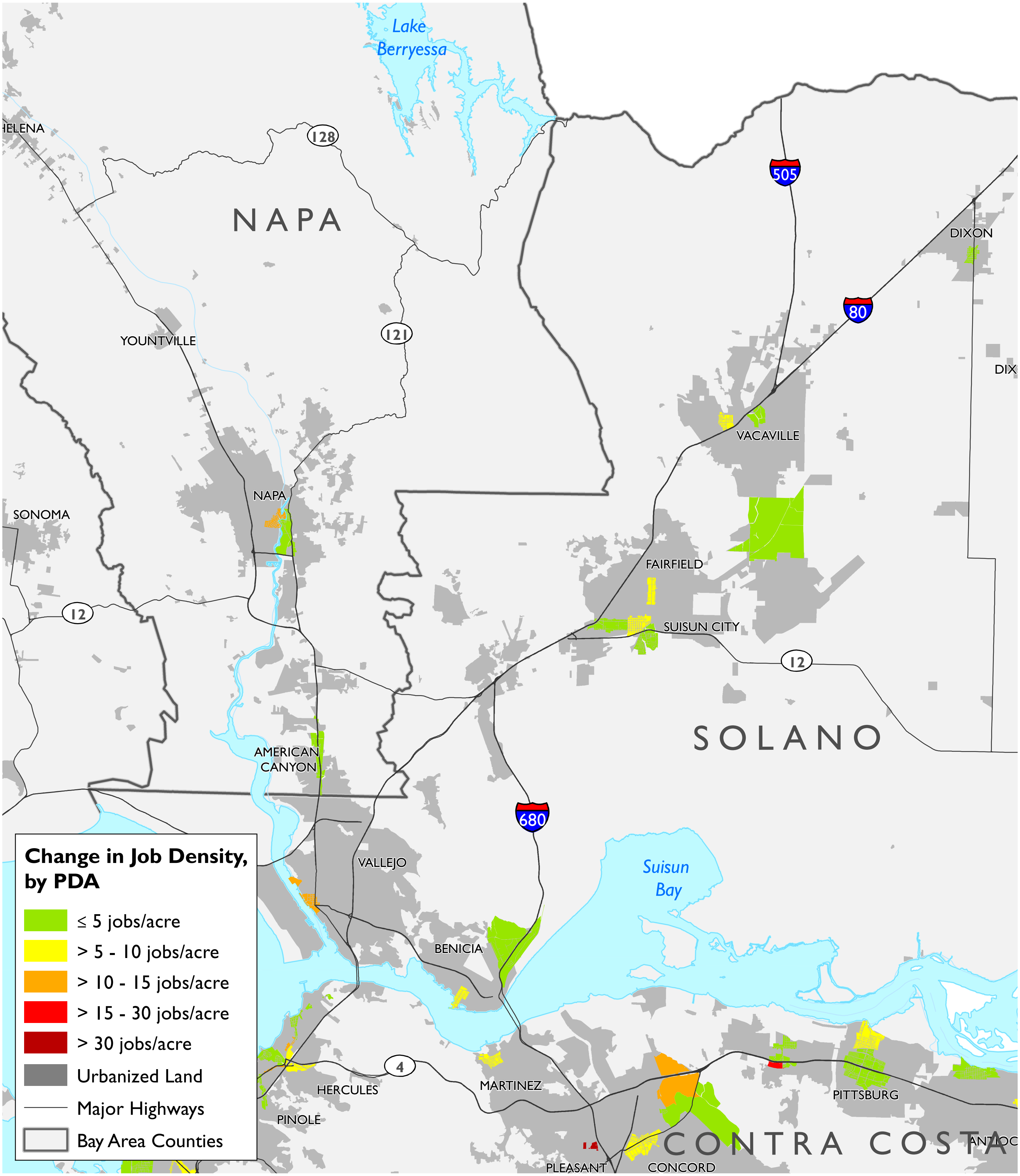
Figure 1.2-21

Change in PDA Job Density, 2010-2040, Solano & Napa



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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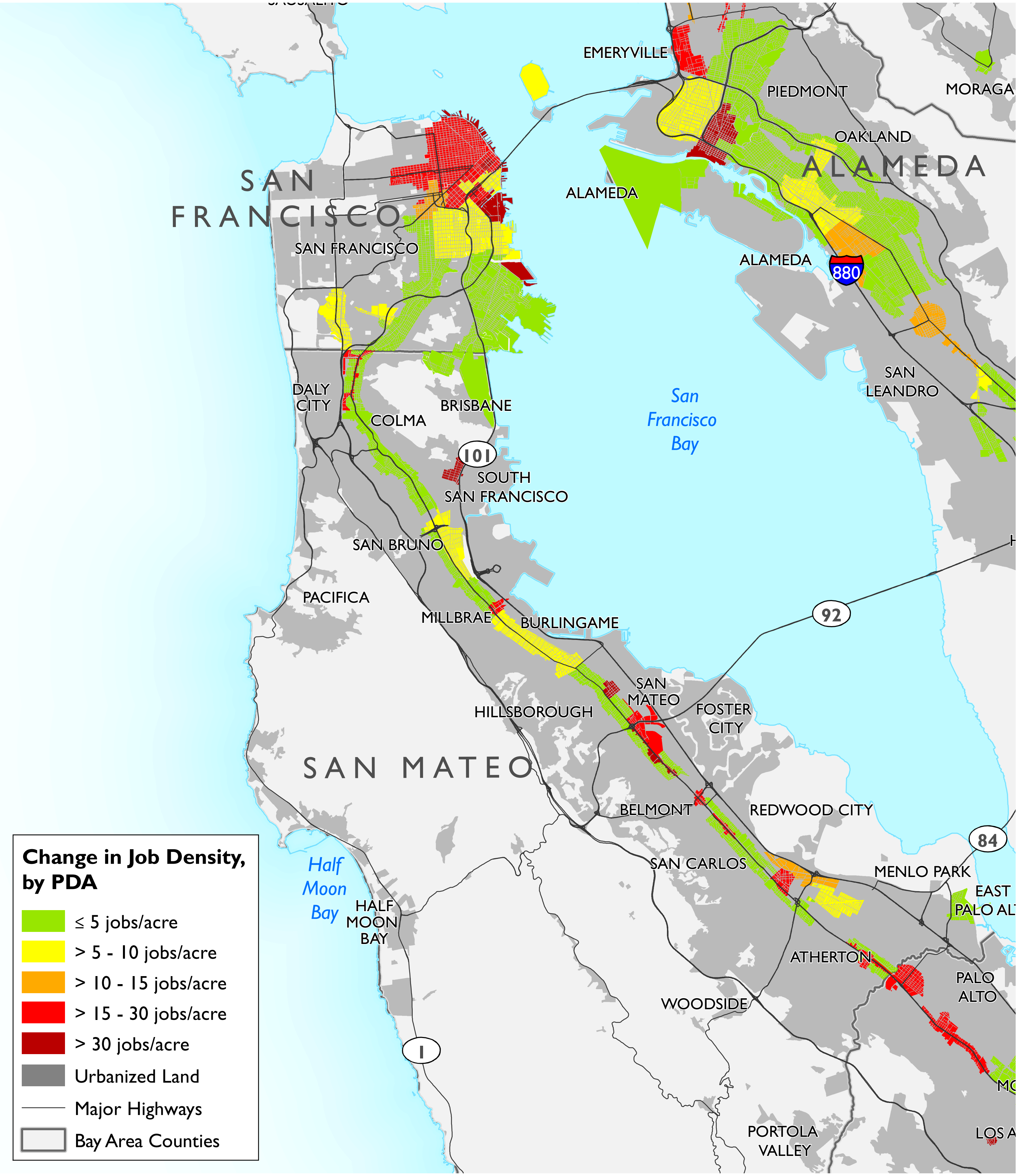
Figure 1.2-22

Change in PDA Job Density, 2010-2040, San Francisco & San Mateo



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

0 1 2 4 Miles

1 in = 4 miles

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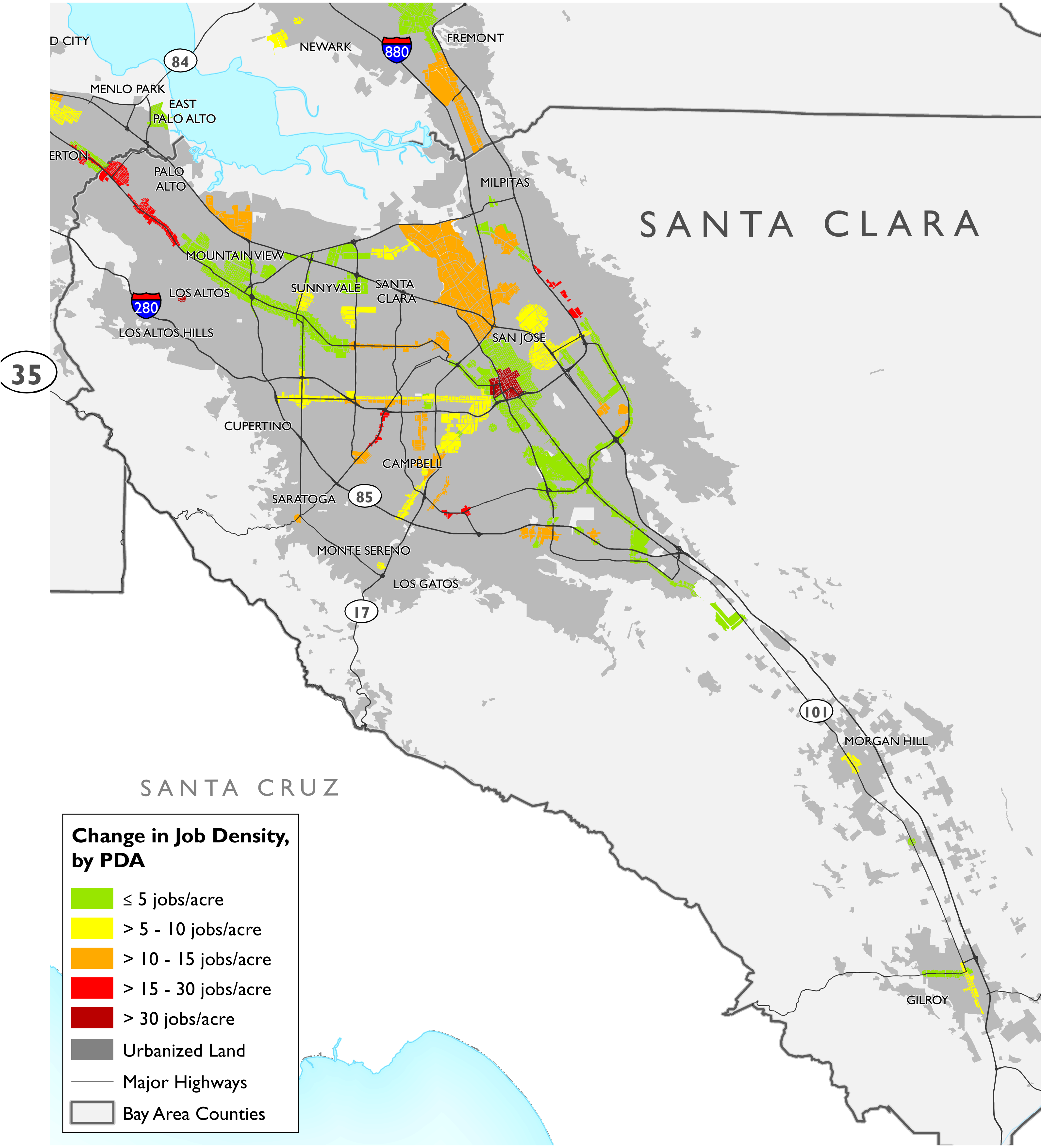
Figure 1.2-23

Change in PDA Job Density, 2010-2040, Santa Clara County



Data Source: Metropolitan Transportation Commission, 2013; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Part Two

Settings, Impacts, and Mitigation Measures

2.0 Introduction and Study Approach

Introduction

Part Two of the EIR contains the settings and analyses of environmental impacts of the proposed Plan, organized by issue area. Within each issue area, the environmental setting (both physical and regulatory) is established, significance criteria are presented, analysis methodology is described, and impact analysis is conducted and summarized. For each potentially significant impact, mitigation measures are identified. Impacts of project alternatives are presented and compared in Chapter 3.1.

General Methodology and Assumptions

In order to assess the effects of the proposed Plan, it is necessary to make assumptions about future environmental conditions at the time it is fully implemented. The horizon year of the proposed Plan is 2040.

Key assumptions in the impact analysis include the following:

- The base year for existing conditions for the analysis is 2010. For comparisons where 2010 data are not available, the closest available year is used. An exception to this appears in *Chapter 2.5: Climate Change and Greenhouse Gases,* which includes a 2005 baseline to satisfy statutory requirements of Senate Bill 375.
- This analysis does not consider phasing of improvements or interim stages of the proposed Plan between 2010 and 2040, as the purpose of the analysis is to evaluate the Plan as a whole. The one exception to this approach appears in *Chapter 2.5: Climate Change and Greenhouse Gases,* which includes an examination of impacts in 2020 and 2035 as compared to a 2005 baseline to satisfy statutory requirements of Senate Bill 375.
- As a program-level EIR, individual project impacts are not addressed in detail; the focus of this analysis is to address the impacts which, individually or in the aggregate, may be regionally significant.

Types of Impacts

In compliance with CEQA Guidelines, the following general types of environmental impacts are considered:

- **Direct or primary impacts**, which are caused by the proposed Plan and occur at the same time and place as the proposed Plan.
- **Indirect or secondary impacts**, which are caused by the proposed Plan and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect or secondary impacts may include growth-inducing impacts and other impacts related to induced changes in the pattern of land use, population density, or growth rate, and related impacts on air and water and other natural systems, including ecosystems. Indirect or secondary impacts may also include cumulative impacts.
- **Short-term impacts**, which are those of a limited duration, such as the impacts that would occur during the construction phase of a project.
- **Long-term impacts**, which are those of greater duration, including those that would endure for the life of the proposed Plan and beyond.
- **Significant unavoidable impacts**, which cannot be mitigated to a level that is less than significant.
- **Irreversible environmental changes**, which may include current or future irretrievable commitments to using non-renewable resources, or growth-inducing impacts that commit future generations to similar irretrievable commitments of resources. Irreversible change can also result from risks of accidents and injury associated with the proposed Plan.
- **Cumulative impacts that include two or more individual impacts which,** when considered together, are considerable or which compound or increase other environmental impacts. The individual impacts may be changes resulting from a single project or a number of separate projects. The cumulative effect from several projects is the change in the environment that results from the incremental effect of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively significant, projects taking place over a period of time. The analysis of the proposed Plan is essentially a cumulative analysis throughout the EIR.

As a program-level EIR, individual transportation and development project impacts are not addressed in detail; rather the focus of this EIR is to address the impacts of a program of projects, which, individually or in the aggregate, may be regionally significant. For example, the physical impacts of major regional transportation expansion projects are addressed, while potential impacts on specific wetlands or a specific species habitat by an individual interchange reconstruction project would not be discussed, unless it can be surmised that the effect would be regionally significant. This approach does not relieve local jurisdictions of the responsibility for evaluating project-specific, locally significant impacts. All impacts of individual projects will be evaluated in future environmental review, as relevant, by the appropriate implementing agency as required under CEQA and/or NEPA prior to each project being considered for approval, as applicable.

Impact Significance

For each issue area, criteria of significance are established, based on normally accepted standards for environmental review and State CEQA Guidelines. Impacts are individually numbered within each issue area. For each impact, impacts are identified as being no adverse impact (NI), less than significant (LS), or potentially significant (PS). If potentially significant impacts are identified, mitigation measures to address the impacts are identified. The effectiveness of the recommended mitigation measures is then assessed and the residual impact after mitigation is identified. It is this residual impact that is reported in the *Executive Summary*. The impacts after mitigation are classified as follows:

- **Significant and Unavoidable (SU):** cannot be mitigated to a level that is less than significant;
- **Less than Significant with Mitigation (LS-M):** can be mitigated to a level that is less than significant;
- **Less than Significant (LS):** does not exceed the significance criteria or threshold; or
- **No Adverse Impact (NI):** no environmentally adverse impact is identified.

Mitigation

For some impacts, mitigation measures are commitments by MTC and ABAG. For other impacts, MTC and ABAG do not have regulatory or approval authority over the project. In those cases, MTC and ABAG suggest specific mitigation measures for consideration by project sponsors. Project sponsors shall commit to mitigation measures at the time of certification of their project environmental review document. These commitments obligate project sponsors to implement measures that would minimize or eliminate significant impacts pursuant to CEQA. The project sponsor or local jurisdiction shall be responsible for ensuring adherence to the mitigation measures prior to and during construction of the project. In accordance with "Environmental Guidelines of the Metropolitan Transportation Commission," Resolution 1481 revised July 2008 pursuant to CA Public Resources Code Section 21081.7, MTC shall be provided with status reports of compliance with mitigation measures.

Throughout Part 2, it is noted where projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures, as feasible, to address site-specific conditions. MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore if this EIR finds that it cannot be ensured that a mitigation measure would be implemented in all cases, impacts would remain significant. Where existing regulatory requirements (i.e., for hazards or water resources) or permitting requirements exist (i.e., for biological resources), it is assumed that since these regulations are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented, thereby reducing impacts to less than significant where relevant.

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2.1 Transportation

This chapter describes the current transportation conditions and examines the effects of the transportation projects and land use pattern included in the proposed Plan on travel conditions in 2040. The study area consists of the existing and proposed elements of the transportation system for the nine-county Bay Area, including highways, local roads, rail, bus and ferry transit, and bicycle and pedestrian facilities. This chapter evaluates the impacts related to transportation such as changes in travel times, accessibility to jobs, traffic congestion, vehicle miles traveled per capita, and transit utilization that may result from the implementation of the proposed Plan.

Environmental Setting

EXISTING REGIONAL TRANSPORTATION CONDITIONS (2010)

The Bay Area features a large and complex transportation network, allowing for multimodal access across the region. The transportation system includes interstate and state highways, local arterial roadways, local streets and roads, public transit systems, bicycle and pedestrian facilities, seaports, and airports; when combined, these facilities allow for the movement of people and goods throughout the region. The various elements of the Bay Area transportation system are described below.

Note that all of the existing conditions data for transportation reflects travel patterns and infrastructure for the baseline year of 2010. More information about the selection of this baseline analysis year is provided in Part 1 of this EIR.

Roadway Network: The Bay Area currently contains over 1,300 directional miles of limited-access highways, which include both interstates and state highways. These facilities form the backbone of the transportation system, providing access to major employment centers and to destinations outside of the Bay Area. In addition to providing mobility for automobiles, these facilities also support express/transbay bus services and freight movement. The major limited-access highways in the Bay Area are listed in **Table 2.1-1** on the following page. In addition, the Bay Area has over 33,000 directional miles of arterials and local streets, providing more localized access to individual communities. Together, these roadway facilities accommodate nearly 17 million vehicle trips a day. **Figure 2.1-1** depicts the major roadway facilities in the Bay Area.

(Note that directional miles cited above are defined as miles of roadway in a single direction. For example, a one-mile-long, bidirectional segment of roadway would be two directional miles of roadway.)

TABLE 2.1-1: MAJOR LIMITED-ACCESS HIGHWAYS IN THE BAY AREA

Route	*Highway Limits*[1]		*Bay Area Counties Served*[2]
Interstate 80	San Francisco	Teaneck, NJ	SF, ALA, CC, NAP, SOL
Interstate 280	San Francisco	San José	SF, SM, SCL
Interstate 380	San Bruno	South San Francisco	SM
Interstate 580	San Rafael	Tracy	MRN, CC, ALA
Interstate 680	Fairfield	San José	SOL, CC, ALA, SCL
Interstate 780	Vallejo	Benicia	SOL
Interstate 880	Oakland	San José	ALA, SCL
Interstate 980	Oakland	Oakland	ALA
Interstate 238	San Leandro	Castro Valley	ALA
Interstate 505	Dunnigan	Vacaville	SOL
U.S. Route 101	Olympia, WA	Los Angeles	SON, MRN, SF, SM, SCL
State Route 1	Leggett	Dana Point	SON, MRN, SF, SM
State Route 4	Hercules	Markleeville	CC
State Route 12	Sebastopol	San Andreas	SON, NAP, SOL
State Route 17	San José	Santa Cruz	SCL
State Route 24	Oakland	Walnut Creek	ALA, CC
State Route 29	Upper Lake	Vallejo	NAP, SOL
State Route 37	Novato	Vallejo	MRN, SON, NAP, SOL
State Route 85	Mountain View	San José	SCL
State Route 87	San José	San José	SCL
State Route 92	Half Moon Bay	Hayward	SM, ALA
State Route 160	Sacramento	Antioch	SOL, CC
State Route 237	Mountain View	Milpitas	SCL
State Route 242	Concord	Concord	CC

Notes:

1. Reflects the overall route limits, rather than the limits of the limited-access segment.
2. County abbreviations used: ALA (Alameda), CC (Contra Costa), Marin (MRN), NAP (Napa), San Francisco (SF), San Mateo (SM), Santa Clara (SCL), Solano (SOL), and SON (Sonoma).

Figure 2.1-1
Major Road Facilities

Data Source: Metropolitan Transportation Commission, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Public Transit Systems: There are over 11,500 transit route miles of service including heavy rail (BART), light rail (Muni Metro and VTA Light Rail), commuter rail (Caltrain and ACE), diesel and electric buses, cable cars, and ferries. Transit in the Bay Area accommodates almost 1.6 million boardings a day, primarily through four major operators (Muni, BART, AC Transit, and VTA). These four operators provide the most frequent service in the urban core of the Bay Area; a complete list of the major public transit operators is shown in **Table 2.1-2**. Amtrak also provides long-distance rail services to the Bay Area via the Capitol Corridor, San Joaquin, Coast Starlight, and California Zephyr lines—connecting the region to the Central Valley, Southern California, the Pacific Northwest, and the Midwest. **Figure 2.1-2** shows the areas served by each of the Bay Area transit operators.

TABLE 2.1-2: MAJOR PUBLIC TRANSIT OPERATORS IN THE BAY AREA

Transit System	*Mode*	*Average Weekday Ridership*[1]	*Bay Area Counties Served*
Muni	Local/express bus Light rail Cable car	666,000	MRN, **SF**, SM
BART	Heavy rail	369,000	**ALA**, **CC**, **SF**, **SM**
AC Transit	Local/transbay bus	198,000	**ALA**, **CC**, SCL, SF, SM
VTA	Local/express bus Light rail	135,000	ALA, **SCL**, SM
SamTrans	Local/express bus	45,000	SCL, SF, **SM**
Caltrain	Commuter rail	40,000	**SCL**, **SF**, **SM**
Golden Gate Transit/ Marin Transit	Local/express bus Ferry	29,000	CC, **MRN**, SF, **SON**
County Connection	Local/express bus	12,000	ALA, **CC**
Santa Rosa CityBus	Local bus	10,000	**SON**
Tri Delta Transit	Local/express bus	8,000	**CC**
Wheels	Local/express bus	6,000	**ALA**, CC
Sonoma County Transit	Local/express bus	5,000	**SON**
SolTrans[2]	Local/express bus	5,000	CC, **SOL**
WestCAT	Local bus Express/transbay bus	4,000	**CC**, SF
WETA[3]	Ferry	4,000	**ALA**, **SF**, **SM**, **SOL**
ACE	Commuter rail	3,000	**ALA**, **SCL**
FAST	Local/express bus	3,000	CC, **SOL**
Union City Transit	Local bus	2,000	**ALA**
VINE	Local/express bus	2,000	**NAP**, SOL
Petaluma Transit	Local bus	1,000	**SON**
Vacaville City Coach	Local bus	1,000	**SOL**

TABLE 2.1-2: MAJOR PUBLIC TRANSIT OPERATORS IN THE BAY AREA

Transit System	*Mode*	*Average Weekday Ridership*[1]	*Bay Area Counties Served*
Rio Vista Delta Breeze	Local/express bus	< 1,000	CC, **SOL**

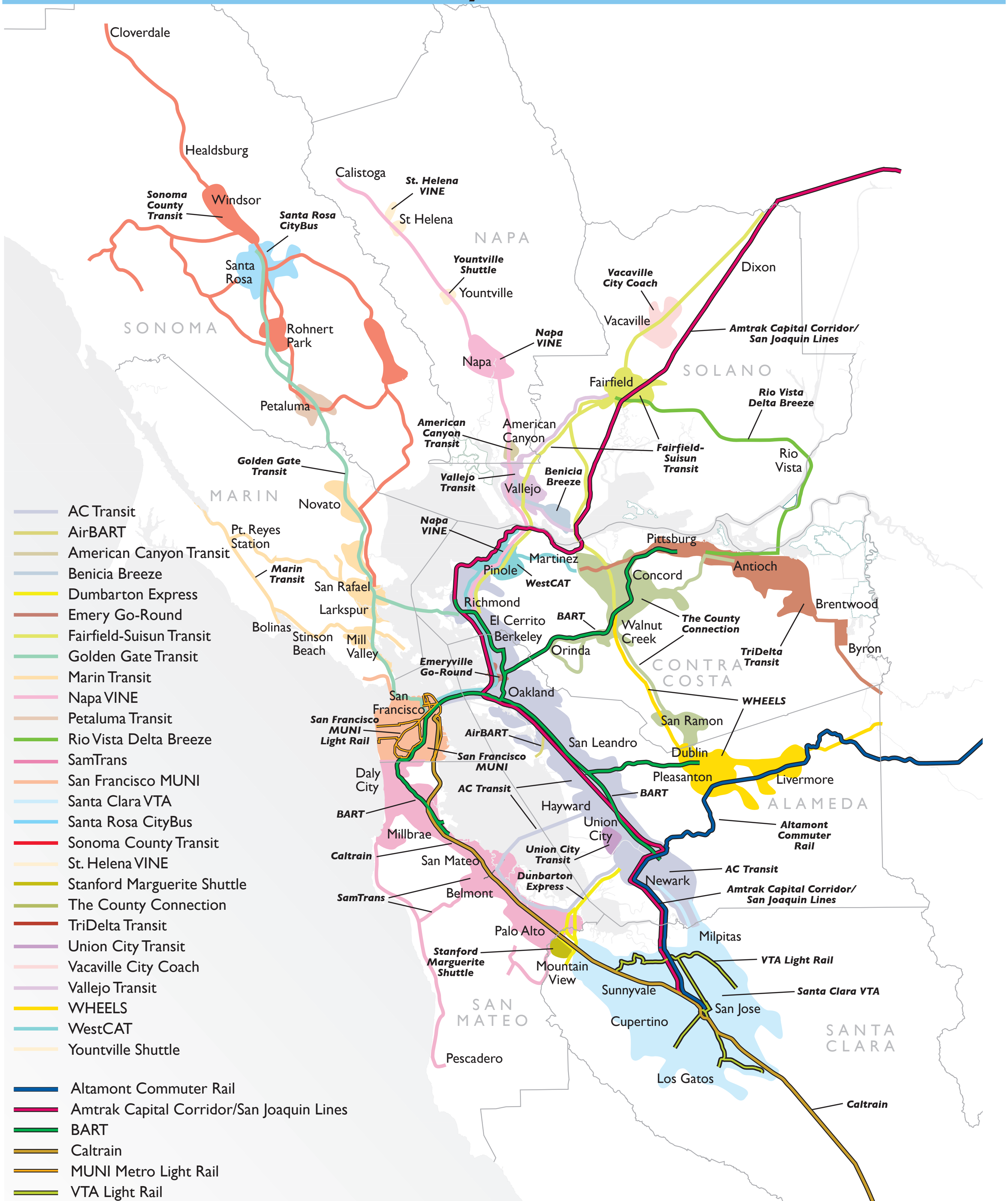
Note: Primary counties served by operator are marked in **bold**.

1. Reflects FY 2010-2011 ridership data; rounded to the nearest 1,000 daily riders.
2. Includes prior services in Benicia and Vallejo (Benicia Breeze and Vallejo Transit [bus only]).
3. Includes preexisting ferry services (Alameda/Oakland Ferry and Vallejo Transit [ferry only]).

Source: Statistical Summary of Transit Operators, MTC, June 2012.

Figure 2.1-2

Transit Lines & Areas Served by Transit



Data Source: Metropolitan Transportation Commission, 2012; Dyett & Bhatia, 2013

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Bicycle and Pedestrian Facilities: The availability of non-motorized facilities in the Bay Area supports the region's transportation, air quality, health, and livability goals. In addition to pedestrian facilities, such as paths and sidewalks, which exist throughout the region, the Bay Area has an extensive local system of bikeways. The California Highway Design Manual defines three classes of bikeways:

- Class I Bikeway (Bike Path): completely separated right-of-way for exclusive use of bicycles and pedestrians
- Class II Bikeway (Bike Lane): dedicated lane for bicycle travel on a street or highway
- Class III Bikeway (Bike Route): shared lane for bicycle travel on a street or highway

Under the California Highway Design Manual definitions, the Bay Area has 700 miles of Class I facilities, over 2,000 miles of Class II facilities, and over 1,300 miles of Class III facilities. **Figure 2.1-3** shows the location of the various bikeways through the Bay Area.

Seaports and Airports: The Bay Area is served by five seaports, which provide the opportunity for intermodal transfers to trucks and railcars. The Port of Oakland, the largest of the five, is the third largest U.S. seaport on the West Coast (after the Ports of Los Angeles and Long Beach). Other seaports include the Port of San Francisco, the Port of Richmond, the Port of Benicia, and the Port of Redwood City. These seaports are supported by freight railroad services operated by Union Pacific (UP) and Burlington Northern Santa Fe (BNSF).

The Bay Area is also served by three major international airports: San Francisco International Airport (SFO), Oakland International Airport (OAK), and Norman Y. Mineta San José International Airport (SJC). Each of these airports provides mobility for people and freight nationally and internationally. The region is also served by one smaller airport with limited commercial service, Charles M. Schulz Sonoma County Airport (STS), as well as numerous smaller general aviation airports.

Regional Travel Patterns: In summary, the Bay Area transportation system offers numerous modes and routes for the movement of people and goods. **Table 2.1-3** provides key metrics regarding Bay Area travel behavior in 2010, the most recent year of detailed U.S. Census data for the San Francisco Bay Area.

TABLE 2.1-3: BAY AREA TRAVEL BEHAVIOR, 2010

Daily[1] Transit Boardings	1,581,000
Daily Vehicle Trips[2]	16,912,000
Daily Vehicle Miles of Travel (VMT)[b]	149,046,000
Daily[1] Vehicle Miles of Travel[2] per Capita[3]	20.8
Daily Vehicle Hours of Recurring Delay	266,000
Daily Vehicle Hours of Recurring Delay (Freeways)	141,000
Daily Vehicle Hours of Recurring Delay (Expressways and Arterials)	58,000
Daily Vehicle Hours of Recurring Delay (Other Facilities)	67,000
Daily Vehicle Hours of Non-Recurrent Delay[4]	108,000
Total Daily Vehicle Hours of Delay	**374,000**
Average Total Delay per Vehicle (Minutes)	**4.6**

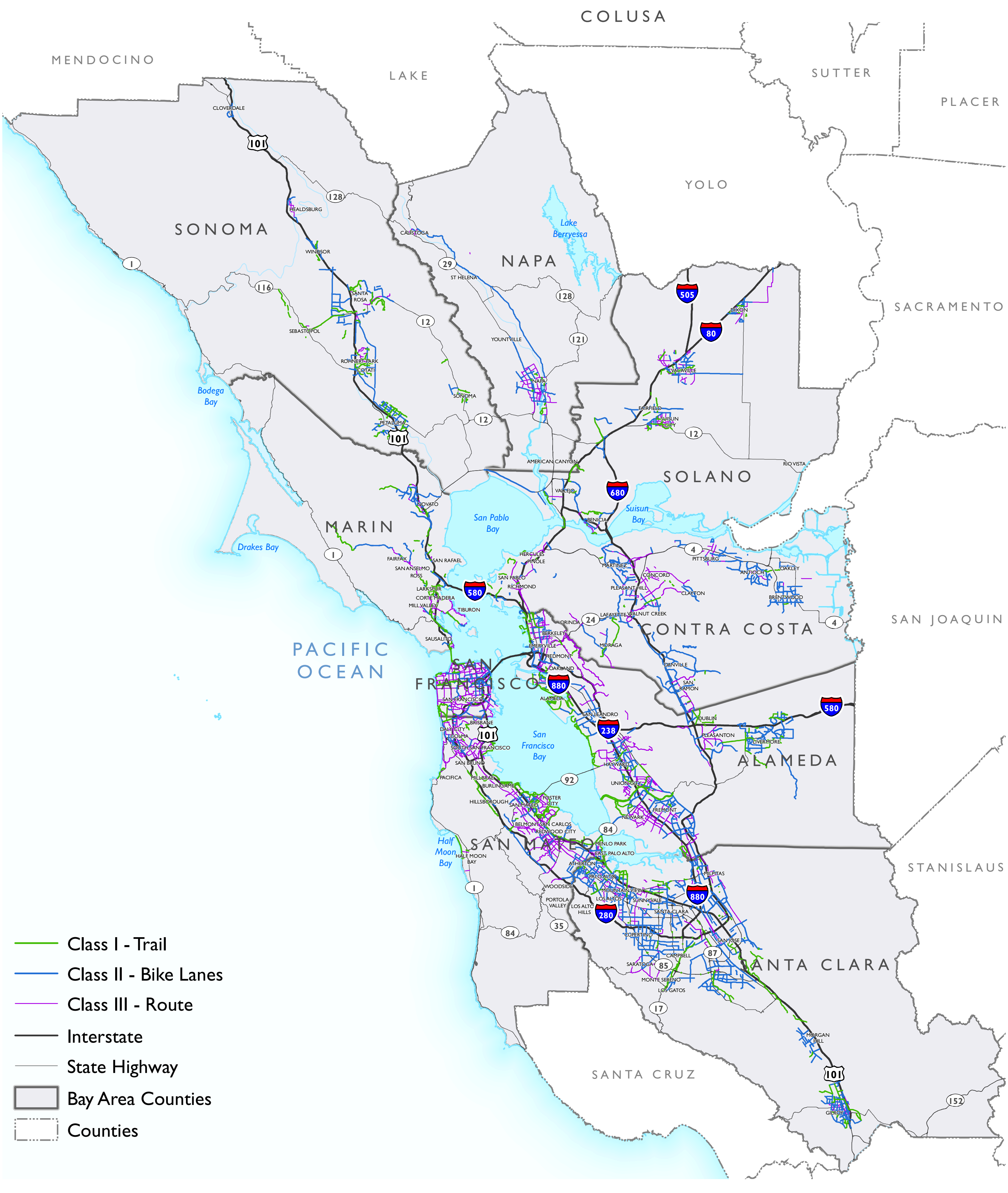
Notes:

1. Daily metrics are measured for a typical weekday.
2. Only reflects interzonal trips (assigned directly to the highway network); includes intraregional, interregional, airport-bound, and commercial vehicle trips.
3. Total daily VMT is calculated using Travel Model One; therefore, to calculate per-capita VMT, it is essential to use simulated population levels to ensure consistency. Simulated population may be slightly different than overall population forecasts for Plan Bay Area EIR alternatives due to slight variability in modeling tools. Further clarification on this issue can be found in the Plan Bay Area Supplemental Reports.
4. Only includes non-recurrent delay on freeway facilities.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Figure 2.1-3

Bicycle Facilities



Data Source: Metropolitan Transportation Commission, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Vehicle Miles Traveled

Cars, buses, and commercial vehicles travel about 149 million miles a day on the Bay Area freeways and local roads (which is equivalent to about 21 vehicle miles traveled per day per person). Vehicle miles traveled (VMT) is a term used throughout this EIR and refers to the number of vehicle miles traveled within a specified geographic area during a given period of time. One vehicle traveling one mile constitutes one vehicle mile, regardless of its size or the number of passengers. VMT is a common measure of roadway use and economic activity. The region's per capita VMT is the total VMT divided by the population of the Bay Area; basically, it is a measure of the vehicle miles each person travels on average. In general, per capita VMT data correlate with various economic and lifestyle factors. Per capita VMT tends to increase as a result of greater overall economic activity in the region, higher levels of per-household auto ownership, and greater demand for single-family homes in suburban locations.

Roadway Congestion and Delay

Delay on Bay Area roads and freeways amounts to over 374,000 hours per weekday. Delay is the time difference between travel under congested conditions and travel at posted speed limit. Recurrent delay arises from fluctuations in demand (such as rush hour traffic), the manner in which the facility is operated, and the physical layout of the roadway. Approximately 29 percent of weekday roadway delay is considered non-recurrent, which is caused by collisions, vehicle breakdowns, and other random events (such as inclement weather and debris). The magnitude of non-recurrent delay depends on the nature of the incident: a vehicle collision is likely to cause more delay than a vehicle pulled over on the shoulder.

Daily Trips

Of the trips made by Bay Area residents, 30 percent are for work, 14 percent for college or school, and 14 percent for shopping, as shown below in **Table 2.1-4**. The average one-way commute distance for the region is about 13 miles, as shown in **Table 2.1-5**. San Francisco residents have the shortest average one-way commute distance (6.9 miles), while Contra Costa County residents have the longest average one-way commute distance (17.4 miles). The core counties of the region (San Francisco, San Mateo, Alameda, and Santa Clara) have commute distances less than the regional average, while the more suburban and rural outer counties (Contra Costa, Solano, Napa, Sonoma, and Marin) have commute distances greater than the regional average.

TABLE 2.1-4: TYPICAL WEEKDAY DAILY PERSON TRIPS BY PURPOSE, 2010

Purpose	*Trips*	*% of Total*
Commute to Work	7,130,000	30%
Commute to College	573,000	2%
Commute to School	2,687,000	11%
At Work	1,661,000	7%
Eating Out	990,000	4%
Escort	2,380,000	10%
Shopping	3,190,000	14%
Social	702,000	3%
Other	4,278,000	18%
Total[1]	**23,592,000**	**100%**

Note: Daily metrics are measured for a typical weekday.

1. Only reflects intraregional personal trips.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

TABLE 2.1-5: AVERAGE ONE-WAY COMMUTE DISTANCE (IN MILES) BY COUNTY, 2010

County of Residence	*Commute Distance*
Alameda	13.5
Contra Costa	17.4
Marin	15.6
Napa	17.0
San Francisco	6.9
San Mateo	12.9
Santa Clara	11.0
Solano	15.6
Sonoma	16.6
Bay Area	**13.0**

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012

Travel Trends: Transportation Modes, Travel Time to Work, and Commute Patterns

According to the U.S. Census, Bay Area residents use a range of transportation modes to get to their workplaces, as shown below in **Table 2.1-6**. While approximately four in five Bay Area residents rely on an automobile to get to work on a typical day, 10 percent of residents rely on public transit and 4 percent either walk or bike to work.

Over the past two decades, the share of workers driving alone to work has been fairly constant. Carpooling has decreased in popularity over the past decade, declining from 13 percent in 1990 to 11 percent in 2010. While transit mode share has remained constant over the past 20 years, bicycling to work has become much more popular in the past decade. Finally, the percentage of Bay Area residents working from home has nearly doubled since 1990.

TABLE 2.1-6: BAY AREA RESIDENT WORKERS CATEGORIZED BY MEANS OF TRANSPORTATION TO WORK, 1990-2010

Year	*1990*	*2000*	*2010*
Drive Alone	2,105,000	2,248,000	2,243,000
% of Total	68%	68%	68%
Carpool	400,000	427,000	354,000
% of Total	13%	13%	11%
Transit	294,000	321,000	333,000
% of Total	10%	10%	10%
Walk	112,000	106,000	112,000
% of Total	4%	3%	3%
Bike	32,000	36,000	50,000
% of Total	1%	1%	2%
Other	37,000	36,000	35,000
% of Total	1%	1%	1%
Work at Home	105,000	133,000	194,000
% of Total	3%	4%	6%
Total Workers	**3,086,000**	**3,306,000**	**3,321,000**

Source: U.S. Census 1990 and 2000; American Community Survey 2010.

Significant variability in mode shares exists between Bay Area counties, as shown below in **Table 2.1-7**. San Francisco County is the obvious exception, with the highest transit mode share (34 percent) in the region. In contrast to other counties, where four in five commuters rely on the automobile, less than half of San Francisco commuters use auto-based transportation. This leads to significantly higher mode shares for walking, biking, and transit. Four other counties have significant transit mode shares—Alameda, San Mateo, Contra Costa, and Marin. Higher transit mode shares in these locations is partly explained by their proximity to San Francisco job centers—strong transit connections to/from that county provide a competitive alternative to driving (given the high cost of parking and significant congestion that makes auto travel less desirable).

TABLE 2.1-7: BAY AREA RESIDENT COMMUTE MODE SHARES BY COUNTY, 2010

Mode	*Drive Alone*	*Carpool*	*Transit*	*Walk*	*Bike*	*Other*	*Work at Home*
Alameda County	67%	11%	11%	3%	1%	1%	6%
Contra Costa County	69%	13%	9%	1%	1%	1%	6%
Marin County	68%	10%	7%	5%	1%	0%	9%
Napa County	79%	10%	1%	3%	0%	1%	5%
San Francisco County	36%	8%	34%	9%	3%	2%	7%
San Mateo County	70%	11%	8%	3%	1%	1%	5%
Santa Clara County	78%	10%	3%	2%	2%	1%	5%
Solano County	77%	14%	2%	2%	0%	1%	4%
Sonoma County	76%	10%	2%	2%	1%	1%	8%
Bay Area Total	**68%**	**11%**	**10%**	**3%**	**1%**	**1%**	**6%**

Source: American Community Survey 2010.

While the average travel time to work increased between 1990 and 2000, it has declined since 2000 as shown in **Table 2.1-8**. The average one-way commute duration for the Bay Area increased by 7 percent between 1990 and 2010, from 25.6 minutes in 1990 to 27.4 minutes in 2007. However, since 2000, there has been a 7 percent decline in commute duration. The major downturn in the regional (and national) economy during this period certainly played a significant factor in reducing congestion. Between 2000 and 2010, Alameda and Marin counties each experienced a substantial reduction in travel time to work—11 and 13 percent, respectively.

TABLE 2.1-8: AVERAGE TRAVEL TIME TO WORK, 1990 - 2010

County of Residence	*One-Way Trip Duration (minutes)*				
	1990	*2000*	*2010*	*Change 1990-2010*	*Change 2000-2010*
Alameda	25.8	30.8	27.4	+6%	-11%
Contra Costa	29.3	34.4	32.5	+11%	-6%
Marin	28.4	32.3	28.0	-1%	-13%
Napa	21.4	24.3	24.3	+14%	0%
San Francisco	26.9	30.7	30.3	+13%	-1%
San Mateo	24.0	27.0	24.5	+2%	-9%
Santa Clara	23.3	26.1	24.3	+4%	-7%
Solano	28.2	31.8	28.6	+1%	-10%
Sonoma	24.1	26.8	25.8	+7%	-4%
Bay Area	**25.6**	**29.4**	**27.4**	**+7%**	**-7%**

Source: U.S. Census 1990 and 2000; American Community Survey 2010.

A high proportion of Bay Area residents continue to commute outside their county of residence to jobs in other counties. **Table 2.1-9** shows the number of workers who live and work in the same county as well as the number of residents who commuted to other counties for work from 1990 to 2010. In 1990, approximately 26 percent of the region's workers commuted outside their resident county for work. This share has increased to nearly 28 percent by 2010. At the county level, Alameda, San Francisco, and Santa Clara counties all saw their share of resident workers commuting elsewhere increase between 1990 and 2010. The other counties saw an increasing number of resident workers working in their counties. The decentralization of regional job centers offers a partial explanation for this trend.

There is also a certain amount of commuting into the Bay Area from counties outside of the region that currently occurs. Specifically, there are an estimated 116,000 workers (about 3.4 percent of employees) who currently commute into the Bay Area. In part, the existing in-commute can be explained by the significant difference in the median housing costs of the counties of origin for the commuters and the Bay Area counties in which they work. For example, some workers in the Bay Area currently commute into the region from San Joaquin County where the median housing price between 2006 and 2010 was $318,600, compared to $637,000 in the Bay Area region, or half the price.[1]

It has been suggested that, if sufficient housing opportunities were provided in the Bay Area, the existing in-commute would be greatly reduced. However, it is important to acknowledge that many of the commuters that travel to the Bay Area for work may actually prefer to live outside of the Bay Area for various reasons (not just the reduced cost of housing). Thus, even if sufficient housing opportunities were provided in the Bay Area, there would still be commuting into the region.

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[1] U.S. Census Bureau, 2006-2010 American Community Survey.

TABLE 2.1-9: BAY AREA RESIDENT WORKERS COMMUTE PATTERNS BY COUNTY, 1990 - 2007

	Live and Work in Same County			*Live Here, Work Elsewhere*			*% Resident Workers Commuting Out*		
County	*1990*	*2000*	*2010*	*1990*	*2000*	*2010*	*1990*	*2000*	*2010*
Alameda	446,000	454,000	460,244	187,000	225,000	218,090	30	33	32
Contra Costa	240,000	255,000	276,776	161,000	187,000	186,956	40	42	40
Marin	73,000	79,000	73,769	52,000	48,000	43,256	41	38	37
Napa	38,000	44,000	48,248	13,000	13,000	13,062	25	23	21
San Francisco	307,000	322,000	334,383	75,000	97,000	103,431	20	23	24
San Mateo	202,000	206,000	213,589	145,000	148,000	139,095	42	42	39
Santa Clara	710,000	728,000	703,011	86,000	101,000	109,663	11	12	13
Solano	97,000	99,000	111,490	61,000	75,000	67,141	39	43	38
Sonoma	156,000	184,000	182,501	35,000	41,000	36,514	18	18	17
Bay Area	**2,270,000**	**2,371,000**	**2,404,011**	**815,000**	**935,000**	**917,208**	**26**	**28**	**28**

Source: U.S. Census 1990 and 2000; American Community Survey 2010.

REGULATORY SETTING

Federal Statutes

Moving Ahead for Progress in the 21st Century (MAP-21)

The Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law in July 2012 and reauthorized the federal highway and public transportation programs for fiscal years 2013 and 2014 for a total of $105 billion, holding funding flat relative to prior years. However, the bill marks a notable departure from prior surface transportation acts in several respects, most notably its short duration, elimination of earmarks, consolidation of programs, and introduction of performance measures into the federal transportation policy framework. While the bill retains many of the larger highway and transit programs of its predecessor—the Safe Accountable, Flexible, Efficient Transportation Equity Act, known as SAFETEA—it eliminates almost 100 smaller programs and distributes a much larger share of funds by formula (93 percent compared to 83 percent under SAFETEA).

Metropolitan Planning General Requirements

Under MAP-21, the U.S. Department of Transportation (USDOT) requires that metropolitan planning organizations, such as MTC, prepare long-range transportation plans (RTPs) and update them every four years if they are in areas designated as "nonattainment" or "maintenance" for federal air quality standards. Prior to enactment of MAP-21, the primary federal requirements regarding RTPs were included in the metropolitan transportation planning rules—Title 23 CFR Part 450 and 49 CFR Part 613. MAP-21 makes a number of changes to the statutes that underpin these regulations, and revisions to the regulations are expected to be made in early 2013. Key federal requirements for long range plans include the following:

- RTPs must be developed through an open and inclusive process that ensures public input; seeks out and considers the needs of those traditionally under served by existing transportation systems; and consults with resource agencies to ensure potential problems are discovered early in the RTP planning process;
- RTPs must be developed for a period of not less than 20 years into the future; RTPs must reflect the most recent assumptions for population, travel, land use, congestion, employment, and economic activity;
- RTPs must have a financially constrained element, transportation revenue assumptions must be reasonable, and the long range financial estimate must take into account construction-related inflation costs;
- RTPs must include a description of the performance measures and performance targets used in assessing the performance of the transportation system;
- RTPs must include a system performance report evaluating the condition and performance of the system with respect to performance targets adopted by the state that detail progress over time;
- RTPs may include multiple scenarios for consideration and evaluation relative to the state performance targets as well as locally-developed measures.

- RTPs must conform to the applicable federal air quality plan, called the State Implementation Plan (SIP), for ozone and other pollutants for which an area is not in attainment;[2] and
- RTPs must consider planning factors and strategies in the local context.[3]

National Environmental Policy Act

The National Environment Policy Act of 1969 (NEPA) requires federal agencies to assess the possible environmental consequences of projects which they propose to undertake, fund, or approve. While the RTP is not subject to NEPA, individual federally funded programs or projects requiring federal approval will be subject to a NEPA evaluation.

State Statutes

California Transportation Commission Regional Transportation Plan Guidelines

California law relating to the development of the RTPs is primarily reflected in Government Code Section 65080. Pursuant to Government Code section 65080(d), MPOs, such as MTC, that are located in nonattainment areas must update their RTPs at least every four years. If the current RTP is determined to be adequate such that an update is not warranted, the MPO may re-adopt the current RTP.

The RTP Guidelines require that an RTP addresses three distinct elements—a policy element, an action element, and a financial element. In addition, when applicable, RTPs shall be consistent with federal planning and programming requirements and shall conform to the RTP Guidelines adopted by the California Transportation Commission (CTC). The CTC cannot program projects that are not identified in the RTP.

Under Government Code Section 14522, the CTC is authorized to prepare guidelines to assist in the preparation of RTPs. The CTC's RTP guidelines suggest that projections used in the development of an RTP should be based upon available data (such as from the Bureau of the Census), use acceptable forecasting methodologies, and be consistent with the Department of Finance baseline projections for the region. The guidelines further state that the RTP should identify and discuss any differences between the agency projections and those of the Department of Finance. The most recent update to the RTP guidelines was published in 2010, and includes new provisions for complying with Senate Bill 375 (see below), as well as new guidelines for regional travel demand modeling. CTC's detailed guidelines for MPOs can be found at: http://www.catc.ca.gov/programs/rtp/2010_RTP_Guidelines.pdf.

The regional travel demand model guidelines are "scaled" to different sizes of MPO's. MTC is included in the "E" grouping of the MPO's serving the largest populations in the state. The guidelines for regional travel demand modeling are the most ambitious for the "E" group, and include (among many other things):

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[2] See MTC's Draft Transportation Air Quality Conformity Analysis for Plan Bay Area and 2011 Transportation Improvement Program Amendment #11-25 (July 2011) for more information. MTC's web page, http://www.mtc.ca.gov, has more information about the Air Quality Conformity Task Force meetings and materials related to the federal conformity analysis.

[3] For more details on the planning factors, see California Transportation Commission, Regional Transportation Guidelines, 2010.

- Guidelines and standards for validation and sensitivity testing of the model;
- Transition to an activity-based demand model;
- Participate in peer review every 10 years; and
- Build a microeconomic land use model as soon as is practical.

MTC has relied on an activity-based travel demand model (Travel Model One) and a microeconomic land use model (UrbanSim) for the development of this EIR. The aforementioned CTC guidelines and standards for model validation and sensitivity testing are being followed.

Senate Bill 375

The Sustainable Communities and Climate Protection Act of 2008 (California Senate Bill 375) has diversified the areas of study from past RTPs to include land use impacts and climate change issues. At the same time, past statutes on RTPs continue to govern these integrated RTP/SCS planning efforts. Specifically, Senate Bill 375 (SB 375) requires MPOs to prepare a Sustainable Communities Strategy (SCS) that demonstrates how the region will meet its greenhouse gas (GHG) reduction targets through integrated land use, housing and transportation planning. The SCS must identify a transportation network that is integrated with the forecasted development pattern for the plan area and will reduce GHG emissions from automobiles and light trucks in accordance with targets set by the California Air Resources Board. *Chapter 2.5: Climate Change* includes a more in-depth discussion of SB 375 and its implications for Plan Bay Area.

Senate Bill 1339

Senate Bill 1339 authorizes MTC and BAAQMD (the Bay Area Air Quality Management District) to jointly adopt a commute benefit ordinance that requires major Bay Area employers to offer their employees certain types of commute benefits, such as pre-tax contributions towards public transit passes or commute shuttle services. The bill authorizes MTC and BAAQMD to implement the program through 2017, at which point state legislative action would be required to continue the ordinance.

Regional and Local Statutes

Transportation 2035

Transportation 2035 was the previous RTP adopted by MTC in 2009. The proposed Plan builds upon this effort by incorporating an even more focused growth pattern built upon the Priority Development Area framework and by increasing the region's commitment to "Fix It First" (a longstanding MTC policy to prioritize discretionary funding for maintenance and operations of the region's existing transportation assets). As a result of SB 375, the proposed Plan shifted previously voluntary goals, such as greenhouse gas reduction, to become statutory targets of the planning effort.

Congestion Management Agency Transportation Plans

Each of the nine Bay Area counties has a Congestion Management Agency (CMA) designated to manage traffic congestion through implementation of multimodal transportation projects. These agencies work with MTC to advance road, bicycle, pedestrian, and transit projects in line with regional objectives. In addition, many CMAs develop county transportation plans that should be consistent with the Regional

Transportation Plan adopted by MTC; many of these CMAs intend on updating their countywide plans following the adoption of Plan Bay Area. The most recent county transportation plans are listed below.

- Alameda County Transportation Commission: 2012 Alameda Countywide Transportation Plan
- Contra Costa Transportation Authority: 2009 Countywide Comprehensive Transportation Plan
- San Francisco County Transportation Authority: San Francisco Transportation Plan 2035
- Santa Clara Valley Transportation Authority: Valley Transportation Plan 2035
- Solano Transportation Authority: 2009 Comprehensive Transportation Plan 2035 Update
- Sonoma County Transportation Authority: 2009 Comprehensive Transportation Plan for Sonoma County

The remaining three CMAs do not develop such plans on a regular basis, but they still play a major role in implementing regional transportation priorities:

- City/County Association of Governments of San Mateo County
- Napa County Transportation and Planning Agency
- Transportation Authority of Marin

Local Agency General Plans

State law requires cities and counties to adopt general plans, which must include a transportation element. The transportation element describes the acceptable operating standards, levels of service, classifications, and transportation related goals of a given city or county; it is typically a multimodal section that addresses roads, public transit, bicycle facilities, and pedestrian facilities. This EIR does not explicitly identify localized traffic issues that might be the focus of a city's general plan; rather, it will deal with issues of overall system performance from a regional perspective.

Impact Analysis

SIGNIFICANCE CRITERIA

According to CEQA Guidelines, Appendix G, a project will generally have a significant effect if it would conflict with an applicable plan or policy establishing measures of effectiveness for performance of the circulation system, or if it would conflict with an applicable congestion management program. This definition is somewhat limited for the purposes of this program-level EIR. Therefore, a more expansive set of criteria has been defined to determine whether the transportation improvements and land use pattern in the proposed Plan will have a significant adverse effect on future regional mobility in the Bay Area. Criteria are focused on accessibility by all modes, traffic/congestion, vehicle miles traveled per capita, and transit capacity.

Implementation of the proposed Plan would have a potentially significant adverse impact if it results in:

Criterion 1: A substantial increase in per-trip travel time for commute travel by any mode over existing conditions. A substantial increase in per-trip travel time is defined as greater than 5 percent.

Criterion 2: A substantial increase in per-trip travel time for non-commute travel by any mode over existing conditions. A substantial increase in per-trip travel time is defined as greater than 5 percent.

Criterion 3: A substantial increase in per capita VMT on facilities experiencing level of service (LOS) F compared to existing conditions during AM peak periods, PM peak periods, or during the day as a whole (LOS F defines a condition on roads where traffic substantially exceeds capacity, resulting in stop-and-go conditions for extended periods of time). A substantial increase in LOS F-impacted per capita VMT is defined as greater than 5 percent.

Criterion 4: A substantial increase in per capita VMT compared to existing conditions. A substantial increase in per capita VMT is defined as greater than 5 percent.

Criterion 5: An increased percent utilization of regional transit supply resulting in an exceedence of transit capacity at AM peak hours, at PM peak hours, or for the day. An exceedance is defined as passenger seat-mile demand for any transit technology being greater than 80 percent of passenger seat-miles supplied by transit operators.

These criteria reflect revisions made to the draft significance criteria included in the Notice of Preparation (NOP) as a result of the scoping process. Criteria 1 and 2, which focus on the per-trip travel time to reach jobs and other key destinations, replaced the initial proposal to measure the number of jobs within a fixed travel time. The draft significance criterion included in the NOP would have measured how many employment opportunities the average Bay Area resident could reach in a given number of minutes; however, this criterion exhibited several major limitations. First, it was overly influenced by the growth in population and jobs, meaning that it failed to illuminate any travel time impacts due to the significant growth in job opportunities. Second, it did not address the spatial match between different individuals and different job types; for example, if a low-income household lived in close proximity to numerous high-income/high-knowledge technology jobs, the proximity of these jobs has minimal direct benefit for the low-income residents' employment prospects as their skill set would make them unlikely to be employed at those sites (leading to a longer commute to reach their actual lower-income employment site).

By substituting per-capita commute and non-commute travel times as significance criteria in lieu of the jobs-based criterion, the limitations above have been addressed. The revised significance criteria are also more relevant to Bay Area travelers, as they better capture actual travel experiences by looking at travel times between travelers' forecasted home and work locations. The revised criteria also address non-commute impacts not reflected in the initial jobs-based measurement included in the NOP. These significance criteria are considered for each of the primary travel modes—auto, transit, and bicycle/pedestrian—responding to comments received in the scoping process to specifically analyze multimodal impacts (in particular, public transit).

In addition, Criterion 3 was revised to reflect per capita congested VMT under LOS F conditions, rather than just total VMT. This more appropriately captures the individual impacts of traffic congestion on a typical Bay Area traveler, rather than primarily being a reflection of the population growth that generally correlates with total VMT metrics.

Finally, Criterion 5, which measures the impacts of the proposed Plan on transit capacity constraints, was added as a result of comments received from transportation agencies during the EIR scoping process. This criterion addresses issues related to transit crowding, when transit demand exceeds the supply of seats available on a given transit mode, including local bus, light rail, ferry, express bus, heavy rail (BART), and commuter rail.

METHOD OF ANALYSIS

The EIR analysis was based on transportation and land use forecasts developed using the MTC/ABAG integrated model. This forecasting tool combined the travel demand forecasting model, known as Travel Model One, with the land use forecasting model, known as UrbanSim. Additional information on these tools can be found in *Chapter 1.2: Overview of the Proposed Plan Bay Area.*

The integrated model produced all of the key outputs used in assessing the significance of transportation impacts, such as vehicle miles traveled (VMT), vehicle hours of delay (VHD), and accessibility, as well as other outputs such as volume to capacity ratios and level of service.

EIR alternatives were analyzed using this model by adding transportation improvements (for example, those listed in *Chapter 1.2: Overview of the Proposed Plan Bay Area*) on top of the region's existing transportation infrastructure; land use policies were also tested to examine how they affect population and employment distributions. By incorporating these land use and transportation network changes into the model, it is possible to forecast the impacts of each alternative on regional travel behavior.

References

The Summary of Predicted Traveler Responses and Summary of Predicted Land Use Responses supplemental documents, released in March 2013, provide detail regarding the modeling assumptions and outputs for Plan Bay Area. These reports provide further information on modeling methodologies, as well as data summary tables for key horizon years. These summary reports, as well as other model development and validation documents, can be obtained on the OneBayArea website at www.onebayarea.org.

YEAR 2040 CONDITIONS UNDER THE PROPOSED PLAN

In order to assess potential impacts, this analysis first compares existing transportation conditions with the future conditions under the proposed Plan in terms of projected trips, projected travel modes and vehicle travel, and proposed transportation supply. These transportation indicators, model inputs and/or outputs that are not depicted in the impact analysis tables, facilitate understanding of the analyses and conclusions. They are provided for transparency in order to illuminate some of the underlying causes of the transportation impacts forecasted.

As the proposed Plan incorporates demographic forecasts, land use patterns, and transportation investments, cumulative impacts are analyzed, reflecting the combined effects of these elements.

However, regional population and job growth are the most significant drivers of transportation trends and impacts over the lifespan of the proposed Plan; more Bay Area residents and employees lead to greater demand for all forms of transportation. Apart from these demographic trends, the proposed Plan's inclusion of significant transit capacity increases, coupled with minimal expansion of the highway system, leads to a slight shift from automobile travel to public transit and non-motorized modes.

Demographic Trends

The proposed Plan relies on population and employment forecasts developed by ABAG; these forecasts form the basis for analyzing transportation impacts of the proposed Plan. The projections indicate that the region's population is expected to grow by 30 percent over the next three decades, while the region's employment is forecasted to increase by 33 percent over the same time period. While auto ownership per household is expected to decline by 2 percent, the total number of automobiles in the region would increase as a result of this household growth, as reflected in **Table 2.1-10**.

The expected level of population and job growth leads to a greater number of commute and non-commute trips in the coming decades. The proposed Plan is designed to address this expected growth in travel demand through transportation infrastructure improvements and land use strategies.

TABLE 2.1-10: BAY AREA DEMOGRAPHIC FORECASTS (2010-2040)

	2010	*2040*	*Numerical Change*	*Percent Change*
Total Population[1]	7,091,000	9,196,000	2,105,000	+30%
Total Employment	3,385,000	4,505,000	1,120,000	+33%
Employed Residents	3,269,000	4,350,000	1,081,000	+33%
Total Households	2,608,000	3,308,000	700,000	+27%
% of Households with Zero Autos	9%	11%	+2%	N/A
% of Households with One Auto	33%	33%	0%	N/A
% of Households with Multiple Autos	58%	56%	-2%	N/A
Average Vehicles by Household	1.78	1.75	-0.03	-2%

Note:

1. Population statistics reflect the total Bay Area population able to travel on the region's transport network; it does not include immobile, involuntary populations such as prison inmates.

Sources: Association of Bay Area Governments, 2012; Metropolitan Transportation Commission Travel Forecasts, 2012.

Proposed Transportation System Capacity Increases

As discussed in *Chapter 1.2: Overview of the Proposed Plan Bay Area*, the transportation system improvements in the proposed Plan are primarily focused on maintaining and operating the existing transportation system. This investment strategy reflects the relatively mature state of the Bay Area's roadway and transit systems. The proposed Plan also includes a set of major transit capital improvements, including BART to San José, Caltrain electrification, and bus rapid transit lines in the region's urban core. These transit investments were identified as a result of a rigorous performance assessment process and align closely with the proposed land use pattern emphasizing focused growth in the region's locally-identified Priority Development Areas. Finally, the proposed Plan includes a limited amount of funding for targeted roadway capacity increases, including bottleneck relief at congested interchanges and the development of a Regional Express Lane Network.

Maintenance and operations projects will not affect people's travel behavior, and system efficiency programs (other than the Freeway Performance Initiative that directly impacts freeway and arterial operations) tend to affect travel behavior in subtle and localized ways that are generally difficult to assess in a regional analysis. Projects that expand transportation system capacity will have the greatest impact on travel behavior and are considered in detail in this EIR analysis. As shown in **Table 2.1-11**, capacity increases as a result of the proposed Plan are primarily a result of transit expansion and frequency improvement projects, as well as a more limited increase in roadway capacity across the region.

Roadway Network: The region's existing roadway network is composed of about 20,751 lane-miles, with 31 percent of those miles on freeways and expressways and 69 percent of those miles on arterials and collectors (**Figure 2.1-1** from earlier in this chapter illustrates the major existing Bay Area roadway facilities). Compared to existing conditions, the proposed Plan adds three percent to the total roadway lane-miles. A significant component of the roadway capacity increases is the Regional Express Lanes Network, which builds new high-occupancy/toll (HOT) lanes on many of the region's most congested freeway corridors. Highway widening projects, including capacity improvements to SR-4 in eastern Contra Costa County, US-101 in the North Bay, and I-680 in eastern Alameda County and eastern Contra Costa County, are responsible for the remainder of the freeway capacity increases.

Public Transit Systems: Transit seat-miles, a measure of transit capacity, are the miles that transit vehicles travel multiplied by the number of seats in each vehicle. The existing transit network (2010 conditions) consists of three dominant modes: heavy rail (e.g., BART—39 percent of seat-miles), local bus (30 percent of seat-miles), and commuter rail (e.g., Caltrain—13 percent of seat-miles). Daily transit seat-miles will increase by 27 percent from existing conditions due to the transit expansion and frequency improvement projects included in the proposed Plan. The largest increases in seat-miles in the proposed Plan are for heavy rail transit which adds 12,609,000 seat-miles from 2010 conditions (a 29 percent increase) and for commuter rail transit which adds 8,379,000 seat-miles from 2010 conditions (a 58 percent increase). These specific significant increases are primarily the result of projects such as BART to San José, eBART, SMART, and Caltrain Electrification/Frequency Improvements.

TABLE 2.1-11: TRANSPORTATION SYSTEM CAPACITY (2010-2040)

	2010	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
Freeway Lane-Miles	5,495	6,056	561	+10%
Expressway Lane-Miles	1,019	1,132	113	+11%
Arterial Lane-Miles	8,710	8,749	39	0%
Collector Lane-Miles	5,528	5,502	-26[2]	0%
Total Roadway Lane-Miles	**20,751**	**21,438**	**687**	**+3%**
Daily[1] Local Bus Seat-Miles	34,477,000	37,828,000	3,351,000	+10%
Daily Express Bus Seat-Miles	7,560,000	9,050,000	1,490,000	+20%
Daily Light Rail Seat-Miles	8,114,000	10,781,000	2,667,000	+33%
Daily Heavy Rail Seat-Miles	44,134,000	56,743,000	12,609,000	+29%
Daily Commuter Rail Seat-Miles	14,463,000	22,842,000	8,379,000	+58%
Daily Ferry Seat-Miles	4,612,000	7,099,000	2,487,000	+54%
Total Daily Transit Seat-Miles	**113,361,000**	**144,344,000**	**30,983,000**	**+27%**

Notes:

1. Daily metrics are measured for a typical weekday.
2. Decrease in lane-miles is a result of general-purpose lanes being converted to bus-only facilities.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Regional Travel Patterns

When comparing year 2040 conditions under the proposed Plan to existing conditions, daily vehicle trips increase by 22 percent and daily transit use increases by 93 percent. Note that the increases in total regional travel activity are primarily due to projected regional growth in population, jobs, and workers; investments in transportation infrastructure and implementation of the proposed land use pattern are only minor contributors to changes in total regional travel activity. However, as the analysis of the proposed Plan considers cumulative regional impacts, Bay Area population and employment growth are fundamental components of those impacts.

Table 2.1-12 displays vehicle hours of delay by facility type (i.e., freeways, expressways, arterials) and the breakdown of recurrent and non-recurrent delay. Overall, total vehicle hours of delay are forecasted to increase through year 2040 under the proposed Plan. Arterials and expressways will experience a larger increase in recurrent vehicle hours of delay relative to freeways (79 percent increase compared to a 48 percent increase). Non-recurrent delay on freeways will increase by 36 percent over existing conditions assuming implementation of the proposed Plan.

TABLE 2.1-12: BAY AREA TRAVEL BEHAVIOR, 2010-2040

	2010	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
Daily[1] Transit Boardings	1,581,000	3,054,000	1,473,000	+93%
Daily Vehicle Trips[2]	16,912,000	20,677,000	3,765,000	+22%
Daily Vehicle Miles of Travel (VMT)[2]	149,046,000	179,408,000	30,362,000	+20%
Daily[1] Vehicle Miles of Travel[2] per Capita[3]	20.8	19.6	-1.2	-6%
Daily Vehicle Hours of Recurring Delay (overall)	266,000	409,000	143,000	+54%
Daily Vehicle Hours of Recurring Delay (Freeways)	141,000	208,000	67,000	+48%
Daily Vehicle Hours of Recurring Delay (Expressways and Arterials)	58,000	104,000	46,000	+79%
Daily Vehicle Hours of Recurring Delay (Other Facilities)	67,000	97,000	30,000	+45%
Daily Vehicle Hours of Non-Recurrent Delay[4]	108,000	147,000	39,000	+36%
Total Daily Vehicle Hours of Delay	**374,000**	**556,000**	**182,000**	**+49%**
Average Delay per Vehicle (Minutes)	**4.6**	**5.6**	**1.0**	**+22%**

Notes:

1. Daily metrics are measured for a typical weekday.
2. Only reflects interzonal trips (assigned directly to the highway network); includes intraregional, interregional, airport-bound, and commercial vehicle trips.
3. Total daily VMT is calculated using Travel Model One; therefore, to calculate per-capita VMT, it is essential to use simulated population levels to ensure consistency. Simulated population may be slightly different than overall population forecasts for Plan Bay Area EIR alternatives due to slight variability in modeling tools. Further clarification on this issue is found in the Plan Bay Area EIR technical appendices.
4. Only includes non-recurrent delay on freeway facilities.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Daily Trips by Mode

Growth in households and employment leads to a greater number of trips in the region. As a result of the demographic forecasts, the total number of trips made by residents of the Bay Area (known as person trips) is expected to increase over the life of the proposed Plan. As shown in **Table 2.1-13**, the total number of person-trips in the region increases from 23.6 million daily person trips today to 29.4 million under the proposed Plan. This represents a 25 percent increase in person trips compared to existing conditions. This increase, while significant, is lower than the rates of household growth, employment growth, and population growth over the life of the proposed Plan.

When combined with proposed Plan transportation infrastructure investments, the proposed changes in the regional land use pattern have the potential to shift individuals' travel mode choice decisions. **Table 2.1-13** also identifies the share of regional travel activity in year 2040 relying on single-occupant vehicles, carpooling, public transit, walking, and bicycling to reach daily destinations. While the year 2040 shares of the various travel modes remain relatively similar to existing year 2010 conditions, a slight increase in transit and non-motorized modes is evident. Transit mode share increases from 5 percent to 7 percent by 2040 as a result of the proposed Plan, while walking and bicycling increase from 11 percent to 13 percent by 2040.

TABLE 2.1-13: TYPICAL WEEKDAY DAILY PERSON TRIPS, BY MODE

Purpose	*2010*		*2040 Plan*	
	Trips	*% of Total*	*Trips*	*% of Total*
Drive Alone	11,717,000	50%	14,020,000	48%
Carpool	8,052,000	34%	9,433,000	32%
Transit	1,186,000	5%	2,151,000	7%
Walk	2,383,000	10%	3,429,000	12%
Bike	254,000	1%	393,000	1%
Total Trips[1]	**23,592,000**	**100%**	**29,426,000**	**100%**

Note:

1. Excludes commercial and interregional trips.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

SUMMARY OF IMPACTS

The proposed land use pattern and transportation investments in the proposed Plan would reduce vehicle miles traveled per capita by shifting some trips from single-occupant vehicle travel or carpool travel to public transit or non-motorized modes, while at the same time increasing the utilization of public transit services (within year 2040 capacity constraints). However, as a result of population and employment growth expected in the Bay Area, average per-trip travel times are expected to increase and the number of per capita vehicle miles traveled in extremely congested conditions would increase as well. These effects are primarily a result of the demographic trends, while the land use and transportation components of the proposed Plan reduce impacts of regional growth.

Of the five significance criteria considered, significant impacts are only forecast for one criterion: per capita vehicle miles traveled in extremely congested conditions. The four other criteria—commute travel times, non-commute travel times, per capita vehicle miles traveled, and transit utilization—all have impacts that are forecasted to be less than significant.

Implementation of transportation projects and land use developments in the proposed Plan will be phased over many years, so local impacts will be different from year to year. As transportation and land use development projects advance from planning into implementation, short-term impacts, such as delays to travelers, would be created by congestion in and around construction zones. At a regional and programmatic level over the entire planning period, the sum of these discrete short-term effects are considered less than significant. However, large numbers of construction projects occurring at the same time, or one local area experiencing construction of many projects consecutively, could result in localized delay impacts that are significant. These must be evaluated at the project level as more information about the timing, design, scope, and construction program are available.

IMPACTS AND MITIGATION MEASURES

Impacts on the transportation network are generally regional in nature. Localized impacts are expected to vary depending on the proximity to local and regional transportation improvements, as well as land use changes on the neighborhood level. All impacts in this section necessarily consider the combination of demographic, land use, and transportation impacts and are by definition cumulative. Therefore, these impacts are not addressed separately.

Impact

2.1-1 Implementation of the proposed Plan could result in a substantial increase in per-trip travel time for commute travel by any mode over existing conditions. A substantial increase in per-trip travel time is defined as greater than 5 percent.

Projected changes in per-trip commute travel time from 2010 to 2040 are the result of several factors, including transportation network improvements, more focused growth patterns shifting a greater share of the population into the urban core, and greater demand for travel as a result of higher levels of population and employment. Compared to existing conditions, average projected commute travel times are expected to increase by three percent under the proposed Plan, as shown in **Table 2.1-14**. However, this slight increase is considered less than significant (a five percent increase is considered significant).

No individual travel mode experiences a significant impact on its commute travel time as a result of the proposed Plan. However, auto modes (drive alone and carpool) are expected to experience small travel time reductions, while transit and bicycle modes are forecasted to be minimally impacted by slightly greater travel times. This result is primarily due to mode shift expected from the proposed Plan. As more individuals decide to rely on modes with longer average travel times (such as transit), the average commute travel time for the region tends to increase. While the mode shift can lead to a congestion reduction benefit that reduces average travel times for autos, it may lengthen the commutes of a relatively small number of travelers. Decreased travel times for driving commutes are also a result of the proposed Plan's land use strategy, which places a high priority on moving jobs and households closer together. This leads to shorter average distances between home and employment and therefore shorter auto commute travel times.

This impact is considered less than significant (LS).

TABLE 2.1-14: PER-TRIP COMMUTE TRAVEL TIME[1], BY MODE

Mode	*2010*	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
Drive Alone	18.7	18.0	-0.7	-4%
Carpool	14.2	13.7	-0.5	-4%
Transit	44.0	44.3	0.3	+1%
Walk	19.5	19.3	-0.2	-1%
Bike	12.5	12.8	0.3	+2%
All Modes	**19.8**	**20.4**	**0.6**	**+3%**

Note:

1. Travel times are shown in minutes.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Mitigation Measures

None required.

Impact

2.1-2 Implementation of the proposed Plan could result in a substantial increase in per-trip travel time for non-commute travel by any mode over existing conditions. A substantial increase in per-trip travel time is defined as greater than 5 percent.

The forecasted effects of the proposed Plan on non-commute travel times are similar to the commute travel patterns under year 2040 Plan conditions. Impacts of the proposed Plan on per-trip non-commute travel times are less than significant (LS), measuring only two percent greater than existing conditions, as shown in **Table 2.1-15** (a 5 percent increase is considered significant).

While per-trip travel time improvements are forecasted for all modes except biking, the mode shift away from the automobile leads to a higher average per-trip travel time for non-commute purposes. As more individuals decide to rely on modes with longer average travel times (such as transit), the average non-commute travel time for the region tends to increase. While the mode shift can lead to a congestion reduction benefit that reduces average travel times for autos, it may lengthen travel times for a relatively small number of travelers.

This impact is considered less than significant (LS).

TABLE 2.1-15: PER-TRIP NON-COMMUTE TRAVEL TIME,[1] BY MODE

Mode	*2010*	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
Drive Alone	11.6	11.4	-0.2	-2%
Carpool	11.4	11.3	-0.1	-1%
Transit	36.2	35.5	-0.7	-2%
Walk	18.3	18.1	-0.2	-1%
Bike	11.0	11.1	0.1	+1%
All Modes	**12.7**	**12.9**	**0.2**	**+2%**

Note:

1. Travel times are shown in minutes.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012

Mitigation Measures

None required.

Impact

2.1-3 Implementation of the proposed Plan could result in a substantial increase in per capita VMT on facilities experiencing level of service (LOS) F compared to existing conditions during AM peak periods, PM peak periods, or during the day as a whole (LOS F defines a condition on roads where traffic substantially exceeds capacity, resulting in stop-and-go conditions for extended periods of time). A substantial increase in LOS F-impacted per capita VMT is defined as greater than 5 percent.

The EIR evaluates the change in the amount of per capita automobile travel on facilities experiencing the worst level of service (LOS) and the hours of congestion experienced by motorists. **Table 2.1-16** displays per capita vehicle miles of travel (VMT) by time period and by LOS. LOS reflects traffic density on a range from A to F based on the volume to capacity (V/C) ratio for roadway facilities.

Under the proposed Plan, per capita VMT on severely congested facilities (LOS F) would increase compared to existing conditions. Congested per capita VMT would increase by 29 percent during the AM peak hours, by 71 percent during the PM peak hours, and by 51 percent for the day as a whole. These roadway traffic service levels reflect the impact of total VMT growth far exceeding the growth of roadway capacity.

TABLE 2.1-16: PER-CAPITA DAILY VEHICLE MILES OF TRAVEL BY LEVEL OF SERVICE (2010-2040)

LOS[1] (V/C Ratio)	*2010*	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
AM Peak Period (6 AM to 10 AM)				
A-C (< 0.75)	4.19	3.70	-0.50	-12%
D-E (0.75-1.00)	1.05	1.16	0.10	+10%
F (> 1.00)	**0.06**	**0.08**	**0.02**	**+29%**
Total	5.31	4.93	-0.37	-7%
PM Peak Period (3 PM to 7 PM)				
A-C (< 0.75)	4.68	4.11	-0.57	-12%
D-E (0.75-1.00)	1.20	1.35	0.15	+12%
F (> 1.00)	**0.06**	**0.10**	**0.04**	**+71%**
Total	5.94	5.56	-0.39	-7%
Daily				
A-C (< 0.75)	18.27	16.56	-1.71	-9%
D-E (0.75-1.00)	2.45	2.88	0.44	+18%
F (> 1.00)	**0.12**	**0.19**	**0.06**	**+51%**
Total	20.84	19.63	-1.21	-6%

Note:

1. LOS (level of service) measures traffic density with a range of A to F. LOS A-C reflect free-flow conditions with minimal delay. LOS D-E reflect somewhat congested conditions with some possible delays. LOS F reflects very congested conditions with significant volumes greater than roadway capacity, leading to significant delays.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

The proposed Plan works to minimize congestion impacts through a number of regional policies and investment strategies, including:

- Implementation of significant transit capacity increases along fixed guideways to provide congestion-immune alternatives to freeway and arterial corridors (including projects such as BART Metro, BART to San José, Central Subway, Van Ness Bus Rapid Transit, Geary Bus Rapid Transit, and East Bay Bus Rapid Transit);
- Expansion of the Freeway Performance Initiative to go beyond existing freeway ramp meters to focus heavily on signal coordination along congested arterials;
- The proposed land use pattern, which would emphasize focused growth in Priority Development Areas and shorten commute distances by bringing jobs and housing closer together; and
- Continued funding of the OneBayArea Grant (OBAG) program to accelerate development initiatives in Priority Development Areas through infrastructure improvements.

Despite inclusion of these transportation and land use strategies in the proposed Plan, a potentially significant (PS) impact related to the increase in per capita VMT on facilities already experiencing LOS F would remain. Mitigation measures 2.1(a), 2.1(b), and 2.1(c) are described below.

Mitigation Measures

2.1(a) MTC, in its role as the Bay Area Toll Authority (BATA), shall pursue an additional peak period bridge toll on the San Francisco Oakland Bay Bridge to discourage vehicle travel during weekday peak periods, shifting travelers to other times of day or other modes

2.1(b) MTC and the BAAQMD shall proceed with implementation of the region's commute benefit ordinance authorized by Senate Bill 1339, which affects all major employers (with more than 50 employees), and discourages auto-based commute travel.

2.1(c) MTC shall pursue a policy that requires the implementation of ramp metering throughout the region's highway network as a condition of discretionary funding.

Significance after Mitigation

The increase in per capita VMT on facilities experiencing LOS F represents a significant impact compared to existing conditions. In order to assess whether implementation of these specific mitigation strategies would result in measureable traffic congestion reductions, implementing actions would need to be refined and matched to local conditions in any subsequent project-level environmental analysis.

While the mitigation measures described above commit MTC and ABAG to advance bridge toll and commuter benefit policies to reduce levels of severe traffic congestion, it is not known at this time if these strategies would reduce the impact below the significance threshold of a five percent increase to a less than significant level. Furthermore, MTC and ABAG cannot guarantee that local jurisdictions or employers would implement such policies in the most effective manner possible, given political or financial limitations. For purposes of a conservative analysis, therefore, this impact is determined to remain significant and unavoidable (SU).

Impact

2.1-4 Implementation of the proposed Plan could result in a substantial increase in per capita VMT compared to existing conditions. A substantial increase in per capita VMT is defined as greater than 5 percent.

As shown in **Table 2.1-17**, projected per capita VMT will decrease by 6 percent by year 2040, representing a reduction of 1.2 miles per person per day, even as total VMT increases by 20 percent. This reduction under the proposed Plan is a result of the focused growth land use strategy and transit expansion program, combined with the demographic projections which lead to an increased proportion of non-workers and retirees (who drive significantly fewer miles per day) in future years.

Although the shift to alternative modes is only a few percentage points' difference compared to year 2010 baseline conditions (shown in **Table 2.1-13**), daily VMT per capita will be reduced under the proposed Plan as a result of lower levels of driving in the region. Furthermore, the proposed land use pattern brings travel origins and destinations closer together, reducing the distance required to reach employment, retail, and service hubs. Therefore, as per-capita vehicle miles traveled will decrease as a result of the Plan, this impact would have no adverse impact (NI).

TABLE 2.1-17: DAILY VEHICLE MILES OF TRAVEL PER CAPITA (2010-2040)

	2010	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
Daily[1] Vehicle Miles of Travel (VMT)[2]	149,046,000	179,408,000	30,362,000	+20%
Daily[1] Vehicle Miles of Travel[2] per Capita[3]	**20.8**	**19.6**	**-1.2**	**-6%**

Notes:

1. Daily metrics are measured for a typical weekday.
2. Only reflects interzonal trips (assigned directly to the highway network); includes intraregional, interregional, airport-bound, and commercial vehicle trips.
3. Total daily VMT is calculated using Travel Model One; therefore, to calculate per-capita VMT, it is essential to use simulated population levels to ensure consistency. Simulated population may be slightly different than overall population forecasts for Plan Bay Area EIR alternatives due to slight variability in modeling tools. Further clarification on this issue can be found in the Plan Bay Area EIR technical appendices.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Mitigation Measures

None required.

Impact

2.1-5 Implementation of the proposed Plan could result in increased percent utilization of regional transit supply resulting in an exceedence of transit capacity at AM peak hours, at PM peak hours, or for the day. An exceedance is defined as passenger seat-mile demand for any transit technology being greater than 80 percent of passenger seat-miles supplied by transit operators.

Higher levels of transit ridership forecasted for year 2040 will lead to greater utilization levels for all public transit modes. Even though the proposed Plan includes significant investments that create new transit lines or boost frequencies on existing lines, transit demand rises at a faster rate than new capacity is implemented in the proposed Plan.

As this EIR examines the regional and systemwide impacts of transportation investments and land use shifts, localized capacity issues are not directly addressed here. Importantly, the integrated model used to evaluate and compare alternatives emphasizes evaluation of regional travel patterns and is not calibrated for localized route-by-route analyses. Localized impacts on transit utilization levels will vary depending on neighborhood level changes in land use (both jobs and residents), as well as the magnitude of transit frequency or capacity improvements on a given transit line. While capacity constraints are an existing issue for a small subset of transit lines in high-density locations like San Francisco, and these capacity limitations may continue in the future, they do not represent regional impacts to the overall system. Instead, localized operational capacity issues should be addressed when considering individual projects, rather than on the programmatic level for Plan Bay Area.

As shown in **Table 2.1-18**, in the AM peak period (when demand for transit is greatest), utilization of transit capacity (transit demand divided by transit supply) increases from 28 percent in year 2010 to 44 percent in year 2040; in the PM peak period, utilization increases from 25 percent in year 2010 to 39 percent in year 2040. For the day as a whole, utilization rises from 21 percent in year 2010 to 33 percent in year 2040. Light rail services have the greatest level of demand compared to service levels supplied, followed closely by heavy rail services. Commuter rail service demand approximately triples, but commuter rail services still only fill 17 percent of their total seat-miles.

As the passenger experience is relatively comparable as long as a passenger is able to easily locate a seat, capacity constraints become an issue only if utilization levels exceed 80 percent, meaning that it is difficult or impossible for a passenger to find a seat (and therefore the passenger must stand during the journey). Regional transit utilization levels for all public transit modes, during both peak periods and for the day as a whole, remain well below that threshold. Therefore, year 2040 regional transit capacity would have no adverse impact (NI) on system performance.

TABLE 2.1-18: UTILIZATION OF PUBLIC TRANSIT SYSTEMS, BY MODE (2010-2040)

	2010 Percent Utilization[1]	*2040 Plan Percent Utilization*[1]
AM Peak Period (6 AM to 10 AM)		
Local bus	24%	42%
Light rail[2]	35%	57%
Ferry	19%	23%
Express bus	30%	44%
Heavy rail[3]	40%	57%
Commuter rail[4]	7%	22%
All modes	28%	44%
PM Peak Period (3 PM to 7 PM)		
Local bus	25%	42%
Light rail[2]	34%	59%
Ferry	9%	12%
Express bus	26%	37%
Heavy rail[3]	36%	46%
Commuter rail[4]	5%	20%
All modes	25%	39%
Daily		
Local bus	19%	34%
Light rail[2]	27%	49%
Ferry	8%	13%
Express bus	25%	36%
Heavy rail[3]	27%	36%
Commuter rail[4]	6%	17%
All modes	21%	33%

Notes:

1. Percent utilization measures the passenger seat-miles required by forecasted transit patrons as a percentage of total passenger seat-miles provided by transit operators (i.e. the percentage of seats on transit vehicles filled with passengers). Utilization levels greater than 80 percent reflect conditions where passengers either would have difficulty finding a seat or would have to stand during all or part of their ride.
2. Reflects utilization of Muni Metro and VTA light rail systems.
3. Reflects utilization of BART heavy rail system.
4. Reflects utilization of Caltrain, SMART, Capitol Corridor, and ACE commuter rail systems.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Mitigation Measures

None required.

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2.2 Air Quality

This section evaluates the regional air quality impacts of implementing the proposed Plan. The analysis focuses on the following criteria pollutants: (1) ground-level ozone precursor emissions, for which the Bay Area is currently designated as a non-attainment area under the national and state standards, (2) particulate matter (PM) emissions, for which the Bay Area is currently designated as non-attainment under the national and state standards; and (3) carbon monoxide emissions, for which the Bay Area is designated as attainment under the national standard. It also evaluates criteria pollutants and Toxic Air Contaminants (TACs) from construction activity and local and regional emissions of TACs and fine particulate matter ($PM_{2.5}$).

This EIR examines these at a regional level. However, for TACs and $PM_{2.5}$ a localized analysis is provided to identify potential public health impacts from locating new sensitive receptors within Transit Priority Project (TPPs) areas. The EIR does not examine the effects on local or regional air quality from specific land use and transportation improvements in the proposed Plan.

The related issues of greenhouse gas emissions and potential climate change effects are addressed separately in *Chapter 2.5: Climate Change and Greenhouse Gases* of this EIR.

Environmental Setting

PHYSICAL SETTING

Air quality is affected by the rate, amount, and location of pollutant emissions, and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions, including wind speed, wind direction, and air temperature, in combination with local surface topography (i.e., geographic features such as mountains and valleys), determine the effect of air pollutant emissions on local and regional air quality.

Climate, Meteorology, and Topography

The Bay Area region has a Mediterranean climate characterized by wet winters and dry summers. Rainfall totals can vary widely over a short distance, with windward coastal mountain areas receiving over 40 inches of rain, while leeward areas receive about 15 inches. During rainy periods, horizontal and vertical air movement ensures rapid pollutant dispersal. Rain also washes out particulate and other pollutants.

Normally, air temperatures decrease with increasing elevations. Sometimes this normal pattern is inverted, with warmer air aloft, and cool air trapped near the earth's surface. This phenomenon occurs in all seasons. In summer, especially when wind speeds are very low, a strong inversion will trap air emissions and high levels of ozone smog can occur. In winter, a strong inversion can trap emissions of particulate and carbon monoxide near the surface, resulting in unhealthful air quality.

The Bay Area topography is complex, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The Pacific Ocean bounds the area to the west with warmer inland valleys to the south and east. The only major break in California's Coast Range occurs at San Francisco Bay. The gap on the western side is called the Golden Gate, and on the eastern side, it is called the Carquinez Strait. These gaps allow air to pass between the Central Valley and the Pacific Ocean. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific, resulting in a mild climate tempered by cool sea breezes with light average wind speeds. The usually mild climatological pattern is interrupted occasionally by periods of extremely hot weather, winter storms, and offshore winds.

Regional wind patterns vary from season to season. During the summer, winds flowing from the northwest are drawn inland through the Golden Gate and over the lower portions of the San Francisco Peninsula. Wind speeds may be strong locally in areas where air is channeled through a narrow opening, such as the Carquinez Strait, Golden Gate or the San Bruno Gap. In the winter, the region frequently experiences stormy conditions with moderate to strong winds, as well as periods of stagnation with very light winds. Winter stagnation episodes are characterized by nighttime drainage flows in coastal valleys. Drainage refers to the reversal of the usual daytime air-flow patterns; air moves from the Central Valley toward the coast.

Wind tends to move from areas of high-pressure to areas of low-pressure. In warmer months, this means that air currents move on-shore from the Pacific Ocean to inland areas. Pacific Ocean air receives emissions from numerous sources (anthropogenic and biogenic) as it comes onshore, and will then carry these pollutants to areas many miles away. Mountains and valleys often affect on-shore winds. This means that a wind pattern that started as northwesterly will often swing 90 degrees or more when it encounters topographic features.

The climatological pollution potential of an area is largely dependent on winds, atmospheric stability, solar radiation, and terrain. The combination of low wind speeds and a strong inversion produces the greatest concentration of air pollutants. On days without inversions, or on days of winds averaging over 15 miles per hour (mph), smog potential is greatly reduced. Because of wind patterns, and, to a lesser degree, the geographic location of emission sources, high ozone levels usually occur in inland valleys, such as the Livermore area. High particulate matter levels can occur in areas of intense motor vehicle use, such as freeways, ports, etc., and in most valley areas where residential wood smoke and other pollutants are trapped by inversions and stagnant air.

Existing Air Quality and Attainment Status Summary

The federal Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) (40 CFR part 5) for six pollutants considered harmful to public health and the environment. These six pollutants are ground-level ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead (Pb). EPA calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria (science-based guidelines) for setting permissible levels.

Under amendments to the federal Clean Air Act, EPA has classified air basins or portions thereof, as either "attainment" or "nonattainment" for each criteria pollutant, based on whether or not the national standards have been achieved. The California Clean Air Act, patterned after the federal Clean Air Act, also designates areas as "attainment" or "nonattainment" for State standards. Thus, California has two sets of attainment/nonattainment designations: one with respect to national standards and one with respect to State standards.

Table 2.2-1 identifies the ambient air quality standards and attainment status for all criteria pollutants. The Bay Area is currently designated as a nonattainment area for State and federal ozone standards, the federal 24 hour $PM_{2.5}$ standard, and State PM_{10} standards. Based on the nonattainment status of these pollutants, this analysis is focused on ground-level ozone, particulate matter, and carbon monoxide.[1] **Table 2.2-2** presents a ten-year Bay Area air quality summary for days over the national and California standards for ozone, carbon monoxide, and particulate matter. Each of these criteria pollutants is discussed in more detail in the following pages.

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1 In April 1998, the Bay Area was re-designated to attainment for the national 8-hour carbon monoxide standard. However, the Bay Area must continue to demonstrate attainment of that standard. Because of this, the EIR evaluates the carbon monoxide impacts of the proposed Plan.

TABLE 2.2-1: BAY AREA AMBIENT AIR QUALITY STANDARDS AND ATTAINMENT STATUS AS OF 2012

Pollutant	*Averaging Time*	*California Standard*[1,2]	*Attainment Status for California Standard*	*Federal Primary Standard*[1,3]	*Attainment Status for Federal Standard*	*Major Pollutant Sources*
Ozone	8 hour	0.070 ppm	Non-Attainment	0.075 ppm	Non-Attainment	Motor vehicles, other mobile sources, combustion, industrial and commercial processes
	1 hour	0.09 ppm	Non-Attainment			
Carbon Monoxide (CO)	8 hour	9.0 ppm	Attainment	9 ppm	Attainment	Internal combustion engines, primarily gasoline-powered motor vehicles
	1 hour	20 ppm	Attainment	35 ppm	Attainment	
Nitrogen Dioxide (NO_2)	1 hour	0.18 ppm	Attainment	0.100 ppm	Unclassified	Emissions from cars, trucks, and buses
	Annual Arithmetic Mean	0.030 ppm	---	0.053 ppm	Attainment	
Sulfur Dioxide (SO_2)	24 Hour	0.04 ppm	Attainment	0.14 ppm	Attainment	Fossil fuel combustion at power plants and other industrial facilities, and burning of high sulfur containing fuels by locomotives, large ships, and non-road equipment
	1 Hour	0.25 ppm	Attainment	0.075 ppm	Attainment	
	Annual Arithmetic Mean	---	---	0.030 ppm	Attainment	
Particulate Matter (PM_{10})	24 Hour	50 µg/m³	Non-Attainment	150 µg/m³	Unclassified	Dust- and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays)
	Annual Arithmetic Mean	20 µg/m³	Non-Attainment	---	---	
Particulate Matter – Fine ($PM_{2.5}$)	24 Hour	---	---	35 µg/m³	Non-Attainment	Same as above
	Annual Arithmetic Mean	12 µg/m³	Non-Attainment	15 µg/m³	Attainment	

TABLE 2.2-1: BAY AREA AMBIENT AIR QUALITY STANDARDS AND ATTAINMENT STATUS AS OF 2012

Pollutant	*Averaging Time*	*California Standard*[1,2]	*Attainment Status for California Standard*	*Federal Primary Standard*[1,3]	*Attainment Status for Federal Standard*	*Major Pollutant Sources*
Lead[4]	30 day Average	1.5 µg/m³	---	---	Attainment	Fuels in on-road motor vehicles and industrial sources
	Calendar Quarter	---	---	1.5 µg/m³	Attainment	
	Rolling 3 Month Average[5]	---	---	0.15 µg/m³		

Notes:

1. PPM=parts per million; mg/m³=milligrams per cubic meter; and µg/m³=micrograms per cubic meter
2. California standards for ozone, CO (except Lake Tahoe), NO_2, SO_2, PM_{10}, $PM_{2.5}$, and visibility reducing particles are values not to be exceeded. All other are not to be equaled or exceeded.
3. National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
4. The California Air Resources Board has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
5. National lead standard, rolling 3-month average: final rule signed October 15, 2008.

Source: Bay Area Air Quality Management District, 2012; The California Air Resources Board 2011a.

TABLE 2.2-2: TEN-YEAR BAY AREA AIR QUALITY SUMMARY (2002-2011)

Days Over Standard for Ozone, Carbon Monoxide and Particulate Matter (PM)

	Ozone			*Carbon Monoxide*			*PM_{10}*		*$PM_{2.5}$*
	1-Hr	*8-Hr*		*1-Hr*	*8-Hr*		*24-Hr*		*24-Hr*[2]
Year	*Cal*	*Nat*[1]	*Cal*	*Nat*	*Cal*	*Nat/Cal*	*Nat*	*Cal*	*Nat*
2002	16	7	-	0	0	0	0	6	7
2003	19	7	-	0	0	0	0	6	0
2004	7	0	-	0	0	0	0	7	1
2005	9	1	9	0	0	0	0	6	0
2006	18	12	22	0	0	0	0	15	10
2007	4	1	9	0	0	0	0	4	14
2008	9	12	20	0	0	0	0	5	12
2009	11	8	13	0	0	0	0	1	11
2010	8	9	11	0	0	0	0	2	6
2011	-	4	10	0	0	0	0	4	8

Notes:

1. On May 17, 2008, the U.S. EPA implemented a more stringent national 8-hour ozone standard, revising it from 0.08 ppm to 0.075 ppm. Ozone exceedance days for 2008 reflect the new standard.
2. On December 17, 2006, the U.S. EPA implemented a more stringent national 24-hour $PM_{2.5}$ standard—revising it from 65 μg/m^3 to 35 μg/m^3. Starting in 2006, $PM_{2.5}$ exceedance days reflect the new standard.

Nat = National, Cal =California

Source: Bay Area Air Quality Management District, 2010.

Ozone

Ozone is a reactive pollutant, which is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and oxides of nitrogen (NO_x). ROG and NO_x are known as precursor compounds of ozone. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of ROG and NO_x that help to form ozone. Ozone is a regional air pollutant because it is formed downwind of sources of ROG and NO_x under the influence of wind and sunlight. During summertime (particularly on hot, sunny days with little or no wind), ozone levels are at their highest.

Short-term exposure to elevated concentrations of ozone is linked to such health effects as eye irritation and breathing difficulties. Repeated exposure to ozone can make people more susceptible to respiratory infections and aggravate pre-existing respiratory diseases. Long-term exposures to ozone can cause more serious respiratory illnesses. Ozone also damages trees and other natural vegetation, reduces agricultural productivity, and causes deterioration of building materials, surface coatings, rubber, plastic products and textiles.

Tables 2.2-3 and **2.2-4** show exceedances of the State one-hour ozone standard and national eight-hour ozone standard, respectively. The number of days the region experiences unhealthy ozone levels has fallen overall. This improvement is due to the California Air Resources Board (ARB) regulations affecting motor vehicle emissions and Bay Area Air Quality Management District (BAAQMD) regulations to reduce emissions from industrial and commercial sources.

TABLE 2.2-3: DAYS EXCEEDING THE CALIFORNIA 1-HOUR OZONE STANDARD (1998-2010)

Stations by Sub-Region	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
Northern													
Benicia	--	--	--	--	--	--	--	--	--	0	2	--	--
Napa	3	4	0	1	1	2	0	0	1	0	1	1	1
San Rafael	0	2	0	0	0	0	0	0	0	0	0	0	0
Santa Rosa	0	1	0	0	0	1	0	0	0	0	0	0	0
Vallejo	3	4	0	0	1	2	1	0	0	0	1	2	0
Central													
Hayward	4	4	1	2	0	3	0	0	2	0	1	4	--
Oakland	0	0	0	0	0	0	0	0	--	--	0	0	1
Redwood City	0	0	0	1	0	1	1	0	0	0	0	0	2
San Francisco	0	0	0	0	0	0	0	0	0	0	0	0	0
San Leandro	2	3	1	0	1	2	1	1	0	0	0	--	--
Richmond/San Pablo	0	1	0	0	0	0	1	0	0	0	0	0	1
Eastern													
Bethel Island	10	5	1	3	5	0	1	0	9	0	4	2	3
Concord	13	8	2	6	5	5	1	1	8	1	3	2	2
Fairfield	9	9	1	3	4	0	1	0	3	0	2	2	1
Livermore	21	14	7	9	10	10	5	6	13	2	5	8	3
Pittsburg	4	2	1	2	4	0	0	0	3	1	1	--	--
Southern													
Fremont	7	3	2	3	3	4	0	1	4	0	1	4	1
Los Gatos	5	4	0	2	4	7	0	3	7	0	2	3	2
Mountain View/ Sunnyvale	2	7	--	0	0	4	1	1	3	0	0	--	--
San José Central	4	3	0	2	--	4	0	1	5	0	1	0	5
San José East	5	2	1	0	0	2	0	1	--	--	--	--	--
Gilroy	10	3	--	3	6	6	0	0	4	0	1	1	0
San Martin	15	7	4	7	8	9	0	2	7	1	2	4	2

Source: Bay Area Air Quality Management District, 2010.

TABLE 2.2-4: DAYS EXCEEDING THE NATIONAL 8-HOUR OZONE STANDARD (1998-2010)

Stations by Sub-Region	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
Northern													
Benicia	--	--	--	--	--	--	--	--	--	0	--	--	--
Napa	1	1	0	0	0	0	0	0	0	0	2	1	2
San Rafael	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Rosa	0	0	0	0	0	0	0	0	0	0	0	0	0
Vallejo	0	1	0	0	0	0	0	0	0	0	0	0	1
Central													
Hayward	0	1	0	1	0	1	0	--	0	0	1	3	--
Oakland	0	0	0	0	0	0	0	0	--	--	0	0	0
Redwood City	0	0	0	0	0	0	0	0	0	0	0	0	1
San Francisco	0	0	0	0	0	0	0	0	0	0	0	0	0
San Leandro	0	0	0	0	0	0	0	0	0	0	--	--	--
Richmond/San Pablo	0	0	0	0	0	0	0	0	0	0	0	--	1
Eastern													
Bethel Island	5	5	1	2	3	0	0	0	1	0	4	3	4
Concord	6	6	1	1	3	1	0	0	4	0	6	2	1
Fairfield	3	4	0	0	0	0	0	0	1	0	1	2	2
Livermore	10	5	2	2	6	3	0	1	5	1	6	6	3
Pittsburg	1	1	0	1	2	0	0	0	1	0	1	--	--
Southern													
Fremont	0	1	0	0	0	1	0	0	0	0	1	0	1
Los Gatos	2	1	0	1	2	2	0	1	4	0	2	4	2
Mountain View/Sunnyvale	0	1	--	0	0	2	0	0	0	0	1	--	--
San José Central	1	0	0	0	--	0	0	0	1	0	2	0	3
San José East	0	0	0	0	0	0	0	0	--	--	--	--	--
Gilroy	4	0	--	2	2	2	0	0	2	0	1	2	5
San Martin	6	3	1	2	5	4	0	0	5	0	2	5	5

Source: Bay Area Air Quality Management District, 2010.

Carbon Monoxide

Carbon monoxide (CO) is an odorless and invisible gas. It is a non-reactive pollutant that is a product of incomplete combustion of gasoline in automobile engines. Carbon monoxide is a localized pollutant, and the highest concentrations are found near the source. Ambient carbon monoxide concentrations generally follow the spatial and temporal distributions of vehicular traffic and are influenced by wind speed and atmospheric mixing. Carbon monoxide concentrations are highest in flat areas on still winter nights, when temperature inversions trap the carbon monoxide near the ground. When inhaled at high concentrations, carbon monoxide reduces the oxygen-carrying capacity of the blood, which, in turn, results in reduced oxygen reaching parts of the body. Most of the Bay Area's carbon monoxide comes from on-road motor vehicles, although a substantial amount also comes from burning wood in fireplaces. Over the past 10 years, the Bay Area has not experienced any exceedances of either the national or state carbon monoxide standard.

Particulate Matter

Particulate matter includes dirt, dust, soot, smoke and liquid droplets found in the air. Coarse particulate matter, or PM_{10}, refers to particles less than or equal to 10 microns in diameter (about one-seventh the diameter of a human hair). PM_{10} is primarily composed of large particles from sources such as road dust, residential wood burning, construction/demolition activities, and emissions from on- and off-road engines. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Fine particulate matter, or $PM_{2.5}$, refers to particles less than or equal to 2.5 microns in diameter, and contains particles formed in the air from primary gaseous emissions. Examples include sulfates formed from SO_2 emissions from power plants and industrial facilities, nitrates formed from NO_x emissions from power plants, automobiles, and other combustion sources, and carbon formed from organic gas emissions from automobiles and industrial facilities.

The Bay Area experiences its highest particulate matter concentrations in the winter, especially during evening and night hours, due to the cool temperatures, low-wind speeds, low inversion layers, and high humidity. Specifically, $PM_{2.5}$ is viewed as a significant component of the region's total particulate matter problem because the $PM_{2.5}$ fraction of total particulate matter accounts for approximately 60 percent of the PM_{10} during the winter and approximately 45 percent during the rest of the year. On days when the PM standards are exceeded, $PM_{2.5}$ can account for as much as 90 percent of PM_{10}.

Coarse and fine particulate matters are small enough to get into the lungs and can cause numerous health problems, including respiratory conditions such as asthma and bronchitis, and heart and lung disease. People with heart or lung disease, the elderly, and children are at highest risk from exposure to particulate matter.

Toxic Air Contaminants

The California Health and Safety Code defines toxic air contaminants (TACs) as air pollutants that may cause or contribute to an increase in mortality or in serious illness, or that may pose a present or potential hazard to human health. TACs are less pervasive in the urban atmosphere than criteria air pollutants, but are linked to short-term (acute) or long-term (chronic and/or carcinogenic) adverse human health effects. For evaluation purposes, TACs are separated into carcinogens and non-carcinogens based on the nature of the physiological effects associated with exposure to TACs. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. Cancer risk from carcinogens is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure. Non-carcinogens differ in that there is a safe level in which it is generally assumed that no negative health impacts would occur. These levels are determined on a pollutant-by-pollutant basis.

There are many different types of TACs with varying degrees of toxicity. TACs may also exist as particulate matter or as vapors or gases. Sources of TACs include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and motor vehicle exhaust—particularly diesel-powered vehicles. Compared to other air toxics that ARB has identified and controlled, diesel particulate matter (diesel PM) emissions are estimated to be responsible for about 70 percent of the total ambient air toxics risk statewide.

The three most potent carcinogens come primarily from motor vehicles—diesel PM overall, and 1,3-butadiene and benzene as specific components of diesel PM. Cleaner motor vehicles and fuels are reducing the risks from these three priority toxic air pollutants. The remaining toxic air pollutants, such as hexavalent chromium and perchloroethylene, while not appearing to contribute as much to the overall risks, can present high risks to people living close to a source due to the highly localized concentration of TACs. ARB has control measures for motor vehicles, consumer products, and industrial source programs either already on the books, in development, or under evaluation for most TACs.

Health risks from diesel PM are highest in areas of concentrated emissions, such as near ports, rail yards, freeways, or warehouse distribution centers. According to the ARB, diesel engine emissions are responsible for the majority of California's known cancer risk from outdoor air pollutants. Those most vulnerable are children whose lungs are still developing and the elderly who may have other serious health problems. Based on numerous studies, ARB has also stated that diesel PM is a contributing factor for premature death from heart and/or lung diseases. In addition, diesel PM reduces visibility and is a strong absorber of solar radiation that contributes to global warming.[2]

According to the ARB, levels of toxic air pollutants have decreased significantly with the adoption of airborne toxic control measures, stringent vehicle standards, requirements for low emission vehicles, and cleaner fuels. Since 1980, there has been a statewide reduction of 98 percent in lead, and since 1990, there has been a statewide reduction of 85 percent in benzene 80 percent in 1,3-butadiene, 75 percent in hexavalent chromium, and 50 percent in diesel PM. The estimated cancer risk from TACs, measured statewide, has been reduced by 60 percent since 1990.[3]

To address community risk from air toxics, BAAQMD initiated the Community Air Risk Evaluation (CARE) program in 2004 to evaluate and reduce health risks associated with exposure to outdoor TACs. The program examines TAC emissions from point sources, area sources and on-road and off-road mobile sources co-located with sensitive populations to help focus mitigation strategies. In fiscal year 2012 alone, the BAAQMD allocated over $60 million to fund diesel emission reduction projects in CARE communities. Some of the projects funded included replacing or retrofitting on and off road heavy duty trucks; installation of shore side electric power at 11 berths at the Port of Oakland to reduce ship emissions; and to replace a locomotive operating at the rail yard in Richmond.

Based on annual emissions inventory of TACs prepared through the CARE program, TAC emissions from all sources in the Bay Area region were estimated to be 115 tons per day for 2005. The largest single source of daily average TAC emissions was on-road mobile sources, accounting for 38 percent. Diesel PM emissions constitute about 86 percent of cancer toxicity-weighted pollutants emitted in the region.

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[2] See ARB's fact sheet entitled "Health Effects of Diesel Exhaust Particulate Matter found at http://www.arb.ca.gov/research/diesel/dpm_draft_3-01-06.pdf.

[3] ARB, The California Almanac of Emissions and Air Quality, 2009 Edition.

The largest single sources of diesel PM in the Bay Area region include the Port of Oakland, refineries, and rail yards.

REGULATORY SETTING

Air quality is regulated at the federal, state, and regional levels. The following subsection summarizes the applicable air quality regulations and regulatory agencies.

Federal Regulations

Federal Clean Air Act

The federal Clean Air Act (CAA) of 1970, amended in 1977 and 1990 (42 USC 7506(c)), was enacted for the purposes of protecting and enhancing the nation's air resources to benefit public health. In 1971, the CAA required the EPA to set NAAQS to achieve the purposes of Section 109 of the act. The NAAQS require that certain pollutants should not exceed specified levels; areas that exceed the standard for specified pollutants are designated as "nonattainment" areas. In promulgating the NAAQs, the EPA allowed some states the option to develop stricter state standards. As such, California has adopted its own set of stricter standards under the California Clean Air Act (CCAA) of 1988 (described under State Regulations).

The federal CAA requires states to develop State Implementation Plans (SIPs) that outline how each state will control air pollution under the CAA. A SIP includes the regulations, programs and policies that a state will use to clean up polluted areas. States must hold public hearings and provide opportunities for the public and industries to be involved and comment on the development of each state plan. The Bay Area's latest SIP is the *2001 Ozone Attainment Plan*, which demonstrates how the region is addressing the national 1-hour ozone standard.

1990 Amendments to Clean Air Act

The 1990 Amendments to the CAA included a provision to address air toxics. Under Title III of the CAA, EPA establishes and enforces National Emission Standards for Hazardous Air Pollutants (NESHAPs), which are nationally uniform standards oriented towards controlling particular hazardous air pollutants (HAPs). Section 112(b) of the CAA identifies 189 "Air Toxics" (hazardous air pollutants), directs EPA to identify sources of the 189 pollutants, and establishes a 10-year time period for EPA to issue technology-based emissions standards for each source category. Title III of the CAA provides for a second phase under which EPA is to assess residual risk after the implementation of the first phase of standards and impose new standards, when appropriate, to protect public health.

Federal Transportation Conformity Requirements

Transportation conformity is required under the CAA section 176(c) to ensure that federally supported highway and transportation project activities are consistent with ("conform to") the purpose and requirements of the SIP. Conformity currently applies to areas that are designated nonattainment, and those re-designated to attainment after 1990 ("maintenance areas") for the following transportation-related criteria pollutants: ozone, $PM_{2.5}$ and PM_{10}, CO, and NO_x. Conformity, to the purpose of the SIP, means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. Conformity is demonstrated by showing that the total air pollutant emissions projected for a RTP/SCS are within the emissions limits ("budgets") established by the SIP.

Conformity requires demonstration that transportation control measures (TCMs) in ozone nonattainment areas are implemented in a timely fashion. TCMs are expected to be given funding priority and to be implemented on schedule and, in the case of any delays, any obstacles to implementation have been or are being overcome. A total of 33 TCMs have been fully implemented since the 1982 Bay Area Air Quality Plan; 12 TCMs were originally listed in the 1982 Bay Area Air Quality Plan, 16 additional TCMs were adopted by MTC in February 1990 in response to a 1990 lawsuit in the federal District Court to bring the region back on the "Reasonable Further Progress" track, and five TCMs were adopted as part of the 2001 1-Hour Ozone Attainment Plan. These TCMs include strategies such as improved transit service and transit coordination, ridesharing services and new carpool lanes, signal timing, freeway incident management, and increased gas taxes and bridge tolls to encourage use of alternatives modes.

MTC must make a determination that the proposed Plan conforms to the SIP and is consistent with the applicable air quality attainment plans. The transportation conformity analysis and findings prepared by MTC for the proposed Plan are addressed in a separate process from the Plan Bay Area environmental review process, and are included as a Supplemental Report to Plan Bay Area that is available for review at www.onebayarea.org.

State Regulations

California Clean Air Act

The California Clean Air Act (CCAA) of 1988 requires nonattainment areas to achieve and maintain the state ambient air quality standards by the earliest practicable date and local air districts to develop plans for attaining the state ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide standards. The ARB sets the state ambient air quality standards.

Under the CCAA, areas not in compliance with the standard must prepare plans to reduce ozone. Non-compliance with the state ozone standard does not impact the ability to proceed with any transportation plan, program, or project. The first Bay Area Clean Air Plan (CAP) was adopted in 1991, and updates to the CAP have occurred since then, with the most recent being the *Bay Area 2010 Clean Air Plan*. The Bay Area 2010 CAP provides "all feasible measures" to reduce ozone in the Bay Area.

Senate Bill 656 (Chapter 738, Statues of 2003)

In 2003, the Legislature enacted Senate Bill (SB) 656 (Chapter 738, Statutes of 2003), codified as Health and Safety Code Section 39614, to reduce public exposure to PM_{10} and $PM_{2.5}$. SB 656 requires ARB, in consultation with local air pollution control and air quality management districts (air districts), to develop and adopt, by January 1, 2005, a list of the most readily available, feasible, and cost-effective control measures that could be employed by ARB and the air districts to reduce PM_{10} and $PM_{2.5}$ (collectively referred to as PM). The legislation establishes a process for achieving near-term reductions in PM throughout California ahead of federally required deadlines for $PM_{2.5}$, and provides new direction on PM reductions in those areas not subject to federal requirements for PM. Measures adopted as part of SB 656 will complement and support those required for federal $PM_{2.5}$ attainment plans, as well as for State ozone plans. This will ensure continuing focus on PM reduction and progress towards attaining California's more health protective standards. This list of air district control measures was adopted by the ARB on

November 18, 2004. ARB also developed a list of State PM control measures for mobile and stationary sources, including measures planned for adoption as part of ARB's Diesel Risk Reduction Plan. The lists are at the following web site: http://www.arb.ca.gov/pm/pmmeasures/pmmeasures.htm.

To comply with SB 656, BAAQMD reviewed the list of 103 potential PM control measures prepared by ARB and developed a Particulate Matter Implementation Schedule which was adopted by BAAQMD in November 2005.[4] As a result, the BAAQMD adopted or amended existing rules to reduce particulate matter from internal combustion engines, chain driven commercial broiling, and residential woodburning and expanded its public awareness program.

Toxic Air Contaminant Identification and Control Act of 1983

Under the Toxic Air Contaminant Identification and Control Act of 1983 (Assembly Bill (AB) 1807, Chapter 1047, Statues of 1983), the California Legislature created a two-step identification and risk management program to reduce the risk of health effects from air toxic substances. During the first step (identification), the ARB and the Office of Environmental Health Hazard Assessment (OEHHA) determines if a substance should be formally identified as a toxic air contaminant (TAC) in California. During the second step (risk management), the ARB reviews the emission sources of an identified TAC to determine if any regulatory action is necessary to reduce the risk. The analysis includes a review of controls already in place, the available technologies and associated costs for reducing emissions, and the associated risk. Conducting public outreach is essential during the development of a control plan and any control measure to ensure that the ARB efforts are cost-effective and appropriately balance public health protection and economic growth.

In 1993, AB 1807 was amended to include the identification and control of additional TACs. Specifically, AB 2728 required the ARB to identify the 189 federal hazardous air pollutants as TACs. For substances that have not previously been identified under AB 1807, but were subsequently identified under AB 2728, health effects values will need to be developed.

Assembly Bill 2588 Air Toxics "Hot Spots" Information and Assessment Act of 1987

In September 1987, the California Legislature established the Air Toxics "Hot Spots" Information and Assessment Act of 1987, Assembly Bill (AB) 2588 (Health and Safety Code Sections 44300-44394). It requires facilities to report their air toxics emissions, ascertain health risks, and to notify nearby residents of significant risks. The emissions inventory and risk assessment information from this program has been incorporated into this report. In September 1992, the "Hot Spots" Act was amended by Senate Bill 1731 which required facilities that pose a significant health risk to the community to reduce their risk through a risk management plan.

Diesel Risk Reduction Plan

In August 1998, the ARB identified particulate emissions from diesel-fueled engines (diesel PM) as toxic air contaminants, based on data linking diesel PM emissions to increased risks of lung cancer and respiratory disease. Following the identification process, the ARB was required by law to determine if

[4] http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Particulate%20Matter/sb656_staff_report.ashx.

there is a need for further control, which led to creation of the Diesel Advisory Committee to assist in the development of a risk management guidance document and risk reduction plan. In September 2000, the ARB adopted the Diesel Risk Reduction Plan, which recommends control measures to reduce the risks associated with diesel PM and achieve a goal of 75 percent diesel PM reduction by 2010 and 85 percent by 2020.

Specific statewide regulations designed to further reduce diesel PM emissions from diesel-fueled engines and vehicles will be evaluated and developed. The goal of these regulations is to make diesel engines as clean as possible by establishing state-of-the-art technology requirements or emission standards to reduce diesel PM emissions.

California Health and Safety

Under the California Health and Safety Code, Division 26 (Air Resources), the ARB is authorized to adopt regulations to protect public health and the environment through the reduction of TACs and other air pollutants with adverse health effects. As such, the ARB has promulgated several mobile and stationary source airborne toxic control measures (ATCMs). For instance, effective as of July 2003, ARB approved an ATCM that limits school bus idling and idling at or near schools to only when necessary for safety or operational concerns (13 CCR Chapter 10 Section 2480). This ATCM is intended to reduce diesel PM and other TACs and air pollutants from heavy-duty motor vehicle exhaust. It applies to school buses, transit buses, school activity buses, youth buses, general public paratransit vehicles, and other commercial motor vehicles. This ATCM focuses on reducing public exposure to diesel PM and other TACs, particularly for children riding in and playing near school buses and other commercial motor vehicles, who are disproportionately exposed to pollutants from these sources. In addition, effective February 2005, the ARB approved an ATCM to limit the idling of diesel-fueled commercial motor vehicles with gross vehicular weight ratings of greater than 10,000 pounds, regardless of the state or country in which the vehicle is registered (13 CCR Chapter 10 Section 2485).

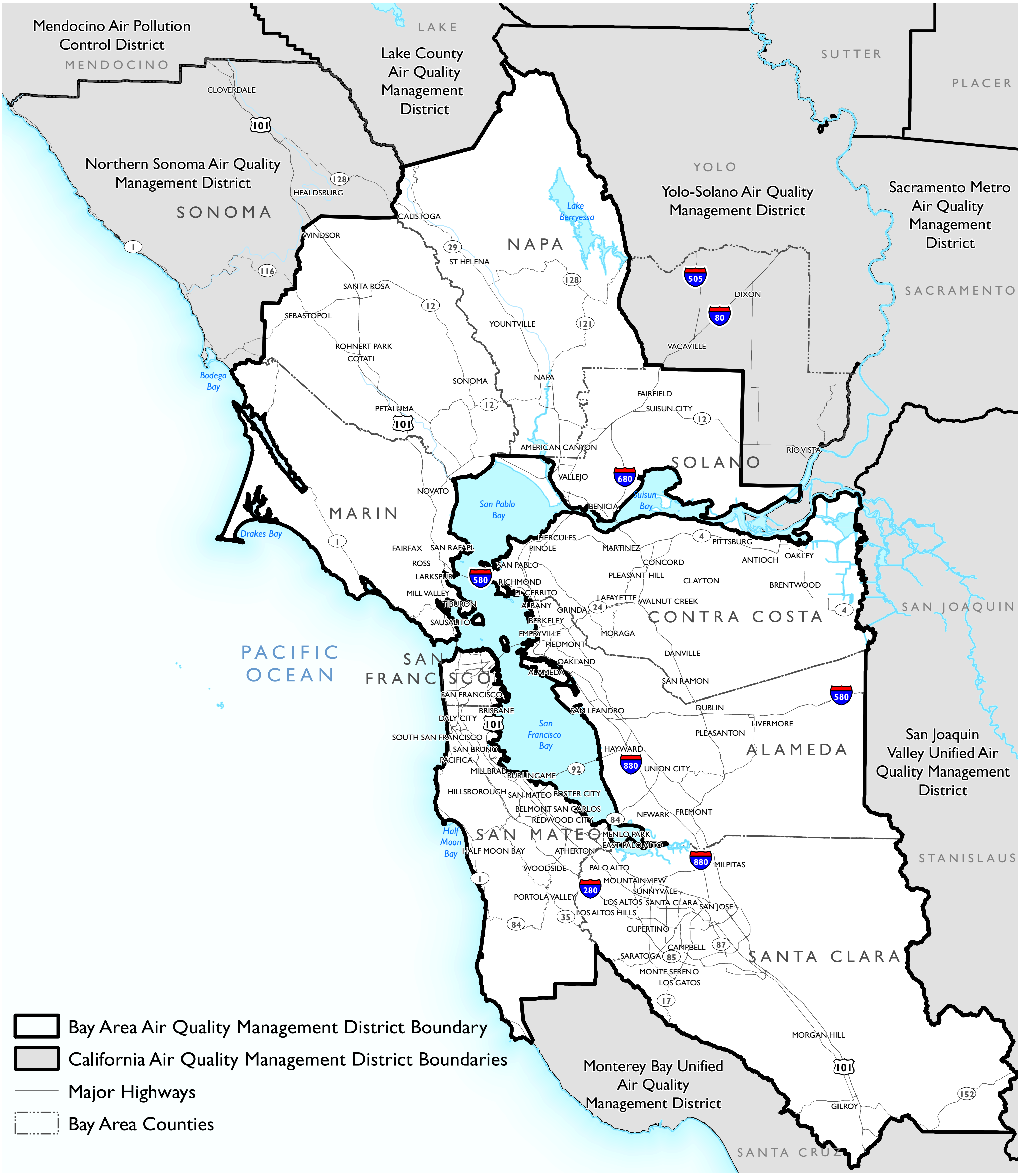
Regional Regulations

Air District Boundaries

The nine-county MTC region encompasses three air basins: the San Francisco Bay Air Basin in its entirety, portions of the North Coast Air Basin, and portions of the Sacramento Valley Air Basin. Northern Sonoma County is located within the North Coast Air Basin, and eastern Solano County is located within the Sacramento Valley Air Basin (the remaining areas not located within those air basins are located within the San Francisco Bay Air Basin). BAAQMD governs the San Francisco Bay Air District, the Northern Sonoma County Air Pollution Control District (NSCAPCD) governs the North Coast Air Basin, and the Yolo-Solano Air Pollution Control District (YSAPCD) governs the Sacramento Valley Air Basin. The geographic boundaries of these three air basins and air districts are shown in **Figure 2.2-1**. Each air pollution control district is responsible for attaining and maintaining air quality standards and undertakes a variety of activities, including: adopting and enforcing rules and regulations, issuing permits for stationary sources of air pollution, inspecting stationary sources of air pollution, responding to citizen inquiries and complaints, monitoring ambient air quality and meteorological conditions, administering incentives-based programs to reduce motor vehicle emissions, and conducting public education campaigns. In California, air pollution control districts generally follow county boundaries; in the more urban areas, county agencies were merged by State legislation into unified air quality management districts.

Figure 2.2-1

Air Basin Boundaries



Data Source: Air Resource Board, California Environmental Protection Agency, 2012; Metropolitan Transportation Commission, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Impact Analysis

IMPACT SIGNIFICANCE CRITERIA

Implementation of the proposed Plan would have a potentially significant adverse impact if it would:

Criterion 1: Conflict with or obstruct implementation of an applicable air quality plan, including: (a) the primary goals; (b) applicable control measures; or (c) implementation of any control measures.

Criterion 2: Cause a substantial net increase in construction-related emissions.

Criterion 3: Cause a net increase of emissions of criteria pollutants from on-road mobile sources compared to existing conditions, including: (a) ROG, NO_x, CO, and $PM_{2.5}$; or (b) PM_{10}.

Criterion 4: Cause a cumulative net increase in emissions of diesel PM, 1,3-butadiene, and benzene (TACs) from on-road mobile sources compared to existing conditions.

Criterion 5: Cause a localized net increase in sensitive receptors located in Transit Priority Project (TPP) corridors where: (a) TACs or fine particulate matter ($PM_{2.5}$) concentrations result in a cancer risk greater than 100/million or a concentration of $PM_{2.5}$ greater than 0.8 $\mu g/m^3$ of $PM_{2.5}$; or (b) sensitive receptors are located within set distances (**Table 2.2-10**) to mobile or stationary sources of TAC or $PM_{2.5}$ emissions; or (c) TACs or fine particulate matter ($PM_{2.5}$) concentrations result in noncompliance with an adopted Community Risk Reduction Plan.

Criterion 6: Cause a localized larger increase or smaller decrease of TACs and or $PM_{2.5}$ emissions in disproportionally impacted communities compared to the remainder of the Bay Area communities.

METHOD OF ANALYSIS

Consistency with Air Quality Plans

The EIR includes a qualitative assessment to evaluate whether the proposed Plan's transportation investments and land development pattern will result in any inconsistencies with BAAQMD's 2010 Clean Air Plan (2010 CAP) or the 2001 State Implementation Plan (SIP) for ozone.

A more detailed analysis related to consistency with the 2001 SIP is addressed in the required federal transportation conformity analysis and findings prepared by MTC, which is being prepared separately from the environmental review process for Plan Bay Area, and will be included as a Supplemental Report to Plan Bay Area and can be found at www.onebayarea.org.

Construction-Related Emissions

Construction emissions can vary depending on the level of activity, the specific operations taking place, the equipment being operated, local soil conditions, weather conditions, and other factors. A qualitative analysis of potential local and regional air quality impacts from construction activity associated with proposed Plan investments was conducted. The qualitative analysis is based on dispersion modeling that has been completed for representative construction projects. At the program level of analysis, it is not possible to quantify the amount of emissions expected from implementation of the transportation projects or land use development that would be consistent with the proposed Plan. However, the overall impact on local and regional air quality from any one project or all of the projects combined will be primarily dependent on the number of pieces and age of diesel powered equipment operating daily and the duration of their operation at the construction site or in the region. Should implementing agencies adopt feasible mitigation measures for each construction project resulting from the proposed Plan, impacts associated with construction activity on local and regional air quality will be less than significant. Therefore, this analysis identifies the measures, or best management practices (BMPs), that must be implemented for an individual construction project to have less than significant impacts.

Motor Vehicle Emissions

MTC's travel demand forecasting models produce forecasts of travel behavior and vehicle activity. These models have been extensively reviewed by federal and State agencies and refined in connection with their application to air quality analyses of various kinds. Key model outputs for use in air quality analyses include: total daily vehicle trips, vehicle miles of travel (VMT), and distribution of vehicle miles of travel by speed. This information was then used to determine total emissions from transportation activity in the Bay Area using motor vehicle emissions models developed and maintained by the ARB.

Table 2.2-5 provides the core 2040 travel activity data used to calculate regional motor vehicle emissions. Between 2010 and 2040, the Bay Area is projected to add about 2.1 million people (30 percent increase) and 1.1 million jobs (33 percent increase). Based on expected future growth, MTC and ABAG estimate that the total vehicles miles traveled will increase by 20 percent, which means that VMT is growing at a slower rate compared to population growth and job growth in the region. This can be attributed to the focused land use pattern and investment in transit and roadway projects in the proposed Plan.

TABLE 2.2-5: TRAVEL DATA

	2010	*2040 Plan*	*Change 2010 to 2040 Plan*	
			Numerical	*Percent*
Vehicles in Use	4,608,722	5,463,760	855,038	19%
Daily Vehicle Miles Traveled (VMT)	163,903,095	196,927,122	33,024,027	20%
Engine Starts	30,834,375	36,362,648	5,528,273	18%
Total Population	**7,091,000**	**9,196,000**	**2,105,000**	**30%**
Total Employment	**3,385,000**	**4,505,000**	**1,120,000**	**33%**

Source: Metropolitan Transportation Commission, 2012.

ARB's latest emissions inventory model that calculates emissions for motor vehicles operating on roads in California is EMFAC2011. Emission estimates of on-road vehicle emissions include consideration of the fleet mix (vehicle type, model year, and accumulated mileage); miles traveled; ambient temperatures; vehicle speeds; and vehicle emission factors, as developed from Smog Check data, Caltrans vehicle counts, and ARB testing programs. The model also incorporates the effects of recent diesel regulations including ARB's truck and bus rules; and greenhouse gas regulations including the Pavley Clean Car

Standard and the Low Carbon Fuel standard; however the newest national fuel standards for model year (MY) 2017 through 2025 light-duty motor vehicles are not included in EMFAC2011. EMFAC2011 has CO_2 controls for MYs 2009 through 2016 (Pavley Phase I) only. Because of this, and the ARB Advanced Clean Car Standards approved in 2012, it is anticipated that emissions in the future will be lower than those calculated by this current version of the EMFAC model (EMFAC2011).[5]

EMFAC2011 generates emission factors for all types of on-road vehicles under different ambient and driving conditions. ARB developed these factors based on thousands of emissions tests on both new and used vehicles recruited randomly from the California fleet. In the EMFAC2011 model, the emission rates were combined with vehicle activity data provided by regional transportation agencies (such as MTC) to calculate the regional emissions inventories.

Emission estimates for ROG, NO_X, CO and particulate matter (associated with engine exhaust and tire wear) are direct outputs from EMFAC2011. To obtain rough estimates of the amount of particulate matter generated by autos from roads (called "entrained dust"), regional VMT[6] was multiplied by the following (annual) factors: (1) 0.132 grams/mile entrained dust for $PM_{10,}$ and (2) 0.020 grams/mile entrained dust for $PM_{2.5}$.[7]

Toxic Air Contaminants (TACs)

TACs were evaluated on both a regional and local level. The regional analysis studies the impacts of the cumulative TAC emissions for the entire Bay Area; the local analysis studies the impacts of TAC emissions on corridors within TPPs and disproportionally impacted communities to provide a better understanding of localized health impacts. The methodologies for both the regional TACs and localized TACs analysis are described below.

Regional TACs

To calculate TACs from all on-road motor vehicles, MTC uses the CT-EMFAC model, a complementary model to EMFAC2011, which estimates diesel PM, benzene and 1,3-butadiene emissions in units of kilograms per day. The EMFAC2011 and CT-EMFAC emissions factors reflect travel speeds and vehicle types specific to each roadway link.

Local Pollutant Impact Analysis

The purpose of the local pollutant impact analysis is to assess potential localized health impacts to new sensitive receptors that could be located within TPP corridors based on the proposed Plan transportation investments and proposed Plan land use scenario. One of the primary objectives of SB 375 and the SCS is to locate more residential and commercial/retail development along existing transit corridors to reduce vehicle trips, vehicle miles traveled and mobile source air pollution. While this strategy can be beneficial

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[5] http://www.arb.ca.gov/msprog/consumer_info/advanced_clean_cars/consumer_acc.htm.

[6] Note that MTC upwardly adjusts the regional VMT forecasts from the MTC travel demand models to account for differences in VMT estimates produced by ARB and MTC using a protocol prescribed by ARB.

[7] California Air Resources Board, Miscellaneous Process Methodology 7.9 - Entrained Paved Road Travel, Paved Road Dust. Revised and Updated, July 2012

to air quality in general by reducing the amount of air pollution emitted into the atmosphere every day, serious adverse health impacts can result by locating sensitive receptors within close proximity to sources of TACs and $PM_{2.5}$. The urbanized areas along these transit corridors typically contain a wide range of air pollution sources including stationary and area sources (e.g., gas stations, manufacturing facilities, etc.) and mobile sources (e.g., cars, trucks, trains etc.) which generate TACs and $PM_{2.5}$ that can create localized health risks to residents and other sensitive receptors from prolonged exposure to elevated concentrations.

An analysis of TAC concentrations from stationary and mobile emission sources was conducted within TPP areas, which can include Priority Development Areas (PDAs). As shown in **Figure 2.2-2**, many PDAs (74 percent of PDA acreage) overlap with TPP areas. While PDAs were locally defined and used by MTC and ABAG to identify future growth areas in the proposed Plan, TPP areas are defined by SB 375 as areas within half a mile of a major transit stop or high quality transit corridor, amongst other criteria[8]. TPP corridors generally include existing neighborhoods served by transit, and contain a wide range of housing options along with jobs, schools, and amenities. Under SB 375, certain residential or mixed use residential projects and projects located within TPP corridors that meet defined criteria may be eligible for CEQA streamlining. The local pollutant impact analysis focuses on impacts within TPP areas, rather than in PDAs, to more closely mirror SB 375 and to more closely reflect data and modeling prepared by BAAQMD and used in the local pollutant impact analysis. Implementing agencies can utilize the analysis for certain CEQA streamlining purposes, as appropriate.

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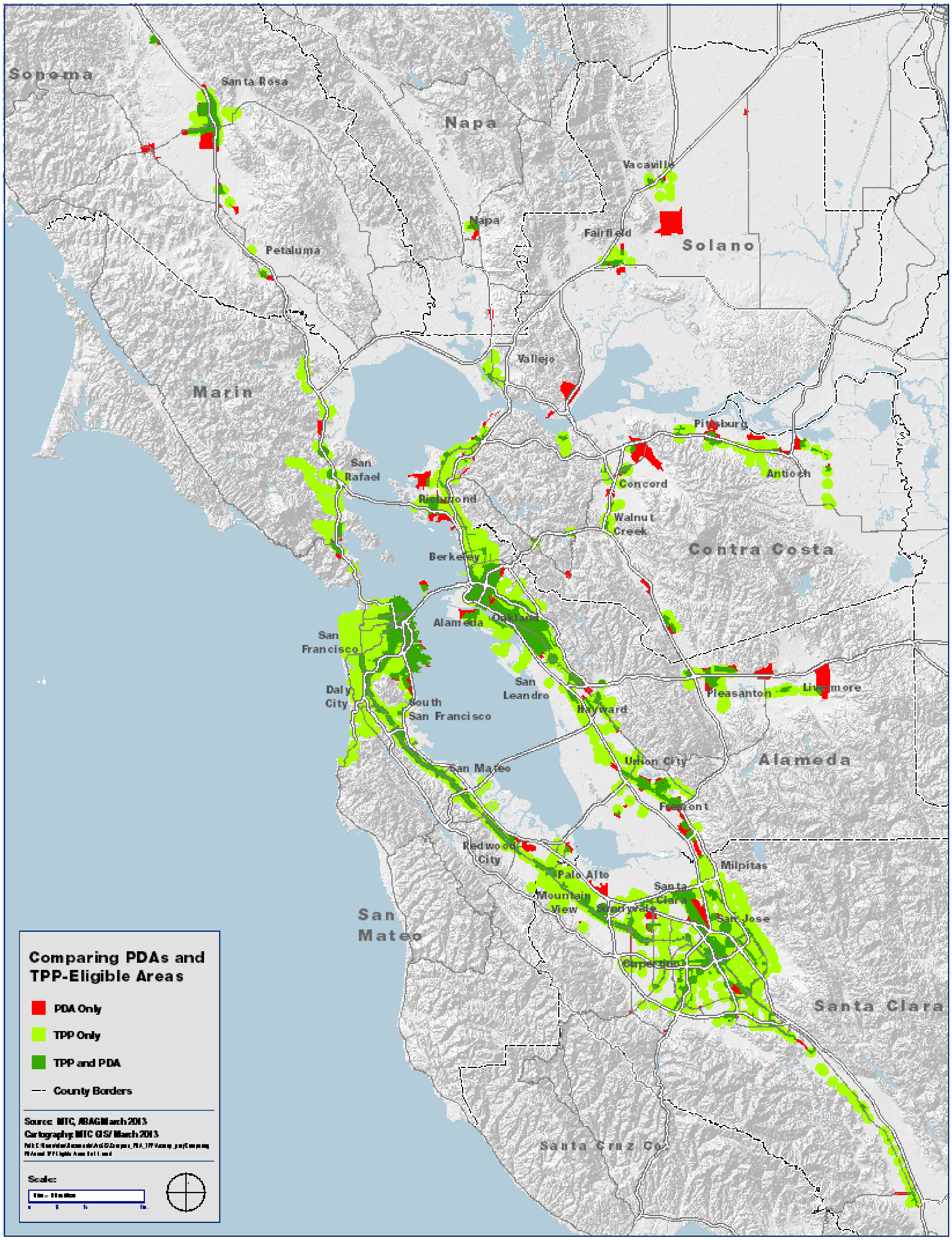
[8] More information on TPP areas can be found here: http://opr.ca.gov/docs/SB375-Intro-Charts.pdf.

Figure 2.2-2: Priority Development Areas and Transit Priority Projects Corridors



Under the proposed Plan land use scenario, it is anticipated that TPP corridors will absorb a majority of the approximately 700,000 new households and 1.1 million new jobs expected in the Bay Area by 2040. The majority of the housing growth and job growth is expected to occur around the Bay Area's core transit network (e.g., BART, Caltrain, etc.) in San Francisco, Alameda, San Mateo, and Santa Clara counties. With more limited transit access, the North Bay counties of Marin, Napa, Sonoma, and Solano are expected to take on a much smaller share of regional growth.

Using emissions data from BAAQMD, stationary and mobile emission sources were estimated through dispersion modeling for highways and rail lines. For the cities of San Francisco and San José, BAAQMD is assisting with the preparation of Community Risk Reduction Plans (CRRPs) to address TACs and $PM_{2.5}$. To identify the potential for adverse health effects to occur if sensitive receptors were located within TPPs, BAAQMD evaluated TPP corridors to identify areas that may be exposed to existing sources of TACs and $PM_{2.5}$ that would exceed impact significance Criterion 5. BAAQMD used its extensive stationary source database to estimate cancer risk and particulate matter concentrations around these stationary sources. The cancer risk and $PM_{2.5}$ concentrations for stationary sources were calculated using health effect values adopted by the Office of Environmental health Hazard Assessment (OEHHA); health protective assumptions relating to the extent of an individual's exposure (a 70-year exposure duration was used) including age sensitivity factors; and a conservative modeling procedure (using the EPA SCREEN 3 model) that established how TACs are dispersed in the atmosphere.[9] For a few of the stationary sources, BAAQMD staff had conducted a site-specific health risk assessment as part of a separate permit process. The cancer risk and $PM_{2.5}$ concentrations from these health risk assessments are also included in the database.

BAAQMD estimated cancer risk and $PM_{2.5}$ concentration data for mobile sources located in and within 1,000 feet of TPP areas. Mobile sources include freeways, roadways with over 30,000 annual average daily trips (AADT), and railroads. Mobile source TAC and $PM_{2.5}$ emissions from Bay Area highways were calculated through modeling using CALINE3, developed by the California Department of Transportation. The dispersion modeling applied EMFAC2011 emission factors from ARB and daily vehicle activity profiles by highway link provided by Caltrans and MTC. BAAQMD meteorological data were used for each County within the Bay Area. A similar analysis was conducted to estimate TAC and $PM_{2.5}$ emissions from the Bay Area's railroad network (further described below).

A geospatial analysis was conducted using GIS software to evaluate potential increased cancer risks and/or $PM_{2.5}$ concentrations due to TAC and/or $PM_{2.5}$ emissions from mobile and stationary sources in TPP areas. The geospatial analysis was executed using BAAQMD's estimated health risk data on stationary and mobile sources of TAC's and $PM_{2.5}$. The geospatial analysis identifies areas where the cumulative cancer risks and/or $PM_{2.5}$ concentrations exceed MTC's air quality significance thresholds using a spatial additive process. The spatial additive process involves three data sets: a regularized raster dataset[10] representing the spatial extent of the TPP areas, to which all pollution values associated with the

[9] Except for gas stations, where EPA's AERMOD atmospheric dispersion model was used instead.

[10] Raster data consists of a matrix of cells (or pixels) organized into rows and columns (a grid) where each cell contains a value representing information, such as temperature (or, in this case, health risk data). Source: Esri.com.

stationary and mobile sources are added; raster datasets representing the TAC and/or $PM_{2.5}$ plumes associated with each stationary sources that were decayed to a specified distance (discussed in greater detail in Appendix E); and raster datasets representing TAC emissions and/or $PM_{2.5}$ concentrations generated by mobile sources. Appendix E contains a more detailed description of the GIS model methodology.

The following subsections describe the emission sources included in the local pollutant analysis and how health risks from each source were estimated.

Highways

Highways include all freeways, highways, and state routes that run through a TPP corridor. Cancer risk and $PM_{2.5}$ concentrations were derived for highways using BAAQMD's Highway Screening Analysis Tool. The data in the tool is based on dispersion modeling conducted by BAAQMD for every highway in the Bay Area.

High Traffic Roadways

This source includes all roadways with over 30,000 vehicles per day that run through a TPP corridor. Cancer risk and $PM_{2.5}$ concentrations were estimated using BAAQMD's Roadway Screening Analysis Tool. BAAQMD developed county-specific roadway screening tables based on annual average daily vehicle trips on roadways.

Railroads

Railroad sources include all rail lines and rail stations in TPP corridors. BAAQMD prepared screening tables for Amtrak, Caltrain, SMART rail, ACE, and freight rail. The screening tables are based on dispersion modeling.

Ferry Terminals

Ferry Terminals include commuter ferry stations located in TPP corridors. BAAQMD prepared general screening data for ferry terminals by county.

Large Mobile Sources

This source includes ports, railyards, distribution centers, refineries, and chrome platters located within or in close proximity to TPP corridors. Appropriate distances from large sources identified in the impact assessment (**Table 2.2-11**) are based on BAAQMD emission data, health studies, and ARB recommendations.

Stationary Sources

Stationary sources include sources permitted by BAAQMD such as refineries, gas stations, back-up generators, auto body shops, etc. Cancer risk and $PM_{2.5}$ concentrations are estimated using BAAQMD's Stationary Source Screening Analysis Tool.

The TAC analysis also analyzed exposure to impacted communities within the entire region. Using MTC roadway modeling information, all freeway links within impacted communities were evaluated to determine if there will be a localized increase or decrease in TACs associated with the implementation of the proposed Plan. These levels were compared to a "no net increase" threshold.

Regional Pollutant Analysis of Toxic Air Contaminants and $PM_{2.5}$ in Disproportionally Impacted Communities

There are numerous locations within the Bay Area where concentrations of TACs and fine particulate matter ($PM_{2.5}$) are substantially higher than other areas. These areas tend to be along major transportation and goods movement corridors. These areas also often include communities that are more vulnerable to the effects of air pollution, due to age of residents (youth and seniors), higher rates of adverse health outcomes, or low household income. The effects of the proposed transportation projects and land use scenario are evaluated to determine if TAC and $PM_{2.5}$ emissions will increase or decrease in these disproportionally impacted communities compared to other communities. For the purpose of this analysis, disproportionally impacted communities were identified through BAAQMD's Community Air Risk Evaluation Program.

CARE Communities

BAAQMD's Community Air Risk Evaluation Program (CARE) was initiated in 2004 to identify areas with elevated concentrations of, and public exposure to, TACs. The CARE program is examining population exposure to elevated concentrations of $PM_{2.5}$ and other pollutants as additional criteria for identifying areas that are disproportionally impacted. The intent of the CARE program is to estimate the potential increased health risks associated with exposure to TACs and $PM_{2.5}$ from stationary and mobile sources, to identify the primary sources causing this disproportionate impact, and to develop risk reduction strategies to reduce public exposure and therefore public health risks.[11]

CARE communities are defined as areas that (1) are close to or within areas of high TAC and $PM_{2.5}$ emissions; (2) contain sensitive populations, defined as youth and seniors; and (3) where over 40 percent of the population has income levels below the federal poverty level. Six CARE communities have been identified to date: Concord, eastern San Francisco, western Alameda County, Redwood City/East Palo Alto, Richmond/San Pablo, and San José. In general, these communities are adjacent to major arterials, roadways, freeways and ports. The counties of Marin, Napa, Solano, and Sonoma are not evaluated in this impact discussion since they do not contain any CARE communities.

The six CARE communities overlap with most of the MTC's Communities of Concern (COC)—which are low income and minority communities defined by MTC as experiencing potential transportation accessibility disparities.[12] MTC's evaluation of the proposed Plan's transportation investments on COCs will be addressed in the Plan Bay Area Equity Analysis, prepared as a Supplemental Report and available at www.onebayarea.org. The analysis in this EIR focuses on potential impacts in CARE communities alone because these areas have been identified as those with the highest existing emissions of TACs and $PM_{2.5}$ and are currently disproportionately impacted when compared to other communities in the Bay Area.

Figure 2.2-3 below highlights the region's six CARE communities and demonstrates how the CARE communities overlap with the majority of MTC's COCs.

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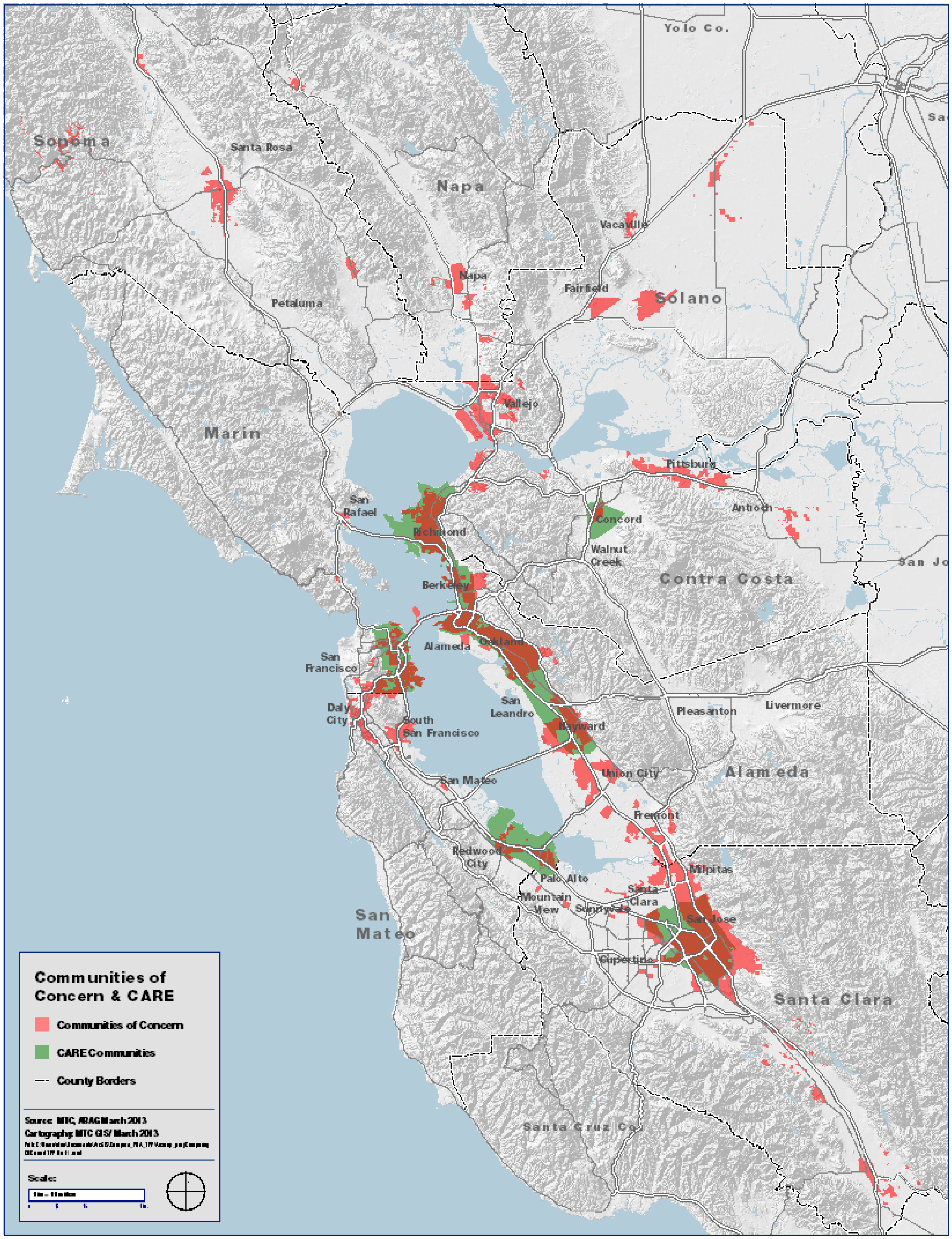
[11] http://baaqmd.gov/Divisions/Planning-and-Research/CARE-Program.aspx.

[12] More information on MTC's Communities of Concern is available here, http://www.mtc.ca.gov/planning/snapshot/

Figure 2.2-3: Communities of Concern and CARE



Motor Vehicle Emissions

Travel activity data for the roadway network in CARE communities and the Bay Area in general were derived from MTC's travel demand forecasting model. The model produced forecasts of travel behavior and vehicle activity for the proposed Plan's base year, 2010; the horizon year 2040 with Project; and the horizon year 2040 without the Project. The model provides outputs for VMT, along with daily vehicle trips and distribution of vehicle miles of travel by speed. This data is then imported into EMFAC2011, the motor vehicles emissions model developed and maintained by ARB to obtain emissions data.

In this analysis, MTC only included in its model runs roadway links that carry 10,000 or more vehicles per day with sensitive land uses (including residential, schools, and day cares) within 1,000 feet of the roadway's centerline. Roadway links without any sensitive land uses within 1000 feet of the roadway centerline were not included in the analysis. This approach was developed through MTC's Equity Analysis workgroup and is consistent with BAAQMD's methodology for evaluating TACs and $PM_{2.5}$ impacts. MTC then identified all the roadway links that run through identified CARE communities and non-CARE communities per the criteria listed above. TAC and $PM_{2.5}$ emissions were then estimated for CARE and non-CARE roadway links in each county. For example, the emission estimates for CARE communities in Contra Costa County reflect vehicle activity on the roadway links in the Concord and Richmond/San Pablo CARE communities.

SUMMARY OF IMPACTS

The combined impact of the land use and transportation changes anticipated from implementation of the proposed Plan would not conflict with or obstruct implementation of the applicable air quality plans. The overall impact of the proposed Plan due to construction of land-use and transportation projects would result in a direct but short-term impact as projects advance into construction at different times, over the horizon of the proposed Plan.

Compared to existing conditions, the impacts in 2040 with the proposed Plan show lower ROG, NOx (summertime and wintertime), CO, and $PM_{2.5}$ emissions, largely because of stringent controls for new vehicles, engines and fuels. However, due to growth in VMT and generation of road dust, emissions for PM_{10} are expected to increase under the proposed Plan compared to existing conditions.

The impacts for TACs (diesel PM, 1,3-butadiene, and benzene) show lower emissions in 2040 with the implementation of the proposed Plan, also as a result of stronger state regulations for vehicles and fuels. There would be a net increase in sensitive receptors located in TPP corridors (including PDAs located within TPPs) where TAC concentrations result in a cancer risk greater than 100/million or a $PM_{2.5}$ concentration greater than 0.8 $\mu g/m^3$; or within set distances to mobile and/or stationary sources of TAC or $PM_{2.5}$ emissions; however, in jurisdictions with an adopted CRRP, any proposed project that includes sensitive land uses and or receptors should be evaluated against the standards, thresholds and mitigation measures in those adopted plans and where a proposed project is consistent with an adopted CRRP, the impact would be less than significant.

Between CARE and non-CARE communities there are slight differences in the percent reductions in TACs and $PM_{2.5}$ expected in 2040 under the proposed Plan and 2010 existing conditions. When re-entrained road dust is included in total emissions, some CARE communities will experience an increase in emissions while non-CARE communities will experience either a smaller increase or a decrease in these emissions. This disproportionate effect in CARE communities would result in a potentially significant impact.

IMPACTS AND MITIGATION MEASURES

Impact

2.2-1(a) Implementation of the proposed Plan could conflict with or obstruct implementation of the primary goals of an applicable air quality plan.

The region's most recent ozone plan, the Bay Area 2010 Clean Air Plan (2010 CAP), prepared by BAAQMD, was developed in response to ozone planning requirement in the California Health and Safety Code. The 2010 CAP set forth a control strategy that includes control measures to reduce emissions and atmospheric concentrations of ozone and its precursors, $PM_{2.5}$, key toxic air contaminants, as well as the "Kyoto 6" greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulpher hexafluoride).[13]

The primary goals of the 2010 CAP are to improve Bay Area air quality and protect public health. The control strategy in the 2010 CAP recognizes the need to reduce motor vehicle travel and emissions by integrating transportation, land use, and air quality planning. Cleaner fuels and improved emission controls have substantially reduced emissions from mobile sources in recent decades. However, growth in motor vehicle use (as measured in VMT on both a per capita and an absolute basis) has offset some of the benefit of the improved emission controls. This increase in VMT has been caused or facilitated by dispersed development patterns that result in people being dependent on motor vehicles for all types of trips and activities, in addition to increases that are the result of population and job growth. Therefore, the 2010 CAP recognizes the need to encourage future population and job growth in areas that are well served by transit and where mixed-use communities provide jobs, housing, and retail in close proximity.

Key themes embedded in the 2010 CAP include:

- The need to reduce motor vehicle emissions by driving cleaner, driving smarter, and driving less;
- Reducing per capita VMT and promoting policies that enable families to choose reduce their motor vehicle ownership;
- Designing communities where people can walk, bike, or use transit on a convenient basis; and
- Ensuring that focused growth in priority areas is planned and designed so as to protect people from both existing sources and new sources of emissions.

Consistent with the 2010 CAP, the proposed Plan is based on the goals of reducing emissions of greenhouse gases from the transportation sector, reducing VMT on a per capita basis, and focusing growth in areas that are well-served by transit and existing infrastructure.

[13] The 2010 Clean Air Plan prepared by BAAQMD can be found here: http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Clean-Air-Plans.aspx

Both the land use patterns and the transportation investments defined in the proposed Plan support the primary goals of the Bay Area 2010 Clean Air Plan. The proposed Plan would therefore not conflict with or obstruct implementation of the primary goals of an applicable air quality plan and the impact is less than significant (LS). No mitigation measures are required.

Mitigation Measures

None required.

Impact

2.2-1(b) Implementation of the proposed Plan could conflict with or obstruct implementation of applicable control measures of an applicable air quality plan.

Numerous transportation projects included in the proposed Plan will help implement the applicable control measures listed in the 2010 CAP. **Table 2.2-6** provides a summary of the proposed Plan transportation investments that will help implement relevant control measures in the 2010 CAP. For purposes of evaluating consistency with the proposed Plan, the relevant 2010 CAP control measures include mobile source measures (MSMs) A-1 and A-2, the full set of 17 transportation control measures (TCMs), and local impact measure (LUM) #4.

TABLE 2.2-6: PROPOSED PLAN INVESTMENTS AND POLICIES THAT SUPPORT IMPLEMENTATION OF 2010 CAP CONTROL MEASURES

Relevant Control Measures in 2010 Clean Air Plan	*Supporting Policies and Investments in the proposed Plan **
MSM A-1: Promote Clean and Fuel-Efficient Vehicles: Promote the use of clean and fuel-efficient vehicles, and efficient driving habits and proper vehicle maintenance to reduce emissions.	The Climate Policy Initiatives in the proposed Plan (RTP ID # 230550) will include measures to promote efficient driving habits.
MSM A-2: Zero Emission Vehicles and Plug-In Hybrids: Acquire and deploy battery-electric and plug-in hybrid electric vehicles. Install and expand public charging infrastructure. Promote the use of public charging infrastructure.	As an element of the Climate Policy Initiatives (RTP ID # 230550), the proposed Plan will allocate approximately $170 million over ten years to promote electric vehicles, including consumer incentives, education, and installation of charging stations.
TCM A-1: Local and Area-Wide Bus Service Improvements: Sustain and improve bus service by funding existing service, implementing Bus Rapid Transit (BRT) in key corridors, and implementing transit priority measures to improve the speed of bus service.	The proposed Plan includes substantial funding for bus operators throughout the region, including funding to implement BRT in key corridors. Projects to fund bus service improvements include RTP ID #s 21017, 94526, 94527, 94558, 94572, 94610, 94636, 94666, 94683, 98207, 22455, 240526, 230161, 230164 and 240077.
TCM A-2: Local and Regional Rail Service Improvements: Sustain and expand rail service providing funding for rail cars and stations. Fund BART extensions, Caltrain electrification, new Transbay Terminal, Capitol Corridor, and SMART commuter rail in the North Bay.	The proposed Plan includes substantial funding for commuter rail operators throughout the region. This includes BART (RTP ID #s 21132, 94525, 240196, 21211, 240374 and 240375); Transbay Transit Center/Caltrain extension (RTP ID #s 21342 and 230290); Caltrain electrification and improvements (RTP ID #s 22481, 21627, 240019, 240031, 240048); SMART rail (RTP ID #s 22001 and 240736); Capitol Corridor (RTP ID # 22009); and ACE commuter rail (21790).
TCM B-1: Freeway and Arterial Operations Strategies: Implement freeway and arterial performance improvements, including the Freeway Performance Initiative, the Bay Area Freeway Service Patrol, and the Arterial Management Program.	The proposed Plan projects 230221, 230222, 230419, and 230597 will all help to implement TCM B-1 by improving traffic flow on freeways and key arterials.
TCM B-2: Transit Efficiency and Use Strategies: Improve transit efficiency and rider convenience through continued operation of 511 Transit, and full implementation of Clipper fare payment system and the Transit Hub Signage Program.	The proposed Plan includes funds to implement the regional Transit Performance Initiative (RTP ID # 240735), MTC's Transit Connectivity Plan (RTP ID # 230336), as well as projects in specific counties, such as Contra Costa (230196) and the San Francisco Transit Effectiveness Project (240171).
TCM B-3: Bay Area Express Lane Network: Implement the regional express lane network; provide express bus service in these corridors.	The proposed Plan includes funds to implement the regional express lane network via 25 specific projects, including 22002, 22042, 230088, 230656, and 230657.
TCM B-4: Goods Movement Improvements and	The proposed Plan projects that will help to

TABLE 2.2-6: PROPOSED PLAN INVESTMENTS AND POLICIES THAT SUPPORT IMPLEMENTATION OF 2010 CAP CONTROL MEASURES

Relevant Control Measures in 2010 Clean Air Plan	*Supporting Policies and Investments in the proposed Plan **
Emission Reductions Strategies: Reduce diesel emissions from trucks used in goods movement. Implement seven Proposition 1B Trade Corridors Improvement Fund projects identified in this measure.	implement TCM B-4 include Alameda County Goods Movement Program (RTP ID # 22082, 22760, and 240394); Martinez Rail Corridor improvements (240738); and relocation of Cordelia truck scales facility in Solano County (230322).
TCM C-1: Voluntary Employer Trip-Reduction Programs: Work with employers, transit agencies, and shuttle providers to promote ridesharing, transit, cycling and walking for work trips. Consider adopting a commute benefits ordinance to reduce out-of-pocket transit costs to employees.	The proposed Plan Climate Policy Initiatives (see RTP ID # 230550), including vanpool incentives, will support implementation of TCM C-1. The proposed Plan policy initiatives also include adoption and implementation of a regional commute benefits ordinance, a key element of TCM-1.
TCM C-2: Safe Routes to Schools and Safe Routes to Transit Programs: Implement Safe Routes to Schools (SR2S) programs and other measures to promote safe access for pedestrians and cyclists to schools and transit.	The proposed Plan includes $30 million to implement Safe Routes to Transit (RTP ID # 22245). Additional projects that will help to implement TCM C-2 include Alameda County Transportation Demand Management Program (240393), and Safe Routes to Schools programs in Napa County (22417), San Mateo County (240084), and Sonoma County (240561).
TCM C-3: Ridesharing Services and Incentives: Encourage ridesharing and promote and expand car-sharing services.	The proposed Plan includes $5 million to expand City Carshare (RTP ID #22244). The proposed Plan also earmarks $6 million for vanpool incentives as part of the Climate Policy Initiatives.
TCM C-4: Conduct Public Education and Outreach: Implement the Spare the Air program and related elements in the regional Transportation Climate Action Campaign.	The proposed Plan includes approximately $700 million to implement various Climate Policy Initiatives (RTP ID #230550), including public outreach and education.
TCM C-5: Promote "Smart Driving": Promote smart driving, compliance with posted speed limits, and related efforts to reduce greenhouse gas emissions from the transportation sector.	The proposed Plan includes approximately $700 million to implement various Climate Policy Initiatives (RTP ID #230550), including a public education campaign, a tire pressure cap rebate program, and a fuel economy meter rebate program.
TCM D-1: Bicycle Access and Facilities Improvements: Provide a comprehensive network of bicycle lanes, routes, and pathways, as well as continued and routine maintenance on existing bicycle facilities. Implement "complete streets" policies to ensure that cyclists and pedestrians are safely accommodated on all streets and roads. Maintain and expand facilities to accommodate bicycles on rail transit, buses and ferries. Consider implementing bicycle-sharing programs.	The proposed Plan will provide funding to implement bicycle projects throughout the region, including: Alameda County: 24003, 240206, 240227, Contra Costa County: 240381, 21225, 230542, 240459, 240637 Marin County: 240678 Napa County: 230527, 240612 San Francisco: 240488, 240533, 240551 San Mateo County: 230430, 240590 Santa Clara County: 240509 Solano County: 98212, 2405566, 240558

TABLE 2.2-6: PROPOSED PLAN INVESTMENTS AND POLICIES THAT SUPPORT IMPLEMENTATION OF 2010 CAP CONTROL MEASURES

Relevant Control Measures in 2010 Clean Air Plan	*Supporting Policies and Investments in the proposed Plan **
	Sonoma County: 240651
TCM D-2: Pedestrian Access and Facilities Improvements: Provide a comprehensive network of facilities, including sidewalks, pathways and provide for pedestrian access in their development plans. Implement “complete streets” policies to ensure that cyclists and pedestrians are safely accommodated on all streets and roads. Adopt land use policies that support more compact, infill development to make neighborhoods more walkable.	The proposed Plan projects to improve pedestrian facilities include the City of Berkeley Pedestrian Master Plan (240197), the Napa County Safe Routes to Schools program (22417), and projects to implement bike and ped improvements in San Mateo County (230430). (Also see pedestrian improvements in Santa Clara, Solano and Sonoma counties described for TCM D-1 above.)
TCM D-3: Local Land-Use Strategies: Update general plans and area plans to promote infill development and support land use that allows residents and employees to walk, bicycle, and use transit, instead of relying on private automobiles. Create mixed-use transit-oriented developments in proximity to transit stations and key bus routes.	Many of the policies and investments in the proposed Plan, such as the One Bay Area Grant (OBAG) program, are directed toward implementation of the land-use strategies described in TCM D-3. Examples of local projects include projects # 21624 (incentive program to support transit-oriented development) and # 240086 (Transportation for Livable Communities program) in San Mateo county.
TCM E-1: Value-Pricing Strategies: Implement value pricing policies and programs such as time-of-day pricing on trans-bay bridges and cordon pricing recommendations from San Francisco County’s Mobility, Access, and Pricing Study.	The proposed Plan includes funding to implement the San Francisco congestion pricing program, including Treasure Island pricing program and cordon pricing (240728).
TCM E-2: Promote Parking Policies to Reduce Motor Vehicle Travel: Implement parking policies to reduce motor vehicle travel, such as limiting the supply of off-street parking in areas well served by transit, eliminating or reducing minimum parking requirements, unbundling the price of parking spaces from rents, and implementing performance-based pricing for curb parking in high-use areas.	Policy Action 4.2 (see Table __ above) calls for revising parking policies to support infill development. PDA earmarks funding to expand San Francisco’s innovative *SFpark* program (RTP ID # 240334 and 240476).
TCM E-3: Implement Transportation Pricing Reform: Develop and implement policies to ensure that user costs to own and operate motor vehicles reflect the full environmental and social costs related to vehicle use.	The proposed Plan includes funding to implement the San Francisco congestion pricing program, including Treasure Island pricing program and cordon pricing (240728) and programs that MTC has underway, including bridge tolls and express lane network.
LUM 4: Land Use Guidance: Provide tools and resources to local agencies to help them develop policies and plans to improve air quality, reduce motor vehicle travel, and reduce population exposure to air pollutants.	PDA Policy Action # 1.6 calls for regional agencies to provide tools to help local jurisdictions develop and implement plans to focus new growth in priority development areas.

TABLE 2.2-6: PROPOSED PLAN INVESTMENTS AND POLICIES THAT SUPPORT IMPLEMENTATION OF 2010 CAP CONTROL MEASURES

Relevant Control Measures in 2010 Clean Air Plan	*Supporting Policies and Investments in the proposed Plan **

Note:

* The proposed Plan investments shown in Table 2.2-6 are intended to demonstrate how the proposed Plan will help to implement the 2010 CAP. There may be additional proposed Plan investments not shown in Table 2.2-6 that also help to implement the 2010 CAP control measures.

Both the policies and the transportation investments defined in the proposed Plan are consistent with the relevant control measures in the 2010 CAP and the impact is less than significant (LS). No mitigation measures are required.

Mitigation Measures

None required.

Impact

2.2-1(c) Implementation of the proposed Plan could conflict with or obstruct implementation of any control measures in an applicable air quality plan.

As a whole, the proposed Plan investments described in **Table 2.2-6** support the goals of the 2010 CAP and will help implement key control measures in the 2010 CAP. However, it is possible that certain proposed Plan investments could increase VMT and/or emissions of air pollutants and GHGs, including projects that increase highway capacity, such as expansion of express lanes in the region. The expanded regional ferry network was changed from a TCM to a further study measure (FSM) in the 2010 CAP due to uncertainty as to whether expanded ferry service will actually achieve a net reduction in emissions of air pollutants and GHGs. These issues should be addressed in the project-level CEQA analyses prepared for these projects.

A key theme in the 2010 CAP is the need to ensure that the region plans for focused growth in PDAs in a way that protects people from both existing sources and new sources of emissions.[14] Protecting Bay Area residents who live and/or work in areas identified for future development in the proposed Plan will require a combination of good land use planning and project design to identify and avoid potential impacts to public health, in addition to appropriate measures to mitigate any potentially significant impacts that are identified.

Issues related to potential localized air quality impacts from specific projects will be addressed in the sections below which analyze potential impacts in terms of short-term construction emissions, cumulative increase of criteria pollution from on-road mobile sources, and avoiding exposure of sensitive receptors to substantial concentrations TACs and $PM_{2.5}$.

[14] See discussion on pages 4-21 to 4-23 in Volume I of the 2010 Clean Air Plan, as well as the description of LUM 4 in Volume II of the 2010 Clean Air Plan

Based on the assessment of each measure of consistency, the combined impact of the land use and transportation changes anticipated from implementation of the proposed Plan would not conflict with or obstruct implementation of the applicable air quality plan. As discussed above, proposed Plan investments could be inconsistent with the 2010 CAP goals of reducing VMT. However, subsequent project level review of those investments should ensure any potential impacts are identified and mitigated. Therefore, the impact on the implementation of other applicable air quality plans would be less than significant (LS). No mitigation measures are required.

Mitigation Measures

None required.

Impact

2.2-2 Implementation of the proposed Plan could result in a substantial net increase in construction-related emissions.

The U.S. EPA and the ARB have adopted rules and regulations establishing criteria pollutant and hazardous emissions limits for diesel powered on-road vehicles and off-road equipment. The current EPA and ARB rules and emission standards are in the process of being implemented and are therefore reasonably foreseeable. They will continue to be phased in over the next 10 years and are expected to reduce diesel PM emissions by 90 percent or more when compared to vehicles and equipment built prior to 2004. EPA and ARB on-road and off-road regulations target the primary sources of emissions at construction sites. These include on-road heavy duty trucks, and cranes and off-road aerial lifts, backhoes, crawler tractors, excavators, forklifts, graders, loaders, mowers, rollers, scrapers, skid steer loaders, tractors, trenchers, two engine vehicles and workover rigs. In addition, ARB's cleaner fuel standards will reduce emissions from all internal combustion engines and their stationary and portable equipment regulations will reduce emissions from the smaller equipment used at construction sites, such as portable generators and tub grinders.

The most effective way to ensure that construction projects do not adversely impact local and regional air quality and therefore public health is to minimize the amount of criteria and TACs associated with each individual projects' construction activity. The EPA and ARB have adopted stringent air emission regulations for new and existing fleets of construction equipment that is common to all construction sites. However, these regulations alone cannot assure that all projects consistent with the proposed Plan will use only the lowest emission construction equipment due primarily to the fleet averaging component of the regulations compliance requirements. Therefore, construction impacts are considered potentially significant (PS). Mitigation measure 2.2(a) is described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.2(a) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to best management practices (BMPs), such as the following:[15]

Construction Best Practices for Exhaust

- The applicant/general contractor for the project shall submit a list of all off-road equipment greater than 25 hp that will be operating for more than 20 hours over the entire duration of the construction activities at the site, including equipment from subcontractors, to BAAQMD for review and certification. The list shall include all of the information necessary to ensure the equipment meets the following requirement:
  - All off-road equipment shall have: 1) engines that meet or exceed either USEPA or ARB Tier 2 off-road emission standards; and 2) engines are retrofitted with an ARB Level 3 Verified Diesel Emissions Control Strategy (VDECS), if one is available for the equipment being used.[16]
- Idling time of diesel powered construction equipment and trucks shall be limited to no more than two minutes. Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with the manufacturers' specifications.
- Portable diesel generators shall be prohibited. Grid power electricity should be used to provide power at construction sites; or propane and natural gas generators may be used when grid power electricity is not feasible.

Construction Best Practices for Dust

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. For projects over five acres of size, soil moisture should be maintained at 12 percent. Moisture content can be verified by lab samples or moisture probe.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping should be done in conjunction with thorough watering of the subject roads.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadway, driveway, and sidewalk paving shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading.

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[15] Adapted from BAAQMD, CEQA Air Quality Guidelines (May 2011).

[16] Equipment with engines meeting Tier 4 Interim or Tier 4 Final emission standards automatically meet this requirement, therefore a VDECS would not be required.

- All construction sites shall provide a posted sign visible to the public with the telephone number and person to contact at the Lead Agency regarding dust complaints. The recommended response time for corrective action shall be within 48 hours. BAAQMD's Complaint Line (1-800 334-6367) shall also be included on posted signs to ensure compliance with applicable regulations.
- All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
- Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.
- Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
- All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
- Site accesses to a distance of 100 feet from the paved road shall be treated with a six- to 12-inch compacted layer of wood chips, mulch, or gravel.
- Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than 1 percent.

Significance after Mitigation

The measures described above are intended to keep dust from becoming airborne and to keep diesel PM emissions as low as possible through the use of readily available, lower-emitting diesel equipment, and/or equipment using alternative cleaner fuels, such as propane, natural gas, and electricity, as well as on-road trucks using diesel PM filters.

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.2-3(a) Implementation of the proposed Plan could cause a net increase in emissions of criteria pollutants ROG, NO_x, CO, and $PM_{2.5}$ from on-road mobile sources compared to existing conditions.

As shown in **Table 2.2-7**, the emissions for criteria pollutants ROG, NO_x (summertime and wintertime), CO, and $PM_{2.5}$ from mobile sources would decrease between 2010 and the 2040 horizon for the proposed Plan (emissions of PM_{10} would increase and are described under Impact 2.2-3b). When compared to existing conditions (2010), the proposed Plan reduces ROG emissions by 61 percent, summertime NO_x emissions by 70 percent, wintertime NO_x emissions by 71 percent, CO emissions by 70 percent, and $PM_{2.5}$ emissions by five percent. A major reason for these reductions is the increasingly stringent emission controls ARB has adopted for new vehicle engines and fuels over the past few decades. This includes the Truck and Bus Regulation which requires diesel trucks and buses to be upgraded to reduce emissions. As of January 1, 2012, heavier trucks must be retrofitted with PM filters; older trucks must be replaced starting January 1, 2015, and nearly all trucks and buses will need to have 2010 model year engines or equivalent by January 1, 2023. Other contributors include emission-control devices, the Enhanced Smog Check Program, and fleet turnover wherein older polluting cars are retired and replaced with newer and substantially less polluting cars. Additionally, the land use pattern in the proposed Plan includes concentrating future growth at higher densities around existing and proposed transit investments, which would reduce driving and motor vehicle emissions. Therefore, there is no adverse impact (NI).

TABLE 2.2-7: EMISSION ESTIMATES FOR CRITERIA POLLUTANTS USING EMFAC2011 EMISSION RATES (TONS PER DAY)

	2010	*2040 Plan*	*Change 2010 to 2040 Plan*	
			Numerical	*Percent*
ROG	93.7	36.5	-57.1	-61%
NOx (Summertime)	164.3	48.5	-115.8	-70%
NOx (Wintertime)	185.3	53.7	-131.5	-71%
CO	879.9	266.5	-613.4	-70%
$PM_{2.5}$	10.4	9.9	-0.5	-5%

Source: Metropolitan Transportation Commission, 2012.

Mitigation Measures

None required.

Impact

2.2-3(b) Implementation of the proposed Plan could cause a net increase in emissions of PM_{10} from on-road mobile sources compared to existing conditions.

As shown in **Table 2.2-8**, PM_{10} emissions from mobile sources would increase by 12 percent during the proposed Plan's timeframe compared to existing conditions. The higher levels of PM_{10} emissions in 2040 conditions are due to the fact that these emissions are strongly influenced by the 20 percent growth in VMT (which directly affects entrained roadway dust), with some contributions from tire and brake wear and exhaust. The reason particulate matter emissions from mobile sources are not expected to increase at the same rate as VMT (20 percent) is the stringent emission control ARB has adopted for new vehicle engines, particularly diesel engines, including the Truck and Bus Regulation. Note that daily VMT and daily VHD are increasing when comparing the proposed Plan to existing conditions, but to a large degree, these increases are offset by the regulatory and fleet improvements. PM control programs implemented by local Air Districts also contribute to the emission reductions relative to VMT.

In addition to the Truck and Bus Regulation, there are already ongoing State and regional efforts to mitigate the effects of particulate matter emissions. For instance, the ARB adopted a Diesel Risk Reduction Plan (DRRP) in October 2000, and as a part of that, has since adopted a series of regulations to require cleaner diesel fuel, to restrict idling of diesel engines, and to reduce emissions from both old and new on-road and off-road diesel engines. In 2005, MTC implemented a $14 million program to retrofit 1,700 diesel bus engines operated by Bay Area transit agencies to reduce particulate matter emissions, and in 2006, MTC and BAAQMD implemented a $2 million incentive program to reduce emissions from solid waste collection vehicle fleets that operate within BAAQMD. Furthermore, BAAQMD implements a variety of incentive programs that help fleet operators offset the cost of purchasing low-emission vehicles, re-powering old polluting heavy duty engines with cleaner, lower-emission engines, and installing control devices that reduce particulate and NO_x. Nonetheless, this increase in PM_{10} emissions overall represents a potentially significant (PS) impact. Mitigation measures 2.2(b) and 2.2 (c) are described below.

TABLE 2.2-8: EMISSION ESTIMATES FOR CRITERIA POLLUTANTS USING EMFAC2011 EMISSION RATES (TONS PER DAY)

	2010	*2040 Plan*	*Change 2010 to 2040 Plan*	
			Numerical	*Percent*
PM_{10}	36.4	41.0	4.5	12%

Source: Metropolitan Transportation Commission, 2012.

Mitigation Measures

2.2(b) MTC and ABAG, in partnership with BAAQMD, and other partners who would like to participate, shall work to leverage existing air quality and transportation funds and seek additional funds to continue to implement BAAQMD and ARB programs aimed at retrofits and replacements of trucks and locomotives.

2.2(c) MTC and ABAG, in partnership with BAAQMD and the Port of Oakland, and other partners who would like to participate, shall work together to secure incentive funding that may be available through the Carl Moyer Memorial Air Quality Standards Attainment Program to reduce port-related emissions.

Mitigation Measures 2.1 (a), 2.1(b), and 2.1 (c) (included in *Chapter 2.1: Transportation*) as well as 2.2 (d) and 2.2 (e) (included below under Impacts 2.2-5(b) and 2.2-6) could help reduce the increase in PM_{10}.

Significance after Mitigation

The increase in PM_{10} represents a significant impact compared to existing conditions. The mitigation measures identified above are anticipated to reduce this potentially significant impact. However, the exact reductions are not known at this time. Therefore, the impact is determined to remain significant and unavoidable (SU).

Impact

2.2-4 Implementation of the proposed Plan could cause a cumulative net increase in emissions of diesel PM, 1,3-butadiene, and benzene (toxic air contaminants) from on-road mobile sources compared to existing conditions.

As shown in **Table 2.2-9**, there would be a 71 percent decrease in diesel PM, a 70 percent decrease in 1,3-butadiene, and a 70 percent decrease in benzene compared to existing conditions. These reductions can be attributed to California's state laws to evaluate and control TACs, namely AB 1807 that created the Toxic Air Contaminant Identification and Control Act, SB 2588 that established the Air Toxics "HOT Spots" Information and Assessment Act, and SB 656 that requires ARB and local Air Districts to identify control measures for PM. Other state regulations that reduce smog or other pollutants also reduce TACs, such as the standards for low emission vehicles, clean fuels, reformulated gasoline, diesel fuel specifications, and ARB's Heavy Duty Diesel Inspection Programs. In addition, there are a number of regional programs in place to address PM in general and TACs in particular, including the ARB, BAAQMD, and Port of Oakland's Bay Area Goods Movement Program that provides financial incentives to owners of equipment used in freight movement to upgrade to cleaner technologies, and numerous Port of Oakland Clean Air Programs such as the Maritime Air Quality Improvement Plan, Comprehensive Truck Management Plan, Truck Air Quality Project, Vision 2000 Program and Air Emissions, and West Oakland Particulate Air Quality Monitoring Program. Overall, the reduction in TAC emissions and ongoing regulations and programs would ensure there would be no adverse impact (NI).

TABLE 2.2-9: EMISSION ESTIMATES FOR TOXIC AIR CONTAMINANTS POLLUTANTS (KILOGRAMS PER DAY)

	2010	*2040 Plan*	*Change 2010 to 2040 Plan*	
			Numerical	*Percent*
Diesel PM	2,599.6	755.9	-1,843.8	-71%
1,3-Butadiene	162.4	48.2	-114.1	-70%
Benzene	731.2	219.3	-511.9	-70%

Source: Metropolitan Transportation Commission, 2012.

Mitigation Measures

None required. However, see also mitigation measures for Impact 2.2-3(b) above, which have co-benefits for addressing TAC emissions.

Local Impact

2.2-5(a) Implementation of the proposed Plan could cause a localized net increase in sensitive receptors located in Transit Priority Project (TPP) corridors where TACs or fine particulate matter ($PM_{2.5}$) concentrations result in a cancer risk greater than 100/million or a concentration of $PM_{2.5}$ greater than 0.8 µg/m^3.

The local pollutant analysis quantified and mapped the anticipated increased risk and $PM_{2.5}$ concentrations within TPPs throughout the Bay Area based on existing conditions. Any areas identified as having an increased cancer risk greater than 100 in a million or $PM_{2.5}$ concentration greater than 0.8

$\mu g/m^3$ would result in a potentially significant and unavoidable impact. TAC and $PM_{2.5}$ sources that were evaluated in this analysis include freeways, high volume roadways, ports, rail yards, refineries, chrome plating facilities; dry cleaners using perchloroethylene, gas stations and numerous other Air District permitted stationary sources. The emission sources and GIS spatial analysis that makes up the local pollutant analysis is described in more detail below.

Note that, for future projects not within one of these mapped areas, the significance of impacts is considered in the analyses presented under impacts 2.2-5(b) and 2.2-5(c) below.

Stationary Source Data

Using air pollutant emissions data from 2012 stationary source permits, BAAQMD developed a stationary source screening tool that contains cancer risk and $PM_{2.5}$ concentration data for all stationary sources in the Bay Area, available on BAAQMD's website.[17] The stationary source screening tool provides estimated cancer risk and $PM_{2.5}$ concentrations for stationary sources based on conservative modeling parameters, including worst case assumptions for meteorology. The estimated cancer risk and $PM_{2.5}$ concentration are considered "worst case" potential impacts since consideration of source specific conditions, such as exhaust stack heights, exhaust flow rates, and more site specific meteorology would result in lower estimates of cancer risk and $PM_{2.5}$ concentrations.

Where data were available, cancer risk and $PM_{2.5}$ concentrations were adjusted to reflect decreasing values based on distance from a source. For example, BAAQMD developed distance multiplier tools for gas stations and diesel back-up generators (also known as emergency or standby generators). These multiplier tools, available on BAAQMD's website, provide dispersion values to estimate the reductions in cancer risk and $PM_{2.5}$ concentrations expected further away from the source of emissions.[18] For other sources besides gas station and generators, where BAAQMD could not identify dispersion values, the cancer risk and $PM_{2.5}$ concentrations for each source were assumed to be the same at the source and up to 1,000 feet from the source.

BAAQMD's stationary source data also includes the effects of the ARB's air toxics control measure (ATCM) for dry cleaners using perchloroethylene (PERC). The ATCM regulation requires that dry cleaners using PERC be phased out by January 2023. The cancer risk estimates in the stationary source screening tool are based on a 70 year exposure rate, the health risk exposure standard used by OEHHA. The cancer risks for dry cleaners used in the GIS model were adjusted to be based on a 13-year exposure, from the years 2010 to 2035, to reflect the phasing out of PERC.

Large sources, such as refineries, ports, and land use sources without available emissions data, such as truck distribution centers, are addressed below under Impact 2.2-5(b).

Mobile Source Data

For freeways, BAAQMD conducted dispersion modeling, using vehicle activity data for 2009 and vehicle fleet emissions data for 2014, to estimate cancer risk and $PM_{2.5}$ concentrations for every freeway link in

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[17] http://baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx

[18] http://baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx.

the Bay Area. The 2009 activity data was the most recent available from Caltrans at the time of the BAAQMD modeling in 2012. The 2014 vehicle fleet emissions data reflects the best available emissions data available from ARB's EMFAC2011 model. Known as the highway screening tool, it considers average annual daily traffic (AADT) counts, fleet mix and profiles, ARB emission factors using EMFAC 2011, vehicle speeds from MTC's travel demand model, and other modeling parameters per freeway link. The screening tool captures anticipated diesel PM emission reductions from ARB's on-road heavy duty diesel vehicle regulations, specifically the On-Road Heavy Duty Diesel Vehicles Regulation targeting trucks and buses. The tool provides estimated cancer risk and $PM_{2.5}$ concentration data measured from the edge of the freeway for distances from 10 to 1,000 feet on either side of the freeway, demonstrating how health risks lessen with distance from the freeway.[19]

For roadways with over 30,000 AADT, BAAQMD conducted dispersion modeling to develop a roadway screening tool. The tool, available on BAAQMD's website, is organized as county specific tables based on: a roadways AADT count, percent of heavy duty trucks and truck profiles, distance from roadway (10 to 1000 feet), north/south or east/west direction from roadway, ARB emission factors (EMFAC 2007 was best available data at time of modeling), and county-specific meteorological data from Air District monitoring stations. The roadway tool also reflects anticipated diesel PM emission reductions from ARB's On-Road Heavy Duty Diesel Vehicles Regulation.

BAAQMD estimated cancer risk and $PM_{2.5}$ concentrations for railroads and rail stations. Rail emissions were estimated along existing passenger and freight lines as well as proposed future lines in Marin County (i.e., SMART line) and eBART along Highway 4 in Contra Costa County. Emissions along freight corridors were estimated based on fuel consumption and passenger rail emissions were estimated based on the rail activity, idling times at stations, and speeds of individual trains. Passenger and freight (including switchers) emissions that run on parallel or shared tracks were aggregated to estimate total emissions along rail corridors. Site-specific meteorological conditions for each rail link were used. Estimates of cancer risk and $PM_{2.5}$ concentrations at various distances from the edge of the rail lines were provided in the GIS layer for railroad emissions.

Local Pollutant Impact Conclusion

The GIS spatial analysis model was used to compile and process all the stationary and mobile source cancer risk and $PM_{2.5}$ concentration data described above to identify areas in and within 1,000 feet of the TPP areas where an increased cancer risk is greater than 100 in a million and/or $PM_{2.5}$ concentrations exceed 0.8 $\mu g/m^3$. **Figures 2.2-4** through **2.2-21** below display the results of the GIS spatial analysis by county. In general, the figures show that areas over the threshold tend to occur along high traffic freeways, high use rail lines, locations with numerous stationary sources, and locations where a single stationary source has very high estimated cancer risk or $PM_{2.5}$ concentration levels.

TPP areas with cancer risk and $PM_{2.5}$ concentrations estimated to be below the thresholds; and that are not within the set distances (described in Impact 2.2-5(b) below); and are compliant with an adopted Community Risk Reduction Plan (described in Impact 2.2-5(c) below) are considered to have a less than

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[19] The screening tool provides modeled health risks at 6 feet and 20 feet heights. The 20 feet heights are meant for project level analysis where residents may only be located on the second floor and above. The GIS model applies the modeled health risks at 6 feet, which is the worst case scenario.

significant impact to locating new sensitive receptors within these areas of TPPs and do not present a significant public health risk from localized TAC and $PM_{2.5}$ emissions.

TPP areas with an increased cancer risk and/or $PM_{2.5}$ concentration over the thresholds do present a potential public health impact and are considered to have potentially significant impacts for locating new sensitive receptors. Any future land use proposals for these areas that include sensitive receptors should evaluate potential TAC and $PM_{2.5}$ impacts during project level environmental review.[20] It is anticipated that future project level environmental review will in most cases result in less conservative and therefore lower estimates of cancer risk and $PM_{2.5}$ concentrations from existing sources. This would be due primarily to the use of more site specific TAC and $PM_{2.5}$ emissions and meteorology data. In some cases, estimated increased cancer risks or $PM_{2.5}$ concentrations may be found to be less than the preliminary estimates provided here.

The results of the GIS spatial analysis are based on increased cancer risk and $PM_{2.5}$ data for existing stationary and mobile sources in and within 1,000 feet of TPP areas. Proposed projects that include a new source of TAC and/or $PM_{2.5}$ or are located within a source that was not included in this analysis should conduct project specific environmental review to assess their potential increased cancer risk and $PM_{2.5}$ concentrations. Any new stationary sources of emissions subject to a BAAQMD permit will be required to analyze TAC and $PM_{2.5}$ emissions which will ensure that they do not adversely impact existing or new sensitive receptors above MTC thresholds. Projects locating sensitive receptors in areas mapped above the significance thresholds would result in potentially significant (PS) impacts.

Mitigation Measures

Implement Mitigation Measure 2.2(d) under Impact 2.2-5(b) below.

Significance after Mitigation

Implementation of Mitigation Measure 2.2(d) would reduce the severity of the impacts identified for projects that would locate sensitive receptors in TPP areas where the increased cancer risk is greater than 100 in a million or $PM_{2.5}$ concentrations are greater than 0.8 $\mu g/m^3$. However, the mitigation measure may not be sufficient to reduce all impacts to less than significant in all areas above the thresholds. Additional site specific analysis would be needed when a project is proposed in these areas to determine the actual level of impact and if feasible mitigation measures exist for the project to implement to get them below the thresholds.

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions

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[20] Lead agencies for proposed projects should contact BAAQMD if they are unsure whether their project site falls in an impacted area or not.

preclude the reduction of all project impacts to less than significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Figure 2.2-4

San Francisco Bay Area Local Pollutant Analysis

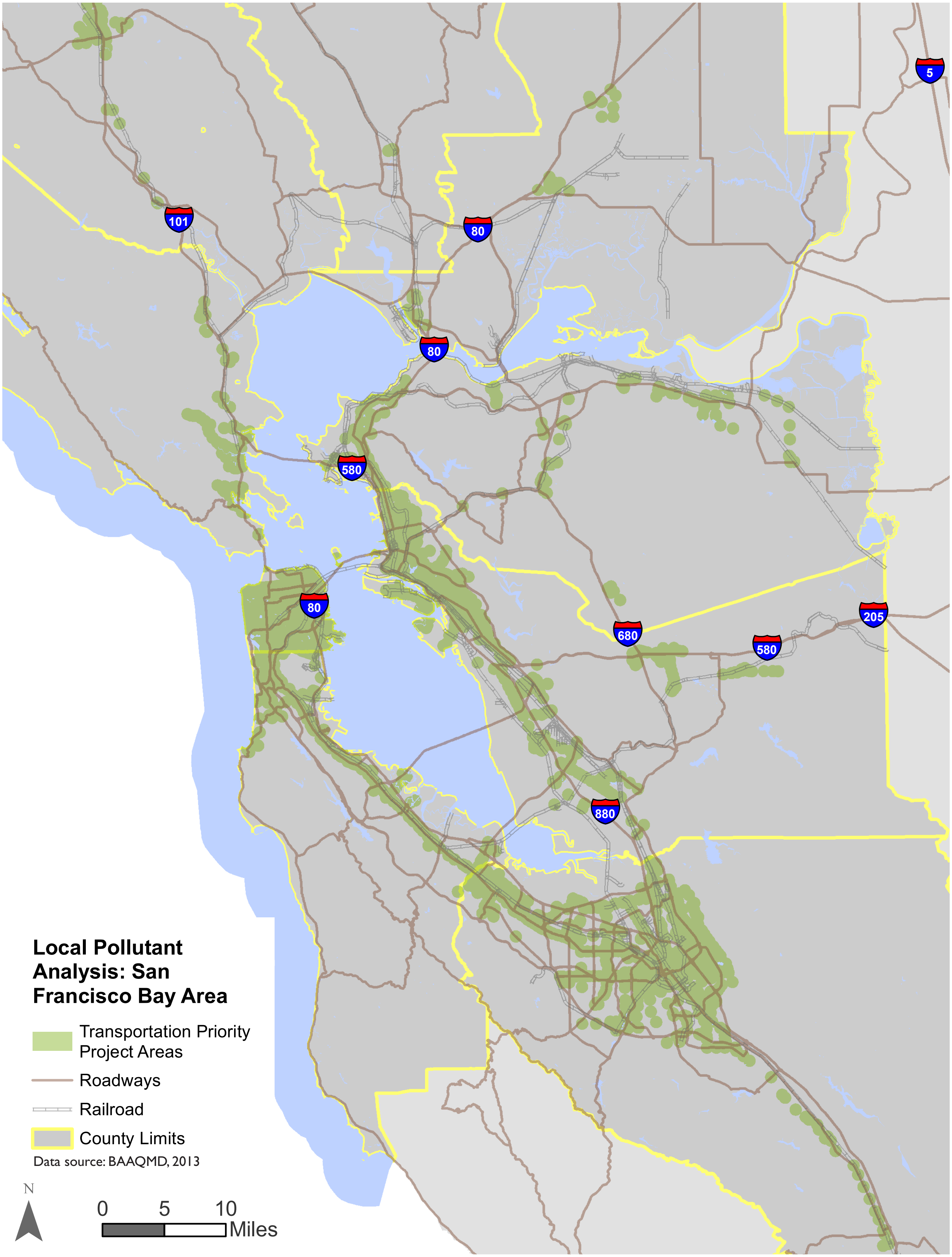

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Figure 2.2-5

Northern Alameda County Local Pollutant Analysis

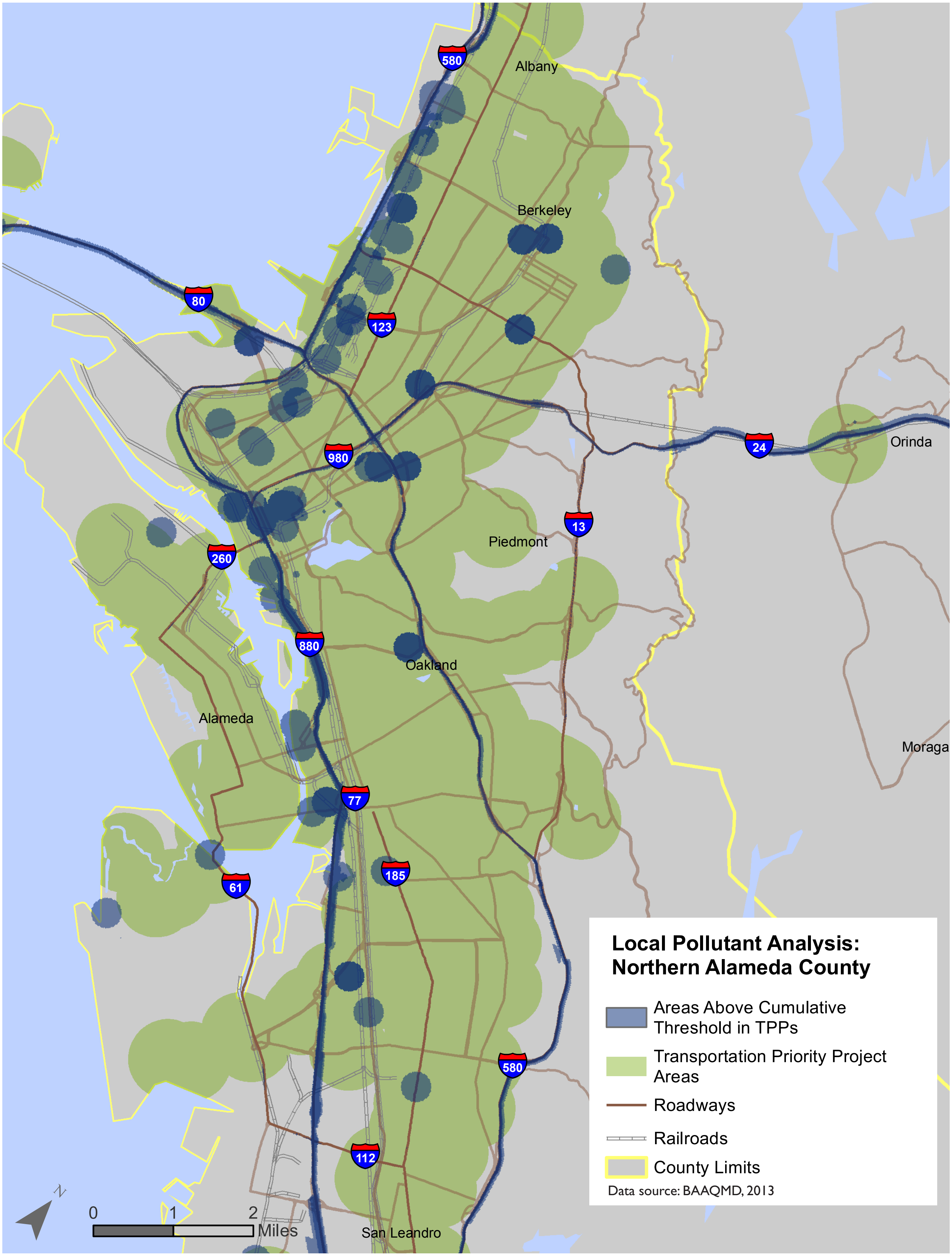

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Figure 2.2-6

Eastern Alameda County

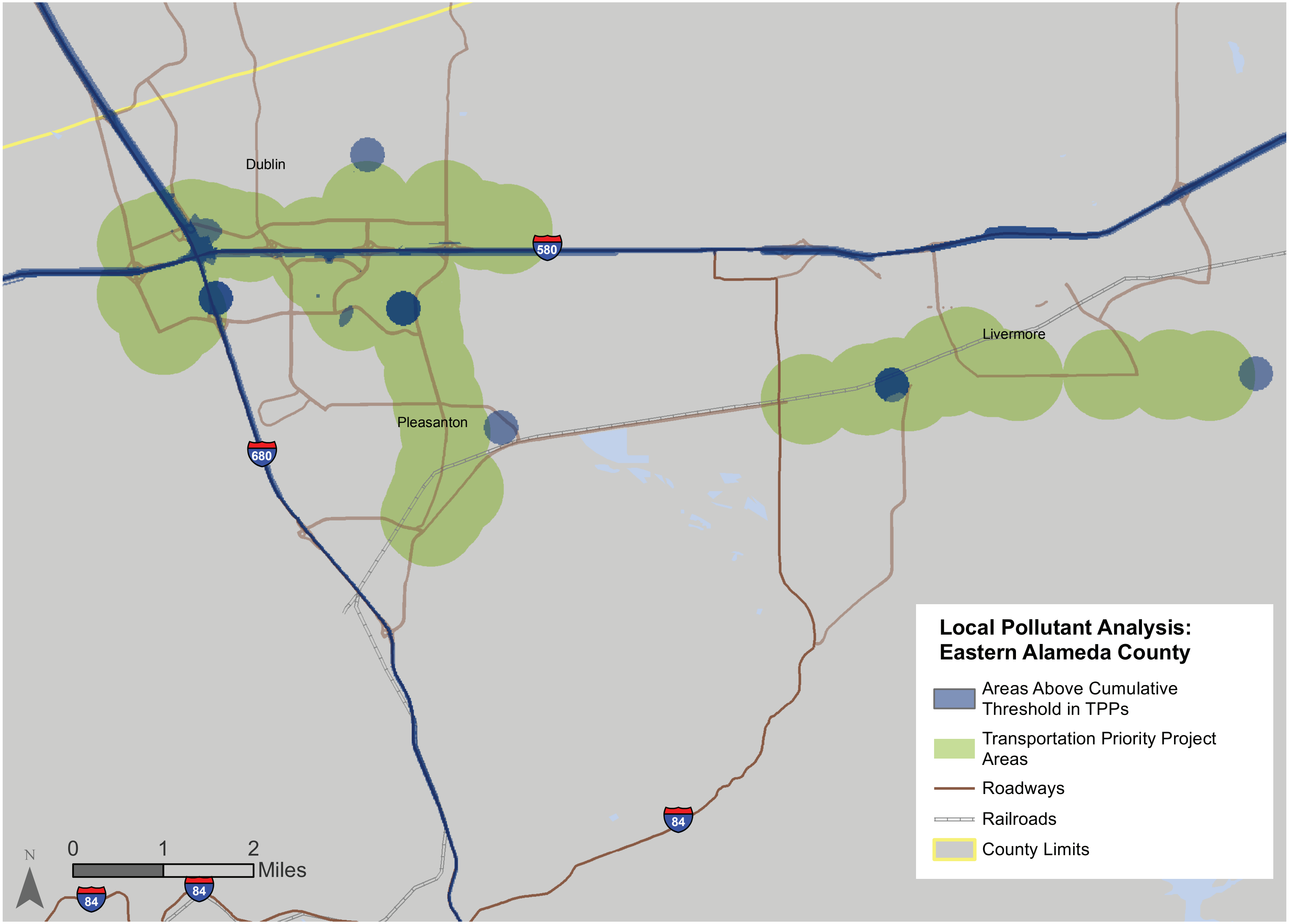

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Figure 2.2-7

Southern Alameda County Local Pollutant Analysis

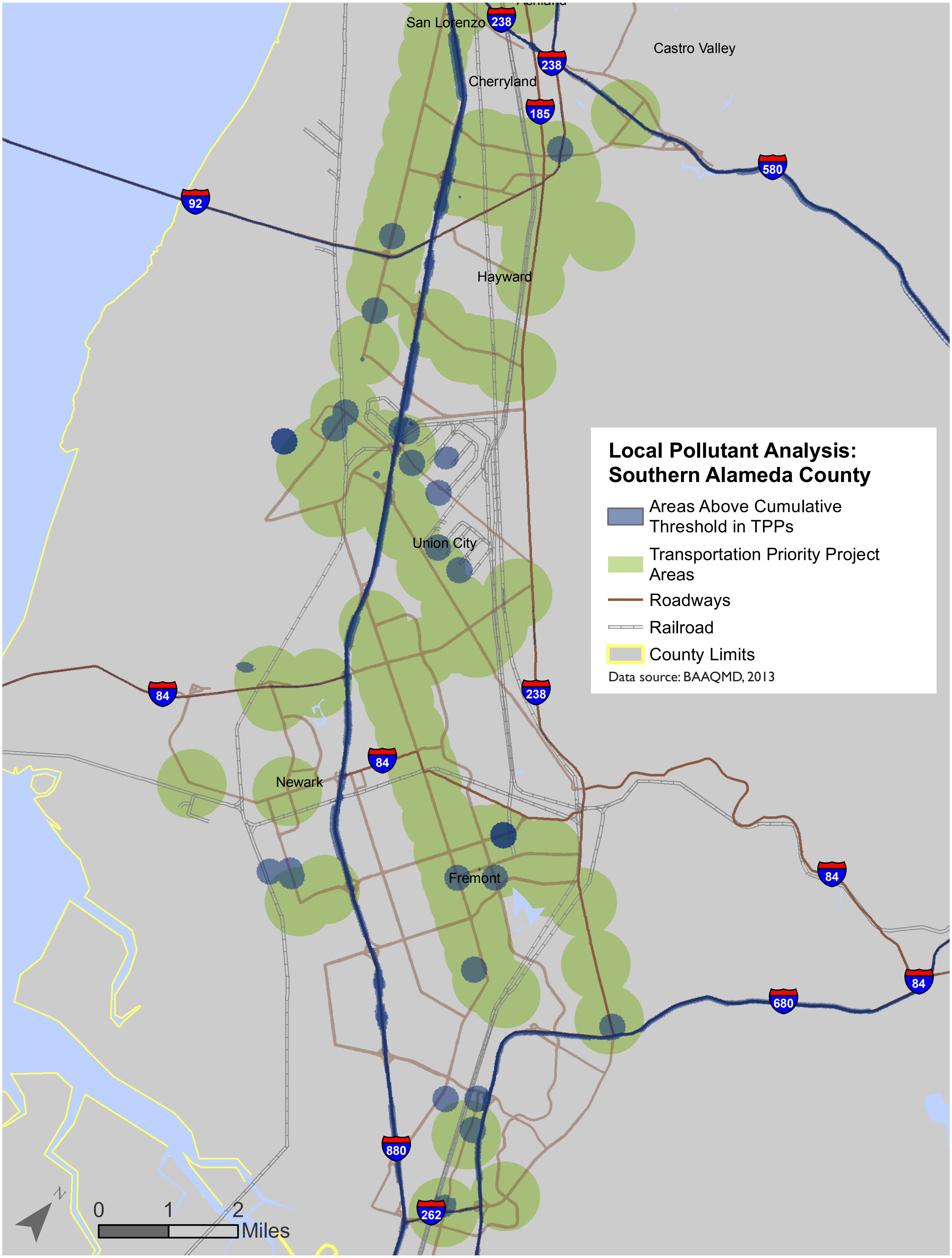

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Figure 2.2-8

Western Contra Costa County

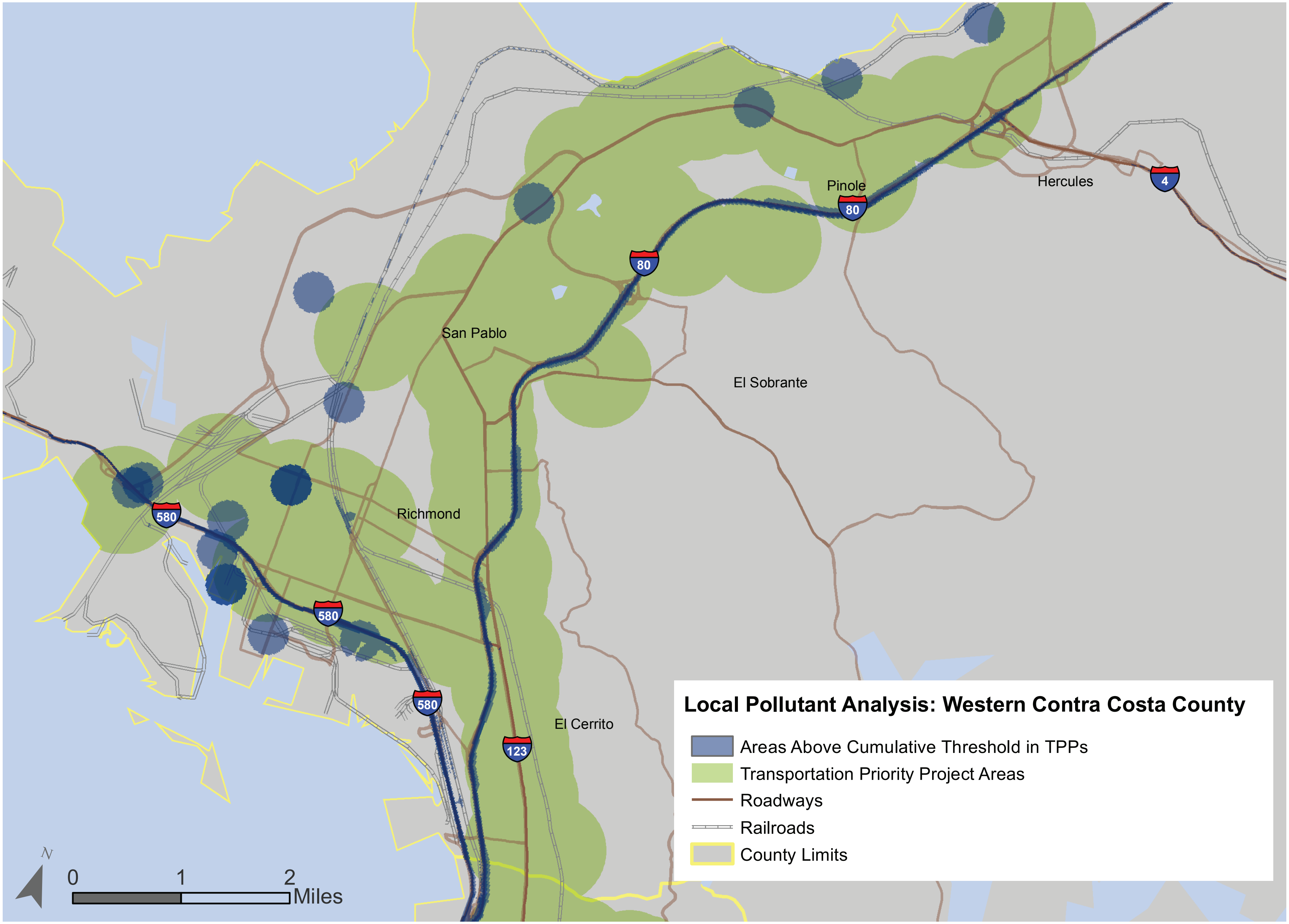

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Figure 2.2-9

Central Contra Costa County

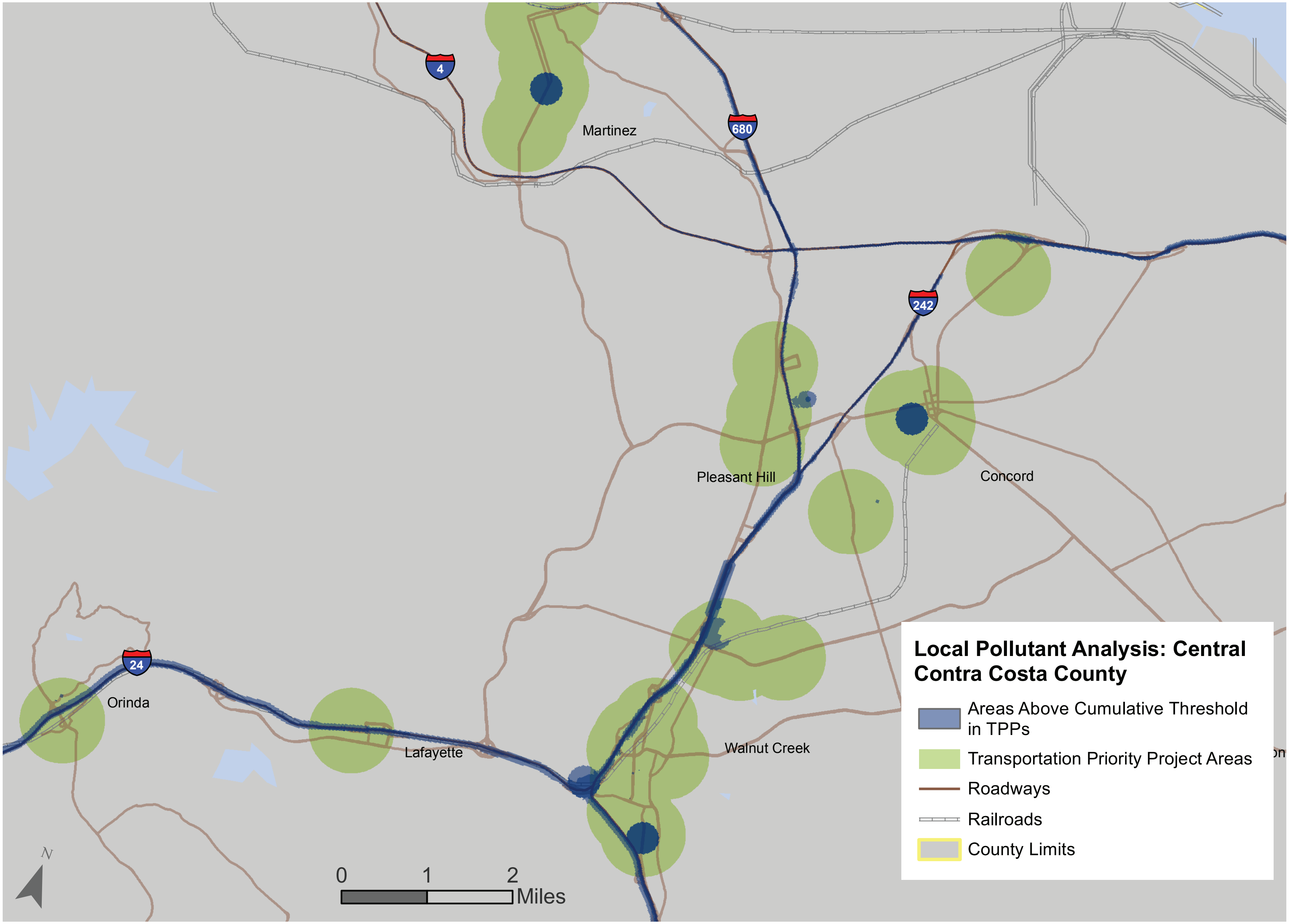

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Figure 2.2-10

Eastern Contra Costa County

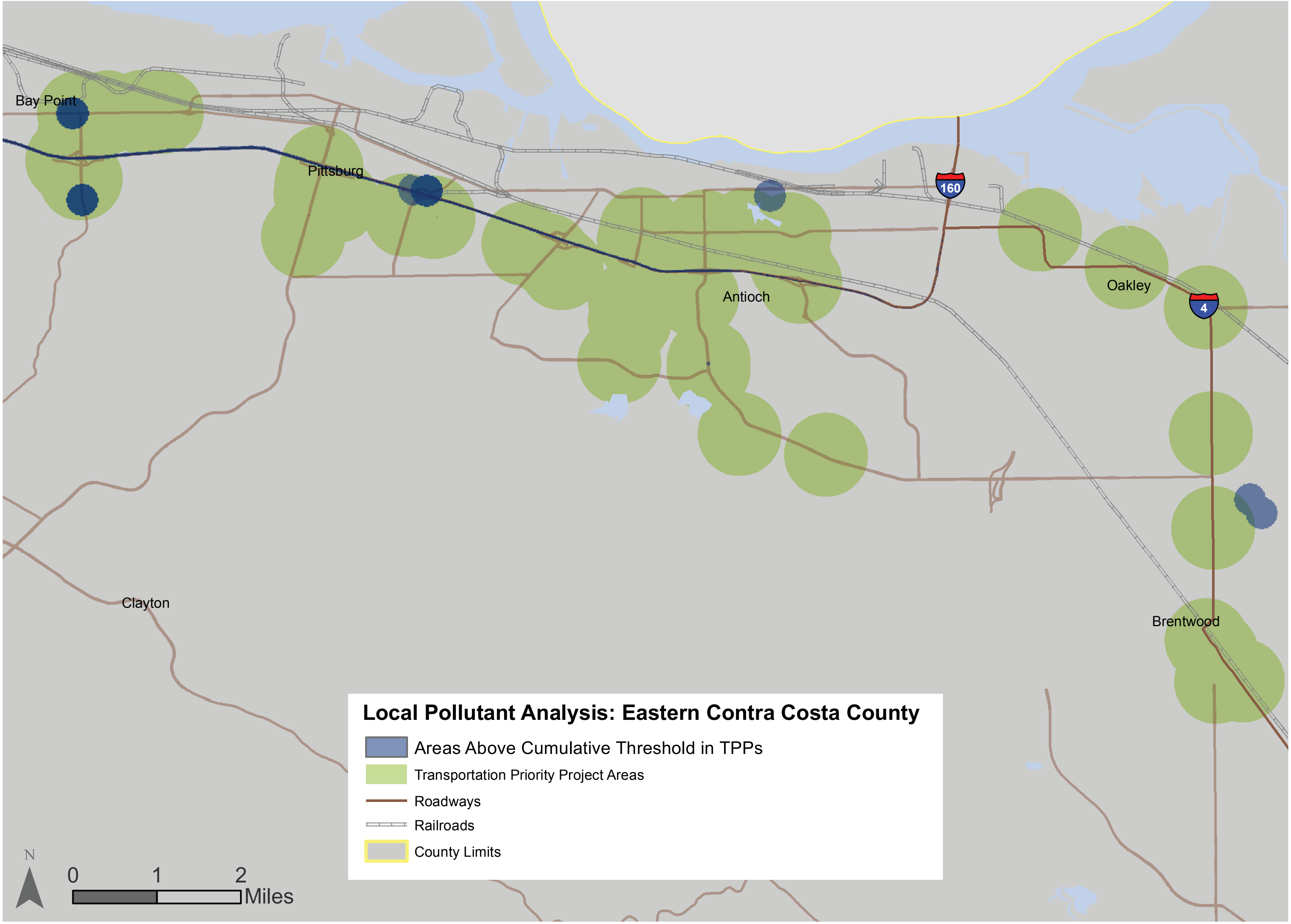

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Figure 2.2-11

Northern Marin County Local Pollutant Analysis

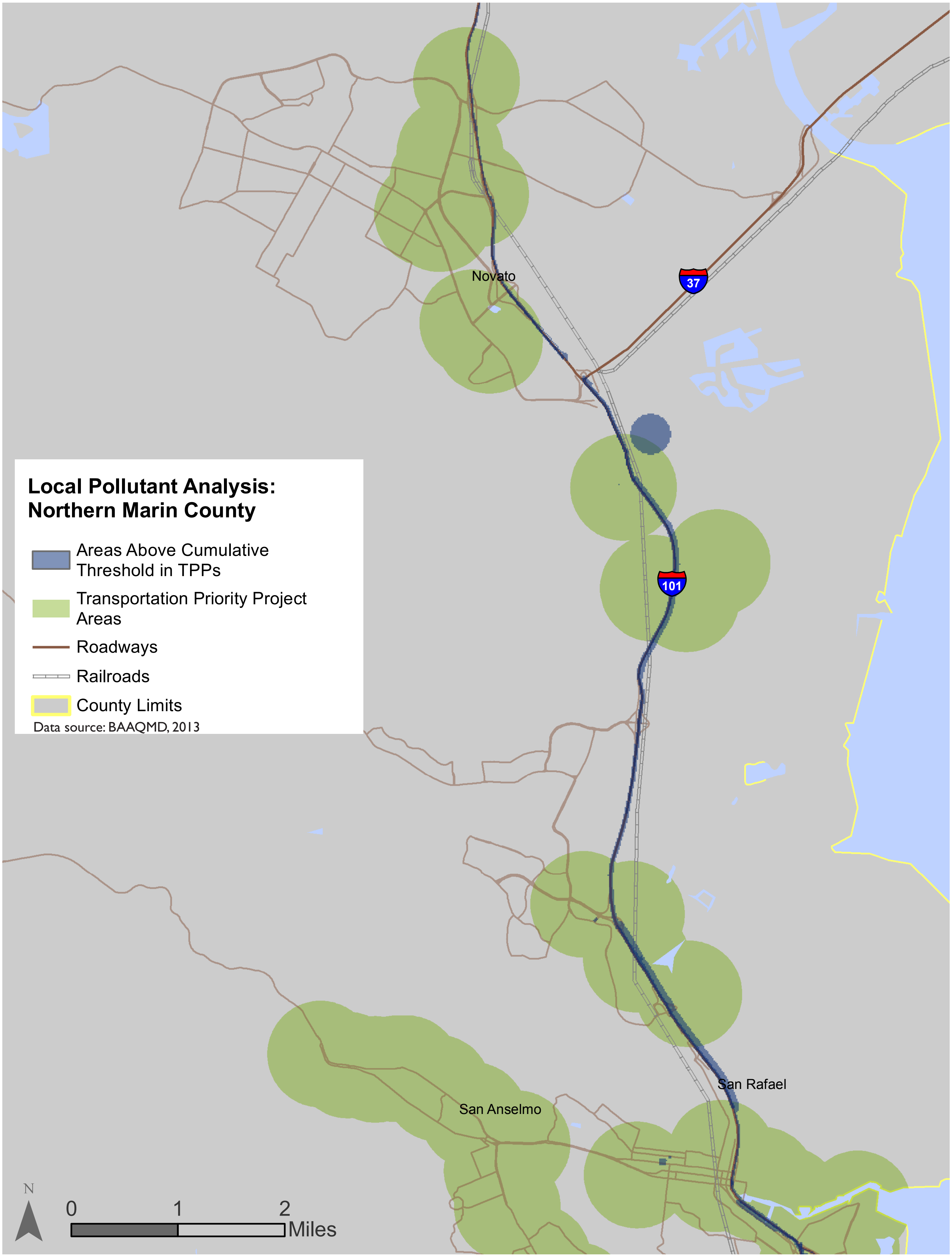

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Figure 2.2-12

Southern Marin County Local Pollutant Analysis

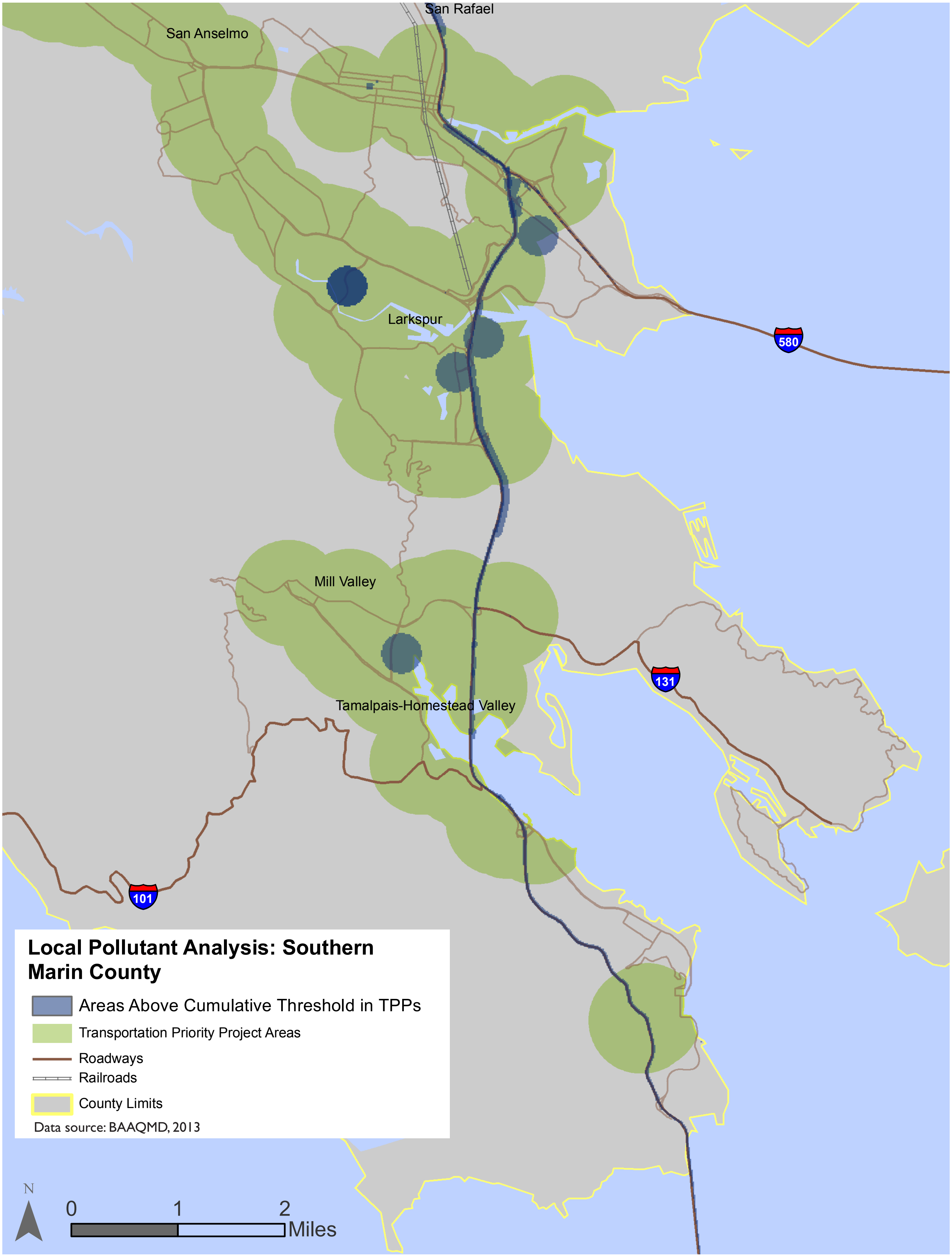

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Figure 2.2-13

Napa County Local Pollutant Analysis

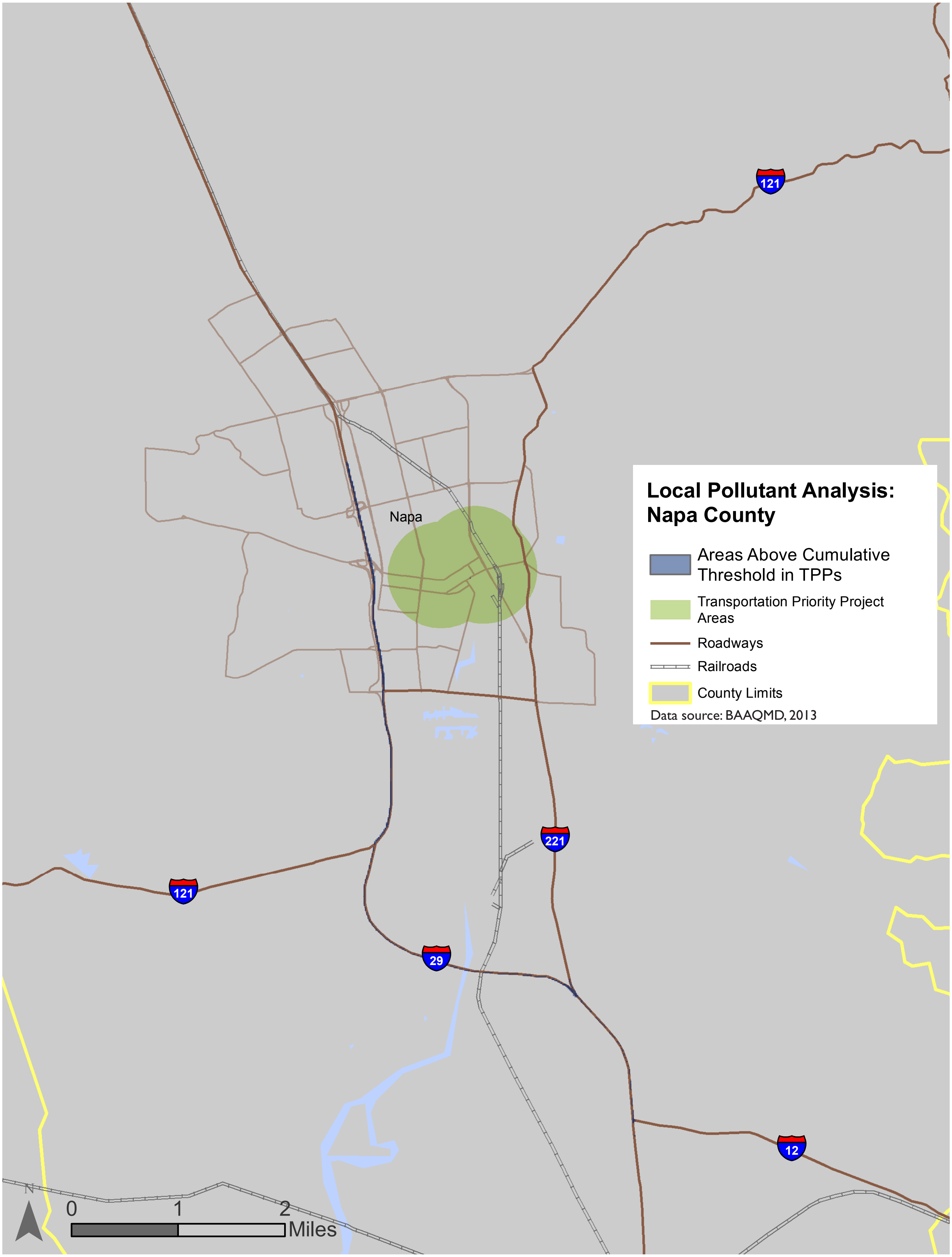

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Figure 2.2-14

Northern Santa Clara County Local Pollutant Analysis

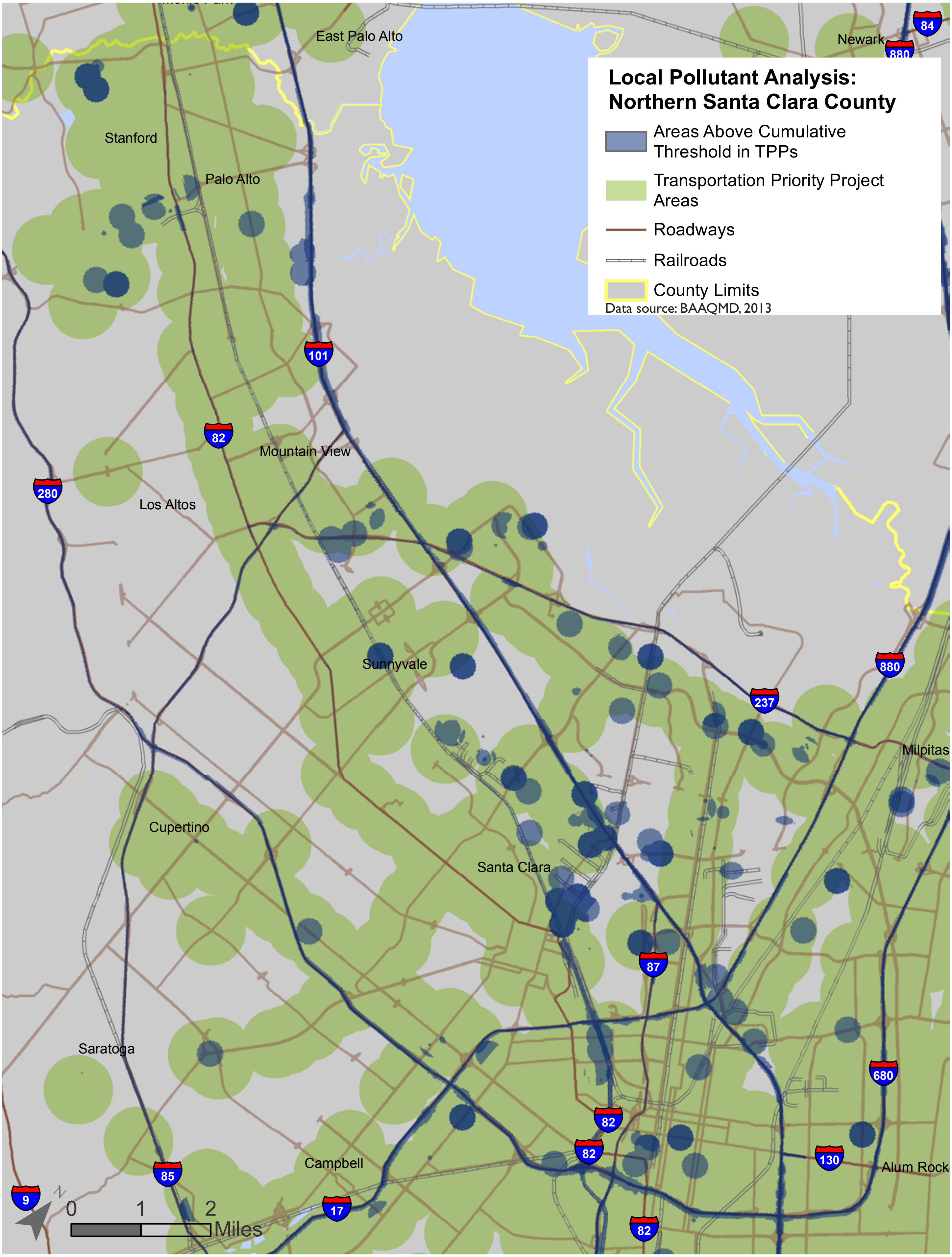

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Figure 2.2-15

Central Santa Clara County Local Pollutant Analysis

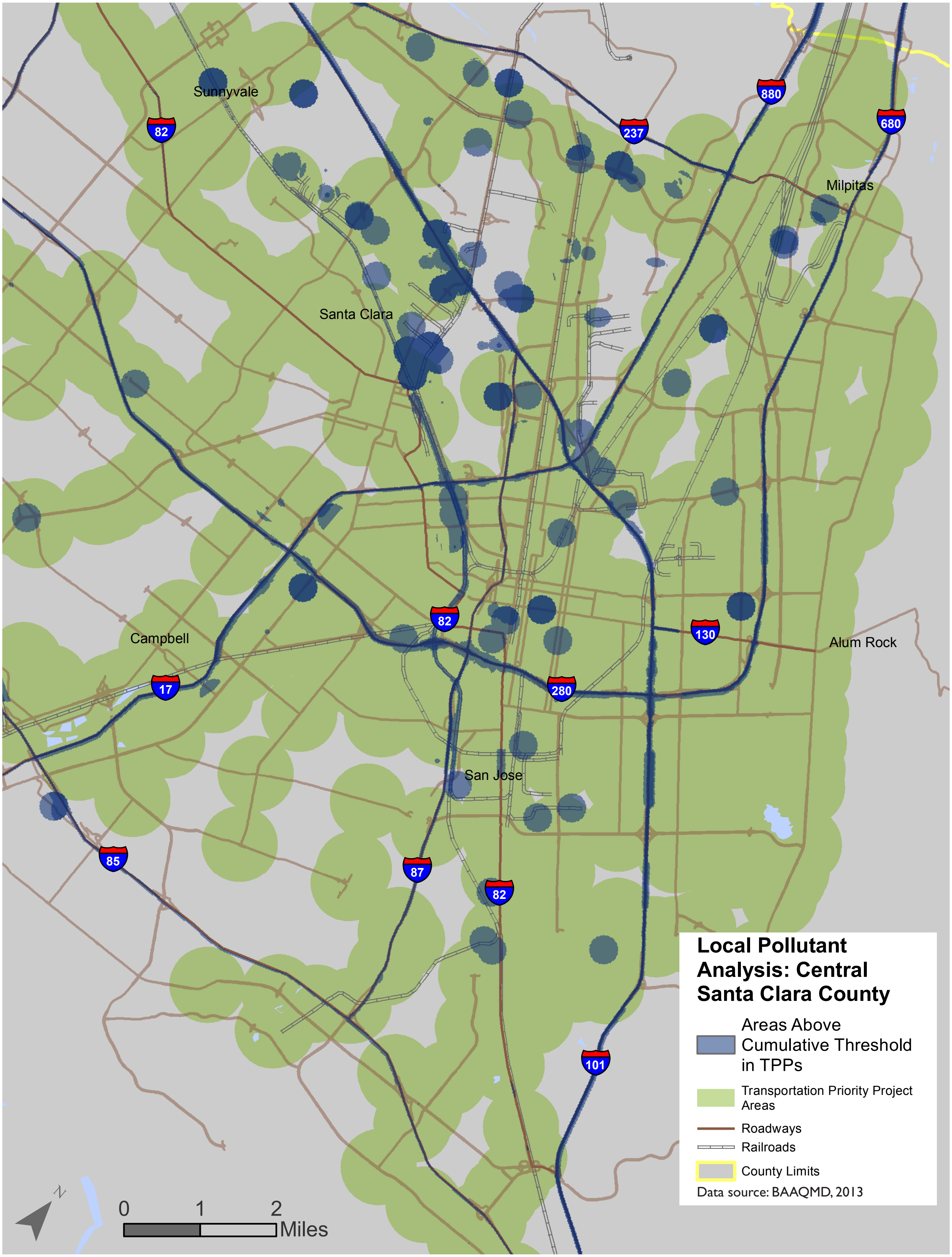

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Figure 2.2-16

Southern Santa Clara County Local Pollutant Analysis

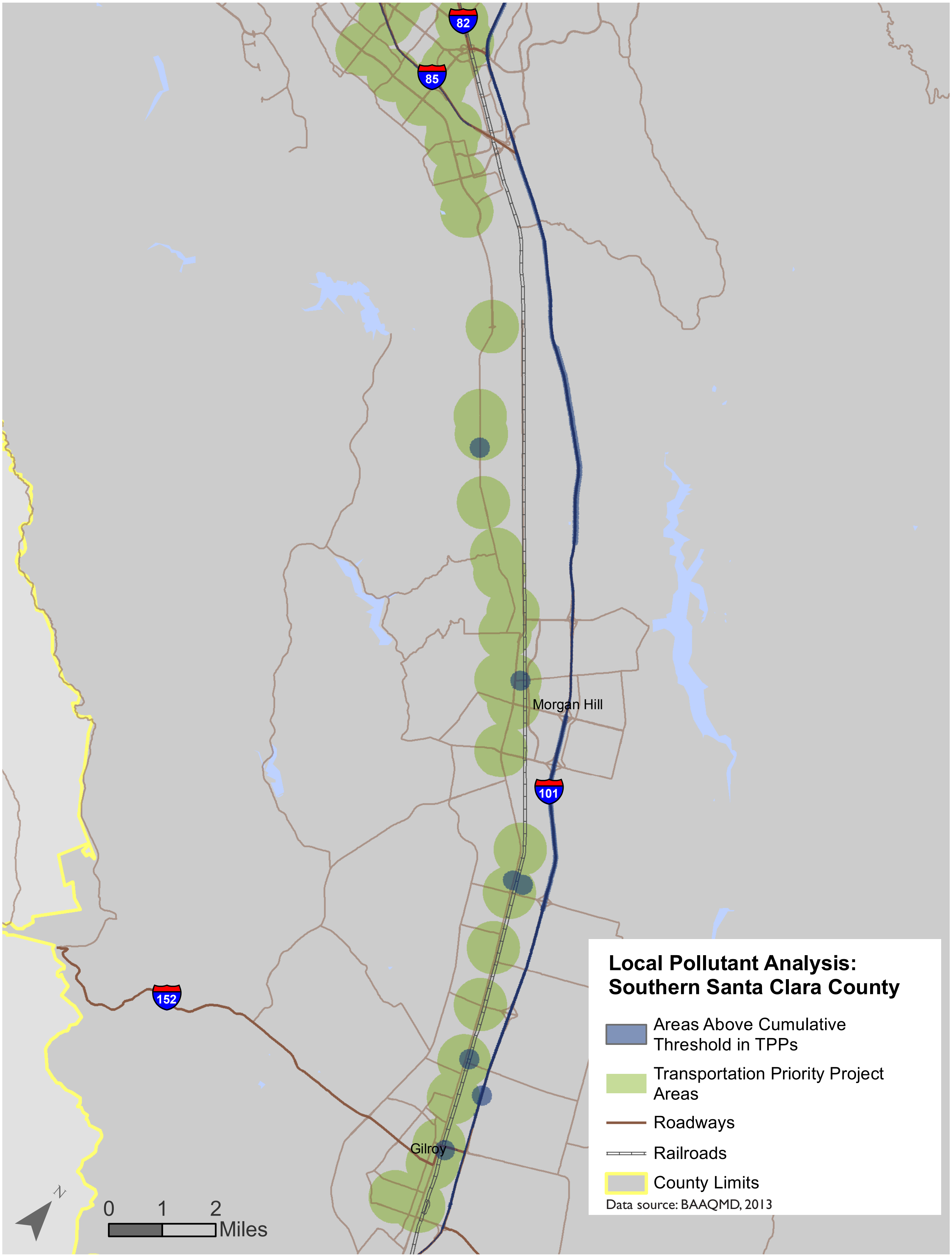

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Figure 2.2-17

San Francisco County

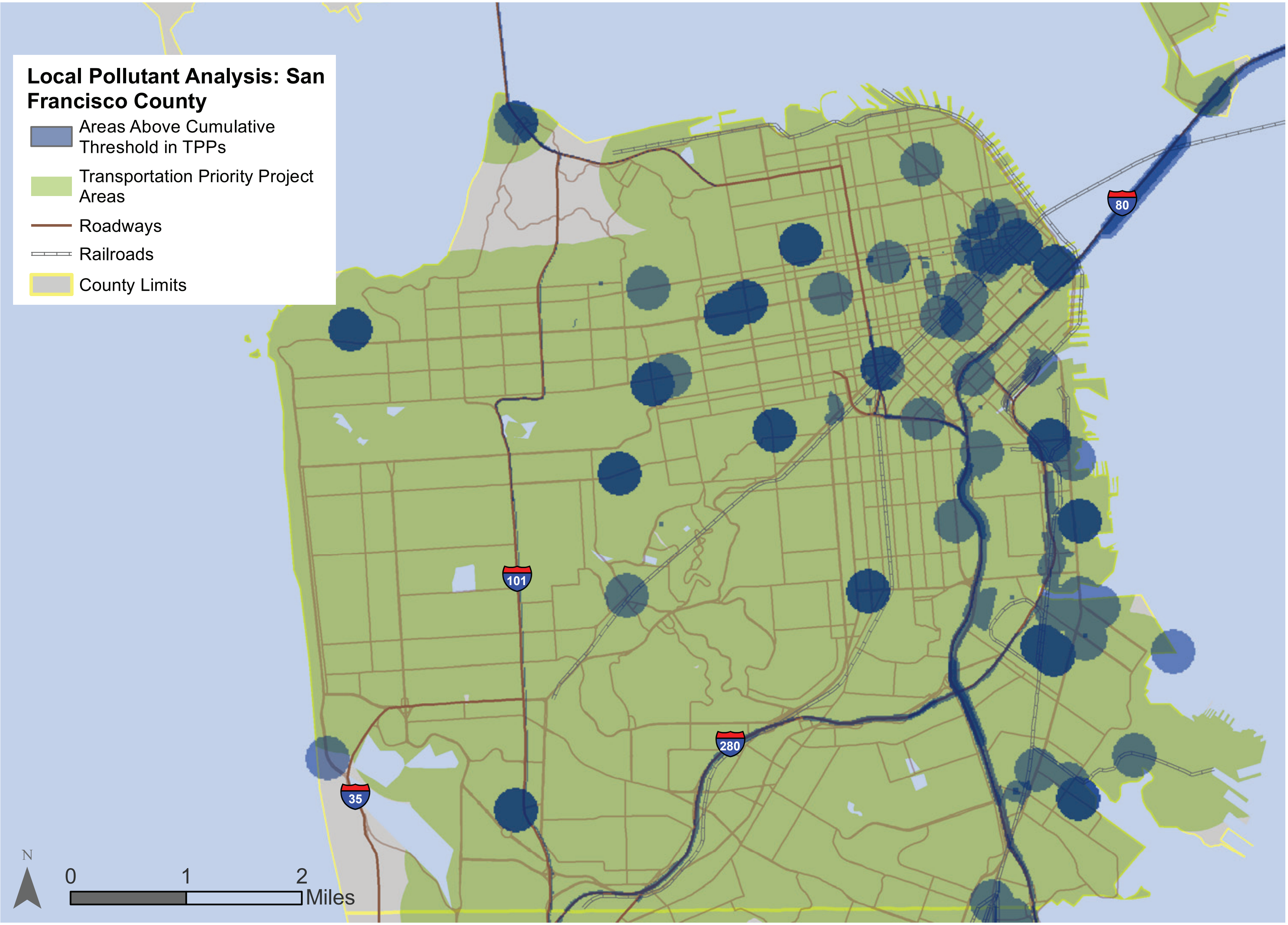

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Figure 2.2-18

Northern San Mateo County Local Pollutant Analysis

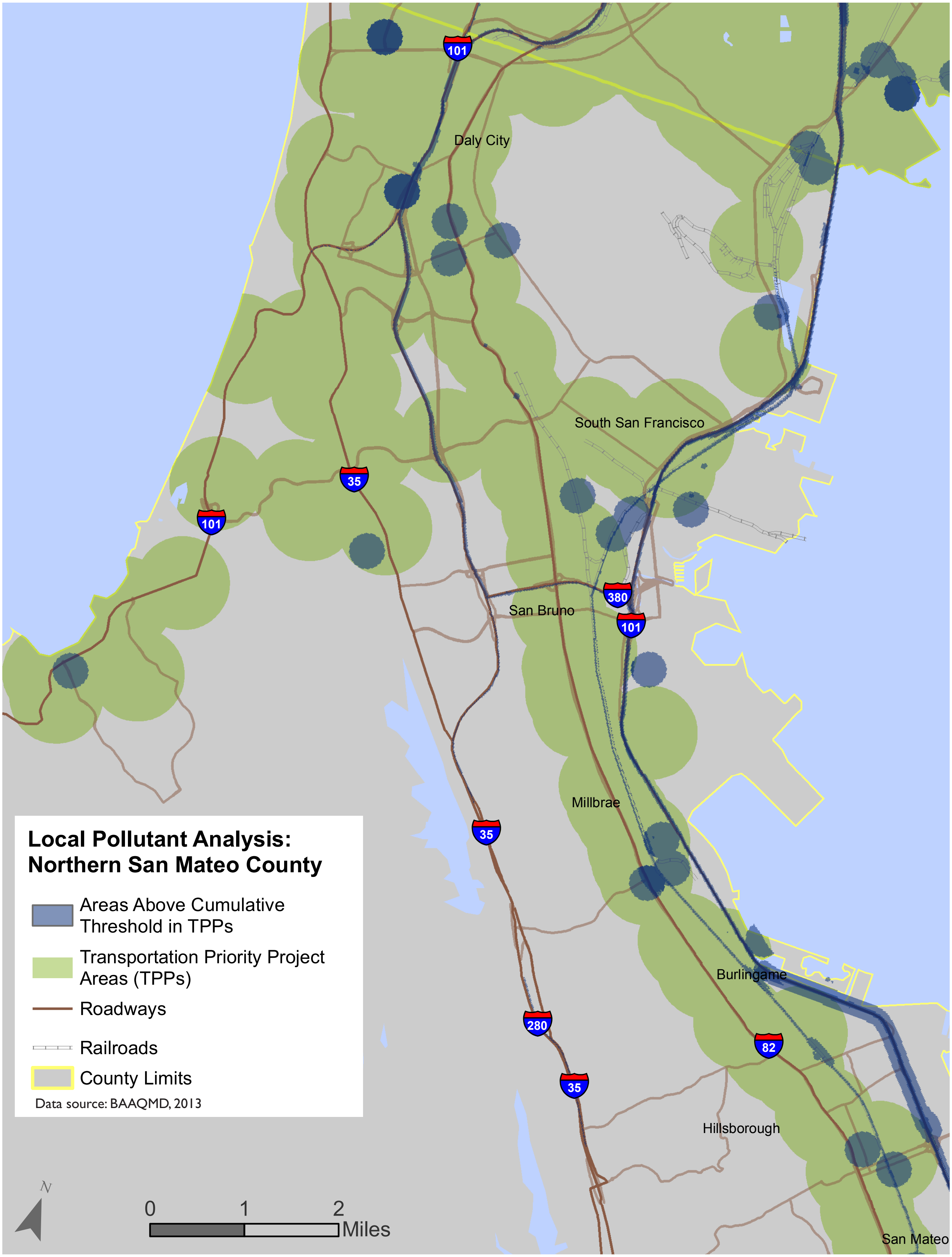

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Figure 2.2-19

Southern San Mateo County Local Pollutant Analysis

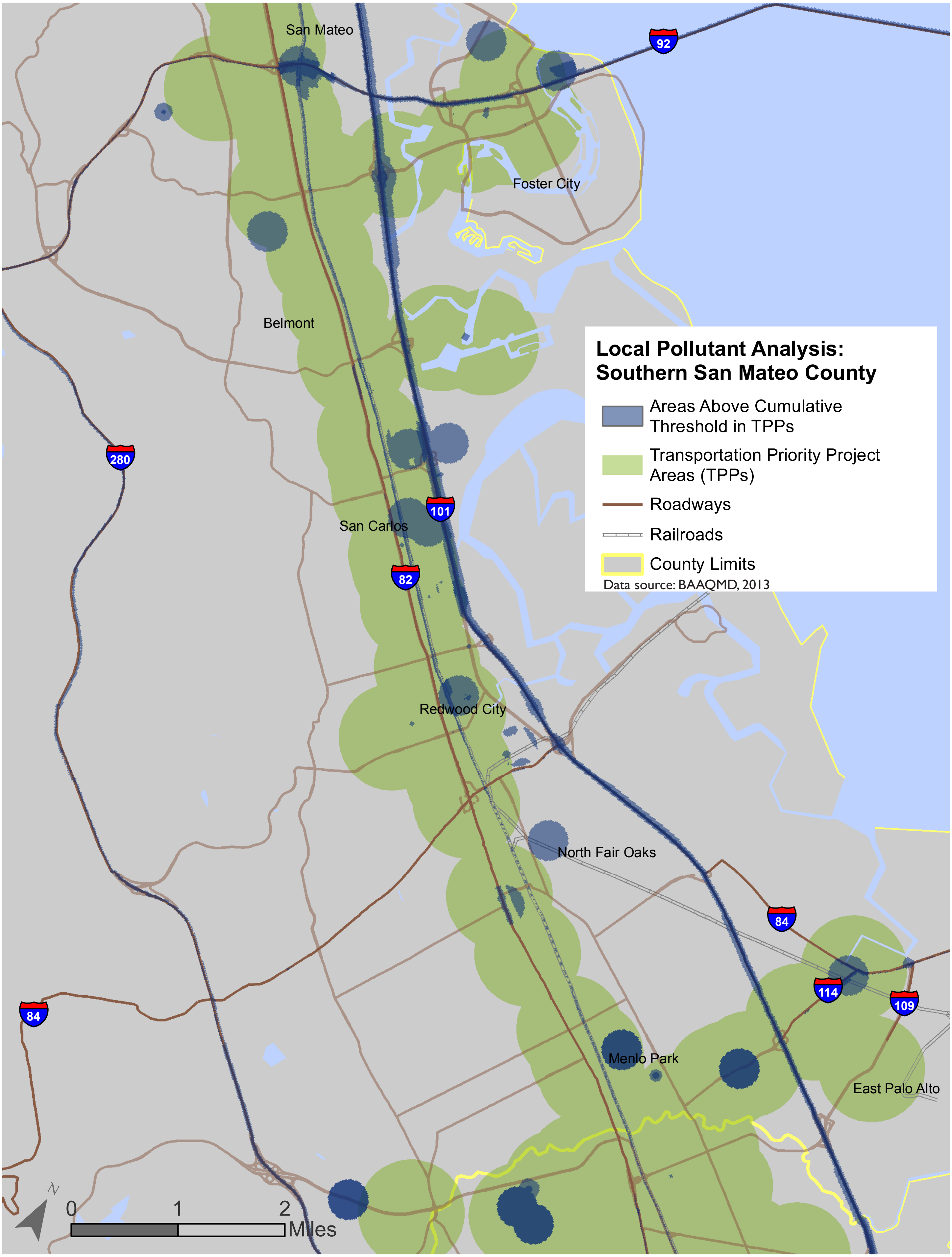

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Figure 2.2-20

Southern Solano County Local Pollutant Analysis

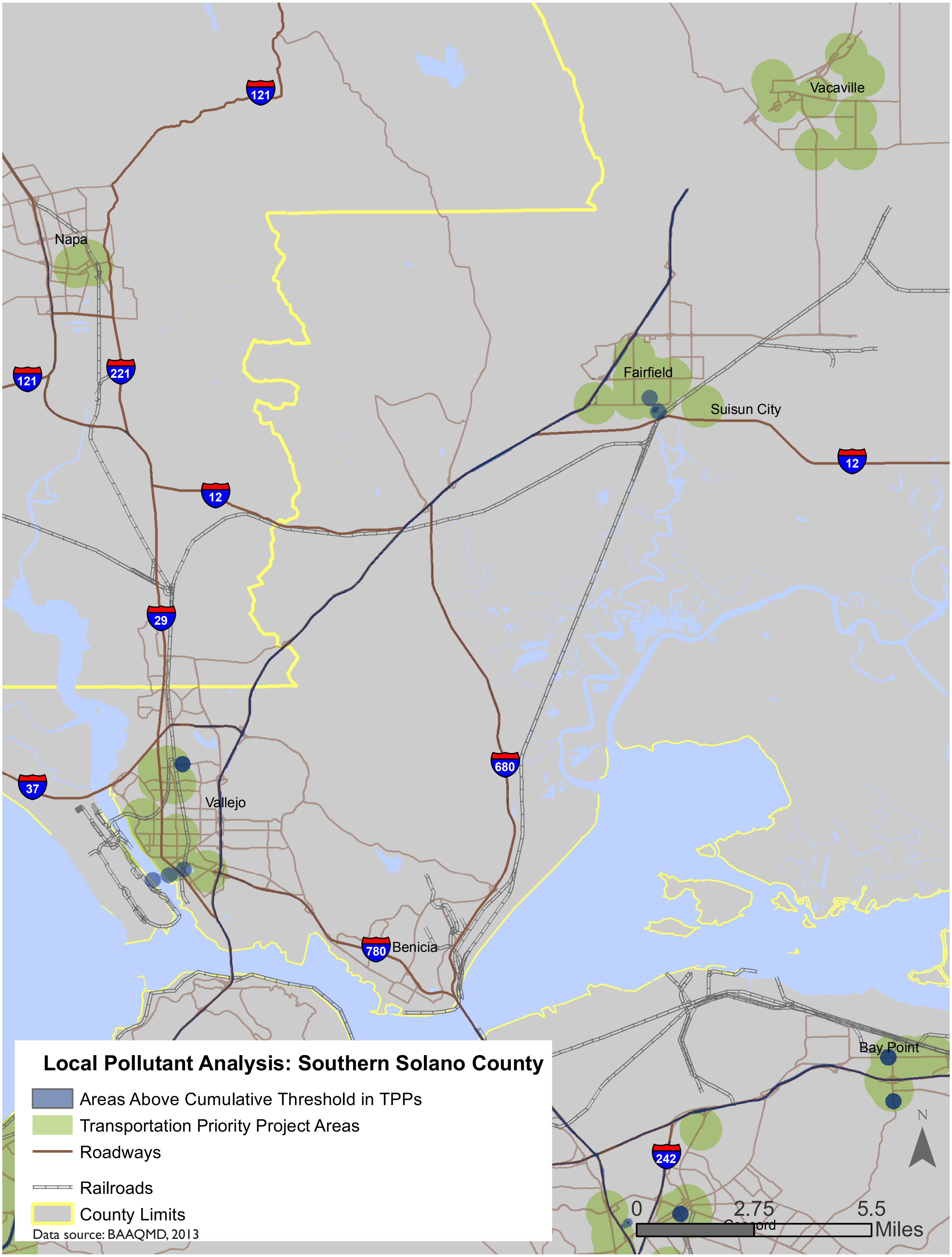

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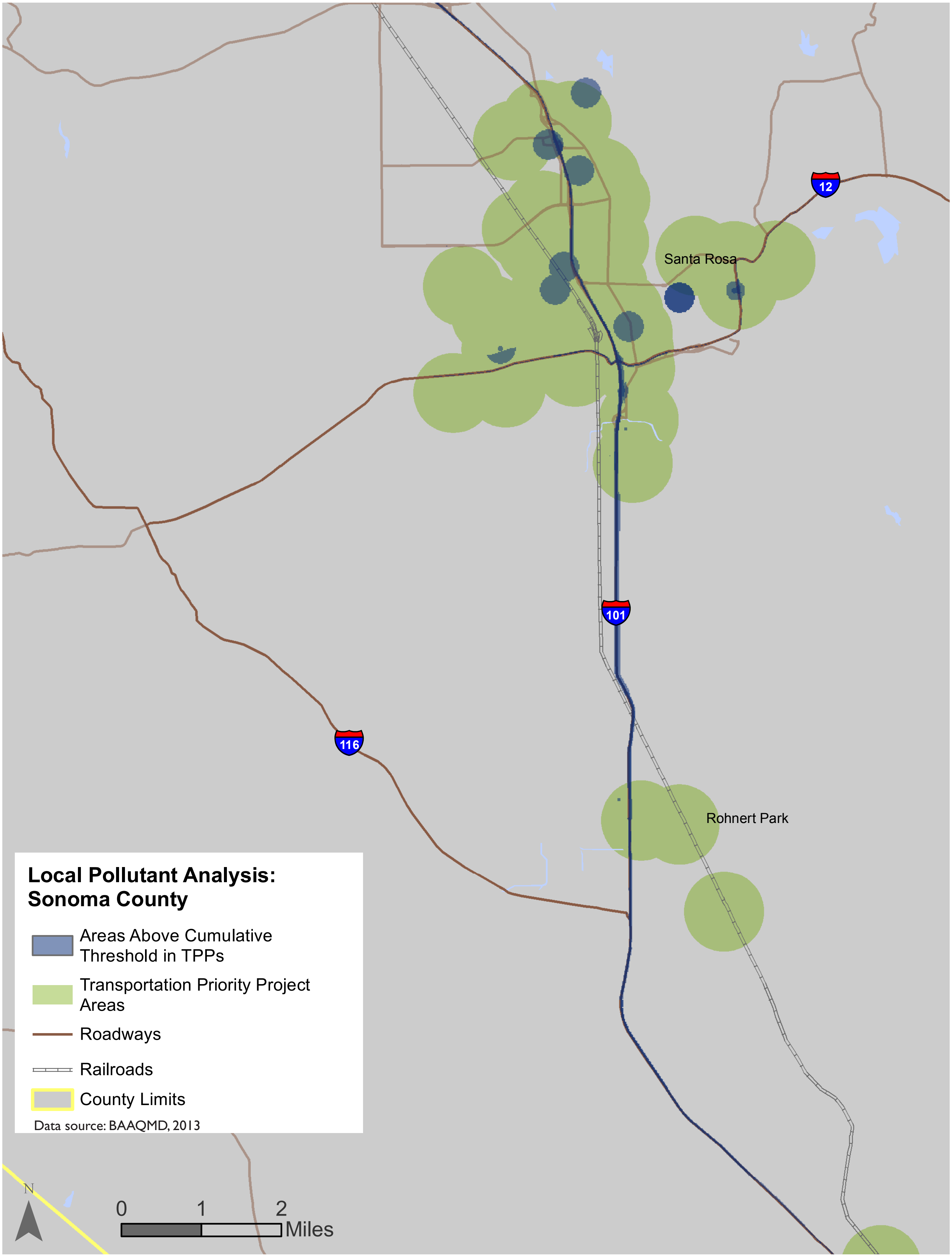
Figure 2.2-21

Sonoma County Local Pollutant Analysis



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Impact

2.2-5(b) Implementation of the proposed Plan could cause a localized net increase in sensitive receptors located in Transit Priority Project (TPP) corridors within set distances (Table 2.2-10) to mobile or stationary sources of TAC or $PM_{2.5}$ emissions.

New research on the health effects of TACs and $PM_{2.5}$ reinforces earlier findings regarding adverse health impacts on both respiratory and cardiovascular health but also a wider range of potential effects, such as diabetes, autism, cognitive functions in older adults, and oxidative damage to DNA. In addition, US EPA has not identified a level of TAC/ $PM_{2.5}$ concentration where no negative health effects are observed.[21]

In general, the closer one gets to a source of emissions, the higher the pollutant concentrations one will be exposed to. Ideally, sensitive land uses would be set back an appropriate distance such that sensitive receptors would not be exposed to TAC and $PM_{2.5}$ concentrations that could adversely affect their health. However, this is the central issue surrounding infill development, such as in TPPs and PDAs, where the objective is to locate jobs and housing in close proximity to each other to reduce automobile trips and therefore mobile source emissions. In doing so, sensitive receptors can be located too close to stationary or mobile sources and exposed to unhealthy levels of TACs and $PM_{2.5}$ concentrations.

To help identify the appropriate distances that sensitive receptors should be protected from these stationary and mobile sources, MTC utilized work prepared by ARB 2005 *Air Quality and Land Use Handbook: A Community Health Perspective* (Handbook), and BAAQMD permit data. ARB developed the Handbook to bring attention to the potential health impacts associated with locating sensitive receptors in close proximity to air pollution sources. Using available health data, air quality modeling, and monitoring studies, the Handbook provides recommendations for how far sensitive land uses should be located away from some specific sources of air pollution. The ARB recommended distances are based primarily on data showing that air pollution exposure from TACs and $PM_{2.5}$ can be reduced as much as 80 percent when sensitive land uses are set back the recommended distance. The distance recommendations were based on existing health studies and data available at that time. ARB distance recommendations were only made when the relative exposure and health risk from a source could be reasonably characterized from the available data. For each source type, the Handbook summarizes the key health and distance related findings that helped form the distance recommendation for that source.

ARB recommends using local air pollution source data, where appropriate and if available, to better determine specific health risk near local TAC and $PM_{2.5}$ sources, especially for sources not included in ARB's Handbook, or to identify more appropriate distance recommendations than they provide in the Handbook.

For sources of TACs and $PM_{2.5}$ not included in ARB's Land Use Handbook or for sources where Air District data was more site specific than ARB's data, MTC and ABAG worked with BAAQMD to develop distance recommendations for siting new sensitive land uses for use in this analysis. BAAQMD provided site specific stationary source permit data or existing studies to support the distance

[21] "Understanding Particulate Matter: Protecting Public Health in the San Francisco Bay Area," Bay Area Air Quality Management District, November 2012.

recommendations for diesel generators, refineries, sea ports, airports, railroads, rail stations, and ferry terminals.

The specific set distances recommended for avoiding locating sensitive land uses are listed below in **Table 2.2-10**. For detailed explanations of set distances recommended by ARB, see the 2005 *Air Quality and Land Use Handbook: A Community Health Perspective*. Recommended distances used for this analysis are summarized below and described in detail in Appendix E.

The ARB recommends that land use agencies "avoid siting" any sensitive land uses within the set distances identified within the Handbook. This recommendation is due to potential adverse health impacts that could affect sensitive receptors from prolonged exposure to higher concentrations of TACs and $PM_{2.5}$. Therefore, any future land use development that includes sensitive receptors within any of the set distances identified above would be considered a potentially significant (PS) impact. Mitigation Measure 2.2(d) is described below.

TABLE 2.2-10: DISTANCE RECOMMENDATION FROM SENSITIVE RECEPTORS

Source	*Distance Recommendation from Sensitive Receptors*
Freeway/Highway, Roadway	500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day.
Distribution Center	1,000 feet of a distribution center with over 100 daily truck trips.
Gas Dispensing Facility	300 feet of a large gas dispensing facility (a facility with a throughput of 3.6 million gallons or more per year); 50 feet of a small gas dispensing facility (a facility with a throughput of less than 3.6 million gallons per year).
Dry Cleaning Operation	300 feet of dry cleaning operation using PERC; 500 feet of dry cleaning operations with two or more machines using PERC.
Chrome Plating Facility	1,000 feet of a chrome plating facility.
Railyard	1,000 feet of BNSF Richmond; BNSF Railway, Pittsburg; Union Pacific, Martinez; and Union Pacific, Milpitas. 0.5 miles of Maritime Port of Oakland/UP Railyard.
Railroad and Rail Station	200 feet of a railroad or rail station.
Ferry Terminal	500 feet of a ferry terminal.
Diesel Generator	350 feet of a diesel generator with an estimated cancer risk greater than 10 in a million.
Sea Port	0.5 miles of Maritime Port of Oakland/UP Railyard; 1,000 feet of Port of Benicia, Port of Redwood City; Port of Richmond.
Oil Refinery	0.5 miles of Chevron, Richmond; Shell, Martinez; Phillips 66, Rodeo; Tesoro, Martinez; and Valero, Benicia.
Airport	0.5 miles of all major airports, including San Francisco International, Oakland International Airport, and Norman Y. Mineta San José International Airport.

Source: The Bay Area Air Quality Management District, 2013.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.2(d) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to best management practices (BMPs), such as the following:

- Installation of air filtration to reduce cancer risks and PM exposure for residents, and other sensitive populations, in buildings that are in close proximity to freeways, major roadways, diesel generators, distribution centers, railyards, railroads or rail stations, and ferry terminals. Air filter devices shall be rated MERV-13 or higher. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required.
- Phasing of residential developments when proposed within 500 feet of freeways such that homes nearest the freeway are built last, if feasible.
- Sites shall be designed to locate sensitive receptors as far as possible from any freeways, roadways, diesel generators, distribution centers, and railyards. Operable windows, balconies, and building air intakes shall be located as far away from these sources as feasible. If near a distribution center, residents shall not be located immediately adjacent to a loading dock or where trucks concentrate to deliver goods.
- Limiting ground floor uses in residential or mixed-use buildings that are located within the set distance of 500 feet to a non-elevated highway or roadway. Sensitive land uses, such as residential units or day cares, shall be prohibited on the ground floor.
- Planting trees and/or vegetation between sensitive receptors and pollution source, if feasible. Trees that are best suited to trapping PM shall be planted, including one or more of the following: Pine (*Pinus nigra* var. *maritima*), Cypress (*X Cupressocyparis leylandii*), Hybrid popular (*Populus deltoids X trichocarpa*), and Redwoods *(Sequoia sempervirens*).
- Within developments, sensitive receptors shall be separated as far away from truck activity areas, such as loading docks and delivery areas, as feasible. Loading dock shall be required electrification and all idling of heavy duty diesel trucks at these locations shall be prohibited.
- If within the project site, diesel generators that are not equipped to meet ARB's Tier 4 emission standards shall be replaced or retrofitted.
- If within the project site, emissions from diesel trucks shall be reduced through the following measures:
  - Installing electrical hook-ups for diesel trucks at loading docks.
  - Requiring trucks to use Transportation Refrigeration Units (TRU) that meet Tier 4 emission standards.
  - Requiring truck-intensive projects to use advanced exhaust technology (e.g. hybrid) or alternative fuels.
  - Prohibiting trucks from idling for more than two minutes as feasible.

- Establishing truck routes to avoid residential neighborhoods or other land uses serving sensitive populations. A truck route program, along with truck calming, parking and delivery restrictions, shall be implemented to direct traffic activity at non permitted sources and large construction projects.

Significance after Mitigation

The mitigation measures described above may result in cancer risk and $PM_{2.5}$ concentration reductions of 40 to 90 percent, depending on their applicability in a proposed project. See Appendix E for more information on the effectiveness of each mitigation measure.

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project located within a set distance to a freeway or roadway, diesel generator, distribution center, rail line or railyard as defined above adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M) (so long as the proposed project is not located in an area above the 100/million cancer risk or $PM_{2.5}$ concentration of 0.8 $\mu g/m^3$, as outlined in Impact 2.2-5(a)). However, for future development with sensitive land uses within set distances for gas stations, dry cleaners, airports, sea ports, chrome plating facilities, and oil refineries, implementation of Mitigation Measure 2.2(d) may not be sufficient to reduce the impact in all cases. Additional site specific analysis would be needed when a project is proposed in these areas to determine the actual level of impact and if feasible mitigation measures exist for the project to implement to get them below the thresholds. The impact for these projects would therefore remain significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels (as described above). For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Impact

2.2-5(c) Implementation of the proposed Plan could cause a localized net increase in sensitive receptors located in Transit Priority Project (TPP) corridors where TACs or fine particulate matter ($PM_{2.5}$) concentrations result in noncompliance with an adopted Community Risk Reduction Plan.

BAAQMD launched an initiative in 2010 to assist cities and counties in reducing TACs and $PM_{2.5}$ through a plan-based, comprehensive, community-wide approach, commonly known as a community risk reduction plan (CRRP). BAAQMD prepared a guidance document, *Draft Guidelines for a Plan Approach for Reducing TACs and $PM_{2.5}$*, and partnered with the cities of San Francisco and San José to prepare CRRPs. BAAQMD provided funding, staff time, and technical resources, including emissions data and dispersion modeling, to each of the cities. At the time of this EIR's publication, BAAQMD completed the emissions inventory and dispersion modeling for San Francisco and the emissions inventory for San José. According to BAAQMD, the dispersion modeling for San José is anticipated to be completed in spring 2013.

In jurisdictions with an adopted CRRP, any proposed project that includes sensitive land uses and or receptors should be evaluated against the standards, thresholds and mitigation measures in those adopted plans. Where a proposed project is consistent with an adopted CRRP, the impact would be less than significant (LS).

Mitigation Measures

None required.

Impact

2.2-6 Implementation of the proposed Plan could result in a localized larger increase or smaller decrease of TACs and or $PM_{2.5}$ emissions in disproportionally impacted communities compared to the remainder of the Bay Area communities.

The method of analysis described above was used to determine if the investments and land use scenario would result in a larger increase or smaller decrease in TAC and $PM_{2.5}$ emissions in disproportionately impacted communities when compared to the Bay Area at large. TAC and $PM_{2.5}$ emissions were estimated along the major transportation corridors within the CARE communities for the proposed Plan's base year (2010) and the horizon year (2040).

Table 2.2-11 lists MTC's modeling results, expressed as a percentage change in TAC and $PM_{2.5}$ exhaust emissions when compared to the base year emissions for each county with a CARE community and the entire region. Overall TAC and $PM_{2.5}$ exhaust emissions from diesel and gasoline vehicles decrease significantly throughout the Bay Area between existing conditions in 2010 and the proposed Plan's horizon year 2040. Diesel PM, benzene, and 1, 3 butadiene TAC emissions from on-road vehicle exhaust are estimated to decrease between 68 and 75 percent. Region-wide $PM_{2.5}$ emissions from all on-road vehicle exhaust are expected to decrease by approximately 55 percent. These reductions are largely attributed to the implementation of ARB's On-Road Heavy-Duty Diesel Vehicle Regulations, which aims to achieve an 85 percent reduction in diesel PM by 2023.

Between CARE and non-CARE communities there are slight differences in the percent reductions expected in 2040. There are certain instances where non-CARE communities are estimated to have slightly higher $PM_{2.5}$ and TAC exhaust emission reductions than the CARE communities. The CARE community in Santa Clara County is an example where this occurs. These results may be explained by the fairly substantial increase expected in VMT within the Santa Clara CARE community when compared to the anticipated increase in VMT for the remainder of Santa Clara County. Then there are instances where a CARE community is expected to result in slightly higher reductions in TACs and $PM_{2.5}$, such as in Alameda County. While the percent difference in estimated $PM_{2.5}$ and TAC emissions isn't substantial between CARE and non-CARE communities, it does suggest that these disproportionally impacted communities may not realize the same level of $PM_{2.5}$ and TAC emission reductions expected throughout the remainder of the county.

TABLE 2.2-11: PERCENT CHANGE IN ON-ROAD MOBILE SOURCE EXHAUST EMISSIONS, YEARS 2010 - 2040

	Exhaust Only $PM_{2.5}$	*Diesel PM*	*Benzene*	*1, 3 Butadiene*	*VMT*
Alameda CARE Community	-56.11%	-69.23%	-71.16%	-71.56%	18.64%
Remainder of County	-55.13%	-67.24%	-69.27%	-69.58%	24.69%
Contra Costa CARE Community	-57.54%	-69.35%	-71.82%	-72.15%	14.56%
Remainder of County	-57.69%	-68.71%	-70.57%	-70.84%	15.92%
San Francisco CARE Community	-53.23%	-70.01%	-74.02%	-74.47%	11.57%
Remainder of County	-46.22%	-69.78%	-75.53%	-75.80%	7.89%
San Mateo CARE Community	-56.91%	-69.90%	-70.68%	-71.19%	19.00%
Remainder of County	-57.67%	-69.16%	-71.20%	-71.51%	15.53%
Santa Clara CARE Community	-50.86%	-66.16%	-67.58%	-68.08%	31.63%
Remainder of County	-54.14%	-67.23%	-69.55%	-69.92%	23.00%
Regionwide CARE Communities	-54.49%	-68.43%	-70.55%	-70.99%	21.12%
Remainder of Region	-55.64%	-67.66%	-69.97%	-70.27%	20.21%

Source: The Bay Area Air Quality Management District, 2013.

Table 2.2-12 lists MTC's modeling results, expressed as a percentage change in Total $PM_{2.5}$ emissions when compared to the 2010 base year emissions, for each county with a CARE community and the entire region. Total $PM_{2.5}$ includes exhaust from all vehicles, as well as re-entrained road dust, brake wear and tire wear, and does not include TACs from gasoline vehicles. Brake wear and tire wear emission rates are estimated in EMFAC2011. Road dust emissions are estimated from ARB's paved road dust methodology, which is based on EPA's dust emission rates estimates (EPA, AP-42 13.2.1, January 2011). When all sources of $PM_{2.5}$ are aggregated, the anticipated $PM_{2.5}$ emission reductions are much smaller than the emission changes presented in **Table 2.2-11**, which only show vehicle exhaust emissions. In fact, when Total $PM_{2.5}$ is estimated some counties even show an increase between 2010 and 2040.

This outcome may be explained by a number of factors. Emissions from gasoline and diesel on-road vehicles have been substantially reduced by stringent California and federal exhaust emission standards. ARB on-road Heavy-Duty Diesel Regulations are expected to reduce diesel PM by 85 percent by 2020. In addition, $PM_{2.5}$ from brake and tire wear from passenger vehicles is expected to represent approximately 85 to 90 percent of particulate matter from vehicles well into the future.[22] Currently, there are no regulations that have been adopted that will reduce future levels of particulate matter from tire and brake wear and re-entrained road dust emissions. Therefore, EMFAC2011 does not consider any improvements in brake and tire wear and re-entrained road dust emissions in future year's emission estimates. This means that as VMT increases, so do $PM_{2.5}$ emissions from brake and tire wear and re-entrained road dust. This is an example where increases in VMT are outstripping the technological advances of low emission vehicles.

[22] EMFAC 2011 Technical Documentation, ARB, September 19, 2011, p. 112.

Table 2.2-12 also shows that the CARE community in Santa Clara County, as well as regionwide CARE communities, will experience higher total $PM_{2.5}$ emissions between 2010 and 2040 in comparison with non-CARE portions of the County, and the region as a whole. As a result of the projected increase of $PM_{2.5}$ emissions in the CARE communities from 2010 to 2040, a potentially significant (PS) impact will occur based on the impact criteria for disproportionally impacted communities. Mitigation measures 2.2 (e) and 2.2 (f) are described below.

TABLE 2.2-12: PERCENT CHANGE IN ON-ROAD MOBILE SOURCE TOTAL PM EMISSIONS, YEARS 2010–2040 (TOTAL $PM_{2.5}$ INCLUDES VEHICLE EXHAUST, RE-ENTRAINED ROAD DUST, TIRE AND BRAKE WEAR)

Alameda CARE Community	**-1.36%**
Remainder of County	**2.49%**
Contra Costa CARE Community	**-3.64%**
Remainder of County	**-3.70%**
San Francisco CARE Community	**-3.62%**
Remainder of County	**-2.35%**
San Mateo CARE Community	**-1.53%**
Remainder of County	**-4.82%**
Santa Clara CARE Community	**10.53%**
Remainder of County	**2.89%**
Regionwide CARE Communities	**1.65%**
Remainder of Region	**-0.23%**

Source: The Bay Area Air Quality Management District, 2013.

Mitigation Measures

Mitigation measures to reduce TAC and $PM_{2.5}$ emissions from on-road trucks and locomotives that shall be implemented by MTC/ABAG and BAAQMD include, but are not limited to the following:

2.2(e) MTC/ABAG shall partner with BAAQMD to develop a program to install air filtration devices in existing residential buildings, and other buildings with sensitive receptors, located near freeways or sources of TACs and $PM_{2.5}$.

2.2(f) MTC/ABAG shall partner with BAAQMD to develop a program to provide incentives to replace older locomotives and trucks in the region to reduce TACs and $PM_{2.5}$.

In addition, Mitigation Measures 2.1 (a), 2.1(b), and 2.1 (c) (included in *Chapter 2.1: Transportation*) and 2.2 (d) (included under Impact 2.2-5(b)) could help reduce TAC and $PM_{2.5}$ emissions.

Significance after Mitigation

The proposed Plan could result in a larger increase or smaller decrease of TACs and $PM_{2.5}$ emissions in disproportionally impacted communities. These impacts vary across counties. The mitigation measures identified above are anticipated to reduce this potentially significant impact. However, the exact reductions are not known at this time. Therefore, this impact remains significant and unavoidable (SU).

2.3 Land Use and Physical Development

This chapter evaluates the potential effects of the proposed Plan on land use and housing in the Bay Area. It describes trends in overall land use and physical development, including job and housing growth, and agricultural lands. The impact analysis addresses the potential for physical disruption to land uses, displacement of people or housing, loss of agricultural lands, and division or separation of communities. In addition, the proposed Plan's consistency with adopted land use plans and policies is assessed.

Environmental Setting

PHYSICAL SETTING

Land Use Patterns

Since World War II, the San Francisco Bay Area has grown from a primarily agricultural region with one major city (San Francisco) to the seventh most populous combined metropolitan region in the United States[1] with multiple centers of employment, residential development, and peripheral agricultural areas. The pattern of land uses in the Bay Area includes a mix of open space, agriculture, intensely developed urban centers, a variety of suburban employment and residential areas, and scattered older towns. This pattern reflects the landforms that physically define the region; the Bay, rivers, and valleys. Major urban areas are located around the Bay, with the older centers close to the Golden Gate. Newer urban areas are found in Santa Clara County to the south, the valleys of eastern Contra Costa and Alameda Counties, and Sonoma and Solano Counties to the north. The Pacific coast and the northern valleys are primarily in agricultural and open space use, while the agricultural areas adjoining the Central Valley have seen substantial suburban development in recent years, particularly in Solano County and eastern Contra Costa County.

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[1] Census 2010. Accessed August 17, 2012, at http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_NSRD_GCTPL2.US41PR&prodType=table

Extent of Urban Development

According to MTC, only about 17.8 percent of the region's approximately 4.4 million acres were developed in 2010.[2] The remaining undeveloped area includes open space and agricultural lands as well as water bodies (excluding the San Francisco Bay) and parks. Comparatively, 28 percent of the region is identified as protected open space. The amount of land developed in each of the nine counties varies from a low of five percent in Napa County to a high of 80 percent in San Francisco.[3] The Bay Area includes 101 cities, with San José, San Francisco, and Oakland representing the largest urbanized centers. Other major urban centers have formed throughout the region leading to the overall urbanization as illustrated in **Figure 2.3-1**. As shown in **Table 2.3-1**, the counties with the highest employment totals are Santa Clara, Alameda, and San Francisco counties, while the counties with the highest population are Santa Clara, Alameda, and Contra Costa counties.

TABLE 2.3-1: 2010 EMPLOYMENT, HOUSING, AND POPULATION, BY COUNTY

County	*Employment*	*Jobs per Acre*[1]	*Housing Units*	*Housing Units per Acre*[1]	*Households*	*Population*	*Population per Square Mile*[1]
Alameda	694,450	1.95	582,550	1.64	545,140	1,510,270	2,720
Contra Costa	344,920	1.01	400,260	1.17	375,360	1,049,030	1,960
Marin	110,730	0.87	111,210	0.88	103,210	252,410	1,270
Napa	70,650	0.20	54,760	0.15	48,880	136,480	240
San Francisco	568,720	23.25	376,940	15.41	345,810	805,240	21,065
San Mateo	345,200	2.01	271,030	1.58	257,840	718,450	2,670
Santa Clara	926,260	1.59	631,920	1.08	604,200	1,781,640	1,960
Solano	132,350	1.95	152,700	0.32	141,760	413,340	560
Sonoma	192,010	0.24	204,570	0.25	185,830	483,880	380
Region	**3,385,300**	**1.04**	**2,785,950**	**0.86**	**2,608,020**	**7,150,740**	**1,406**

1. Acreage and square miles used to calculate densities exclude the San Francisco Bay and protected open spaces.

Source: Association of Bay Area Governments, Plan Bay Area Jobs-Housing Connection Strategy for employment, housing units, and households; US Census 2010 for population; Open space from Bay Area Open Space Council, 2011; Dyett & Bhatia, 2012.

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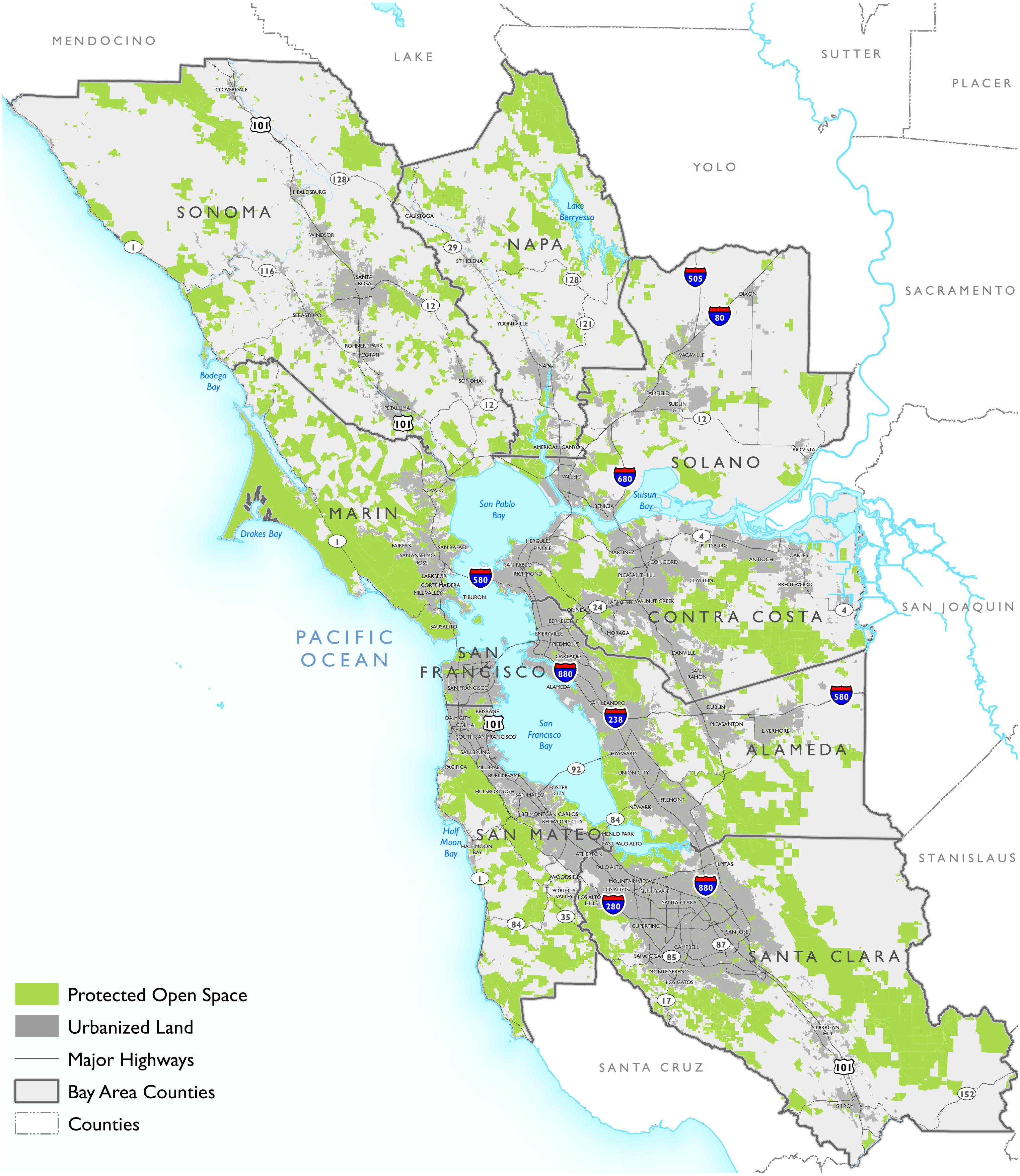
[2] Urbanized Acres in 2010 are based upon the UrbanSim parcels identified urbanized areas in 2010 by the California Department of Conservation Farmland Mapping and Monitoring Program, 2010 for Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara and Solano; data for San Francisco is from 2006. As defined by the Department of Conservation, "urban and built-up land" is occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to a ten acre parcel.

[3] Excludes San Francisco Bay water acreage.

Figure 2.3-1

Urbanized Land and Open Space



Data Source: Bay Area Protected Areas Database, Bay Area Open Space Council, 2012; Farmland Mapping and Monitoring Program, Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Housing Stock

The current stock of housing in the Bay Area includes a relatively large supply of detached and single-family homes, in part because single-family homes have been the predominant form of housing produced in the region for decades. In contrast, currently townhouses, apartment buildings, condos, and other multifamily housing options are comparatively limited. Existing supply and expected demand for various housing types are outlined in **Table 2.3-2.**

While single family homes are expected to continue to be the type of housing with the highest demand, a large increase in interest in other housing types is expected as a result of changing demographics.[4] By 2040 it is expected that the share of housing demand will decrease for single-family homes and increase for multifamily homes and townhomes, as shown in **Table 2.3-2**.

The projected oversupply of single-family homes is expected to reduce demand for other housing types by almost 170,000 units as some households that would otherwise choose multifamily units instead opt for single family homes made more affordable due to excess supply. As a result, new multifamily housing demand is estimated at 394,000 units, and 306,000 new units for attached town homes (**Table 2.3-2**). Although this suggests no demand for newly constructed single-family homes, some production will likely occur as the Bay Area housing market adjusts to these trends.

TABLE 2.3-2: NET HOUSING SUPPLY AND DEMAND BY BUILDING TYPE, 2010 – 2040

Building Type	*Supply 2010*	*Share of 2010 Demand*	*Demand 2040*	*Share of 2040 Demand*	*Housing Demand 2010-2040*	*Net Housing Demand 2010-2040*
Multifamily	717,000	26%	1,206,100	35%	489,100	393,900
Attached / Townhouse	508,000	18%	888,000	26%	380,000	306,100
Detached / Single Family	1,535,000	56%	1,365,900	39%	-169,100	0
Total	**2,760,000**	**100%**	**3,460,000**	**100%**	**700,000**	**700,000**

Source: Association of Bay Area Governments, Plan Bay Area Jobs-Housing Connection Strategy, adapted from Arthur C. Nelson, May 2012.

Coastal Bay Land Uses

The Coastal Commission and the Bay Conservation and Development Commission (BCDC) regulate land use near the coastline in order to protect and enhance the coastline, and to promote public access along the coastline. More information on how these agencies regulate uses near the coast is addressed in the *Regulatory Setting* section below.

[4] See the Projections 2013 Technical Report for more detail, available on the project website, www.onebayarea.org.

Agricultural Land

Current and Historical Agricultural Uses

The Bay Area has a significant amount of land in agricultural uses. In 2010, just over half of the region's approximately 4.5 million acres were classified as agricultural land, as defined by the California Department of Conservation Farmland Mapping and Monitoring Program.[5] Of these 2.3 million acres of agricultural land, over 70 percent (about 1.7 million acres) are used for grazing. Products grown in the Bay Area include field crops, fruit and nut crops, seed crops, vegetable crops and nursery products. Field crops, which include corn, wheat, and oats, as well as pasture lands, represent approximately 63 percent of Bay Area agricultural land.[6]

Table 2.3-3 shows the acres of agricultural lands, by farmland type, for each county in the region, excluding San Francisco County. **Figure 2.3-2** shows the location of these agricultural lands within the region. The classification of agricultural lands is based primarily on soils and climate, though Prime Farmland, Farmland of Statewide Importance, and Unique Farmland must have been used for agricultural production at some time during the previous four years. For more information about farmland classification, see the discussion under the *Regulatory Setting* section below.

Over the last 50 years, a large amount of agricultural land has been converted to urban uses in the Bay Area. According to the U.S. Census of Agriculture, the region had over 3 million acres of land in farms in 1954. By 2007 (the most recent year for which data is available), land in farms, which includes pasture lands, had decreased by 36 percent, over a million fewer acres than in 1954.[7] During this same period, Cropland Harvested decreased by 44 percent. Irrigated land, however, increased by 12 percent, due primarily to very large increases in vineyard planting in Napa and Sonoma counties. **Table 2.3-4** shows historical agricultural land data for the region's nine counties.

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[5] California Department of Conservation, 2010.

[6] County Crop Reports, 2006.

[7] U.S. Department of Agriculture, 1978, 2007.

TABLE 2.3-3: BAY AREA AGRICULTURAL LANDS, 2010

	Alameda	*Contra Costa*	*Marin*	*Napa*	*San Mateo*	*Santa Clara*	*Solano*	*Sonoma*[1]	*Region*
Prime Farmland[2]	4,000	26,500	0	31,600	2,200	17,300	131,800	30,800	244,200
Farmland of Statewide Importance[3]	1,200	7,400	230	9,700	150	3,600	6,400	17,300	45,900
Unique Farmland[4]	2,400	3,200	290	16,400	2,300	2,500	9,300	32,100	68,500
Farmland of Local Importance[5]	0	53,000	63,300	18,500	700	4,300	0	80,000	219,800
Important Farmland Subtotal	**7,600**	**90,100**	**63,820**	**76,200**	**5,350**	**27,700**	**147,500**	**160,200**	**578,400**
Grazing Land[6]	244,000	168,600	89,200	179,000	48,800	392,100	209,200	419,000	1,750,600
Agricultural Land Total	**251,600**	**258,700**	**153,020**	**255,200**	**54,150**	**419,800**	**356,700**	**579,200**	**2,329,000**

Notes:

1. Agricultural land use for Sonoma County uses data from year 2008. Data for year 2010 was not available.
2. Farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields.
3. Similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store moisture.
4. Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards.
5. Important to the local agricultural economy as determined by county's board of supervisors and local advisory committee.
6. Land on which the existing vegetation is suited to the grazing of livestock.

Source: California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program, GIS Data for Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara, Solano (2010), Farmland GIS Data for Sonoma County (2008).

TABLE 2.3-4: BAY AREA AGRICULTURAL LANDS, 1954 AND 2007

	1954			2007			Percent Change 1954-2007		
	Cropland Harvested	*Land in Farms*	*Irrigated Land in Farms*	*Cropland Harvested*	*Land in farms*	*Irrigated Land*[1]	*Cropland Harvested*	*Land in farms*	*Land in Irrigated Farms*
Alameda	59,548	316,994	22,599	10,759	204,633	9,687	-82%	-35%	-57%
Contra Costa	85,807	324,856	50,117	23,876	146,993	27,421	-72%	-55%	-44%
Marin	12,133	236,956	974	4,007	133,275	1,614	-67%	-44%	65%
Napa	52,168	311,907	8,390	51,860	223,246	51,604	-1%	-28%	1%
San Francisco	88	307	n/a	n/a	7	6	-100%	-99.9%	100%
San Mateo	24,194	84,247	6,623	4,909	57,089	3,579	-80%	-32%	-46%
Santa Clara	148,056	590,041	114,677	23,381	299,866	22,245	-84%	-49%	-81%
Solano	135,071	423,423	79,971	120,410	358,225	145,988	-11%	-15%	82%
Sonoma	98,053	761,832	20,231	91,197	530,895	78,265	-7%	-30%	386%
Region	615,118	3,050,563	303,582	330399	1,954,299	340,409	-47%	-36%	12%

1. The names of categories for irrigated land have changed since 1954; this appears to be the closest match.

Source: U.S. Census of Agriculture, 1978, 2007.

Figure 2.3-2
Farmlands

Data Source: Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Williamson Act Lands

In 1965, the State Legislature passed the California Land Conservation Act (better known as the Williamson Act) in response to agricultural property tax burdens resulting from rapid land value appreciation. Rapidly rising property taxes, resulting from nearby urbanization, made agricultural uses increasingly less economically viable. See the discussion under the *Regulatory Settings* section of this chapter for a comprehensive description of the Williamson Act.

Agricultural land under Williamson Act contract includes both "prime" and "nonprime" lands. The California Land Conservation Acts defines prime agricultural land as: (1) U.S. Department of Agriculture (USDA) Class I or II soils; (2) Storie Index soil rating 80 to 100; (3) land that has returned a predetermined annual gross value for three of the past five years; (4) livestock-supporting land with a carrying capacity of at least one animal unit per acre; or (5) land planted with fruit or nut trees, vines, bushes or crops that have a non-bearing period of less than five years and that will normally return a predetermined annual gross value per acre per year during the commercial bearing period (Government Code Section 51200-51207). Nonprime lands include pasture and grazing lands and other non-irrigated agricultural land with lesser quality soils. Prime agricultural lands under the Williamson Act are defined differently from Prime Farmland under the Department of Conservation Farmland Mapping and Monitoring Program, as outlined above.

In 2006, about 1.2 million acres of land were under Williamson Act contract in the Bay Area. Of this, about 203,000 acres were prime farmland and one million acres were nonprime.[8] Lands under Williamson Act contract, therefore, are primarily used for pasture and grazing and not for the cultivation of crops. Nearly 70 percent of prime and nonprime lands under contract are in Santa Clara, Solano, and Sonoma counties. **Table 2.3-5** shows the number of acres of land under Williamson Act contracts in the Bay Area as of 2006, and Williamson Act lands are shown on **Figure 2.3-3.**

As a general rule, land can be withdrawn from Williamson Act contract only through the nine-year nonrenewal process. Immediate termination via cancellation is reserved for "extraordinary," unforeseen situations (See *Sierra Club v. City of Hayward (1961)* 28 Cal.3d 840, 852-855). Furthermore, it has been held that "cancellation is inconsistent with the purposes of the (Williamson) act if the objectives to be served by cancellation should have been predicted and served by nonrenewal at an earlier time, or if such objectives can be served by nonrenewal now" (*Sierra Club v. City of Hayward).* Given the extended phasing and time periods involved in the proposed Plan, it appears potentially feasible to utilize the nonrenewal process if contract termination is necessary for implementation of the proposed Plan.

[8] California Department of Conservation, 2006.

TABLE 2-3.5: WILLIAMSON ACT CONTRACTS IN THE BAY AREA, 2006

	Prime	*Nonprime*	*Total*	*Percent*
Alameda	3,200	138,300	141,500	11%
Contra Costa	5,500	39,000	44,500	4%
Marin	1,100	80,600	81,700	7%
Napa	19,500	49,000	68,500	5%
San Mateo	0	46,500	46,500	4%
Santa Clara	11,300	325,000	336,300	27%
Solano	119,500	142,800	262,300	21%
Sonoma	43,100	228,100	271,200	22%
Region	**203,200**	**1,049,300**	**1,252,500**	**100%**

Source: California Department of Conservation, 2006.

Figure 2.3-3

Williamson Act Lands

Data Source: Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2010; Williamson Act Program,California State Department of Conservation, 2006;The Conservation Lands Network, 2012; Cal-Atlas Geospatial Clearinghouse, 2012;Tom Tom North America, 2011; Dyett & Bhatia, 2012.;

0 5 10 20 Miles

1 in = 16 miles

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Open Space

The Bay Area contains over one million acres of parks and open space across its nine counties (see **Table 2.3-6** and **Figure 2.3-4**). According to the Bay Area Protected Areas Database complied by the Bay Area Open Space Council and GreenInfo Network, 147,000 acres of new parkland were added to the region's open space inventory between 2002 and 2011, representing a 26-percent increase.[9] Additionally, approximately 200,000 acres of privately owned land are held in permanent reserve as of 2011. While access by the general public to these reserve areas is restricted, they are important for the preservation of wildlife habitats and the protection of the environmental and rural characteristics of various parts of the region.

TABLE 2.3-6: BAY AREA PARKS AND OPEN SPACE

County	*Parks and Open Space (acres)**
Alameda	116,000
Contra Costa	130,000
Marin	162,000
Napa	129,000
San Francisco	6,000
San Mateo	108,000
Santa Clara	201,000
Solano	53,000
Sonoma	110,000
TOTAL	**1,015,000**

* Includes publicly owned lands and privately owned lands that are accessible to the public.

Note: Figures may not sum due to independent rounding.

Source: Bay Area Open Space Council and GreenInfo Network, Bay Area Protected Areas Database, 2011.

Forests

The Bay Area is home to a variety of forest types spread throughout the nine-county region. Forests are generally located at higher elevations of the Coastal Range in areas with sufficient moisture. Forest land is a valuable environmental and aesthetic resource and a defining feature in many parts of the landscape in the Bay Area. Forest habitats include a wide range of woodland and forest species. For a comprehensive description of specific forest types and species, please refer to *Chapter 2.9: Biological Resources*. Forests in California are protected by the California Department of Forestry and Fire Protection.

9 Bay Area Open Space Council and GreenInfo Network, Bay Area Protected Areas Database, 2011.

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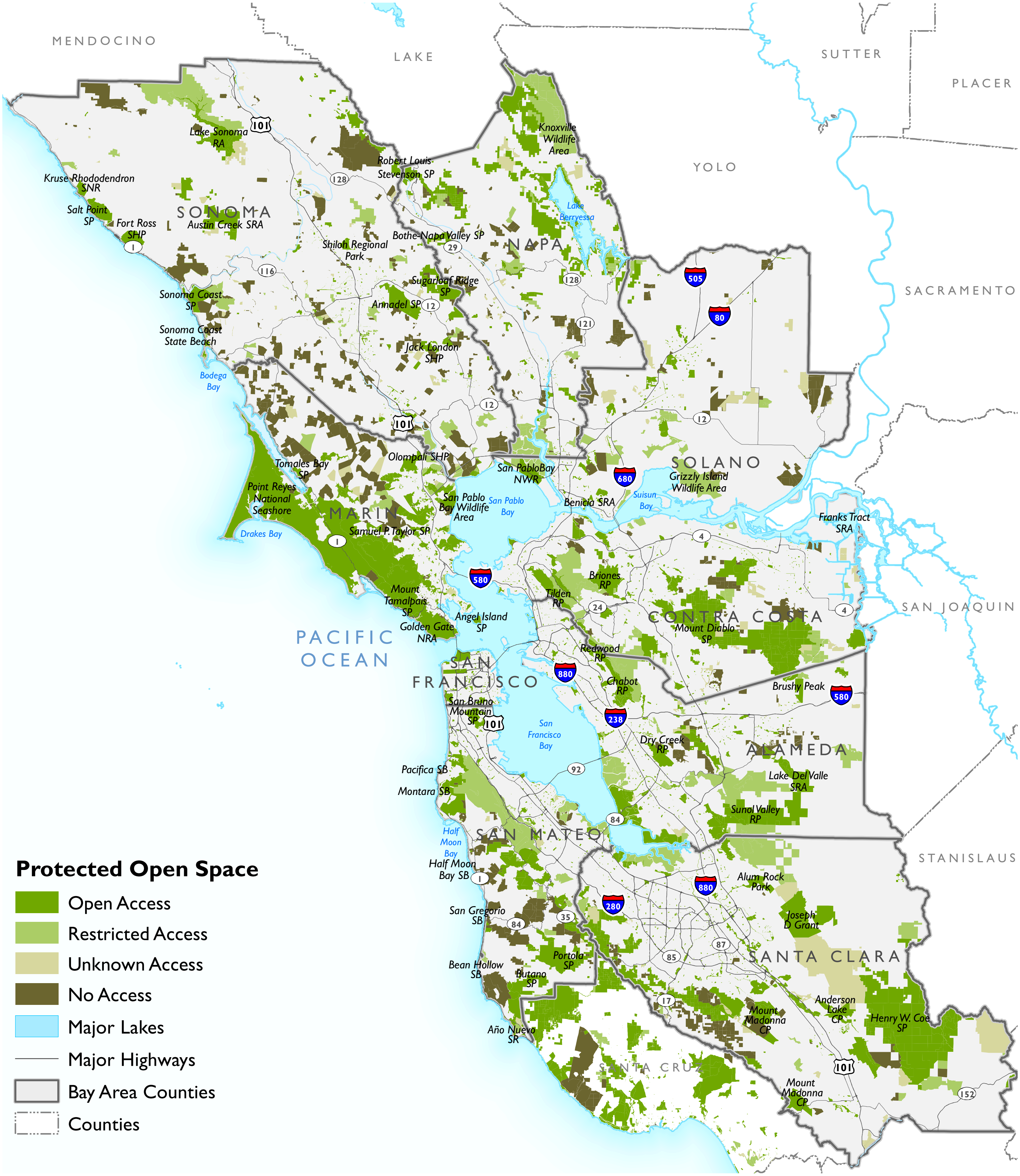
Figure 2.3-4

Regional Parks and Open Space



Protected Open Space

- Open Access
- Restricted Access
- Unknown Access
- No Access
- Major Lakes
- Major Highways
- Bay Area Counties
- Counties

Data Source: Bay Area Protected Areas Database, Bay Area Open Space Council, 2012; California State Park Boundaries, Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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1 in = 16 miles

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REGULATORY SETTING

The regulatory setting includes federal and State agencies and laws, local regulatory bodies, and local control mechanisms guiding agricultural, land use, and transportation decisions. Note that information on Natural Community Conservation Plans and Habitat Conservation Plans is included in *Chapter 2.9: Biological Resources,* and information on Airport Land Use Compatibility Plans is included in *Chapter 2.13: Hazards.*

Federal Regulations

Department of Housing and Urban Development (HUD)

The Department of Housing and Urban Development (HUD) is the federal agency responsible for national policy and programs that address housing needs in the U.S. HUD aims to improve and develop the Nation's communities and enforce fair housing laws. HUD plays a major role in supporting homeownership by underwriting homeownership for lower- and moderate-income families through its mortgage insurance programs.

U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS)

The USDA Natural Resources Conservation Service (NRCS) maps soils and farmland uses to provide comprehensive information necessary for understanding, managing, conserving and sustaining the nation's limited soil resources. In addition to many other natural resource conservation programs, the NRCS manages the Farmland Protection Program, which provides funds to help purchase development rights to keep productive farmland in agricultural uses. Working through existing programs, USDA joins with state, tribal, or local governments to acquire conservation easements or other interests from landowners.

Federal Farmland Protection Policy Act

The USDA's NRCS oversees the Farmland Protection Policy Act (FPPA) (7 U.S. Code [USC] Section 4201 et seq.; see also 7 Code of Federal Regulations [CFR] 658). The FPPA (a subtitle of the 1981 Farm Bill) is national legislation designed to protect farmland. The FPPA states its purpose is to "minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses." The FPPA applies to projects and programs that are sponsored or financed in whole or in part by the federal government. The FPPA does not apply to private construction projects subject to federal permitting and licensing, projects planned and completed without assistance from a federal agency, federal projects related to national defense during a national emergency, or projects proposed on land already committed to urban development. The FPPA spells out requirements to ensure federal programs are compatible with state, local, and private programs and policies to protect farmland, to the extent practical, and calls for the use of the Land Evaluation and Site Assessment (LESA) system to aid in analysis. Because MTC or its project sponsors may ultimately seek some federal funding for transportation improvements, the FPPA is considered in this document.

Food, Conservation, and Energy Act of 2008 (Federal Farm Bill)

In 2008, the U.S. Department of Agriculture passed the 2008 version of the Federal Farm Bill, which is passed about every five years. The Federal Farm Bill governs Federal agriculture and related programs. It includes 15 titles that govern many areas related to food and agriculture production; among them are provisions governing farm credit, agricultural and forest conservation programs, stewardship of land and water resources, and the encouragement of renewable energy sources, among others.

Federal Forest Legacy Program

The Federal Forest Legacy Program was a part of the 1990 Farm Bill. Its purpose is to identify and protect environmentally important forestlands that are threatened by present or future conversion to non-forest uses. The program provides conservation easements and gives priority to lands that can be effectively protected and managed, as well as lands that have significant scenic, recreational, timber, riparian, fish and wildlife, threatened and endangered species, and other cultural or environmental values. Properties that are "working forests," where the forestland is managed for the production of forest products, are also eligible under this program. Involvement in this program by private land owners is voluntary.

Land and Water Conservation Fund Act, Section 6(f)(3)

Section 6(f)(3) of the Land and Water Conservation Fund Act (LWCF Act) of 1965 (16 U.S.C. § 460l et seq.) contains provisions to protect federal investments in park and recreation resources and the quality of those assisted resources. The law recognizes the likelihood that changes in land use or development may make park use of some areas purchased with LWCF Act funds obsolete over time, particularly in rapidly changing urban areas, and provides for conversion to other use pursuant to certain specific conditions.

Section 6(f)(3) states that no property acquired or developed with assistance under Section 6(f)(3) shall, without the approval of the Secretary, be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he or she finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he or she deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location.

This requirement applies to all parks and other sites that have been the subject of LWCF Act grants of any type, and includes acquisition of park land and development or rehabilitation of park facilities. If a transportation project would have an effect upon a park or site that has received LWCF Act funds, the requirements of Section 6(f)(3) would apply.

State Regulations

Senate Bill 375 (Chapter 728, Statutes of 2008)

The Global Warming Solutions Act of 2006 (AB 32), requires the State of California to reduce greenhouse gas (GHG) emissions to 1990 levels no later than 2020. Pursuant to the passing of AB 32, SB 375, Sustainable Communities and Climate Projection Act of 2008, was passed to assist in achieving the goals of AB 32 for emissions associated with cars and light trucks. The bill requires each of the 17 Metropolitan Planning Organizations (MPOs) to prepare a Sustainable Communities Strategy (SCS) within their Regional Transportation Plan (RTP). These plans set forth the vision for growth in the region, taking into account the transportation, housing, environmental, and economic needs of the region while reducing the impact on valuable agricultural land and open space through policies encouraging more compact development. Each SCS is a blueprint by which the region will meet its GHG emissions reductions target if there is a feasible way to do so. Plan Bay Area is the integrated SCS and RTP for the San Francisco Bay Area, consistent with SB 375.

Department of Housing and Community Development (HCD)

In response to state population and household growth, and to ensure the availability of affordable housing for all income groups, the State Department of Housing and Community Development (HCD) is responsible for determining the regional housing need for all jurisdictions in California.

Housing Element Law

Enacted in 1969, Housing element law (Government Code Section 65580-65589.8) mandates that local governments adequately plan to meet the existing and projected housing needs of all economic segments of the community. The law acknowledges that, in order for the private market to adequately address housing needs and demand, local governments must adopt land use plans and regulatory systems which provide opportunities for, and do not unduly constrain, housing development. As a result, housing policy in the State rests largely upon the effective implementation of local general plans and, in particular, local housing elements. Housing element law also requires the Department of Housing and Community Development (HCD) to review local housing elements for compliance with State law and to report its written findings to the local government.

Senate Bill No. 2 (Chapter 633, Statutes of 2007)

SB 2 strengthens state housing element law (Government Code Section 65583) by ensuring that every jurisdiction identifies potential sites where new emergency shelters can be located without discretionary review by the local government. It also increases protections for providers seeking to open a new emergency shelter, transitional housing or supportive housing development, by limiting the instances in which local governments can deny such developments.

California Coastal Commission

The Coastal Commission is one of California's three designated coastal management agencies that administer the federal Coastal Zone Management Act (CZMA) in California. In partnership with coastal cities and counties, it plans and regulates the use of land and water in the coastal zone. Development activities, which are broadly defined by the CZMA to include (among others) construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters, generally require a coastal permit from either the Coastal Commission or the local government. CZMA gives State coastal management agencies regulatory control over all activities that may affect coastal resources including any new developments, and highway improvement projects that use federal funds.

The mission of the Coastal Commission, established by voter initiative in 1972 and later made permanent by the Legislature through adoption of the California Coastal Act of 1976, is to protect, conserve, restore, and enhance environmental and human-based resources of the California coast and ocean for environmentally sustainable and prudent use by current and future generations. The Coastal Act includes specific policies that address issues such as shoreline public access and recreation, lower cost visitor accommodations, terrestrial and marine habitat protection, visual resources, landform alteration, agricultural lands, commercial fisheries, industrial uses, water quality, offshore oil and gas development, transportation, development design, power plants, ports, and public works. The coastal zone, which was specifically mapped by the Legislature, covers an area larger than the State of Rhode Island. On land, the coastal zone varies in width from several hundred feet in highly urbanized areas to up to five miles in certain rural areas, and offshore, the coastal zone includes a three-mile-wide band of ocean. The coastal zone established by the Coastal Act does not include San Francisco Bay, where development is regulated by the Bay Conservation and Development Commission (BCDC).

The Coastal Commission plans and regulates the use of land and water in the coastal zone in partnership with coastal cities and counties. Development activities, which are broadly defined by the Coastal Act to include (among others) construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters, generally require a coastal permit from either the Coastal Commission or the local government. Implementation of Coastal Act policies is accomplished primarily through the preparation of local coastal programs (LCPs) that are required to be completed by each of the 15 counties and 60 cities located in whole or in part in the coastal zone. Completed LCPs must be submitted to the Coastal Commission for review and approval. An LCP includes a land use plan (LUP) which may be the relevant portion of the local general plan, including any maps necessary to administer it, and the zoning ordinances, zoning district maps, and other legal instruments necessary to implement the land use plan. Coastal Act policies are the standards by which the Coastal Commission evaluates the adequacy of LCPs, and amendments to certified LUPs and LCPs only become effective after approval by the Coastal Commission. The Coastal Commission is required to review each certified LCP at least once every five years to ensure that coastal resources are effectively protected in light of changing circumstances.

The Bay Area coastline is part of the North Central Coast Area. As of July 1, 2011, LCPs were effectively certified for Sonoma County, Marin County (with deferred certification for the Calle del Arroyo Lots), San Francisco City and County (one of two segments), San Mateo County, Daly City, and the City of Pacifica (with deferred certification for the Quarry Area and Shell Dance).

Bay Conservation and Development Commission (BCDC)

BCDC is dedicated to the protection and enhancement of San Francisco Bay and the Suisun Marsh and to the encouragement of their responsible use. As the other designated coastal zone management agency, and pursuant to the McAteer-Petris Act, BCDC is designated as the agency responsible for the protection of the Bay and its natural resources and for the regulation of the development of the Bay and shoreline to their highest potential with a minimum of Bay fill. For development projects, including transportation improvements, BCDC jurisdiction includes the Bay itself (including San Pablo and Suisun Bays, sloughs, and certain creeks) and, in general, a 100-foot band along the Bay shoreline.

The McAteer-Petris Act further specifies that certain water-oriented land uses should be permitted on the shoreline, including ports, water-related industries, airports, wildlife refuges, water-oriented recreation and public assembly, desalinization plants, and power plants requiring large amounts of water for cooling purposes. Priority areas designated for such uses in the Bay Plan are to be reserved for them in order to minimize the need for future filling in the Bay for such uses. It is necessary to obtain BCDC approval prior to undertaking any work within 100 feet of the Bay shoreline (including grading); filling of the Bay or certain tributaries of the Bay; dredging; Suisun Marsh projects; any filling, new construction, major remodeling, substantial change in use, and many land subdivisions in the Bay, along the shoreline, in salt ponds, duck hunting preserves or other managed wetlands adjacent to the Bay.

Williamson Act and Farmland Security Zone Contracts

The California Land Conservation Act (Government Code Section 51200 et seq.) of 1965, commonly known as the Williamson Act, provides a tax incentive for the voluntary enrollment of agricultural and open space lands in contracts between local government and landowners. The Act allows local governments to assess agricultural land based on the income-producing value of the property, rather than the "highest and best use" value, which had previously been the rule. The contract enforceably restricts the land to agricultural and open space uses and compatible uses defined in state law and local ordinances. An agricultural preserve, which is established by local government, defines the boundary of an area within which a city or county will enter into contracts with landowners. Local governments calculate the property tax assessment based on the actual use of the land instead of the potential land value assuming full development.

Terms of Williamson Act contracts are 10 years and longer. The contract is automatically renewed each year, maintaining a constant, 10-year contract, unless the landowner or local government files to initiate nonrenewal. A "notice of nonrenewal" starts the nine-year nonrenewal period. During the nonrenewal process, the annual tax assessment gradually increases. At the end of the nine-year nonrenewal period, the contract is terminated. Only a landowner can petition for a contract cancellation. Tentative contract cancellations can be approved only after a local government makes specific findings and determines the cancellation fee to be paid by the landowner.

The State of California has the following policies regarding public acquisition of, and locating public improvements on lands in, agricultural preserves and on lands under Williamson Act contracts (Government Code Section 51290–51295):

- State policy is to avoid locating federal, state, or local public improvements and improvements of public utilities, and the acquisition of land, in agricultural preserves.
- State policy is to locate public improvements that are in agricultural preserves on land other than land under Williamson Act contract.
- State policy is that any agency or entity proposing to locate such an improvement, in considering the relative costs of parcels of land and the development of improvements, give consideration to the value to the public of land, particularly prime agricultural land, in an agricultural preserve.

Since 1998, another option in the Williamson Act Program has been established with the creation of Farmland Security Zone contracts. A Farmland Security Zone is an area created within an agricultural preserve by a board of supervisors upon the request of a landowner or group of landowners. Farmland Security Zone contracts offer landowners greater property tax reduction and have a minimum initial term of 20 years. Like Williamson Act contracts, Farmland Security Zone contracts renew annually unless a notice of nonrenewal is filed.

California Farmland Conservancy Program

The California Farmland Conservancy Program (Public Resources Code Section 10200 et seq.) supports the voluntary granting of agricultural conservation easements from landowners to qualified nonprofit organizations, such as land trusts, as well as local governments. Conservation easements are voluntarily established restrictions that are permanently attached to property deeds, with the general purpose of retaining land in its natural, open-space, agricultural, or other condition while preventing uses that are deemed inconsistent with the specific conservation purposes expressed in the easements. Agricultural conservation easements define conservation purposes that are tied to keeping land available for continued use as farmland. Such farmlands remain in private ownership, and the landowner retains all farmland use authority, but the farm owner is restricted in its ability to subdivide or use the land for nonagricultural purposes, such as urban uses. Potential impacts on conservation easements would be addressed in subsequent project-level documents.

Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP) is the only statewide land use inventory conducted on a regular basis. The California Department of Conservation administers the FMMP, pursuant to which it maintains an automated map and database system to record changes in the use of agricultural lands. Farmland under the FMMP is listed by category—Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. The farmland categories listed under the FMMP are described below. The categories are defined pursuant to USDA land inventory and monitoring criteria, as modified for California.

Prime Farmland

Prime Farmland is land with the best combination of physical and chemical features to sustain long-term production of agricultural crops. These lands have the soil quality, growing season, and moisture supply necessary to produce sustained high yields. Soil must meet the physical and chemical criteria determined by the NCRS. Prime Farmland must have been used for production of irrigated crops at some time during the four years prior to the mapping date by the FMMP.

Farmland of Statewide Importance

Farmland of Statewide Importance is similar to Prime Farmland but with minor differences, such as greater slopes or a lesser ability of the soil to store moisture. Farmland of Statewide Importance must have been used for production of irrigated crops at some time during the four years prior to the mapping date.

Unique Farmland

Unique Farmland has lesser quality soils than Prime Farmland or Farmland of Statewide Importance. Unique Farmland is used for the production of the state's leading agricultural crops. These lands are usually irrigated but may include nonirrigated orchards or vineyards found in some climatic zones in California. Unique Farmland must have been used for crops at some time during the four years prior to the mapping date.

Farmland of Local Importance

Farmland of Local Importance is farmland that is important to the local agricultural community as determined by each county's board of supervisors and local advisory committees.

Quimby Act

The 1975 Quimby Act (California Government Code section 66477) authorized cities and counties to pass ordinances requiring that developers set aside land, donate conservation easements, or pay fees for park improvements. The Act states that the dedication requirement of parkland can be a minimum of three acres per thousand residents or more, up to five acres per thousand residents if the existing ratio is greater than the minimum standard. Revenues generated through in lieu fees collected under the Quimby Act cannot be used for the operation and maintenance of park facilities. In 1982, the Act was substantially amended. The amendments further defined acceptable uses of or restrictions on Quimby funds, provided acreage/population standards and formulas for determining the exaction, and indicated that the exactions must be closely tied (nexus) to a project's impacts as identified through studies required by CEQA.

State Open Space Standards

State planning law (Government Code Section 65560) provides a structure for the preservation of open space by requiring every city and county in the State to prepare, adopt, and submit to the Secretary of the Resources Agency a "local open-space plan for the comprehensive and long-range preservation and conservation of open-space land within its jurisdiction." The following open space categories are identified for preservation:

- *Open space for public health and safety,* including, but not limited to, areas that require special management or regulation due to hazardous or special conditions.
- *Open space for the preservation of natural resources,* including, but not limited to, natural vegetation, fish and wildlife, and water resources.
- *Open space for resource management and production,* including, but not limited to, agricultural and mineral resources, forests, rangeland, and areas required for the recharge of groundwater basins.
- *Open space for outdoor recreation,* including, but not limited to, parks and recreational facilities, areas that serve as links between major recreation and open space reservations (such as trails, easements, and scenic roadways), and areas of outstanding scenic and cultural value.
- *Open space for the protection of Native American sites,* including, but not limited to, places, features, and objects of historical, cultural, or sacred significance such as Native American sanctified cemeteries, places of worship, religious or ceremonial sites, or sacred shrines located on public property (further defined in California Public Resources Code Sections 5097.9 and 5097.993).

State Public Park Preservation Act of 1971

The primary instrument for protecting and preserving parkland is the State Public Park Preservation Act of 1971 (Pub. Resources Code, §§ 5400-5409). Under the Act, cities and counties may not acquire any real property that is in use as a public park for any non-park use unless compensation or land, or both, are provided to replace the parkland acquired. This ensures no net loss of parkland and facilities.

California Forestry Legacy Program Act of 2000

The California Forestry Legacy Program Act, similar to the Federal Forest Legacy Program, is a program of the California Department of Forestry and Fire Protection (CAL FIRE). The program provides conservation easements to environmentally sensitive forest areas that have environmental, aesthetic or commodity value. Money from the program is obtained by gifts, donations, federal grants and loans, and other appropriate funding sources, and from the sale of bonds pursuant to the Safe Neighborhood Parks, Clean Water, Clean Air, and Coastal Protection Bond Act of 2000. This program is entirely voluntary by landowners who wish to participate.

CALFIRE Fire and Resource Assessment Program

In 2008, the Federal Farm Bill added a provision to federal law that required states to provide assessments of the status of all forest resources and forest resource trends and conditions. Priority landscapes throughout the state are delineated through assessment reports to help forest management programs understand the issues behind forest resources. The assessment includes information on threats to forest lands in the state, including threats from wildfire, development, forest pests, and exotic invasive species; as well as more recent threats to forest lands including renewable energy infrastructure, off highway vehicle use, and climate change. The assessment includes statewide maps that pinpoint areas of concern related to these possible threats.

Regional/Local Regulations

Association of Bay Area Governments (ABAG)

Through its role as the Bay Area's council of governments (COG), ABAG has been designated by the State and federal governments as the official comprehensive planning agency for the Bay Area. ABAG reviews projects of regional significance for consistency with regional plans and is also responsible for preparation of the Regional Housing Needs Allocation (RHNA), pursuant to California Government Code Section 65584(a). ABAG's locally adopted Regional Housing Needs Allocation (2007-2014) (approved by the ABAG Board May 15, 2008), along with the San Francisco Bay Area Housing Needs Plan, 2007-2014 (released June 5, 2008) provide a policy guide for planning the region's housing, economic development, environmental quality, transportation, recreation, and health and safety.

MTC Resolution 3434 Transit Oriented Development (TOD) Policy for Regional Transit Expansion Projects (Resolution 3434)

MTC adopted a TOD Policy in 2005 to support the development of communities around new transit lines and stations identified as part of the Resolution 3434 Regional Transit Expansion Program. Resolution 3434 aims to improve the cost-effectiveness of regional investments in new transit expansions in order to ease the Bay Area's chronic housing shortage, create vibrant new communities, and help preserve open space through ensuring that new development patterns are more supportive of transit. The three key elements of the regional TOD policy are:

- Corridor-level thresholds to quantify appropriate minimum levels of development around transit stations along new corridors;
- Local station area plans that address future land use changes, station access needs, circulation improvements, pedestrian friendly design, and other key features in a transit-oriented development; and
- Corridor working groups that bring together Congestion Management Agencies (CMAs), city and county planning staff, transit agencies, and other key stakeholders to define expectations, timelines, roles and responsibilities for key stages of the transit project development process.

TOD policy application only applies to physical transit extensions funded in Resolution 3434 with regional discretionary funds (as defined in the policy guidelines), regardless of the level of funding. However, single station extensions to international airports are not subject to the TOD policy due to the infeasibility of housing development. The implementation process of the TOD policy involved coordination with the transit agency, city, and MTC/CMA/ABAG in order to determine thresholds for station areas and housing. Each transit extension project funded in Resolution 3434 must determine corridor-level thresholds, which may vary by modes of transit, in the form of minimum number of housing units along the corridor. Along with determining thresholds, each physical transit extension project seeking funding from Resolution 3434 must demonstrate that the thresholds for the corridor are met through existing development and adopted station area plans that commit local jurisdictions to a level of housing that meets the threshold.

FOCUS

ABAG and MTC, along with the Bay Area Air Quality Management District and the Bay Conservation and Development Commission, initiated an incentive-based strategy called FOCUS in 2007, which was supported in part by a Regional Blueprint Planning Grant from the State of California. While FOCUS is not part of the regional regulatory framework, it represented a step forward in integrating land use and transportation policies and investments. The primary mission of FOCUS is to work with local and regional entities to encourage more housing adjacent to transit in existing communities and to conserve regionally significant resource areas. FOCUS includes the identification of Priority Development Areas (PDAs) and Priority Conservation Areas (PCAs). Local governments volunteer to designate areas of their communities as PDAs. Designated PDAs are then eligible for capital infrastructure funds, planning grants, and technical assistance to support housing and transit-oriented developments. In addition, the purpose of identifying PCAs as part of FOCUS is to highlight near-term opportunities for land conservation in the Bay Area that have consensus from local agencies for protection. Highlighting these areas as part of a regional planning program is intended to help inform the distribution of public funds and leverage private funds and new partnerships to invest in these areas. **Figure 2.3-5** depicts the FOCUS Priority Development Areas.

Local Agency Formation Commissions

Each county in California has a local agency formation commission (LAFCO), which is the agency that has the responsibility to create orderly local government boundaries, with the goals of encouraging the orderly formation of local governmental agencies and the preservation of open space lands, and discouraging urban sprawl. LAFCOs are governed by Section 56000 of the California Government Code. This legislation sets the Commission's powers and duties, procedures for establishing and changing governmental boundaries, and other statewide policies that LAFCOs must consider while making their determinations. While LAFCOs have no direct land use power, their actions determine which local government will be responsible for planning new areas. LAFCOs address a wide range of boundary actions, including creation of spheres of influences for cities, adjustments to boundaries of special districts, annexations, incorporations, detachments of areas from cities, and dissolutions of cities.

Local Control Mechanisms

General Plans

The most comprehensive land use planning for the San Francisco Bay Area region is provided by city and county general plans, which local governments are required by State law (California Government Code Section 65300 et seq.) to prepare as a guide for future development. The general plan contains goals and policies concerning topics that are mandated by State law or which the jurisdiction has chosen to include. Required topics are: land use, circulation, housing, conservation, open space, noise, and safety. Other topics that local governments frequently choose to address are: public facilities, parks and recreation, community design, and/or growth management. City and county general plans must be consistent with each other. County general plans must cover areas not included by city general plans (i.e., unincorporated areas).

Specific and Master Plans

A city or county may also provide land use planning by developing community or specific plans for smaller, more specific areas within their jurisdiction. These plans are more localized and provide focused guidance for developing a specific area, including development standards tailored to the area, and systematic implementation of the general plan.

Zoning

The city or county zoning code is the set of detailed requirements that implement the general plan policies at the level of the individual parcel. The zoning code presents standards for different uses and identifies which uses are allowed in the various zoning districts of the jurisdiction. Since 1971, State law has required the city or county zoning code to be consistent with the jurisdiction's general plan (California Government Code Section 65860).

Growth Control Measures

Local growth control endeavors to manage community growth by various methods, including tying development to infrastructure capacity or traffic level of service standards, limiting the number of new housing units, setting limits on the increase of commercial square footage, linking development to a jobs-housing balance, and the adoption of urban growth boundaries. These goals and others can be achieved through the adoption of a countywide Growth Management Program (GMP). GMPs, including urban growth boundaries, have been implemented by county government and/or cities in all of the nine Bay Area counties.

Public Ownership, Purchase of Development Rights, and Open Space Acquisition

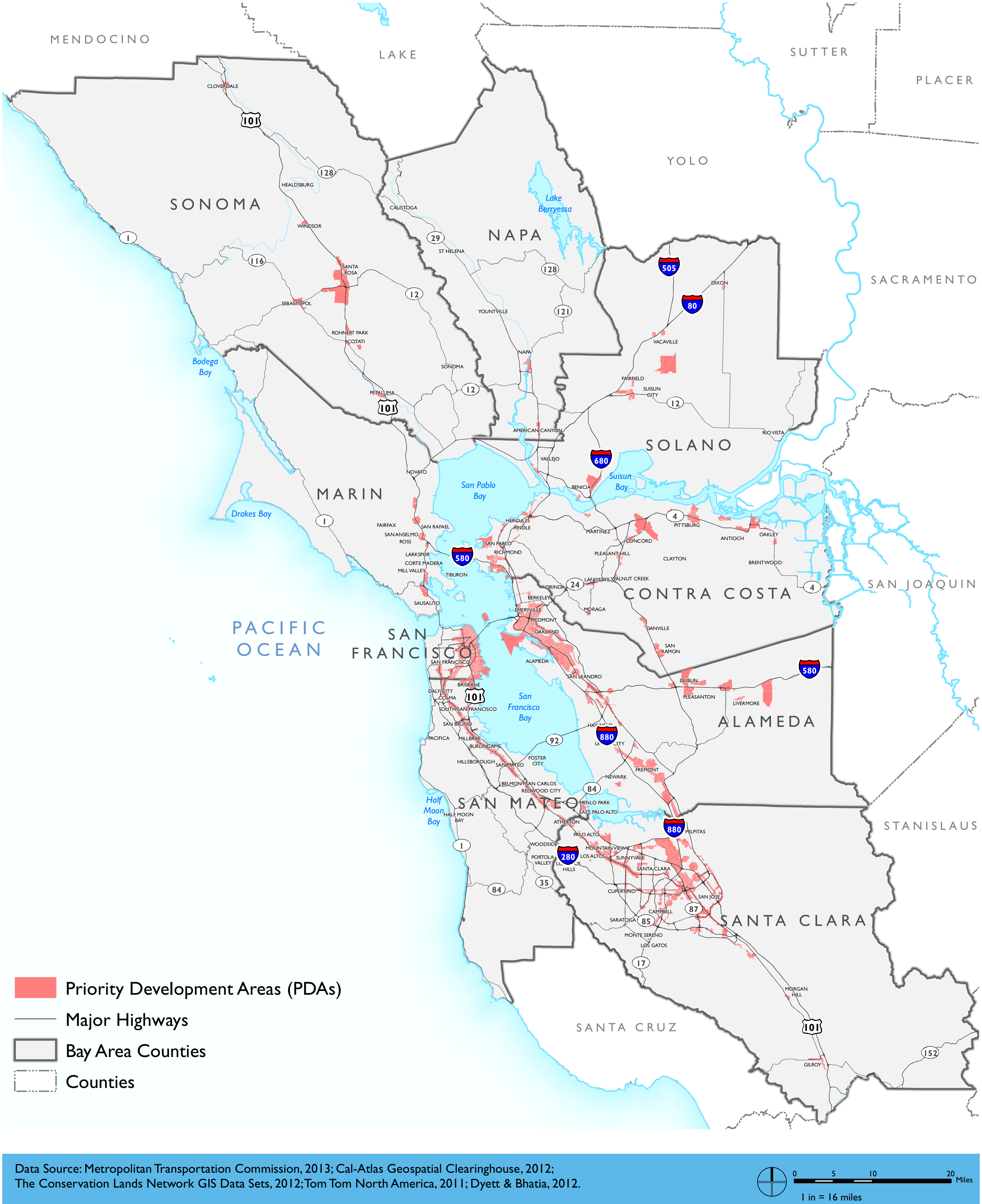
Local governments and special districts, either on their own or working with land trusts and conservancies, can acquire fee title to agricultural and open space lands or purchase development rights to preserve rural and agricultural areas, watersheds, or critical habitat, or to create public parks and recreational areas. Such actions have been undertaken in all Bay Area counties and have had significant effects on the shape of cities and urban form in the region.

Recreation and Parks Master Plans

These plans outline projected recreation facility needs and strategies for fulfilling those needs. The main purpose of the plans is to provide guidance for addressing preservation, use, development, and administration of recreation facilities. These policy and action documents ensure the preservation of the natural environment, while providing improvements to facilitate human enjoyment of the parks and recreation areas. Plans can target goals and future actions for a specific park or be generalized to a collection of parks in a larger system.

Figure 2.3-5

Priority Development Areas (PDAs)



Data Source: Metropolitan Transportation Commission, 2013; Cal-Atlas Geospatial Clearinghouse, 2012; The Conservation Lands Network GIS Data Sets, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Impact Analysis

The land use impact analysis assesses the potential for significant adverse impacts related to conversion or loss of important agricultural lands and open space; community displacement and disruptions, including potential loss of housing and separation of people from community resources; and Plan consistency with adopted land use plans.

SIGNIFICANCE CRITERIA

Implementation of the proposed Plan would have a potentially significant adverse impact if it would:

Criterion 1: Result in residential or business disruption or displacement of substantial numbers of existing population and housing.

Criterion 2: Result in permanent alterations to an existing neighborhood or community by separating residences from community facilities and services, restricting access to commercial or residential areas, or eliminating community amenities.

Criterion 3: Conflict substantially with the land use portion of adopted local general plans or other applicable land use plans, including specific plans, existing zoning, or regional plans such as coastal plans or the Bay Plan.

Criterion 4: Convert substantial amounts of important agricultural lands and open space (Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) or lands under Williamson Act contract to non-agricultural use. Such conversion from agricultural use would be significant whether or not the proposed facility is consistent with local or regional plans.

Criterion 5: Result in the loss of forest land, conversion of forest land to non-forest use, or conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production.

METHOD OF ANALYSIS

The EIR land use analysis addresses the following issues: community displacement and disruptions, including potential loss of housing; physical divisions of communities or disruption of access to community facilities and services; proposed Plan consistency with adopted land use plans; conversion or loss of important agricultural lands or open space; and loss of forest land.

The land use analysis is based on outputs from the land use and transportation models (referenced below), which are compared to existing conditions to identify potential impacts. The transportation projects considered include those that have the potential for physical impacts based on characteristics such as expansion, widening, new construction or new configurations. The land use strategy is analyzed based on areas with the greatest projected land-use changes, in terms of projected population, jobs, densities, and land uses by location. The analysis also considers impacts by county to determine: (1) the general amount and type of land that might be impacted; and (2) where impacts may be concentrated.

Because there are no details about right-of-way requirements for the various transportation investments, the analysis necessarily makes general assumptions about the amount of land needed to implement the transportation projects in the proposed Plan (specific assumptions are cited in footnotes in the detailed analysis). Further, future land use development is programmatic and not site specific, so detailed information on the amount of land developed is necessarily based on a series of conservative assumptions, outlined in the impact assessment. As a result, the analysis presents a conservative scenario of land use impacts, and the acreages in the analysis are used as a guide in assessing relative impacts.

Residential or Business Disruption, Division, or Displacement

This assessment evaluates potential direct impacts due to physical disruptions to existing communities, including potential displacement of residents, as a result of the proposed land use strategy and transportation improvements. Because the goal of the proposed Plan is to accommodate the region's population, displacement as a result of land use changes is not expected to be a significant impact region-wide. However, localized displacement as a result of land use changes is addressed qualitatively, and a general assessment of how the proposed Plan could impact housing is included, with a focus on physical impacts such as displacement. Additionally, the analysis considers potential impacts related to disrupting existing businesses. (It is noted here that displacement as a result of affordability is addressed in the proposed Plan as part of the Equity Analysis, rather than in this EIR.) Land use displacement that would result in low-income residents moving farther away from jobs (to find replacement low-income housing) is evaluated in relation to how it impacts other issue areas, for instance in terms of impacts related to transportation and air quality. Because income is considered in the UrbanSim land use model as well as the MTC Travel Model, land use changes as a result of shifting markets and affordability is incorporated into the final model outputs. However, specific impacts related to affordability and market impacts are not assessed in this EIR. Urbanized land footprints were developed for the proposed Plan based on GIS raster data developed by MTC using UrbanSim land use outputs.[10] Raster data includes the forecast location of new jobs and housing throughout the region. Detailed information on modeling processes, including adjustments and outputs, is included in the Plan Bay Area Land Use Model Data Summary supplemental report, released in March 2013. This data and other documents can be obtained from the MTC/ABAG Library, or from the OneBayArea website at www.onebayarea.org.

The transportation projects with potential physical impacts were studied using GIS and compared with existing land use maps to ascertain whether they could result in residential or business disruption or displacement of substantial numbers of existing population and housing. The analysis is presented by county and involves assumptions based on limited available information, since in most cases, the transportation projects are in the early planning phases and land use changes are at the policy level, rather than specific project-level. Overall, 160 of the 700 transportation projects in the proposed were identified as projects with potential physical impacts on land use, based on general characteristics such as widening, construction, and new roadway configurations.

Additionally, the EIR analyzes the potential for long term physical separation or division of communities by reviewing the location of land use projects under the proposed Plan in relation to surrounding land uses and community development. High growth areas for new jobs and housing, new road or highway projects, extension projects, and major interchange projects are assumed to have a higher potential to divide existing communities, while areas with only minor land use changes, widening and other projects

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[10] Future urbanized footprint is based on modeled future development of over eight people per acre and/or 10 jobs per acre.

along established transportation rights-of-way are assumed to have a lower potential to divide existing communities or neighborhoods in the long-term.

Consistency with Land Use Plans

The proposed Plan focuses regional growth into PDA areas. In preparation for the drafting of the proposed Plan, local jurisdictions, which have land use authority, nominated areas within their borders as potential PDAs appropriate to concentrate future growth. Local jurisdictions identified the appropriate Place Type for each PDA (such as regional center, transit neighborhood, or rural town), which provides a general set of guidelines for the character, scale, and density of future growth and best matches the community vision for the area.[11] Regional land use and housing allocations, particularly as related to PDAs, were based on extensive dialogue between ABAG and local jurisdictions and the proposed Plan will only be implemented insofar as local jurisdictions adopt its policies and recommendations. A qualitative discussion related to the generalized effects of these changes is outlined below.

The EIR qualitatively evaluates local and sub-regional planning efforts and the potential impacts of the proposed Plan on those efforts. Aspects of the proposed Plan that might otherwise support and encourage land use changes could face offsetting pressures such as:

- General Plan policies and development controls that require voter approval (such as those set by initiative).
- General Plan policies and development controls based on joint-powers agreements (such as regional open space reserves, buffers between communities, or urban service boundaries and urban limit lines).
- General Plan policies and development controls reflecting infrastructure constraints or severe environmental constraints.

Local jurisdictions are responsible for adopting land use policies as part of their general and neighborhood plans and implementing them through local ordinance. As a result, MTC and ABAG have no direct control over local land use planning. Nevertheless, regional efforts will be made through OneBayArea Grant (OBAG) funding to assist local jurisdictions in aligning local land use policies with the proposed Plan. Additionally, MTC and ABAG's PDA Planning Grant Program will assist local jurisdictions in increasing housing supply and jobs, increasing land use intensities, promoting alternative modes of travel, and managing parking.

Regional plans such as the Bay Plan are addressed in general terms. Consistency with Natural Community Conservation Plans and Habitat Conservation Plans is addressed in *Chapter: 2.9 Biological Resources*. Consistency with Airport Land Use Compatibility Plans is addressed in *Chapter 2.13: Hazards*.

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[11] Association of Bay Area Governments, Plan Bay Area Jobs-Housing Connection Strategy, revised May 16, 2012.

Agricultural Lands and Open Space

The agricultural lands and open space analysis identifies factors affecting development impacts at the county level and determines whether the proposed Plan would affect the relative ability of local jurisdictions to protect agriculture and open space designated as "permanent." The overall goal is to minimize the adverse effect of increased demand for public facilities and services on prime farmland and other important farmland slated to be preserved. The analysis considers direct and indirect impacts and focuses on identified priority agricultural areas. The analysis also identifies areas that may be subject to conversion of Williamson Act contract lands.

To conduct the agricultural lands and open space analysis, 160 of the 700 transportation projects in the proposed Plan were identified as projects with potential physical impacts on farmland, based on general characteristics such as widening, construction, and new roadway configurations. Since many of these projects are located in urban areas, only a subset overlaps with mapped farmland. Similarly, the locations of projected new housing and employment uses were identified. The location of projected new housing and employment uses were then studied using Geographic Information Systems (GIS) and compared with the farmland maps referenced in the Environmental Setting to determine the extent of the physical impacts of the proposed Plan transportation projects and land use changes on important agricultural lands.

Forest Lands

Forest data was collected from the USDA National Agricultural Statistics Service's 2011 Cropland Data Layer (CDL) for California. The CDL is produced yearly, and uses satellite imagery to produce 30-meter resolution crop-specific land cover data. Urban and non-agricultural land cover designations are grouped in broad categories, of which four relate to forest or wooded areas: Deciduous Forest, Evergreen Forest, Mixed Forest, and Woody Wetlands. Similarly to the agricultural analysis above, these four categories were compared with future transportation and development projects and the overlapping area was calculated.

SUMMARY OF IMPACTS

Community Disruption/Displacement

Short-term construction effects of land use and transportation projects could cause localized impacts, but would be temporary in nature. Long term impacts on community disruption or displacement are possible as a result of proposed transportation projects and land development where substantial land use changes are identified.

Community Separation

While long term impacts resulting from proposed transportation projects are anticipated to be minor and mitigable, land use projects have the potential for long-term impacts given the variation in local land use controls and standards related to new development.

Consistency with Local Plans

The land use and transportation projects in the proposed Plan are not expected to substantially conflict with local or regional plans. The proposed Plan was developed with input from local jurisdictions for both land use and transportation projects. Land use authority will remain with the relevant local jurisdictions and permitting agencies (such as BCDC) and the proposed Plan will only be implemented insofar as local jurisdictions adopt its policies and recommendations.

Conversion of Farmland, Open Space, and Timberland or Forestland

Together, land use and transportation projects in the proposed Plan have the potential to convert 5,941 acres of agricultural land to urbanized uses, which represents 0.3 percent of all agricultural land in the Bay Area. Of this, 1,184 acres are identified as Prime or Unique Farmland, or Farmland of Statewide Importance (assuming no overlap). Further, 723 acres of Williamson Act lands are identified as potentially converted by combined land use and transportation projects. This represents 0.06 percent of all Williamson Act lands in the Bay Area. Finally, 2,022 acres of protected open space lands are identified as potentially converted by combined land use and transportation projects. This represents 0.5 percent of all open space lands in the Bay Area. Together, land use and transportation projects in the proposed Plan have the potential to convert 1,414 acres of forest land or timberland to urbanized uses, which represents 0.1 percent of total forest land and timberland acreage in the Bay Area.

IMPACTS AND MITIGATION MEASURES

Impact

2.3-1 Implementation of the proposed Plan could result in residential or business disruption or displacement of substantial numbers of existing population and housing.

Impacts of Land Use Projects

Regional Effects

Development projects under the proposed Plan could result in short term local community disruption where such improvements involve significant construction activity. Projects will undergo construction at different times throughout the life of the proposed Plan. New development resulting from the proposed Plan could displace residents or disrupt businesses and existing land use patterns. The significance of the disruption will depend upon the size and extent of the development, the nature of the disruption, and the duration of construction. While construction activities are typically limited in duration, work on major projects often spans a period of several years because the projects are large and complex and/or because the construction contractors are required to keep traffic flowing on existing lanes passing through or adjacent to construction sites. As a result, the construction of major development can result in frequent inconveniences (e.g., blocked or limited access, detours, or delays) and irritations for residents and businesses of communities immediately adjacent to the construction sites during the construction period. Large-scale projects for which the duration of construction is longer than several months could cause localized displacement. However, since construction impacts are temporary in nature they are considered less than significant. Mitigation Measure 2.3(a), described below, would provide additional mitigation for short term impacts associated with construction, as needed.

Further, the development of additional housing units and commercial space in PDAs could have the long-term effect of stimulating demand by attracting new residents and businesses that are seeking improved access to transit, a tighter network of commercial markets, and other amenities. Changing development types and higher prices resulting from increased demand could disrupt business patterns and displace existing residents to other parts of the region or outside the region altogether. However, the proposed Plan seeks to accommodate the projected population and employment growth in the region, consistent with historic trends. As such, any displacement or disruption would most likely occur locally, and in general, more units and jobs would be created to replace any lost jobs and housing overall. Displacement impacts as a result of land use projects at the regional level would therefore be less than significant (LS). No additional mitigation measures are required.

Localized Effects

Planning projects in urban areas and reusing urban sites or facilities support focused growth and transit-oriented development initiatives (such as improving station access or expanding the capacity of current BART stations), and are expected to involve the redevelopment of existing urban sites with higher density development. Since the proposed Plan seeks to accommodate projected population and employment growth in the region, new development would provide additional space for housing and businesses within the Bay Area; locally, however, businesses may be disrupted and residents displaced as some areas transition to denser urban settings. Impacts of displacement or disruption would be most likely felt as a result of new development where the overall density changes most significantly, since in these areas the building type may be likely to change (e.g., from low or midrise to high rise buildings or from single family to multifamily housing). Changes in building type may impact the types of uses accommodated, the desirability or target market, as well as rents. The 10 Bay Area PDAs with the greatest change in household and employment density are shown in **Tables 2.3-7** and **2.3-8,** respectively. As the tables show, the biggest density changes occur in major urban centers, including Oakland, San Francisco, and San José. Downtown and transit centers in Berkeley, Redwood City, and Millbrae round out the top-10 list for household density, and Berkeley and areas of Silicon Valley round out the top-10 list for employment density.

Overall, implementation of the proposed Plan could result in potentially significant (PS) permanent localized displacement and disruption. Mitigation measures 2.3(b) and 2.3(c) are described below.

TABLE 2.3-7: HOUSEHOLD DENSITY BY PRIORITY DEVELOPMENT AREA

Priority Development Area	*Density (Households per Acre)*		*Difference (2040 – 2010 Density)*
	2010	*2040*	
San Francisco: Transbay Terminal	5	128	124
Redwood City: Downtown	7	46	39
Berkeley: Downtown	23	59	37
Millbrae: Transit Station Area	4	40	36
San José: Greater Downtown	8	42	34
San José: Capitol Corridor Urban Villages	4	36	32
Oakland: Downtown & Jack London Square	20	48	28
South San Francisco: Downtown	13	40	27
San José: Stevens Creek TOD Corridor	12	38	25
San Francisco: Market & Octavia	44	69	25

Source: MTC, 2012; Dyett & Bhatia, 2013.

TABLE 2.3-8: EMPLOYMENT DENSITY BY PRIORITY DEVELOPMENT AREA

Priority Development Area	*Density (Jobs per Acre)*		*Difference (2040 – 2010 Density)*
	2010	*2040*	
San Francisco: Transbay Terminal	205	996	791
San Francisco: Mission Bay	11	110	98
Oakland: Downtown & Jack London Square	166	240	74
San José: Greater Downtown	61	119	58
Berkeley: Downtown	136	193	57
San Francisco: Port of San Francisco	14	66	52
Santa Clara Valley Transportation Authority: City Cores, Corridors & Station Areas	178	227	49
San Mateo: Downtown	60	98	39
San Mateo: El Camino Real	24	60	36
South San Francisco: Downtown	23	58	35

Source: MTC, 2012; Dyett & Bhatia, 2013.

Impacts of Transportation Projects

Disruption and displacement are by nature location-specific, and as such, impacts resulting from the proposed Plan would occur at the local level. Therefore, regional effects are not addressed separately as they are assumed to be the same. Projects will undergo construction at different times throughout the life of the proposed Plan. New transportation facilities resulting from the proposed Plan could disrupt, displace, or block access to community amenities, or disrupt existing businesses and land use patterns. The significance of the disruption will depend upon the size and extent of the project, the nature of the disruption, and the duration of construction. While construction activities are typically limited in duration, work on major projects often spans a period of several years because the projects are large and complex and/or because the construction contractors are required to keep traffic flowing on existing lanes passing through or adjacent to construction sites. As a result, the construction of major transportation facilities can result in frequent inconveniences (e.g., blocked or limited access, detours, or delays) and irritations for residents and businesses immediately adjacent to the construction sites during the construction period. Large-scale projects for which the duration of construction is longer than several months could cause localized displacement, particularly for businesses. However, since construction impacts are temporary in nature they are considered less than significant. Mitigation Measure 2.3(a), described below, would provide additional mitigation for short-term impacts associated with construction, as needed.

There are 160 major projects in the proposed Plan in nine counties with the potential to impact 12,200 households and 38,200 jobs, assuming worst-case disturbance.[12] Of those, most (88) are widening pro-

[12] The calculation is based on a 100 foot buffer on either side of the centerline of a linear project and a 100 foot radius around the center of a point project, such as an intersection improvement resulting in a new configuration. "Major projects" defined as those which are listed in the RTP as expansion projects costing $10 million or more that include new roadway construction, road widening, or other ground-disturbing construction.

jects, 33 are related to intersection or interchanges, 34 are new roads, and the remaining are extensions or other types of physical improvement projects that do not fit into any category, as shown in **Table 2.3-9**. Local governments have initiated projects in the proposed Plan with the intention of enhancing the quality of life in existing communities and neighborhoods. Examples include constructing rail extensions in San Francisco, Oakland, and Silicon Valley, operating Bus Rapid Transit along major corridors, and implementing transit accessibility, traffic calming, and bicycle and pedestrian improvement projects in many communities throughout the region. However, these projects could also cause temporary disruptions to residents and businesses such as traffic interruption, as well as permanent disruption such as the demolition of homes or businesses. As a result, although there may be beneficial long-term effects associated with transportation projects, there is also the potential for significant impacts, resulting in potentially significant (PS) permanent impacts. Mitigation measures 2.3(b) and 2.3(c) are described below.

TABLE 2.3-9: TYPES OF PROJECTS POTENTIALLY DISRUPTING EXISTING LAND USE

	Type of Project in Plan					
County	*Extension*	*Intersection*	*New*	*Widening*	*Other*	*Total*
Alameda	4	10	7	19	-	40
Contra Costa	5	5	9	24	2	45
Marin	-	-	-	1	-	1
Napa	1	-	-	-	1	2
San Francisco	4	-	6	1	-	11
San Mateo	2	1	1	4	1	9
Santa Clara	10	11	5	17	-	43
Solano	-	3	3	4	-	10
Sonoma	1	3	-	7	-	11
Regional/Multiple Counties[1]	2	-	3	11	1	17
Total	**29**	**33**	**34**	**88**	**5**	**189**[2]

Notes:

1. This category includes projects such as BART, and other transit projects of a regional scale.
2. This total includes some double counting of projects due to the fact that numerous projects have multiple components that are categorized under more than one project type. Projects in this table represent 160 individual projects listed in MTC's Regional Transportation Plan.

Source: Metropolitan Transportation Commission 2012; Dyett & Bhatia, 2013.

Combined Effects

While it is unlikely that multiple construction projects would occur in the same location and timeframe over the life of the proposed Plan, there is the possibility that short-term displacement and disruption from construction of a combination of transportation and land use projects could result in compounded short-term impacts in some locations. Similarly, while long-term impacts would likely not be worsened by concurrent land use and transportation improvements, there could be worsened impacts in some locations. For instance, redevelopment near a transit station could push shifts in building and market type resulting in displacement. Further, if over time land use and transportation projects that require demolition of existing homes occur in the same area, the impact could be worsened by displacing a larger number of units locally. This type of displacement or disruption would only occur locally since regionally more units and jobs would be created to replace any lost jobs and housing overall. Overall, impacts in the long-term would be potentially significant (PS). Mitigation measures 2.3(a), 2.3(b), and 2.3(c) are described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.3(a) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Regulating construction operations on existing facilities to minimize traffic disruptions and detours, and to maintain safe traffic operations.
- Ensuring construction operations are limited to regular business hours where feasible.
- Controlling construction dust and noise. See "Construction Best Practices for Dust" under Mitigation Measure 2.2(a) in *Chapter 2.2: Air Quality*.
- Controlling erosion and sediment transport in stormwater runoff from construction sites. See "Construction Best Practices for Dust" under Mitigation Measure 2.2(a) in *Chapter 2.2: Air Quality*.
- Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce short-term disruption and displacement.

Mitigation Measure 2.2(a) in *Chapter 2.2: Air Quality* includes additional applicable measures related to this impact, which are included here by reference.

2.3(b) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Developing pedestrian and bike connectors across widened sections of roadway;
- Using sidewalk, signal, and signage treatments to improve the pedestrian connectivity across widened sections of roadway;
- Using site redesign or corridor realignment, where feasible, to avoid land use disruption; and
- Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce long-term disruption and displacement.

2.3(c) Through regional programs, such as MTC/ABAG's Priority Development Area (PDA) Planning Program, MTC/ABAG shall continue to support the adoption of local zoning and design guidelines that encourage pedestrian and transit access, infill development, and vibrant neighborhoods.

Significance After Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.3-2 Implementation of the proposed Plan could result in permanent alterations to an existing neighborhood or community by separating residences from community facilities and services, restricting access to commercial or residential areas, or eliminating community amenities.

Impacts of Land Use Projects

Community separation is by nature location-specific, and as such, impacts resulting from the proposed Plan would occur at the local level. Therefore, regional effects are not addressed separately as they are assumed to be the same. The proposed Plan includes new household and employment development, largely focused into PDAs. The proposed Plan encourages development in urban infill sites that, in many cases, may be underutilized or vacant and currently act as physical barriers in individual communities; by developing these sites and designing them as centers of community activity, local jurisdictions could actually remove or decrease divisions and barriers between neighboring communities and amenities. However, some large projects could reduce connectivity if they fail to include pedestrian amenities, close off existing roads, or otherwise result in development that restricts access within the community. Most city and county general plans include policies, such as zoning and/or design guidelines, which ensure new development preserves community connectivity. Further, MTC and ABAG encourage the inclusion of pedestrian-oriented development standards and guidelines in PDA Plans funded by MTC/ABAG.

Given the uncertainty around local implementation of standards related to connectivity, the impact of land use projects on community separation is considered potentially significant (PS). Mitigation measure 2.3(f) is described below.

Impacts of Transportation Projects

Community separation is by nature location-specific, and as such, impacts resulting from the proposed Plan would occur at the local level. Therefore, regional effects are not addressed separately as they are assumed to be the same. Most of the major proposed transportation projects are located in existing rights-of-way, meaning that they will not cause any new separation within existing communities. Some projects in the proposed Plan would actually improve or expand interconnections between neighborhoods and communities that are currently separated by major transportation corridors. Examples include bridges or undercrossings (with bike lanes) of commuter rail lines, bicycle/pedestrian overcrossings of freeways, and urban trail and pathway projects. Safe Routes to School projects also improve accessibility within communities to schools. Additionally, many proposed projects, such as new transit services like the SMART line in Marin and Sonoma counties, are intended to relieve traffic congestion that is expected to increase as a result of regional population growth and may, as a result, improve community connectivity. There remains some potential for long term community separation caused by projects within the proposed Plan, such as the widening of a roadway which could make crossing more difficult. However, this type of impact would be expected to be minor, and easily addressed in project design. Overall, transportation project impacts related to community separation are expected to less than significant (LS). Mitigation measures 2.3 (d), 2.3(e), and 2.3(f), described below, would provide additional mitigation for impacts, as needed.

Combined Effects

Depending on local regulation, long-term land use impacts related to community accessibility are potentially significant but transportation impacts are anticipated to be less than significant, and are not expected to worsen land use impacts or result in significant impacts when considered together with land use impacts. As a result of potentially significant long-term land use impacts, combined long-term impacts are also considered potentially significant (PS). Mitigation measures 2.3(d), 2.3(e) and 2.3(f) are described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below. In addition to the following mitigation measures, measures 2.3(a), 2.3(b), and 2.3(c) under Impact 2.3-1 would reduce temporary construction related to community separation impacts.

2.3(d) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. All new transportation projects shall be required to incorporate design features such as sidewalks, bike lanes, and bike/pedestrian bridges or tunnels that maintain or improve access and connections within existing communities and to public transit. Implementing agencies shall require project sponsors to comply with existing local regulations and policies that exceed or reasonably replace measures that reduce community separation.

2.3(e) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. New development projects shall be required to provide connectivity for all modes such that new development does not separate existing uses, and improves access where needed and/or feasible, by incorporating 'complete streets' design features such as pedestrian-oriented streets and sidewalks, improved access to transit, and bike routes where appropriate. Implementing agencies shall require project sponsors to comply with existing local regulations and policies that exceed or reasonably replace measures that reduce community separation.

2.3(f) Through regional programs such as the One Bay Area Grants (OBAG), MTC/ABAG shall continue to support planning efforts for locally sponsored traffic calming and alternative transportation initiatives, such as paths, trails, overcrossings, bicycle plans, and the like that foster improved neighborhoods and community connections.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.3-3 Implementation of the proposed Plan could conflict substantially with the land use portion of adopted local general plans or other applicable land use plans, including specific plans, existing zoning, or regional plans such as coastal plans or the Bay Plan.

Impacts of Land Use Projects

The proposed Plan focuses regional growth into PDA areas. In preparation for the drafting of the proposed Plan, local jurisdictions, which have land use authority, nominated areas within their borders as potential PDAs appropriate to concentrate future growth. Since PDAs were nominated by local jurisdictions, it is not anticipated that the proposed Plan will conflict substantially with local land use plans, or if there are conflicts that they would be resolved at the local level though area plans and/or general plan or zoning amendments. However, local jurisdictions have local land use authority, meaning that in the case that the proposed Plan does conflict with local zoning or specific plans, the local jurisdiction would have ultimate land use authority. The proposed Plan will only be implemented insofar as local jurisdictions adopt its policies and recommendations.

In the Bay Area, Sonoma County, Marin County, the City and County of San Francisco, San Mateo County, and the cities of Daly City, Pacifica, and Half Moon Bay all have certified LCPs. According to GIS-based analysis, there are few land use projects anticipated under the proposed Plan that would occur in the Coastal Zone and these would be limited to transportation projects. Therefore, there would be no impact related to LCP compatibility resulting from land use development under the Plan.

The San Francisco Bay Plan establishes policies to guide the use of San Francisco Bay and its shoreline;[13] in particular, the Bay Conservation and Development Commission (BCDC), which is responsible for implementation of the Bay Plan, is authorized to control both bay filling/dredging and shoreline development. In order to minimize the future filling of the Bay, the Bay Plan identifies Priority Use Areas (PUAs), which are reserved for water-oriented land uses including ports, water-related industries, airports, wildlife refuges, water-oriented recreation and public assembly, desalinization plants, and power plants requiring large amounts of water for cooling purposes.

Regionally, overlap between PUA and PDA areas equals a total of 1,560 acres. As seen in **Table 2.3-10**, the overlap is greatest in Solano and San Francisco counties (620 and 450 acres, respectively). Local land

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[13] BCDC jurisdiction is defined in the McAteer-Petris Act as the area between the Bay shoreline, as defined in the Act, and a line 100 feet landward of and parallel to the shoreline.

use plans must be consistent with Bay Plan PUA designations. PDA areas that overlap PUAs will be required to conform to land use restrictions detailed in the Bay Plan. Since PDAs are intended as "complete communities," the mixed-use communities that will develop close to the Bay will, in many cases, integrate with and complement rather than conflict with the water-oriented recreation uses envisioned by the Bay Plan. Maritime, airport, wildlife refuge and industrial uses that are incompatible with mixed-use would retain their designation unless BCDC changes them. Several of the PDAs, including a number of those that overlap with PUA designations as discussed above, are sited on piers along the San Francisco waterfront. Some of the proposed uses in these PDAs may conflict with BCDC land use policies. As noted above, the proposed Plan will only be implemented insofar as local jurisdictions adopt its policies and recommendations. In cases where the PDA overlaps a PUA, the uses within the PUA must be consistent with Bay Plan requirements. Land use compatibility will be further addressed during subsequent environmental review as PDAs are implemented and detailed project design or specific plans can resolve these land use inconsistencies. Given local and BCDC land use authority and permitting processes and the potential for compatible adjacent land uses envisioned in the Bay Plan and the proposed Plan, this impact is considered less than significant (LS). No mitigation is required.

TABLE 2.3-10: PRIORITY DEVELOPMENT AREA AND BCDC PRIORITY USE AREA ACRES OF OVERLAP

County	*Overlap Acres*
Alameda	110
Contra Costa	220
Marin	110
San Francisco	450
San Mateo	60
Solano	620
Total	**1,560**

Note: Figures do not sum due to independent rounding.

Source: San Francisco Bay Conservation & Development Commission, 2012; Dyett & Bhatia, 2013.

Impacts of Transportation Projects

The transportation projects included in the proposed Plan were selected from over 1,000 submitted to MTC for consideration to its open "call for projects," which involved a public outreach and local engagement process to solicit candidate projects for consideration in the Plan. Each of the nine regional Congestion Management Agencies (CMAs) assisted MTC by coordinating project submittals for their county. Caltrans and multi-county transit operators were allowed to submit directly to MTC, but coordination with the CMAs was encouraged by MTC. Since the majority of proposed transportation projects were nominated by local jurisdictions, it is not anticipated that the proposed RTP will conflict substantially with local general plans.

Of the proposed transportation improvement projects, thirty-three are located in BCDC PUA designated areas. Eleven are local streets and roads projects, eight are arterial system management projects, 10 are transit projects, two are State Highway System projects, and one is a freight facility project. Proposed transportation improvement projects generally seek to improve access and mobility throughout the region and are expected to promote public access to lands within BCDC jurisdiction in general. It is noted that BCDC can only permit auto and transit projects on Bay fill, if the structure is a bridge.

While transportation improvements on State and Interstate highways and those sponsored by special districts—such as BART, AC Transit, SamTrans, Golden Gate Transportation District, etc.—are not necessarily derived from local general plans, these project sponsors work with their respective county CMAs to ensure consistency with local jurisdiction planning efforts. As a result, the transportation improvements in the proposed Plan are not expected to conflict with the land use designations of current local general plans, so transportation impacts are considered less than significant (LS). No mitigation is required.

Combined Effects

Since the proposed Plan was developed to incorporate feedback from local jurisdictions for both land use designations and transportation projects, and land use authority will remain with the relevant local jurisdictions and permitting agencies (such as BCDC), the combined effects of the land use and transportation projects are expected to be less than significant (LS). No mitigation is required.

Mitigation Measures

None required.

Impact

2.3-4 Implementation of the proposed Plan could convert substantial amounts of important agricultural lands and open space or lands under Williamson Act contract to non-agricultural use.

Impacts of Land Use Projects

Conversion of agricultural land or open space as a result of development projects is location-specific in nature, and as such, impacts resulting from the proposed Plan would occur primarily at the local level, with regional impacts essentially being the culmination of localized impacts. Land converted from Prime or Important Farmland to residential or commercial use can have direct effects in that productive land can no longer produce crops, but it may also have indirect effects to the extent that conversion creates fragmentation of agricultural land and adjacent use conflicts, hinders existing transportation access to agricultural lands, or restricts infrastructure options that are necessary to the function of the agricultural property.

The proposed Plan targets new household and job growth in PDAs, which are largely within the urbanized footprint and typically support infill development. However, a relatively small portion of PDA acreage (approximately 7,600 acres) overlaps with agricultural lands, about 80 percent of which is grazing land. The rest is divided between Farmland of Local importance, Farmland of Statewide Importance, Prime Farmland, and Unique Farmland. Additionally, PDA boundaries overlap with approximately 300 acres of lands that are under Williamson Act contract. Most of the overlap between PDA and agricultural land is located in Contra Costa and Solano counties (2,700 and 3,000 acres, respectively). While the PDAs are areas in which growth is focused, PDAs would not be developed in their entirety, and would include diverse land uses in addition to jobs and housing that could include preservation of agricultural land. Likely development is addressed below and in **Table 2.3-11.**

Anticipated new urbanized land, based on UrbanSim modeling, was also compared to agricultural lands.[14] In contrast to the above summary, this UrbanSim analysis includes areas located both inside and outside of PDAs and represents the likely extent of overall development resulting from the proposed Plan rather than assuming full development within each PDA. This more detailed distribution of land uses identifies 4,385 acres of agricultural land that would be potentially converted to land use development. This represents a negligible proportion (0.2 percent) of all agricultural land in the Bay Area. As shown in **Table 2.3-11**, the majority of conversion would occur on grazing lands (2,992 acres or 68 percent of all converted acres), and would be focused in Contra Costa and Solano counties (1,432 and 1,020 acres, respectively). Of the total acres converted, 820 acres are identified as Prime or Unique Farmland, or Farmland of Statewide Importance. Additionally, 471 acres of agricultural land under Williamson Act contact could be converted to urbanized land, as indicated in **Table 2.3-12**. The majority of these Williamson Act acres would be in Solano, Alameda, and Santa Clara counties.

TABLE 2.3-11: FARMLAND ACRES POTENTIALLY AFFECTED BY PROPOSED DEVELOPMENT, BY COUNTY AND TYPE

	Farmland of Local Importance	*Farmland of Statewide Importance*	*Grazing Land*	*Prime Farmland*	*Unique Farmland*	***Total***	***% of Total by County***
Alameda	-	-	710	89	47	**846**	**19%**
Contra Costa	121	114	1,170	11	16	**1,432**	**33%**
Marin	16	0	1	-	-	**17**	**0.4%**
Napa	28	1	5	10	10	**54**	**1%**
San Mateo	-	-	6	1	58	**65**	**1%**
Santa Clara	103	11	150	68	120	**452**	**10%**
Solano	**-**	2	891	127	-	**1,020**	**23%**
Sonoma	305	37	59	89	9	**499**	**11%**
TOTAL	**573**	**165**	**2,992**	**395**	**260**	**4,385**	**100%**
% of Total by Type	**13%**	**4%**	**68%**	**9%**	**6%**	**100%**	**-**

Note: Figures may not sum due to independent rounding.

Sources: MTC, 2013; Census TIGER/Line Shapefiles, 2010; Farmland Mapping and Monitoring Program, Department of Conservation, 2008- 2010.

[14] Future urbanized footprint is based on modeled future development of over eight people per acre and/or 10 jobs per acre.

TABLE 2.3-12: WILLIAMSON ACT ACRES POTENTIALLY AFFECTED BY PROPOSED DEVELOPMENT, BY COUNTY

County	*Acres*
Alameda	91
Contra Costa	15
Marin	2
Napa	16
San Mateo	44
Santa Clara	106
Solano	123
Sonoma	74
Total	**471**

Source: MTC 2013; MTC UrbanSim Raster Files, 2012; Census TIGER/Line Shapefiles, 2010; Farmland Mapping and Monitoring Program, Department of Conservation, 2008- 2010.

A relatively small portion of PDA acreage (approximately 3,450 acres) overlaps with protected open space land (excluding agricultural land, forest land, or timberland, which are addressed separately). The largest overlaps are anticipated in Santa Clara, Alameda, and San Francisco counties (710, 690, and 480 acres, respectively). While the PDAs are areas in which growth is focused, PDAs would not be developed in their entirety, and would include diverse land uses in addition to jobs and housing that could include preservation of open space. Likely development is addressed below and in **Table 2.3-13.**

Anticipated new urbanized land, based on UrbanSim modeling, was also compared to protected open space lands (excluding agricultural land, forest land, or timberland, which are addressed separately).[15] As noted above, this UrbanSim analysis includes areas located both inside and outside of PDAs and represents the likely extent of overall development resulting from the proposed Plan rather than assuming full development within each PDA. This more detailed distribution of land uses identifies 1,742 acres of open space that would be potentially converted to land use development, which represents a negligible proportion (0.5 percent) of protected open space acreage in the Bay Area that is not also agricultural, timberland, or forest land. As shown in **Table 2.3-13**, the majority of conversion would be focused in Alameda and San Francisco counties.

[15] Future urbanized footprint is based on modeled future development of over eight people per acre and/or 10 jobs per acre.

TABLE 2.3-13: PROTECTED OPEN SPACE ACRES POTENTIALLY AFFECTED BY PROPOSED DEVELOPMENT, BY COUNTY

County	*Overlap Acres*
Alameda	494
Contra Costa	221
Marin	135
Napa	57
San Francisco	319
San Mateo	126
Santa Clara	157
Solano	110
Sonoma	123
Total	**1,742**

Source: MTC, 2013; California Protected Areas Database, 2012.

With the exception of San Francisco, all counties in the Bay Area protect open space and agricultural lands by county-wide land use measures, such as urban service areas, environmental corridors, slope/density restrictions, stream conservation areas, or riparian buffers. Additionally, some cities have Urban Growth Boundaries (UGB) to limit sprawl and protect agricultural land. Generally, this means that if a project falls outside a UGB, there are regulatory measures in place to aid local jurisdictions in farmland protection. Still, there are many communities without growth limits in place, and those that do exist vary in quality, effectiveness, and enforcement. According to MTC/ABAG, of 101 Bay Area municipalities, 27 have UGBs as of January 2013. Additionally, countywide growth boundaries in Contra Costa and San Mateo counties apply to all cities within their jurisdiction. Counties and cities with measures protecting open space are summarized in **Table 2.3-14.**

TABLE 2.3-14: BAY AREA URBAN GROWTH BOUNDARIES AND COUNTY-WIDE LAND USE MEASURES

County	*County-Wide Measure*	*Cities with an Urban Growth Boundary*
Alameda	Yes	Dublin, Fremont, Hayward, Livermore, Pleasanton
Contra Costa	Yes	County Urban Limit Line applies to all jurisdictions in the County
Marin	Yes	Novato
Napa	Yes	American Canyon, Napa, St Helena, Yountville
San Francisco[1]	No	--
San Mateo	Yes	County Urban-Rural Boundary applies to all jurisdictions in the County
Santa Clara	Yes	Cupertino, Gilroy, Milpitas, Morgan Hill, Palo Alto, San José
Solano	Yes	Benicia, Fairfield, Rio Vista, Vacaville
Sonoma	Yes	Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, Sonoma, Windsor

1. San Francisco County has no affected farmland acres.

Source: MTC, 2012.

While the majority of new development proposed in the Plan will consist of urban infill in PDAs and other urbanized areas, thereby not impacting agricultural land, and local and regional policies and programs exist to limit conversion of agricultural land, the potential conversion of 4,385 acres of farmland is considered potentially significant (PS). Mitigation Measures 2.3(g) and 2.3(h) are described below.

Impacts of Transportation Projects

Generally, the effects of transportation projects on agricultural land and open space—conversion, fragmentation, use conflicts, decreased access, and limitations on agricultural infrastructure—are similar to those of land use development projects.

Transportation projects in the proposed Plan have the potential to impact 1,529 acres of farmland, assuming the worst-case disturbance.[16] This represents a negligible proportion (.07 percent) of all agricultural land in the Bay Area. Of that farmland, the majority (49 percent) is Grazing Land, 28 percent is Farmland of Local Importance, 15 percent is Prime Farmland, and the remainder is made up of Farmland of Statewide Importance and Unique Farmland, as documented for each county in **Table 2.3-15**.[17] Sonoma and Alameda counties are the most impacted by the proposed Plan, with 607 and 294 acres of potentially threatened farmland, respectively. San Francisco, San Mateo, and Santa Clara counties have the least amount of affected land, with no acres impacted in San Francisco and San Mateo and 52 acres in

[16] The acreage calculation is based on a 100-foot buffer on either side of the centerline of a linear project and a 100-foot radius around the center of a point project, such as an intersection improvement resulting in a new configuration. Existing roadway is categorized as "roadway" and thus not counted in farmland impact totals.

[17] The farmland acre totals include land not currently in production. In some cases, these farmlands may be zoned for urban development.

Santa Clara. Of the total acres converted, 364 acres are identified as Prime or Unique Farmland, or Farmland of Statewide Importance. Further, of the 1,529 acres of agricultural land with potential for conversion, approximately 252 acres (16 percent) across six counties are under Williamson Act contract, as indicated in **Table 2.3-16.** This represents 0.02 percent of all Williamson Act land in the Bay Area.

TABLE 2.3-15: FARMLAND ACRES POTENTIALLY AFFECTED BY PROPOSED TRANSPORTATION PROJECTS, BY COUNTY AND TYPE

County	*Farmland of Local Importance*	*Farmland of Statewide Importance*	*Grazing Land*	*Prime Farmland*	*Unique Farmland*	*Total*	*Percent of Total (by County)*
Alameda	-	-	292	1	1	**294**	**19%**
Contra Costa	62	12	114	1	-	**189**	**12%**
Marin	72	-	16	-	-	**88**	**6%**
Napa	38	13	4	22	3	**81**	**5%**
San Mateo	-	-	-	-	-	**-**	**0%**
Santa Clara	14	4	15	10	8	**52**	**3%**
Solano	-	-	154	62	1	**218**	**14%**
Sonoma	235	26	147	130	70	**607**	**40%**
Total	**421**	**55**	**742**	**226**	**83**	**1,529**	**100%**
% of Total (by Type)	**28%**	**4%**	**49%**	**15%**	**5%**	**100%**	

Note: Figures may not sum due to independent rounding.

Source: MTC, 2013; MTC Regional Transportation Plan, 2012; Census TIGER/Line Shapefiles, 2010; Farmland Mapping and Monitoring Program, Department of Conservation, 2008- 2010.

TABLE 2.3-16: WILLIAMSON ACT ACRES POTENTIALLY AFFECTED BY PROPOSED TRANSPORTATION PROJECTS, BY COUNTY

County	*Overlap Acres*
Alameda	13
Contra Costa	28
Marin	47
Napa	1
Solano	39
Sonoma	124
Total	**252**

Source: MTC, 2013; MTC Regional Transportation Plan, 2012; Census TIGER/Line Shapefiles, 2010; Farmland Mapping and Monitoring Program, Department of Conservation, 2008- 2010.

Overall, transportation projects in the proposed Plan have the potential to impact 280 acres of protected open space (excluding agricultural land, forest land, or timberland, which are addressed separately), assuming the worst-case disturbance, as indicated in **Table 2.3-17**.[18] This represents a negligible proportion (0.08 percent) of all open space land in the Bay Area that is not also agricultural, timberland, or forest land. San Francisco, Alameda, and San Mateo are the counties most impacted.

Though it is particularly difficult to project the potential impact of intersection improvements on farmland acres, the projects included in this analysis generally represent intersection improvements that result in new roadway configurations and thus may have different edge conditions than the existing intersections. The buffer used to quantify potential impact of intersection improvements is necessarily general—a 100 foot radius—and likely to be a conservative estimate of disturbance.

[18] The acreage calculation is based on a 100-foot buffer on either side of the centerline of a linear project and a 100-foot radius around the center of a point project, such as an intersection improvement resulting in a new configuration. Existing roadway is categorized as "roadway" and thus not counted in impact totals.

TABLE 2.3-17: PROTECTED OPEN SPACE ACRES POTENTIALLY AFFECTED BY PROPOSED TRANSPORTATION PROJECTS, BY COUNTY

County	*Overlap Acres*
Alameda	43
Contra Costa	6
Marin	31
Napa	5
San Francisco	55
San Mateo	46
Santa Clara	14
Solano	16
Sonoma	64
Total	**280**

Source: MTC, 2013; California Protected Areas Database, 2012.

The likelihood of farmland and open space conversion increases where transportation improvements are located at the edges of existing urban areas, along waterways, or over hills separating urban areas. The extent of this impact will depend on the final scale and design of proposed projects and on the project-specific analysis required by CEQA to determine the importance of the resource land. However, given the predominant location of projects within developed areas and existing corridors, the conversion of agricultural resource land is likely to be limited. Many municipalities have already planned for the conversion of some open space to urban uses, usually where the land is for grazing (which is not an endangered agricultural activity) rather than agricultural production. However, some conversion could be significant, depending on the amount and type of farmland that is converted. The conversion of agricultural and open space acreage is considered potentially significant (PS). Mitigation Measures 2.3(g) and 2.3(h) are described below.

Combined Effects

Together, land use and transportation projects in the proposed Plan have the potential to convert 5,941 acres of agricultural land to urbanized uses, which represents 0.3 percent of all agricultural land in the Bay Area. Of this, 1,184 acres are identified as Prime or Unique Farmland, or Farmland of Statewide Importance (assuming no overlap). Further, 723 acres of Williamson Act lands are identified as potentially converted by combined land use and transportation projects. This represents 0.06 percent of all Williamson Act lands in the Bay Area. Finally, 2,022 acres of protected open space land (excluding agricultural land, forest land, or timberland, which are addressed separately) are identified as potentially converted by combined land use and transportation projects. This represents 0.5 percent of 368,400 acres of open space land in the Bay Area that is not also agricultural, timberland, or forest land. The overall proportion of these conversions relative to Bay Area resources is negligible. However, any conversion of agricultural or open space land as a result of land use or transportation projects is considered significant, therefore the impact on agricultural and open space acreage is considered potentially significant (PS). Mitigation Measures 2.3(g) and 2.3(h) are described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.3(g) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Requiring project relocation or corridor realignment, where feasible, to avoid farmland, especially Prime Farmland;
- Acquiring conservation easements on land at least equal in quality and size as partial compensation for the direct loss of agricultural land;
- Maintain and expand agricultural land protections such as urban growth boundaries;
- If a Williamson Act contract is terminated, a ratio greater than 1:1 of land equal in quality shall be set aside in a conservation easement, as recommended by the Department of Conservation;
- Instituting new protection of farmland in the project area or elsewhere in the County through the use of less than permanent long-term restrictions on use, such as 20-year Farmland Security Zone contracts (Government Code Section 51296 et seq.) or 10-year Williamson Act contracts (Government Code Section 51200 et seq.);
- Assessing mitigation fees that support the commercial viability of the remaining agricultural land in the project area, County, or region through a mitigation bank that invests in agricultural infrastructure, water supplies, marketing, etc.;
- Minimizing severance and fragmentation of agricultural land by constructing underpasses and overpasses at reasonable intervals to provide property access;
- Requiring agricultural enhancement investments such as supporting farmer education on organic and sustainable practices, assisting with organic soil amendments for improved production, and upgrading irrigation systems for water conservation;
- Requiring berms, buffer zones, setbacks, and fencing to reduce use conflicts between new development and farming uses and to protect the functions of farmland; and
- Requiring other conservation tools available from the California Department of Conservation's Division of Land Resource Protection.
- Requiring compliance with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce farmland conversion.

2.3(h) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Requiring project relocation or corridor realignment, where feasible, to avoid protected open space.
- Requiring conservation easements on land at least equal in quality and size as partial compensation for the direct loss of protected open space.
- Maintain and expand open space protections such as urban growth boundaries.

- Requiring compliance with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce open space conversion.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Impact

2.3-5 Implementation of the proposed Plan could result in the loss of forest land, conversion of forest land to non-forest use, or conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production.

Impacts of Land Use Projects

Conversion of forest land or timberland as a result of development projects is location-specific in nature, and as such, impacts resulting from the proposed Plan would occur primarily at the local level, with regional impacts being the culmination of localized impacts. Land converted from timberland to residential or commercial use can have direct effects in that productive land can no longer produce timber crops, but it may also have indirect effects to the extent that conversion creates fragmentation of timberland and adjacent use conflicts, hinders existing transportation access to timberlands, or restricts infrastructure options that are necessary to the function of the timberland property.

The proposed Plan targets new household and job growth in PDAs, which are largely within the urbanized footprint and typically support infill development. However, a relatively small portion of PDA acreage (approximately 470 acres) overlaps with identified forest land or timberland areas.[19] Most of the overlap between PDAs and forest land is located in Marin and Santa Clara counties (270 and 70 acres, respectively). This overlap represents a planning consideration rather than likely development since PDAs would not be developed in their entirety. Likely development is addressed below and in **Table 2.3-18.**

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[19] USDA, National Agricultural Statistics Service, California Cropland Data Layer, 2011.

Anticipated new urbanized land based on UrbanSim modeling was also compared to forest land and timberlands.[20] In contrast to the above summary, this UrbanSim analysis includes areas located both inside and outside of PDAs and represents the likely extent of overall development resulting from the proposed Plan rather than assuming full development within each PDA. This more detailed distribution of land uses identifies 1,352 acres of forest land and timberland that would be potentially converted to land use development, which represents a negligible proportion (one percent) of total Bay Area forest land and timberland acreage. As shown in **Table 2.3-18**, the majority of conversion would be focused in Marin, Alameda, Sonoma, and San Mateo counties. In addition, current timberland or forest land zoning exists in Contra Costa, Sonoma, and San Mateo counties. The existing urbanized footprint overlaps with approximately 282 acres of areas zoned for timberland or forest land; the proposed Plan would only result in one additional acre of overlap.

The majority of new development proposed in the proposed Plan will consist of urban infill in PDAs and other urbanized areas, thereby limiting impacts on forest land or timberland. As noted above, some Bay Area cities have UGBs to limit sprawl and protect forest land and timberland. While the potential conversion of 1,352 acres of forest and timberland is considered potentially significant (PS), only a small fraction of all Bay Area forest land and timberland would be impacted by the proposed Plan (0.1 percent of 1,233,000 acres regionally). Mitigation Measure 2.3(i) is described below.

TABLE 2.3-18: FOREST AND TIMBERLAND ACRES POTENTIALLY AFFECTED BY PROPOSED DEVELOPMENT, BY COUNTY

County	*Acres[1]*	*% of Total by County*
Alameda	244	18%
Contra Costa	161	12%
Marin	255	19%
Napa	68	5%
San Francisco	98	7%
San Mateo	201	15%
Santa Clara	88	7%
Solano	6	-
Sonoma	231	17%
Total	**1,352**	**100%**

1. Acres of forest and timberland include areas identified as deciduous forest, evergreen forest, mixed forest, and woody wetland.

Source: MTC, 2013; USDA, National Agricultural Statistics Service, California Cropland Data Layer, 2011.

[20] Future urbanized footprint is based on modeled future development of over eight people per acre and/or 10 jobs per acre.

Impacts of Transportation Projects

Overall, there are transportation projects in eight counties (excluding Contra Costa) with the potential to impact 62 acres of forest land or timberland, assuming the worst-case disturbance, which is a negligible proportion of overall forest and land timberland acres in the Bay Area.[21] San Francisco, Sonoma, and San Mateo counties are the most impacted, with 22, 22, and 12 acres of potentially threatened forest land and timberland, respectively. Impacted acreage in the other five counties is negligible (less than three acres).

Though it is particularly difficult to project the potential impact of intersection improvements on forest land and timberland acres, the projects included in this analysis generally represent intersection improvements that result in new roadway configurations and thus may have different edge conditions than the existing intersections. The buffer used to quantify potential impact of intersection improvements is necessarily general—a 100 foot radius—and likely to be a conservative estimate of disturbance.

The likelihood of forest land and timberland conversion increases where transportation improvements are located at the edges of existing urban areas, along waterways, or in areas currently separating urban areas. The extent of this impact will depend on the final scale and design of proposed projects and on the project-specific analysis require by CEQA to determine the importance of the endangered resource land. However, given the predominant location of projects within developed areas and existing corridors, the conversion of forest land and timberland is likely to be limited. Many municipalities have already planned for the conversion of some open space to urban uses. However, some conversion could be significant, depending on the amount of forest land and timberland that is converted. The conversion of forest land and timberland acreage is considered potentially significant. Mitigation Measure 2.3(i) is described below.

Combined Effects

The combined effects of land use and transportation projects in the proposed Plan on forest land and timberland are potentially significant. However, the total number of acres with potential for conversion to urbanized uses from both land use and transportation projects (1,414) represents a negligible proportion (0.1 percent of 1,233,000 acres regionally) of total forest land and timberland acreage in the Bay Area.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.3(i) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Requiring project relocation or corridor realignment, where feasible, to avoid timberland or forest land.

[21] The acreage calculation is based on a 100 foot buffer on either side of the centerline of a linear project and a 100 foot radius around the center of a point project, such as an intersection improvement resulting in a new configuration. Existing roadway is categorized as "roadway" and thus not counted in timberland impact totals.

- Requiring conservation easements on land at least equal in quality and size as partial compensation for the direct loss of timberland or forest land.
- Requiring compliance with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce forest land conversion.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

2.4 Energy

This chapter was prepared pursuant to CEQA Guidelines Section 15126 and Appendix F of the CEQA Guidelines, which require that EIRs include a discussion of the potential energy impacts of projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. This chapter discusses the energy impacts of implementing transportation improvements in the proposed Plan, as well as the direct and indirect energy-related consequences of land use decisions that are consistent with the proposed Plan's policy guidance. The transportation-related analysis in this section includes issues related to consumption of non-renewable energy sources for construction and operation of projects, while the land use-related analysis in this section includes energy consumption due to residential and non-residential growth consistent with the proposed Plan's policy direction. The energy consumption analysis is presented on a per capita basis to allow for comparison as the Bay Area increases in both population and jobs under the proposed Plan. For an analysis of greenhouse gas production and proposed Plan impacts on climate change, please see *Chapter 2.5: Climate Change and Greenhouse Gases.*

Energy related to land use is primarily direct energy consumption for space heating and onsite electricity/heating/cooling (co-generation) facilities at residential and commercial uses, industrial plant energy consumption, and indirect energy consumed in generation of electricity at power plants. Transportation energy use is related to the efficiency of cars, trucks and public transportation; choice of travel modes (automobile, carpool and public transit); and miles traveled by these modes. Energy is also consumed with construction and routine operation and maintenance of the transportation infrastructure.

Energy usage is typically quantified using the British thermal unit (Btu), and this analysis discusses impacts in terms of Btu. As points of reference, the approximate amount of energy contained in a gallon of gasoline, a cubic foot of natural gas, and a kilowatt hour (kWhr) of electricity are 123,000 Btu, 1,000 Btu, and 3,400 Btu, respectively.

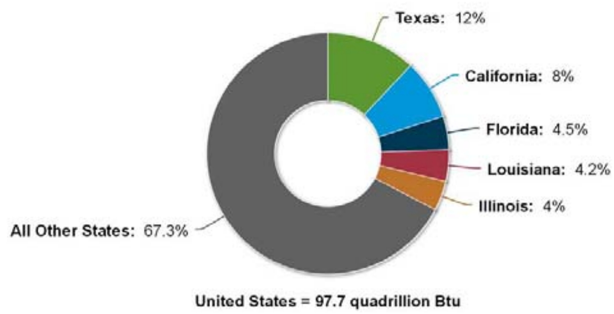
Environmental Setting

PHYSICAL SETTING

Energy Types and Sources

Total energy consumption in the U.S. in 2010 was approximately 98.0 quadrillion Btu, which represents about 19 percent of the world's energy consumption. The U.S. is the second largest consumer of energy in the world, behind China; the U.S. remains the world's largest per-capita consumer of energy, with an average yearly per capita consumption rate of 308 Million Btus. Fossil fuels provide approximately 83 percent of the energy used in the U.S. Nuclear Power and renewable energy each provide approximately 8.5 percent.[1,2]

California is the most populous state in the U.S., and its energy consumption is second only to Texas. However, because of the energy-efficiency programs and policies administered at the state level, California has the lowest per capita energy consumption rate in the country, with a yearly per capita consumption rate of 217 million Btus. The transportation sector is by far the largest energy consumer in California, with more registered vehicles than any other state and among the longest work commute times in the nation.[3]



Source: U.S. Energy Information Administration, State Energy Data System 2010

California relies on a regional power system composed of a diverse mix of natural gas, renewable, hydroelectric, and nuclear generation resources. Approximately 71 percent of the electrical power needed to meet California's demand is produced in the state; the balance, approximately 29 percent, is imported from the Pacific Northwest and the Southwest.[4] In 2010, California's in-state electricity was derived from natural gas (53.4 percent), large hydroelectric resources (14.6 percent), coal (1.7 percent), nuclear sources (15.7 percent), and renewable resources that include geothermal, biomass, small hydroelectric resources, wind, and solar (14.6 percent).[5]

The energy consumed by the transportation sector accounts for roughly 41 percent of California's petroleum demand and 38 percent of its greenhouse gas emissions. The transportation sector, including on-road and rail transportation (but excluding aviation), consumes roughly 16 billion gallons of gasoline and four billion gallons of diesel fuel each year. California is the third largest consumer of gasoline in the world, behind the U.S. (as a whole) and China.[6]

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[1] Energy Information Administration Annual Energy Review, 2010 U.S. Primary Energy Consumption by Source and Sector, available at http://www.eia.gov/totalenergy/data/annual/showtext.cfm?t=ptb0101

[2] Barr, Robert. *China Surpasses U.S. as Top Energy Consumer*. MSNBC. NBCNews.com June 8, 2001. Accessed August, 6, 2012

[3] EIA, 2009. *California Energy Fact Sheet*. November 2009.

[4] CEC, *Energy Almanac*. Total Electricity System Power. August 2012.

[5] CEC, *Energy Almanac*. California's Major Sources of Energy. April 2011.

[6] Energy Information Administration Annual Energy Review, 2010 U.S. Primary Energy Consumption by Source and Sector, available at http://www.eia.gov/totalenergy/data/annual/showtext.cfm?t=ptb0101

Petroleum

California is a net importer of oil. It produces only about 37.2 percent of the petroleum it uses. In 2007, the consumers in the state spent nearly $50 billion on gasoline and $9.7 billion on diesel. Petroleum-based fuels account for 96 percent of the state's transportation needs. The dependence on a single type of transportation fuel makes Californians vulnerable to petroleum price spikes.[7]

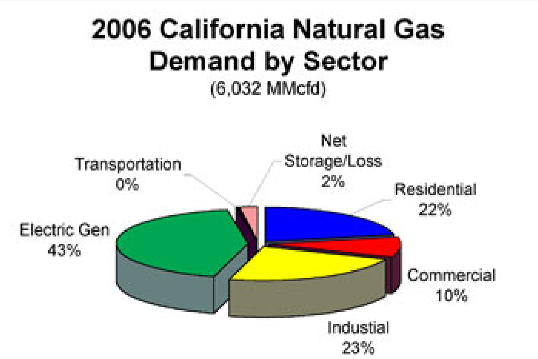
Most gasoline and diesel fuel sold in California for motor vehicles is refined in California to meet State-specific formulations required by the California Environmental Protection Agency's Air Resources Board. Major petroleum refineries in California are concentrated in three counties: Contra Costa County in northern California, Kern County in central California, and Los Angeles County in southern California. In the Bay Area, Valero, Tesoro, Phillips, Shell and Chevron operate refineries in Contra Costa County and adjacent Solano County.

California processes approximately 2 million barrels per day of crude oil from its 20 operable refineries. California ranks third in petroleum refining capacity in the U.S. and accounts for more than one-tenth of the total U.S. capacity. Approximately 38 percent of the petroleum refined in California comes from in-state oil production facilities, 12 percent comes from Alaska, and the remaining 50 percent comes from foreign sources. The long-term oil supply outlook for California indicates that in-state and Alaskan supplies are declining, leading to increasing dependence on foreign oil sources.[8]

Natural Gas

Four regions supply California with natural gas. Three of them—the Southwestern U.S., the Rocky Mountains, and Canada—supply approximately 87 percent of all natural gas consumed in California. The remainder is produced in California.

As illustrated in the chart to the right, in 2006, approximately 43 percent of all natural gas consumed in the state was used to generate electricity. Residential consumption represented approximately 22 percent of California natural gas use with the balance consumed by the industrial, resource extraction, and commercial sectors.[9] Pacific Gas & Electric (PG&E) is the primary natural gas provider for the San Francisco Bay Area.



Source: Utility and pipeline filings to the California Energy Commission

7 CEC, *Energy Almanac*. California Petroleum Statistics and Data. April 2011.

8 EIA, 2009. *California Energy Fact Sheet*. November 2009.

9 CEC, *Energy Almanac*. California's Major Sources of Energy. April 2011.

Natural gas has become an increasingly important source of energy as more of the state's power plants rely on this fuel. While California's successful efficiency programs and its reliance on renewable sources of electricity should slow the demand for natural gas, competition for the state's imported supply is increasing.

Electricity and Renewables

Power plants in California meet approximately 71 percent of the in-state electricity demand; hydroelectric power from the Pacific Northwest provides another 8 percent and power plants in the southwestern U.S. provide another 21 percent.[10] The contribution of in-state and out-of-state power plants depends upon, among other factors, the precipitation that occurred in the previous year and the corresponding amount of hydroelectric power that is available. In the Bay Area, Contra Costa County is home to one of the largest power plants in California: Mirant Corp.'s Pittsburg Power Plant. It is the seventh largest power plant in California (second largest in Northern California after Dyenergy's Moss Landing plant in Monterey County) and consumes natural gas. Smaller power plants and cogeneration facilities are located throughout the Bay Area. PG&E is the primary electricity supplier to northern California.

California is the leading producer of electricity generation from non-hydroelectric renewable energy sources in the U.S. California generates electricity using wind, geothermal, solar, fuel wood and municipal solid waste/landfill gas resources. The state is the top producer of geothermal energy in the nation with over 2,500 megawatts of capacity. A collection of 22 geothermal power plants known as "The Geysers," located in the Mayacamas Mountains (Lake County) north of San Francisco, is the largest complex of its kind in the world, with more than 700 megawatts of installed capacity. California is also a leading producer of wind energy and holds nearly ten percent of the nation's capacity. Additionally, the world's largest solar power facility operates in the Mojave Desert.[11]

Alternative Fuels

The U.S. Department of Transportation currently recognizes the following as alternative transportation fuels: methanol and denatured ethanol (alcohol mixtures that contain no less than 70 percent of the alcohol fuel), natural gas (compressed or liquefied), liquefied petroleum gas, hydrogen, coal-derived liquid fuels, fuels derived from biological materials (i.e., biomass), and electricity. The liquid fuel referred to as Methanol (M85) consists of methanol and gasoline and is derived from natural gas, coal, or woody biomass. The liquid fuel referred to as Ethanol (E85) consists of ethanol and gasoline and is derived from corn, grains or agricultural waste. Natural gas consists of a high percentage of methane (generally above 85 percent), and varying amounts of ethane, propane, butane, and inerts (typically nitrogen, carbon dioxide, and helium) and comes from underground reserves. Liquefied petroleum gas (LPG) consists mostly of propane and is a byproduct of petroleum refining or natural gas processing. Current technologies for electric vehicles include lead acid and nickel metal hydride batteries.

Commercial and Residential Energy Use

Homes built between 2000 and 2005 used 14 percent less energy per square foot than homes built in the 1980s and 40 percent less energy per square foot than homes built before 1950. However, larger home

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[10] Ibid.

[11] EIA, 2009. *California Energy Fact Sheet*. November 2009.

sizes have offset these efficiency improvements. Primary energy consumption in the residential sector totaled 20.99 quadrillion Btu in 2009, equal to 54 percent of consumption in the buildings sector and 22 percent of total primary energy consumption in the U.S. Energy consumption increased 24 percent from 1990 to 2009. However, because of projected improvements in building and appliance efficiency, the Energy Information Administration's 2012 Annual Energy Outlook forecast a 13 percent increase from 2009 to 2035.[12]

Commercial buildings represent just under one-fifth of U.S. energy consumption, with office space, retail space, and educational facilities representing about half of commercial sector energy consumption. In aggregate, commercial buildings consumed 46 percent of building energy consumption and approximately 19 percent of U.S. energy consumption. In comparison, the residential sector consumed approximately 22 percent of U.S. energy consumption.[13]

Commercial and residential space heating (including onsite co-generation facilities at commercial buildings) comprise a large share of direct energy end use in the Bay Area. Other major energy users include industrial facilities (including oil refineries that consume energy in the production of gasoline and other fuels) and electricity-generating power plants, which burn fossil fuels (generally natural gas) to convert those fuels to electricity. Electricity generation is typically classified as "indirect" energy use because the end product, electricity, is consumed at a location distinct from the power plant where it is produced.

Electricity and natural gas consumption for the nine Bay Area counties in 2010 is shown in **Table 2.4-1.**

TABLE 2.4-1: ELECTRICITY AND NATURAL GAS CONSUMPTION IN THE SAN FRANCISCO BAY AREA, 2010

County	*Electricity (million kWh)*	*Natural Gas (million Therms)*
Alameda	10,878	420
Contra Costa	9,215	1,015
Marin	1,422	79
Napa	1,024	40
San Francisco	5,855	264
San Mateo	4,756	221
Santa Clara	16,564	458
Solano	3,128	226
Sonoma	2,875	115
Total Bay Area	**55,717**	**2,838**

Source: California Energy Commission, Energy Consumption Data Management System, 2010: http://ecdms.energy.ca.gov/

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[12] U.S. Department of Energy, Building Data Energy Book, 2012.

[13] Ibid.

Energy Use for Transportation

Transportation is the largest energy consumer nationwide, accounting for 27 percent of the total national energy use.[14] On-road vehicles are estimated to consume approximately 80 percent of California's transportation energy demand, with cars, trucks, and buses accounting for nearly all of the on-road fuel consumption. Petroleum products (gasoline, diesel, jet fuel) account for almost 99.5 percent of the energy used by the California transportation sector with the rest provided by ethanol, natural gas and electricity.[15]

On-road vehicles use about 90 percent of the petroleum consumed in California. Caltrans estimates that in 2006, over 3.2 billion gallons of gasoline and diesel fuel were consumed in the nine Bay Area counties—an increase of about 8 million gallons over 2000 consumption levels.[16]

Vehicle Miles Traveled and Gasoline Consumption

According to Caltrans, California can expect a 57 percent increase in total gasoline consumption and a 61 percent increase in the number of vehicle miles traveled (VMT) from 2007 to 2030.[17] As noted in the regulatory setting, several State mandates and efforts, such as SB 375, seek to reduce VMT. However, fuel consumption per capita in California decreased by nearly 3 percent from 2000 to 2007, while the Bay Area experienced an 8 percent decrease in fuel consumption per capita.[18] Despite the progress in decreasing per capita VMT and per capita fuel consumption, the continued projected increases in total fuel consumption and VMT can be attributed to the overall increase in population; see *Chapter 2.1: Transportation* for more information on VMT and other travel-related data.

Total gasoline usage in California did not change in 2010 compared to the previous year. Gasoline use in California was estimated at a total of 14.851 billion gallons for the 12 months of 2010. However, since 2007, gasoline sales have declined by approximately 5 percent (15.672 billion gallons in 2007).[19]

Gasoline and diesel consumption for the nine Bay Area counties during 2010 and 2011 are shown in **Table 2.4-2**. Over this period, gasoline and diesel consumption in the Bay Area decreased by approximately 1.5 percent, with 4 percent decreases in Santa Clara and Solano counties.

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[14] U.S. Department of Energy, Energy Information Administration, Monthly Energy Review, March 2012.

[15] Bureau of Transportation Statistics, Transportation Energy Consumption by Energy Source: 2008, available at http://www.bts.gov/publications/state_transportation_statistics/state_transportation_statistics_2010/html/table_07_01.html.

[16] California Department of Transportation, 2008 California Motor Vehicle Stock, Travel, and Fuel Forecast, June 2009.

[17] Ibid.

[18] California Department of Transportation, 2010 California Regional Progress Report. *One State, Many Resources. Our Future.*

[19] California State Board of Equalization, Fuel Taxes Division. Taxable Gasoline Gallons 10 Year Report (excluding aviation gasoline).

TABLE 2.4-2: GASOLINE AND DIESEL CONSUMPTION IN THE SAN FRANCISCO BAY AREA, 2010 AND 2011 (1,000 GALLONS)

County	*2010*	*2011*	*% Change*
Alameda	709,971	691,879	-0.02%
Contra Costa	415,568	417,289	0.4%
Marin	138,606	139,564	0.7%
Napa	61,120	61,454	0.5%
San Francisco	158,105	164,537	0.4%
San Mateo	310,976	311,078	0.03%
Santa Clara	765,325	737,831	-4.0%
Solano	236,490	226,451	-4.0%
Sonoma	204,797	206,692	0.9%
Total Bay Area	3,000,985	2,956,775	-1.5%

Source: California Department of Transportation, Division of Transportation System Information, 2010, http://www.dot.ca.gov/hq/tsip/tab/mvstaff.html; Environmental Science Associates, 2012.

With the highest fuel prices in the nation, California has seen fuel usage continue its downward trend, and gasoline consumption per capita is also slowing. The average California gas price per gallon at the pump increased from $1.88 in 2003 to $3.12 in 2007 to $3.61 in 2008 to $4.07 in August of 2012.[20]

Long-term energy consumption trends for transportation will be largely determined by fuel efficiency trends for motor vehicles, as motor vehicles are the predominant transportation mode for passengers and commercial goods.

Energy Used By Public Transit

Public transit energy consumption includes energy consumed for the operation of public buses, electrified and diesel rail systems, and ferries. Energy factors used by MTC for buses, BART (heavy rail), commuter rail (Caltrain and SMART), light rail (VTA and SFMTA) and ferries are provided in **Table 2.4-3.** The energy efficiency of each of these modes may vary according to operating conditions and ridership. For example, if a ferry that uses 1.256 million Btu per mile carries 400 passengers on a trip, the energy usage is approximately 3,140 Btu per passenger mile, while a bus that consumes 37,310 Btu per mile uses about 1,245 Btu per passenger mile if it carries 30 passengers.

[20] CEC, Energy Almanac. California Gasoline Statistics & Data. August 2012.

TABLE 2.4-3: ENERGY FACTORS OF TRANSIT SERVICE

Service	*Energy Factor (Btu/Vehicle Mile)[a]*
Bus	37,310
Light Rail Transit	62,797
Heavy Rail Transit	62,797
Commuter Rail Transit	92,739
Ferry Transit	1,255,797

a. Energy use per passenger mile is less, depending on passenger load of transit vehicle.

Source: MTC, 2008; U.S. Department of Energy, 2008 (bus and rail); American Public Transit Association, 2008 (ferry).

Energy Used by Private and Commercial Vehicles

Commercial vehicles, generally composed of light, medium, and heavy trucks, are typically fueled by diesel or gasoline, and are part of the general fleet mix of vehicles present within the Bay Area transportation system.

Average fuel economy is expected to increase for automobiles and all types of trucks. The federal Corporate Average Fuel Economy (CAFE) is the required average fuel economy for a vehicle manufactures' entire fleet of passenger cars and light trucks for each model year. For many years, the standard for passenger automobiles was 27.5 miles per gallon (mpg), and the standard for light trucks, a classification that also includes sport utility vehicles (SUVs) under 8,500 pounds, rose to 22.5 mpg for 2008 models. Effective with the 2011 model year, the CAFE standard was revised from a single number to a model-specific formulation based on the size of the vehicle, in square feet (wheelbase times track, or the distance between the axles multiplied by the distance between the wheels of each axle), referred to the vehicle's "footprint." For 2012, the average CAFE standard for passenger cars is 33.3 mpg, while for light trucks, it is 25.4 mpg.[21]

Based on data provided by MTC, this energy analysis uses an average on-road vehicle fleet fuel economy of 17.94 mpg for the baseline (2010) year and 25.03 mpg for 2040.[22]

Energy Use and Global Warming

Scientists and climatologists have produced evidence that the burning of fossil fuels by vehicles, power plants, industrial facilities, residences and commercial facilities have led to an increase of the earth's temperature. For an analysis of greenhouse gas production and proposed Plan impacts on climate change, please see *Chapter 2.5: Climate Change and Greenhouse Gases*.

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[21] Federal Register, Vol. 75, No. 88, May 7, 2010; p. 25330.

[22] MTC, 2012.

REGULATORY SETTING

Federal and State agencies regulate energy consumption through various policies, standards, and programs. At the local level, individual cities and counties regulate energy through their regulatory and planning activities.

Energy conservation is embodied in many federal, State, and local statutes and policies. At the federal level, energy standards apply to numerous products (e.g., the EnergyStar™ program) and transportation (e.g., fuel efficiency standards). At the State level, Title 24 of the California Administrative Code sets forth energy standards for buildings, rebates/tax credits are provided for installation of renewable energy systems, and the Flex Your Power program promotes conservation in multiple areas.

Federal Regulations

Energy Policy and Conservation Act, and CAFE Standards

The Energy Policy and Conservation Act (EPCA) of 1975 established nationwide fuel economy standards in order to conserve oil. Pursuant to this Act, the National Highway Traffic and Safety Administration, part of the U.S. Department of Transportation, is responsible for revising existing fuel economy standards and establishing new vehicle fuel economy standards.

The Corporate Average Fuel Economy (CAFE) program was established to determine vehicle manufacturer compliance with the government's fuel economy standards. Compliance with CAFE standards is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States. The U.S. EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. The CAFE values are a weighted harmonic average of the EPA city and highway fuel economy test results. Based on information generated under the CAFE program, the U.S. Department of Transportation is authorized to assess penalties for noncompliance. Under the Energy Independence and Security Act of 2007 (described below), the CAFE standards were revised for the first time in 30 years.

Energy Policy Act of 1992 (EPAct)

The Energy Policy Act of 1992 (EPAct) was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are also included in EPAct. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.

Energy Policy Act of 2005

The Energy Policy Act of 2005 provides renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 is designed to improve vehicle fuel economy and help reduce U.S. dependence on oil. It represents a major step forward in expanding the production of renewable fuels, reducing dependence on oil, and confronting global climate change.

The Energy Independence and Security Act of 2007:

- Increases the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022, which represents a nearly five-fold increase over current levels; and
- Reduces U.S. demand for oil by setting a national fuel economy standard of 35 miles per gallon by 2020—an increase in fuel economy standards of 40 percent.

By addressing renewable fuels and CAFE standards, the Energy Independence and Security Act of 2007 will build on progress made by the Energy Policy Act of 2005 in setting out a comprehensive national energy strategy for the 21st century.

California Greenhouse Gas Waiver

In December of 2005, the California Air Resources Board (ARB) requested, and on June 14, 2011, the EPA granted an amendment to California's motor vehicle GHG emission standards beginning with model year 2009. EPA Clean Air Act standards require a waiver for states to enact more stringent emission standards for new cars. On June 14, 2011, the EPA confirmed that ARB's amendments to its motor vehicle GHG emission standards are within the scope of the existing waiver of preemption issued.

State Regulations

Warren-Alquist Act

The 1975 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission (CEC). The Act established a State policy to reduce wasteful, uneconomical and unnecessary uses of energy by employing a range of measures. The California Public Utilities Commission (PUC) regulates privately-owned utilities in the energy, rail, telecommunications, and water fields.

State of California Energy Plan

The CEC is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The current plan is the 1997 California Energy Plan.[23] The plan calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators in

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[23] California Energy Commission, 1997.

implementing incentive programs for zero-emission vehicles and addressing their infrastructure needs; and encouragement of urban designs that reduce VMT and accommodate pedestrian and bicycle access.

Assembly Bill 2076: Reducing Dependence on Petroleum

Pursuant to Assembly Bill (AB) 2076 (Chapter 936, Statutes of 2000), the CEC and the ARB prepared and adopted in 2003 a joint agency report, *Reducing California's Petroleum Dependence*. Included in this report are recommendations to increase the use of alternative fuels to 20 percent of on-road transportation fuel use by 2020 and 30 percent by 2030, significantly increase the efficiency of motor vehicles, and reduce per capita vehicles miles traveled.[24] Further, in response to the CEC's 2003 and 2005 *Integrated Energy Policy Reports*, the Governor directed the CEC to take the lead in developing a long-term plan to increase alternative fuel use.[25]

A performance-based goal of AB 2076 is to reduce petroleum demand to 15 percent below 2003 demand. The options include:[26]

- Near-Term Options (could be fully implemented by 2010)
  - Use more fuel efficient replacement tires with proper inflation
  - Improve fuel economy in government fleets
  - Improve private vehicle maintenance
- Mid-Term Options (could be fully implemented in the 2010-2020 time frame)
  - Double fuel efficiency of current model light duty vehicles to 40 miles per gallon
  - Use natural gas-derived Fischer-Tropsch fuel as a 33 percent blending agent in diesel
- Long-Term Options
  - Introduce fuel cell light duty vehicles in 2012, increasing to 10 percent of new vehicle sales by 2020, and 20 percent by 2030.

Recommendations included:

- The Governor and Legislature should adopt the recommended State-wide goal of reducing demand for on-road gasoline and diesel to 15 percent below the 2003 demand level by 2020 and maintaining that level for the foreseeable future.

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[24] Reducing California's Petroleum Dependence, California Energy Commission and Air Resources Board, joint agency report, August 2003, publication #P600-03-005.

[25] Letter from Governor Arnold Schwarzenegger to the Legislature, attachment: Review of Major Integrated Energy Policy Report Recommendations, August 23, 2005.

[26] California Energy Commission/California Air Resources Board: Reducing California's Petroleum Dependence, August 14, 2003 Final, Adopted, Joint Agency AB 2076 Report, publication # 600-03-006F.

- The Governor and Legislature should work with the California delegation and other states to establish national fuel economy standards that double the fuel efficiency of new cars, light trucks and SUVs.
- The Governor and Legislature should establish a goal to increase the use of non-petroleum fuels to 20 percent of on-road fuel consumption by 2020 and 30 percent by 2030.

Integrated Energy Policy Report

Senate Bill (SB) 1389 (Chapter 568, Statutes of 2002) required the CEC to: "[C]onduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The Energy Commission shall use these assessments and forecasts to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety." (Public Resources Code Section 25301(a)) This work culminated in the Integrated Energy Policy Report (IEPR).

The CEC adopts an IEPR every two years and an update every other year. The 2011 IERP is the most recent IEPR, which was adopted in February 8, 2012. The 2011 IERP provides a summary of priority energy issues currently facing the State, outlining strategies and recommendations to further the State's goal of ensuring reliable, affordable, and environmentally responsible energy sources. Energy topics covered in the report include progress toward State-wide renewable energy targets and issues facing future renewable development; efforts to increase energy efficiency in existing and new buildings; progress by utilities in achieving energy efficiency targets and potential; improving coordination among the State's energy agencies; streamlining power plant licensing processes; results of preliminary forecasts of electricity, natural gas, and transportation fuel supply and demand; future energy infrastructure needs; the need for research and development efforts to support State-wide energy policies; and issues facing California's nuclear power plants.[27]

Senate Bill 1078: California Renewables Portfolio Standard Program

Senate Bill (SB) 1078 (Chapter 516, Statutes of 2002) establishes a renewable portfolio standard (RPS) for electricity supply. The RPS requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide 20 percent of their supply from renewable sources by 2017. This target date was moved forward by SB 1078 to require compliance by 2010. In addition, electricity providers subject to the RPS must increase their renewable share by at least 1 percent each year. The outcomes of this legislation will impact regional transportation powered by electricity.

Assembly Bill 1493: Reduction of Greenhouse Gas Emissions

Assembly Bill (AB) 1493 (Chapter 200, Statutes of 2002), known as the "Pavley bill," amended Health and Safety Code sections 42823 and 43018.5 requiring ARB to develop and adopt regulations that achieve maximum feasible and cost-effective reduction of Greenhouse Gas (GHG) emissions from passenger vehicles, light-duty trucks, and other vehicles used for noncommercial personal transportation in California.

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[27] California Energy Commission, 2011. 2011 Integrated Energy Policy Report. Publication Number: CEC-100-2011-001-CMF.

Implementation of new regulations prescribed by AB 1493 required that the State of California apply for a waiver under the federal Clean Air Act. Although the U.S. Environmental Protection Agency (EPA) initially denied the waiver in 2008, the EPA approved a waiver in June 2009, and in September 2009, ARB approved amendments to its initially adopted regulations to apply the Pavley standards that reduce greenhouse gas emissions (GHG) to new passenger vehicles in model years 2009 through 2016. According to ARB, implementation of the Pavley regulations is expected to reduce fuel consumption while also reducing GHG emissions.[28]

Energy Action Plan

The first Energy Action Plan (EAP) emerged in 2003 from a crisis atmosphere in California's energy markets. The state's three major energy policy agencies (the PUC, the CEC, and the Consumer Power and Conservation Financing Authority [established under deregulation and now defunct]) came together to develop one high-level, coherent approach to meeting California's electricity and natural gas needs. It was the first time that energy policy agencies formally collaborated to define a common vision and set of strategies to address California's future energy needs and emphasize the importance of the impacts of energy policy on the California environment.

In the October 2005 *Energy Action Plan II*, the CEC and the PUC updated their energy policy vision by adding some important dimensions to the policy areas included in the original *EAP*, such as the emerging importance of climate change, transportation-related energy issues and research and development activities. The CEC recently adopted an update to the EAP II in February 2008 that supplements the earlier EAPs and examines the State's ongoing actions in the context of global climate change.

Assembly Bill 1007: State Alternative Fuels Plan

Assembly Bill (AB) 1007 (Chapter 371, Statutes of 2005) required the CEC to prepare a State plan to increase the use of alternative fuels in California. The CEC prepared the State Alternative Fuels Plan (SAF Plan) in partnership with the ARB and in consultation with other State, federal, and local agencies. The SAF Plan presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-state production. The SAF Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce greenhouse gas emissions, and increase in-state production of biofuels without causing a significant degradation of public health and environmental quality.

Bioenergy Action Plan, Executive Order #S-06-06

Executive Order #S-06-06, April 25, 2006, establishes targets for the use and production of biofuels and biopower, and directs State agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The Executive Order establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels within California by 2010,

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[28] California Air Resources Board, "Clean Car Standards - Pavley, Assembly Bill 1493" webpage; last updated October 4, 2010. Available at: www.arb.ca.gov/cc/ccms/ccms.htm. Reviewed January 15, 2013.

40 percent by 2020, and 75 percent by 2050. The Executive Order also calls for the State to meet a target for use of biomass electricity.

Governor's Low Carbon Fuel Standard (Executive Order #S-01-07)

In January 2007, Executive Order S-01-07 established a Low-Carbon Fuel Standard. The Order calls for a statewide goal to be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 ("2020 Target"), and that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California. Further, it directs the ARB to determine if an LCFS can be adopted as a discrete early action measure pursuant to AB 32, and if so, consider the adoption of a LCFS on the list of early action measures required to be identified by June 30, 2007, pursuant to Health and Safety Code Section 38560.5. The LCFS applies to all refiners, blenders, producers or importers ("Providers") of transportation fuels in California, will be measured on a full fuels cycle basis, and may be met through market-based methods by which Providers exceeding the performance required by a LCFS shall receive credits that may be applied to future obligations or traded to Providers not meeting the LCFS.

In June 2007, the ARB approved the LCFS as a Discrete Early Action item under AB 32 and in April 2009 the ARB approved the new rules and carbon intensity reference values with the new regulatory requirements taking effect in January 2011. The standards require providers of transportation fuels to report on the mix of fuels that they provide and demonstrate that they meet the LCFS intensity standards annually. This is accomplished by ensuring that the number of "credits" earned by providing fuels with a lower carbon intensity than the established baseline (or obtained from another party) is equal to or greater than the "deficits" earned from selling higher intensity fuels.

In December 2011 the U.S. District Court for the Eastern District of California issued three rulings against the LCFS including a requirement for ARB to abstain from enforcing the LCFS. In April 2012, the Ninth Circuit granted ARB's motion for a stay of the injunction while it continues to consider ARB's appeal of the lower court's decision.

Title 24, California Code of Regulations

California Code of Regulations, Title 24, Part 6, is California's Energy Efficiency Standards for Residential and Non-residential Buildings. Title 24 was established by the CEC in 1978 in response to a legislative mandate to create uniform building codes to reduce California's energy consumption, and provide energy efficiency standards for residential and nonresidential buildings. In 2008, the CEC updated Title 24 standards with more stringent requirements effective January 1, 2010. The 2010 standards are expected to substantially reduce the growth in electricity and natural gas use of new construction versus existing rules. Additional savings result from the application of the standards on building alterations. The building efficiency standards are enforced through the local plan check and building permit process. Local government agencies may adopt and enforce additional energy standards for new buildings as reasonably necessary due to local climatologic, geologic, or topographic conditions, provided that these standards exceed those provided in Title 24.

California Global Warming Solutions Act of 2006 (AB 32)

Assembly Bill (AB) 32, the California Global Warming Solutions Act (Health and Safety Code Section 38500 et seq.), was signed in September 2006. The Act requires the reduction of statewide GHG emissions to 1990 levels by the year 2020. This change, which is estimated to be a 25 to 35 percent reduction from current emission levels, will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. The Act also directs the Air Resources Board (ARB) to develop and implement regulations to reduce statewide GHG emissions from stationary sources and address GHG emissions from vehicles. The ARB has stated that the regulatory requirements for stationary sources will be first applied to electricity power generation and utilities, petrochemical refining, cement manufacturing, and industrial/commercial combustion. The second group of target industries will include oil and gas production/distribution, transportation, landfills and other GHG-intensive industrial processes.

In 2008, the ARB adopted the Scoping Plan for AB 32- the main strategies California will use to reduce the GHGs that cause climate change (many of those by products of energy use). The Scoping Plan has a range of GHG reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 program implementation regulation to fund the program. The Scoping Plan recognizes that the SB 375 regional GHG emissions reduction targets is the main action required to obtain the necessary reductions from the land use and transportation sectors in order to achieve the 2020 emissions reduction goals of AB 32.

Senate Bill 375 (Chapter 728, Statutes of 2008)

Senate Bill (SB) 375, adopted September 30, 2008 helps meet the AB 32 goals of reducing emissions from cars and light duty trucks. SB 375 requires regional planning agencies to include a Sustainable Communities Strategy (SCS) in their regional transportation plan (RTP) that demonstrates how the region could achieve GHG emissions reductions set by ARB through integrated land use and transportation planning. Local governments retain control of land use planning authority; however, SB 375 amended the California Environmental Quality Act (Pub. Resources Code § 21000 et seq.) to ease environmental review of specific types of developments that are anticipated to reduce emissions. Plan Bay Area is the integrated SCS and RTP for the San Francisco Bay Area, consistent with SB 375.

Local Regulations

County and City General Plans

Many of the counties and cities in the Bay Area region have general plan elements and policies that specifically address energy use and conservation. Those energy conservation measures contain goals, objectives, and policies aimed at reducing energy consumption. These include policies on energy retrofits to existing residential and commercial land uses, zoning and building ordinances for energy efficiency of new construction, and ways to reduce VMT through land use and transportation priorities.

County and City Climate Action Plans

Additionally, many counties and cities in the Bay Area region are drafting or have adopted climate action plans or energy action plans. These documents set goals and targets on the reduction of greenhouse gas emissions and outline polices to help achieve those goals. Strategies often focus on reducing emissions from transportation, which modify land use and transportation policy specifically focused on reducing VMT. For an analysis of greenhouse gas production and proposed Plan impacts on climate change, please see *Chapter 2.5: Climate Change and Greenhouse Gases.*

Impact Analysis

IMPACT SIGNIFICANCE CRITERIA

Implementation of the proposed Plan would have a potentially significant adverse impact if the Plan would:

Criterion 1: Result in an increase in overall per capita energy consumption (i.e., consumption of electricity, natural gas, gasoline, diesel, or other non-renewable energy types) relative to baseline conditions; increase reliance on fossil fuels; decrease reliance on renewable energy sources; or otherwise use energy in an inefficient, wasteful, or unnecessary manner, contrary to the guidance in Appendix F of the *CEQA Guidelines*.

Criterion 2: Be inconsistent with adopted plans or policies related to energy conservation.

METHOD OF ANALYSIS

Energy would be consumed during both the construction and operational phases of development under the proposed Plan, in the form of direct and indirect energy. Direct energy is the fuel consumed to propel the vehicle and the energy (electricity and natural gas) used in buildings. Indirect energy is all of the remaining energy needed to construct, operate, and maintain the buildings and infrastructure. The analysis estimates the total amount of energy expected to be consumed in 2040 with implementation of the proposed Plan, and compares this to current energy use (baseline of 2010). Both direct (i.e., operational) energy and indirect (i.e., construction/manufacturing and maintenance of the facility and vehicles) energy impacts are quantified using standard energy models (i.e., Btu).

Direct Energy Use

The estimated average annual energy consumption factors by land use are presented in **Table 2.4-4** and were used to calculate direct energy consumption from land use changes under the proposed Plan.

TABLE 2.4-4: DIRECT LAND USE ENERGY CONSUMPTION FACTORS

Land Use/Energy Source	*Usage/Unit*
Single-Family Residential	
Electricity	7,415 kWh/du/yr
Natural Gas	49.6 MMBtu/du/yr
Multi-Family Residential	
Electricity	4,434 kWh/du/yr
Natural Gas	22.5 MMBtu/du/yr
Commercial	
Electricity	13.64 kWh sf/yr
Natural Gas	0.02949 MMBtu/sf
Office	
Electricity	21.35 kWh/ sf/yr
Natural Gas	0.02052 MMBtu/sf
Industrial	
Electricity	7.71 kWh/ sf/yr
Natural Gas	0.00433 MMBtu/sf

Notes:
du: dwelling unit   sf: square feet
kWh: kilowatt hour   MMBtu: 1 million Btu

Source: Bay Area Greenhouse Gas Model, Bay Area Air Quality Management District, April 2010.

Direct energy consumption for transportation involves energy used by the operation of vehicles. In assessing the direct energy impact, consideration was given to the following factors:

- Vehicle mix, including light-duty vehicles, medium trucks, and heavy trucks;
- Annual regional VMT per capita; and
- Variation of fuel consumption rates by vehicle type.

Indirect Energy Use

Indirect or construction energy effects involve the one-time, non-recoverable energy associated with construction of roadways and structures, and construction and maintenance of the vehicles using the facility. Indirect energy consumption for land use is the total energy spent in the production of a building, from the manufacture of materials to their delivery and construction. **Table 2.4-5** presents the indirection land use energy consumption factors.

TABLE 2.4-5: INDIRECT LAND USE ENERGY CONSUMPTION FACTORS

Land Use	*Usage/Unit*
Single-Family Residential[1]	1,674,400 MMBtu/du
Multi-Family Residential[1]	867,280 MMBtu/du
Commercial	940 MMBtu/sf
Office	1,640 MMBtu/sf
Industrial	974 MMBtu/sf

Notes:

1. Single-family dwellings assumed at an average of 2,392 sq. ft.; multi-family dwellings at an average of 1,172 sq. ft.

du: dwelling unit; sf: square feet; MMBtu: 1 million Btu

Source: Energy used in construction from: Advisory Council on Historic Preservation, *Assessing the Energy Conservation Benefits of Historic Preservation,* 1979.
(http://www.achp.gov/1979%20%20Energy%20Conserv%20and%20Hist%20Pres.pdf);
Building size from: U.S. Department of Energy, *Buildings Data Energy Book 2011*
(http://buildingsdatabook.eren.doe.gov/).

Indirect energy is calculated by determining the energy equivalent of all of the material products and operations necessary to keep the transportation system operable. The indirect energy analysis was conducted using the Input-Output Method, which converts either VMT or Year 2012 construction dollars into energy consumption. The analysis is based on existing data from other roadway improvement projects in the United States, utilizing conversions listed in **Table 2.4-6.**

TABLE 2.4-6: INDIRECT TRANSPORTATION PROJECT ENERGY CONSUMPTION FACTORS

	Energy Factor
Construction	
Automobiles and Trucks (manufacturing)	1,410 Btu/Vehicle Mile[1]
Bus (manufacturing)	3,470 Btu/Vehicle Mile[1]
Roadway (construction)	27,500 Btu/1977$[2]
Track Work	5,044 Btu/1982$[2]
Maintenance	
Automobiles and Trucks	1,400 Btu/Vehicle Mile[1]
Bus	13,142 Btu/Vehicle Mile[1]

Notes:

1. Energy use per passenger mile is less, depending on passenger load of transit vehicle.
2. 2012$ converted to 1977$ and 1982$.

Source: Caltrans, 1983, Energy and Transportation Systems. July 1983.

SUMMARY OF IMPACTS

Direct and Indirect Energy Use

Implementation of the proposed Plan (including transportation projects and land use development) combined with improvements in vehicle technology would result in lower per capita daily energy consumption relative to existing conditions (2010). Thus the overall energy impact is considered to be less than significant (LS).

Policy Consistency

The Integrated Energy Policy Report (IEPR) remains the guiding document for California energy policy.[29] To the extent that the proposed Plan can address statewide energy policy, it would generally be consistent with the IEPR because the proposed Plan attempts to leverage funding in ways that reduce the need for energy use. In particular the proposed Plan supports the IEPR in efforts to increase energy efficiency in existing and new buildings through increased density and reduce transportation fossil fuel demand by increasing alternative transportation modes. Thus, there is no adverse impact (NI) related to consistency between the proposed Plan and the primary guiding document for California energy policy.

IMPACTS AND MITIGATION MEASURES

Impact

2.4-1 Implementation of the proposed Plan could result in an increase in per-capita direct and indirect energy consumption compared to existing conditions.

Impacts of Land Use Projects

Total and per capita annual direct energy consumption in the nine-county region are shown in **Table 2.4-7**. In 2010, annual per capita consumption was over 38.85 million Btu per person. Assuming the growth in the proposed Plan, annual per capita energy consumption is expected to be just under 38.5 million Btu per person by 2040, a per capita decrease of approximately 1 percent.

[29] California Energy Commission, 2011. 2011 Integrated Energy Policy Report. Publication Number: CEC-100-2011-001-CMF.

TABLE 2.4-7: ANNUAL DIRECT LAND USE ENERGY USE IN THE BAY AREA

Land Use	2010 Baseline		2040 Project		Change[1]
	Electricity MWh/yr	Natural Gas MMBtu/yr	Electricity MWh/yr	Natural Gas MMBtu/yr	
Residential	16,486,370,327	103,410,804	20,218,975,130	124,961,755	22.6% / 20.8%
Non-Residential[2]	26,825,719,955	26,651,104	36,272,270,190	36,010,262	35.2% / 35.1%
Total	**41,851,958,700**	**129,002,788**	**55,034,827,392**	**160,395,541**	**30.4% / 23.8%**
Combined Total	277,842,760 MMBtu/yr		353,720,146 MMBtu/yr		+28.6%
Per Capita Total	38.85 MMBtu/yr/person		38.47 MMBtu/yr/person		-1%

Notes:
1. Percent Change for Residential, Non-Residential Use, and Total Use is given as Electricity / Natural Gas.
2. The job generating factors used include: retail: 1:424 sf; office: 1:403 sf; industrial: 1:815 sf, consistent with the UrbanSim land use model.

MWh – Megawatt-hour; MMBtu – Million British thermal units

Source: Metropolitan Transportation Commission Model Outputs 2012, Environmental Science Associates, 2012

The decrease in residential per capita energy demand for land use is due in part to the expected change in land use patterns under the proposed Plan. The electricity and natural gas estimates include lower energy consumption for multi-family residential units. According to a study from the Energy Information Administration, multi-family residential units, when compared to single family residential units, are 44 percent more efficient on a per unit basis in terms of consumption of electricity and 35 percent more efficient with natural gas consumption.[30] Multifamily units are projected to increase from 37 percent of all residential units in 2010 to 44 percent in 2040. Due to space efficiency, multifamily units consume less energy than single family homes.

Electricity and natural gas consumption per job would increase approximately three percent over the time horizon of the proposed Plan as a result of an increase in technology sector jobs, which are typically located in the energy intensive office environment.

The indirect energy use for land uses is related to the total energy consumed in the construction of structures, including the energy used to create all of the building materials used in those structures. As such, while the analysis includes a column for existing (2010) conditions in **Table 2.4-8,** this represents energy "embedded" in existing buildings. However, the focus is on the change in per capita energy consumed in construction, since that is the most appropriate measure of a change in efficiency from the baseline conditions to the proposed Plan. As presented in **Table 2.4-8**, the indirect energy consumption for buildout of the proposed Plan would increase by 18 percent. However, the indirect energy consumption is growing at a slower rate than the projected population growth of 30 percent, resulting in a decrease in per capita consumption. This can be attributed to the focus on multifamily homes which use less indirect energy to construct.

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[30] Energy Information Administration, 2005, *Residential Energy Consumption Survey.*

TABLE 2.4-8: ESTIMATED INDIRECT LAND USE ENERGY CONSUMPTION (IN BnBTUS)

			Change 2010 to 2040	
	2010	*2040*	*Numerical*	*Percent*
Indirect Energy				
Single Family	2,762,239,262	3,117,816,520	355,577,258	11%
Multifamily	832,058,025	1,254,147,590	422,089,565	34%
Commercial	7,122,192	7,665,001	542,809	7%
Office	61,589,951	91,049,101	29,459,150	32%
Industrial	16,898,925	18,389,359	1,490,434	8%
Indirect Energy Total	**3,679,908,355**	**4,489,067,571**	**809,159,216**	**18%**
Per Capita Energy (BnBTUs)	519	488	-31	-6%
Per Capita Daily Energy (MMBTUs)	47.4	44.6	-2.8	-6%

BnBTU: Billion British Thermal Units; MMBT: Million British Thermal Units

Note: Numbers may not add due to rounding.

Source: Environmental Science Associates, 2013; Metropolitan Transportation Commission Model Outputs 2012.

Although total electricity use and demand for natural gas would increase under the proposed Plan, energy use per capita would decrease. Further, as noted in the Environmental Settings section above, under existing conditions, California receives 14.6 percent of its electricity supply from renewable resources (i.e., geothermal, biomass, small hydroelectric resources, wind, and solar). The analysis does not account for potential increases in renewable energy, the use of which is discussed in Appendix F of the *CEQA Guidelines,* stating that energy goals should "decrease reliance on fossil fuels" and "increase reliance on renewable energy sources." Further, this analysis does not account for anticipated adoption of stricter local green building codes, energy action plans, and similar documents, which would be expected to result in actual future energy use being lower than that projected based on existing and past rates of consumption. Since the analysis does not account for an increase in the use of renewable sources of energy or future energy efficiency, it can be considered conservative, as these changes are expected to occur over the course of the Plan horizon. Therefore, implementation of the proposed Plan does not conflict with the goal of decreasing overall per capita energy consumption.

Additionally, the preceding discussion does not include an analysis of the impact of the AB 32 Scoping Plan measures on per capita energy consumption. Although the Scoping Plan includes measures and strategies to achieve GHG emissions reductions, several measures achieve reductions through a decrease in energy consumption specific to the built environment. Specifically, the following measures from the Scoping Plan would further reduce energy consumption per capita through 2040:

- E-1 Energy Efficiency and Conservation–More stringent building and appliance standards help reduce electricity consumption.
- E-3 Renewable Electricity Standard–Reach 33 percent renewables by 2020.
- E-4 Million Solar Roofs–Move away from natural gas and electricity to on-site renewables.CR-1 Energy Efficiency and Conservation–More stringent building and appliance standards help reduce natural gas consumption.

- CR-2 Solar Hot Water–Goals of AB 1470, use of renewable energies for water heaters.

See *Chapter 2.5: Climate Change and Greenhouse Gases* for more information on Scoping Plan measures and reductions.

Impacts of Transportation Projects

Implementation of the proposed transportation strategy would result in lower daily per capita energy consumption in 2040 relative to baseline existing conditions (2010). The proposed Plan's daily per capita energy consumption for direct transportation energy (including on-road transportation energy) would be 28 percent lower than baseline energy use, with the decline in energy use attributable to an anticipated increase in average miles per gallon for automobiles due to implementation of the Pavley rules regarding vehicle emissions (see discussion under Regulatory Setting), which would more than offset increased vehicle miles traveled. While bus energy use would more than double, cars and trucks would continue to consume the vast majority of directly expended transportation energy, and thus would drive the overall decrease in direct energy use per capita. Data used in the direct energy calculations and the results for transportation energy use are shown in **Table 2.4-9.**

TABLE 2.4-9: DAILY DIRECT TRANSPORTATION ENERGY USE IN THE BAY AREA

	VMT by Mode (daily)	*Daily Fuel by Mode (gal)*	*Btu per gal*	*On-Road Energy Use (BnBtus[1])*	*Btu Use per Capita*
Existing Conditions (2010)					
Passenger	136,393, 170	6,759,650	114,000	771	109,966
Trucks	7,470,993	898,378	129,500	116	16,601
Buses	395,507	75,409	129,500	10	1,393
Other Vehicles	4,786,330	234,778	114,000	27	3,819
Total				**923**	**131,780**
Proposed Plan (2040)					
Passenger	160,959,546	5,027,199	114,000	573	62,720
Trucks	15,856,360	2,048,456	129,500	265	29,031
Buses	1,062,667	182,825	129,500	24	2,591
Other Vehicles	1,529,427	69,751	114,000	8	870
Total				**870**	**95,213**
Total Change 2010 to 2040			**53**		**36,567**
% Change 2010 to 2040			**-6%**		**-28%**

1. BnBtu (Billion British Thermal Units) per day

Source: Metropolitan Transportation Commission Model Outputs 2012, Environmental Science Associates, 2012.

There would also be indirect energy impacts from the consumption of energy for construction, manufacturing, and maintenance purposes (see **Table 2.4-10**). The average daily indirect energy consumption for the proposed Plan would increase from 2010 conditions as a result of increased alternative mode construction (i.e., light rail, commuter rail, bus rapid transit, etc.), increased vehicle maintenance, and the energy used in manufacture of autos and transit vehicles.

TABLE 2.4-10: ESTIMATED DAILY INDIRECT TRANSPORTATION ENERGY CONSUMPTION (IN BILLION BTUS)

			Change 2010 to 2040	
	2010	*2040*	*Numerical*	*Percent*
Indirect Energy				
Manufacturing/Maintenance	213.3	263.6	50.3	24%
Construction	--	107.8	107.8	100%
Indirect Energy Total	213.3	371.5	126.8	74%
Per Capita Daily Energy (BTUs)	30,438.1	40,652.8	10,214	33%

BTU: British Thermal Units

Note: Numbers may not add due to rounding.

Source: Environmental Science Associates, 2012; Metropolitan Transportation Commission Model Outputs 2012

Combined Effects

The combined effect of both the land use and transportation projects associated with the proposed Plan would result in lower direct per capita energy use by about 16 percent, compared to existing conditions, as shown in **Table 2.4-11**. Construction, manufacturing, and maintenance energy use would increase by 33 percent, but the overall change (direct and indirect energy use combined) would be a 10 percent decline per capita in energy use. Therefore, it is determined that implementation of the proposed Plan would not increase overall per capita energy consumption, nor would it substantially increase reliance on fossil fuels (less transportation energy), substantially decrease reliance on renewable energy sources (the proposed Plan would reduce energy use per capita), or otherwise use energy in an inefficient, wasteful, or unnecessary manner. The impact is considered less than significant (LS) and no mitigation measures are required.

TABLE 2.4-11: DAILY PER CAPITA ENERGY USE (BTUS PER PERSON)

			Change 2010 to 2040 Project	
Category	*2010*	*2040 Project*	*Numerical*	*Percent*
Land Use Energy	106,448	105,387	-1,061	-1%
Direct Transportation Energy	131,781	95,213	-36,567	-27.7%
Subtotal: Direct Energy	**238,229**	**200,600**	**-37,62**	**-15.8%**
Land Use Energy	47	45	-2	-
Direct Transportation Energy	30,439	40,653	10,213	33.6%
Subtotal: Indirect Energy	**30,487**	**40,698**	**10,211**	**33.6%**
Total	**268,716**	**241,254**	**-27,462**	**-10.2%**

BTU: British Thermal Units

Note: Numbers may not add due to rounding.

Source: Environmental Science Associates, 2012; Metropolitan Transportation Commission Model Outputs 2012

Mitigation Measures

None required.

Impact

2.4-2 Implementation of the proposed Plan could be inconsistent with adopted plans or polices related to energy conservation.

Impacts of Land Use and Transportation Projects

The analysis of consistency with existing energy plans and policies focuses on the California Integrated Energy Policy Report, as it is the primary guiding document for California energy policy. The most recent version of that report, issued in 2011, calls for California's industries to meet environmental goals while accommodating economic and population growth; attainment of AB 32 goals to reduce California's greenhouse gas emissions to 1990 levels by 2020; and meeting the State's growing energy needs while reducing carbon dioxide emissions (see *Chapter 2.5: Climate Change and Greenhouse Gases* for further discussion of AB 32).

The proposed Plan would be consistent with the Integrated Energy Policy Report (IEPR) because it leverages funding (such as through the OneBayArea Grant program) to promote compact, mixed-use development that combines both residential and commercial uses and is located close to public transit, jobs, schools, shopping, parks, recreation and other amenities.[31] For example, projects located in Priority Development Areas are given priority for grants over projects outside those established areas. These types of land uses are more energy efficient in the transportation sector (i.e., reduced single occupancy travel) and built environment sector (i.e., reduced square footage), a primary goal outlined in the IEPR.

There are many factors beyond the control of MTC and ABAG and outside the scope of the proposed Plan that could influence future energy use, including State and federal regulatory actions (e.g., changes in fuel economy standards), local land use decisions (i.e., where city and county government approve subsequent development projects, both foreseen and unforeseen in the Plan, and the resulting energy required to travel to and from these projects), global economic factors (e.g., the cost of oil, natural gas, electricity, and other forms of energy), and others. In light of these factors, MTC's and ABAG's jurisdiction is limited and cannot ensure future energy reductions in the Bay Area.

The overall intent of the proposed Plan is consistency with the goals of SB 375, which, through regional land use and transportation planning, is expected to result in reductions in energy consumption, compared to what would otherwise occur in future years. This analysis concludes that, on a programmatic level, the proposed plan is consistent with the most current statewide guiding energy policy contained in the IEPR, therefore resulting in no adverse impact (NI). No mitigation is required.

Mitigation Measures

None required.

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[31] Metropolitan Transportation Commission, *Bay Area Agencies Approve Preferred Land Use Scenario and Transportation Investment Strategy*, 2012.

2.5 Climate Change and Greenhouse Gases

Global climate change (GCC) poses an immediate threat to the Bay Area's economy, environment, and public health. The anticipated impacts of climate change in California range from water shortages to inundation from sea level rise. Transportation systems contribute to climate change primarily through the emissions of certain greenhouse gases (CO_2, CH_4, and N_2O) from nonrenewable energy (primarily gasoline and diesel fuels) used to operate passenger, commercial and transit vehicles. Land use changes contribute to climate change through construction and operational use of electricity and natural gas, and waste production.

This section of the EIR analyzes quantitatively how implementation of the proposed Plan Bay Area may contribute to global climate change through greenhouse gas emissions related to transportation and land uses. In addition, the analysis qualitatively describes the potential impacts of sea level rise on the proposed regional land use patterns included in the Plan, as well as on the proposed transportation investment projects.

Environmental Setting

PHYSICAL SETTING

Global Climate Change

Climate is defined as the average statistics of weather, which include temperature, precipitation, and seasonal patterns such as storms and wind, in a particular region. Global climate change refers to the long term and irrevocable shift in these weather related patterns. Using ice cores and geological records, baseline temperature and CO_2 data extends back to previous ice ages thousands of years ago. Over the last 10,000 years, the rate of temperature change has typically been incremental, with warming and cooling occurring over the course of thousands of years. However, scientists have observed an unprecedented increase in the rate of warming over the past 150 years, roughly coinciding with the global industrial revolution, which has introduced tremendous amounts of greenhouse gases (defined below) into the atmosphere.

Climate modeling capabilities have been greatly enhanced in recent years allowing for the future range of climate change effects to be better understood. However, there are limitations to representing the anticipated changes at a downscaled or regional level. What is certain is that, even if specifics are unknown, the global forecasted future trends will still apply at a local level.

The world's leading climate scientists—the IPCC[1]—have reached consensus that global climate change is "very likely" caused by humans, and that hotter temperatures and rising sea levels will continue for centuries. The rate at which these changes occur will be affected by current and future anthropogenic emissions. In particular, human influences have:

- *Very likely* contributed to sea level rise and increased storm surge during the latter half of the 20th century;
- *Likely* contributed to changes in wind patterns, affecting extra-tropical storm tracks and temperature patterns;
- *Likely* increased temperatures of extreme hot nights, cold nights and cold days; and
- *More likely than not* increased risk of heat waves, area affected by drought since the 1970s, and frequency of heavy precipitation events.[2]

The IPCC predicts that the global mean temperature increase between 1990 and 2100 could range from 2.0 to 11.5 degrees Fahrenheit. They project a sea level rise of seven to 23 inches (0.2 to 0.6 meters) by the end of the century, with a greater rise possible depending on the rate of polar ice sheet melting.

According to the California Energy Commission (CEC), accelerating GCC has the potential to cause adverse impacts in the Bay Area[3], including but not limited to:

- *Water Supply:* Changes in local rainfall, salt water intrusion, sea water flooding the delta, and a reduced Sierra snowpack can all threaten the Bay Area's water supply.
- *Infrastructure:* Increased risks of flooding due to sea level rise, coastal erosion, more frequent and extreme storms, and stronger precipitation events may lead to damage, inoperability, or impairment of critical infrastructure such as wastewater treatment plants, sewage, power plants, and transportation. This would affect not only daily commutes and activities, but also emergency response.

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[1] The Intergovernmental Panel on Climate Change (IPCC) is a scientific intergovernmental body set up by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP). Its role is to assess, on a comprehensive, objective, open and transparent basis, the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts, and options for adaptation and mitigation.

[2] Intergovernmental Panel on Climate Change, 2007a.

[3] Climate Change Impacts, Vulnerabilities, and Adaptation in the San Francisco Bay Area: A synthesis of PIER Program Reports and Other Relevant Research. A white paper from the CEC's California Climate Change Center. CEC-500-2012-071. July 2012.

- *Agriculture:* Changes in temperatures, more extreme heat days, and the earlier onset of spring may lead to suboptimal growing conditions for grapes and other agricultural products that significantly contribute to the Bay Area economy and tourism.

- *Ecosystems and Biodiversity:* With sea level rise, the Bay Area's coastal wetlands are threatened and cannot naturally move inland due to existing developments, thus destroying this important ecosystem. This threatens the region's freshwater fish species and may allow non-native species to thrive. Increased temperatures also result in increased fire risk.
- *Energy Demand, Supply, and Transmission:* Energy demand will increase as temperature extremes become more common. This could lead to rolling blackouts or other issues with the Bay Area's aging energy infrastructure.
- *Public Health:* Most Bay Area residences and businesses were not built with air conditioning to control temperatures on extreme heat days, which may lead to heat stroke. Higher temperatures also lead to worsened air quality and potentially the spread of diseases and pests. Increased incidence and severity of wildfires may also contribute to worsening air quality. These changes will disproportionately burden children, the elderly, and those with pre-existing health conditions.

Greenhouse Gases

Gases that trap heat in the Earth's atmosphere are called greenhouse gases (GHGs). These gases play a critical role in determining the Earth's surface temperature. Part of the solar radiation that would have been reflected back into space is absorbed by these gases, resulting in a warming of the atmosphere. Without natural GHGs, the Earth's surface would be about 61 degrees cooler.[4] This phenomenon is known as the greenhouse effect. However, scientists have proven that emissions from human activities—such as electricity generation, vehicle emissions, and even farming and forestry practices—have elevated the concentration of GHGs in the atmosphere beyond naturally-occurring concentrations, enhancing the greenhouse effect and contributing to the larger process of global climate change. The six primary GHGs are:

- **Carbon Dioxide (CO_2),** emitted when solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products are burned;
- **Methane (CH_4),** produced through the anaerobic decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, incomplete fossil fuel combustion, and water and wastewater treatment;
- **Nitrous oxide (N_2O),** typically generated as a result of soil cultivation practices, particularly the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning;
- **Hydrofluorocarbons (HFCs),** primarily used as refrigerants;
- **Perfluorocarbons (PFCs),** originally introduced as alternatives to ozone depleting substances and typically emitted as by-products of industrial and manufacturing processes; and

[4] California Climate Action Team, 2006.

- **Sulfur hexafluoride (SF_6),** primarily used in electrical transmission and distribution.

Though there are other contributors to global warming[5], these six GHGs are identified explicitly by the US Environmental Protection Agency (EPA) as threatening the public health and welfare of current and future generations[6]. GHGs have varying potential to trap heat in the atmosphere, known as global warming potential (GWP), and atmospheric lifetimes. GWPs reflect how long GHGs remains in the atmosphere, on average, and how strongly they absorb energy. Gases with a higher GWP absorb more energy per pound than gases with a lower GWP, and thus contribute more to warming Earth. For example, one ton of CH_4 has the same contribution to the greenhouse effect as approximately 23 tons of CO_2; hence, CH_4 has a 100-year GWP of 23 while CO_2 has a GWP of 1.[7] GWP ranges from 1 (carbon dioxide) to 22,000 (sulfur hexafluoride). GWP is alternatively described as "carbon dioxide equivalents", or CO_2e. The parameter "atmospheric lifetime" describes how long the molecules will remain in the atmosphere. Atmospheric lifetimes of GHGs range from tens to thousands of years. All of these gases remain in the atmosphere long enough to become well mixed. The amount that is measured in the atmosphere is roughly the same all over the world, regardless of the source of the emissions.

California and Bay Area GHG Emissions

GHG emissions contributing to global climate change are attributable in large part to human activities associated with the electricity, transportation, industrial, commercial, residential, and agricultural/forestry sectors. The State of California alone produces about 2 percent of the entire world's GHG emissions, with major emitting sources here including fossil fuel consumption from transportation (38 percent), electricity production (23 percent), industry (20 percent), agricultural and forestry (7 percent), residential (6 percent), and commercial (4 percent)[8]. Much like nations around the world, California government is putting in place programs and legislation to drastically reduce GHG emissions with the hope of thereby delaying, mitigating, or preventing at least some of the anticipated impacts of GCC on California communities.

Furthermore, local and regional agencies in the Bay Area have taken steps to measure, quantify, evaluate, and mitigate their contributions to GHG emissions and GCC. For example, 45 cities and counties in the Bay Area have already developed their own climate action plans and 101 have completed GHG emissions

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5 Diesel particulate matter, which is also referred to as black carbon, is a strong absorber of solar radiation; scientists have known for many years that when black carbon particles combine with dust and chemicals in air they become more efficient in absorbing solar radiation. Black carbon constitutes the largest uncertainty in current predictions of climate change in global climate models. See California Air Resources Board, Climate Change – Characterization of Black Carbon and Organic Carbon Air Pollution Emissions and Evaluation of Measurement Methods, page 1, available at http://www.arb.ca.gov/research/apr/past/04-307_v2.pdf [as of August 22, 2012]. See also Chapter 2.2: Air Quality of this EIR for an analysis of diesel particulate matter emissions.

6 Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, Final Rule, Federal Register, Docket ID No. EPA-HQ-OAR-2009-0171, December 14, 2009.

7 California Climate Action Registry, General Reporting Protocol Version 3.1, 2009.

8 California Air Resources Board Greenhouse Gas Inventory Data 2000-2009.

inventories.[9] Additionally, many cities, business, and municipal agencies are voluntary members of the Climate Action Registry, a private non-profit organization originally formed by the State of California that serves as a voluntary GHG registry to protect and promote early actions to reduce GHG emissions by organizations.

In 2010, the Bay Area Air Quality Management District (BAAQMD) updated a baseline inventory of GHG emissions for the year 2007. According to that inventory, 95.8 million tons of CO_2e were emitted in the Bay Area in 2007.[10] **Table 2.5-1** shows the emissions breakdown by pollutant.

TABLE 2.5-1: 2007 BAY AREA CO_2E EMISSIONS BY POLLUTANT

Pollutant	*Percentage*	*CO_2e (Million Metric Tons/Year)*
Carbon Dioxide	92	88
Methane	3	3
Nitrous Oxide	2	2
HFC, PFC, SF_6	4	4
Total	**100**	**96**

Source: Bay Area Air Quality Management District, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated 2010.

The Bay Area's transportation sector alone contributes 36 percent of the CO_2e GHG emissions, tied with industrial and commercial sources (36 percent), and followed by energy production activities (electricity generation and co-generation) (16 percent), residential fuel use (7 percent), off road equipment (3 percent), and agriculture/farming (1 percent). Bay Area emissions by sector are illustrated in **Figure 2.5-1**.

Before accounting for regulations that have been adopted since 2007, Bay Area GHG emissions were expected to grow at a rate of 1.4 percent a year due to population growth and economic expansion.[11] Economic activity variations and the fraction of electric power generation in the region[12] will cause year-to-year fluctuations in the emissions trends. **Figure 2.5-2** shows the emission trends by major sources for the period of 1990 to 2029.

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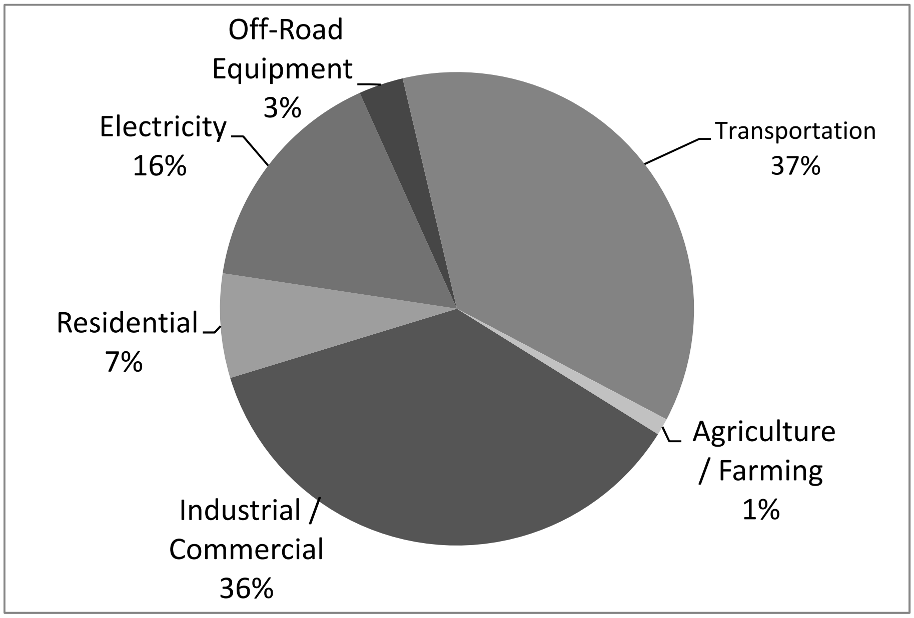
[9] Bay Area Air Quality Management Office, SF Bay Area Climate Portal, 2012.

[10] Bay Area Air Quality Management District, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.

[11] Ibid.

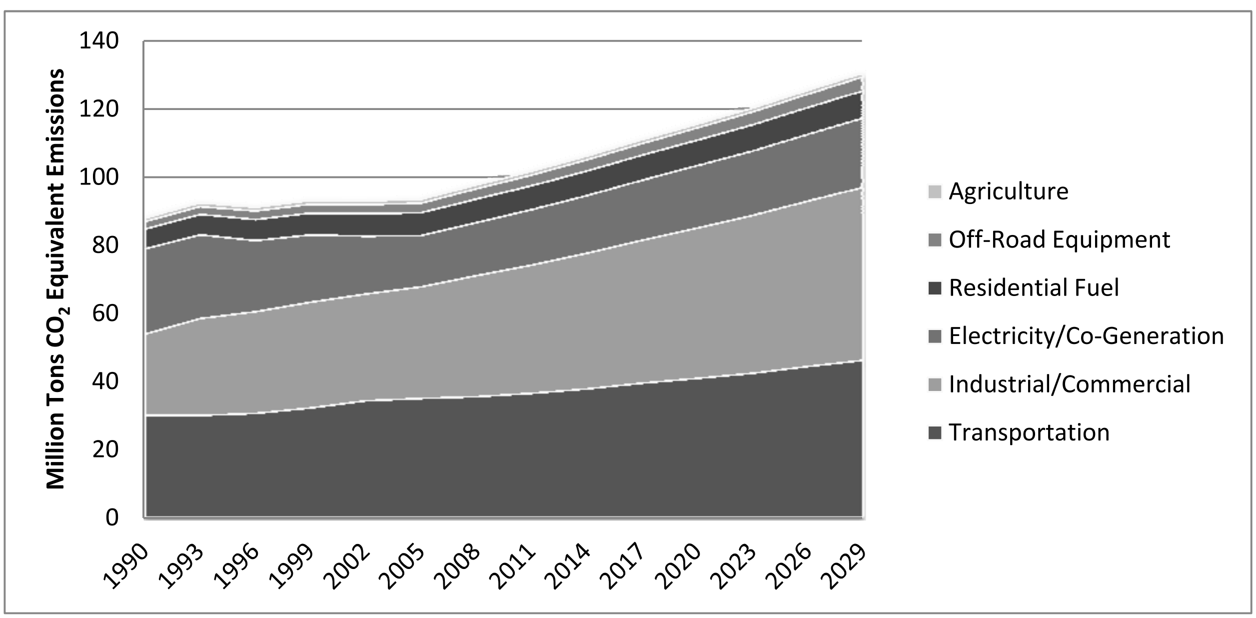
[12] Ibid. Electric power generation includes fossil fuels, imports, and co-generation, as well as more generalized electricity generation. Year-to-year variation in the Bay Area depends on several factors including the availability of hydroelectric and other imported power.

Figure 2.5-1: 2007 Bay Area Greenhouse Gas Emissions by Sector, as a Percent of Total Emissions



Source: Bay Area Air Quality Management District, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated 2010.

Figure 2.5-2: Bay Area Greenhouse Gas Emissions Trends by Major Source



Source: Bay Area Air Quality Management District, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated 2010.

Sea Level Rise

Historical Data

Sea levels began rising globally at the end of the last ice age more than 10,000 years ago.[13] Data on ocean water levels is collected continuously from a worldwide network of more than 1,750 tidal gages, and new satellite-based sensors are extending these measurements. The data indicates that the global mean sea level is rising at an increasing rate, and sea level rise is already affecting much of California's coastal region, including the San Francisco Bay and its upper estuary (the Sacramento-San Joaquin Delta). Water level measurements from the San Francisco Presidio gage (CA Station ID: 9414290), indicate that mean sea level rose by an average of 0.08 ± 0.008 inches per year (reported as 2.01 ± 0.21 millimeters per year) from 1897 to 2006, equivalent to a change of about eight inches in the last century.[14]

According to California's Ocean Protection Council Science Advisory Team, future sea level rise projections should not be based on linear extrapolation of historic sea level observations. For estimates beyond one or two decades, linear extrapolation of sea level rise based on historic observations is considered inadequate and would likely underestimate the actual sea level rise because of expected non-linear increases in global temperature and the unpredictability of complex natural systems.[15]

Projected Climate Conditions

Global and regional climate models can be used to project the range of estimated sea level rise rates based on emission scenarios and climate simulations. Global climate models are based on well-established physical principles and have been demonstrated to reproduce observed features of recent climate and past climate changes.[16] Global models provide information about climate response to various scenarios, but usually at a low resolution that does not provide the level of detail needed to make planning decisions at a local level. A regional-based model can provide an evaluation of climate processes that are unresolved at the global model scale. There is a broad range of regional-based climate models from the sub-continental-scale with a resolution of approximately 50 kilometers, to a local-scale with resolution of approximately

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[13] United States Geological Survey. Sea Level and Climate. USGS Fact Sheet 002-00. January 2000.

[14] Heberger, Matthew, Heather Cooley, Pablo Herrera, Peter H. Gleick, and Eli Moore. The Impacts of Sea Level Rise on the California Coast. A Paper From: California Climate Change Center. CEC-500-2009-024-F. May 2009.

[15] Sea-Level Rise Task Force of the Coastal and Ocean Working Group of the California Climate Action Team. State of California Sea-Level Rise Interim Guidance Document. Developed with science support provided by the Ocean Protection Council's Science Advisory Team and the California Ocean Science Trust, October 2010.

[16] Intergovernmental Panel on Climate Change. Climate Models and Their Evaluation. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Randall, D.A., R.A. Wood, S. Bony, R. Colman, T. Fichefet, J. Fyfe, V. Kattsov, A. Pitman, J. Shukla, J. Srinivasan, R.J. Stouffer, A. Sumi and K.E. Taylor]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2007.

one to five kilometers.[17] The resolution is typically determined based on the size of the study area and by climate-relevant features such as topography and land cover, and the specific processes to be evaluated. Regional-based climate models that provide locally-relevant climate information are based on model output from global models, and the scale and resolution of the regional-based climate models vary widely depending on the original application and intent of the developed model.

Global Climate Projections

In order to evaluate climate change effects such as sea level rise, the IPCC developed future emission scenarios that differ based on varying assumptions about economic development, population, regulation, and technology. Three of IPCC's emission scenarios were chosen to develop a range of sea level rise projections: the A2 high-emissions scenario, B1 low-emissions scenario, and the A1F1 fast-paced high-emission scenarios.

The A2 high-emission scenario most closely represents the business-as-usual condition. Under this scenario, the world's population exceeds 10 billion by 2050, and atmospheric CO_2 concentrations at the middle and end of the 21st century in this scenario would be about 575 and 870 parts per million (ppm), respectively, which exceeds concentrations associated with dangerous climate change (at ~350 to 400 ppm).

Under the B1 low-emission scenario, global population would peak by midcentury, then decline. The low-emission scenario also includes a shift to less fossil fuel-intensive industries and increased use of clean and resource-efficient technologies. Atmospheric CO_2 concentrations would reach 550 ppm by 2100, below catastrophic levels, but about double pre-industrial levels (~280 ppm).

The A1Fl future scenario describes a world characterized by rapid economic growth. Global population would peak at midcentury and decline thereafter. New and more efficient technologies would be rapidly introduced. However, fossil fuels would remain the primary energy supply, and atmospheric carbon dioxide concentrations would reach 940 ppm by 2100—more than triple pre-industrial levels, and more than double the level associated with dangerous climate change.

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[17] Intergovernmental Panel on Climate Change. Regional Climate Projections. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Christensen, J.H., B. Hewitson, A. Busuioc, A. Chen, X. Gao, I. Held, R. Jones, R.K. Kolli, W.-T. Kwon, R. Laprise, V. Magaña Rueda, L. Mearns, C.G. Menéndez, J. Räisänen, A. Rinke, A. Sarr, and P. Whetton]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2007.

Sea Level Rise Projections

The 2007 IPCC reports estimated that global mean sea levels were projected to rise by 0.2 meters (m) to 0.6 m by 2100, relative to a 1980 to 2000 baseline, depending on future GHG emissions.[18] However, these projections were found to under-predict sea level rise primarily because of the limited ability of global climate models to simulate the dynamics of ice sheets and glaciers.[19] The sea level rise projections associated with the IPCC emission scenarios were subsequently updated to include the dynamics of ice sheets and glaciers, as shown in **Table 2.5-2**.[20]

Sea Level Rise in San Francisco Bay

Table 2.5-2 presents the sea level projections adopted in the California Sea Level Rise Interim Guidance Document.[21] Additional research regarding global and regional sea level rise has occurred since this guidance document was adopted. A 2012 report by the National Research Council (NRC) assessed historic and projected sea level rise for specific locations along the open Pacific coasts of California, Oregon, and Washington. **Table 2.5-3** presents the study findings for local sea level rise near San Francisco.[22] In general, the sea level rise projections presented for San Francisco in **Table 2.5-3** are similar to the projections adopted by the State of California presented in **Table 2.5-2**.

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[18] Using three emission scenarios: A2 (High Emissions Scenario), B1 (Low Emissions Scenario) and A1Fl (Fast-Paced High-Emissions Scenario). See Intergovernmental Panel on Climate Change Global Climate Projections. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Meehl, G.A., T.F. Stocker, W.D. Collins, P. Friedlingstein, A.T. Gaye, J.M. Gregory, A. Kitoh, R. Knutti, J.M. Murphy, A. Noda, S.C.B. Raper, I.G. Watterson, A.J. Weaver and Z.-C. Zhao, 2007]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2007.

[19] Ibid.

[20] Rahmstorf, Stefan, and Martin Vermeer.Proceedings of the National Academy of Sciences, Published online before print December 7, 2009, doi: 10.1073/pnas.0907765106, PNAS December 22, 2009 vol. 106 no. 51 21527-21532.

[21] Sea-Level Rise Task Force of the Coastal and Ocean Working Group of the California Climate Action Team, October 2010.

[22] National Research Council. Sea-level rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future. Prepared by the Committee on Sea Level Rise in California, Oregon, and Washington and the National Research Council Board on Earth Sciences and Resources and Ocean Studies Board Division on Earth and Life Studies. Pre-publication copy, 2012

TABLE 2.5-2: CO-CAT (2010) SEA LEVEL RISE PROJECTIONS USING 2000 AS THE BASELINE

Year	*Emissions Scenario*	*Range of Models, inches above 2000**	*Average of Models, inches above 2000**
2030		5 - 8 in	7 in
2050		10 - 17 in	14 in
2070	Low (B1)	17 - 27 in	23 in
	Medium (A2)	18 - 29 in	24 in
	High (A1FI)	20 - 32 in	27 in
2100	Low (B1)	31 - 50 in	40 in
	Medium (A2)	37 - 60 in	47 in
	High (A1FI)	43 - 69 in	55 in

***Note:** Rahmstorf and Vermeer's paper presents values using 1990 as a baseline. Here the values are adjusted by subtracting 3.4 cm, which represents 10 years of sea-level rise that has already occurred, at an average rate of 3.4 mm/year.

Source: California Ocean Protection Council (CO-CAT) 2010.

TABLE 2.5-3: NRC (2012) REGIONAL SEA LEVEL RISE PROJECTIONS NEAR SAN FRANCISCO, CA

Year	*Projection **	*Range ***
2030	6 in ± 2.0 in	1.8 - 11.7 in
2050	11 in ± 3.6 in	4.8 - 23.9 in
2100	36 in ± 10.0 in	16.7 - 65.5 in

* Projection indicated the mean and ± standard deviation computed for the Pacific coast as defined in NRC (2012).

** Ranges are the means for the IPCC B1 and A1F1 scenarios, as presented in NRC (2012).

Source: National Research Council, 2012.

The National Oceanic and Atmospheric Administration (NOAA) Coastal Service Center released sea level rise inundation maps for the San Francisco Bay Area within NOAA's Sea Level Rise and Coastal Flooding Impacts Viewer in September 2012.[23] The NOAA inundation maps depict sea level rise relative to a mean higher high water (MHHW) condition in the Bay. NOAA's inundation maps benefit from using the latest 2010 high-resolution LiDAR (Light Detection and Ranging) topography data funded by the United States Geological Survey (USGS) and NOAA, as well as improved inundation mapping method-

[23] http://www.csc.noaa.gov/digitalcoast/tools/slrviewer

ologies that account for hydraulic connections to the flooding source.[24] This methodology identifies areas that are low-lying, but protected from inundation by levees, other structures, or topographic features, from the projected inundated area. Because these areas are still at risk of inundation, for example, if a levee, topographic feature or structure were to fail, breach, or be overtopped, these areas are typically presented on the inundation maps as potentially vulnerable, but distinguished from unprotected vulnerable areas. **Figure 2.5-3** presents NOAA's sea level rise inundation map with 24 inches of sea level rise. This map focuses on the San Francisco Bay Area as this is where the primary sea level rise inundation occurs. Limited inundation occurs along the California open coast as the inundation mapping does not include the additional impact of waves.

[24] Marcy D., and B. William, and K. Draganoz, B. Hadley, C. Haynes, N. Herold, J. McCombs, M. Pendleton, S. Ryan, K. Schmid, M. Sutherland, and K. Waters. New mapping tool and techniques for visualizing sea level rise and coastal flooding impacts. Proceedings of the 2011 Solutions to Coastal Disasters Conference, Anchorage, AK, June 2011.

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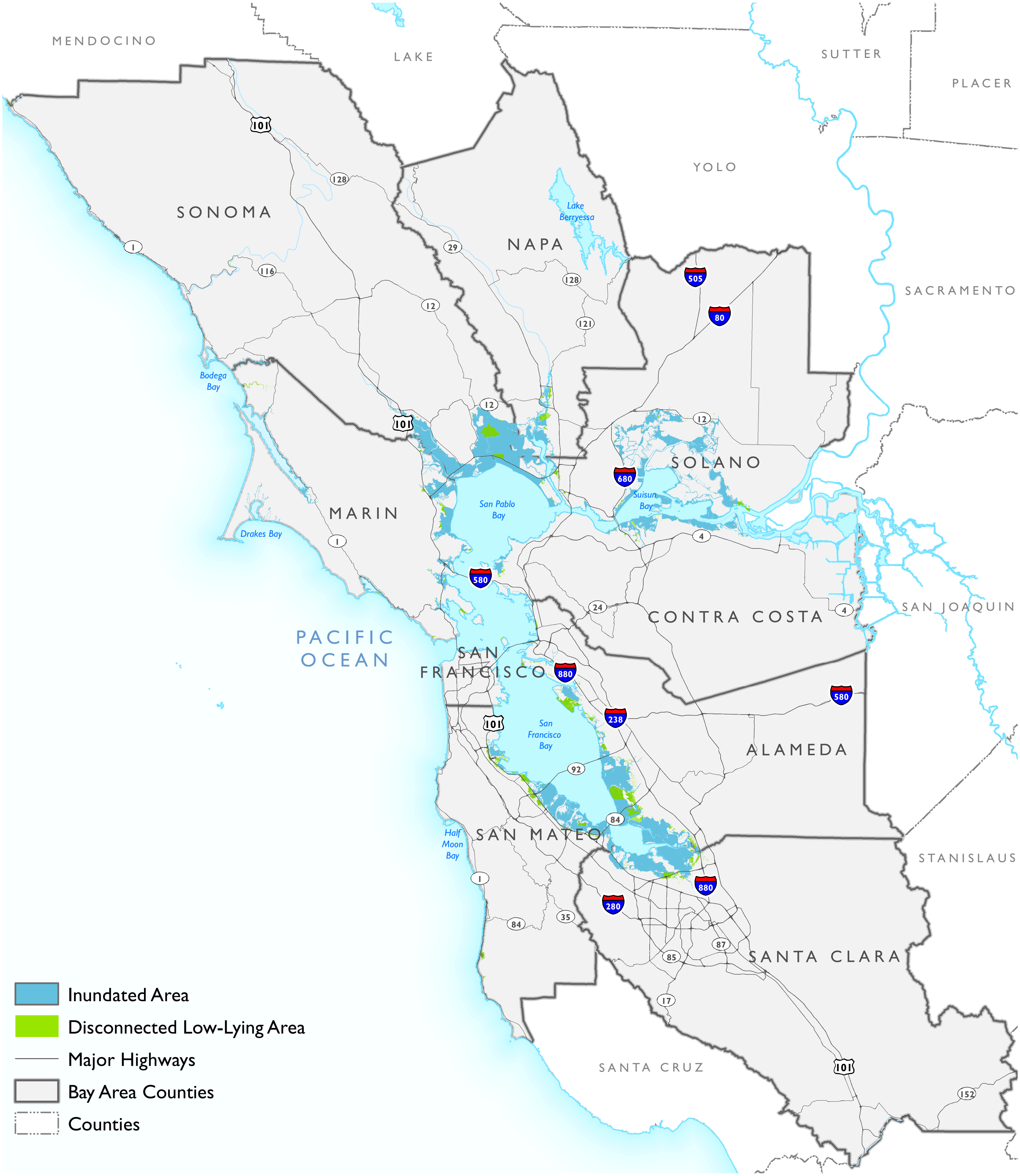
Figure 2.5-3

24-inch Sea Level Rise at Mean Higher High Water



Data Source: NOAA Coastal Services Center Sea Level Rise Inundation Map 2012; AECOM, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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San Francisco Bay Shoreline

The San Francisco Bay and adjacent Pacific coast shoreline is highly diverse, ranging from natural wetlands with limited inboard (or landward) development, to hardened shorelines with developments built up to, and beyond, the shoreline. The level of coastal flood protection and armoring along the shoreline varies based on the inboard land use, topographic conditions and a site's exposure to extreme water levels and waves – both of which can lead to inland flooding and shoreline erosion. As sea level rises, the exposure to higher water levels and increasing wave hazards will increase along the shoreline, thereby increasing the likelihood for inland inundation and flooding. This section describes the existing shoreline characteristics of the nine Bay Area counties at a high level, using a shoreline categorization approach developed for the Adapting to Rising Tides: Transportation Vulnerability and Risk Assessment Pilot Project.[25]

Shoreline Categories

The Adapting to Rising Tides pilot study reduced the highly varied and diverse shoreline in Alameda County into five categories based on their primary physical characteristics, functions and abilities to inhibit inland inundation. The categories include: engineered flood protection structures (i.e., levees, sea walls), engineered shoreline protection structures (i.e., bulkheads, revetments), non-engineered berms (i.e., salt pond and agricultural berms), wetlands, and natural non-wetland shorelines (i.e., beaches, cliffs). The categories developed for Alameda County reasonably encompass the range of shoreline types found throughout the nine-county San Francisco Bay Area.

The flood and erosion protection value of each shoreline category will vary as sea level rises. Engineered flood protection structures may be most effective for preventing near-term inundation by sea level rise, as they are designed to protect inland areas from flooding and inundation. The level of protection will depend on the height of the structure relative to existing conditions and the rate of sea level rise, as well as the condition of the structure and the potential for levee weakening and thus, levee failure. Any structural failure, regardless of its magnitude or spatial extent, could result in significant inland inundation.

Non-engineered berms are common around the San Francisco Bay shoreline. Non-engineered berms protect marshes, ponds, and agricultural areas from wave erosion and provide flood protection to inland developments. These berms are often comprised of Bay mud that has been excavated from the Bay floor and piled and/or stacked in a mound. Many non-engineered berms have been in place around the Bay for several decades, with some dating back over 100 years. Most berms are periodically maintained to compensate for settlement, erosion, failure and rising sea levels. Several areas around the Bay contain extensive networks of non-engineered berms that provide multiple lines of flood defense between the Bay and developed areas. However, the non-engineered nature of their construction typically classifies them as highly vulnerable to sea level rise and seismic events.

Figure 2.5-4 depicts the locations of the engineered levees and non-engineered berms within the low-lying areas adjacent to the Bay, based on the Federal Emergency Management Agency's (FEMA) Mid-

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[25] Adapting to Rising Tides: Transportation Vulnerability and Risk Assessment Pilot Project. MTC, BCDC, and Caltrans with technical assistance from AECOM. November 2011. Funded in part by FHWA.

term Levee Inventory (MLI).[26] This data set does not distinguish between engineered levees and non-engineered berms.

Engineered shoreline protection structures harden the shoreline to reduce erosion and prevent land loss. These structures, by themselves, are not designed to provide flood protection. As sea levels rise, the functionality and stability of revetments can be compromised, particularly if erosive wave forces also increase. As wave conditions exceed the design conditions, the structure could fail, resulting in severe erosion and land loss.

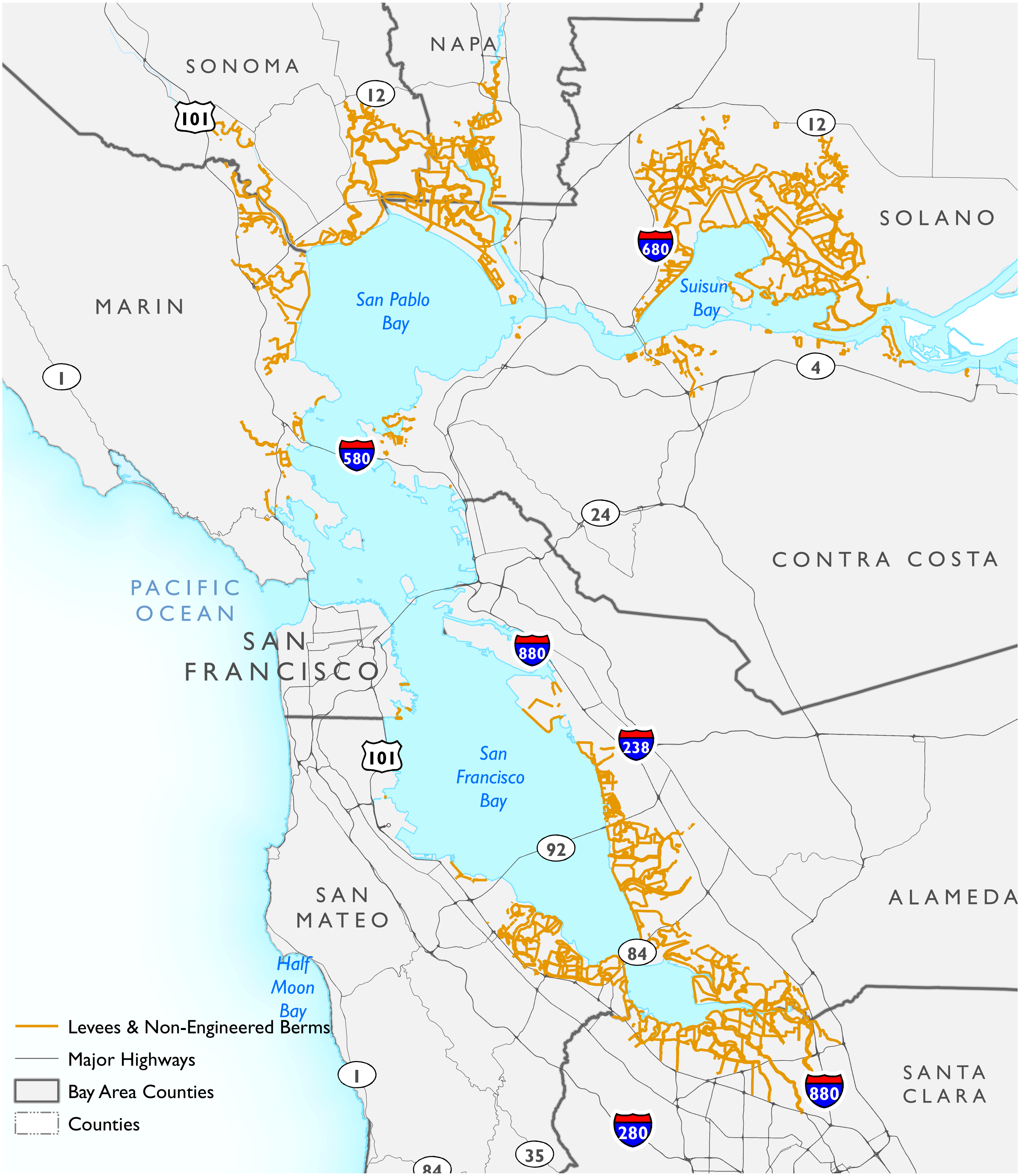
Wetlands dissipate wave energy and provide ecological habitat value. Although many wetlands around the Bay have historically kept pace with sea level rise, it is not known if wetlands will continue to keep pace with the projected accelerated rates of sea level rise.

Other natural or managed non-wetland shorelines, such as natural or artificially maintained beaches, can also provide some wave energy dissipation. San Francisco Bay has a variety of non-wetland natural shorelines, such as beaches, steep slopes, and cliffs. Beaches, whether natural or artificially nourished, are the most vulnerable to rising sea levels. Steep natural slopes and cliffs can also be vulnerable to sea level rise and shoreline erosion, particularly in areas with a dynamic wave climate.

[26] Federal Emergency Management Agency. Midterm Levee Inventory Project Summary Report: Standard Operations Task Order 4. August 1, 2012.

Figure 2.5-4

Levees and Non-Engineered Berms



Data Source: FEMA, Mid-Term Levee Inventory, 2012; AECOM, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Air Quality and Public Health

The negative effects of climate change on air quality in the Bay Area will significantly impact public health, largely through increasing levels of ozone and fine particulate matter (PM). These pollutants will increase through emissions from wildfires and more frequent and longer-lasting heat waves. The health effects of exposure to both ozone and particulate matter have historically been primarily associated with respiratory ailments, such as asthma and bronchitis. However, in recent years, many epidemiological studies have also been published linking exposure to these pollutants, especially PM, with serious cardiovascular illness, including arterosclerosis, strokes, and heart attacks all of which can cause premature death. A recent study at Rice University indicates that a small but significant percentage of cardiac arrests that occur outside hospitals (which are almost always fatal) appear to be triggered by exposure to increased levels of fine particulate matter and ozone.[27]

Exposure to higher levels of ozone and fine particulate matter tend to disproportionately impact the people in our society that are most vulnerable—children, the elderly and the health-impaired. In addition, many people impacted by poor air quality are also subject to socioeconomic conditions that make them less able to prepare for and cope with these effects of climate change.

Wildfires

Climate change is expected to increase the frequency and severity of wildfires in California by altering precipitation and wind patterns, changing the timing of snowmelt, and inducing longer periods of drought. In addition to the direct threat to human life and property, wildfires emit huge quantities of fine particles such as black carbon, and can cause dramatic short-term spikes in pollution levels, greatly increasing population exposure to PM and other harmful pollutants.

According to the BAAQMD report, *Understanding Particulate Matter: Protecting Public Health in the San Francisco Bay Area*, the rash of wildfires that swept across California in late June 2008 caused ambient concentrations of ozone and PM to soar to unprecedented levels.[28] A recent study found that the PM concentrations from these fires not only reached high levels, but that the PM they released was much more toxic than the PM more typically present in the California atmosphere.[29] Smoke from wildfires can cause a variety of acute health effects, including irritation of the eyes and the respiratory tract, reduced lung function, bronchitis, exacerbation of asthma, and premature death. In addition to these health effects, wildfires also release immense quantities of carbon dioxide stored in trees and vegetation into the atmosphere. Therefore, to the extent that climate change increases wildfires, this will increase atmospheric concentrations of GHGs that contribute to climate change, establishing a feedback loop.

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[27] Raun L, and Ensor K. Association of Out-of-Hospital Cardiac Arrest with Exposure to Fine Particulate and Ozone Ambient Air Pollution from Case-Crossover Analysis Results: Are the Standards Protective? Rice University, October 2012.

[28] During the final week of June 2008, PM2.5 levels increased five or ten-fold compared to normal readings at several Bay Area monitoring stations. *Understanding Particulate Matter: Protecting Public Health in the San Francisco Bay Area*, Bay Area Air Quality Management District, November, 2012.

[29] Wegesser et al. "California Wildfires of 2008: Coarse and Fine Particulate Matter Toxicity." *Environmental Health Perspectives* Volume 117, June 2009

Heat

Rising temperatures due to climate change are likely to have negative effects on air quality and public health in the Bay Area. Ground level ozone—the primary component of smog—is formed through photo-chemical reactions among precursor pollutants. The most important of these precursor pollutants are oxides of nitrogen (NO_2) and volatile organic compounds (VOCs). Higher temperatures lead to greater evaporative emissions of VOCs from sources such as fuel storage tanks and motor vehicle fuel tanks, as well as greater emissions of VOCs from biogenic sources such as trees and vegetation. Increased demand for electricity to power air conditioners can also lead to higher emissions of ozone precursors from power plants. In addition to greater emissions of ozone precursors, ozone levels are also expected to increase because ozone formation is highly temperature-sensitive, increasing rapidly as temperatures rise above 90 degrees Fahrenheit. As the Bay Area experiences more extreme heat days, with higher temperatures during both the days and evenings, higher ozone levels will make it more difficult for the region to attain and maintain air quality standards.

Increasing amounts of ground level ozone pose a significant threat to human health. Breathing ozone can trigger a variety of health problems, such as asthma, bronchitis, impacts to lung function, and chest pains. Recent studies have linked premature death to even short-term exposure to ozone.[30] Certain segments of the population are less able to adapt to extreme weather events than others. The 2009 California Adaptation Strategy highlights "elderly, infants, individuals suffering from chronic heart or lung disease, persons with mental disabilities, the socially and/or economically disadvantaged, and those who work outdoors" as particularly vulnerable.[31] According to a 2011 report by the Union of Concerned Scientists, increases in ozone levels induced by climate change in California could result in nearly 443,000 additional cases of serious respiratory illnesses. These and other health-related impacts could cost more than $729 million (in 2008 dollars) in 2020 alone.[32]

As shown in **Figure 2.5-5** the years in which the Bay Area has greater numbers of days exceeding the 8-hour ozone standard correlate very closely with years in which the region experiences higher temperatures.

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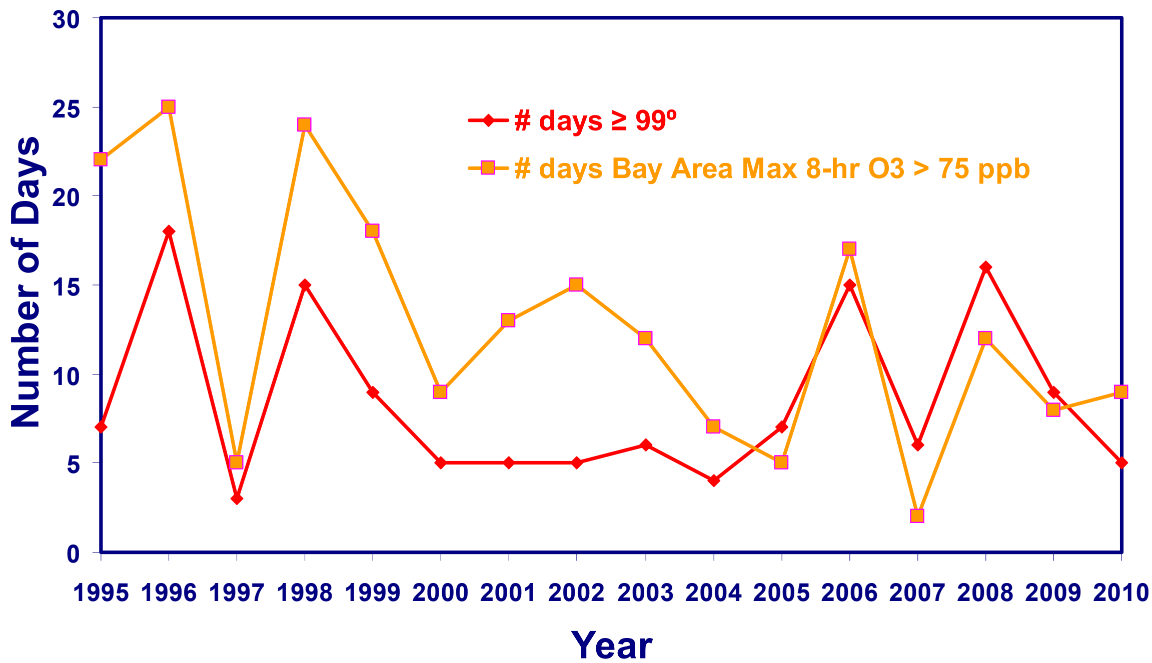
[30] Bell ML, Dominici F, and Samet JM. A Meta-Analysis of Time-Series Studies of Ozone and Mortality with Comparison to the National Morbidity, Mortality, and Air Pollution Study. Epidemiology 2005; 16:436-445. Levy JI, Chermerynski SM, Sarnat JA. Ozone Exposure and Mortality: an empiric Bayes metaregression analysis. Epidemiology 2005; 16:458-468. Ito K, De Leon SF, Lippmann M. Associations Between Ozone and Daily Mortality: analysis and meta-analysis. Epidemiology 2005; 16:446-429.

[31] California Natural Resources Agency, "2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008" 2009, P. 30.

[32] Union of Concerned Scientists, "Climate Change and Your Health: Rising Temperatures, Worsening Ozone Pollution" June, 2011, P. 3.

Figure 2.5-5: Number of Days Exceeding the 8-Hour Ozone Standard and 99 Degree Weather



Source: BAAQMD, 2013.

If higher temperatures lead to increased ozone formation for the reasons described above, this may erode the progress that the region has made over the past 50 years of regulatory action. The BAAQMD's research indicates that, at the current rate of emissions control, the projected increase in ozone due to climate change from 2000 to 2050 would offset about 15 years of progress in reducing ambient ozone levels.[33]

Urban Heat Islands

The high concentration of buildings, parking lots and roadways in urban areas create dry, hot microclimates, or "heat islands," which absorb more of the sun's heat than surrounding rural areas. As urban areas develop, paved and dark surfaces and impermeable structures replace natural vegetation and open spaces. According to the US EPA, on hot, sunny summer days, the sun can heat dry, exposed urban surfaces, such as roofs and pavement, to temperatures of 50 to 90 degrees Fahrenheit (27 to 50 degrees Celsius) hotter than the surrounding air, while more shaded and open surfaces—often in more rural surroundings—remain close to air temperatures.[34] These impermeable, dark manmade surfaces also tend to retain heat longer after the sun goes down, thus limiting the ability of urban areas to cool off during periods of heat waves.

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[33] http://www.baaqmd.gov/Divisions/Planning-and-Research/Research-and-Modeling/Ozone-Modeling.aspx

[34] http://www.epa.gov/heatisland/about/index.htm

Urban heat islands have a direct impact on human health. In addition to contributing to direct health impacts from heat, such as heat stroke, heat islands also contribute to elevated ozone levels, which contribute to a range of cardio-respiratory ailments as described above. The Chicago heat wave of 1995 resulted in the deaths of over 700 people, many of whom were low income and/or elderly. According to the National Weather Service, "Heat is the number one weather-related killer in the United States."[35]

Increased High Global Warming Potential Gases

Certain gases hold the potential to warm the climate at far greater levels than equivalent amounts of carbon dioxide. As discussed earlier, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) have "global warming potential," ranges from 140 to 23,900 times that of CO_2. The greatest source of HFCs, and the greatest source of any high GWP gas, is leakage from refrigeration, heat pumps and air conditioning equipment.

One major coping strategy to rising temperatures in the Bay Area will likely be increased use of air conditioning in buildings and vehicles. Refrigerators and air conditioners leak these powerful high GWP gases into the atmosphere. As rising temperatures increase the demand for refrigeration and air conditioning, this will result in greater emissions of these high GWP gases, which will in turn contribute to additional global warming.

REGULATORY SETTING

Federal Regulations

U.S. Environmental Protection Agency (EPA)

On April 2, 2007, in *Massachusetts v. EPA*, 549 U.S. 497 (2007), the Supreme Court found that greenhouse gases are air pollutants covered by the Clean Air Act. The Court held that the Administrator must determine whether or not emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision.

On December 7, 2009, Administrator Lisa Jackson signed a final action, under Section 202(a) of the Clean Air Act, finding that six key well-mixed greenhouse gases constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to the climate change problem.

This action was a prerequisite for implementing greenhouse gas emissions standards. Current efforts include issuing greenhouse gas emission standards for new motor vehicles, developing and implementing renewable fuel standard program regulations, proposing carbon pollution standards for new power plants, and setting greenhouse gas emissions thresholds to define when permits are required for new and existing industrial facilities under the Clean Air Act, and establishing a greenhouse gas reporting program.

[35] http://www.nws.noaa.gov/om/heat/index.shtml

Global Change Research Act (1990)

In 1990, Congress passed and the President signed Public Law 101-606, the Global Change Research Act. The purpose of the legislation was: "…to require the establishment of a United States Global Change Research Program aimed at understanding and responding to global change, including the cumulative effects of human activities and natural processes on the environment, to promote discussions towards international protocols in global change research, and for other purposes." To that end, the Global Change Research Information Office (GCRIO) was established in 1991 (it began formal operation in 1993) to serve as a clearinghouse of information. The Act requires a report to Congress every four years on the environmental, economic, health and safety consequences of climate change; however, the first and only one of these reports to date, the *National Assessment on Climate Change*, was not published until 2000. In February 2004, operational responsibility for GCRIO shifted to the U.S. Climate Change Science Program.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 was intended to move the U.S. toward greater energy independence and security. This energy bill increases the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022. It also tightens the Corporate Average Fuel Economy (CAFE) standards that regulate the average fuel economy in the vehicles produced by each major automaker.

National Fuel Efficiency Policy

On May 7, 2010, the U.S. Department of Transportation and EPA jointly issued national fuel efficiency and GHG emissions standards for model year 2012-2016 passenger vehicles and light duty trucks. The National Highway Traffic Safety Administration (NHTSA) issued CAFE standards for model year (MY) 2012-2016 passenger cars and light trucks under the Energy Policy and Conservation Act (EPCA) and Energy Independence and Security Act (EISA) and EPA issued national GHG emissions standards under the federal Clean Air Act. These joint GHG and fuel economy standards represent the first phase of the National Program to improve fuel economy and reduce GHG emissions from U.S. light-duty vehicles. Starting with 2012 model year vehicles, the rules require automakers to improve fleet-wide fuel economy and reduce fleet-wide GHG emissions by approximately five percent every year. It is expected that the regulations will result in a 2016 fleet average of 35.5 mpg. These standards are expected to conserve about 1.8 billion barrels of oil and reduce nearly a billion tons of GHG emissions over the lives of the vehicles covered.

In 2012, NHTSA and EPA proposed draft language to extend the National Program (coordinated GHG and fuel economy standards) for model year 2017 through model year 2025. The proposed CAFE standards are projected to require, on an average industry fleet-wide basis for cars and trucks combined, 40.3 to 41.0 miles per gallon (mpg) in model year 2021, and 48.7-49.7 mpg in model year 2025. EPA's proposed GHG standards, which are consistent with NHTSA's CAFE standards, are projected to require 163 grams/mile of CO_2 in model year 2025. This second phase of the National Program is projected to save approximately four billion barrels of oil and two billion metric tons of GHG emissions over the lifetimes of those light duty vehicles sold in MY 2017-2025.

Federal Highway Administration

The Federal Highway Administration encourages the development of Transportation Asset Management Plans (TAMPs) as a means to outline an agency's vision for its transportation future, collect information about specific assets, including their condition and performance, and plan for future risk, among other objectives. The preparation of TAMPs would require inventorying specific components of the region's transportation network and their specific needs, information essential to planning for sea level rise and identifying the most appropriate adaptation strategies.

State Regulations

Assembly Bill 1493 (Chapter 200, Statutes of 2002)

Assembly Bill (AB) 1493 (Pavley) amended Health and Safety Code sections 42823 and 43018.5 requiring the California Air Resources Board (ARB) to develop and adopt regulations that achieve maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles, light-duty trucks, and other vehicles used for noncommercial personal transportation in California. The regulations prescribed by AB 1493 took effect on January 1, 2006, and apply only to 2009 and later model year motor vehicles.

In September 2004, pursuant to AB 1493, the ARB approved regulations to reduce GHG emissions from new motor vehicles. Under the new regulations, one manufacturer fleet average emission standard is established for passenger cars and the lightest trucks, and a separate manufacturer fleet average emission standard is established for heavier trucks. The regulations took effect on January 1, 2006 and set near-term emission standards, phased in from 2009 through 2012, and mid-term emission standards, to be phased in from 2013 through 2016 (referred to as the Pavley Phase 1 rules). For model year 2017 through 2025 the ARB has adopted the National Fuel Efficiency Policy standards as previously described.

Executive Order S-3-05 (Gov. Schwarzenegger, June 2005)

Executive Order S-3-05 was signed on June 1, 2005. The Order recognizes California's vulnerability to climate change, noting that increasing temperatures could potentially reduce snow pack in the Sierra Nevada, which is a primary source of the State's water supply. Additionally, according to this Order, climate change could influence human health, coastal habitats, microclimates, and agricultural yield. The Order set the GHG reduction targets for California: by 2010, reduce GHG emissions to 2000 levels; by 2020 reduce GHG emissions to 1990 levels; by 2050 reduce GHG emissions to 80 percent below 1990 levels.

The Order directs the Secretary of the California Environmental Protection Agency to coordinate oversight of efforts made to achieve these targets with other state agencies and, like all executive orders, the Order has no binding legal effect on regional agencies, such as MTC and ABAG, which are outside of the California Executive Branch. MTC and ABAG may voluntarily consider the emissions reduction targets and other provisions of the Order, but MTC and ABAG play no formal role in the Order's implementation.

California Global Warming Solutions Act of 2006 (AB 32)

Assembly Bill (AB) 32, the California Global Warming Solutions Act (Health and Safety Code Section 38500 et seq.), was signed in September 2006. The Act requires the reduction of statewide GHG emissions to 1990 levels by the year 2020. This change, which is estimated to be a 25 to 35 percent reduction from current emission levels, will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. The Act also directs the ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources and address GHG emissions from vehicles. The ARB has stated that the regulatory requirements for stationary sources will be first applied to electricity power generation and utilities, petrochemical refining, cement manufacturing, and industrial/commercial combustion. The second group of target industries will include oil and gas production/distribution, transportation, landfills and other GHG-intensive industrial processes.

On December 11, 2008, ARB adopted its *Climate Change Scoping Plan* (Scoping Plan), which functions as a roadmap of the ARB's plans to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations. The Scoping Plan contains the main strategies California will implement to reduce CO_2e emissions by 174 MMT, or approximately 30 percent, from the State's projected 2020 emissions level of 596 MMT CO_2e under a "business-as-usual" scenario. The Scoping Plan also breaks down the amount of GHG emissions reductions the ARB recommends for each emissions sector of the State's GHG inventory. The Scoping Plan's recommended measures were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures also put the State on a path to meet the long-term goal of reducing California's GHG emissions by 2050 to 80 percent below 1990 levels.

Senate Bill 1368 (Chapter 598, Statutes of 2006)

Senate Bill (SB) 1368, signed in September 2006, required the California Public Utilities Commission (PUC) to establish a GHG emissions performance standard for "baseload" generation from investor-owned utilities by February 1, 2007. The CEC was required to establish a similar standard for local publicly-owned utilities by June 30, 2007. The legislation further required that all electricity provided to California, including imported electricity, must be generated from plants that meet or exceed the standards set by the PUC and the CEC. In January 2007, the PUC adopted an interim performance standard for new long-term commitments (1,100 pounds of CO_2 per megawatt-hour), and in May 2007, the CEC approved regulations that match the PUC standard.

Executive Order S-01-07 (Gov. Schwarzenegger, January 2007)

In January 2007, Executive Order S-01-07 established a Low-Carbon Fuel Standard. The Order calls for a statewide goal to be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 ("2020 Target"), and that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California. Further, it directs the ARB to determine if an LCFS can be adopted as a discrete early action measure pursuant to AB 32, and if so, to consider the adoption of an LCFS on the list of early action measures required to be identified by June 30, 2007, pursuant to Health and Safety Code Section 38560.5. The LCFS applies to all refiners, blenders, producers or importers ("Providers") of transportation fuels in California, will be measured on a full fuels cycle basis, and may be met through market-based methods by which Providers exceeding the performance required by an LCFS shall receive credits that may be applied to future obligations or traded to Providers not meeting the LCFS.

In June 2007, the ARB approved the LCFS as a Discrete Early Action item under AB 32 and in April 2009 the ARB approved the new rules and carbon intensity reference values with the new regulatory requirements taking effect in January 2011. The standards require providers of transportation fuels to report on the mix of fuels that they provide and demonstrate that they meet the LCFS intensity standards annually. This is accomplished by ensuring that the number of "credits" earned by providing fuels with a lower carbon intensity than the established baseline (or obtained from another party) is equal to or greater than the "deficits" earned from selling higher intensity fuels.

In December 2011, the U.S. District Court for the Eastern District of California issued three rulings against the LCFS including a requirement for ARB to abstain from enforcing the LCFS. In April 2012, the Ninth Circuit granted ARB's motion for a stay of the injunction while it continues to consider ARB's appeal of the lower court's decision.

Executive Order B-16-2012

Executive Order B-16-2012 directs State entities to support and facilitate the rapid commercialization of zero-emission vehicles. The order outlines benchmarks for 2015, 2020, and 2025 related to establishing infrastructure to support and accommodate zero-emission vehicles, helping get zero-emission vehicles to market and on the road, and increasing their use for public transportation and public use, among others. It also establishes a goal of an 80 percent reduction of greenhouse gas emissions from the transportation sector in California as compared to 1990 levels by 2050. This Executive Order also explicitly states that it "is not intended to, and does not create any rights or benefits, substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person."

Senate Bill 97 (Chapter 185, Statutes of 2007)

Senate Bill (SB) 97, adopted August 2007, directed the Governor's Office of Planning and Research (OPR) to adopt amendments to the California Environmental Quality Act (CEQA) Guidelines to address GHG emissions. These amendments became effective in March 2010.

Senate Bill 375 (Chapter 728, Statutes of 2008)

Senate Bill (SB) 375, adopted September 30, 2008 helps meet the AB 32 goals of reducing emissions from cars and light duty trucks. SB 375 requires regional planning agencies to include a Sustainable Communities Strategy (SCS) in their regional transportation plan (RTP) that demonstrates how the region could achieve GHG emissions reductions set by ARB through integrated land use and transportation planning. Local governments retain control of land use planning authority; however, SB 375 amended the California Environmental Quality Act (Pub. Resources Code § 21000 et seq.) to ease environmental review of specific types of developments that are anticipated to reduce emissions. Plan Bay Area is the integrated SCS and RTP for the San Francisco Bay Area, consistent with SB 375.

California's Energy Efficiency Standards for Residential and Nonresidential Buildings

Known by the shorthand name of "Title 24," this policy was established in 1978 in response to a legislative mandate to reduce California's energy consumption. Title 24 is updated periodically to allow for incorporation of new energy efficiency technologies and methods. The most recent update, in 2008, incorporated AB 32 mandates and advanced the energy efficiency requirements in order to meet California's energy needs. The 2013 update to the standards will build upon the previous standards and will take effect in January 2014. Several State energy policy goals drive the design of the current standards: the "Loading Order," which directs California's growing demand must first be met with cost-effective energy efficiency; "Zero Net Energy" (ZNE) goals for new homes by 2020 and commercial buildings by 2030; Governor Brown's Executive Order on Green Buildings; the Green Building Standards Code, and AB 32. The 2013 Standards will use 25 percent less energy for lighting, heating, cooling, ventilation, and water heating than the 2008 Standards. Additionally, the 2013 Standards will result in a reduction of 170,500 tons of GHG emissions per year.

California Green Building Standards Code (2010), California Code of Regulations Title 24, Part 11

California's green building code, referred to as "CalGreen," was developed to provide a consistent approach to green building within the State. Taking effect in January 2011, the Code lays out the minimum requirements for newly constructed residential and nonresidential buildings to reduce GHG emissions through improved efficiency and process improvements. It also includes voluntary tiers to further encourage building practices that improve public health, safety and general welfare by promoting the use of building concepts which minimize the building's impact on the environment and promote a more sustainable design. Local jurisdictions are required to adopt the CalGreen provisions. CalGreen is complimentary with California Energy Code, Title 24, Part 6, which continues to regulate energy efficiency in buildings. CalGreen references Title 24, Part 6 where relevant and several voluntary measures in the CalGreen building code require energy efficient that exceeds Title 24, Part 6 requirements by 15 or 30 percent.

Senate Bill 1 (Chapter 132, Statutes of 2006)

The "Million Solar Roofs" legislation sets a goal of installing 3,000 megawatts of new solar capacity by 2017 in order to move the State toward a cleaner energy future and help lower the cost of solar systems for consumers. The Million Solar Roofs program is a ratepayer-financed incentive program aimed at transforming the market for rooftop solar systems by driving the cost down over time. It provides up to $3.3 billion in financial incentives that decline over time.

Executive Order S-13-08

Governor Schwarzenegger signed California Executive Order (EO) S-13-08 on November 14, 2008, to address the potential impacts of global climate change, including sea level rise. The order emphasizes the need for timely planning to mitigate and adapt to the potential effects of sea level rise on the State's resources. As a result, any State agency planning construction projects in areas vulnerable to future sea level rise must evaluate and reduce the potential risks and increase resiliency, to the extent feasible. Planning must consider a range of sea level rise scenarios for 2050 and 2100.

California Sea Level Rise Interim Guidance Document

EO S-13-08 directs the California Natural Resources Agency, in coordination with other state agencies and the National Academy of Sciences, to assess sea level rise for the Pacific Coast and create official sea level rise estimates for state agencies in California, Oregon and Washington. The assessment and official estimates are expected in 2012—in the interim, the California Ocean Protection Council convened the Sea Level Rise Task Force, comprised of representatives from 16 state agencies, to provide guidance to state agencies on incorporating sea level rise into planning decisions. The California Sea Level Rise Interim Guidance Document, released in October 2010, seeks to enhance consistency across agencies as each develops its respective approach to planning for sea level rise.

The California Sea Level Rise Interim Guidance Document contains seven recommendations for incorporating sea level rise into project planning:

- Use sea level rise projections from the December 2009 Proceedings of National Academy of Sciences, along with agency- and context-specific considerations of risk tolerance and adaptive capacity;
- Consider timeframes, adaptive capacity, and risk tolerance when selecting estimates of sea level rise;
- Coordinate with other state agencies when selecting sea level rise projections, and use the same projections, where feasible;
- Do not base future sea level rise projections on linear extrapolation of historic sea level observations;
- Consider trends in relative local mean sea level;
- Consider storms and extreme events; and
- Consider changing shorelines.

The interim guidance document is expected to be updated regularly, to keep pace with scientific advances associated with sea level rise.

California Climate Adaptation Strategy

In response to EO S-13-08, the California Natural Resources Agency released the California Climate Adaptation Strategy (CAS) in 2009. The strategy proposes a comprehensive set of recommendations designed to inform and guide State agencies in their decision making processes as they begin to develop policies to protect the State, its residents, and its resources from a range of climate change impacts, including sea level rise. The CAS presents recommendations for seven sectors, including Ocean and Coastal Resources and Transportation and Energy Infrastructure.

CAS recommendations specific to Ocean and Coastal Resources emphasize hazard avoidance, adaptation planning, and collaboration with local governments to address sea level rise. The CAS directs State agencies, in general, not to plan, develop, or build any new significant structure in a location requiring significant protection from sea level rise, storm surges, or coastal erosion during the expected life of the structure. The strategy notes that the most risk-averse approach for minimizing the adverse effects of sea level rise and storm activities is to carefully consider new development within areas vulnerable to inundation and erosion. The CAS also recommends that all State agencies prepare sea level rise adaptation plans, guidance, and criteria, as appropriate. The strategy directs State agencies to coordinate with any other agencies with jurisdiction over the coastal zone, (e.g., BCDC, the California Coastal Commission), local governments, and regional organizations on regional adaptation planning. The CAS also recommends that State agencies encourage local governments to adopt policies on setbacks, buffer areas, clustered coastal development, and engineering solutions, among others.

Within the Transportation Energy Infrastructure sector, the CAS specifically directs Caltrans to incorporate climate change vulnerability assessment planning tools, policies, and strategies into existing transportation and investment decisions. The strategy also instructs Caltrans to develop guidelines to establish buffer areas and setbacks to avoid risks to structures within projected "high" future sea level rise or flooding inundation zones.

Caltrans Guidance on Incorporating Sea Level Rise

Pursuant to EO S-13-08 and the California Sea Level Rise Interim Guidance Document, in May 2011 Caltrans released guidance on incorporating sea level rise into planning and decision making with respect to transportation projects. Caltrans' guidance recommends first determining if sea level should be incorporated into project planning, based on the project location and level of risk. A screening process with ten criteria guides the assessment of whether to incorporate sea level rise: design life, redundancy/alternative route(s), anticipated travel delays, evacuations/emergencies, traveler safety, expenditure of public funds, scope of project, effect on non-state highways, and environmental constraints. If the screening determines that sea level rise should be incorporated into project planning, the next step is to estimate the degree of potential impact and assess alternatives for preventing, mitigating and/or absorbing the impact. Caltrans uses the statewide sea level rise estimates presented in the California Sea Level Rise Interim Guidance Document for different years (2030 through 2100) to determine target sea level rise values; Caltrans directs projects with a life that extends to 2030 or earlier not to assume impacts from sea level rise. Having identified target sea level rise values for a project, Caltrans then lays out steps for implementation, including conducting more technical studies of inundation and subsidence and determining any adverse effects on facility functions and operations (e.g., from erosion, exposure to salt water), necessary adaptation measures, and the costs of mitigation.

California Department of Public Health Guidance on Integrating Public Health into Climate Action Planning

In February of 2012, the California Department of Public Health released a guidance document, *Climate Action for Health: Integrating Public Health into Climate Action Planning*. This document introduces key health connections to climate change mitigation strategies, and suggestions for where these fit into a local climate action plan or general plan. The guidance document also provides a number of examples of strategies taken from actual climate action plans that integrate public health objectives, with policy efforts to improve community health and reduce GHG emissions. The information provided is advisory, voluntary, and educational. The document includes specific policy recommendations for transportation and land use planning, including incorporation of green space and tree canopy to mitigate urban heat islands, and healthy siting of housing, schools and health care facilities to avoid major air quality impacts.

Coastal Act

The California Coastal Act of 1976 directs the California Coastal Commission (Coastal Commission) to protect and enhance the State's coastal resources. The Coastal Commission has planning, regulatory, and permitting authority over all development within the coastal zone, whose landward boundary varies with location. The Act governs coastal hazards for new development, mandating that it minimize risks to life and property in areas of high flood. New development must be located such that it will not be subject to erosion or stability hazard over the course of its design life, and construction of protective devices (e.g., seawalls, revetment) that substantially alter natural land forms along bluffs and cliffs are not permitted (Section 30253).

The Coastal Commission's mandate extends to climate change, including sea level rise; however, the agency is currently assessing how best to address sea level rise and other challenges resulting from climate change. The Coastal Commission partners with local governments to form Local Coastal Programs (LCPs), transferring the power to regulate development within the coastal zone to cities and counties.

Within the Bay Area, all of San Mateo, San Francisco, Marin, and Sonoma counties, along with the cities of Daly City, Pacifica and Half Moon Bay have certified LCPs. Any changes in the Coastal Commission's policies and/or regulations with respect to sea level rise may ultimately require revisions to LCPs.

Regional Coordination

In the Bay Area, the Joint Policy Committee (JPC) coordinates the regional planning efforts of ABAG, the BAAQMD, the San Francisco BCDC and MTC. In 2011, the JPC was given direction to produce a Bay Area Climate and Energy Resilience Strategy to provide guidance on how to include protecting the Bay Area's economy, public health, infrastructure and ecosystems from sea-level rise, water shortages, high energy prices and other impacts in long-term regional and local planning, including Plan Bay Area. This work focuses on the institutional structures and resources that will be needed to create a multi-stakeholder adaptive management process on regional resilience. This project will make the Bay Area economically stronger and healthier in the near-term and more prepared for the major challenges confronting us between now and the middle of the 21st Century.

In September 2012, the JPC adopted a work plan to develop a Regional Sea Level Rise Adaptation Strategy. The objective of the project is to ensure the ongoing health and ecological viability of regional natural resources, such as San Francisco Bay; coordinate adaptation mechanisms that transcend local jurisdictional boundaries; and share the costs of adaptation responses at a regional level, especially when regional resources are involved. The sea level rise adaption strategy work plan focuses on providing enough background information and support to develop a "bottom-up" regional strategy where the regional agencies work with local entities to assess vulnerabilities and risks, identify critical assets, explore adaptation options, and use a balanced approach to identify costs, benefits and adaptation strategies for the natural resources/ecosystem services provided by the Bay and its watersheds. The lessons learned from these collaborative efforts will be used to inform the second iteration of Plan Bay Area and be fully integrated into the third iteration.

Regional and Local Regulations

BAAQMD Guidance on GHG Policies

The BAAQMD published updated CEQA Air Quality Guidelines in May 2012. This document includes a section listing policies and mitigation measures recommended for plans prepared within the San Francisco Bay Area Air Basin, and in particular for local general plans. Recommended policies and mitigation measures are incorporated in the identification of mitigation measures in the impact analysis as needed.

San Francisco Bay Plan

The BCDC is charged with the protection, enhancement, and responsible use of the San Francisco Bay. The agency's jurisdiction includes the Bay itself, all land within 100 feet of the Bay shoreline, salt ponds, managed wetlands and certain waterways named in the Commission' law. BCDC guides uses of the Bay and its shoreline through policies set forth in the McAteer-Petris Act, the Suisun Marsh Preservation Act, the San Francisco Bay Plan, originally adopted in 1968, and the Suisun Marsh Protection Plan, originally adopted in 1977. In October 2011, BCDC amended its Bay Plan sea level rise policies and added new climate change findings and policies to the Bay Plan with the adoption of Amendment No. 1-08.

The policies included in the Bay Plan amendment aim to protect existing and planned development from sea level rise while preserving public access to the Bay and ecosystems. New large shoreline projects must assess the risks of sea level rise and storms, based on the best available estimates of sea level rise. Large projects that could experience risks to public safety, e.g., flooding, must be designed to cope with flood levels expected at the midcentury and have an adaptive strategy for the end of century, depending on the life of the project. The new policies encourage projects whose benefits outweigh the risks of flooding—specifically, those that reduce carbon emissions by locating jobs and housing near public transportation. Projects may place fill in the Bay to protect existing and planned development from flooding and erosion, provided that a number of provisions are met to minimize flood risks (e.g., shoreline setbacks, elevation above flood levels) and avoid, minimize and mitigate impacts to Bay resources. Shoreline protection projects (e.g., levees, sea walls) and public access must be designed to withstand the effects of sea level rise and storms. The new policies also encourage habitat preservation and enhancement in undeveloped areas subject to flooding. Finally, the Bay Plan directs BCDC to collaborate with other agencies and the public to create a regional strategy that addresses and adapts to sea level rise.

County Climate Action Plans

Alameda County Climate Action Plans

The County of Alameda has adopted two climate action plans addressing specific county-wide concerns. Both plans seek to achieve a goal of 15 percent GHG reductions by 2020.

Alameda County (Unincorporated Areas) Climate Action Plan

The Alameda County (Unincorporated Areas) Community Climate Action Plan addresses reduction of greenhouse gas emissions in the unincorporated areas of Alameda County. These communities include Ashland, Castro Valley, Cherryland, Fairview, Hayward Acres, San Lorenzo, Sunol, and Rural East County. The Plan identifies a series of 37 local programs and policy measures related to transportation, land use, building energy, water, waste, and green infrastructure. The Plan identifies a total potential reduction in community-wide emissions by more than 15 percent by the year 2020. This Plan was approved in June 2011, and an EIR will be completed prior to the Plan becoming effective.

Alameda County Climate Action Plan for Government Services and Operations

The Alameda County Climate Action Plan for Government Services and Operations was adopted in 2010. The Board of Supervisors adopted 16 Commitments to Climate Protection that provide overarching vision, a goal of 15 percent GHG reductions by 2020, and the Climate Action Plan, which includes 80 recommended actions to achieve the identified goal.

Contra Costa Climate Action Plan

On December 26, 2012, a Draft Climate Action Plan was completed for Contra Costa County and released by the Department of Conservation and Development for public review and comment. The Draft Climate Action Plan identifies specific measures on how the County can achieve a GHG reduction target of 15% below baseline levels by the year 2020. In addition to reducing GHG, the Draft Climate Action Plan includes proposed policies and actions to improve public health and provide additional community benefits, and it lays the groundwork for achieving long-term greenhouse reduction goals for 2020 and 2035. Adoption of this plan is pending.

Marin County Greenhouse Gas Reduction Plan

Adopted in October 2006, the Marin County Greenhouse Gas Reduction Plan identifies an emissions inventory and reduction target. It includes a range of CO_2 reduction measures to reduce GHG emissions to 15 to 20 percent below 1990 levels by the year 2020 for internal government and 15 percent county-wide. Measures are organized in the categories of building energy use, transportation, waste management, and land use.

Climate Action Plan for San Francisco

Adopted in 2004, the Climate Action Plan for San Francisco: Local Actions to Reduce Greenhouse Gas Emissions includes an emissions inventory of community-wide and municipal operations and a reduction target of 20 percent below 1990 levels by 2012. With "business as usual," greenhouse gas emissions are predicted to rise to 10.8 million tons per year in 2012. The 20 percent reduction target would reduce San Francisco's overall GHG emissions to 7.2 million tons per year by 2012. As of 2010 San Francisco had achieved citywide emission reductions of 14.5 percent from 1990 levels. The CAP includes several actions and next steps related to transportation, energy, renewable energy and solid waste. San Francisco further adopted GHG emissions reduction goals including 20 percent reduction below 1990 levels for 2012, 25 percent by 2017, 40 percent by 2025 and 80 percent by 2050.

Sonoma County Community Climate Action Plan

Adopted in October 2008, the Sonoma County Community Climate Action Plan includes an emissions inventory and several solutions designed to reach its goal of reducing greenhouse gas (GHG) emissions to 25 percent below 1990 levels by 2015. Strategies are related to electricity and natural gas, transportation and land use, agriculture and forests, and solid waste.

The CAP finds that implementation of all major quantified solutions will reach about 22 percent below 1990 levels, which is about 37 percent below business as usual (multiple solutions are not yet quantified).

County of Solano Climate Action Plan

Adopted in 2011, the County of Solano Climate Action Plan communitywide GHG emissions reduction goal of 20 percent below 2005 levels by 2020. The CAP addresses both municipal and communitywide emissions for the unincorporated County. The CAP recommends 31 measures and 94 implementing actions that the community can take to reduce both emissions and communitywide contributions to global climate change. Measures and actions are related to statewide reductions, agriculture, energy and efficiency, transportation and land use, waste reduction and recycling, and water conservation.

County Sea Level Rise Programs

Solano County Sea Level Rise Strategic Program

In June 2011, Solano County released its Sea Level Rise Strategic Program (SLRSP) to address climate change and associated sea level rise at the local level. As directed by the County's General Plan, the SLRSP investigates the potential effects of sea level rise on Solano County, including specific properties and resources, and presents protection and adaptation strategies. The SLRSP considers two inundation scenarios: 16 inches by midcentury and 55 inches by the end of the century. According to their analysis, sea level rise is expected to inundate 130 square miles in Solano County by midcentury, including approximately 27 miles of total roadway (Interstate highways, State highways and local roadways) and eight miles of railway. By the end of the century, sea level rise will inundate 163 square miles of land, 80 miles of total roadway, and 15 miles of railway.

Major roads and highways, along with railways, in the County are considered to be highly sensitive and vulnerable to the effects of sea level rise, with low adaptive capacity. Residential, industrial, and commercial developments are also all highly sensitive and vulnerable to sea level rise, although the adaptive capacity of these uses is low-to-medium, given the ability for residents and businesses with resources to pursue alternative locations. For all new transportation infrastructure and development, the SLRSP recommends designing projects to tolerate periodic flooding and providing for new development that can be adapted or relocated. New development in areas prone to flooding from sea level rise should be minimal. The SLRSP notes the difficulty in determining adaptive strategies for transportation infrastructure, as they will be developed based on future vulnerability and risk analyses specific to each asset. However, it specifically recommends collaborating with MTC and Caltrans on adaptation planning for affected roadways.

County General Plans

Marin Countywide Plan

The Marin Countywide Plan (November 2007), effectively the County's general plan, includes goals, policies, and implementing programs that address climate change and the risks of sea level rise in Marin County.

The Natural Systems and Agriculture Element includes a section on Atmosphere and Climate, including the following goal and policies, which are supported by implementing programs:

- **GOAL AIR-4: Minimization of Contributions to Greenhouse Gases.** Prepare policies that promote efficient management and use of resources in order to minimize greenhouse gas emissions. Incorporate sea level rise and more extreme weather information into the planning process.
  - **AIR-4.1 Reduce Greenhouse Gas Emissions.** Adopt practices that promote improved efficiency and energy management technologies; shift to low-carbon and renewable fuels and zero emission technologies.
  - **AIR-4.2 Foster the Absorption of Greenhouse Gases.** Foster and restore forests and other terrestrial ecosystems that offer significant carbon mitigation potential.

- **GOAL AIR-5: Adaptation to Climate Change.** Adopt policies and programs that promote resilient human and natural systems in order to ease the impacts of climate change.
  - **AIR-5.1 Determine Marin-Specific Climate Change.** Participate in research that examines the effects of climate change on human and natural systems in Marin.
  - **AIR-5.2 Prepare Response Strategies for Impacts.** Prepare appropriate response strategies that aid systems in adapting to climate change based on sound scientific understanding of the potential impacts.

In terms of sea level rise, the Plan's Environmental Hazards Element includes policies to minimize flooding, including evaluating the potential for sea level rise when processing development applications (Policy EH-3.3). Additional policies specifically address the risk of sea level rise by directing the County to amend its Development Code to incorporate construction standards consistent with Bay Plan policies for areas subject to increased flooding from sea level rise (Implementing Program EH-3.k) and limit new construction or require elevated buildings and infrastructure in areas subject to sea level rise (Implementing Program EH-3.n). The Environmental Hazards Element also seeks to limit the repair, replacement, and construction of coastal seawalls and erosion barriers to protect against sea level rise (Implementing Program EH-3.l) and pursue funding for levee reconstruction in areas threatened by sea level rise (Implementing Program EH-3.o).

The Marin Countywide Plan's Natural Systems and Agriculture Element specifically states the goal of incorporating sea level rise into the planning process (GOAL AIR-4) and adopting policies and programs to adapt to climate change (GOAL AIR-5). More specific policies seek to assess the effects of sea level rise on property and infrastructure (Implementing Program AIR-5.b) and prepare response strategies in coordination with BCDC, the Coastal Commission, and other relevant agencies, including limiting development on coastal wetlands (Implementing Program AIR-5.c). The Natural Systems and Agriculture Element also calls for the establishment of criteria for setbacks to buffer existing and historic baylands from development, including the possible implications of future sea level rise (Implementing Program BIO-5.a) and the identification of baylands that could provide protection from sea level rise (GOAL BIO-5, Implementing Program BIO-5.i).

Contra Costa County General Plan

The Contra Costa County General Plan (January 2005) includes several policies that address sea level rise. The general plan specifically notes the flood hazards for islands in the Sacramento-San Joaquin Delta. The Safety Element requires that buildings in urban development near the shoreline and in flood-prone areas be protected from flood dangers, including from sea level rise (Policy 10-41). New housing must be sited above the highest water level expected during the life of the project or protected by levees (Policy 10-42). The County must review flooding policies annually to incorporate new scientific data on sea level rise and amend the policies as necessary (Policy 10-44).

Napa County General Plan

The Napa County General Plan (June 2008) addresses climate change – including the risk of sea level rise—and sustainable practices for environmental health related to water, energy conservation, air pollutant, greenhouse gas emissions, clean energy generation, and similar issues in its Conservation Element. Goals, policies, and action items specific to climate change and greenhouse gases include:

- **Goal CON-15:** Reduce emissions of local greenhouse gases that contribute to climate change.
- **Policy CON-65:** The County shall support efforts to reduce and offset greenhouse gas (GHG) emissions and strive to maintain and enhance the County's current level of carbon sequestration functions through the following measures:
  - Study the County's natural, agricultural, and urban ecosystems to determine their value as carbon sequesters and how they may potentially increase.
  - Preserve and enhance the values of Napa County's plant life as carbon sequestration systems to recycle greenhouse gases.
  - Perpetuate policies in support of urban-centered growth and agricultural preservation preventing sprawl.

- Perpetuate policies in support of alternative modes of transportation, including transit, paratransit, walking, and biking.
- Consider GHG emissions in the review of discretionary projects. Consideration may include an inventory of GHG emissions produced by the traffic expected to be generated by the project, any changes in carbon sequestration capacities caused by the project, and anticipated fuel needs generated by building heating, cooling, lighting systems, manufacturing, or commercial activities on the premises. Projects shall consider methods to reduce GHG emissions and incorporate permanent and verifiable emission offsets.
- Establish partnerships with experts, trade associations, non-governmental associations, and community and business leaders to support and participate in programs related to global climate change. [Implemented by Action Items CON CPSP-1 and 2]

- **Policy CON-74:** The County shall evaluate new technologies for energy generation and conservation and solid waste disposal as they become available, and shall pursue their implementation as appropriate in a manner consistent with the principle of adaptive management. This evaluation shall include review of promising technological advances which may be useful in decreasing County greenhouse gas (GHG) emissions, increase in renewable energy that is generated locally, and review of the County's success in meeting targets for GHG emission reductions. [Implemented by Action Item CON CPSP-4]
- **Policy CON-75:** The County shall work to implement all applicable local, state, and federal air pollution standards, including those related to reductions in GHG emissions. [Implemented by Action Item CON CPSP-6]
- **Action Item CON CPSP-1:** The County shall develop a greenhouse gas (GHG) emissions inventory measuring baseline levels of GHGs emitted by County operations through the use of electricity, natural gas, fossil fuels in fleet vehicles and County staff commute trips, and shall establish reduction targets. [Implements Policy CON-65]
- **Action Item CON CPSP-2:** The County shall conduct a GHG emission inventory analysis of all major emission sources in the County by the end of 2008 in a manner consistent with Assembly Bill 32, and then seek reductions such that emissions are equivalent to year 1990 levels by the year 2020. Development of a reduction plan shall include consideration of a "green building" ordinance and other mechanisms that are shown to be effective at reducing emissions. [Implements Policy CON-65]
- **Action Item CON CPSP-3:** The County shall conduct an audit within the next five years of County facilities to evaluate energy use, the effectiveness of water conservation measures, production of GHGs, use of recycled and renewable products and indoor air quality to develop recommendations for performance improvement or mitigation. The County shall update the audit periodically and review progress towards implementation of its recommendations. [Implements Policy CON-67]
- **Action Item CON CPSP-5:** The County shall quantify increases in locally generated energy between 2000 and 2010, and establish annual numeric targets for local production of "clean" (i.e., minimal GHG production) energy by renewable sources, including solar, wind, biofuels, waste, and geothermal. [Implements Policy CON-70]

In terms of sea level rise, the plan establishes the goal of maintaining and improving marshland habitat in the County's southern portion. Specific policies direct the County to monitor the effects of sea level rise on marshlands, wetlands, agriculture, and the economy and to modify practices through adaptive management, when necessary (Policy CON-31-e, Policy CON-73).

Solano County General Plan

The Solano County General Plan includes several goals, policies, and implementation programs to address climate change. In addition, the plan includes a table that identifies a range of policies from related to other issues addressed throughout the plan (such as community form, Energy Efficiency Transportation Water Management, etc.) that are related to addressing climate change. Specific climate change policies include:

- **HS.G-5:** Recognize the multiple functions of the natural environment for safety, recreation, protection from climate changes, and economic uses.
- **HS.G-6:** Increase awareness of the effect humans have on the environment and encourage individuals and organizations to modify habits and operations that cause degradation to the environment and contribute to climate change.
- **HS.G-7:** Prepare for and adapt to the effects of climate change.
- **HS.P-53:** Evaluate the potential effects of climate change on Solano County's human and natural systems and prepare strategies that allow the County to appropriately respond and adapt.
- **HS.I-57:** Comply with all federal and/or state GHG emission reduction targets to reduce the County's contribution to global climate change. The plan should include strategies to reduce vehicle miles traveled, energy consumption, and other sources of GHGs within the county. This should be done in conjunction with the County's Climate Action Plan found in HS.I-73.
- **HS.I-73:** Develop and adopt a climate action plan for Solano County. It is the intent of Solano County to coordinate and seek participation from all cities in preparation of a countywide baseline study and in preparation and implementation of the Climate Action Plan (CAP).

Sonoma County General Plan 2020

In 2005, Sonoma County and all of its Cities pledged to measure and reduce their greenhouse gas emissions by 25 percent below 1990 levels by 2015. The Sonoma County General Plan, adopted in 2008, includes the following policies and objectives related to GHG emissions (in addition to polices related to energy efficiency and green development):

- **Objective OSRC-14.4:** Reduce greenhouse gas emissions by 25 percent below 1990 levels by 2015.
- **Policy OSRC-14g:** Develop a Greenhouse Gas Emissions Reduction Program, as a high priority, to include the following:
  - A methodology to measure baseline and future VMT and greenhouse gas emissions;
  - Targets for various sectors including existing development and potential future development of commercial, industrial, residential, transportation, and utility sources;

  - Collaboration with local, regional, and State agencies and other community groups to identify effective greenhouse gas reduction policies and programs in compliance with new State and Federal standards;
  - Adoption of development policies or standards that substantially reduce emissions for new development;
  - Creation of a task force of key department and agency staff to develop action plans, including identified capital improvements and other programs to reduce greenhouse gases and a funding mechanism for implementation; and
  - Monitoring and annual reporting of progress in meeting emission reduction targets.

- **Policy OSRC-14i:** Manage timberlands for their value both in timber production and offsetting greenhouse gas emissions.
- **Objective OSRC-16.1:** Minimize air pollution and greenhouse gas emissions.

Local Climate Action Plans

Several Bay Area jurisdictions have completed community emissions inventories (101), and 45 jurisdictions have finalized and adopted community climate action plans, as shown in **Table 2.5-4**. It is noted that there are also jurisdictions that have drafted or are in the process of drafting climate actions plans, which are not included in **Table 2.5-4**.

TABLE 2.5-4: BAY AREA CITIES WITH COMPLETED GHG EMISSIONS INVENTORIES OR CLIMATE ACTION PLANS

Jurisdiction	*Completed Community Emissions Inventory*	*Finalized and Adopted Community Climate Action Plan*
Alameda County	**x**	**x**
Alameda	x	x
Albany	x	x
Berkeley	x	x
Dublin	x	x
Emeryville	x	x
Fremont	x	x
Hayward	x	x
Livermore	x	x
Newark	x	x
Oakland	x	x
Piedmont	x	x
Pleasanton	x	x
San Leandro	x	x
Union City	x	x
Contra Costa County	**x**	**-**
Antioch	x	x
Brentwood	-	-
Clayton	-	-
Concord	x	-
Danville	x	-
El Cerrito	x	-
Hercules	x	-
Lafayette	x	-
Martinez	x	x
Moraga	x	-
Oakley	x	-
Orinda	x	-
Pinole	x	-
Pittsburg	x	-
Pleasant Hill	-	-
Richmond	x	-
San Pablo	x	x

TABLE 2.5-4: BAY AREA CITIES WITH COMPLETED GHG EMISSIONS INVENTORIES OR CLIMATE ACTION PLANS

Jurisdiction	*Completed Community Emissions Inventory*	*Finalized and Adopted Community Climate Action Plan*
San Ramon	x	x
Walnut Creek	x	x
Marin County	**x**	**x**
Belvedere	x	x
Corte Madera	x	-
Fairfax	x	-
Larkspur	x	x
Mill Valley	x	-
Novato	x	x
Ross	x	x
San Anselmo	x	x
San Rafael	x	x
Sausalito	x	-
Tiburon	x	x
Napa County	**x**	**-**
American Canyon	x	-
Calistoga	x	-
Napa	x	-
St. Helena	x	-
Yountville	x	-
San Francisco	**x**	**x**
San Mateo County	**x**	**-**
Atherton	x	-
Belmont	x	-
Brisbane	x	-
Burlingame	x	x
Colma	x	-
Daly City	x	-
East Palo Alto	x	x
Foster City	x	-
Half Moon Bay	-	-
Hillsborough	x	x
Menlo Park	x	x

TABLE 2.5-4: BAY AREA CITIES WITH COMPLETED GHG EMISSIONS INVENTORIES OR CLIMATE ACTION PLANS

Jurisdiction	*Completed Community Emissions Inventory*	*Finalized and Adopted Community Climate Action Plan*
Millbrae	x	-
Pacifica	x	-
Portola Valley	x	-
Redwood City	x	x
San Bruno	x	-
San Carlos	x	x
San Mateo	x	x
S. San Francisco	x	-
Woodside	-	-
Santa Clara County	**x**	**-**
Campbell	-	-
Cupertino	-	-
Gilroy	x	x
Los Altos	x	-
Los Altos Hills	x	-
Los Gatos	x	-
Milpitas	x	-
Monte Sereno	-	-
Morgan Hill	x	-
Mountain View	x	x
Palo Alto	x	x
San José	x	x
Santa Clara	x	-
Saratoga	x	-
Sunnyvale	x	x
Solano County	**x**	**x**
Benicia	x	x
Dixon	x	-
Fairfield	x	-
Rio Vista	x	-
Suisun City	x	-
Vacaville	x	-
Vallejo	x	-

TABLE 2.5-4: BAY AREA CITIES WITH COMPLETED GHG EMISSIONS INVENTORIES OR CLIMATE ACTION PLANS

Jurisdiction	*Completed Community Emissions Inventory*	*Finalized and Adopted Community Climate Action Plan*
Sonoma County	**x**	**x**
Cloverdale	x	-
Cotati	x	-
Healdsburg	x	-
Petaluma	x	-
Rohnert Park	x	-
Sebastopol	x	-
Santa Rosa	x	x
Sonoma (city)	x	-
Windsor	x	-
TOTALS	**101**	**44**

Source: Bay Area Air Quality Management District, 2012; Dyett & Bhatia, 2012.

Impact Analysis

The climate change impact analysis assesses the potential for significant adverse impacts related to GHG emissions, plan consistency, and impacts of sea level rise. Impacts of the environment (such as sea level rise) on a project or plan (as opposed to impacts of a project or plan on the environment) are beyond the scope of required CEQA review. "[T]he purpose of an EIR is to identify the significant effects of a project on the environment, not the significant effects of the environment on the project." (*Ballona Wetlands Land Trust v. City of Los Angeles* (2011) 201 Cal.App.4th 455, 473.) The impacts discussed in this section related to sea level rise are effects on users of the project and structures in the project of preexisting environmental hazards, as explicitly found by the court in the *Ballona* decision, and therefore "do not relate to environmental impacts under CEQA and cannot support an argument that the effects of the environment on the project must be analyzed in an EIR." (*Id.* at p. 475.) Nonetheless, an analysis of these impacts is provided for informational purposes.

SIGNIFICANCE CRITERIA

Implementation of Plan Bay Area would have a potentially significant adverse impact if the Plan would:

Criterion 1: Fail to reduce per capita passenger vehicle and light duty truck CO_2 emissions by seven percent by 2020 and by 15 percent by 2035 as compared to 2005 baseline, per SB 375.

Criterion 2: Result in a net increase in direct and indirect GHG emissions in 2040 when compared to existing conditions.

Criterion 3: Substantially impede attainment of goals set forth in Executive Order S-3-05 and Executive Order B-16-2012.

Criterion 4: Substantially conflict with any other applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

Criterion 5: Result in a net increase in transportation investments within areas regularly inundated by sea level rise by midcentury.

Criterion 6: Result in a net increase in the number of people residing within areas regularly inundated by sea level rise by midcentury.

Criterion 7: Result in an increase in land use development within areas regularly inundated by sea level rise by midcentury.

METHOD OF ANALYSIS

Greenhouse Gas Emissions

MTC generates vehicle activity data from its travel demand forecasting models, and uses EMFAC 2011 to calculate the CO_2 emissions from motor vehicle sources. Because the emissions model is based on the travel demand forecast model outputs, it accounts for the land use pattern as well as transportation improvements outlined in the proposed Plan. The emissions model also accounts for the effects of congestion (changes in average vehicle speeds) on CO_2 emissions. A detailed description of EMFAC 2011 is included in *Chapter 2.2: Air Quality* and a detailed description of the MTC travel demand forecasting model is included in *Chapter 2.1: Transportation*. EMFAC 2011 CO_2 output was subsequently adjusted to account for MTC's Climate Policy Initiatives, which are part of the proposed Plan and are expected to reduce overall emissions in 2020 by 3,950 tons of CO_2 per day, and by 5,900 tons of CO_2 per day in 2035 and 2040. **Table 2.5-5** shows these reduction assumptions by policy and corresponding reductions in annual Metric Tons of CO_2 equivalent ($MTCO_2e$). Detailed information on how the policy reductions were calculated and details on the assumed implementation year for each policy are included in MTC's supplemental technical report, *Summary of Predicted Traveler Responses*, available on the project website www.onebayarea.org.

TABLE 2.5-5: PLAN BAY AREA CLIMATE POLICY INITIATIVES AND REDUCTIONS

	2020			*2035 /2040*		
Policy	*% Per Capita Reduction from 2005*	*Daily Tons of CO_2*	*Annual $MTCO_2e$*[1]	*% Per Capita Reduction from 2005*	*Daily Tons of CO_2*	*Annual $MTCO_2e$*
Regional Electric Vehicle Public Charger Network	-0.1%	-90	-25,800	-0.3%	-270	-75,000
Vehicle Buy-Back and Plug-In/ Electric Vehicles Purchase Incentives	0.0%	-	-	-0.5%	-480	-133,500
Car Sharing	-2.6%	-2,060	-572,400	-2.8%	-2,540	-703,700
Vanpool Incentives	-0.3%	-230	-63,800	-0.4%	-360	-98,500
Clean Vehicles Feebate Program	0.00%	-	-	-0.7%	-640	-176,300
Smart Driving Strategy	-1.9%	-1,450	-403,100	-1.6%	-1,390	-384,800
Commuter Benefits Ordinance	-0.2%	-120	-32,500	-0.3%	-230	-64,700
Total	**-5.1%**	**-3,950**	**-1,097,600**	**-6.6%**	**-5,900**	**-1,636,500**

Note: Figures may not sum due to independent rounding.

1. A ratio of 1.00:1.02 was applied to all EMFAC 2011 generated CO_2 estimates to convert them to CO_2e. Emissions are annualized by multiplying by 300 to take account for the fact that there is less traffic on weekends. Conversion factors are taken from the California Air Resource Board Local Government Operations Protocol, Version 1.1, May 2010.

Source: MTC, 2013, Dyett & Bhatia, 2013.

The analysis conducted for Criterion 1 focuses on carbon dioxide (CO_2) emissions related to the operation of passenger vehicles and light duty trucks. Emissions for Criterion 1 are considered to be conservative estimates because they are presented without accounting for reductions in mobile source emissions that would be expected to result from ongoing implementation of Pavley 1 and the LCFS; per SB 375 the impact assessment does not include the emissions reductions from these legislative requirements. However, application of Pavley fuel efficiency standards and LCFS are anticipated to reduce levels even further in 2020 and 2035.

For Criterion 2, the analysis incorporates operational land use emissions, mobile sources, and waste. Land use and transportation impacts are identified separately in order to distinguish impacts and develop appropriate mitigation measures as needed, but the final analysis considers the combined impact of all emission sources. Unlike Criterion 1, transportation emissions include all vehicle classes and the emissions reduction benefits from Pavley and the LCFS. Operational land use emissions are calculated based on existing and projected electricity and natural gas use. Usage and conversion factors are taken from the Bay Area Greenhouse Gas Model,[36] and emissions factors are taken from the Local Government Opera-

[36] Bay Area Air Quality Management District, April 2010.

tions Protocol.[37] Waste emissions are calculated using US EPA's WARM model. All emissions are shown in $MTCO_2e$.

Land use emissions also account for ARB Scoping Plan[38] (described in the Regulatory Setting) reductions related to the electricity and natural gas sectors, and recycling and waste sector. The Scoping Plan identifies 49.7 million $MTCO_2e$ worth of reductions in the electricity and natural gas sector. Waste emission reductions identified in the Scoping Plan from landfill methane control (a discrete early action) are also included (one million MTCO2e). Other recycling and waste-related measures are not included since the Scoping Plan notes that the remaining two measures are not counted toward the AB 32 goal. The Scoping Plan also identifies a 26 million $MTCO_2e$ reduction as a result of green buildings; however this is not included in the analysis since the Scoping Plan notes that measures would overlap with reductions already identified for the electricity and natural gas Sectors (most Green Building emissions reductions are accounted for in energy, waste, water, and transportation sectors for purposes of AB32).

To account for the ARB Scoping Plan measures, this analysis derives the Bay Area's share of statewide reductions by calculating the region's share of forecasted statewide growth in dwelling units for 2020. The statewide forecast of dwelling units identifies 19 percent of California's future population and households in the Bay Area in 2020.[39] Therefore, 19 percent of the 50.7 million $MTCO_2e$ are applied to the GHG emissions forecast total, resulting in a total reduction of 9.6 million $MTCO_2e$.

It is likely that additional measures will be taken beyond 2020, thereby increasing this reduction in GHG emissions beyond what is currently identified in the ARB Scoping Plan. However, since these measures are not yet identified, this analysis only considers measures currently included in the ARB Scoping Plan for 2020 as the total reduction in 2040. ARB Scoping Plan reductions incorporated in the GHG emissions analysis are shown in **Table 2.5-6**.

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[37] California Air Resource Board Local Government Operations Protocol, Version 1.1, May 2010, Appendices E and G.

[38] California Air Resources Board, Climate Change Scoping Plan: A Framework for Change, December 2008.

[39] Population Growth: State of California, Department of Finance, Interim Population Projections for California and Its Counties 2010-2050, Sacramento, California, May 2012; Household Growth: California Department of Housing and Community Development, Exhibit 7: Projected Household Growth by Metro Region, MSA, and County: 1997-2020, accessed January 8, 2013.

TABLE 2.5-6: ARB SCOPING PLAN REDUCTIONS FOR ELECTRICITY AND NATURAL GAS SECTORS

Measure No.	*Measure Description*	*Scoping Plan GHG Reductions (Annual MMT CO_2e)*	*19% of Scoping Plan Total $MTCO_2e$*
E-1	Energy Efficiency (32,000 GWh of Reduced Demand) ▪ Increased Utility Energy Efficiency Programs ▪ More Stringent Building and Appliance Standards ▪ Additional Efficiency and Conservation Programs	15.2	2,888,000
E-2	Increase Combined Heat and Power Use by 30,000 GWh (Net reductions include avoided transmission line loss)	6.7	1,273,000
E-3	Renewables Portfolio Standard (33% by 2020)	21.3	4,047,000
E-4	Million Solar Roofs (including California Solar Initiative, New Solar Homes Partnership and solar programs of publicly owned utilities); Target of 3000 MW Total Installation by 2020	2.1	399,000
CR-1	Energy Efficiency (800 Million Therms Reduced Consumptions) Utility Energy Efficiency Programs Building and Appliance Standards Additional Efficiency and Conservation Programs	4.3	817,000
CR-2	Solar Water Heating (AB 1470 goal)	0.1	19,000
RW-1	Landfill Methane Control (Discrete Early Action)	1	190,000
Total		**50.7**	**9,633,000**

Sources: California Air Resource Board, Climate Change Scoping Plan: A Framework for Change, December 2008; Dyett & Bhatia, 2013.

This assessment also includes a qualitative analysis of airport emissions. Construction-related GHG emissions are addressed qualitatively as a contributor to overall emissions levels, with a focus on best management practices (BMPs).

It is noted that analyses for Criteria 1 and 2 are considered conservative because they do not account for additional local measures and policies to reduce GHG emissions, such as those included in local climate action plans.

Long-Range Consistency with EO S-3-05 and EO B-16-2012

The assessment for Criterion 3 evaluates the proposed Plan's likelihood to impede implementation of executive orders S-3-05 and B-16-2012, which both identify GHG reduction targets for 2050 (80 percent reduction as compared to 1990 levels for overall GHG emissions and transportation sector GHG emissions, respectively). Because these orders target a year beyond the life of the proposed Plan, and because executive orders do not apply directly to regional agencies like MTC and ABAG, but rather apply to agencies within the executive branch of government, this assessment evaluates whether or not implementation of the proposed Plan would impede attainment of the identified orders and whether the Plan moves the region towards a downward trajectory of GHG emissions in 2050.

This evaluation builds on the analyses completed for Criteria 1 and 2, and looks at the trajectory of emissions into the future based on these assessments. The analysis assumes a continued rate of benefits over time as a result of ongoing identification and implementation of effective regulations.

Plan Consistency

For Criterion 4, the EIR assesses the Plan's consistency with State and regional GHG plans, policies, and regulations. In addition, local climate action plans (CAPs) are discussed in the context of local efforts to achieve the same state and regional goals and targets as Plan Bay Area.

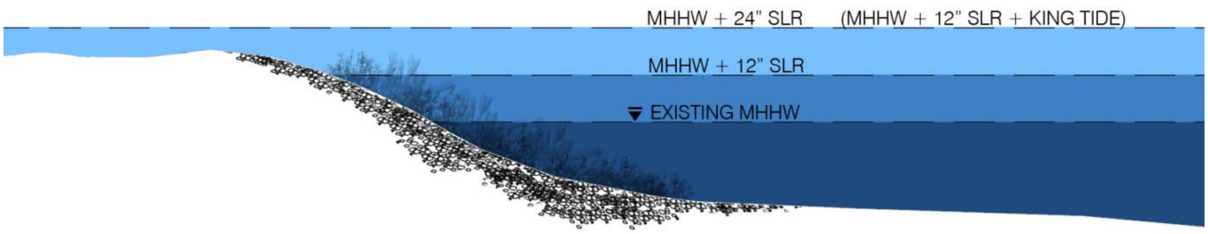
Sea Level Rise

The sea level rise analysis provides a program-level assessment of generalized potential impacts associated with future sea level rise in the San Francisco Bay Area utilizing the inundation mapping produced by NOAA for their Sea Level Rise and Coastal Flooding Impacts Viewer. Potential midcentury (e.g., 2050) sea level rise conditions were selected for this analysis, rather than 2040 conditions, as most sea level rise projections are associated with midcentury and end-of-century conditions. NOAA's inundation maps depict sea level rise on top of MHHW conditions, which are a good approximation of the highest "average" daily tidal inundation an area could be subjected to under future conditions. However, extreme high tides occur that are higher than MHHW. The most well-known extreme high tide condition in San Francisco Bay is often referred to as a "King Tide." King Tide is a colloquial term that refers to the especially high tide conditions that happen only a few times a year. In San Francisco Bay and along the California coast, King Tides generally occur during the winter months.

King Tides can be 12 (or more) inches higher than MHHW; therefore, the inundation of low-lying areas around the Bay observed during a King Tide event is often used as a real-world illustration of the areas around the Bay that would be subjected to regular, daily inundation by midcentury with sea level rise. In other words, the extent of inundation that occurs during an existing King Tide event could be used as a surrogate for the future, regular inundation extent that would be observed with 12 inches of sea level rise relative to MHHW.

The sea level rise impact analysis considers the inundation extent associated with 24 inches of sea level rise at MHHW, as presented within NOAA's Sea Level Rise and Coastal Flooding Impacts Viewer and in **Figure 2.5-3.** This extent of inundation is used as a surrogate for 12 inches of sea level rise at midcentury, coupled with a King Tide event. This scenario was selected as it represents a level of future inundation by Bay waters that could be expected to occur multiple times each year, particularly during the winter months when King Tides typically occur, even in the absence of extreme coastal storm surge events. For the purposes of this assessment, this level of inundation is considered "regular inundation" by sea level rise. **Figure 2.5-6** presents the relationship of these different scenarios for illustrative purposes.

Figure 2.5-6: Comparative Inundation by Scenario



Source: AECOM, 2012.

The proposed transportation projects and land use development projects—in particular in PDAs and transit priority project eligible areas (TPPs)—are analyzed based upon their location relative to inundation areas presented in **Figure 2.5-3**. For Criterion 5, transportation investments located entirely or partially within the inundated areas are identified. For linear transportation projects, such as highway improvements, the length of the projects within the inundated area is calculated relative to the total length of the projects (presented as the percent within the inundation zone). For non-linear projects (such as facility improvements), it is assumed that the project is 100 percent within the inundation zone. The primary shoreline type(s) (e.g., flood protection structure, shoreline protection structure, non-engineered berm, wetland, and natural shoreline) between each project and the Bay or Pacific coast are also identified in order to facilitate the selection of appropriate mitigation measures (adaptation strategies) that may include shoreline modifications or improvements. The primary shoreline types were identified using high-resolution oblique and aerial imagery along with professional judgment. The San Francisco Bay shoreline is complex and highly diverse; therefore, multiple shoreline types may be present in any given area. A more detailed identification of shoreline types and shoreline vulnerabilities may be required as part of future project-level planning.

Along with the areas subject to potential future inundation, **Figure 2.5-3** displays low-lying hydraulically disconnected areas—these are areas with ground elevations below the projected future sea level rise water surface elevations, but they are not inundated, as they do not have a direct hydraulic connection to the Bay. In other words, these areas are protected from inundation by levees, embankments, or other topographic features. Although the transportation investments within these low-lying areas are not projected to be within the sea level rise inundation zone, based on existing levels of protection, these investments are still at risk of inundation in the event that an existing structure fails or is not properly maintained into the future.

Similarly, for Criteria 6 and 7, the PDAs and TPPs that intersect the inundated areas and the low-lying, hydraulically-disconnected areas are identified in order to estimate the potentially-impacted population as well as land-use development changes within both the PDAs and TPPs and the inundated areas. The locations of forecast population growth and new land use development are identified using GIS raster data developed by MTC using the UrbanSim model land use outputs for the proposed Plan. More information on the raster processes can be found in an appendix to the supplementary report *Summary of Predicted Land Use Responses*, available on the project website www.onebayarea.org. For Criterion 6, the total impacted population within each of the nine Bay Area counties was also evaluated. While development will be focused within PDAs, development will ultimately occur both within and outside of PDA areas. The same approach was also used for Criterion 7 to estimate the number of employees and the number of households within the inundated areas (including within PDAs, TPPs, and for each county overall). Employment and households were used as a surrogate for increases in commercial and industrial land use development and residential land use development, respectively.

It is noted that multiple uncertainties are inherent in the sea level rise impact analysis, beyond the uncertainties associated with the projected rate of sea level rise anticipated to occur by midcentury. The inundation mapping used for the analysis is intended as a planning-level tool to illustrate the potential for inundation and coastal flooding under future conditions. The maps are based on model outputs and do not account for all of the complex and dynamic bay processes or future conditions such as erosion, subsidence, future construction or shoreline protection upgrades, or other changes to San Francisco Bay or the region that may occur in response to sea level rise. The maps also rely on USGS and NOAA 2010 Light Detection and Ranging (LIDAR) topographic data at a two-meter horizontal grid resolution. Although this data set represents the best available topographic data, and the data has undergone a rigorous review by a third party, the data has not been extensively ground-truthed. Levee crests and other topographic features that may impact coastal floodwater conveyance may be over or under-represented by the LIDAR data. For more context about the maps and the associated caveats and uncertainties, please refer to the NOAA Sea Level Rise and Coastal Flooding Impacts Viewer.[40]

SUMMARY OF IMPACTS

Consistency with SB 375

The proposed Plan is consistent with SB 375, as modeled CO_2 emissions meet the SB 375 targeted reductions for per capita car and light duty truck emissions. In fact, the proposed Plan would result in greater emission reductions than the SB 375 targets.

Net Change in Total GHG Emissions

Forecast GHG emissions are expected to decline with the implementation of the proposed Plan when considering scoping plan reductions for electricity and natural gas, recycling and waste, and implementation of Pavley and the LCFS regulations. Overall emissions in 2040 are expected to be less than under existing conditions.

Long-Range Consistency with EO S-3-05 and EO B-16-2012

Because the goals of executive orders S-3-05 and B-16-2012 are more than 35 years into the future, the assessment considers the following factors:

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[40] NOAA Coastal Services Center Digital Coast, Sea Level Rise and Coastal Flooding Impacts Viewer: http://www.csc.noaa.gov/digitalcoast/tools/slrviewer

- Per capita car and light duty truck emissions decline from 2005 through 2040, and are expected to continue to decline into the future;
- Total GHG emissions from land use and transportation are expected to decline from 2010 through 2040, and are expected to continue to decline into the future;
- New innovations in technology and science are expected, along with continued market shift towards green building and zero emission vehicles; and
- The RTP and SCS must be updated every four years, providing frequent opportunities to reevaluate progress towards executive order achievement.

Therefore, the Bay Area is heading in the direction of achieving the executive order goals, and does not impede achievement of these identified goals.

Plan Consistency

The proposed Plan is found to be consistent with State goals and mandates. Further, it is not expected that the proposed Plan would conflict with local CAPs or GHG reduction plans as they are complimentary efforts towards the reduction of GHG emissions in line with State goals and mandates. Therefore, the proposed Plan is expected to be consistent with other GHG reduction plans.

Sea Level Rise

All nine San Francisco Bay Area counties have areas that are vulnerable to rising Bay sea levels. The low-lying areas adjacent to the Bay shoreline contain some of the Bay Area's most significant transportation corridors and infrastructure, many of which have planned enhancements, expansions and improvements under the proposed Plan. These low-lying areas are also home to Bay Area residents and businesses, and many counties will see increases in population density and land-use development within future flood prone areas under the proposed Plan.

Under the proposed Plan, the transportation investments would increase within areas subjected to potential future inundation by sea level rise. These investments include a mix of project types, including enhancements to existing transportation infrastructure, expansions of existing infrastructure and facilities, as well as new infrastructure.

IMPACTS AND MITIGATION MEASURES

Because greenhouse gas emissions are global in nature and regulatory targets are defined at the state and regional level, this analysis considers only the cumulative effects of implementation of the proposed Plan. Further, modeling of passenger vehicle and light duty truck emissions accounts for both the land use strategy (increase in households and jobs) and transportation projects and therefore land use development and transportation projects are addressed together for each impact.

The impacts associated with sea level rise vary throughout the region depending on the inland topography and the existing shoreline protection structures; therefore, this analysis evaluated the impacts at the local scale. Regional impacts are essentially the culmination of localized impacts throughout the region. Each of the impacted transportation projects is evaluated individually. The impacts associated with population and land-use development are also evaluated spatially at the local scale, with impacts presented at the county level.

Impact

2.5-1 Implementation of the proposed Plan could fail to reduce per capita passenger vehicle and light duty truck CO_2 emissions by 7 percent by 2020 and by 15 percent by 2035 as compared to 2005 baseline, per SB 375.

Table 2.5-7 shows total daily and per capita car and light duty truck CO_2 emissions, which are expected to decline over time. The proposed Plan is expected to result in a 10.3 percent decline in per capita emssions from 2005 to 2020, and a 16.4 percent decline in per capita CO_2 emissions from 2005 to 2035, exceeding the SB 375 targets (of seven and 15 percent, respectively). This decline is attributable to numerous factors, most importantly the integrated land use and transporation plan in which the land use pattern focuses growth in higher-density locations near transit services. This compact approach to growth allows more efficient use of the existing transportation infrasturcture. The land use development pattern is described in greater detail in *Chapter 1.2: Overview of the Proposed Plan Bay Area.*

While total vehicle miles traveled are expected to increase by 20 percent from existing conditions to 2040 as a result of the Plan, this is less than the overall population growth of 30 percent over the same period. This is attributable in part to the proposed Plan investments in transit operations and expansion. These investments will result in a 27 percent increase in daily transit seat-miles from existing conditions due to the transit expansion and frequency improvement projects included in the proposed Plan. The proposed Plan also results in an increase in the share of trips that are made by transit and by walking, while drive along trips are expected to decline. More detail on the performance of the transportation network under the proposed Plan can be found in *Chapter 2.1: Transportation.*

TABLE 2.5-7: TOTAL AND PER CAPITA PASSENGER VEHICLE AND LIGHT DUTY TRUCK CO_2 EMISSIONS

Year	*Population*	*Modeled GHG Emissions (daily tons of CO_2)*	*Policy Initiatives Reduction (daily tons of CO_2)*	*CO_2 Emissions Per Capita (lb)*	*Per Capita CO_2 Emissions Relative to 2005*	*SB 375 Target*
2005	7,008,000	72,000	0	20.5	0.0%	n/a
2020	7,694,000	75,000	-4,000	18.3	-10.3%	-7.0%
2035	8,749,000	81,000	-5,900	17.1	-16.4%	-15.0%
2040	9,137,000	83,000	-5,900	16.8	-18.0%	n/a

Source: MTC, 2013.

This analysis does not include implementation of Pavley or LCFS standards, which are expected to further reduce CO_2 emissions and result in a decrease in total CO_2 emissions over time. These standards are incorporated in Impact 2.5-2. Because the proposed Plan woud result in a decrease in per capita car and light duty truck CO_2 emissions that exceed the SB 375 target, there is no adverse impact (NI). No mitigation measures are required.

Mitigation Measures

None required.

Impact

2.5-2 Implementation of the proposed Plan could result in a net increase in direct and indirect GHG emissions in 2040 when compared to existing conditions.

Land Use GHG Emissions

An overview of GHG emissions related to land use projects is shown in **Table 2.5-8**. As described in the methodology section, ARB's Scoping Plan reductions for the electricity and natural gas and recycling and waste sectors are incorporated in this analysis. Operational GHG emissions as a result of implementation of the land use component of Plan Bay Area were forecast based on existing and forecast single family and multifamily occupied housing units and existing and forecast jobs by sector. As shown in **Table 2.5-8**, GHG emissions from electricity and natural gas would increase by 28 percent over existing conditions without implementation of scoping measures. Note that residential GHG emissions would increase by 22 percent and nonresidential GHG emissions would increase by 35 percent. The relatively lower increase in residential GHG emissions is tied to an increase in the share of multifamily units, which require less electricity and natural gas to operate. Waste GHG emissions would increase by 30 percent, consistent with overall anticipated population growth. After application of scoping measures related to electricity and natural gas and recycling and waste, however, overall land use GHG emissions (electricity, natural gas, and waste GHG emissions) would decrease by 12 percent overall, relative to existing conditions.

Since overall land use-related GHG emissions are expected to decline from existing conditions to 2040 with implementation of the proposed Plan, there is no adverse impact (NI) and no mitigation measures are required.

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TABLE 2.5-8: EXISTNG AND FORECASTED ANNUAL LAND USE GHG EMISSIONS ($MTCO_2E$)

			Baseline (2010)		Project (2040)			
Land Use/GHG Source	*Usage Factor*	*Unit*	*Total Usage*	*$MTCO_2e$*	*Total Usage*	*$MTCO_2e$*	*Change in $MTCO_2e$ 2010-2040*	*% Change 2010-2040*
Single-Family Residential								
Electricity	7.42	MWh/du/yr	12,225,000	2,997,000	13,807,000	3,385,000	388,000	
Natural Gas	49.60	MMBtu/du/yr	81,775,000	5,476,000	92,358,000	6,185,000	709,000	
Multi-Family Residential								
Electricity	4.43	MWh/du/yr	4,254,000	1,043,000	6,412,000	1,572,000	529,000	
Natural Gas	22.50	MMBtu/du/yr	21,585,000	1,445,000	32,537,000	2,179,000	734,000	
Residential Subtotal				***10,961,000***		***13,321,000***	***2,360,000***	***22%***
Commercial								
Electricity	0.0136	MWh sf/yr	1,943,000	476,000	2,223,000	545,000	69,000	
Natural Gas	0.0295	MMBtu/sf/yr	4,200,000	281,000	4,807,000	322,000	41,000	
Office								
Electricity	0.0214	MWh sf/yr	21,216,000	5,202,000	30,240,000	7,414,000	2,212,000	
Natural Gas	0.0205	MMBtu/sf/yr	20,392,000	1,366,000	29,064,000	1,946,000	580,000	
Industrial								
Electricity	0.0077	MWhsf/yr	3,667,000	899,000	3,809,000	934,000	35,000	
Natural Gas	0.0043	MMBtu/sf/yr	2,059,000	138,000	2,139,000	143,000	5,000	
Non-Residential Subtotal				***8,362,000***		***11,304,000***	***2,943,000***	***35%***
Electricity and Natural Gas GHG Emissions (No Reductions)				**19,323,000**		**24,625,000**	**5,302,000**	**27%**
Waste GHG Emissions (No Reductions)			**5,025,000**	**4,943,000**		**6,410,000**	**1,467,000**	**30%**
Total Land Use GHG Emissions (No Reductions)				**24,266,000**		**31,035,000**	**6,769,000**	**28%**
Electricity and Natural Gas and Recycling and Waste Scoping Plan Reductions				0		-9,633,000		

TABLE 2.5-8: EXISTNG AND FORECASTED ANNUAL LAND USE GHG EMISSIONS ($MTCO_2E$)

			Baseline (2010)		Project (2040)			
Land Use/GHG Source	*Usage Factor*	*Unit*	*Total Usage*	*$MTCO_2e$*	*Total Usage*	*$MTCO_2e$*	*Change in $MTCO_2e$ 2010-2040*	*% Change 2010-2040*
Total Land Use GHG Emissions (With Scoping Plan Reductions)				**24,266,000**		**21,402,000**	**-2,864,000**	**-12%**

Note: Figures may not sum due to independent rounding.

1. Usage factors reflect average use for climate zone four per the BAAQMD BGM User's Manual.
2. Dwelling unit = du; square feet = sf; MWh = megawatt hour; MMBtu = one million British thermal units.
3. Conversion factors from number of jobs to sf: commercial: 1:403sf (retail); office: 1:424 sf (finance, health, other); industrial: 1:815 sf (agriculture and manufacturing). Factors based on average square feet per job used in the UrbanSim model

Source: MTC 2013; Dyett & Bhatia, 2013; BAAQMD, 2010; ARB, 2010.

Transportation GHG Emissions

Overall, as a result of the growing number of residents and jobs in the region, total on-road transportation GHG emissions would be expected to increase over time if no standards were put in place. However, consistent with State legislation, the analysis incorporates implementation of Pavley and LCFS regulations over the life of the proposed Plan. As shown in **Table 2.5-9**, when these standards are taken into account overall GHG emissions decline by 25 percent for passenger vehicles and by 7 percent for buses. While trucks and other vehicles GHG emissions continue to increase over time, these modes make a relatively small contribution to overall on-road GHG emissions. In sum, annual GHG emissions are expected to decrease by over 4.6 million $MTCO_2e$ from 2010 to 2040 under the proposed Plan, a 19 percent decline.

TABLE 2.5-9: EXISITNG AND FORECASTED ANNUAL TRANSPORTATION GHG EMISSIONS ($MTCO_2e$)

	2010 Baseline $MTCO_2e$	*2040 Proposed Plan $MTCO_2e$*	*Change from Existing*	*Percent Change from Existing*
Vehicle GHG Emissions (No Reductions)				
Passenger Vehicles	19,457,000	22,919,000	3,462,000	18%
Trucks	4,447,000	6,908,000	2,461,000	55%
Buses	615,000	634,000	19,000	3%
Other Vehicles	136,000	177,000	41,000	30%
MTC Climate Policy Initiative	--	-1,636,000	--	--
Total (No Reductions)	**24,655,000**	**29,002,000**	**4,347,000**	**18%**
Vehicle GHG Emissions (Pavley + LCFS)				
Passenger Vehicles	19,383,000	14,631,000	-4,752,000	-25%
Trucks	4,447,000	6,217,000	1,770,000	40%
Buses	615,000	571,000	-44,000	-7%
Other Vehicles	136,000	159,000	23,000	17%
MTC Climate Policy Initiative	--	-1,636,000	--	--
Total (Pavley + LCFS)	**24,581,000**	**19,942,000**	**-4,639,000**	**-19%**

Note: Figures may not sum due to independent rounding.

Source: MTC, 2013; Dyett & Bhatia, 2013.

Other regional GHG emissions are expected to occur from airport use. While airports can be expected to increase the number of flights to serve the increase in population and jobs, airports will also continue to have access to new technology and be required to comply with BAAQMD General Conformity rules for criteria air pollutants,[41] which would likely also have benefits for GHG emissions. For instance, as a result

[41] A requirement in federal law and administrative practice that requires that projects will not be approved if they do not conform with the State Implementation Plan by: causing or contributing to an increase in air pollutant emissions, violating an air pollutant standard, or increasing the frequency of violations of an air pollutant standard.

of development of newer engine technology and the continuing trend in the use of larger aircraft by the airlines, in the long term, the reduction in organic compound (ORG) and carbon monoxide (CO) emissions will offset some of the effects of the overall increase in the number of aircraft operations.[42] While criteria pollutants are not primary GHG pollutants, trends in criteria pollutants, ORG, and CO may have implications for CO_2 emissions and other GHG pollutants over time. These effects are not currently quantified, and therefore are not incorporated into a quantitative analysis.

Since overall transportation-related GHG emissions are expected to decline from existing conditions to 2040 with implementation of the proposed Plan, there is no adverse impact (NI). No mitigation measures are required.

Combined Effects

With land use GHG emissions (electricity, natural gas, and waste GHG emissions) expected to decline by 12 percent and transportation GHG emissions expected to decline by 19 percent, the combined effect of land use and transportation GHG emissions would result in a 15 percent reduction in total GHG emissions from 2010 to 2040, as shown in **Table 2.5-10**.

TABLE 2.5-10: TOTAL REGIONAL ANNUAL GHG EMISSIONS

	2010 $MTCO_2e$	*2040 $MTCO_2e$*	*Change from 2010 to 2040*	*Percent Change from 2010 to 2040*
Land Use Emissions Subtotal[1]	24,266,000	21,402,000	-2,864,000	-12%
Transportation Emissions Subtotal[2]	24,581,000	19,942,000	-4,639,000	-19%
Regional Emissions Total	**48,847,000**	**41,344,000**	**-7,503,000**	**-15%**

Note: Figures may not sum due to independent rounding.

1. Land Use emissions account for ARB Scoping Reductions, as outlined in Table 2.5-7.
2. Transportation emissions account for Pavley regulations, and the LCFS, as outlined in Table 2.5-8.

Source: MTC, 2013; Dyett & Bhatia, 2013.

Additional construction-related GHG emissions from implementation of both land use and transportation projects would contribute to emissions levels in the Bay Area. Project level details would be required to assess the specific construction-related impact. Best practice measures may include using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment for at least 15 percent of the fleet; using local building materials for at least 10 percent; and recycling or reusing at least 50 percent of construction waste or demolition materials.[43] Additional best practice measures for reduction of GHG emissions during construction are outlined in **Appendix E**. Due to the project-specific nature of construction emissions, quantitative estimates are not included in the assessment.

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[42] This trend is not true for NOx emissions, which is expected to be at a higher rate than the rate of increase in the number of aircraft operations. BAAQMD, Emission Inventory Methodology for Commercial Aircraft, Jet (Excerpt), updated by Sukarn Claire, 2011.

[43] BAAQMD, California Environmental Quality Act Air Quality Guidelines, Updated May 2012.

Since overall GHG emissions are expected to decline from existing condition to 2040 with implementation of the proposed Plan, there is no adverse impact (NI) and no mitigation measures are required.

Mitigation Measures

None required.

Impact

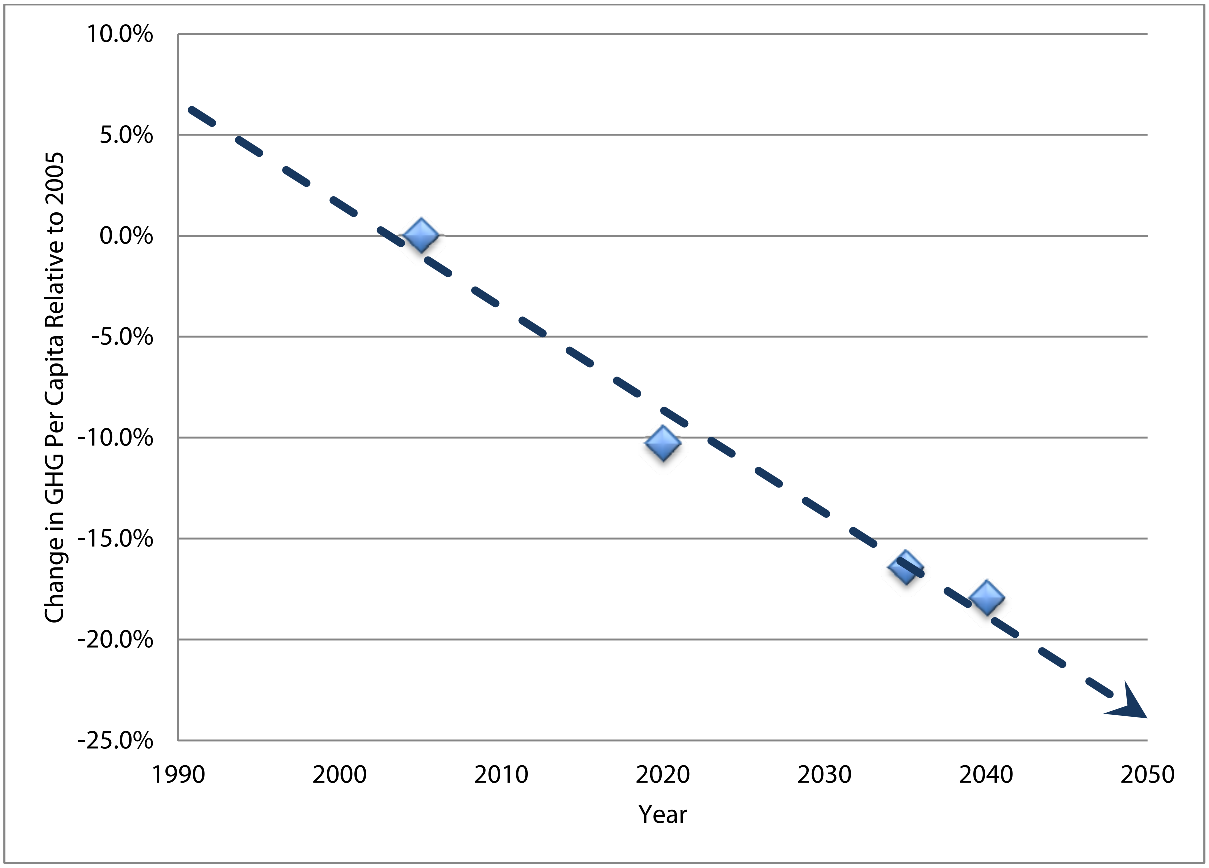
2.5-3 Implementation of the proposed Plan could substantially impede attainment of goals set forth in Executive Order S-3-05 and Executive Order B-16-2012.

This assessment evaluates the proposed Plan's likelihood to impede implementation of executive orders S-3-05 and B-16-2012, which both identify GHG reduction targets for 2050 (80 percent reduction as compared to 1990 levels for overall GHG emissions and transportation sector emissions, respectively), thereby extending beyond the life of the proposed Plan. Because these orders target a year beyond the life of the proposed Plan, this assessment evaluates consistency by identifying whether or not implementation of the proposed Plan is likely to impede attainment of the identified orders.

This analysis is based on a continued rate of benefits over time as a result of similarly effective regulations and regional plans that will be identified for the next time period through State and local processes. Building on analyses completed for Impacts 2.5-1 and 2.5-2, this analysis looks at the trajectory of emissions into the future.

Figure 2.5-7 shows per capita car and light duty truck CO_2 emissions, with modeled years identified as blue diamonds and a trend line identifying the trajectory through 2050. As shown in **Figure 2.5-7,** emissions are expected to continue on a downward trajectory beyond the horizon year of the proposed Plan. This assessment does not include Pavley or LCFS reductions, which are expected to further contribute to greater vehicle emission reductions by 2050.

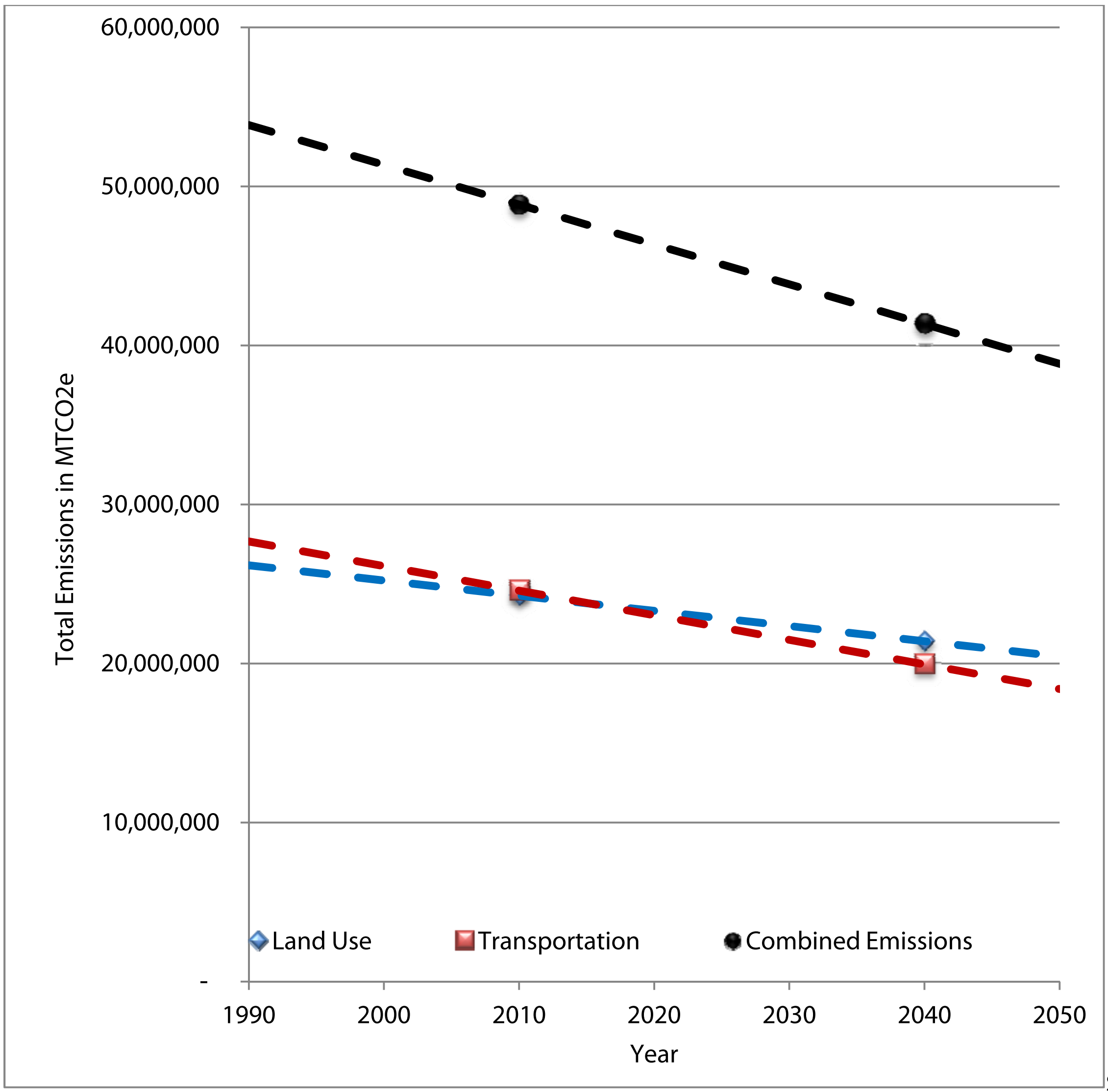
Figure 2.5-7: Per Capita Emissions Car and Light Duty Truck Emissions



Source: MTC, 2013.

Similarly, **Figure 2.5-8** shows total $MTCO_2e$ emissions both separately and combined for operation of land uses and on-road transportation in 2010 and 2040, as evaluated for Impact 2.5-2. The chart also identifies trend lines showing the emissions trajectory through 2050. Estimates include emissions reductions identified in ARB's Scoping Plan for electricity and natural gas, recycling and waste, and assumes implementation of Pavley and LCFS regulations. As shown in **Figure 2.5-8,** emissions are expected to continue to decline beyond the horizon of the proposed Plan.

Figure 2.5-8: Total Emissions by Sector and Linear Trajectory, Annual $MTCO_2e$



Source: MTC, 2013; Dyett & Bhatia, 2013.

Because the goals of executive orders S-3-05 and B-16-2012 are more than 35 years into the future, and new innovations in technology and science are expected, along with continued market shift towards green building and zero emission vehicles, it is reasonable to determine that, given the downward trajectories identified, the Bay Area is heading in the direction of achieving the executive order goals, and therefore does not impede achievement of these identified goals. And, according to the ARB Scoping Plan, new technologies and strategies will be necessary to achieve the long-term goal: "Reducing our greenhouse gas emissions by 80 percent will require California to develop new technologies that dramatically reduce dependence on fossil fuels, and shift into a landscape of new ideas, clean energy, and green technology."[44] In addition, several documents outline measures and policies that individual projects and/or local jurisdictions may implement to further reduce greenhouse emissions, including:

- The Bay Area Air Quality Management District's 2012 CEQA Guidelines, Recommended Plan Level GHG Mitigation Measures or General/Area Plan Policies Sections 9.6.1-9.6.6;
- The California Air Pollution Control Officers Association's Model Policies for Greenhouse Gases in General Plans, June 2009; and
- Tier 2 measures outlined in CalGreen, the 2010 California Green Building Standards Code.

Further, the proposed Plan must be updated every four years, thereby providing frequent opportunities to reevaluate progress towards executive order achievement. While modeling may not be able to show achievement of an 80 percent reduction today, given the overall downward trajectory beyond 2040, which indicates that implementation of the proposed Plan would not impede achievement of executive order goals, the impact is considered less than significant (LS). No mitigation measures are required.

Mitigation Measures

None required.

Impact

2.5-4 Implementation of the proposed Plan could substantially conflict with any other applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

Development facilitated by the proposed Plan is not expected to conflict with any applicable plan, policy or regulation adopted with the intent to reduce GHG emissions. The *Regulatory Setting*, above, describes the plans, policies, and regulations relevant to the proposed Plan that are related to the reduction of GHG emissions. The proposed Plan would not conflict with these plans, policies, and regulations. Specifically, the proposed Plan would not be in conflict with the GHG reduction goals of SB 375, AB 32, EO S-3-05 and EO B-16-2012, as outlined in Impacts 2.5-1 through 2.5-3.

Local CAPs or GHG reduction plans are adopted in an effort to comply with the goals set for local governments in the AB 32 Scoping Plan and are therefore designed to support the same State-mandated goals and targets for GHG reduction outlined above. While the proposed Plan is consistent with AB 32 and SB 375 goals, it is ultimately local jurisdictions that have authority to determine if projects are consistent with local plans. MTC and ABAG have no jurisdiction in approval of development within the region.

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[44] California Air Resources Board, Climate Change Scoping Plan, a Framework for Change, December 2008.

The proposed Plan does not address all of the potential reduction measures, goals, and GHG targets that are identified in local CAPs, general plans, and other plans that address climate change; each locality will set targets based on state, regional, or local conditions. Further, not all plans will have the same reduction goals and implementation measures as a result of various local factors and considerations (see **Table 2.5-4** in the Regulatory Setting for a list of local jurisdictions with GHG inventories and adopted CAPs). The proposed Plan identifies a compact land use pattern that is paired with targeted transportation investments in order to identify an efficient system that results in reductions to per capita and overall GHG emissions. However, some variations may exist on the local level. For instance, the proposed Plan's focused growth pattern may not support an individual jurisdiction's efforts to meet its GHG target by constraining growth. While some variations may exist between the proposed Plan and specific local Climate Action Plans, these variations would need to be assessed at the local level. On a whole, it is expected that local climate action plans and the proposed Plan would be complimentary efforts towards the reduction of GHG emissions in line with State goals and mandates.

Therefore, the proposed Plan is not expected to substantially conflict with local climate action or GHG reduction plans, and the impact is considered to have no adverse impact (NI) and no mitigation measures are required.

Mitigation Measures

None required.

Impact

2.5-5 Implementation of the proposed Plan may result in a net increase in transportation investments within areas regularly inundated by sea level rise by midcentury.

Thirty-two of the approximately 700 Plan Bay Area transportation projects under the proposed Plan are located, partially or wholly, within areas projected to be regularly inundated (i.e., inundated multiple times each year) by sea level rise by midcentury, as shown in **Table 2.5-11**. Any increase in transportation investments within the sea level rise inundation zone is considered a significant impact; however, these impacts can be mitigated through careful project-level planning and design that considers long-term sea level rise and includes adaptive strategies that are appropriate to the project type, surrounding land use, and the adjacent Bay shoreline type. This impact is considered potentially significant (PS). Mitigation measures 2.5(a), 2.5(b), 2.5(c) and 2.5(d) are outlined below.

Twenty one transportation projects are located within low-lying areas that are currently protected from existing and/or future inundation from Bay waters by levees and/or other topographic features or structures that act to inhibit the conveyance of floodwaters inland (see **Table 2.5-12**). Some of these projects run through both inundated and low-lying areas and therefore are included in both **Table 2.5-11** and **Table 2.5-12.** Although the portions of projects within the low-lying areas are not projected to be within the sea level rise inundation zone, based on the existing level of protection, they are still at risk of inundation in the event that an existing structure (e.g., levee, roadway embankment) fails or is not properly maintained into the future, or the topographic feature that is providing protection erodes or is modified in a way that reduces is protective value. This impact is considered potentially significant (PS). Mitigation measures 2.5(a), 2.5(b), 2.5(c) and 2.5(d) are outlined below.

TABLE 2.5-11: PROPOSED TRANSPORTATION PROJECTS WITHIN MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

RTP ID	*Project Name*	*% Inundated*[1]	*Shoreline Type*
Alameda County[2]			
22009	Expand Capitol Corridor intercity rail service from Oakland to San José - project development	5%	Berms, wetlands
22780	Implement AC Transit Grand-MacArthur Bus Rapid Transit (BRT)	< 5%	Engineered shore protection structures
230054	Construct auxiliary lanes on I-880 between Whipple Road and Industrial Parkway West	< 5%	Berms, wetlands
240018	Implement commuter service between Peninsula and East Bay (includes implementation of Phase 1 service as determined by on-going environmental work, railroad right-of-way acquisition, and environmental only for rail improvements)	< 5%	Berms, wetlands
98207	Construct Bus Rapid Transit facility from Alameda Naval Station to 12th Street BART station, improve freeway weaving at I-880/I-980 interchange, construct new on-ramp at Market Street/6th Street and off-ramp at Martin Luther King Way/5th Street, improve operations at Posey and Webster Tubes, construct park and ride on Mariner Square Drive near Posey Tube entrance, add Intelligent Transportation Systems (ITS) elements on Webster Street, Ralph Appezatto Memorial Parkway, 6th Street, 5th Street, Broadway, Harrison Street, and 7th Street (Phase 1)	45%	Engineered shore protection structures
Marin County			
98154	Implement Marin Sonoma Narrows Stage 1 (Marin County)	< 5%	Berms, wetlands
21325	Improve U.S. 101 Greenbrae/Twin Cities Corridor (includes modifying access ramps, new bus stops, improving transit stops and facilities, and adding pedestrian/bicycle facilities)	30%	Wetlands
240552	Construct multi-use pathway connecting Calpark tunnel and the Ferry Terminal in Larkspur	5%	Wetlands
240691	Marin Sonoma Narrows HOV Lane and corridor improvements	< 5%	Berms, wetlands
San Mateo County			
21613	Widen Route 92 between San Mateo-Hayward Bridge to I-280, includes uphill passing lane from U.S. 101 to I-280	20%	Engineered flood protection structures
230428	Extend Blomquist Street over Redwood Creek to East Bayshore and Bair Island Road	10%	Berms, wetlands
230704	Make Route 92 operational improvements to Chess Drive on- and off-ramps	100%[3]	Engineered flood protection structures
240060	Modify existing lanes on U.S. 101 from Whipple to County line to accommodate HOV/T lane	< 5%	Engineered flood protection structures

TABLE 2.5-11: PROPOSED TRANSPORTATION PROJECTS WITHIN MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

RTP ID	*Project Name*	*% Inundated*[1]	*Shoreline Type*
240143	Construct new multi-purpose pedestrian/bicycle overcrossing across U.S. 101, north of and adjacent to existing Millbrae Avenue Bridge across U.S. 101	45%	Engineered shore protection structures
240176	Widen Triton Drive between Foster City Boulevard and Pilgrim Drive	100%	Engineered flood protection structures
Santa Clara County			
230267	Widen Montague Expressway to 8-lanes for HOV lanes between Lick Mill and Trade Zone boulevards and on Guadalupe River Bridge and Penitencia Creek Road	< 5%	Engineered flood protection structures
230267	Widen Montague Expressway to 8-lanes for HOV lanes between Lick Mill and Trade Zone boulevards and on Guadalupe River Bridge and Penitencia Creek Road	< 5%	Engineered flood protection structures
230531	Construct auxiliary lanes on U.S. 101 in Mountain View and Palo Alto, from Route 85 to Embarcadero Road	50%	Berms, wetlands
230532	Improve interchange at Route 237/North 1st Street	100%[3]	Engineered flood protection structures
240436	Improve southbound U.S. 101 between San Antonio Road to Carleston Road/Rengstorff Avenue	75%	Berms, wetlands
240441	Improve interchange at U.S. 101/Oregon Expressway/Embarcadero Road	100%[3]	Engineered flood protection structures
240463	Convert Route 237 HOV lanes to express lanes between North First Street and I-880 (included under VTA Express Lane Network RTPID #240742)	25%	Engineered flood protection structures
240466	U.S. 101 express lanes between Whipple Avenue and Cochrane Road: Convert HOV lane to express lane between Whipple Avenue (in San Mateo County) and Santa Clara County line; Convert HOV lane into express lane and construct additional express lane between Santa Clara County line and Cochrane Road (included under VTA Express Lane Network RTPID #240742)	< 5%	Berms, wetlands
240481	Convert Route 237 HOV lanes to express lanes between North First Street to Mathilda Avenue (included under VTA Express Lane Network RTPID #240742)	< 5%	Engineered flood protection structures
Multi-County			
21013	State-Owned Toll Bridge Rehabilitation/Replacement/Retrofit	< 5%	Berms, wetlands
22001	Implement Sonoma-Marin Area Rail Transit District (SMART) Commuter Rail and Multi-Use Pathway Project (Initial Operating Segment)	5%	Berms, wetlands
230221	Implement I-80 Integrated Corridor Mobility (ICM) project operations and management	< 5%	Engineered shore protection structures

TABLE 2.5-11: PROPOSED TRANSPORTATION PROJECTS WITHIN MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

RTP ID	*Project Name*	*% Inundated[1]*	*Shoreline Type*
230581	San Francisco Ferry Berthing Improvements Program (Phase 1): improvements to existing ferry terminals and construction of new terminals to accommodate increases in ferry ridership	100%[3]	Engineered shore protection structures
230668	Convert I-880 HOV lanes to express lanes between Hengenberger Road and Route 237 southbound, and Hacienda Drive to 237 northbound (included under MTC Regional Express Lane Network RTPID #240741)	< 5%	Berms, wetlands
230685	Express Lanes on I-680: Widen I-680 northbound for express lane from Rudgear to North Main; Convert HOV lanes to express lanes between Benicia Bridge and Alcosta Boulevard in each direction (included under MTC Regional Express Lane Network RTPID #240741)	< 5%	Engineered shore protection structures
230686	Widen I-680 in each direction for express lanes between Martinez Bridge to I-80 (included under MTC Regional Express Lane Network RTPID #240741)	< 5%	Berms, natural shoreline
240587	Widen I-680 northbound for express lanes from Marina Vista Avenue to North Main Street (included under MTC Regional Express Lane Network RTPID #240741)	< 5%	Berms, engineered shore protection structures
240736	Expand and enhance the SMART commuter rail system (Phase II) by constructing a one-station extension from San Rafael to Larkspur, constructing a one-station extension from North Santa Rosa to Windsor, implementing capacity improvements along the Initial Operating Segment (Sonoma County only), and completing the multi-use pathway from Larkspur to Cloverdale.	20%	Engineered shore protection structures

Notes:

1. % Inundated represents the sum of all areas within the sea level rise inundation zone for a given project. Inundation calculations are based on based on MTC GIS files identifying transportation project locations. The projects were mapped to the best of MTC's ability based on the information submitted by the project sponsor. The exact project locations may change as the projects are further developed.
2. Counties without inundated transportation projects are not shown.
3. These projects were represented as point projects in MTC's GIS-based maps of each transportation project, therefore they are considered 100% inundated as the point is located within the sea level rise inundation zone.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 2.5-12: PROPOSED TRANSPORTATION PROJECTS WITHIN MIDCENTURY LOW-LYING HYDRAULICALLY DISCONNECTED ZONE

RTP ID	*Project Name*	*% Inundated*[1]	*Shoreline Type*
Alameda County[2]			
21131	Build a BART Oakland Airport Connector between Coliseum BART station and Oakland International Airport	15%	Engineered flood protection structures
22009	Expand Capitol Corridor intercity rail service from Oakland to San José - project development	< 5%	Berms, wetlands
240018	Implement commuter service between Peninsula and East Bay (includes implementation of Phase 1 service as determined by on-going environmental work, railroad right-of-way acquisition, and environmental only for rail improvements)	< 5%	Berms, wetlands
98207	Construct Bus Rapid Transit facility from Alameda Naval Station to 12th Street BART station, improve freeway weaving at I-880/I-980 interchange, construct new on-ramp at Market Street/6th Street and off-ramp at Martin Luther King Way/5th Street, improve operations at Posey and Webster Tubes, construct park and ride on Mariner Square Drive near Posey Tube entrance, add Intelligent Transportation Systems (ITS) elements on Webster Street, Ralph Appezatto Memorial Parkway, 6th Street, 5th Street, Broadway, Harrison Street, and 7th Street (Phase 1)	25%	Engineered shore protection structures
San Francisco County			
240147	Implement Southeast Waterfront Transportation Improvements - Phase 1	< 5%	Engineered shore protection structures
240163	Implement Hunters Point Shipyard and Candlestick Point Local Roads Phase 1	100%	Engineered shore protection structures
240358	Implement Mission Bay New Roadway Network	5%	Engineered shore protection structures
240400	Implement Treasure Island/Yerba Buena Island Street Network (includes a new street network, traffic calming, pedestrian improvements, biking improvements, streetscape improvements, and transit/shuttle stops)	100%	Engineered flood protection structures; engineered shore protection structures
San Mateo County			
21608	Construct auxiliary lanes (one in each direction) on U.S. 101 from Marsh Road to Embarcadero Road	5%	Engineered flood protection structures
21612	Improve access to and from the west side of Dumbarton Bridge on Route 84 connecting to U.S. 101, includes flyovers, interchange improvements, and conversion of Willow Road between Route 84 and U.S. 101 to expressway	15%	Engineered flood protection structures

TABLE 2.5-12: PROPOSED TRANSPORTATION PROJECTS WITHIN MIDCENTURY LOW-LYING HYDRAULICALLY DISCONNECTED ZONE

RTP ID	*Project Name*	*% Inundated*[1]	*Shoreline Type*
21613	Widen Route 92 between San Mateo-Hayward Bridge to I-280, includes uphill passing lane from U.S. 101 to I-280	< 5%	Engineered flood protection structures
230592	Improve streetscape and traffic calming along Bay Road, and construct new northern access connection between Demeter Street and University Avenue	20%	Berms, wetlands
240060	Modify existing lanes on U.S. 101 from Whipple to County line to accommodate HOV/T lane	< 5%	Engineered flood protection structures
240133	Widen Millbrae Avenue between Rollins Road and U.S. 101 southbound on-ramp and resurface intersection of Millbrae Avenue and Rollins Road	90%	Engineered shore protection structures
240143	Construct new multi-purpose pedestrian/bicycle overcrossing across U.S. 101, north of and adjacent to existing Millbrae Avenue Bridge across U.S. 101	40%	Engineered shore protection structures
Santa Clara County			
240374	Extend BART to Berryessa (includes environmental, preliminary engineering, property acquisition and construction phases)	< 5%	Berms, wetlands
240466	U.S. 101 express lanes between Whipple Avenue and Cochrane Road: Convert HOV lane to express lane between Whipple Avenue (in San Mateo County) and Santa Clara County line; Convert HOV lane into express lane and construct additional express lane between Santa Clara County line and Cochrane Road (included under VTA Express Lane Network RTPID #240742)	< 5%	Berms, wetlands
240481	Convert Route 237 HOV lanes to express lanes between North First Street to Mathilda Avenue (included under VTA Express Lane Network RTPID #240742)	15%	Engineered flood protection structures
Multi-County			
21627	Caltrain Service Frequency Improvements (6-Train Service during Peak Hours), Electrification (San Francisco to Tamien), and Communications-Based Overlay Signal System (CBOSS) and Positive Train Control System (PTC)	< 5%	Engineered shore protection structures
22001	Implement Sonoma-Marin Area Rail Transit District (SMART) Commuter Rail and Multi-Use Pathway Project (Initial Operating Segment)	< 5%	Berms, wetlands
240588	Widen I-680 southbound for express lanes from Marina Vista Avenue to Livorna Road (included under MTC Regional Express Lane Network RTPID #240741)	< 5%	Berms, engineered shore protection structures

TABLE 2.5-12: PROPOSED TRANSPORTATION PROJECTS WITHIN MIDCENTURY LOW-LYING HYDRAULICALLY DISCONNECTED ZONE

RTP ID	*Project Name*	*% Inundated*[1]	*Shoreline Type*

Notes:

1. % Inundated represents the sum of all areas within the low-lying hydraulically disconnected zone for a given project. Inundation calculations are based on MTC GIS files identifying transportation project locations. The projects were mapped to the best of MTC's ability based on the information submitted by the project sponsor. The exact project locations may change as the projects are further developed.
2. Counties without inundated transportation projects are not shown.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

Mitigation Measures

2.5(a) MTC and ABAG shall continue coordinating with BCDC, in partnership with the Joint Policy Committee and regional agencies and other partners who would like to participate, to conduct vulnerability and risk assessments for the region's transportation infrastructure. These assessments will build upon MTC and BCDC's Adapting to Rising Tides Transportation Vulnerability and Risk Assessment Pilot Project focused in Alameda County. Evaluation of regional and project-level vulnerability and risk assessments will assist in the identification of the appropriate adaptation strategies to protect transportation infrastructure and resources, as well as land use development projects, that are likely to be impacted and that are a priority for the region to protect. The *Adaptation Strategy* sub-section found at the end of this section includes a list of potential adaptation strategies that can mitigate the impacts of sea level rise. In most cases, more than one adaptation strategy will be required to protect a given transportation project or land use development project, and the implementation of the adaptation strategy will require coordination with other agencies and stakeholders. As MTC and ABAG conduct vulnerability and risk assessments for the region's transportation infrastructure, the Adaptation Strategy sub-section should serve as a guide for selecting adaptation strategies, but the list should not be considered all inclusive of all potential adaptation strategies as additional strategies not included in this list may also have the potential to reduce significant impacts.

2.5(b) MTC and ABAG shall work with the Joint Policy Committee to create a regional sea level rise adaptation strategy for the Bay Area.

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.5(c) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. The project sponsors and implementing agencies shall coordinate with BCDC, Caltrans, local jurisdictions (cities and counties), and other transportation agencies to develop Transportation Asset Management Plans (TAMPs) that consider the potential impacts of sea level rise over the asset's life cycle.

2.5(d) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Executive Order S-13-08 requires all state agencies, including Caltrans, to incorporate sea level rise into planning for all new construction and routine maintenance projects; however, no such requirement exists for local transportation assets and development projects. Implementing agencies shall require project sponsors to incorporate the appropriate adaptation strategy or strategies to reduce the impacts of sea level rise on specific transportation and land use development projects where feasible based on project- and site-specific considerations. Potential adaptation strategies are included in the *Adaptation Strategy* subsection found at the end of this section.

Significance After Mitigation

Any increase in transportation investments within the area projected to be inundated by sea level rise is considered significant. Selection and implementation of appropriate mitigation measures and adaptation strategies may reduce the impact associated with sea level rise to less than significant on a project-by-project basis. The appropriate adaptation strategies will be selected as part of the future project-level analysis and planning. At this time, sufficient detail is not available to identify which adaptation strategy or strategies would be the most effective for each individual transportation project. In addition, successful implementation of the mitigation measures and adaptation strategies requires participation by other agencies and stakeholders.

This EIR includes a range of adaptation strategies to guide local jurisdictions, regional agencies, and transportation agencies in identifying strategies that are appropriate for transportation and development projects that may be subjected to regular future inundation by sea level rise. However, this EIR does not include guidance on how to select an adaptation strategy from the range of options presented, as local jurisdictions and transportation agencies will consider feasibility during subsequent project-level planning.

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.5-6 Implementation of the proposed Plan could result in a net increase in the number of people residing within areas regularly inundated by sea level rise by midcentury.

The projected land use changes under the proposed Plan results in an increase in the number of residents within the area of the PDAs projected to be regularly inundated by sea level rise (**Table 2.5-13**), TPPs (**Table 2.5-14**), and within each county as a whole (**Table 2.5-15**). The most significant increases within the inundation zone (numerically) are located within Santa Clara County, which is a low-lying and densely populated county. The least significant increases (numerically) are located in Napa and Sonoma Counties, which are both more sparsely populated within the potentially inundated areas.

The population within the potentially-inundated portion of the PDAs would increase by 245 percent between 2010 and 2040 (**Table 2.5-13**). Within the TPPs, the number of residents within the inundated areas would increase by 60 percent (**Table 2.5-14**), and throughout the San Francisco Bay Area as a whole, the number of people within the potentially inundated areas would increase by 30 percent between 2010 and 2040 (**Table 2.5-15**).

Within the midcentury low-lying, hydraulically disconnected areas, the increase in the number of residents within the PDAs is 360 percent (**Table 2.5-13**), compared to an increase of 100 percent within the TPPs (**Table 2.5-14**) and 80 percent within the San Francisco Bay Area as a whole (**Table 2.5-15**).

This impact is considered potentially significant (PS). Mitigation measures 2.5(b) and 2.5(d) are outlined for Impact 2.5-5.

TABLE 2.5-13: TOTAL POPULATION WITHIN PDA AND MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*		*Year 2040 Proposed Plan*		*% Increase*		*Numerical Increase*	
	Within SLR Zone	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*
Alameda	< 10	20	100	3,450	1,470%	17,150%	90	3,430
Contra Costa	300	0	490	30	65%	350%	190	30
Marin	120	0	430	< 10	245%	0%	300	< 10
Napa	< 10	0	10	0	630%	0%	10	0
San Francisco	30	10	970	4,200	2,730%	41,900%	940	4,190
San Mateo	210	2,250	710	10,330	250%	360%	510	8,080
Santa Clara	2,240	2,140	9,880	2,210	340%	< 10%	7,630	70
Solano	1,680	0	3,240	40	90%	420%	1,570	40
Sonoma	< 10	0	20	0	320%	0%	10	0
Total	**4,600**	**4,420**	**15,850**	**20,270**	**245%**	**360%**	**11,250**	**15,850**

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 2.5-14: TOTAL POPULATION WITHIN TPP AND MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*		*Year 2040 Proposed Plan*		*% Increase*		*Numerical Increase*	
	Within SLR Zone	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*
Alameda	1,350	1,130	1,540	2,210	10%	100%	190	1,080
Contra Costa	10	< 10	90	20	500%	1,320%	70	10
Marin	7,920	1,470	9,000	1,480	10%	< 10%	1,080	10
Napa	< 10	0	< 10	0	350%	0%	< 10	0
San Francisco	330	10	2,030	2,240	510%	19,280%	1,700	2,230
San Mateo	12,900	1,1750	15,590	25,050	20%	110%	2,690	13,300
Santa Clara	3,920	2,610	12,960	2,890	230%	10%	9,040	280
Solano	0	220	0	270	0%	30%	0	60
Sonoma	< 10	0	11	0	90%	0%	< 10	0
Total	**26,450**	**17,180**	**41,220**	**34,150**	**60%**	**100%**	**14,770**	**16,970**

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 2.5-15: TOTAL POPULATION WITHIN COUNTY[1] AND MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*		*Year 2040 Proposed Plan*		*% Increase*		*Numerical Increase*	
	Within SLR Zone	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*
Alameda	1,450	2,050	1,630	6,110	10%	200%	180	4,050
Contra Costa	750	10	1,360	50	80%	450%	610	40
Marin	11,170	3,060	12,380	3,180	10%	< 10%	1,210	120
Napa	100	20	120	30	20%	60%	20	10
San Francisco	340	10	1,930	3,910	480%	33,720%	1,600	3,900
San Mateo	50,680	23,790	56,320	41,950	10%	80%	5,640	18,170
Santa Clara	11,930	2,690	26,820	3,030	130%	10%	14,890	340
Solano	1,790	280	3,370	340	90%	20%	1580	60
Sonoma	130	30	170	30	20%	0%	30	0
Total	**78,340**	**31,940**	**104,090**	**58,630**	**30%**	**80%**	**25,750**	**26,690**

1. Includes all population within each county that is within the sea level rise inundation zone, including population within and outside of the PDAs and TPPs.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

Mitigation Measures

Implement Mitigation Measures 2.5(b) and 2.5(d) under Impact 2.5-5.

Significance after Mitigation

Any increase in the number of residents within the areas projected to be inundated by sea level rise is considered significant. Selection and implementation of the appropriate mitigation measures and adaptation strategies may reduce the impact associated with sea level rise to less than significant. However, the appropriate adaptation strategies will be selected as part of future project-level analysis and planning. At this time, sufficient detail is not available to identify which adaptation strategy or strategies would be the most effective at protecting the population within the sea level rise inundation zone. In most cases, regional strategies that aim to protect large developed areas will be the most effective at protecting the impacted population, but successful implementation of regional adaptation strategies requires participation by other agencies and stakeholders.

This EIR includes a range of adaptation strategies to guide local jurisdictions, regional agencies, and transportation agencies in identifying strategies that are appropriate for transportation and development projects that may be subjected to regular future inundation by sea level rise. However, this EIR does not include guidance on how to select an adaptation strategy from the range of options presented, as local jurisdictions and transportation agencies will consider feasibility during subsequent project-level planning.

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Impact

2.5-7 Implementation of the proposed Plan could result in an increase in land use development within areas regularly inundated by sea level rise by midcentury.

The increase in land use development was evaluated using employment as a surrogate for an increase in commercial and industrial land use (or land use density), and households as a surrogate for an increase in residential land use (or an increase in residential housing density). The increase in employment and households was evaluated within the PDAs (**Tables 2.5-16** and **2.5-19**), TPPs (**Tables 2.5-17** and **2.5-20**), and within the counties as a whole (**Tables 2.5-18** and **2.5-21**).

Employment within the PDAs and potentially inundated areas is projected to increase by 55 percent between 2010 and 2040 under the proposed Plan (**Table 2.5-16**). Within the potentially inundated TPPs, employment would increase by 30 percent (**Table 2.5-17**), and throughout the San Francisco Bay Area as a whole, the number of people employed within the potentially inundated areas would increase by 30 percent between 2010 and 2040 (**Table 2.5-18**). Since employment is a surrogate for commercial and industrial land use, under the proposed Plan, there is projected to be an increase in commercial and industrial land use development within the PDAs, TPPs, and throughout the nine Bay Area counties within the sea level rise inundation zone. Santa Clara County is projected to have the largest increase in commercial and industrial land use development (numerically) within the potentially inundated portions of PDAs (**Table 2.5-16**), and San Mateo County is projected to have the largest increase (numerically) within the potentially inundated portions of TPPs and the county as whole, when compared to the other Bay Area counties (**Table 2.5-17**).

Within the low-lying, hydraulically disconnected areas, the increase in employment within the PDAs is 110 percent (**Table 2.5-16**), compared to an increase of 50 percent within the TPPs (**Table 2.5-17**) and 50 percent within the San Francisco Bay Area as a whole (**Table 2.5-18**). San Mateo County is projected to have the largest increase in industrial and commercial land use development within the low-lying, hydraulically disconnected areas within the PDAs, TPPs, and within the county as a whole.

The number of households (and thus, residential land-use development) within the PDAs and potentially inundated areas is projected to increase by 260 percent between 2010 and 2040 under the proposed Plan (**Table 2.5-19**). Within the TPPs, the number of households is projected to increase by 50 percent (**Table 2.5-20**), and throughout the San Francisco Bay Area as a whole, the number of households within the potentially inundated areas is projected to increase by 30 percent between 2010 and 2040 (**Table 2.5-21**). Santa Clara County is projected to have the largest increase in residential development within the sea level rise inundation zone within the PDAs, TPPs, and within the county as a whole when compared to the other eight Bay Area counties.

Within the low-lying, hydraulically disconnected areas, the increase in households within the PDAs is 310 percent (**Table 2.5-19**), compared to an increase of 100 percent within the TPPs (**Table 2.5-20**) and 80 percent within the San Francisco Bay Area as a whole (**Table 2.5-21**). San Mateo County is projected to have the largest increase in residential land use development within the low-lying, hydraulically disconnected areas within the PDAs and the county as a whole, while Santa Clara County is projected to have the largest increase within TPPs.

This impact is considered potentially significant (PS). Mitigation measures 2.5(b) and 2.5(d) are outlined for Impact 2.5-5.

TABLE 2.5-16: TOTAL EMPLOYMENT WITHIN PDA AND MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*		*Year 2040 Proposed Plan*		*% Increase*		*Numerical Increase*	
	Within SLR Zone	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*
Alameda	120	260	370	800	210%	205%	250	530
Contra Costa	20	0	30	0	60%	0%	10	0
Marin	900	40	1,050	40	15%	0%	150	0
Napa	0	0	0	0	0%	0%	0	0
San Francisco	160	780	690	2,670	335%	245%	530	1,900
San Mateo	1,250	6,130	1,940	11,500	55%	90%	680	5,370
Santa Clara	5,690	70	8,460	100	50%	45%	2,770	30
Solano	230	60	410	90	80%	45%	180	30
Sonoma	10	0	30	0	185%	0%	20	0
Total	**8,380**	**7,340**	**12,980**	**15,200**	**55%**	**110%**	**4,600**	**7,860**

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 2.5-17: TOTAL EMPLOYMENT WITHIN TPP AND MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*		*Year 2040 Proposed Plan*		*% Increase*		*Numerical Increase*	
	Within SLR Zone	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*
Alameda	1,090	1,470	1,430	2,030	30%	40%	340	560
Contra Costa	340	50	520	70	60%	50%	190	20
Marin	9,510	210	11,330	220	20%	< 10%	1,810	20
Napa	0	0	0	0	0%	0%	0	0
San Francisco	170	910	670	2,660	300%	190%	500	1,750
San Mateo	24,100	6,280	29,880	9,490	20%	50%	5,790	3,210
Santa Clara	5,100	2,660	6770	3,550	30%	30%	1,670	880
Solano	< 10	870	10	1,020	80%	20%	< 10	160
Sonoma	10	0	30	0	170%	0%	20	0
Total	**40,310**	**12,440**	**50,640**	**19,040**	**30%**	**50%**	**10,330**	**6,600**

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 2.5-18: TOTAL EMPLOYMENT WITHIN COUNTY[1] AND MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*		*Year 2040 Proposed Plan*		*% Increase*		*Numerical Increase*	
	Within SLR Zone	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*
Alameda	1,500	5,370	1,890	7,580	30%	40%	390	2,210
Contra Costa	1,390	410	2,020	420	50%	< 10%	630	10
Marin	11,510	1,000	13,720	1,100	20%	10%	2,210	100
Napa	30	520	40	570	30%	10%	< 10	50
San Francisco	130	900	520	2,790	300%	210%	390	1,880
San Mateo	48,750	20,090	65,070	30,960	30%	50%	16,320	10,870
Santa Clara	16,890	2,830	24,500	3,850	50%	40%	7,610	1,020
Solano	450	940	680	1,110	50%	20%	230	170
Sonoma	280	10	350	10	30%	< 10%	80	0
Bay Area	**80,920**	**32,060**	**108,790**	**48,400**	**30%**	**50%**	**27,870**	**16,340**

1. Includes all population within each county that is within the sea level rise inundation zone, including population within and outside of the PDAs and TPPs.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 2.5-19: TOTAL HOUSEHOLDS WITHIN PDA AND MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*		*Year 2040 Proposed Plan*		*% Increase*		*Numerical Increase*	
	Within SLR Zone	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*
Alameda	< 10	< 10	30	910	1,250%	11,790%	30	900
Contra Costa	90	0	140	10	50%	110%	40	10
Marin	50	0	180	0	250%	100%	130	0
Napa	< 10	0	< 10	0	0%	0%	< 10	0
San Francisco	20	< 10	350	1,400	2,070%	17,260%	330	1,390
San Mateo	40	850	210	3,990	410%	370%	170	3,140
Santa Clara	900	890	4,060	910	350%	< 10%	3,170	20
Solano	580	0	1,100	10	90%	140%	520	10
Sonoma	< 10	0	< 10	0	255%	0%	< 10	0
Total	**1,690**	**1,750**	**6,080**	**7,240**	**260%**	**310%**	**4,400**	**5,490**

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 2.5-20: TOTAL HOUSEHOLDS WITHIN TPP AND MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*		*Year 2040 Proposed Plan*		*% Increase*		*Numerical Increase*	
	Within SLR Zone	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*
Alameda	510	390	570	740	10%	90%	60	350
Contra Costa	< 10	< 10	30	< 10	240%	790%	20	0
Marin	2,430	600	2,750	580	10%	< 0%	320	-20
Napa	0	0	< 10	0	370%	0%	< 10	0
San Francisco	160	< 10	800	790	410%	9670%	640	780
San Mateo	5,570	4,380	6,400	9,760	20%	120%	830	5380
Santa Clara	1,460	1,100	4,760	1,270	230%	20%	3,300	180
Solano	0	90	0	120	0%	0%	0	20
Sonoma	< 10	0	< 10	0	70%	0%	< 10	0
Total	**10,130**	**6,570**	**15,310**	**13,260**	**50%**	**100%**	**5,180**	**6,690**

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 2.5-21: TOTAL HOUSEHOLDS WITHIN COUNTY[1] AND MIDCENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*		*Year 2040 Proposed Plan*		*% Increase*		*Numerical Increase*	
	Within SLR Zone	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*	*Within SLR Zone*	*Within LOW Zone*
Alameda	540	710	580	1,820	< 10%	160%	40	1,110
Contra Costa	230	< 10	440	10	100%	700%	210	10
Marin	3,760	1,240	4,110	1,260	< 10%	< 10%	350	20
Napa	40	< 10	40	10	10%	50%	< 10	< 10
San Francisco	160	< 10	760	1,270	380%	15,610%	600	1,260
San Mateo	19,620	8,580	21,290	15,640	< 10%	80%	1,670	7,060
Santa Clara	4,300	1,120	9,890	1,330	130%	20%	5,590	210
Solano	630	120	1,150	140	80%	20%	520	20
Sonoma	40	10	60	10	30%	0%	10	0
Total	**29,320**	**11,800**	**38,320**	**21,490**	**30%**	**80%**	**9,000**	**9,690**

1. Includes all population within each county that is within the sea level rise inundation zone, including population within and outside of the PDAs and TPPs

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

Mitigation Measures

Implement Mitigation Measures 2.5(b) and 2.5(d) under Impact 2.5-5.

Significance after Mitigation

Any increase in land use development within areas projected to be regularly inundated by sea level rise is considered a significant impact. Selection and implementation of the appropriate mitigation measures and adaptation strategies may reduce the impact associated with sea level rise to less than significant. However, the appropriate adaptation strategies will be selected as part of future project-level analysis and planning. At this time, sufficient detail is not available to identify which adaptation strategy or strategies would be the most effective at protecting the projected land use development within the sea level rise inundation zone. In most cases, regional strategies that aim to protect large developed areas will be the most effective at protecting the impacted development, but successful implementation of regional adaptation strategies requires participation by other agencies and stakeholders.

This EIR includes a range of adaptation strategies to guide local jurisdictions, regional agencies, and transportation agencies in identifying strategies that are appropriate for transportation and development projects that may be subjected to regular future inundation by sea level rise. However, this EIR does not include guidance on how to select an adaptation strategy from the range of options presented, as local jurisdictions and transportation agencies will consider feasibility during subsequent project-level planning.

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Adaptation Strategies

Each of the adaptation strategies presented below has the potential to reduce significant impacts to less than significant levels, although the ultimate outcome will depend on the vulnerability and risk of inundation associated with the specific project or development. Additional adaptation strategies not included within this list may also have the potential to reduce significant impacts. Many transportation and development projects will require a combination of several adaptation strategies. The selection of the appropriate adaptation strategy, or strategies, would be made during subsequent project-level analysis and planning. In many cases, particularly with respect to land use development projects, implementation of the selected adaptation strategies may require coordination and collaboration with multiple agencies and stakeholders.

Some adaptation strategies, particularly those involving the construction of new structures such as floodwalls, may have secondary environmental impacts and require their own CEQA evaluations. Therefore, adaptation strategies specific to transportation projects and land use development projects will be developed as part of subsequent project-level EIRs, and the adaptation measures themselves will be subject to separate CEQA/NEPA compliance.

Many of the adaptation strategies presented below can be applied to multiple asset types—for example, providing an alternative transportation mode would be an option for impacted local streets and roads, state highways and commuter rail. Therefore, the strategies are organized according to their outcome, specifically: protection, functional inundation, or inundation. For example, strategies such as relocating an asset or building a levee would protect an asset against inundation, while conducting partial/temporary closure or providing an alternative transportation mode would allow for the asset to function if inundated. Some strategies may result in a variety of outcomes, from protection to inundation, depending on the goals at hand, and so are included as a fourth category ("Strategies with a Range of Outcomes"). The suite of options discussed below includes adaptation that is both asset-specific (e.g., elevation of a single road segment) and that which applies to multiple assets (e.g., construction of a floodwall), along with structural and non-structural/policy strategies. While some strategies are specific to transportation or development assets (e.g., structures, infrastructure), others may apply to both. The applicability of each adaptation strategy is noted in parentheses at the end of each adaptation strategy definition.

Protection Strategies

This subset of adaptation strategies focuses on protecting transportation projects and land use development projects from the impacts of sea level rise through both structural and non-structural (policy) approaches. If implemented, the following strategies would help minimize or avoid the damage to transportation assets and new development expected to be regularly inundated by rising sea levels:

- **Update building/design codes:** Counties and communities should adopt updated building codes within their respective Building Ordinances that require transportation and development projects to consider sea level rise and include adaptation strategies. For example, the building codes can require the implementation of structural measures, such as improving drainage, or raising road surfaces or the first floor elevation of new structures (e.g., transit stations, residential buildings), or making any structures (e.g., rail and transit stations, residential buildings) more resilient to flooding through specific construction techniques and materials. (*Transportation projects, land use development projects*.)
- **Apply zoning restrictions in high-risk-areas:** Local jurisdictions should amend their zoning codes or create specific shoreline zoning ordinances to limit development (i.e., designate open space or low-density residential) or specify design requirements in areas subject to sea level rise. Overlay zoning districts that delineate areas with special characteristics (e.g., sea level rise or coastal storm surge inundation hazard) and apply additional regulations are another tool to guide development towards areas that are at low risk for sea level rise. (*Land use development projects*.)
- **Establish setbacks/buffers:** Minimum setbacks from the shoreline can limit development in areas at risk for sea level rise. Setbacks can be applied uniformly or vary with the scale of devel-

opment, increasing for larger developments to minimize the property and residents/employees placed at risk. In the case of sea level rise, setbacks and buffers guide development to lower-risk areas. Buffers also restrict development adjacent to sensitive natural areas, such as tidal wetlands. In areas with tidal wetlands, buffers can preserve the storm surge and wave dissipation properties of tidal wetlands while allowing wetlands and beaches room to migrate landward as sea levels rise. (*Transportation projects, land use development projects.*)

- **Implement conditional development in high-risk-areas:** Local jurisdictions can require that developers meet specific conditions to obtain a permit to develop in areas at risk for sea level rise. Such conditions include building design that is flood proof/resilient, raised foundations or first floor elevations, impact fees to fund emergency preparedness/response, buffers and other coastal protection measures, protection measures that have limited redirection of flood impact onto other adjacent areas, and the removal of structures as sea levels rise, among others. (*Land use development projects.)*
- **Encourage cluster development in low-risk areas:** This strategy involves the use of incentives (e.g., density bonuses, reduced development impact fees, tax incentives, streamlined permitting) to focus development in areas not expected to be regularly inundated by sea level rise. This will increase the density of development in areas not at risk for regular inundation, thereby decreasing the density of new development in high-risk areas. (*Land use development projects.*)
- **Transfer of development rights:** For this strategy, a local jurisdiction would create a voluntary program that allows property owners to transfer development rights from sensitive areas, such as those subject to sea level rise, to areas more appropriate for development. A property owner with development rights in an area likely to be inundated would sell the development rights to an owner or developer of a property in a low-risk area, increasing the density of development in lower-risk areas. As a result, less new development would be likely to occur in higher-risk areas. *(Land use development projects.)*
- **Create rolling easements:** Rolling easements establish a boundary from the shoreline that moves inland as sea levels rise, allowing wetlands and beaches to migrate inland. This strategy allows development along the coast but transfers the risk to property owners, requiring the removal of certain structures as the shoreline moves landward over time. Communication of risk is important for this strategy to be effective. Rolling easements may be appropriate where the restriction of development and the purchase of land by local governments are infeasible. (*Land use development projects.*)
- **Prioritize infrastructure investments in low-risk areas:** Local jurisdictions can guide new development away from areas at risk of inundation from sea level rise by prioritizing investments in supporting infrastructure (e.g., municipal sewer) in lower-risk areas. Transportation agencies can adopt a similar approach, focusing first on the planning and construction of new projects that are not subject to sea level rise. (*Transportation projects, land use development projects.)*
- **Incorporate open space into the urban fabric:** Designating low-lying areas as open space (e.g., parks, natural areas) can reduce the risk of sea level rise by restricting development in high-risk areas. Open space can be designed or allowed to be periodically inundated, such as during extreme tides (e.g., King Tides). *(Land use development projects.)*
- **Raise elevation:** This strategy involves elevating the surface or grade of new transportation or development projects (e.g., local road, railroad tracks, buildings, structures) above the expected

sea level rise inundation level. Consideration of changes to overland flow and increased flooding to adjacent areas would be applied to manage any potential negative impacts of this strategy. (*Transportation projects, land use development projects.*)

- **Elevate mechanical/electrical equipment:** Transportation assets, buildings and other infrastructure with mechanical and/or electrical equipment at grade may malfunction if inundated. This strategy involves elevating any critical components, such as switchgears or substations—for existing or planned assets—to ensure that they are above flood levels and not at risk of inundation from sea level rise. (*Transportation projects, land use development projects.*)
- **Relocate:** The movement of transportation assets, structures, and functions from areas subject to sea level rise to lower-risk areas may be a possible strategy. Relocation may occur before an asset experiences inundation, or it may be planned as a response to sea level rise. (*Transportation projects, land use development projects.*)
- **Build/raise levee (engineered flood protection):** Building a new levee or raising the elevation of existing levees is a form of engineered flood protection designed to protect inland areas from inundation and erosion resulting from sea level rise. Levees are earthen structures constructed with sloped sidewalls, where the base is wider than the top. The level of protection will depend on the height of the levee relative to existing conditions and the rate of sea level rise, as well as the condition of the levee. This strategy could be implemented at the local or regional level, the latter involving the collaboration of multiple local jurisdictions and/or transportation agencies. (*Transportation projects, land use development projects.*)
- **Construct floodwall (engineered flood protection):** Floodwalls are also a form of engineered flood protection; however, in contrast to levees, floodwalls are concrete or steel structures. Floodwalls are often built in lieu of or on top of levees, typically where space does not allow for a levee's broad base. As with levees, the construction of floodwalls could be implemented at the local or regional level. (*Transportation projects, land use development projects.*)
- **Create berm:** Berms are non-engineered earthen structures that provide protection from wave erosion and provide flood protection to inland development and infrastructure. Expansive networks of berms currently exist along the San Francisco Bay shoreline that protect marshes, ponds, and agricultural areas, and may provide multiple lines of flood defense for developed areas. However, because berms are not engineered and experience settlement, erosion, and failure, they are highly vulnerable to sea level rise and storm surge. The effectiveness of berms in providing protection from sea level rise and storm surge events may depend on regular and routine maintenance. (*Transportation projects, land use development projects.*)

Functional Inundation Strategies

The following strategies focus on physical and operational measures designed to allow transportation and land use development projects to continue functioning with sea level rise:

- **Increase maintenance at flooding hotspots:** Transportation and development assets that are allowed to flood frequently are likely to experience greater wear and tear and therefore, have greater maintenance needs. This strategy entails planning for an increased level and/or frequency of maintenance in targeted areas of transportation and development projects that are anticipated to flood regularly with sea level rise. (*Transportation projects, land use development projects.*)

- **Use corrosion-resistant materials:** Some materials are more resistant to the corrosive effects of saltwater, and incorporating them into certain parts of infrastructure that are likely to be permanently inundated, such as bridge touchdowns or building foundations, may prolong asset life. (*Transportation projects, land use development projects.*)
- **Retrofit/make waterproof:** Bridge tollbooths, ferry terminals, and other structures can be upgraded to withstand periodic inundation and continue to function, either in conjunction with sea level rise or following storm events. (*Transportation projects, land use development projects.*)

Inundation Strategies

The strategies below plan and allow for inundation, focusing on alternatives where assets experience flooding from sea level rise. These strategies are primarily aimed at transportation assets, although the implementation of partial or temporary closures may be adapted to address commercial development as well:

- **Provide alternative transportation mode:** Commuters and other passengers can be offered a different mode of transportation when assets experience flooding from sea level rise depending on the road, rail, BART, and ferry options available and appropriate. Providing alternatives for goods movement is considered less viable. This strategy may include the identification of emergency measures to maintain mobility and safety in the event that longer-term closures are needed to repair damage. *(Transportation projects.)*
- **Conduct partial or temporary closure:** The closure of part or all of a transportation asset is a management option, particularly during extreme events. The level of service required would determine the adequacy of this adaptation strategy, as it is unlikely that recurring closure would be acceptable for some assets. In the case of such closures, commuters and other passengers could use nearby assets (e.g., adjacent transit stations) or alternative transportation modes or routes; alternate routes for goods traffic are less likely to be readily available. *(Transportation projects.)*
- **Construct low-water crossings:** For roads likely to flood frequently from sea level rise or extreme tide levels such as King Tides, this strategy offers an alternative to raising road elevations. Low-water crossings allow vehicles to travel safely over a waterway during low tide or normal flow conditions, either via a bridge or causeway under dry conditions; however, under extreme high tide or high flow conditions, vehicles may either travel safely over the crossing with "wet wheels," or the crossing may be closed to traffic if inundation exceeds a certain depth. The creation of low-water crossings acknowledges access limitations due to frequent inundation, and the crossings can be designed to avoid blocking drainage pathways. This strategy is most appropriate for local streets and roads with low traffic volumes and likely requires the availability of alternative routes or transportation modes, as low-water crossings can effectively close affected roadways. *(Transportation projects.)*
- **Develop emergency management plan:** An emergency management plan can designate alternative transportation modes or routes for use during periodic inundation associated with extreme coastal flood events. This plan may be coupled with a community's Hazard Mitigation Plan. *(Transportation projects.)*

Strategies with a Range of Outcomes

The specific outcome of the following strategies, in terms of their respective abilities to mitigate the impacts of sea level rise, depends on the specific goals of the local jurisdiction, transportation agencies, or other implementing entity, as well as asset- and site-specific conditions. The outcome could range from protection to inundation:

- **Revise planning guidance/policy:** The review and revision of existing guidance and policies on sea level rise and flood management for specific assets can facilitate proactive planning and adaptation. The incorporation of sea level rise into general and specific plans is a tool for local jurisdictions to address the impacts of sea level rise comprehensively and devise the most appropriate strategies for adaptation over the long-term. Caltrans currently applies their internal guidance on incorporating sea level rise when planning new transportation projects, pursuant to requirements for state agencies. Other agencies charged with implementing transportation projects can adopt a similar approach. *(Transportation projects, land use development projects.)*
- **Form multi-jurisdictional partnerships:** Partnerships between cities, regional entities, federal and state agencies, transportation providers, ports, and others may lead to the development of regional strategies that address sea level rise impacts for multiple transportation and/or development projects. Such partnerships may also facilitate cost-sharing or implementation of structural and/or policy solutions needed to address vulnerabilities and risks to sea level rise. In some cases, existing partnerships could expand their focus to address adaptation solutions in conjunction with other planning activities. MTC and ABAG have been partnering with BCDC, and other local, state, and federal agencies and stakeholders on the Adapting to Rising Tides Project focused in Alameda County. This effort can serve as an example for continued and expanded partnerships in other counties, or as the foundation for the development of regional partnerships in coordination with the Joint Policy Committee. *(Transportation projects, land use development projects.)*
- **Create a comprehensive sea level rise plan:** For local jurisdictions and/or transportation agencies likely to experience sea level rise impacts for multiple assets, the creation of a plan that assesses risk and vulnerability and develops appropriate adaptation strategies represents a comprehensive, proactive approach. Comprehensive sea level rise plans can also be created at the regional level for multiple jurisdictions or partnerships, which may facilitate creative solutions and cost-sharing for any new investments. MTC, ABAG and BCDC, through the Joint Policy Committee, along with other agencies and stakeholders, collaborated on the Adapting to Rising Tides Project focused in Alameda County, which can be used as an example plan for other counties, or as the foundation for the development of a wider-scale regional plan, potentially. *(Transportation projects, land use development projects.)*
- **Create or update hazard mitigation plans:** Mitigation plans identify policies and actions that can be implemented over the long term to minimize risk and the loss of life and property. The Federal Emergency Management Agency (FEMA) requires a hazard mitigation plan as a condition for granting non-emergency funds to a local jurisdiction. In 2010, ABAG adopted the Multi-Jurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area, an update of its 2005 plan. ABAG's plan includes references to sea level rise hazards. Hazard mitigation plans incorporate a range of hazards and can be created or updated to include sea level rise; such plans may be prepared by individual or multiple local jurisdictions (cities and counties). For hazard mitigation plans to be effective, they must be regularly updated and approved. *(Land use development projects.)*

- **Create/restore/enhance wetlands:** Tidal wetlands can mitigate the impacts of sea level rise by serving as open space buffers that restrict development in high-risk areas and by helping to dissipate storm surge and wave energy associated with storm events. The creation of a sediment management program that considers wetland processes such as vertical accretion, as well as planning for wetland transgression or migration, is one example of a way in which local jurisdictions and/or transportation agencies can support the creation, restoration, or enhancement of wetlands. This strategy is most appropriate where shoreline and/or flood protection structures (e.g., bulkheads, floodwalls) do not impede the migration of wetlands to higher ground as sea levels rise. *(Transportation projects, land use development projects.)*
- **Beach nourishment:** The ongoing replenishment of sand from off-site locations can preserve beaches—both natural and artificial—that are subject to erosion and land loss from rising sea levels. This form of soft shoreline protection can maintain a barrier between rising sea levels and transportation and development. In addition to inundation, beach nourishment can protect against storm surge by dissipating wave energy *(Transportation projects, land use development projects.)*
- **Construct shoreline armoring (engineered shore protection):** Revetment and bulkheads are forms of engineered shoreline protection structures that harden the shoreline to reduce erosion and prevent land loss. However, these structures alone do not provide flood protection, and sea level rise, coupled with storm surge, can compromise their functionality and stability. *(Transportation projects, land use development projects.)*
- **Improve drainage:** A number of structural strategies can be employed to facilitate drainage and mitigate the impacts of temporary inundation associated with extreme tide events and storm surge on transportation assets, structures, and infrastructure. The inclusion of more under-drains and/or cross-drains in new roadways could improve the drainage of transportation projects. For development, the installation of backflow/flex valves and/or construction of perimeter wall or piling/column foundations could reduce the impacts of inundation on structures and infrastructure. *(Transportation projects, land use development projects.)*
- **Build causeway:** Causeways represent an alternative for roads or rail tracks likely to be regularly inundated, as they typically traverse open water or wetlands on elevated embankment. While some causeways are designed to avoid all inundation, others may function only at low tide. *(Transportation projects.)*

Shoreline Types

Both the asset type (e.g., rail, transit, residential development, commercial development) and shoreline type (e.g., berms, wetlands) play a role in project-level adaptation planning. For example, enhancing wetlands would not likely be appropriate where flood and shoreline protection structures are present. The following tables illustrate asset and shoreline types by county for transportation projects that fall within the sea level rise inundation zones (**Table 2.5-22**) and low-lying hydraulically disconnected zones by asset type and primary shoreline type (**Table 2.5-23**). Although still important considerations, it is more difficult to assign specific shoreline types to PDAs and TPPs, which are not linear features. Other components that will be important to consider in determining the feasibility of adaptation strategies for specific assets include exposure, sensitivity, adaptive capacity, consequence, overtopping potential, and shoreline system—these elements would be covered under subsequent project-level planning and are not addressed in this EIR.

TABLE 2.5-22: ASSET TYPES AND SHORELINE TYPES OF PROPOSED TRANSPORTATION PROJECTS WITHIN SEA LEVEL RISE INUNDATION ZONE

County	*Engineered shore protection structures*[1]	*Engineered flood protection structures*[2]	*Berms*	*Wetlands*	*Natural Shoreline*
Marin					
Interstate and State Highways[3]			X	X	
Bicycle and Pedestrian				X	
Alameda					
Interstate and State Highways			X	X	
Rail			X	X	
Transit	X				
San Mateo					
Interstate and State Highways		X			
Local Streets and Roads[4]		X			
Transit			X	X	
Bicycle and Pedestrian	X				
Santa Clara					
Interstate and State Highways		X	X	X	
Multi County					
Interstate and State Highways	X		X	X	X
Rail					X

Notes:
1. "Engineered shore protection structures" refers to bulkheads and revetments.
2. "Engineered flood protection structures" refers to levees and flood walls.
3. Interstate and State Highways includes toll bridges.
4. Local Streets and Roads includes arterials and collectors.

TABLE 2.5-23: ASSET TYPES AND SHORELINE TYPES OF PROPOSED TRANSPORTATION PROJECTS WITHIN LOW-LYING HYDRAULICALLY DISCONNECTED ZONE

County	*Engineered shore protection structures*[1]	*Engineered flood protection structures*[2]	*Berms*	*Wetlands*	*Natural Shoreline*
San Francisco					
Local Streets and Roads[3]	X				
Transit	X				
Alameda					
Rail			X	X	
Transit	X	X			
San Mateo					
Interstate and State Highways[4]		X			
Local Streets and Roads	X				
Bicycle and Pedestrian	X		X	X	
Santa Clara					
Interstate and State Highways		X	X	X	
Rail			X	X	
Multi County					
Interstate and State Highways	X		X		
Rail	X		X	X	

Notes:
1. "Engineered shore protection structures" refers to bulkheads and revetments.
2. "Engineered flood protection structures" refers to levees and flood walls.
3. Local Streets and Roads includes arterials and collectors.
4. Interstate and State Highways includes toll bridges.

2.6 Noise

This section assesses the potential noise/vibration impacts associated with implementation of the proposed Plan. The following includes acoustical terminology and background information relevant to the proposed Plan, a presentation of applicable regulatory standards, assessment of acoustical impacts related to implementation of the proposed Plan, and identification of potentially feasible noise mitigation measures where appropriate.

Environmental Setting

PHYSICAL SETTING

Acoustical Terminology

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as unwanted sound (i.e., loud, unexpected, or annoying sound). Acoustics is defined as the physics of sound. In acoustics, the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. Acoustics addresses primarily the propagation and control of sound.

Frequency

The number of sound pressure peaks travelling past a given point in a single second is referred to as the frequency, expressed in cycles per second or Hertz (Hz). A given sound may consist of energy at a single frequency (pure tone) or in many frequencies over a broad frequency range (or band). Human hearing is generally affected by sound frequencies between 20 Hz and 20,000 Hz. (20 kHz).

Amplitude

The amplitude of pressure waves generated by a sound source determines the perceived loudness of that source. Sound pressure amplitude is measured in micro-Pascals (μPa). One μPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 μPa to 100,000,000 μPa. Because of this huge range of values, sound is rarely expressed in terms of pressure. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of human hearing (near total silence) is approximately 0 dB which corresponds to 20 μPa.

Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic means. Under the decibel scale, a doubling of sound energy corresponds to a 3 dB increase. In other words, when two sources are each producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dB higher than one of the sources under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB—rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level of approximately 5 dB louder than one source, and 10 sources of equal loudness together produce a sound level of approximately 10 dB louder than the single source.

A-Weighted Decibels

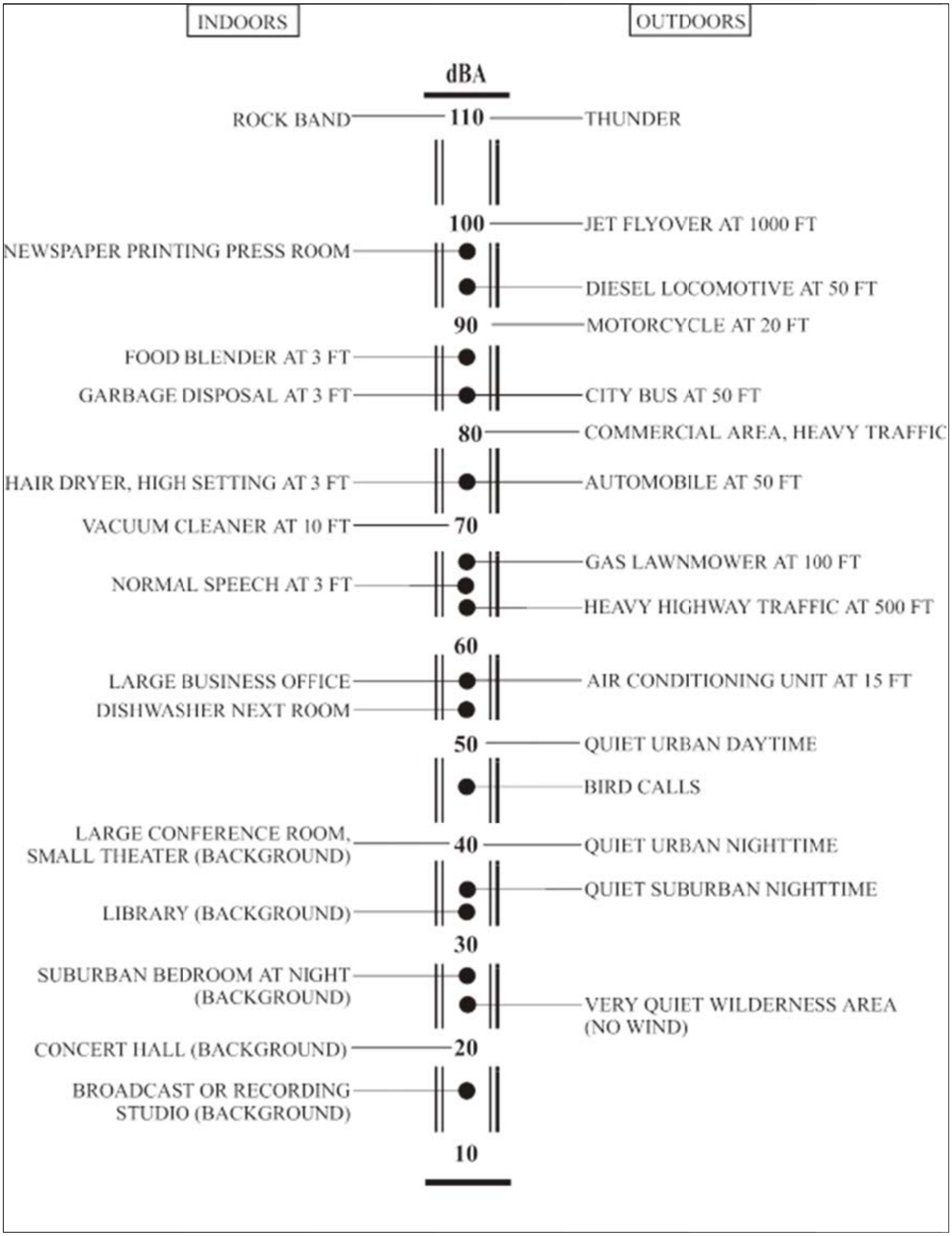
Figure 2.6-1 illustrates sound levels associated with common sound sources. The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental sound levels, perception of loudness is relatively predictable, and can be approximated by frequency filtering using the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard descriptor for environmental noise assessment. All noise levels reported in this section are in terms of A-weighting.

HUMAN RESPONSE TO CHANGES IN NOISE LEVELS

As discussed above, doubling sound energy results in a 3 dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different than what is measured.

Under controlled conditions in a laboratory setting, the trained, healthy human ear is able to discern 1 dB changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency range (1,000 Hz–8,000 Hz). In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy that would result in a 3 dB increase in sound pressure level would generally be perceived as barely detectable. Please refer to **Table 2.6-1.**

Figure 2.6-1: Decibel Scale and Common Noise Sources



Source: Caltrans TeNS, 2009.

TABLE 2.6-1: APPROXIMATE RELATIONSHIP BETWEEN INCREASES IN ENVIRONMENTAL NOISE LEVEL AND HUMAN PERCEPTION

Noise level increase, dB	*Human perception (typical)*
Up to about 3	Not perceptible
About 3	Barely perceptible
About 6	Distinctly noticeable
About 10	Twice as loud
About 20	Four times as loud

Source: Egan, D. (1988). Architectural acoustics. New York: McGraw-Hill.

NOISE SENSITIVE LAND USES

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Noise-sensitive land uses typically include residences, hospitals, schools, transient lodging, libraries, and certain types of recreational uses. Noise-sensitive, residential receivers are found throughout the study area.

NOISE DESCRIPTORS

Noise in our daily environments fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in environmental noise analysis, and may be applicable to this study:

- **Equivalent Sound Level (L_{eq}):** The L_{eq} represents an average of the sound energy occurring over a specified time period. In effect, the L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour, A-weighted equivalent sound level (L_{eq}[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period, and is the basis for noise abatement criteria (NAC) used by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA).
- **Percentile-Exceeded Sound Level (L_n):** The L_n represents the sound level exceeded "n" percentage of a specified period (e.g., L_{10} is the sound level exceeded 10 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time).
- **Maximum Sound Level (L_{max}):** The L_{max} is the highest instantaneous sound level measured during a specified period.
- **Day-Night Average Level (L_{dn}):** The L_{dn} is the energy-average of A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during nighttime hours (10 p.m.-7 a.m.). The L_{dn} is often noted as the DNL.
- **Community Noise Equivalent Level (CNEL):** Similar to L_{dn}, CNEL is the energy-average of the A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during the nighttime hours (10 p.m.-7 a.m.), and a 5 dB penalty

applied to the A-weighted sound levels occurring during evening hours (7 p.m.-10 p.m.). The CNEL is usually within 1 dB of the L_{dn}, and for all intents and purposes, the two are interchangeable. As it is easier to compute, and of more common use, the L_{dn} is used as the long-term noise measure in this study.

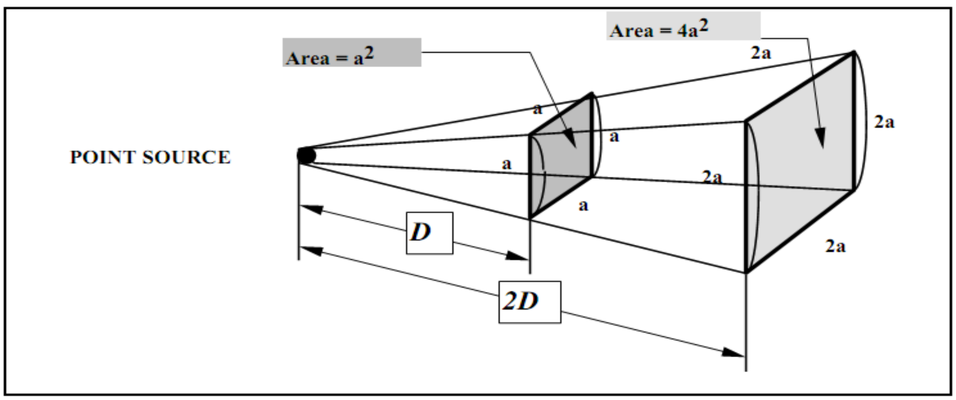
SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors:

Geometric Spreading

Sound from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern; therefore, this type of propagation is called *spherical spreading*. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point/stationary source as its energy is continuously spread out over a spherical surface (see **Figure 2.6-2**).

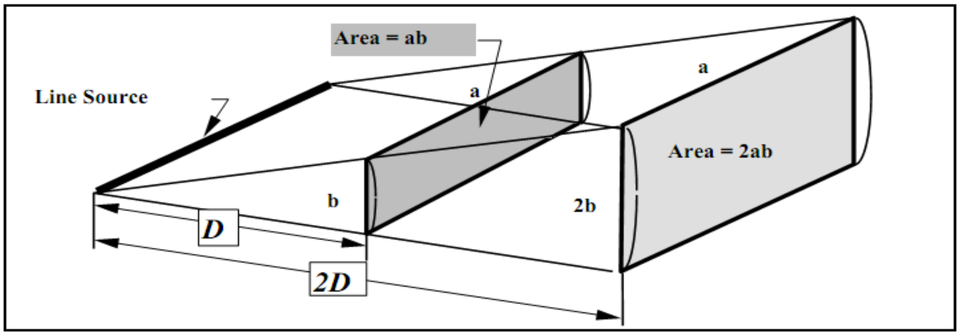
Figure 2.6-2: Point Source Spreading with Distance



Source: Caltrans TeNS, 2009.

Roadways and highways, and to some extent, moving trains, consist of several localized noise sources on a defined path, and hence are treated as "line" sources, which approximate the effect of several point sources (see **Figure 2.6-3**). Noise from a line source propagates over a cylindrical surface, often referred to as *cylindrical spreading*. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. Therefore, noise due to a line source attenuates less with distance than that of a point source with increased distance.

Figure 2.6-3: Line Source Spreading with Distance



Source: Caltrans TeNS, 2009.

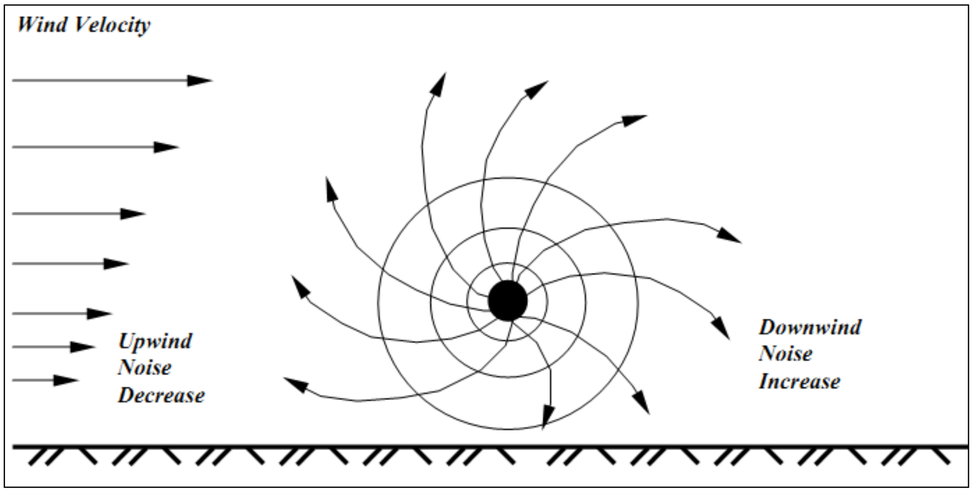
Ground Absorption

The propagation path of noise from many typical sources such as roadways to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a paved parking lot or body of water,), no excess ground attenuation is generally assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is typically assumed. When added to cylindrical spreading from traffic noise sources, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance. When added to spherical spreading (point sources), it results in overall drop-off rates of approximately 7.5 dB. These approximations are generally only applicable for receivers within 300 feet of the noise source(s), and should not be applied to sound path lengths of more than 300 feet.

Atmospheric Effects

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas receivers upwind from the source can have lowered noise levels. This is illustrated in **Figure 2.6-4**.

Figure 2.6-4: Wind Effects on Noise Levels

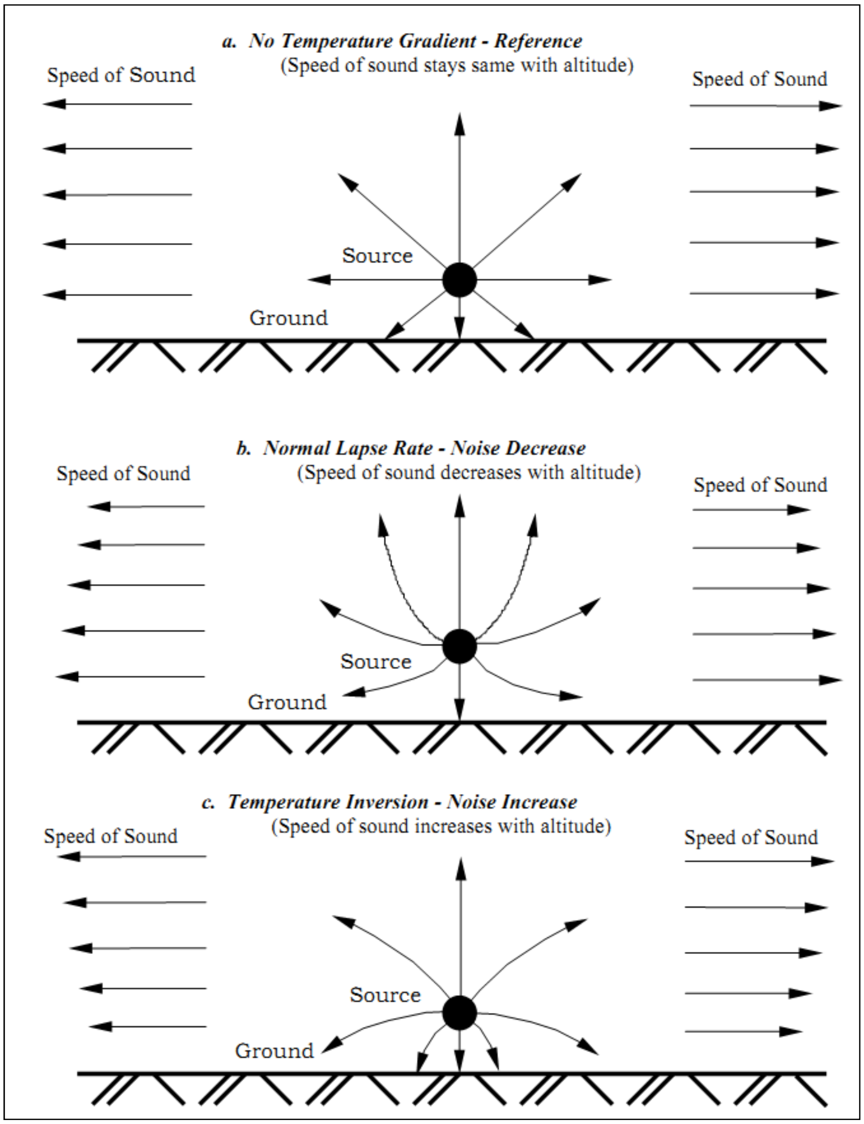


Source: Caltrans TeNS, 2009.

In addition to the enhancing effect produced by wind, sound levels can increase at large distances from the source (e.g., more than 500 feet) due to atmospheric temperature inversions (i.e., increasing temperature with elevation) or can decrease with distance from the source at a higher rate than the typical spreading loss with distance rate (see above) due to a temperature lapse condition (i.e., decreasing temperature with elevation).

Temperature inversions are a common part of the meteorological environment in California. During a temperature inversion the air temperature at the ground is cooler than that several hundred feet above the ground. These temperature inversions are typically caused when a warm, sunny day is followed by a cold, clear night; generally this occurs more frequently and with higher intensity in the fall and the spring seasons. The sun warms the earth surface during the day and generally the air temperature near the ground is higher than the air temperature at higher elevations, but when the sun sets, the earth cools quickly by infrared radiation into space and so does the air mass at lower elevations, so that the temperature of air at high elevations soon becomes warmer than that of the air near the ground. The speed of sound is higher in warmer air, and this inverted temperature profile causes the sound waves in the warmer air to overtake those travelling in cooler air, thus the sound "bends" back toward the ground (see **Figure 2.6-5**).

Figure 2.6-5: Effects of Temperature Gradients on Noise



Source: Caltrans TeNS, 2009.

Other factors such as air temperature, humidity, and turbulence can also have significant effects on sound propagation. For instance, air temperature and humidity have a significant effect on the rate of molecular absorption as sound travels large distances. A sound consisting primarily of middle frequencies such as speech or animal vocalization attenuates approximately five additional decibels for every 1,000 feet of travel with an air temperature of 70 degrees Fahrenheit and a humidity of 30 to 40 percent. This atmospheric effect is in addition to the other effects discussed above.

VIBRATION

Generally speaking, vibration is energy transmitted in waves through the ground. These energy waves dissipate with distance from the vibration source. Because energy is lost during the transfer of energy from one particle to another, the vibratory energy is reduced with increasing distance from the source. Vibration attenuates at a rate of approximately 50 percent for each doubling of distance from the source. This approach only takes into consideration the attenuation from geometric spreading. Since there are additional factors that reduce vibration over distance (e.g., damping from soil condition), this approach tends to provide for a conservative assessment of vibration level at the receiver.

Vibration is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration. Vibration is typically described by its peak amplitude and its root-mean-square (RMS) amplitude. The RMS value can be considered an average value over a given time interval. The peak vibration velocity is the same as the "peak particle velocity" (PPV), generally presented in units of inches/second (in/sec). Peak particle velocity is defined as the maximum instantaneous positive or negative peak of the vibration signal, and PPV is generally used to assess the potential for damage to buildings and structures. The RMS amplitude is typically used for assessing human annoyance to vibration.

PHYSICAL SETTING

The existing noise environment in the Bay Area is comprised of two primary categories of noise sources: transportation and non-transportation. Transportation sources include surface vehicle traffic; railroad train operations, including light rail and commuter trains; and aircraft operations. Non-transportation, or stationary/fixed sources include commercial/industrial equipment, construction equipment, and any other sources not associated with the transportation of people or goods. Existing noise exposure in the Bay Area associated with these primary noise sources is presented below.

Traffic Noise Sources

The ambient noise environment in the Bay Area is defined by a wide variety of noise sources, none more pervasive than traffic. Traffic noise exposure is primarily a function of the volume of vehicles per day, the speed of those vehicles, the number of those vehicles represented by medium and heavy trucks, the distribution of those vehicles during daytime and nighttime hours, and the proximity of noise-sensitive receivers to the roadway. Existing traffic noise exposure is expected to be as low as 50 dB L_{dn} in the most isolated and less frequented locations of the Bay Area, while receivers neighboring area interstates are likely to experience levels as high as 75 dB L_{dn} (FTA Guidance Manual, 2006). Bus transit can also make a meaningful contribution to roadway noise levels. In San Francisco, a large portion of the transit bus fleet is electrified and, consequently, the contribution of bus transit to localized roadway noise levels is decreased. Traffic noise assessment in this analysis is inclusive of bus transit, as buses are an assumed percentage of overall roadway volumes used in the calculation of roadside noise levels.

Rail Noise Sources

The Bay Area is also presently affected by noise from freight and passenger rail operations. While these operations generate significant noise levels in the immediate vicinity of the railways, train operations are intermittent and area railways are widely dispersed. Commuter rail such as SF MUNI and VTA operate with more frequency than standard gauge rail operations but lower speeds resulting in lower noise levels. BART operations, on the other hand, can attain higher speeds and have the potential for greater noise levels along extended stretches. The contribution of rail noise to the overall ambient noise environment in the Bay Area is relatively minor compared to other sources such as traffic. Train operations may be a source of significant groundborne vibration near the tracks. Vibration sensitive receivers within 100 feet of rail operations may be adversely affected by vibration exposure during train events.

Aircraft Noise Sources

The Bay Area is home to many airports—including public use, private use, and military facilities. Major airports include San Francisco International, Oakland International and Norman Y. Mineta San José International. In addition to the numerous daily aircraft operations originating and terminating at these facilities, aircraft not utilizing these airports frequently fly over the Bay Area. All of these operations contribute to the overall ambient noise environment. In general, like rail noise, the proximity of the receiver to the airport and aircraft flight path determines the noise exposure. Other contributing factors include the type of aircraft operated, altitude of the aircraft, and atmospheric conditions. Atmospheric conditions may contribute to the direction of aircraft operations (flow) and affect aircraft noise propagation.

Construction Noise Sources

New development and implementation of transportation improvements will necessarily include construction activities that create relatively short-term noise exposure. Noise production from construction equipment varies greatly depending on factors such as operation being performed and equipment type, model, age, and condition. Noise associated with heavy equipment diesel engine operations often dominates the noise environment in the vicinity of construction sites. Stationary sources such as generators, pumps, and compressors may also produce a significant contribution. However, if present, operations from impact equipment (e.g., pile driving, pavement breaking) will generally produce the highest noise levels, and may also produce significant vibration in the vicinity. Maximum noise exposure from typical construction equipment operations is approximately 75-100 dB (L_{max} at 50 feet) with noise from heavy demolition and pile driving operations having the highest noise production. Please refer to **Table 2.6-2** for typical construction noise levels.

TABLE 2.6-2: TYPICAL NOISE LEVELS FROM DEMOLITION/ CONSTRUCTION EQUIPMENT OPERATIONS

Construction Equipment	*Noise Exposure Level, dB L_{max} at 50 Feet*
Air Compressor	78-81
Backhoe	78-80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82-83
Concrete Mixer (Truck)	79-85
Concrete Pump (Truck)	81-82
Concrete Vibrator	76-80
Crane	81-88
Dozer	82-85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88-89
Loader	79-85
Paver	77-89
Pile Driver (Impact)	101
Pneumatic Tool	85
Pump	76-81
Rail Saw	90
Rock Drill	81-98
Roller	74-80
Saw	76
Scarifier	83-90
Scraper	84-89
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Heavy Diesel Truck	88

Sources: FTA Guidance Manual (Chapter 12), FHWA RCNM V.1.00.

Industry and Other Non-Transportation Noise Sources

A wide variety of industrial and other non-transportation noise sources are located within the Bay Area. These include manufacturing plants, landfills, treatment plants (e.g., water), power generation facilities, food packaging plants, lumber mills, and aggregate mining facilities, just to name a few. Noise generated by these sources varies widely, but in many cases may be a significant if not dominant contributor to the noise environment.

REGULATORY SETTING

Federal Regulations

United State Department of Transportation (USDOT)

The USDOT is composed of several agencies that have the primary responsibilities of keeping the traveling public safe, increasing their mobility, and having our transportation systems contribute to the economic growth of the nation. The USDOT agencies with established acoustical criteria appropriate for this study include the FHWA, the Federal Transit Administration (FTA), the Federal Aviation Administration (FAA), and the Federal Rail Administration (FRA).

Title 23, Part 772 of the Code of Federal Regulation (23 CFR 772) (FHWA)

Title 23, Part 772 of the Code of Federal Regulation (23 CFR 772) is the federal regulation governing traffic noise impact. A federal or federally-funded project would have a traffic noise impact if it involves the construction of a new highway, or includes substantial modification of an existing highway, where the project would result in a substantial operational noise increase, or where the predicted operational noise level approaches or exceeds the FHWA Noise Abatement Criteria (NAC). In this case, a "substantial increase" is not defined by the FHWA, but is generally defined by the state and/or local governing agencies. The noise level is defined as "approaching" the NAC if it is within 1 dB of the applicable criterion. **Table 2.6-3** summarizes the FHWA NAC as presented in the USDOT/FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance document.

Title 14, Part 36 of the Code of Federal Regulation (14 CFR 36) (FAA)

Aircraft operated in the United States are subject to federal requirements for noise emissions levels. The requirements are set forth in Title 14, Part 36 of the Code of Federal Regulation (14 CFR 36), which establishes maximum acceptable noise levels for specific aircraft types, considering model year, aircraft weight, and number of engines.

The FAA Part 150 program encourages airports to prepare noise exposure maps that show land uses that are incompatible with high noise levels (FICON, 1992). The program proposes measures to reduce any incompatibility. With an FAA Part 150 program approved, airport projects such as land acquisition, residential/school sound insulation, etc. become eligible for federal Airport Improvement Program (AIP) funding.

TABLE 2.6-3: SUMMARY OF FHWA NOISE ABATEMENT CRITERIA

Activity Category	*NAC, Hourly-Average Noise Level (L_{eq}[h], dBA)*	*Description of Activities*
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72 Exterior	Developed lands, properties, or activities not included in categories A or B above
D	--	Undeveloped lands
E	52 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: USDOT/FHWA, 1995.

FTA

Transit Operations Noise

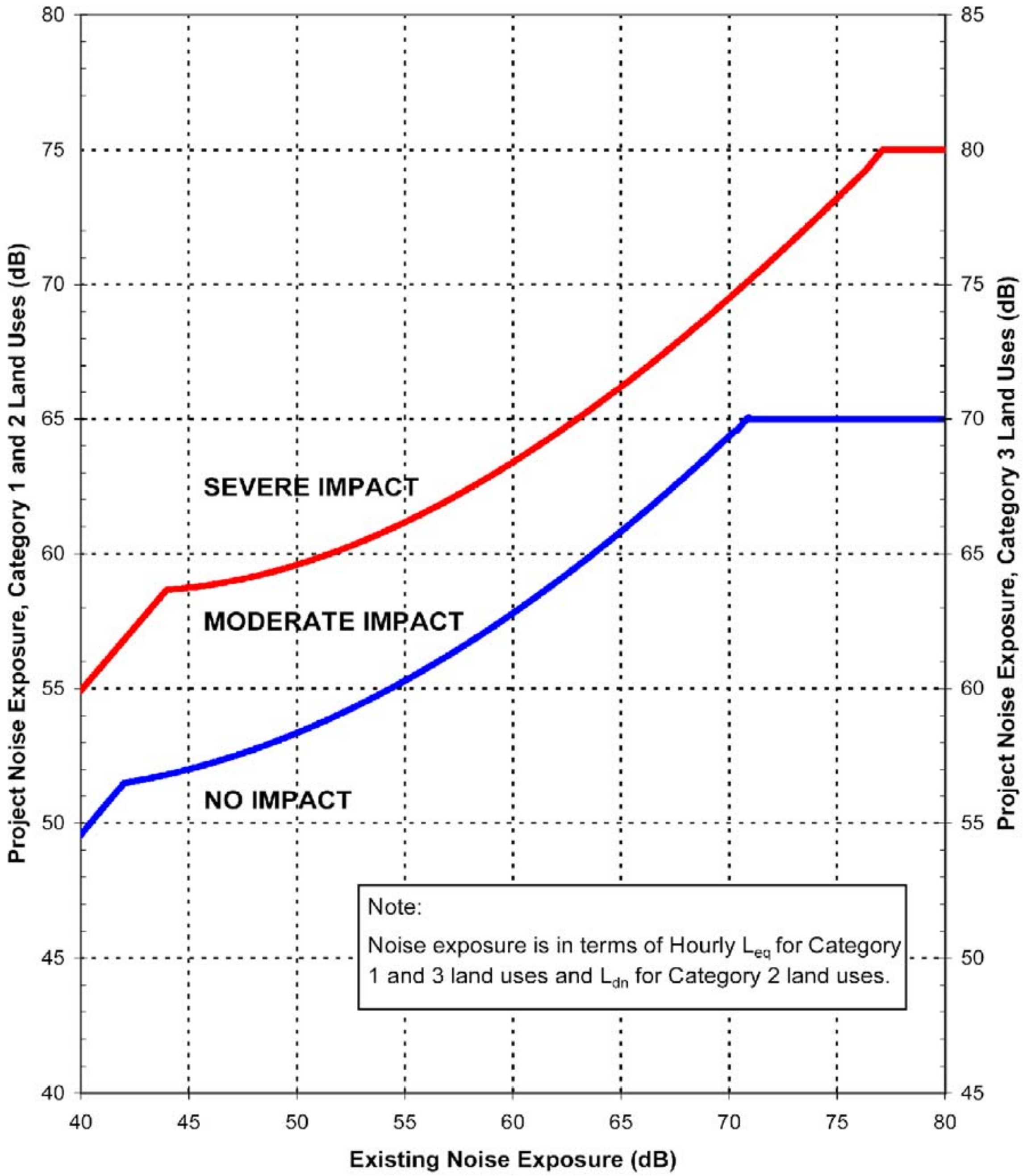
The FTA offers regulations regarding noise exposure associated with federally funded transit projects. "Moderate impact" and "severe impact" criteria are established based on the existing ambient noise environment and the noise sensitivity of the receiving land use. Three categories of land use are established for the impact analysis.

- Category 1: Includes lands set aside for serenity and quiet or for outdoors performing arts entertainment (e.g., national historic landmarks, outdoor amphitheaters).
- Category 2: Residences and buildings where people normally sleep (e.g., homes, hospitals, hotels).
- Category 3: Institutional land with primary daytime and/or evening use (e.g., schools, libraries, churches, medical offices, theaters, parks).

Figure 2.6-6 is a graphical representation of the FTA noise impact criteria. Please note that Categories 1 and 3 apply the L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity. Category 2 applies the L_{dn} since these receivers may be impacted by nighttime (10 p.m.-7 a.m.) transit-related events.

Subjectively, a "moderate impact" is generally noticeable to most people but may not be sufficient to cause strong, adverse reactions from the community. A "severe impact" would likely produce a high percentage of highly annoyed people in the community.

Figure 2.6-6: FTA Noise Impact Criteria



Transit Operations Vibration

The FTA offers regulations regarding vibration exposure associated with federally funded transit projects. Three categories of land use are established for the impact analysis.

- Category 1: Buildings where vibration would interfere with interior operations.
- Category 2: Residences and buildings where people normally sleep (e.g., homes, hospitals, hotels).
- Category 3: Institutional land with primary daytime and/or evening use (e.g., schools, libraries, churches, medical offices, theaters, parks).

Table 2.6-4 summarizes the FTA vibration impact criteria.

TABLE 2.6-4: FTA GROUND-BORNE VIBRATION (GVB) IMPACT CRITERIA FOR GENERAL ASSESSMENT

	GBV Impact Levels (VdB re 1 micro-inch /sec)		
Land Use Category	*Frequent Event[1]*	*Occasional Events[2]*	*Infrequent Events[3]*
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB	65 VdB	65 VdB
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Notes:

1. "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
2. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.
3. "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.
4. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

Source: FTA Guidance Manual, May 2006.

Construction Noise

In addition to transit operations noise, the FTA offers guidance with respect to the evaluation of transit construction noise exposure. Like the operational noise criteria, construction noise criteria should consider the existing (ambient) noise environment. Additionally, construction noise exposure should consider the duration of construction activities and the receiving land use (i.e., sensitivity of receiver). The FTA construction noise guidelines are summarized in **Table 2.6-5.**

TABLE 2.6-5: SUMMARY OF FTA CONSTRUCTION NOISE CRITERIA (GUIDELINES)

Impacted Land Use Type	*Hourly L_{eq}, dBA*		*8-Hour L_{eq}, dBA*	
	Daytime (7 a.m.-10 p.m.)	*Nighttime (10 p.m.-7 a.m.)*	*Daytime (7 a.m.-10 p.m.)*	*Nighttime (10 p.m.-7 a.m.)*
Residential	90	80	80	70
Commercial	100	100	85	85
Industrial	100	100	90	90

Note: In urban areas with very high ambient noise levels, construction noise should not exceed ambient plus 10 dB.

Source: FTA, 2006.

Construction Vibration

The FTA has published guidance relative to impacts from vibration exposure. The FTA has established a general impact criterion of 0.5 in/sec peak particle velocity (PPV). Structural damage to buildings would not be expected below this value. It is expected that regularly experienced vibration levels of 80 VdB (0.01 in/sec PPV) or higher may create an annoyance response from human receivers, and may be considered a nuisance.

State Regulations

California Department of Transportation (Caltrans)

Traffic Operations Noise

The California Department of Transportation Traffic Noise Analysis Protocol (Protocol) establishes the policies and procedures to be used in the assessment of traffic noise exposure and impact for new construction and reconstruction projects. The NAC in the Protocol are the same as those presented in 23 CFR 772 (see USDOT/FHWA information above). The Protocol defines a substantial project-related traffic noise level increase when the project's worst-case hour exceeds the ambient worst-case hour by 12 dB or more.

Rail Operations Noise

Caltrans endorses the use of the FTA noise criteria and methodologies for assessing project-related rail noise and vibration impacts.

Construction Noise

As presented in the Protocol, Section 14-8.2, Noise Control, Caltrans standard specifications establishes a construction noise exposure/production limit of 86 dB (L_{max}) at a distance of 50 feet. Additionally, this specification establishes that all internal combustion engines should be equipped with manufacturer-recommended mufflers, and that no internal combustion engines may be operated without mufflers.

California Code of Regulations (CCR)

Aircraft Operations

The California Airport Noise Standards, Title 21, Section 5000 et seq. of the California Code of Regulations (CCR) apply to any airport that is deemed to have a "noise problem" as established by the local County Board of Supervisors in accordance with the provisions in the regulation. Currently, within the Bay Area, Norman Y. Mineta-San José International Airport and San Francisco International Airport have been given this designation. The Standards establish a noise exposure limit "acceptable to a reasonable person residing in the vicinity of an airport" of 65 dB CNEL.

Noise Insulation Standard

The California Noise Insulation Standards found in CCR, Title 24 establish requirements for new multi-family residential units, hotels, and motels that may be subject to relatively high levels of transportation noise. In this case, the noise insulation criterion is 45 dB L_{dn}/CNEL inside noise-sensitive spaces. For developments with exterior transportation noise exposure exceeding 60 dB L_{dn}/CNEL, an acoustical analysis and mitigation (if required) must be provided showing compliance with the 45 dB L_{dn}/CNEL interior noise exposure limit.

Local Plans and Policies

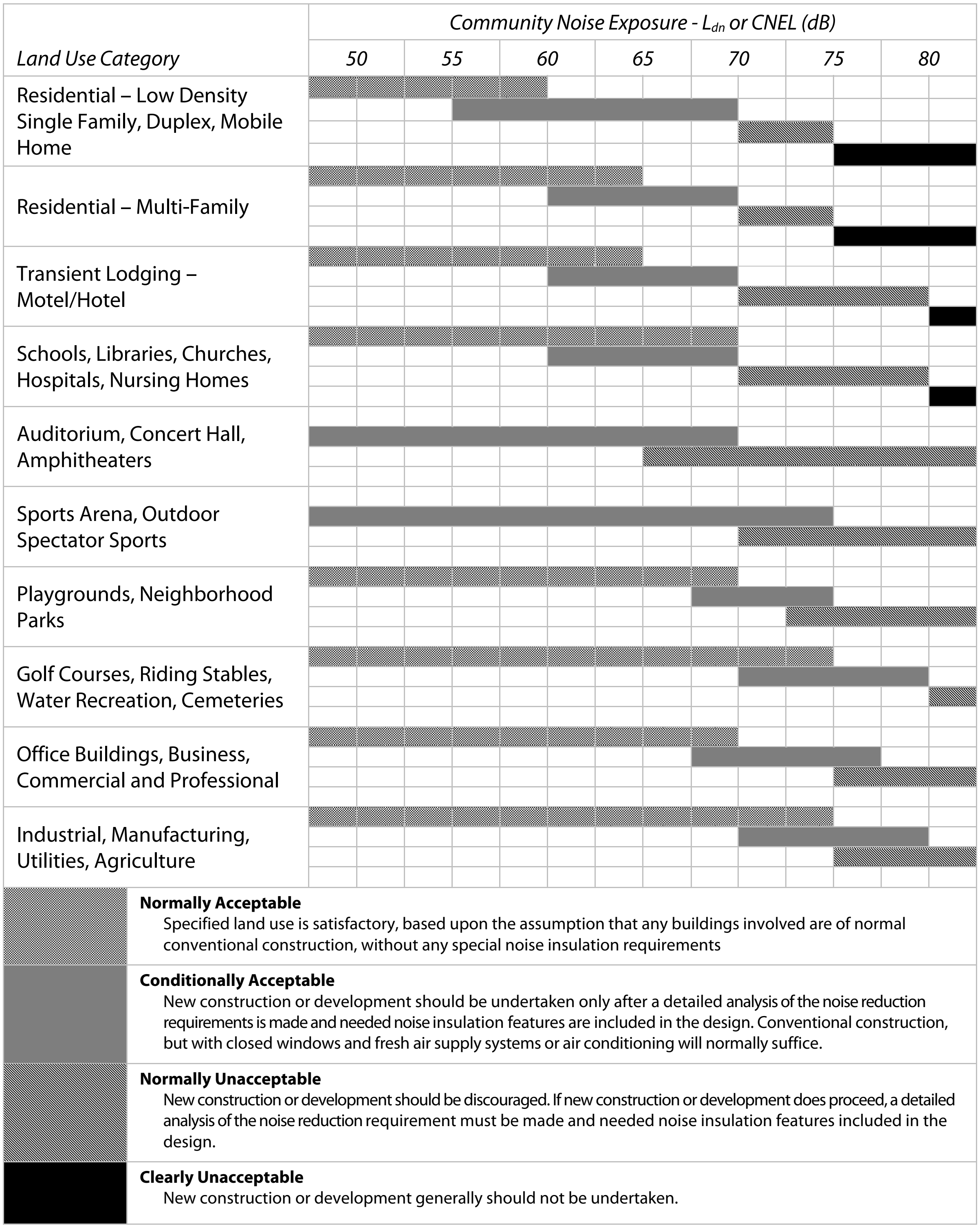
General Plan Noise Elements

Cities and counties within the Bay Area adopt a noise element as part of their general plans to identify, assess, and provide mitigation for noise problems within their communities. The noise element typically assesses current and projected future noise levels associated with local noise sources, including, but not limited to, traffic, trains, aircraft, and industrial operations. Local jurisdictions may adopt their own noise exposure goals and policies, which may or may not be the same or similar to those recommended by the State.

Typical noise/land use compatibility guidelines are presented in **Figure 2.6-7**. In general, noise-sensitive land uses are compatible with exterior transportation-related noise exposure not exceeding 65 dB L_{dn}/CNEL. Additionally, interior noise exposure (from transportation sources) should not exceed 45 dB L_{dn}/CNEL within noise-sensitive spaces. As implied by the name, the standards within the noise element of locally adopted general plans are for planning purposes, and are not generally intended to address noise complaints or other code compliance issues.

Cities and counties often provide noise level performance standards for non-transportation noise sources (e.g., commercial/industrial facilities, mechanical equipment). These standards are used to address intermittent noise exposure, and are often in terms of the hourly average noise level (L_{eq}) or maximum noise level (L_{max}). These criteria are generally tied directly to the standards presented in the city/county municipal code (i.e., noise ordinance).

Figure 2.6-7: Typical Noise/Land Use Compatibility Criteria



Source: State of California, Governor's Office of Planning and Research, 2003. *General Plan Guidelines.*

Municipal Codes

In addition to general plan noise element goals and policies, local jurisdictions often regulate noise exposure through enforcement of a noise ordinance. The noise code is generally applied to address noise complaints associated with non-transportation sources (e.g., public address systems, mechanical equipment), and may also address construction noise exposure/production limits. Noise exposure criteria presented within municipal codes should match performance criteria presented in the noise element of the general plan for the given jurisdiction.

Impact Analysis

SPECIFIC IMPACT SIGNIFICANCE CRITERIA

Implementation of the proposed Plan would have a potentially significant adverse impact if it would:

Criterion 1: Result in exposure of persons to or generation of temporary construction noise levels and/or groundborne vibration levels in excess of standards established in the applicable local general plan or noise ordinance standards. Where local jurisdiction standards are not presented, it is assumed that the proposed construction noise and vibration limits established by the FTA would apply (see Regulatory section above).

Criterion 2: Result in highway noise levels that approach or exceed the FHWA Noise Abatement Criteria.

Criterion 3: Result in transit noise level increases at existing noise-sensitive uses in excess of the FTA noise impact criteria. Please refer to **Figure 2.6-6**.

Criterion 4: Result in transit vibration in excess of the FTA guidance criteria. See **Table 2.6-4** for the applicable criteria. For vibration levels already exceeding the FTA thresholds (without the proposed Plan), a Plan-related increase in vibration level of 3 VdB would be considered significant.

Criterion 5: Where an airport land use plan is adopted or, where such a plan has not been adopted, within two miles of a public airport or public use airport, result in exposure of people residing or working in the planning area to excessive noise levels**.**

METHOD OF ANALYSIS

The method for the program-level analysis of noise impacts is described below. For all components of the analysis, it is expected that some project-specific noise and/or acoustical analyses may be required as part of the environmental review prior to project approval by the appropriate lead agency.

Regional Growth/Land Use Changes

Development projects implemented under the proposed Plan would generate noise during construction and operation. Additionally, residential and mixed-use development would potentially be constructed adjacent to high volume transportation corridors or other uses that might be incompatible with respect to noise (e.g., industrial/commercial facilities). The following analysis addresses these potential noise impacts qualitatively at a program level.

Transportation Network

Traffic

For this noise analysis, the FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108) combined with traffic volume and speed information provided by MTC were used to calculate traffic noise exposure in terms of the L_{dn} for identified roadway segments within the planning area. The assessed roadways do not include every roadway in the area; rather, they represent what are assumed to be the roadway segments most affected by the proposed Plan and consist of freeways, expressways and arterial roadways in the planning area. The initial traffic noise modeling for the proposed Plan does not account for the noise attenuation provided by existing noise barriers. Where such barriers exist, a 6 dB noise level reduction can be assumed at receivers along those roadway segments. To evaluate the proposed Plan, the base year (2010) condition was compared with the 2040 Plan scenario. The analysis reports the potential for absolute noise impacts. Following guidance published by Caltrans and the FHWA, a roadway noise impact is determined to occur if projected noise levels approach the NAC for noise sensitive land uses presented in **Table 2.6-3**. The NAC includes several categories of activities based on their sensitivity to increased noise and sets an hourly-average noise level for each group of activities that would be considered acceptable. Caltrans uses an approach criterion of 1 dBA, whereby a traffic noise impact is considered to occur if roadside noise approaches to within 1 dBA of the NAC. Therefore this analysis applies 66 dBA as the threshold for whether highway noise levels would result in a significant impact. This is 1 dBA below the FHWA threshold of 67 dBA for Activity Group B, which includes picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals, and thereby encompasses virtually all the relevant and sensitive land uses that are near roadways in the Bay Area. The analysis estimates the number of roadway miles under each scenario where noise levels would be equal to or greater than 66 dBA at a distance of 100 feet from the centerline of the roadway.

Rail Transit Operations

Where substantial rail operations increases are proposed in the proposed Plan, the FTA Transit Noise and Vibration Impact Assessment threshold was used to assess the potential for rail-related noise and vibration exposure at acoustically sensitive receivers. Generally there is insufficient data available (e.g., the increase in the number of additional hourly train pass-by events) to provide a quantitative analysis, therefore a qualitative analysis was undertaken, applying mitigation in the form of performance standards to maintain noise and vibration levels below FTA thresholds.

Construction

Development projects and transportation network improvement projects implemented under the proposed Plan would be expected to generate short term noise and vibration level increases during construction. These levels may be substantially higher than existing ambient noise levels or exceed the applicable local construction noise criteria or FTA criteria, adversely affecting acoustically sensitive receivers in the vicinity. Since detailed operations information on specific construction projects is not known at this time, the following analysis addresses these potential noise impacts in a qualitative fashion (program level analysis).

SUMMARY OF IMPACTS

Implementation of transportation improvements in the proposed Plan could result in both short- and long-term impacts on noise levels in the Planning Area. The analysis herein uses a horizon year of 2040 and includes region-wide vehicle miles travelled assumptions and therefore represents a cumulative analysis. Land use development under the proposed Plan would generate short-term noise during construction and long-term noise during operation. Region-wide vehicle miles travelled assumptions used in this analysis include trips generated by land use development projects. Additionally, residential and mixed-use development would potentially be constructed adjacent to high volume transportation corridors which could have adverse impacts to these uses.

Short Term Impacts

Many of the transportation improvements in the proposed Plan would entail construction, often using heavy equipment. Depending on the proximity of such activities to noise sensitive uses and the presence of intervening barriers, construction activities associated with individual projects could generate localized, short term noise impacts from excavation, grading, hauling, concrete pumping, and a variety of other activities requiring the operation of heavy equipment. Land use development projects implemented under the proposed Plan would also entail construction with heavy equipment which, depending on the proximity of such activities to noise sensitive uses, could generate localized, short term noise impacts. In these cases, construction of individual projects could cause exposure of persons to or generation of noise levels in excess of standards established in the applicable local general plan or noise ordinance standards.

Long Term Impacts

Numerous proposed Plan projects have been identified as having potentially significant operational local noise impacts on sensitive land uses, either from vehicle or rail travel. Direct impacts could result from new transit lines or increased frequency of service on existing lines (noise and groundborne vibration); widening of freeways, expressways, or arterials which brings noise closer to sensitive land uses; or addition of new lanes that result in higher traffic volumes and speeds. Land use development projects implemented under the proposed Plan would locate sensitive receptors in close proximity to transportation noise sources such as major arterial roadways and rail transit alignments.

IMPACTS AND MITIGATION MEASURES

Impact

2.6-1 Implementation of the proposed Plan could result in exposure of persons to or generation of temporary construction noise levels and/or groundborne vibration levels in excess of standards established by local jurisdictions or transportation agencies.

Impacts of Land Use Projects

Regional Effects

Although some development would occur outside Priority Development Areas (PDAs), the proposed Plan envisions future residential and job growth primarily within PDAs where transit infrastructure either exists or is planned. As such, implementation of the proposed Plan would result in a concentration of development within identified PDAs that are existing infill development areas. Resulting construction activities associated with development of new residences and commercial and retail land uses would have the potential to temporarily affect nearby sensitive receivers such as existing residences, schools and nursing homes.

From a regional perspective, temporary construction noise and vibration within these PDAs would occur in urban or suburban areas where ambient noise and vibration levels are already affected by roadway traffic and transit sources and would therefore be less noticeable to receivers than if these activities were to occur on the edges of existing development areas or near Priority Conservation Areas (PCAs). As such, separation of PDAs from PCAs represents one method of assessing the potential for regional construction noise and vibration impacts.

Review of the maps of PDAs and PCAs in Appendix C of the *Jobs-Housing Connection Strategy* reveals that, generally, buffers are maintained between PDAs and PCAs. San Francisco and Marin County are two places, however, where this is not the case. In San Francisco, two PCAs are identified within the "urban neighborhood" designation. However, the San Francisco PCAs are City parks that are located adjacent to U.S. Highway 101 or near the Caltrain tracks and therefore are located within an urban area where ambient noise and vibration levels are already affected by roadway traffic and transit sources; as a result, temporary construction noise would not be considered significant from a regional perspective. See Impact 2.6-2 for assessment of roadside noise levels from traffic increases.

The southernmost PDA in Marin County is designated as a *Transit Neighborhood* PDA and has two designated PCAs adjacent or proximate to it. However, both PCAs are proximate to U.S. 101 and subject to existing traffic noise. As a transit neighborhood near Highway 101 and its associated vehicle noise, the PDA is identified in the proposed Plan as appropriate for residential development (low-rise apartments, condominiums, and town homes). Development of this type would be unlikely to involve pile driving or other high impact noise and vibration generating equipment, since these construction activities are generally associated with high-rise development. Consequently, implementation of existing construction noise standards should be sufficient to reduce the potential impact of construction noise to a level that is less than significant (LS). In the absence of pile driving or other high impact equipment, construction-related vibration impacts would also be less than significant at the regional level (LS).

Localized Effects

Construction standards generally limit construction activities to times when construction noise would have the least effect on adjacent land uses, and would require such measures as properly muffling equipment noise, locating equipment as far from sensitive receptors as possible, and turning off equipment when not in use. Some jurisdictions may also have property line or other noise level limits that must be adhered to during construction. Development under the proposed Plan would range from high intensity regional center development of high and midrise offices and residences in San Francisco, Oakland and San José to low-rise development in rural towns such as Sebastopol and Graton. Consequently, depending on the extent of construction activities involved, localized construction-related noise effects may be significant or minor.

Construction activities with the potential for resulting in significant construction-related noise or vibration impacts would be those for which pile driving or other similar invasive foundation work would be required. Generally, these types of construction activities are associated with high-rise development, which the proposed Plan envisions to occur within the "Regional Center" areas of downtown San Francisco, Oakland and San José.

Two of these cities have robust noise ordinances that contain either property line performance standards on construction equipment relative to land use and time of day (Oakland Planning Code Section 17.130.050) or identify performance noise standards for construction equipment at a specific distance (Article 29 of the San Francisco Police Code). The City of San José restricts construction-related activities to certain hours of the day (City of San José Municipal Code Section 20.100.450).

The City of San Francisco's standards specifically exempt pile driving and other impact equipment. Pile driving, which has been documented to generate noise levels in excess of 100 decibels (dBA) at 50 feet could potentially result in significant noise impacts regardless of existing noise ordinance standards. Because the potential exists for development with Regional Center areas to require pile driving adjacent (within 200 feet) to other buildings that may be occupied by residents or other sensitive receptors, construction noise impacts in excess of 90 dBA within these areas are identified as potentially significant (PS) and mitigation is required. Mitigation Measures 2.6(a), 2.6(b), and 2.6(c) are described below.

Neither San Francisco, Oakland nor San José has developed any quantitative standards with regard to vibration. Construction-related vibration impacts from pile driving are generally assessed in environmental review documents by applying the methodology of the Federal Transit Administration which includes standards for structural damage as well as for human annoyance.

Pile driving can result in peak particle velocities (PPV) of up to 1.5 inches per second (in/sec) at a distance of 25 feet (FTA, 2006), but typically average about 0.644 PPV. The Caltrans measure of the threshold of architectural damage for conventional sensitive structures is 0.5 in/sec PPV for new residential structures and modern commercial buildings and 0.25 in/sec PPV for historic and older buildings. Therefore, the potential exists for pile driving to occur within 50 feet of a historic building, resulting in a potential significant vibration impact related to structural damage and mitigation measures are recommended.

Vibration levels can also result in interference or annoyance impacts for residences or other land uses where people sleep, such as hotels and hospitals. FTA vibration annoyance potential criteria depend on the frequency of the events. When vibration events occur more than 70 times per day, as would be the case with pile driving, they are considered "frequent events." Frequent events in excess of 72 VdB are considered to result in a significant vibration impact. Consequently, there would be a potentially significant (PS) vibration annoyance impact if pile driving were to occur within 300 feet of a sensitive receptor and mitigation measures are required. Mitigation Measures 2.6(a), 2.6(b), and 2.6(c) are described below.

Impacts of Transportation Projects

Regional Effects

Construction related noise and vibration impacts of transportation projects, similar to development projects, would depend on the extent of construction being undertaken. Construction activities with the potential for resulting in significant construction-related noise or vibration impacts would be those for which pile driving or other similar invasive foundation work would be required. Generally speaking these types of construction activities are associated with construction of elevated freeways, flyovers, overpasses or other structures requiring substantial structural support.

There are over 200 regional transportation projects identified for the Bay Area region as a whole. Of these projects, several would require pile driving or other similar invasive foundation work such as:

- Golden Gate Bridge seismic retrofit;
- Construction of the Transbay Transit Center and Caltrain Extension;
- Implement Sonoma-Marin Area Rail Transit District (SMART) Commuter Rail;
- Improve ferry facilities/equipment including the Downtown San Francisco Ferry Terminal and procuring additional spare ferry vessel; and
- Implement Presidio Parkway Project.

Many of these regional projects have undergone individual CEQA and/or NEPA review for construction noise impacts and are already being implemented/constructed. Construction noise impacts for these projects are generally determined to be less than significant (LS) with the implementation of mitigation measures in recognition of the temporary nature of construction activities. Mitigation Measures 2.6(a), 2.6(b), and 2.6(c) are described below.

Construction-related vibration impacts are localized in nature and dependant on local soil conditions and the proximity to residential receptors. Consequently, construction-related vibration is not an impact readily assessed at the regional level and is considered herein as a localized effect below.

Localized Effects

Localized transportation projects are proposed throughout the Bay Area and, like the regional projects discussed above, would have the potential for localized noise and vibration impacts, particularly when pile driving or other similar invasive foundation work would be required. Construction noise mitigation normally required by Caltrans' Standard Specifications and Standard Special Provisions[1] as well as local city and county ordinances would be implemented for individual transportation projects that include physical construction activities. Standards generally limit construction activities to times when construction noise would have the least effect on adjacent land uses, and would require such measures as properly muffling equipment noise, locating equipment as far from sensitive receptors as possible, and turning off equipment when not in use. Some jurisdictions may also have property line or other noise level limits that must be adhered to during construction.

It is not expected that these standards would eliminate all construction-related noise, since complete mitigation may not be possible for certain projects, such as those that require pile driving and those in close proximity to sensitive receptors; nonetheless, implementation of existing construction noise standards and identified mitigation measures below should be sufficient to reduce the potential impact of construction noise to a level that is less than significant for standard construction techniques. However,

[1] California Department of Transportation (Caltrans), Technical Noise Supplement, 2009.

recognizing that projects requiring pile driving can generate noise levels above 100 dBA at 50 feet and that the best mitigation measures available can only result in relatively modest reductions, this impact is identified as potentially significant (PS). Mitigation Measures 2.6(a), 2.6(b), and 2.6(c) are described below.

Combined Effects

It is unlikely that both construction of a development project and construction of a transportation project under the proposed Plan would occur adjacent to one another and simultaneously. However, if this were to occur, nearby sensitive receptors would be exposed to an increased intensity of construction-related noise. In acoustical theory, a doubling of sound energy results in an increase of 3 dBA. Consequently, while two adjacent construction projects would combine to increase the resultant noise level, this combined increase would be no more than 3 dBA above the noise generated by a single project and hence would not be perceptible compared to the initial increase over ambient generated by a single construction project. However, since localized effects are identified as potentially significant for both land use projects and transportation project the combined affect is also identified as potentially significant (PS). Mitigation Measures 2.6(a), 2.6(b), and 2.6(c) are described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.6(a) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Implementing agencies shall require one or more of the following set of noise attenuation measures under the supervision of a qualified acoustical consultant:

- Restricting construction activities to permitted hours as defined under local jurisdiction regulations (e.g.; Alameda County Code restricts construction noise to between 7:00 am and 7:00 pm on weekdays and between 8:00 am and 5:00 pm on weekend);
- Properly maintaining construction equipment and outfitting construction equipment with the best available noise suppression devices (e.g. mufflers, silencers, wraps);
- Prohibiting idling of construction equipment for extended periods of time in the vicinity of sensitive receptors;
- Locating stationary equipment such as generators, compressors, rock crushers, and cement mixers as far from sensitive receptors as possible;
- Erecting temporary plywood noise barriers around the construction site when adjacent occupied sensitive land uses are present within 75 feet;
- Implementing "quiet" pile-driving technology (such as pre-drilling of piles and the use of more than one pile driver to shorten the total pile driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions;
- Using noise control blankets on building structures as buildings are erected to reduce noise emission from the site; and
- Using cushion blocks to dampen impact noise from pile driving.

2.6(b) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following vibration attenuation measures under the supervision of a qualified acoustical consultant if pile-driving and/or other potential vibration-generating construction activities are to occur within 60 feet of a historic structure.

- The project sponsors shall engage a qualified geotechnical engineer and qualified historic preservation professional and/or structural engineer to conduct a pre-construction assessment of existing subsurface conditions and the structural integrity of nearby (within 60 feet) historic structures subject to pile-driving activity. If recommended by the pre-construction assessment, for structures or facilities within 60 feet of pile-driving activities, the project sponsors shall require groundborne vibration monitoring of nearby historic structures. Such methods and technologies shall be based on the specific conditions at the construction site such as, but not limited to, the pre-construction surveying of potentially affected historic structures and underpinning of foundations of potentially affected structures, as necessary.
- The pre-construction assessment shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of pile-driving activities and identify corrective measures to be taken should monitored vibration levels indicate the potential for building damage. In the event of unacceptable ground movement with the potential to cause structural damage, all impact work shall cease and corrective measures shall be implemented to minimize the risk to the subject, or adjacent, historic structure.

2.6(c) To mitigate pile-driving vibration impacts related to human annoyance, the implementing agency shall require project sponsors to implement Mitigation Measure 2.6(a) above where feasible based on project- and site-specific considerations.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.6-2 Implementation of the proposed Plan could result in increased traffic volumes that could result in roadside noise levels that approach or exceed the FHWA Noise Abatement Criteria.

Impacts of Land Use and Transportation Projects

The proposed Plan envisions a mixture of development projects throughout the Bay Area region, primarily in PDAs. Land use development projects generate new vehicle trips and the proposed Plan has identified its PDAs near existing and planned transit corridors to reduce vehicle trip generation and reduce vehicle miles travelled throughout the region compared to development on the periphery of existing developed areas. As stated in *Chapter 2.1: Transportation*, the relative improvements under the proposed Plan are largely a result of proposed investments in transit operations and expansion, as well as a supportive land use pattern that better focuses growth in higher-density locations near transit services. Notwithstanding this reduction of vehicle trips compared to conventional development strategies, increased freeway volumes would result from implementation of development projects.

Transportation projects would also affect the distribution of vehicle travel throughout the region. Year 2040 project scenario traffic data includes both development projects and transportation projects. Consequently, with respect to the potential for an increase in regional freeways approaching or exceeding the 67 DNL Noise Abatement Criteria of the FHWA, this impact assessment includes implementation of both development and transportation projects envisioned under the proposed Plan.

Both development and transportation projects could also result in increases or redistribution of traffic on local expressways and arterial roadways that could change roadside noise levels.

Table 2.6-6 identifies the total roadway miles of potentially affected roadways (freeways, expressways, and arterials) that would result in noise levels exceeding 66 dBA for each county and the Bay Area as a whole at the 2040 plan horizon, compared to existing noise levels. The proposed Plan roadway miles are inclusive of both VMT increases due to development from implementation of the proposed Plan region-wide as well as distribution changes resulting from implementation of transportation projects. Additionally, these roadway miles are inclusive of on-road transit modes (buses).

The majority (94.3 percent) of all freeway miles on the modeled roadway network already exceed 66 dBA under existing conditions for the region as a whole. This percentage increases by 5.2 percent under 2040 conditions with implementation of the proposed Plan. Relative to existing conditions, roadway noise levels along arterials would be most affected by implementation of the proposed Plan. For the region as a whole, the proposed Plan would increase by 12.6 percent the arterial roadway miles that approach or exceed the FHWA Noise Abatement Criteria. The percentage of expressways that meet the 66 dBA criterion would also increase under the proposed Plan. For the region as a whole, the proposed Plan would increase by 1.7 percent the expressway miles that approach or exceed the FHWA Noise Abatement Criteria.

Increases in freeway and expressway miles approaching the FHWA Noise Abatement Criteria over the existing conditions will result from the proposed Plan, and this change would represent a potentially significant noise impact. Project sponsors are required to review and consider local land use policies (including noise ordinances and policies) in preparation of their project applications, and local governments are responsible for long-term land use planning related to noise issues and considering the appropriate location of sensitive receptors in relation to existing transportation corridors (the Noise Element described in the regulatory setting). Further, the State of California has Noise Insulation Standards in place to regulate new residential development. However, despite these sources of oversight and regulation, there is still the potential that the program of projects in the proposed Plan could create a significant change in the noise environment compared to existing conditions, particularly for uses that are already nearby roadways and not insulated sufficiently to address the new level of noise. As a result, this impact is considered potentially significant (PS). Mitigation Measure 2.6(d) is described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.6(d) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Adjustments to proposed roadway or transit alignments to reduce noise levels in noise sensitive areas. For example, below-grade roadway alignments can effectively reduce noise levels in nearby areas.
- Techniques such as landscaped berms, dense plantings, reduced-noise paving materials, and traffic calming measures in the design of their transportation improvements.
- Contributing to the insulation of buildings or construction of noise barriers around sensitive receptor properties adjacent to the transportation improvement;
- Use land use planning measures, such as zoning, restrictions on development, site design, and buffers to ensure that future development is noise compatible with adjacent transportation facilities and land uses;
- Construct roadways so that they are depressed below-grade of the existing sensitive land uses to create an effective barrier between new roadway lanes, roadways, rail lines, transit centers, park-n-ride lots, and other new noise generating facilities; and
- Maximize the distance between noise-sensitive land uses and new noise-generating facilities and transportation systems.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

TABLE 2.6-6 NOISE LEVELS BY ROADWAY TYPE (ROADWAY MILES)

County	Roadway Type	2010			Year 2040, Plan			Net Change From 2010		
		# ≥ 66 dBA	Total	% ≥ 66 dBA	# ≥ 66 dBA	Total	% ≥ 66 dBA	# ≥ 66 dBA	Total	% ≥ 66 dBA
San Francisco	Freeway	43	43	99.7%	43	43	100.0%	0	0	0.0%
	Expressway	2	2	100.0%	2	2	100.0%	0	0	0.0%
	Arterial	140	315	44.3%	183	315	58.3%	43	0	14.0%
San Mateo	Freeway	158	165	95.8%	157	165	95.1%	1	0	-0.7%
	Expressway	31	33	95.8%	30	32	95.7%	-1	-1	-0.1%
	Arterial	125	441	28.3%	203	443	45.9%	78	2	17.6%
Santa Clara	Freeway	436	478	91.3%	574	575	99.8%	138	97	8.5%
	Expressway	224	277	80.7%	226	270	83.8%	2	-7	3.1%
	Arterial	402	1,160	34.7%	527	1,166	45.2%	125	6	10.5%
Alameda	Freeway	356	369	96.5%	440	441	99.9%	84	72	3.4%
	Expressway	37	40	92.5%	49	56	86.9%	12	16	-5.6%
	Arterial	364	904	40.3%	507	903	56.2%	143	-1	15.9%
Contra Costa	Freeway	250	264	94.7%	291	292	99.7%	41	28	5.0%
	Expressway	39	44	89.8%	58	64	90.5%	19	20	0.7%
	Arterial	219	805	27.2%	295	798	37.0%	76	-7	1.5%
Solano	Freeway	176	182	96.3%	282	282	100.0%	106	100	3.7%
	Expressway	55	65	85.5%	64	76	83.3%	9	11	-2.2%
	Arterial	64	457	14.0%	118	463	25.6%	54	6	11.6%
Napa	Freeway	24	24	100.0%	24	24	100.0%	0	0	0.0%
	Expressway	34	37	91.3%	37	37	100.0%	3	0	8.7%
	Arterial	38	114	33.6%	66	114	57.8%	28	0	24.2%
Sonoma	Freeway	114	159	90.4%	188	188	99.7%	74	29	9.3%
	Expressway	20	20	100.0%	20	20	100.0%	0	0	0.0%
	Arterial	146	591	24.8%	199	593	33.6%	53	2	8.8%

TABLE 2.6-6 NOISE LEVELS BY ROADWAY TYPE (ROADWAY MILES)

County	*Roadway Type*	*2010*			*Year 2040, Plan*			*Net Change From 2010*		
		# ≥ 66 dBA	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*
Marin	Freeway	101	105	96.2%	121	121	99.9%	20	16	3.7%
	Arterial	40	143	27.7%	67	146	45.5%	27	3	17.8%
Bay Area	Freeway	1,687	1,789	94.3%	2,119	2,131	99.5%	472	330	5.2%
	Expressway	442	517	85.5%	486	557	87.2%	44	40	1.7%
	Arterial	1,538	4,930	31.2%	2,165	4,939	43.8%	627	9	12.6%
	Combined	**3,667**	**7,236**	**50.7%**	**4,770**	**7,626**	**62.6%**	**1,103**	**390**	**11.9%**

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.6-3 Implementation of the proposed Plan could result in increased noise exposure from transit sources that exceed FTA exposure thresholds.

Impacts of Land Use Projects

Many of the development areas in the proposed Plan are purposely located along existing and planned transit corridors to help facilitate a reduction in vehicle miles travelled in the region. Locating residential land uses in proximity to transit could result in exposure of future residents to noise levels in excess of land use compatibility standards established in the local general plan. For example, there are PDAs identified within San Francisco, San Mateo and Santa Clara counties adjacent to the Caltrain alignment, while some PDAs in Alameda, Contra Costa and Solano counties are adjacent to Amtrak alignments.

The state General Plan Guidelines have established land use compatibility standards (presented in **Figure 2.6-7**) to address interior and exterior noise impacts on different land uses. For residential and commercial land uses, these are exterior noise standards that were developed to ensure that acceptable interior noise levels can be achieved with standard construction practices (normally acceptable) conditions). Other exposure categories would require additional insulating techniques beyond common code practices to achieve interior standards. In this way, exterior noise levels are also used as a tool to assess the acceptability of future interior noise levels for future land uses.

Noise monitoring conducted along the Caltrain alignment for proposed residential uses indicates exterior noise level of 71 DNL.[2] This degree of noise exposure is characterized as conditionally acceptable for residential land uses. Such development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design to achieve an interior noise level of 45 DNL, the standard established in the state General Plan Guidelines, as shown in **Figure 2.6-7**. Conventional construction, with the addition of closed windows and fresh air supply systems or air conditioning, will normally suffice for reducing impacts to acceptable levels in these locations. Further, development adjacent to transit lines would be most likely multi-family residential, and therefore, subject to noise insulation standards of Title 24 of the California Code or Regulations. These standards would ensure that multi-family residential land uses adjacent to transit would be constructed to maintain an acceptable interior noise level.

Construction methods and Title 24 requirements would address interior noise levels. However, exterior noise in common areas such as balconies would not be reduced by these methods. Consequently, mitigation measures are identified to reduce exterior noise exposure impacts in common areas.

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[2] Illingworth and Rodkin, *San Carlos Train Depot Site Noise and Vibration Assessment*, San Carlos CA, August 8, 2006.

Other existing (non-road) transit lines in the Bay Area (BART/VTA/MUNI) are electric-powered and therefore generate less noise than diesel locomotive operations along a heavy-rail alignment. Additionally, Caltrain is slated for an upgrade to electrically powered trains by 2019 which will reduce transit noise impacts along its corridor. However, California high speed rail will operate on a blended system with Caltrain by 2029 which could counteract any noise reduction benefits of electrification. Exterior noise exposure impacts from transit resulting from land use projects would be potentially significant (PS). Mitigation Measures 2.6(e), 2.6(f), and 2.6(g) are described below.

Impacts of Transportation Projects

Extension of rail transit service[3] to new areas of the Bay Area could result in exposure of existing sensitive land uses to noise levels in excess of standards developed by the FTA (see **Figure 2.6-6**). Such projects include:

- Third Street Light Rail line extension from north of King Street to Clay Street in Chinatown via a new Central Subway (San Francisco);
- Mission Bay Loop construction to connect the rail turnouts from the existing tracks on Third Street at 18th and 19th Streets with additional rail and overhead contact wire system on 18th, Illinois and 19th Street (San Francisco);
- MUNI T-Line extension from Bayshore/Sunnydale to Caltrain Bayshore Station (San Francisco);
- Light rail corridor extension into Parkmerced development project, add three new light rail stations and facilities, and add tail track and operator support facilities (San Francisco);
- Redwood City Street Car (Redwood City);
- Capitol Expressway light rail extension to Eastridge Transit Center - Phase II (San José);
- Light-rail transit extension from Winchester Station to Route 85 (Vasona Junction) (San José);
- Guadalupe Express light rail improvements (San José);
- Tasman Express Long T (includes double-tracking of a single-tracked light rail segment on the Mountain View line to facilitate the extra line of service) (San José);
- North First Street light rail speed Improvements (San José);
- Capitol Expressway Light Rail Extension - Phase I (includes sidewalk, landscape and street lights on both sides of the expressway from Capitol Avenue to Tully Road) (San José); and
- Sonoma-Marin Area Rail Transit District (SMART) Commuter Rail.

The degree of this potential impact would depend upon the type (diesel or electric powered) and frequency of rail pass-by events and the existing ambient noise level at the existing receptor. Some of the proposed transit extension projects have already undergone CEQA review for noise impacts. For example, the EIS/EIR for the extension of Third Street Light Rail in San Francisco (Central Subway)

[3] While there would also be projects that would increase or extend bus transit, buses are on-road travel and were included in the assessment of roadway noise in Impact 2.6-2.

determined that operational noise impacts of extending the light rail would be less than significant. The same is true for the Vasona Light Rail project in San José. These projects are located in urban areas that are relatively noise impacted by vehicle traffic. However, noise impacts of the Sonoma-Marin Area Rail Transit District (SMART) Commuter Rail transit project would be significant for train horn noise required at at-grade crossings.[4] Some of the above identified rail extension projects within the RTP would result in potentially significant (PS) impacts resulting from permanent increases in noise to existing sensitive receptors along the extended transit alignment that would require mitigation. Mitigation Measures 2.6(e), 2.6(f), and 2.6(g) are described below.

Heavy rail improvements could also include increasing the number of freight trains in the region. Because of the number of existing freight trains that use the existing heavy rail tracks, additional trains are not expected to increase daily noise along any given track by more than 3 dBA relative to baseline conditions and would be considered less than significant (LS).

Combined Effects

Both land use projects and transportation projects would have potentially significant impacts with regard to transit-related noise impacts on sensitive receptors. However, land use projects would be impacts to future sensitive receptors while transit projects would impact existing sensitive receptors. Consequently these two noise exposure impacts are not additive and the combined effects would be no different from the individual impacts addressed above. Mitigation Measures 2.6(e), 2.6(f), and 2.6(g) are described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.6(e) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. When finalizing a development project's site plan, the implementing agency shall require that project sponsors locate noise-sensitive outdoor use areas away from adjacent noise sources and shield noise-sensitive spaces with buildings or noise barriers whenever possible to reduce the potential significant impacts with regard to exterior noise exposure for new sensitive receptors.

2.6(f) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. When finalizing a land use development's site plan or a transportation project's design, the implementing agency shall ensure that sufficient setback between occupied structures and the railroad tracks is provided.

2.6(g) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Prior to project approval, the implementing agency for a transportation project shall ensure

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[4] Sonoma-Marin Area Rail Transit, Draft Environmental Impact Report, November 2005, http://www.sctainfo.org/pdf/smart/deir_ch3_7_noise.pdf

that the transportation project sponsor applies the following mitigation measures to achieve a site-specific exterior noise performance standard as indicated in **Figure 2.6-6** at sensitive land uses, as applicable for rail extension projects:

- Using sound reduction barriers such as landscaped berms and dense plantings;
- Locating rail extension below grade;
- Using methods to resilient damped wheels;
- Using vehicle skirts;
- Using under car acoustically absorptive material; and
- Installing sound insulation treatments for impacted structures.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels, such as where a new rail line or rail extension passes through a heavily developed residential neighborhood. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels, such as where a new rail line or rail extension passes through a heavily developed residential neighborhood. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Impact

2.6-4 Implementation of the proposed Plan could result in increased vibration exposure from transit sources that exceed FTA exposure thresholds.

Impacts of Land Use Projects

Many of development areas in the proposed Plan are purposely located along existing and planned transit corridors to help facilitate a reduction in vehicle miles travelled in the region. Locating residential land uses in proximity to transit could also result in exposure of the future residents to vibration levels in excess of standards established by the FTA (see **Table 2.6-4**). Unlike noise impacts from transportation which are assessed in terms of a long-term (24-hour) noise descriptor, vibration impacts are assessed relative to peak vibration levels. Again, the PDAs along the Caltrain corridor may be used as a worst-case example as the weight of diesel locomotives result in greater vibration generation than light-rail vehicles.[5] Vibration monitoring conducted along the Caltrain alignment indicates peak vibration levels of 79 to 89 Vdb at a distance of 25 feet from track, and 63 to 72 VdB at a distance of 40 feet.[6] Comparing these values to the FTA standards presented in **Table 2.6-4** indicates that a significant vibration impact could occur if residential land uses are located within 40 feet from Caltrain tracks and potentially as far as 65 feet. Consequently, land use projects would have a potentially significant (PS) impact with regard to vibration exposure and mitigation measures are identified. Mitigation Measures 2.6(h) and 2.6(i) are described below.

Impacts of Transportation Projects

Extension of rail transit service[7] to new areas of the Bay Area could result in exposure of existing sensitive land uses to vibration levels in excess of standards developed by the FTA (see **Table 2.6-4**). Such projects include:

- Third Street Light Rail line extension from north of King Street to Clay Street in Chinatown via a new Central Subway (San Francisco);
- Mission Bay Loop construction to connect the rail turnouts from the existing tracks on Third Street at 18th and 19th Streets with additional rail and overhead contact wire system on 18th, Illinois and 19th Street (San Francisco);
- MUNI T-Line extension from Bayshore/Sunnydale to Caltrain Bayshore Station (San Francisco);
- Light rail corridor extension into Parkmerced development project, add three new light rail stations and facilities, and add tail track and operator support facilities (San Francisco);
- Redwood City Street Car (Redwood City);
- Capitol Expressway light rail extension to Eastridge Transit Center - Phase II (San José);
- Light-rail transit extension from Winchester Station to Route 85 (Vasona Junction) (San José);
- Guadalupe Express light rail improvements (San José);
- Tasman Express Long T (includes double-tracking of a single-tracked light rail segment on the Mountain View line to facilitate the extra line of service) (San José);
- North First Street light rail speed Improvements (San José);
- Capitol Expressway Light Rail Extension - Phase I (includes sidewalk, landscape and street lights on both sides of the expressway from Capitol Avenue to Tully Road) (San José); and
- Sonoma-Marin Area Rail Transit District (SMART) Commuter Rail.

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5 Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment*, May 2006.

6 Illingworth and Rodkin, *San Carlos Train Depot Site Noise and Vibration Assessment*, San Carlos CA, August 8, 2006.

7 While there would also be projects that would increase or extend bus transit, buses are on-road travel and were included in the assessment of roadway noise in Impact 2.6-2.

The degree of this potential impact would depend upon the type (diesel or electric powered) and frequency of rail pass-by events and the existing soil conditions at the existing receptor. Some of the proposed transit extension projects have already undergone CEQA review for noise impacts. For example, the EIS/EIR for the extension of Third Street Light Rail in San Francisco (Central Subway) determined that the FTA vibration criteria of 72 VdB would be exceeded at one residential building and the FTA ground-borne noise criteria would be exceeded at two residential buildings on Third Street.[8] Mitigation measures were identified that included vibration propagation testing at these locations during final engineering to determine the predicted impacts and finalize the selection of mitigation measures of either: high resilience (soft) direct fixation fasteners for embedded track and in underground subway tunnels or ballast mats for ballast and tie track. Each of the above identified rail extension projects within the RTP could result in noise and vibration impacts requiring mitigation. Consequently, rail extension projects within the RTP would result in potentially significant (PS) impacts resulting from exposure of sensitive receptors to groundborne vibration along the extended transit alignments that would require mitigation.

Combined Effects

Both land use projects and transportation projects would have potential significant impacts with regard to transit-related vibration impacts on sensitive receptors. However, land use projects would be impacts to future sensitive receptors while transit projects would impact existing sensitive receptors. Consequently these two vibration exposure impacts are not additive and the combined effects would be no different from the individual impacts addressed above.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.6(h) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. When finalizing a development or transportation project's site plan, the implementing agency shall ensure that sufficient setback between occupied structures and the railroad tracks is provided. To meet the 72 VdB limit for the maximum measured train vibration level, residential buildings should be setback a minimum of 65 feet from the center of the nearest track. Alternatively, a reduced setback may be attainable if the project sponsor can demonstrate a project-specific vibration exposure meeting a performance standard of 72 VdB. Depending on specific project conditions, this standard may be attainable without additional mitigation measures or may require applied mitigation such as use of elastomeric pads in the building foundation.

2.6(i) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the

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[8] Federal Transit Administration, U.S. Department of Transportation, City and County of San Francisco, Planning Department, Final Supplemental Environmental Impact Statement/ Supplemental Environmental Impact Report, September 2008.

following. Prior to project approval the implementing shall ensure that project sponsors apply the following mitigation measures to achieve a vibration performance standard of 72 VdB at residential land uses, as feasible, for rail extension projects:

- Using high resilience (soft) direct fixation fasteners for embedded track; and
- Installing Ballast mat for ballast and tie track.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels, such as where a new rail line or rail extension passes through a heavily developed residential neighborhood. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels, such as where a new rail line or rail extension passes through a heavily developed residential neighborhood. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Impact

2.6-5 Implementation of the proposed Plan could result in increased noise exposure from aircraft or airports.

Impacts of Land Use Projects

There are 21 public airports and two military/private airports throughout the Bay Area. Many of these airports are located in urbanized areas where the proposed Plan envisions new development in PDAs. Specifically, the following airports are located immediately adjacent to PDAs identified in the proposed Plan:

- Half Moon Bay Airport;
- San Francisco International Airport;
- San José International Airport;
- Reid-Hillview Municipal Airport (San José);
- Moffett Federal Airfield (Mountain View);
- Travis Air force Base (Fairfield);
- Livermore Municipal Airport; and

- Buchanan Field (Concord).

Most of these airports and airfields have an active airport land use Compatibility Plan (ALUCP) to encourage compatible land uses within the vicinity of the airport. The FAA Part 150 program encourages airports to prepare noise exposure maps that show land uses that are incompatible with high noise levels[9] and these are often included within the ALUCP. For example, San Francisco International Airport has prepared its ALUCP that indicates the number of housing opportunity sites within the 70 CNEL contour for airport operations. The potential exists for development pursuant to implementation of the proposed Plan to occur in areas of 70 CNEL. However, the land use compatibility standards contained in General Plans (see **Figure 2.6-7**) would discourage or require mitigation for construction of sensitive land uses in areas potentially impacted by aircraft noise. Recognizing both the local guidance of general plan noise elements and the guidance of ALUCPs as well as the sound insulation requirements of Title 24, potential noise impacts on sensitive land uses developed within PDAs pursuant to the proposed Plan are considered less than significant (LS), and no mitigation is required.

Impacts of Transportation Projects

There are no airport-related transportation investment projects identified in the Transportation Investment Strategy. Consequently there would be no impact with regard to airport or aircraft related noise as a result of implementation of the Transportation Investment Strategy. Because no impact is identified related to transportation projects, no combined effect is identified.

Combined Effects

As stated above, there are no airport-related transportation investment projects identified in the Transportation Investment Strategy. Consequently, there would be no combined airport exposure impacts from land use projects and transportation projects.

Mitigation Measures

None Required.

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[9] Federal Interagency Committee on Noise (FICON), *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

2.7 Geology and Seismicity

This chapter evaluates the potential impacts related to geology and seismicity resulting from the implementation of the proposed Plan. In addition to regional geologic and seismic hazards, the potential effects of local hazards such as those risks related to underlying geologic materials and soils are also evaluated.

Environmental Setting

PHYSICAL SETTING

The physical setting describes the existing geology in the study area, soils, faults, and other seismic and geologic hazards. The setting of the study area is considered within the regional context of the geologic regime. In general terms, regional geologic conditions can help provide the anticipated conditions on a local basis.

Regional Geology

The State of California has 11 natural geologic regions, known as geomorphic provinces, which are defined by the presence of similar physical characteristics such as relief, landforms, and geology.[1] The majority of the nine-county San Francisco Bay Area is located within what is known as the Coast Range geomorphic province, with eastern portions of Solano, Contra Costa, and Alameda counties extending into the neighboring Great Valley geomorphic province located east of the Coast Ranges.

Coast Range Province

The Coast Range is a geologically complex province that extends 400 miles along the Pacific Coast, from Oregon south into Southern California. The Coast Range province is characterized by a series of northwest-trending ridges and valleys that run roughly parallel to the San Andreas fault zone, and can be further divided into the northern and southern ranges that are separated by San Francisco Bay. San Francisco Bay is a broad shallow regional structural depression, created from an east-west expansion between the San Andreas and the Hayward fault systems. In the southern Bay Area, the Santa Cruz Mountains border San Francisco Bay on the west, while the Berkeley Hills, an extension of the Diablo Range, are to the east. Mount Diablo marks the northern end of the Diablo Range, which stretches 130 miles southward to the Kettleman Hills at the cusp of the San Joaquin Valley. The broad, low-relief Santa Clara and San Benito valleys lie between the Santa Cruz Mountains and the Diablo Range. In the North

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[1] California Geological Survey (CGS), *California Geomorphic Provinces*, CGS Note 36, 2002.

Bay, the rugged, mountainous character of the Marin Peninsula is dominated by Mount Tamalpais (elevation 2,604 feet above sea level).

Much of the Coast Range province is composed of marine sedimentary and volcanic rocks that form the Franciscan Assemblage, located east of the San Andreas Fault. The Franciscan Assemblage in this region of California is approximately 65 to 150 million years old and consists primarily of greenstone (altered volcanic rocks), basalt, chert (ancient silica-rich ocean deposits), and sandstone that originated as ancient sea floor sediments. The region west of the San Andreas Fault is underlain by a mass of basement rock known as the Salinian Block that is comprised of mainly marine sandstone (up to 65 million years old), and various metamorphic rocks[2] believed to have originated some 350 miles to the south. The Salinian Block has been moving northward along the west side of the San Andreas Fault and associated rocks can be found as far north as Point Arena.

Marginal lands surrounding San Francisco Bay consist generally of alluvial plains of low relief that slope gently bayward from the bordering uplands and foothills. The alluvial plains that comprise the Bay margin are composed of alluvial sediments (up to two million years old) consisting of unconsolidated stream and basin deposits. These alluvial plains terminate bayward at the tidal marshlands that immediately surround the Bay. Marshlands are composed of intertidal deposits, including widely found fine-grained plastic clays commonly referred to as Bay Mud, which, in some areas, underlies artificial fills. Historic shoreline reclamation projects beginning at the turn of the twentieth century have resulted in the placement of varying types of man-made artificial fill that overlie intertidal deposits. San Francisco Bay is originally believed to have encompassed 700 square miles, although dredging and fill operations have reduced the Bay to approximately 400 square miles.

Great Valley

Portions of Solano, Contra Costa, and Alameda Counties are located in the Great Valley geomorphic province, which is characterized by a large, nearly level inland alluvial plain 400 miles in length and averaging 50 miles in width. The topography of the Great Valley is flat, but slopes gently along its eastern margin (Sierra Nevada foothills) and western margin (Coast Ranges). Sediments in the Great Valley consist of gravels, sands, clays, and silts that originated largely from the Sierras, with sediments from the Coast Range contributing to a lesser extent. The sediments that compose the valley floor are thick, and in some areas extend as far as 10 miles below the surface. The Great Valley Sequence, a thick section of ancient sea floor sediments extending under the Great Valley, overlies the Coast Range Franciscan Assemblage along the valley's western flank.

Soils

A wide variety of soils and soil types can be found throughout the nine-county Bay Area region. Soils in the Bay Area fall within four major classifications established by the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS). Depending on localized conditions, these general classifications are grouped into more specific soil types by location, climate, and slope. The Santa Clara valley and the alluvial plains surrounding San Francisco Bay are classified as deep alluvial plain and floodplain soils. These soils occupy the valleys in areas with higher rainfall and are considered

[2] Metamorphic rocks are sedimentary or volcanic rocks altered by prolonged heating and deformation.

productive when drained and fertilized. Soils closer to the Bay margin are generally dark-colored clays that have a high water table or are subject to overflow from flooding. Soils at the extreme edge of San Francisco Bay have a moderate to high content of soluble salts; these soils are referred to as alkali soils. Soils in northern San Mateo County, the eastern portion of San Francisco, and Marin County are classified as residual soils and are characterized by moderate depth to underlying bedrock. However, much of the Bay Area has been developed and in urbanized areas, native soils are commonly no longer present or have been reworked and combined with imported fill materials over a long history of earthwork activities associated with development.

Seismologists have observed differences in seismic shaking effects that are partially dependent on underlying soil deposits. Soft soils are known to amplify ground shaking and are considered in seismic design requirements. The National Earthquake Hazards Reduction Program (NEHRP) has defined five soil types based on several different criteria. The USGS has modified these definitions slightly, based on studies of earthquake damage in the Bay Area.[3] The modified definitions are below:

Soil Type A: Includes unweathered intrusive igneous rock. Occurs infrequently in the Bay Area. Does not contribute greatly to shaking amplification.

Soil Type B: Includes volcanics, most Mesozoic bedrock, and some Franciscan bedrock. (Mesozoic rocks are between 245 and 64 million years old. The Franciscan Complex is a Mesozoic unit that is common in the Bay Area.) Does not contribute greatly to shaking amplification.

Soil Type C: Includes some Quaternary (less than 1.8 million years old) sands, sandstones and mudstones, some Upper Tertiary (1.8 to 24 million years old) sandstones, mudstones and limestone, some Lower Tertiary (24 to 64 million years old) mudstones and sandstones, and Franciscan melange and serpentinite. Can contribute to shaking amplification depending on site-specific characteristics.

Soil Type D: Includes some Quaternary muds, sands, gravels, silts and mud. Significant amplification of shaking by these soils is generally expected.

Soil Type E: Includes water-saturated mud and artificial fill. The strongest amplification of shaking is expected for this soil type.

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[3] United States Geological Survey, *Soil Type and Shaking Hazard in the San Francisco Bay Area*, http://earthquake.usgs.gov/regional/nca/soiltype/, accessed August 3, 2012.

Seismicity

The Bay Area is considered a region of high seismic activity with numerous active and potentially active faults capable of producing significant seismic events.[4] The U.S. Geological Survey (USGS) Working Group on California Earthquake Probabilities has evaluated the probability of one or more earthquakes occurring in the Bay Area and concluded that there is currently a 63 percent likelihood of a magnitude 6.7 or higher earthquake occurring in the Bay Area by 2037.[5]

The San Andreas and the Hayward faults are the two faults considered to have the highest probabilities of causing a significant seismic event in the Bay Area. These two faults are classified as strike-slip-type faults[6] that have experienced movement within the last 150 years. The San Andreas Fault is a major structural feature in the region and forms a boundary between the North American and Pacific tectonic plates. Other principal faults capable of producing significant Bay Area ground shaking are listed in **Table 2.7-1** and shown on **Figure 2.7-1,** and include the Calaveras fault, the Rodgers Creek fault, and the Concord–Green Valley faults. A major seismic event on any of these active faults could cause significant ground shaking and surface fault rupture, as was experienced during earthquakes in recorded history, namely the 1868 Hayward earthquake, the 1906 San Francisco earthquake, and the 1989 Loma Prieta earthquake. The estimated magnitudes (moment) identified in **Table 2.7-1** represent *characteristic* earthquakes on particular faults.[7] In addition, active blind- and reverse-thrust faults[8] in the region that accommodate compressional movement include the Monte Vista–Shannon and Mount Diablo faults.

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[4] An active fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 10,000 years). A potentially active fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years), unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not mean that faults lacking evidence of surface displacement are necessarily inactive. "Sufficiently active" is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches (Hart, E. W., Fault-Rupture Hazard Zones in California: Alquist-Priolo Special Studies Zones Act of 1972 with Index to Special Studies Zones Maps, California Geological Survey, Special Publication 42, 1990, revised 1997).

[5] United States Geological Survey (USGS) Working Group on California Earthquake Probabilities (WG02), Fact Sheet 2008-2037, *Forecasting California's Earthquakes – What Can We Expect in the Next 30 Years?,* http://pubs.usgs.gov/fs/2008/3027/fs2008-3027.pdf, 2008.

[6] "Strike-slip" faults primarily exhibit displacement in a horizontal direction, but may have a vertical component. Right-lateral strike-slip movement of the San Andreas fault, for example, means that the western portion of the fault is slowly moving north while relative motion of the eastern side is to the south.

[7] Moment magnitude is related to the physical size of a fault rupture and movement across a fault, while Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave. Moment magnitude provides a physically meaningful measure of the size of a faulting event. The concept of "characteristic" earthquake means that we can anticipate, with reasonable certainty, the actual damaging earthquakes [the size of the earthquakes] that can occur on a fault.

[8] A reverse fault is one with predominantly vertical movement in which the upper block moves upward in relation to the lower block; a thrust fault is a low-angle reverse fault. Blind-thrust faults are low-angled subterranean faults that have no surface expression.

TABLE 2.7-1: ACTIVE FAULTS IN THE BAY AREA[1]

Fault	*Recency of Movement*	*Historical Seismicity[2]*	*Maximum Moment Magnitude Earthquake (Mw)[3]*
Hayward	1868 Holocene	M6.8, 1868 Many <M4.5	7.1
San Andreas	1989 Holocene	M7.1, 1989 M8.25, 1906 M7.0, 1838 Many <M6	7.9
Rodgers Creek-Healdsburg	1969 Holocene	M6.7, 1898 M5.6, 5.7, 1969	7.0
Concord–Green Valley	1955 Holocene	Historic active creep	6.9
Marsh Creek-Greenville	1980 Holocene	M5.6 1980	6.9
San Gregorio–Hosgri	Holocene; Late Quaternary	Many M3-6.4	7.3
West Napa	2000 Holocene	M5.2 2000	6.5
Maacama	Holocene	Historic active creep	7.1
Calaveras	1990 Holocene	M5.6-M6.4, 1861 M4 to M4.5 swarms 1970, 1990	6.8
Mt. Diablo Thrust	Quaternary (possibly active)	n/a	6.7

Notes:

1. See footnote 4 of the text for definition of active faults.
2. Richter magnitude (M) and year for recent and/or large events. Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave.
3. The maximum moment magnitude earthquake (Mw), derived from the joint CGS/USGS Probabilistic Seismic Hazard Assessment for the State of California, 1996. (CGS OFR 96-08 and USGS OFR 96-706).

Sources: CGS, 1996, Hart, 1997; Jennings, 1997; Peterson, 1996, WGCEP, 2008.

Geologic and Seismic Hazards

Surface Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude and nature of fault rupture can vary for different faults or even along different strands of the same fault. Future faulting is generally expected along different segments of faults with recent activity.[9] Structures, transportation facilities, and utility systems crossing fault traces are at risk during a major earthquake due to ground rupture caused by differential lateral and vertical movement on opposite sides of the active fault trace. Lateral displacement may range from a few inches to over 20 feet, as occurred in the 1906 San Francisco earthquake. Thrust faults as well as faults with strike-slip movement can have a vertical displacement component that can total several feet.

However, the exception to obvious surface displacement is the "blind-thrust" fault. The Mt. Diablo blind-thrust fault, for example, is a newly recognized earthquake source for the Bay Area. It has been mapped on the western base of Mt. Diablo on the east side of the San Ramon Valley. The USGS Working Group on California Earthquake Probabilities recommended that this particular thrust fault be considered in their seismic probability calculations. This fault is considered a "blind thrust" because it does not exhibit a surficial expression of displacement. The Mt. Diablo thrust fault slips at a long-term rate of about 3 millimeters/year, but has not been zoned as an active fault under the Alquist-Priolo Act due to the inability to identify its exact location on the surface (see description of the Act in the Regulatory Setting section of this chapter).[10]

Although multiple active and potentially active faults are located within the Bay Area, ground rupture is most likely to occur along active faults zoned as Earthquake Fault Zones under mandate of the Alquist-Priolo Act. It is important to note that surface fault rupture is not necessarily restricted to the area within an Alquist-Priolo Zone. Additionally, ground rupture is possible on both active and potentially active faults not zoned as Earthquake Fault Zones, although these faults are considered less susceptible to ground rupture hazards than the principally active faults listed in **Table 2.7-1.**

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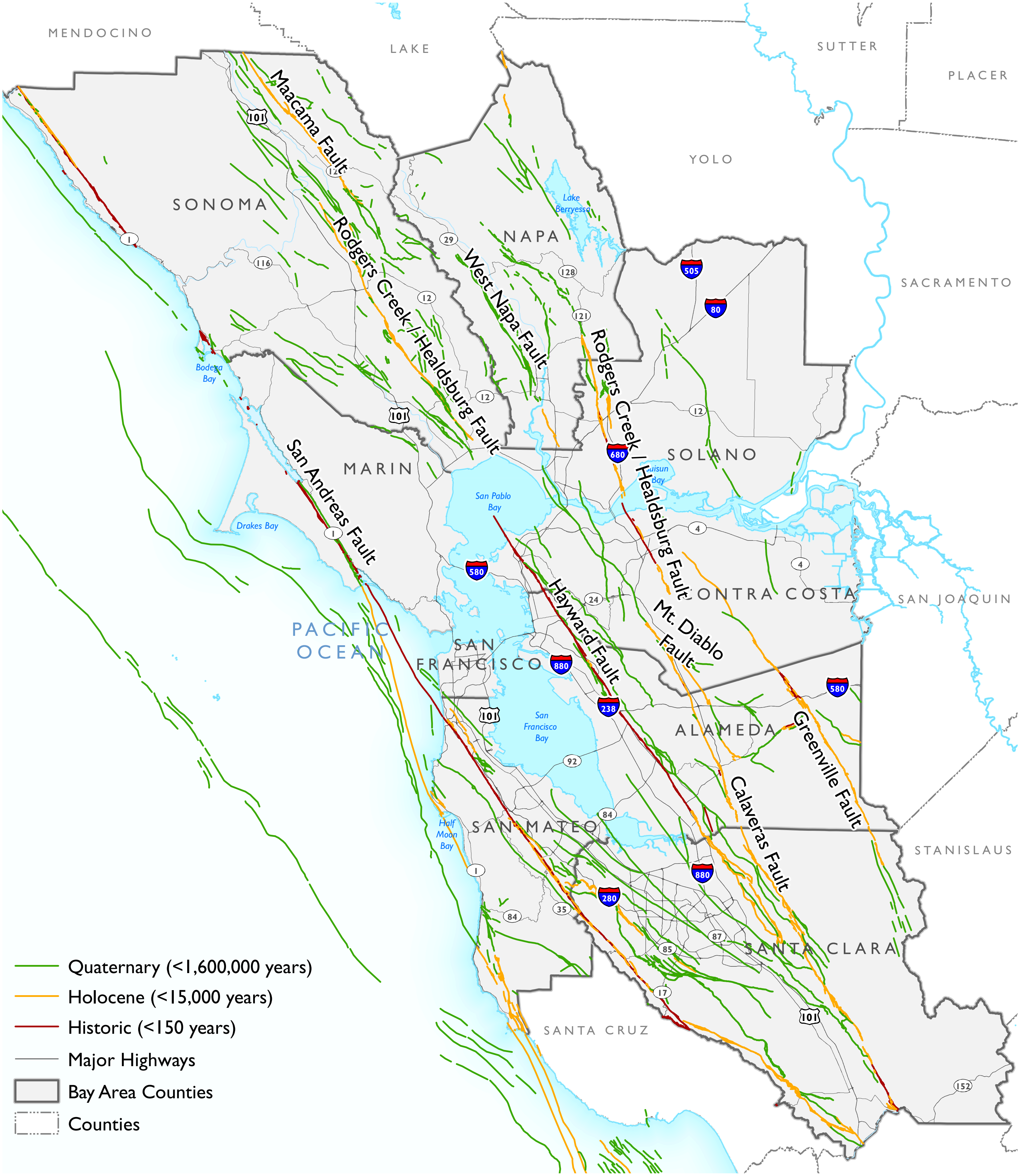
[9] California Geological Survey, *Guidelines for Evaluating and Mitigation Seismic Hazards*, CGS Special Publication 117, 1997.

[10] USGS, 2003.

Figure 2.7-1
Principal Faults



Data Source: Quaternary Faults, U.S. Geological Survey, 2010; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

0 5 10 20 Miles

1 in = 16 miles

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Ground Shaking

Strong ground movement from a major earthquake could affect the Bay Area during the next 30 years. Ground shaking may affect areas hundreds of miles distant from the earthquake's epicenter. The intensity of ground movement during an earthquake can vary depending on the overall magnitude, distance from the fault, focus of earthquake energy, and type of geologic material.

Areas that are underlain by bedrock tend to experience less ground shaking than those underlain by unconsolidated sediments such as artificial fill. The composition of underlying materials in areas located relatively distant from faults can intensify ground shaking. For example, portions of the Bay Area that experienced the worst structural damage due to the Loma Prieta earthquake were not those closest to the fault, but rather those with soils that amplified the effects of ground shaking. The Modified Mercalli (MM) intensity scale (see **Table 2.7-2**) is a common measure of earthquake effects due to ground shaking intensity. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total), and intensities ranging from IV to X could cause moderate to significant structural damage.[11]

TABLE 2.7-2: MODIFIED MERCALLI INTENSITY SCALE

	Intensity Description	*Average Peak Acceleration*[1]
I	Not felt except by a very few persons under especially favorable circumstances.	<0.0017g
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	<0.014g
III	Felt quite noticeably indoors, especially on upper floors of buildings, but many persons do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to a passing of a truck.	<0.014g
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	0.014g-0.039g
V	Felt by nearly everyone, many awakened. Some dishes, windows, broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.	0.039g-0.092g
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.	0.092g-0.18g
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.	0.18g-0.34g

[11] The damage level represents the estimated overall level of damage that will occur for various MM intensity levels. The damage, however, will not be uniform. Some structures will experience substantially more damage than this overall level, and others will experience substantially less damage. Not all structures perform identically in an earthquake. The age, material, type, method of construction, size, and shape of a structure all affect its performance.

TABLE 2.7-2: MODIFIED MERCALLI INTENSITY SCALE

	Intensity Description	*Average Peak Acceleration*[1]
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Persons driving motor cars disturbed.	0.34g-0.65g
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.	0.65g-1.24g
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes.	> 1.24g
XI	Few, if any, masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 1.24g
XII	Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24g

Note:

1. g (gravity)= 980 centimeters per second squared. Acceleration of 1.0 g is equivalent to a car traveling 328 feet from rest in 4.5 seconds.

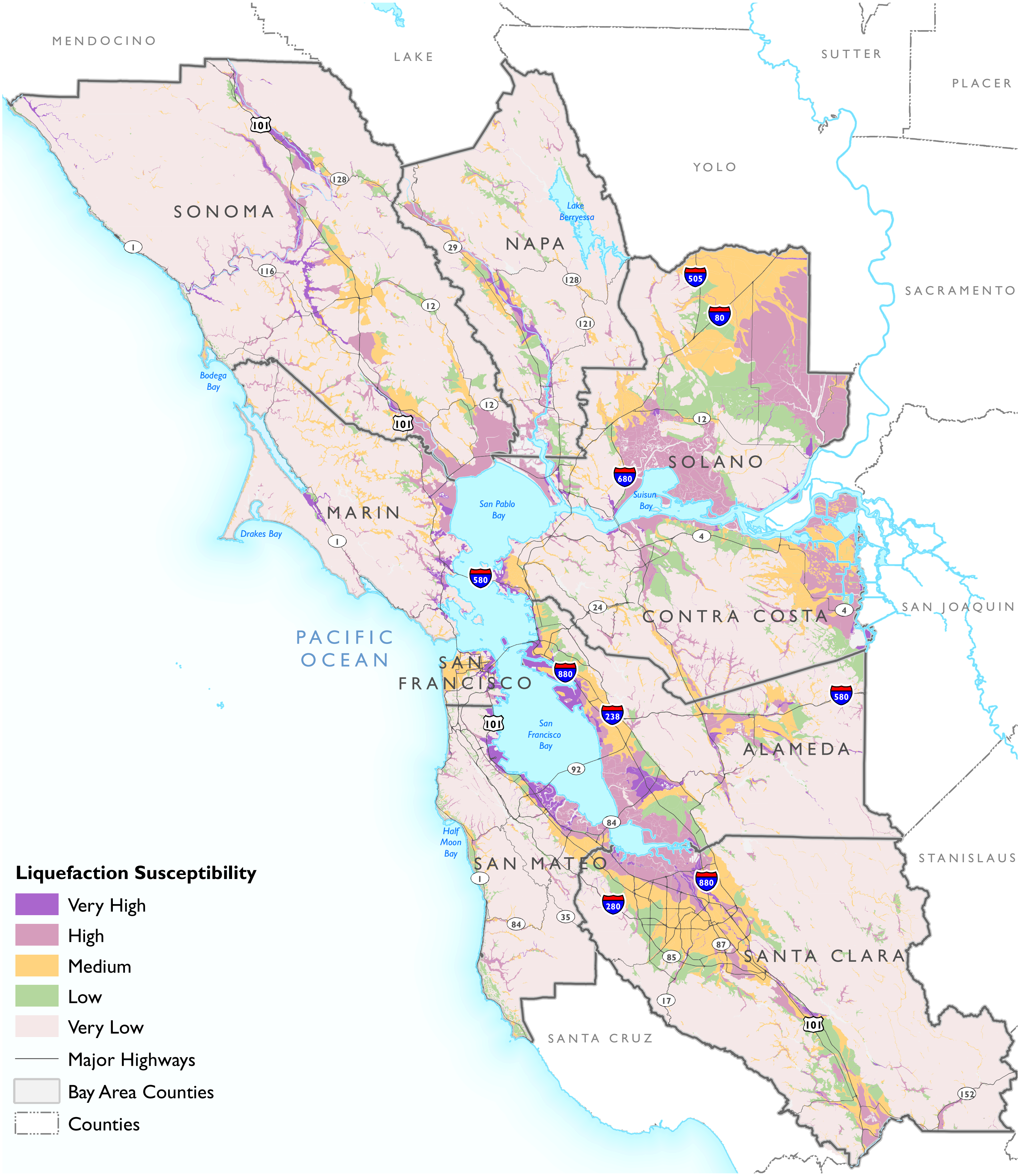
Source: ABAG, 2003 and California Geological Survey, 2003.

Areas most susceptible to intense ground shaking are those areas located closest to the earthquake-generating fault, and areas underlain by thick, loosely unconsolidated, saturated sediments, particularly soft, saturated Bay Muds and artificial fill along the tidal margins of San Francisco Bay.

Liquefaction

Liquefaction is a phenomenon whereby unconsolidated and/or near saturated soils lose cohesion and are converted to a fluid state as a result of severe vibration. The relatively rapid loss of soil shear strength during strong earthquake shaking results in the temporary fluid-like behavior of the soil. Soil liquefaction causes ground failure that can damage roads, airport runways, pipelines, underground cables, and buildings with shallow foundations. Liquefaction can occur in areas characterized by water-saturated, cohesion-less, granular materials at shallow depths, or in saturated unconsolidated or artificial fill sediments located in reclaimed areas along the margin of San Francisco Bay. Liquefaction potential is highest in areas underlain by shallow groundwater and Bay fills, Bay Mud, and unconsolidated alluvium. **Figure 2.7-2** illustrates liquefaction susceptibility in the Bay Area.

Figure 2.7-2
Liquefaction



Data Source: U.S. Geological Survey, 2006; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Expansive Soils

Expansive soils possess a "shrink-swell" characteristic. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in fine-grained clay sediments from the process of wetting and drying. Changes in soil moisture can result from rainfall, landscape irrigation, utility leakage, roof drainage, and/or perched groundwater.[12] Expansive soils are typically very fine grained and have a high to very high percentage of clay. Structural damage may occur incrementally over a long period of time, usually as a result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils. Soils with high clay content, such as the Bay Muds located on the margins of the San Francisco Bay, are highly expansive.

Soil Erosion

Soil erosion is the process whereby soil materials are worn away and transported to another area, either by wind or water. Rates of erosion can vary depending on soil material and structure, building placement, and human activity. The potential for soil erosion is variable throughout the Bay Area. Soil with high amounts of silt can be easily eroded, while sandy soils are less susceptible to erosion. Excessive soil erosion can eventually damage building foundations, roadways, and dam embankments. Erosion is most likely on sloped areas with exposed soil, especially where unnatural slopes are created by cut-and-fill activities. Soil erosion rates can therefore be higher during the construction phase. Typically, the soil erosion potential is reduced once the soil is graded and covered with concrete, structures, or asphalt.

Settlement

Settlement is the depression of the bearing soil when a load, such as that of a building or new fill material, is placed upon it. Settlement can occur from immediate settlement, consolidation, shrinkage of expansive soil, and liquefaction (discussed above). Immediate settlement occurs when a load from a structure or placement of new fill material is applied, causing distortion in the underlying materials. This settlement occurs quickly and is typically complete after placement of the final load. Consolidation settlement occurs in saturated clay from the volume change caused by squeezing out water from the pore spaces. Consolidation occurs over a period of time and is followed by secondary compression, which is a continued change in void ratio under the continued application of the load. Soils tend to settle at different rates and by varying amounts, depending on the load weight, which is a phenomenon referred to as differential settlement. Areas are susceptible to differential settlement if underlain by compressible sediments, such as poorly engineered artificial fill or the "Bay Mud" present in the marshland on the San Francisco Bay margin.

Earthquake-Induced Settlement

Settlement of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid compaction and settling of subsurface materials (particularly loose, non-compacted, and variable sandy sediments) due to the rearrangement of soil particles during prolonged ground shaking. Settlement can occur both uniformly and differentially

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[12] Perched groundwater is a local saturated zone above the water table that typically exists above an impervious layer (such as clay) of limited extent.

(i.e., where adjoining areas settle at different rates). Areas are susceptible to differential settlement if underlain by compressible sediments, such as poorly engineered artificial fill or Bay Mud.

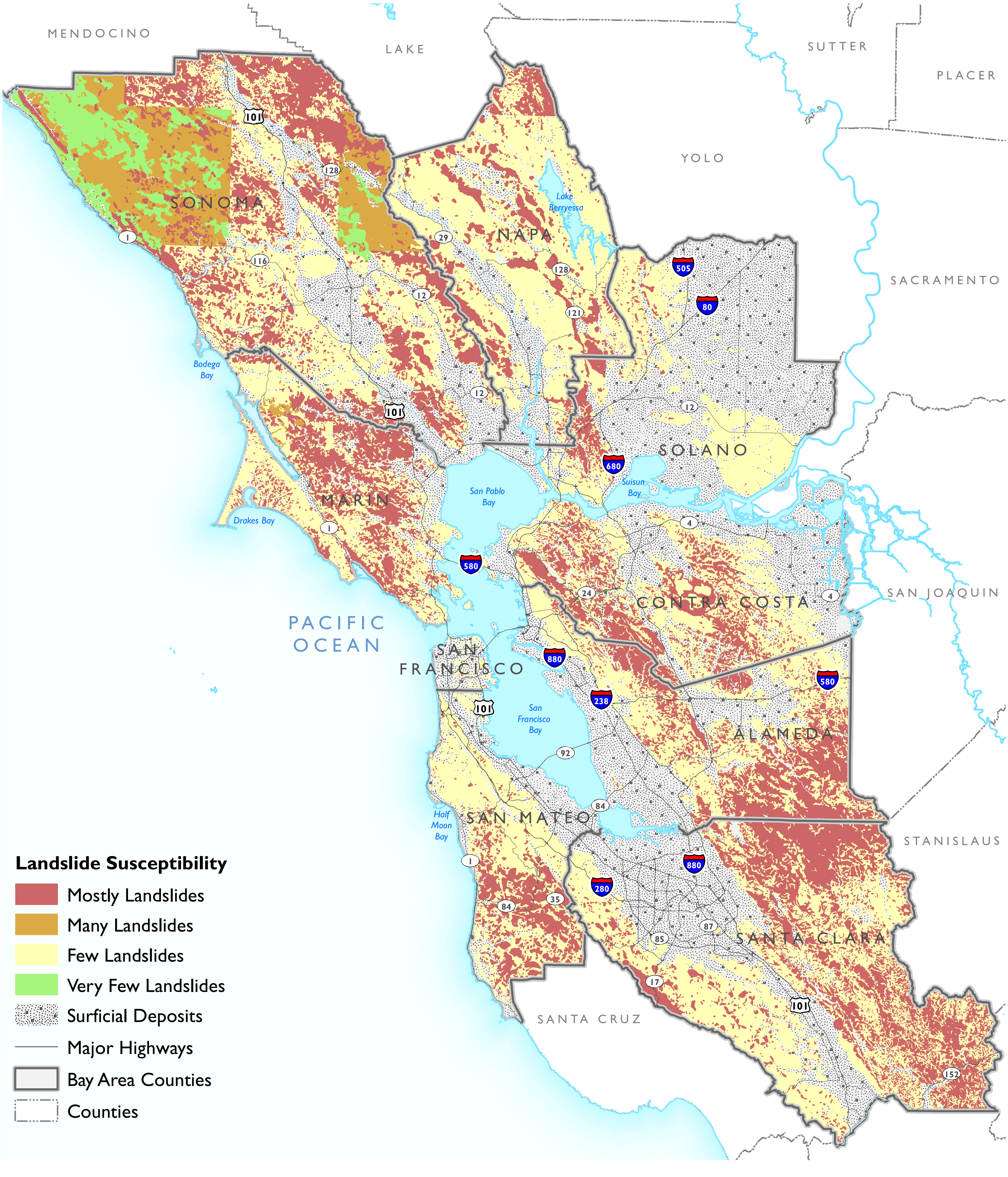
Landslides

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces. A slope failure is a mass of rock, soil, and debris displaced downslope by sliding, flowing, or falling. Exposed rock slopes undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience shallow soil slides, rapid debris flows, and deep-seated rotational slides. Landslides may occur on slopes of 15 percent or less; however, the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges. Landslide-susceptible areas are characterized by steep slopes and downslope creep of surface materials. Debris flows consist of a loose mass of rocks and other granular material that, if saturated and present on a steep slope, can move downslope. The rate of rock and soil movement can vary from a slow creep over many years to a sudden mass movement. Landslides occur throughout California, but the density of incidents increases in zones of active faulting.

Slope stability can depend on a number of complex variables. The geology, structure, and amount of groundwater in the slope affects slope failure potential, as do external processes (i.e., climate, topography, slope geometry, and human activity). The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope. Slope failure under static forces occurs when those forces initiating failure overcome the forces resisting slope movement. For example, a soil slope may be considered stable until it becomes saturated with water (e.g., during heavy rains or due to a broken pipe or sewer line). Under saturated conditions, the water pressure in the individual pores within the soil increases, reducing the strength of the soil. Cutting into the slope and removing the lower portion, or slope toe, can reduce or eliminate the slope support, thereby increasing stress on the slope.

Earthquake motions can induce significant horizontal and vertical dynamic stresses in slopes that can trigger failure. Earthquake-induced landslides can occur in areas with steep slopes that are susceptible to strong ground motion during an earthquake. Areas of known landslide hazards in the region are shown in **Figure 2.7-3**.

Figure 2.7-3
Landslides



Data Source: U.S. Geological Survey, 1997; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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REGULATORY SETTING

Federal Regulations

Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was enacted in 1977 to "*reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program*." To accomplish this, the Act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by NEHRP, which refined the description of agency responsibilities, program goals, and objectives.

NEHRP's mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improvement of building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improvement of mitigation capacity; and accelerated application of research results. The NEHRP designates the Federal Emergency Management Agency (FEMA) as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Programs under NEHRP help inform and guide planning and building code requirements such as emergency evacuation responsibilities and seismic code standards.

Disaster Mitigation Act of 2000

The Disaster Mitigation Act of 2000 (DMA2K) (Public Law 106-390) amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 to establish a Pre-Disaster Mitigation (PDM) program and new requirements for the federal post-disaster Hazard Mitigation Grant Program (HMGP). DMA2K encourages and rewards local and state pre-disaster planning. It promotes sustainability, and seeks to integrate state and local planning with an overall goal of strengthening statewide hazard mitigation. This enhanced planning approach enables local, tribal, and state governments to identify specific strategies for reducing probable impacts of natural hazards such as floods, fire, and earthquakes. In order to be eligible for hazard mitigation funding after November 1, 2004, local governments are required to develop a Hazard Mitigation Plan that incorporates specific program elements of the DMA2K law. In the Bay Area, ABAG has adopted a multi-jurisdictional FEMA-approved 2010 Local Hazard Mitigation Plan Update, which cities and counties can adopt and use, in full or in part, in lieu of preparing all or part of a Local Hazard Mitigation Plan themselves.[13]

State Regulations

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (formerly the Alquist-Priolo Special Studies Zone Act) of 1972 (revised in 1994) is the State law that addresses hazards from earthquake fault zones and requires the delineation of zones along active faults. The purpose of this law is to mitigate the hazard of surface fault rupture by regulating development on or near active faults. As required by the Act, the State has

[13] Multi-Jurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area, ABAG 2010, http://quake.abag.ca.gov/wp-content/documents/ThePlan-Chapters-Intro.pdf

delineated Earthquake Fault Zones (formerly Special Studies Zones) along known active faults in California. Cities and counties must regulate certain development projects within these zones.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This Act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit may be granted for a site within a Seismic Hazard Zone, a geotechnical investigation of the site must be conducted and appropriate mitigation measures incorporated into the project design. The Bay Area includes numerous Seismic Hazard Zones for liquefaction and earthquake induced landslides, as designated by the California Geological Survey. Therefore, any projects in these designated zones require evaluation and mitigation of potential liquefaction or landslide hazards, which must be conducted in accordance with the California Geological Survey, Special Publication 117, adopted March 13, 1997 by the State Mining and Geology Board pursuant to the Seismic Hazards Mapping Act.

California Building Code

The California Building Code (CBC) has been codified in the California Code of Regulations (CCR) as Title 24, Part 2. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. The 2010 CBC is based on the 2009 International Building Code (IBC) published by the International Code Conference. In addition, the CBC contains necessary California amendments, which are based on reference standards obtained from various technical committees and organizations such as the American Society of Civil Engineers (ASCE), the American Institute of Steel Construction (AISC), and the American Concrete Institute (ACI). ASCE Minimum Design Standards 7-05 provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (flood, snow, wind, etc.) for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients which are used to determine a Seismic Design Category (SDC) for a project as described in Chapter 16 of the CBC. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site and ranges from SDC A (very small seismic vulnerability) to SDC E (very high seismic vulnerability and near a major fault) as well as SDC F (Hospitals, Police Stations Emergency control centers etc. in areas near major active faults). Design specifications are then determined according to the SDC in accordance with Chapter 16 of the CBC. Chapter 16, Section 1613 provides earthquake loading specifications for every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, which shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7-05. Chapter 18 of the CBC covers the requirements of geotechnical investigations (Section 1803), excavation, grading, and fills (Section 1804), load-bearing of soils (1805), as well as foundations (Section 1808), shallow foundations (Section 1809), and deep foundations (Section 1810). Chapter 18 also describes analysis of expansive soils and the determination of the depth to groundwater table. For SDC D, E, and F, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading, plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and soil strength loss, and lateral movement or reduction in foundation soil-bearing capacity. It also addresses mitigation measures to be considered in structural design, which may include ground stabilization, selecting appropriate foundation type and depths, selecting appropriate structural systems to accommodate anticipated displacements, or any combination of these measures. The potential for liquefaction and soil strength loss must be evaluated for site-specific peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions.

CCR Title 24 also includes the California Residential Code and the California Green Building Code, which have been adopted as separate documents (CCR Title 24, Part 2.5 and 11, respectively). The California Residential Code includes structural design standards for residential one- and two-family dwellings and covers all structural requirements for conventional construction. This part incorporates by adoption the 2009 International Residential Code of the International Code Council with necessary California amendments for seismic design. All other structures including multi-family residential projects are found in the other parts of the CBC as discussed above.

Regional and Local Regulations

General Plans and Safety Elements

City and county governments develop, as part of a general plan, safety elements that identify goals, objectives, and implementing actions to minimize the loss of life, property damage, and disruption of goods and services from disasters, including floods, fires, non-seismic geologic hazards, and earthquakes. General plans can provide policies and establish the basis for ordinances to ensure acceptable protection of people and structures from risks associated with these hazards. Ordinances can include those addressing unreinforced masonry construction, erosion, or grading.

Hazard Mitigation Plans

As discussed above, in February 2011, ABAG adopted the 2010 multi-jurisdictional Hazard Mitigation Plan for the Bay Area, originally adopted in 2005. Participating local county and city governments in the Bay Area prepare an Annex to this plan to explain how the plan specifically applies to that agency.

Impact Analysis

IMPACT SIGNIFICANCE CRITERIA

Impacts of the environment on a project or plan (as opposed to impacts of a project or plan on the environment) are beyond the scope of required CEQA review. "[T]he purpose of an EIR is to identify the significant effects of a project on the environment, not the significant effects of the environment on the project." (*Ballona Wetlands Land Trust v. City of Los Angeles* (2011) 201 Cal.App.4th 455, 473.) The impacts discussed in this section related to increased exposure of people or structures to risks associated with seismic occurrences and location of people or structures on unstable geologic units are effects on users of the project and structures in the project of preexisting environmental hazards, and therefore "do not relate to environmental impacts under CEQA and cannot support an argument that the effects of the environment on the project must be analyzed in an EIR." (*Id.* at p. 474.) Nonetheless, an analysis of these impacts is provided for information purposes.

Implementation of the proposed Plan Bay Area would have a potentially significant adverse impact related to geology and seismicity if the Plan would:

Criterion 1: Increase exposure of people or structures to the risk of property loss, injury, or death involving: rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area, or based on other substantial evidence of a known fault.

Criterion 2: Increase exposure of people or structures to the risk of property loss, injury, or death involving strong seismic ground shaking.

Criterion 3: Increase exposure of people or structures to the risk of property loss, injury, or death involving seismic-related ground failure including liquefaction.

Criterion 4: Increase exposure of people or structures to the risk of property loss, injury, or death involving landslides.

Criterion 5: Result in substantial soil erosion or topsoil loss.

Criterion 6: Locate projects on a geologic unit or soil that is unstable or that would become unstable as a result of the project; on expansive soils (high shrink-swell potential), as defined in Section 1803A of the 2010 California Building Code (the most recent version of the California Building Code); or on weak, unconsolidated soils, creating substantial risks to life or property from on- or off-site landslide, lateral spreading, liquefaction, or collapse.

METHOD OF ANALYSIS

Impacts are identified for the proposed Plan as a whole and for specific land use and transportation projects involving new construction as compared to existing conditions. Projects that do not include the construction of infrastructure, such as local road maintenance, wheelchair curb ramps, or traffic light coordination, would utilize existing transportation infrastructure or would result in negligible alterations to these facilities. In contrast, land use development projects and other transportation projects in the proposed Plan would include the construction or expansion of elevated interchanges, roadways, bridges, tunnels, transit buildings, and parking lots. The proposed land use development that would occur under the proposed Plan would primarily be located within Priority Development Areas (PDAs) but may also extend outside of these areas. Since the majority of development and growth would occur in these areas, the analysis focuses on PDA areas for land use impacts but also recognizes that some projects would occur outside of the PDAs. Some of these projects, based upon generalized geology maps from United States Geological Survey and California Geological Survey, which provide broad information on the locations of active faults in the Bay Area and areas of liquefaction or landslide potential, may be susceptible to particular seismic hazards such as strong ground shaking due to their location near active faults. This is a program-level analysis based upon generalized potential impacts associated with seismic hazards present in the Bay Area.

SUMMARY OF IMPACTS

The Bay Area contains a wide range of geologic conditions and the entire area is susceptible to the seismic hazards associated with the many active and potentially active faults found in and around the region. These faults could potentially generate seismic ground shaking capable of damaging existing and proposed improvements especially with older structures. As a consequence, new land use and transportation improvements would be exposed to both the direct and indirect effects of earthquakes as well as other existing geological hazards such as landslides and unstable soils. Potential effects from surface fault rupture and severe ground shaking could cause catastrophic damage to transportation infrastructure and development, particularly elevated structures, if not engineered appropriately. New development associated with the land use and new transportation facility designs would be required by current building codes to incorporate the latest scientific findings into site preparations and seismic design.

Direct Impacts

The projected population increase in the Bay Area will result in increased travel on all modes of transportation and new land use development to accommodate new households and jobs. Direct impacts associated with earthquakes include construction of new development and new transportation facilities that would increase the risk of exposure of people and property to the potentially damaging effects of strong seismic shaking, fault rupture, liquefaction and potential tsunamis, and seismically-induced ground failure and slope instability on both existing and proposed improvements. Over time, settlement of unconsolidated soils or soft compressible soils such as Bay Mud can also pose problems to facilities. The potential for structural failures, injuries and loss of life would be greatest on raised structures, on unengineered soils and within fault zones. However, proposed improvements would be constructed to current building and seismic engineering standards which are generally more conservative than have existed in the past.

Short Term Impacts

Short-term impacts are those that could potentially occur during construction of proposed improvements when temporary disturbance to underlying materials occurs. In general, the potential for soil erosion is often highest during the preliminary stages of construction, especially during initial site grading. In addition to causing sedimentation problems in storm drain systems, rapid water erosion could remove topsoil, cause deeply incised gullies on slopes, or undermine engineered soils beneath foundations and paved surfaces.

Long Term Impacts

Road cuts could expose soils to erosion over the life of the project, creating potential landslide and falling rock hazards. Engineered roadways can be undercut over time by uncontrolled stormwater drainage. Projects on steep grades or those requiring substantial amounts of cut and fill would pose the greatest potential for slides and erosion impacts. Engineered soils could also erode due to poor construction methods and design features or lack of maintenance. Use of appropriate construction methods, earthwork design, and road cut design could reduce this potential impact to a less-than-significant level.

Other Impacts

The proposed Plan includes land use development, redevelopment, and improvements to transit service, roadways, interchanges, and overpasses throughout the Bay Area. All new construction, including potentially vulnerable elevated structures and bridges, would be designed to current seismic standards that are routinely updated in the California Building Code in addition to any local additional requirements. It is expected that as a result of these efforts, implementation of the proposed Plan would protect future residents from catastrophic failure, improve the survivability of the Bay Area transportation system, reduce the risk to travelers using existing retrofitted and new transportation facilities, and reduce the overall magnitude and extent of social and economic disruption in the event of a major seismic event.

IMPACTS AND MITIGATION MEASURES

Impact

2.7-1: Implementation of the proposed Plan could expose people or structures to substantial risk of property loss, injury or death related to fault rupture.

Impacts of Land Use Projects

Surface fault rupture could occur along any of the active fault trace or within the associated Alquist Priolo Earthquake Fault Zone (Alquist-Priolo Zone) for the active faults that have been identified within the Planning Area (see **Figure 2.7-1**). Although fault rupture is not necessarily confined to the boundaries of an Alquist-Priolo Zone, the likelihood of rupture occurring outside of these zones is considered very low based on historical evidence and geologic record. The amount and location of surface displacement would depend on the magnitude and nature of the seismic event on the fault. In some cases, surface fault rupture can cause displacement of the ground surface, resulting in substantial damage to foundations, roadways, and utilities. Buried thrust faults and inferred faults are located within the boundaries of the planning area; however, they do not typically experience surface ruptures and are not officially recognized by the Alquist-Priolo Earthquake Fault Zoning Act. Development associated with the proposed Plan would include a variety of land uses, ranging from residential to commercial to industrial, that would increase the number of people (from 7,091,000 in 2010 to 9,196,000 in 2040), structures, and density of housing and jobs—particularly in the Priority Development Areas—that could potentially be exposed to hazards as a result of surface fault rupture.

The PDAs, where the majority of growth would occur, that either fully or partially intersect Alquist-Priolo Zones within the Planning Area are listed below in **Table 2.7-3** along with the associated acreage that intersects Alquist-Priolo Zones.

TABLE 2.7-3: PRIORITY DEVELOPMENT AREAS (PDAS) LOCATED IN FAULT RUPTURE ZONES

	PDA Description	*Acreage within Alquist-Priolo Zone*
1	American Canyon: Highway 29 Corridor	116
2	Benecia: Northern Gateway	56
3	Concord: Downtown	83
4	Dublin: Downtown Specific Plan Area	81
5	Dublin: Transit Center/Dublin Crossings	464
6	East 14th Street and Mission Boulevard Mixed Use Corridor	104
7	Fremont: City Center	157
8	Fremont: Irvington District	115
9	Hayward: Downtown	31
10	Hayward: Mission Boulevard Corridor	91
11	Livermore: Vasco Road Station Planning Area	168
12	Oakland: Transit Oriented Development Corridors	136
13	Richmond: San Pablo Avenue Corridor	8
14	San Pablo: San Pablo Avenue	25

Source: Jennings, 2010, MTC, 2012.

While there are estimates of the location of proposed new development, which will be focused in PDAs but may occur both within and outside of PDA areas, specific locations of potential future projects are not known at this time, and therefore it cannot be stated whether these subsequent projects may be proposed on or near an identified Alquist-Priolo Zone. Therefore, the impacts related to fault rupture hazards at the regional and local level are considered potentially significant (PS). See Mitigation Measure 2.7(a) below.

Impacts of Transportation Projects

As noted above for the land use projects, surface fault rupture could cause displacement of the ground surface, resulting in substantial damage to transportation improvements including transit expansion projects, foundations, roadways, roadway interchanges, and utilities. Improvements associated with the transportation projects within the region would include a variety of different projects that could potentially be exposed to hazards as a result of surface fault rupture. The full list of transportation projects that are located within or partially within an identified Alquist-Priolo Zone is provided in Appendix F. Projects such as interchange improvements to existing roadways that are located within an Alquist-Priolo Zone may not represent any substantially changed risk or hazard but would nonetheless be part of a required geotechnical investigation to fully evaluate the level of potential damage from fault rupture. The potential for adverse fault impacts related to transportation projects from implementation of the proposed Plan at the regional and local level is considered potentially significant (PS) for Impact 2.7-1. See Mitigation Measure 2.7(a) below.

Combined Effects

Land use and transportation project effects related to fault rupture hazards are site specific and dependent solely on the location of the individual projects in relation to the active fault traces. The potential for adverse fault impacts related to land use changes from implementation of the proposed Plan at the regional and local level is considered potentially significant (PS) for Impact 2.7-1. See Mitigation Measure 2.7(a) below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.7(a) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce impacts related to fault rupture, implementing agencies shall require project sponsors to comply with provisions of the Alquist-Priolo Act (Act) for project sites located within or across an Alquist-Priolo Hazard Zone. Project sponsors shall prepare site-specific fault identification investigations conducted by licensed geotechnical professionals in accordance with the requirements of the Act as well as any existing local or Caltrans regulations and policies that exceed or reasonably replace any of the Act requirements. Structures intended for human occupancy (defined as a structure that might be occupied a minimum of 2,000 hours per year) shall be located a minimum distance of 50 feet from any identified active fault traces. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to development in an Alquist-Priolo Hazard Zone.

Significance after Mitigation

The Alquist-Priolo Act strictly regulates where development and road projects can occur in relation to faults by requiring detailed fault identification studies and stipulating minimum setback requirements in addition to any local or Caltrans requirements. Fault identification studies as required by the Alquist-Priolo Act involve onsite trenching and excavation for site-specific identification and location of fault rupture planes where any future rupture would be anticipated. Structures intended for human occupancy (defined as a structure that might be occupied a minimum of 2,000 hours per year) are then required to be setback a minimum distance of 50 feet; local agencies may have further restrictions.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.7(a), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.7-2: Implementation of the proposed Plan could expose people or structures to substantial risk related to ground shaking.

Impacts of Land Use Projects

According to modeling conducted by the US Geological Survey in conjunction with the California Geological Survey, the Bay Area will likely experience at least one major earthquake (greater than moment magnitude 6.7) within the next 30 years. The intensity of such an event would depend on the causative fault and the distance to the epicenter, the magnitude, the duration of shaking, and the characteristics of the underlying geologic materials. The potential for damage or loss during an earthquake of this magnitude could be substantial, especially in older structures and infrastructure that were constructed under less stringent building codes.

In general, ground shaking tends to be more severe in softer sediments such as alluvial deposits where surface waves can be amplified causing a longer duration of ground shaking compared to bedrock materials. Areas where bedrock is exposed or located at relatively shallow depth tend to experience surface waves from an earthquake as more of a sharp jolt, compared to other areas. In general, areas located within or near any of the Bay shoreline areas where alluvial sediments tend to be thicker, especially in areas where unengineered fill exists or loose alluvial materials are found, could experience considerable ground shaking. Therefore, the potential for adverse ground shaking impacts related to land use changes from implementation of the proposed Plan at the regional and local level is considered to be potentially significant (PS). Mitigation Measure 2.7(b) is discussed below.

Impacts of Transportation Projects

As noted above for the land use projects, an earthquake on any one of the active faults in the Bay Area region could cause a large degree of ground shaking in the region, resulting in damage to transportation improvements if they are not engineered appropriately. Improvements associated with the proposed transportation projects within the region would include a variety of transit modifications that could increase the number of people and transit corridors that could potentially be exposed to ground shaking hazards. Therefore, the potential for adverse ground shaking impacts related to improvements associated with the transportation projects at the regional and local level is considered to be potentially significant (PS). Mitigation Measure 2.7(b) is discussed below.

Combined Effects

While the proposed Plan would accommodate in increased population within the seismically active Planning Area, the hazards are dependent on site-specific criteria including the location of the projects in relation to the seismic event, underlying geologic materials, and the magnitude of the event. These impacts are considered to be potentially significant (PS). Mitigation Measure 2.7(b) is discussed below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.7(b) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce impacts related to ground shaking, implementing agencies shall require project sponsors to comply with the most recent version of the California Building Code (CBC). Proposed improvements shall comply with Chapter 16, Section 1613 of the CBC which provides earthquake loading specifications for every structure and associated attachments that must also meet the seismic criteria of Associated Society of Civil Engineers (ASCE) Standard 07-05. In order to determine seismic criteria for proposed improvements, geotechnical investigations shall be prepared by state licensed engineers and engineering geologists to provide recommendations for site preparation and foundation design as required by Chapter 18, Section 1803 of the CBC. Geotechnical investigations shall also evaluate hazards such as liquefaction, lateral spreading, landslides, and expansive soils in accordance with CBC requirements and Special Publication 117A, where applicable. Recommended corrective measures, such as structural reinforcement and replacing native soils with engineered fill, shall be incorporated into project designs. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to building construction.

Significance After Mitigation

Development associated with the proposed land uses would be required under existing law to conform to the current seismic design provisions of the most current version of the CBC, to provide for the latest in earthquake safety and mitigate losses from an earthquake. Proposed developments would also adhere to the local building code requirements that contain seismic safety requirements to resist ground shaking through modern construction techniques. In addition, seismic design criteria is required of all construction and would also apply to transportation projects where adverse effects from ground shaking could occur if the improvements are not designed and constructed in accordance with CBC and local building code requirements. The implementation of roadway improvements would be required to follow design provisions through the most current version of the CBC and local building standards, to employ design standards that consider seismically active areas in order to safeguard against major structural failures or loss of life. Similarly, bridge and overpass design would be required to comply with Caltrans design criteria. Caltrans provides seismic design criteria for new bridges in California, specifying minimum levels of structural system performance, component performance, analysis, and design practices for bridges.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.7(b), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.7–3: Implementation of the proposed Plan could expose people or structures to substantial risk from seismic-related ground failure, including liquefaction.

Impacts of Land Use Projects

Liquefaction typically occurs in areas underlain with loose saturated cohesion-less soils within the upper 50 feet of subsurface materials. These soils, when subjected to ground shaking, can lose their strength resulting from the buildup of excess pore water pressure causing them to behave closer to a liquefied state. As shown in **Figure 2.7-2**, there are many areas throughout the Bay Area region that are considered prone to liquefaction hazards. The full list of PDAs located within liquefaction zones, ranging from very low to very high susceptibility, is shown in Appendix F. Due to the size of the PDAs, each

PDA intersects areas of varying liquefaction potential. According to this regional data, approximately 14 percent of all the PDA land area is located above deposits considered to have a very high potential for liquefaction, 12 percent with high potential, 37 percent moderate, 18 percent low, and 18 percent with very low potential.[14] Other land use projects outside of the PDAs are more widely dispersed and would be located in a range of differing liquefaction potential.

Damage from earthquake-induced ground failure associated with liquefaction could be high in buildings constructed on improperly engineered fills or saturated alluvial sediments that have not received adequate compaction or treatment in accordance with current building code requirements. Ground failure, including liquefaction, as a result of an earthquake could occur in the planning area depending on the underlying conditions including moisture content, relative size of soil particles, and density of subsurface materials within 50 feet of ground surface. Therefore, the potential for adverse ground failure impacts related to land use changes from implementation of the proposed Plan at the regional and local level is considered potentially significant (PS). Mitigation Measure 2.7(b) is described above.

Impacts of Transportation Projects

Liquefaction hazards are generally determined on a site-specific basis although regional mapping of areas considered to have higher liquefaction potential has been conducted throughout the planning area. As noted above for development pursuant to the proposed Plan, ground failure associated with liquefaction could result in damage to transportation improvements if not engineered appropriately. Improvements associated with the proposed transportation projects within the region would include a variety of transit and roadway modifications that could increase the number of people and transit corridors that could potentially be exposed to liquefaction hazards. The full list of transportation projects located within liquefaction zones, ranging from very low to very high susceptibility, is shown in Appendix F.

Therefore, the potential for liquefaction hazards to result in adverse impacts related to improvements associated with the transportation projects at the regional and local level is considered potentially significant (PS) for Impact 2.7-3. Mitigation Measure 2.7(b) is discussed above.

Combined Effects

Implementation of the land use and transportation projects would result in projects being constructed or redeveloped in a range of geologic materials that could be susceptible to liquefaction. Liquefaction hazards are dependent on site-specific conditions and other conditions such as the distance and magnitude of the seismic event. Therefore, liquefaction hazards are considered potentially significant (PS). Mitigation Measure 2.7(b) is discussed above.

Mitigation Measures

Implement Mitigation Measure 2.7(b), included under Impact 2.7-2.

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[14] Approximately 1 percent of PDA areas are mapped as overlying water, including areas such as Lake Merritt in Oakland; this does not necessarily indicate that there are no underlying deposits with liquefaction potential.

Significance After Mitigation

The impacts from ground failure, including liquefaction, from development of proposed land uses associated with the proposed Plan would be addressed through site-specific geotechnical studies prepared in accordance with CBC building code requirements and standard industry practices, as well as State-provided guidance, such as CGS Special Publication 117A, which would specifically address liquefaction especially in areas that have been mapped as seismic hazard zones by the California Geological Survey. Subsequent development would be required to conform to the current seismic design provisions of the CBC to mitigate losses from ground failure as a result of an earthquake. These future projects would also be required to adhere to the local general plans and local building code requirements that contain seismic safety requirements to resist ground failure through modern construction techniques. The implementation of roadway improvements would also be required to identify potential liquefaction hazards and design improvements to meet the most current version of the CBC and local building standards, by employing geotechnical practices such as ground treatment, replacement of existing soils with engineered fill, or use of deep foundation systems to anchor improvements into more competent materials. Similarly, bridge and overpass design would be required to comply with Caltrans design criteria. As stated previously, Caltrans provides seismic design criteria for new bridges in California, specifying minimum levels of structural system performance, component performance, analysis, and design practices for bridges that would include minimizing damage that could be expected from potential liquefaction hazards.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.7(b), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.7–4: Implementation of the proposed Plan could expose people or structures to substantial risk related to landslides.

Impacts of Land Use Projects

The planning area includes a wide range of topographical conditions where landslide hazards vary from very low in low lying areas to very high in some upland areas especially areas with slopes that exceed 15 percent. **Figure 2.7-3** shows areas throughout the region that are considered prone to landslide hazards which can be induced from either seismic conditions, periods of heavy precipitation, or simply through static conditions. The list of PDAs located within landslide zones ranging from surficial deposits on relatively flat terrain to "mostly" landslides is found in Appendix F. Due to the size of the PDAs, each PDA intersects areas of varying landslide potential. According to this regional data, approximately 0.5 percent of all the PDA land area is located in areas mapped as "mostly landslides," 12 percent mapped as "few landslides," 85 percent surficial deposits, and 2 percent mapped as surface water.[15] Development outside of these PDAs is fairly widely dispersed across a variety of terrain but would likely follow a similar breakdown of landslide hazard areas.

Earthquake-induced landslides could occur in unstable upland areas where previous landslide stabilization measures have not been employed. Landslides may occur on slopes of 15 percent or less; however, the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges. Landslide-susceptible areas are characterized by steep slopes and downslope creep of surface materials.

Therefore, the potential for adverse landslide impacts related to land use changes from implementation of the proposed Plan at the regional and local level is considered potentially significant (PS) for Impact 2.7-4. Mitigation Measure 2.7(b) is discussed above.

Impacts of Transportation Projects

In general, upland areas with slopes greater than 15 percent tend to have higher landslide hazards. Regional mapping of areas considered to have higher landslide potential has been conducted throughout the region (see **Figure 2.7-3**). The list of transportation projects located within landslide zones ranging from surficial deposits on relatively flat terrain to "mostly" landslides is shown in Appendix F. As noted above for the land use projects, landslides could result in damage to transportation improvements, particularly if not engineered appropriately. Improvements associated with the transportation projects within the region would include a variety of transit modifications that could potentially be subject to landslide hazards. According to the GIS data, the majority (approximately 75 percent) of the transportation projects are located on surficial deposits with low landslide potential and only two percent are located in areas mapped as "mostly landslides."

Therefore, the potential for landslide hazards to result in adverse impacts related to improvements associated with the transportation projects at the regional and local level is considered potentially significant (PS) for Impact 2.7-4. Mitigation Measure 2.7(b) is discussed above.

Combined Effects

Proposed land use and transportation projects would be located over a range of differing topography. However, as noted above, the majority of the PDAs and transportation projects are located in relatively level areas. Landslide hazards are dependent on site-specific conditions, including the steepness of slopes, and other conditions such as, in the case of seismically induced landslides, the distance and magnitude of the seismic event. Landslide hazards would have a potentially significant (PS) impact. Mitigation Measure 2.7(b) is discussed above.

Mitigation Measures

Implement Mitigation Measure 2.7(b), included under Impact 2.7-2.

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[15] Areas mapped as "mostly landslides" refer to areas considered to have the highest potential for landslides, whereas surficial deposits have the lowest potential.

Significance After Mitigation

Similar to liquefaction hazard areas, the CGS has defined areas that are considered to be highly susceptible to earthquake induced landslide hazards. Development in these areas is required to adhere to geotechnical investigation requirements as detailed in Special Publication 117A. The impacts from landslides on development of future land uses associated with the proposed Plan would be addressed through site-specific geotechnical studies prepared in accordance with CBC building code requirements and standard industry practices as well as State provided guidance, such as CGS Special Publication 117A, which would specifically address landslide hazards located in landslide hazard zones. Development would conform to the current design provisions of the CBC to mitigate losses from landslides. Proposed developments would also adhere to the local general plans, and local building code requirements that can contain hillside development requirements to resist landslides through modern construction design and slope stabilization techniques.

The implementation of roadway improvements would be required to identify potential slope stability hazards and provide slope stabilization measures to meet the most current version of the CBC, and local building standards, by employing geotechnical practices such as use of retaining walls, setback requirements, and deep foundation systems. Incorporation of slope stability measures such as these, in accordance with CBC code requirements, would be effective in minimizing landslide hazards on proposed transportation improvements.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.7(b), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.7-5: Implementation of the proposed Plan could result in substantial soil erosion or the loss of topsoil.

Impacts of Land Use Projects

Development associated with the proposed Plan would likely include earthwork activities that could expose soils to the effects of erosion or loss of topsoil. Once disturbed, either through removal of vegetation, asphalt, or an entire structure, stockpiled soils if not managed appropriately are left exposed to the effects of wind and water. Generally, earthwork and ground-disturbing activities, unless below minimum requirements, require a grading permit, compliance with which minimizes erosion, and local grading ordinances ensure that construction practices include measures to protect exposed soils such as limiting work to dry seasons, covering stockpiled soils and use of straw bales and silt fences to minimize offsite sedimentation.

However, the potential for loss of topsoil or erosion impacts related to land use changes from implementation of the proposed Plan at the regional and local level is considered potentially significant (PS) for Impact 2.7-5. Mitigation Measure 2.7(c) is discussed below.

Impacts of Transportation Projects

Transportation projects within the region would also include earthwork activities that would disturb underlying soils during construction potentially exposing them to erosion and loss of topsoil.

Therefore, the potential for loss of topsoil or erosion impacts related to improvements associated with the transportation projects included in the proposed Plan at the regional and local level is considered potentially significant (PS) for Impact 2.7-5. Mitigation Measure 2.7(c) is discussed below.

Combined Effects

As noted above, construction associated with both the land use and transportation projects would include ground disturbances that could expose underlying soils to the effects of erosion. Therefore, erosion hazards and the potential for loss of topsoil would have a potentially significant (PS) impact. Mitigation Measure 2.7(c) is discussed below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.7(c) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce the risk of soil erosion, implementing agencies shall require project sponsors to comply with National Pollution Discharge Elimination System (NPDES) General Construction Permit requirements. Implementing agencies shall require project sponsors, as part of contract specifications with contractors, to prepare and implement best management practices (BMPs) as part of a Stormwater Pollution Prevention Plan that include erosion control BMPs consistent with California Stormwater Quality Association Handbook for Construction. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to construction practices.

Significance After Mitigation

Development that disturbs more than one acre is subject to compliance with a National Pollutant Discharge Elimination System (NPDES) permit, including the implementation of best management practices (BMPs), some of which are specifically implemented to reduce soil erosion or loss of topsoil, and the implementation of a stormwater pollution prevention plan (SWPPP) through the local jurisdiction. BMPs that are required under a SWPPP would include erosion prevention measures that have proven effective in limiting soil erosion and loss of topsoil. Generally, once construction is complete and exposed areas are revegetated or covered by buildings, asphalt, or concrete, the erosion hazard is substantially eliminated or reduced. As with land use development, earthwork activities for transportation projects would be required to adhere to NPDES permit requirements for construction, as well as any local grading ordinance requirements that may include erosion prevention measures. Incorporation of erosion control BMP measures such as use of straw bales, inlet protective measures, silt fences, and construction scheduling, in accordance with grading code and any revegetation requirements, would be effective in minimizing erosion hazards and loss of topsoil associated with transportation improvements.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.7(c), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.7-6: Implementation of the proposed Plan could locate a subsequent development project on a geologic unit or soil that is unstable, contains expansive properties, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

Impacts of Land Use Projects

Some land use development associated with implementation of the proposed Plan could be located on geologic units or soils that are unstable, or that could become unstable and result in geologic hazards. Areas with underlying materials that include undocumented fills, soft compressible Bay Mud deposits, or loose debris could be inadequate to support development especially multi-story buildings. Soils that exhibit expansive properties when exposed to varying moisture content and over time could result in damage to foundations, walls, or other improvements. Structures, including residential units and commercial buildings, could be damaged as a result of a settlement or differential settlement where structures are underlain by materials of varying engineering characteristics. Construction of new structures in the vicinity of relatively steep slopes could provide additional loading causing landslides or slope failure from unstable soils or geologic units. Slope failure can occur naturally through rainfall or seismic activity, or through earthwork and grading related activities.

Most of the new development would primarily occur adjacent to existing development that may have already been evaluated for unstable soil or geologic units.

Nonetheless, the potential for landslide, lateral spreading, subsidence, liquefaction, or collapse impacts related to land use changes from implementation of the proposed Plan at the regional and local level is considered potentially significant (PS) for Impact 2.7-6. Mitigation Measure 2.7(b) is discussed above.

Impacts of Transportation Projects

Transportation projects within the planning area would include a variety of transit modifications that could be located on unstable soil or geologic units. In general, many of the transportation projects would be located in areas where previous roads or other improvements have occurred and any unstable soils or geologic units would have been addressed at the time of construction. However, some of these may have been addressed under older code requirements that may not be as stringent as current codes.

Therefore, the potential for unstable soils or geologic units hazards to result in adverse impacts related to improvements associated with the Transportation projects at the regional and local level is considered potentially significant (PS) for Impact 2.7-6. Mitigation Measure 2.7(b) is discussed above.

Combined Effects

Both the land use and transportation projects would be located on a wide range of different geologic materials and conditions. Hazards associated with unstable soils or geologic units are dependent on site-specific conditions as well as the specific nature of the individual project proposed. Therefore, the proposed Plan would have a potentially significant (PS) impact. Mitigation Measure 2.7(b) is discussed above.

Mitigation Measures

Implement Mitigation Measure 2.7(b), included under Impact 2.7-2.

Significance After Mitigation

The potential hazards of unstable soil or geologic units would be addressed largely through the integration of geotechnical information in the planning and design process for projects to determine the local soil suitability for specific projects in accordance with standard industry practices and state-provided requirements, such as CBC requirements, CGS Special Publication 117A for liquefaction and landslide hazards in seismic hazard zone, used to minimize the risk associated with these hazards. These measures generally are enforced through compliance with local building codes and ordinances, to avoid or reduce hazards relating to unstable soils and slope failure. Geotechnical investigations as required by grading ordinances, Special Publication 117A, and current CBC building code requirements would also address the identification, evaluation, and recommended measures for addressing potential hazards that may be present at proposed transportation improvement project sites. With implementation of grading permit and building code requirements including seismic design criteria as required by the CBC, Caltrans, Special Publication 117A, and local building code requirements, all improvements and development associated with both the land use development and transportation projects would be designed to minimize potential risks related to unstable soils and geologic units.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.7(b), the impact is found to be less than significant with mitigation (LS-M).

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2.8 Water Resources

This chapter analyzes the surface water and groundwater resources of the Bay Area in relation to the location of projects comprising the proposed Plan. Stormwater runoff, flooding and inundation hazards are also addressed in this chapter. For a discussion of sea (and bay) level rise impacts, see *Chapter 2.5: Climate Change and Greenhouse Gases*. For a discussion of water supply impacts, see *Chapter 2.12*: *Public Utilities and Facilities*.

Environmental Setting

PHYSICAL SETTING

Climate

Climatic conditions in the Bay Area are generally characterized as Mediterranean with moist, mild winters and hot, dry summers. However, the region's varied topography creates several microclimates dependent upon elevation, proximity to the San Francisco Bay or coast, and orientation. As a result, stark climatic differences reflected in temperature, rainfall amounts, and evapotranspiration can occur over relatively short distances. The Bay Area is largely governed by weather patterns originating in the Pacific Ocean, primarily by the southern descent of the Polar Jet Stream bringing with it mid-latitude cyclonic storms in winter. More than 90 percent of precipitation in the Bay Area falls between November and April. Bay Area lowlands (i.e., valley bottoms) receive an annual rainfall of about 15 to 20 inches in the South Bay and about 20 to 25 inches in the North Bay. Higher elevations in the region, particularly along the north- or west-facing slopes of the North Bay, may receive over 40 inches of rain per year. In the summer, the Hawaiian High Pressure cell over the northern Pacific creates mild and dry weather for the region. However, summer in the Bay Area is also known for its thick marine fog layer, which is brought into the Bay by a diurnal westerly breeze formed by the strong pressure gradient between the hot Central Valley and the cooler coastal areas. This moist air is cooled to dewpoint when it crosses the cooler waters of the California Current near the coast. This advection process results in a thick fog forming just offshore, which is pulled eastward through gaps and passes into the Bay Area. Fog diminishes with distance inland from the Bay.[1] **Table 2.8-1** summarizes monthly and annual average precipitation for select sites throughout the Bay Area.

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[1] California Department of Water Resources and the California Water Boards, *San Francisco Bay Integrated Water Management Plan*, 2006.

TABLE 2.8-1: AVERAGE MONTHLY PRECIPITATION, SELECTED BAY AREA SITES

	Inches[1]												
Site	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***Annual***
Fairfield (1950-2012)	4.8	4.0	3.1	1.4	0.6	0.2	0.0	0.1	0.2	1.3	2.8	4.3	**22.7**
Napa, State Hospital (1893-2012)	5.1	4.4	3.4	1.7	0.7	0.2	0.0	0.1	0.3	1.4	3.0	4.5	**24.7**
Oakland, Airport (1948-2012)	3.7	2.7	2.6	1.4	0.4	0.2	0.0	0.1	0.2	1.1	2.5	3.1	**18.0**
Redwood City (1906-2012)	4.4	3.5	2.7	1.2	0.4	0.1	0.0	0.1	0.2	1.0	2.1	3.5	**19.2**
Richmond (1950-2012)	4.8	3.8	3.3	1.7	0.5	0.2	0.0	0.1	0.2	1.3	2.9	4.4	**23.2**
San Francisco, Mission Dolores (1914-2012)	4.4	3.8	2.9	1.4	0.6	0.2	0.0	0.1	0.2	1.1	2.6	4.0	**21.2**
San José (1893-2012)	2.9	2.7	2.3	1.2	0.4	0.1	0.0	0.1	0.2	0.8	1.5	2.4	**14.6**
San Rafael, Civic Center (1894-2012)	8.1	6.5	4.7	2.0	0.7	0.2	0.0	0.1	0.4	1.9	4.1	6.8	**35.6**
Santa Rosa (1902-2012)	6.2	5.3	4.1	2.1	1.0	0.3	0.0	0.1	0.4	1.6	3.6	5.5	**30.1**

1. Rounded to the nearest one-tenth of an inch.

Source: Western Regional Climate Center website, www.wrcc.dri.edu, accessed July 2012

Regional Hydrology

The San Francisco Bay estuary system is one of the largest in t he country and drains approximately 40 percent of California. Water from the Sacramento and San Joaquin Rivers of the Central Valley flow into what is known as the Delta region, then into the sub-bays, Suisun Bay and San Pablo Bay, and finally into the Central Bay and out the Golden Gate. The Delta is a large triangle of interconnected sloughs and agricultural "islands" that forms a key link in California's water delivery system. Some of the fresh water flows through the Delta and into Bay, but much is diverted from the Bay. Nearly half of the surface water in California starts as rain or snow that falls within the watershed and flows downstream toward the Bay. Much of the water flowing toward the Bay is diverted for agricultural, residential, and industrial purposes as well as delivery to distant cities of southern California as part of state and federal water projects.

The two major drainages, the Sacramento and San Joaquin Rivers receive more than 90 percent of runoff during the winter and spring months from rainstorms and snow melt. San Francisco Bay encompasses approximately 1,600 square miles and is surrounded by the nine Bay Area counties of which seven border the Bay. Other surface waters flow either directly to the Bay or Pacific Ocean. The drainage basin that contributes surface water flows directly to the Bay covers a total area of 3,464 square miles. The largest watersheds include Alameda Creek (695 square miles), the Napa River (417 square miles), and Coyote Creek (353 square miles) watersheds. The San Francisco Bay estuary includes deep-water channels, tidelands, and marshlands that provide a variety of habitats for plants and animals. The salinity of the water varies widely as the landward flows of saline water and the seaward flows of fresh water converge near the Benicia Bridge. The salinity levels in the Central Bay can vary from near oceanic levels to one-quarter as much, depending on the volume of freshwater runoff.

Surface Waters

Surface waters in the Bay Area include freshwater rivers and streams, coastal waters, and estuarine waters. Many of the original drainages toward the San Francisco Bay have been channelized and put underground in areas through the urbanization of the area, though a few still remain. Estuarine waters include the San Francisco Bay Delta from the Golden Gate to the Sacramento and San Joaquin Rivers, and the lower reaches of various streams that flow directly into the Bay, such as the Napa and Petaluma Rivers in the North Bay and the Coyote and San Francisquito Creeks in the South Bay. Major water bodies, including creeks and rivers, in the Bay Area are presented in **Figure 2.8-1**. Major rivers and streams are also listed below by county:

- Alameda County: Alameda Creek, San Leandro Creek, San Lorenzo Creek
- Contra Costa County: San Pablo Creek
- Marin County: Corte Madera Creek, Lagunitas Creek, Gallinas Creek, Miller Creek, Novato Creek
- Napa County: Huichica Creek, Napa River
- San Francisco City and County: None
- San Mateo County: Cordilleras Creek, San Mateo Creek, Sanchez Creek
- Santa Clara County: Adobe Creek, Coyote Creek, Guadalupe River, Llagas Creek (drains to the Pacific Ocean via the Pajaro River), Los Gatos Creek, Permanente Creek, San Francisquito Creek, Steven's Creek
- Solano County: Green Valley Creek, Napa River, Putah Creek, Suisun Creek
- Sonoma County: Petaluma River, Russian River, Santa Rosa Creek, Sonoma Creek

Groundwater

A groundwater basin is defined as an area underlain by permeable materials capable of furnishing a significant supply of groundwater to wells or storing a significant amount of water. Groundwater basins are considered as three-dimensional units defined by physical barriers that contain flow. Groundwater basins are closely linked to local surface waters. As water flows from the hills toward San Francisco Bay, it percolates through permeable soils into the groundwater basins. The entire Bay Area region is divided into a total of 28 groundwater basins and two of those basins (Napa-Sonoma Valley and Santa Clara Valley) are further divided into sub-basins. The ten primary groundwater basins in the Bay Area are the Petaluma Valley, Napa-Sonoma Valley, Suisun-Fairfield Valley, San Joaquin Valley, Clayton Valley, Diablo Valley, San Ramon Valley, Livermore Valley, Sunol Valley, and Santa Clara Valley basins.

Groundwater in the region is used for numerous purposes, including municipal and industrial water supply. However, groundwater use accounts for only about five percent of the total water usage. In general, many of the water bearing units, or aquifers, are relatively thin and yield relatively low amounts of groundwater. Groundwater quality varies significantly throughout the Bay Area with some areas of poor water quality as a result of past industrial uses or intrusion of brackish Bay water. Some of the larger basins such as Santa Clara Valley, Napa-Sonoma Valley, and Petaluma Valley have much thicker aquifers that can produce larger volumes of groundwater and generally have good water quality. Therefore, based on water quality and available resources, water supply for much of the Bay Area is provided by imported water supplies through water conveyance facilities such as the Hetch Hetchy Aqueduct, the Mokelumne Aqueduct, the North and South Bay Aqueduct, and others. A detailed discussion of water supply is included in *Chapter 2.12: Public Utilities and Facilities.*

Surface Water Quality

The quality of regional surface water resources within the Bay Area region varies considerably and is locally affected by point-source and nonpoint-source discharges throughout individual watersheds. Regulated point sources such as wastewater treatment effluent and industrial waste discharges usually involve a single point discharge into receiving waters. Point-source pollutants can also enter water bodies from urban runoff that include oil and gasoline by-products from parking lots, streets, and freeways that are collected in drainage systems and discharged directly to surface waters. Copper from brake linings and lead from counterweights contribute heavy metals to local waters. In addition, impervious surfaces increase runoff quantities, taxing flow capacities of local flood control systems and deteriorating natural habitats. Most urban runoff flows untreated into creeks, lakes, and San Francisco Bay. Other pollutant sources include upstream historic and current mining discharges and legacy pollutants that were historically emitted by industry or other human activities, but are currently banned or significantly restricted from current usage. Examples include mercury, lead, PCBs, and DDT.

Nonpoint-source pollutants are transported into surface waters through rainfall, air, and other pathways. The nonpoint-source pollutants originate from many diffuse sources and are the leading cause of water quality degradation in the region's waterways. The sources include: pesticides, oils, and other organic materials; pesticide and sediment erosion from agricultural practices; sediment erosion from forestry roads; and pump-out spillages in marinas.

Regionally, stormwater runoff is estimated to contribute more heavy metals to San Francisco Bay than direct municipal and industrial dischargers, as well as significant amounts of motor oil, paints, chemicals, debris, grease, and detergents. Runoff in storm drains may also include pesticides and herbicides from landscaping products and bacteria from animal waste. As point-source discharges of pollution have been brought under control, the regulatory focus has shifted to nonpoint-source discharges.

In addition to the degradation of water quality in many of the region's surface waters, many of the region's creeks are channelized, culverted, or otherwise geomorphically altered, which has had adverse impacts on aquatic and riparian habitats, sediment transfer, and hydrology. There are also water quality impacts in the more rural areas of the region from grazing and agriculture, confined animal facilities, onsite sewage systems, and land conversions. Coastal watersheds are impaired due to impacts from sedimentation and habitat degradation.

Figure 2.8-1

Major Rivers, Creeks, and Other Water Bodies

Data Source: National Hydrography Dataset, 2007; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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The San Francisco Bay Regional Water Quality Control Board (SFRWQCB) has classified the San Francisco Bay and many of its tributaries as impaired for various water quality constituents. The Clean Water Act requires that states identify water bodies that do not meet water quality standards (see Regulatory Setting discussion in this chapter). Total Maximum Daily Loads (TMDLs) are action plans to restore clean water by examining these water quality problems, identifying sources of pollutants, and specifying actions that create solutions. Within the Bay Area region, the 2010 303(d) list (as defined below in Regulatory Settings discussion) includes more than 270 listings in 88 water bodies.[2] Water Board staff are currently developing TMDL projects or studies to address more than 160 of these listings. Completed and current TMDL projects in the Bay Area are shown in **Figure 2.8-2** and listed below.[3]

Completed TMDL Projects:

- Guadalupe River Watershed – Mercury
- Napa River –Sediment and Pathogens
- Richardson Bay – Pathogens
- San Francisco Bay – Mercury and PCBs
- Sonoma Creek – Pathogens and Sediment
- Tomales Bay – Mercury and Pathogens
- Urban Creeks – Pesticide Toxicity
- Walker Creek – Mercury

TMDL Projects in Development:

- Butano and Pescadero Creeks – Sediment
- Lagunitas Creek – Sediment
- Napa River – Nutrients
- North San Francisco Bay – Selenium
- San Francisquito Creek – Sediment
- San Pedro Creek and Pacifica State Beach – Indicator Bacteria
- Sonoma Creek –Nutrients
- Suisun Marsh – Low Dissolved Oxygen/Organic Enrichment, Mercury, Nutrients, and Salinity
- Walker Creek – Sediment

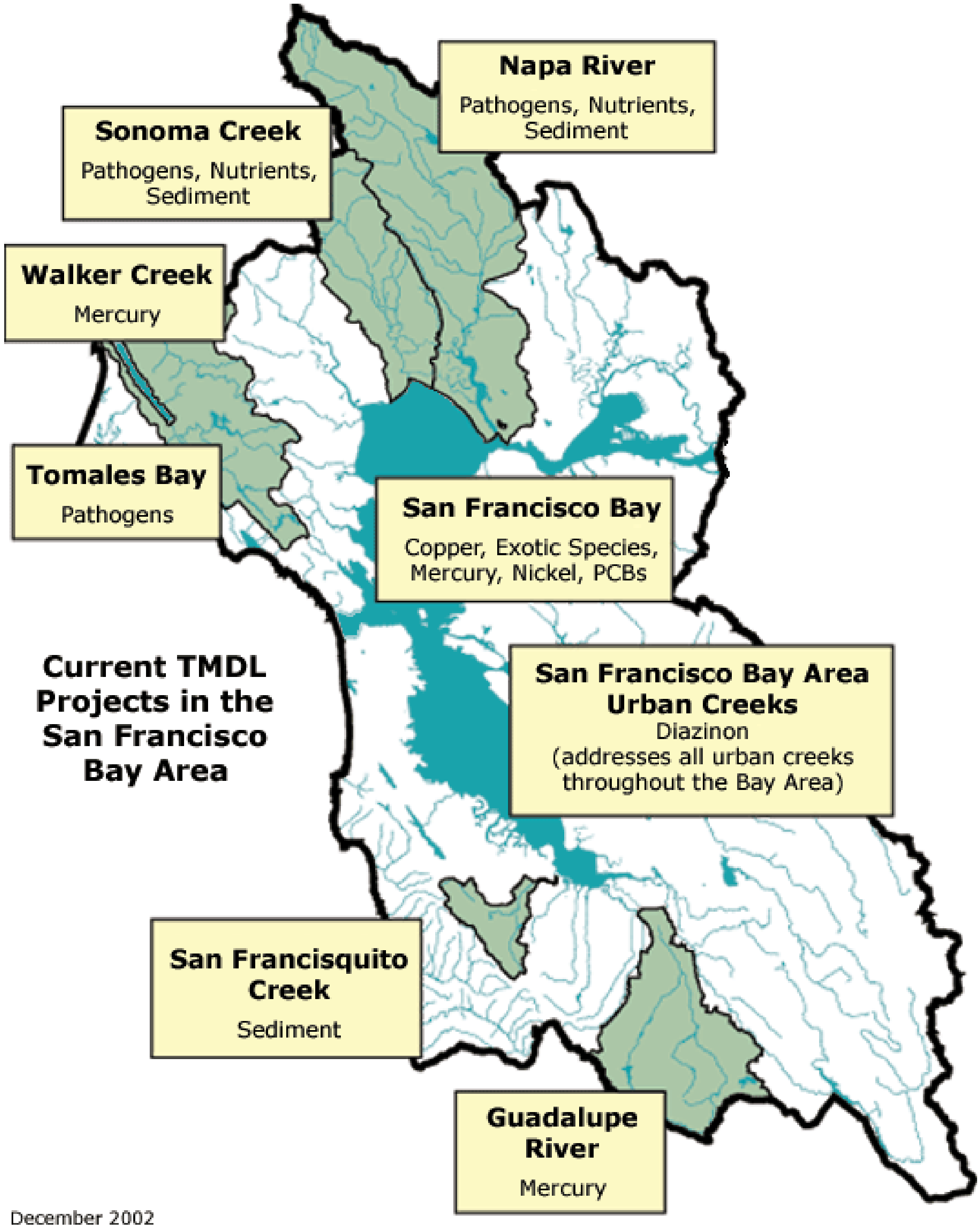
[2] Regional Water Quality Control Board, San Francisco Region (SFRWQCB), *Total Maximum Daily Loads (TMDLs) and the 303(d) List of Impaired Water Bodies*, http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/, accessed August, 7, 2012.

[3] Ibid.

TMDLs account for all pollutant sources, including discharges from wastewater treatment facilities; runoff from homes, agriculture, and streets or highways; "toxic hot spots;" and deposition from the air. The specific urban runoff Best Management Practices (BMPs) and level of implementation that will be required in TMDLs will be determined through TMDL development. The amount of pollution reductions anticipated suggests TMDLs will require significant increases in resources applied to urban runoff control and significant changes in scope and approach to urban runoff control programs.[4]

[4] San Francisco Bay Area Integrated Regional Water Management Plan Coordinating Committee (Coordinating Committee), San Francisco Bay Area IRWM Region, Background Section, also available at http://www.water.ca.gov/irwm/docs/ResourcesLinks/Submitted_Applications/P84_Round1_Planning/MarinMunicipalWaterDistrict/Att3_PG1_WorkPlan_1of2.pdf, September 28, 2010.

Figure 2.8-2: Current TMDL Projects in San Francisco Bay Area



Source: SFRWQCB, 2012

Flood Hazards

The San Francisco Bay contains many flat low-lying marginal areas and highly developed valleys with surrounding steep terrain that is conducive to flooding, especially during intense storms. Due to the topography of alluvial plains, floodwaters escaping some stream channels may flow away from the flooding stream, crossing open areas or flowing through city streets until reaching an adjacent watercourse. This type of flooding compounds and exacerbates local flooding that occurs when storm drains and small channel become blocked or surcharged during storms.

Flood protection agencies have constructed major flood protection infrastructure projects along the following waterways to reduce the impacts of flooding[5]:

- Alameda Creek
- Corte Madera Creek
- Coyote Creek
- Guadalupe River
- Napa River
- Novato Creek
- Petaluma River
- San Francisquito Creek

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program. The program provides subsidized flood insurance to communities that comply with FEMA regulations to limit development in floodplains. FEMA issues Flood Insurance Rate Maps for communities participating in the National Flood Insurance Program. **Figure 2.8-3** identifies federally designated 100-year storm event flood hazard zones in the Bay Area.

FEMA further classifies high risk flood hazard zones for communities that participate in the National Flood Insurance Program where mandatory flood insurance purchase requirements apply, as shown in **Table 2.8-2.**

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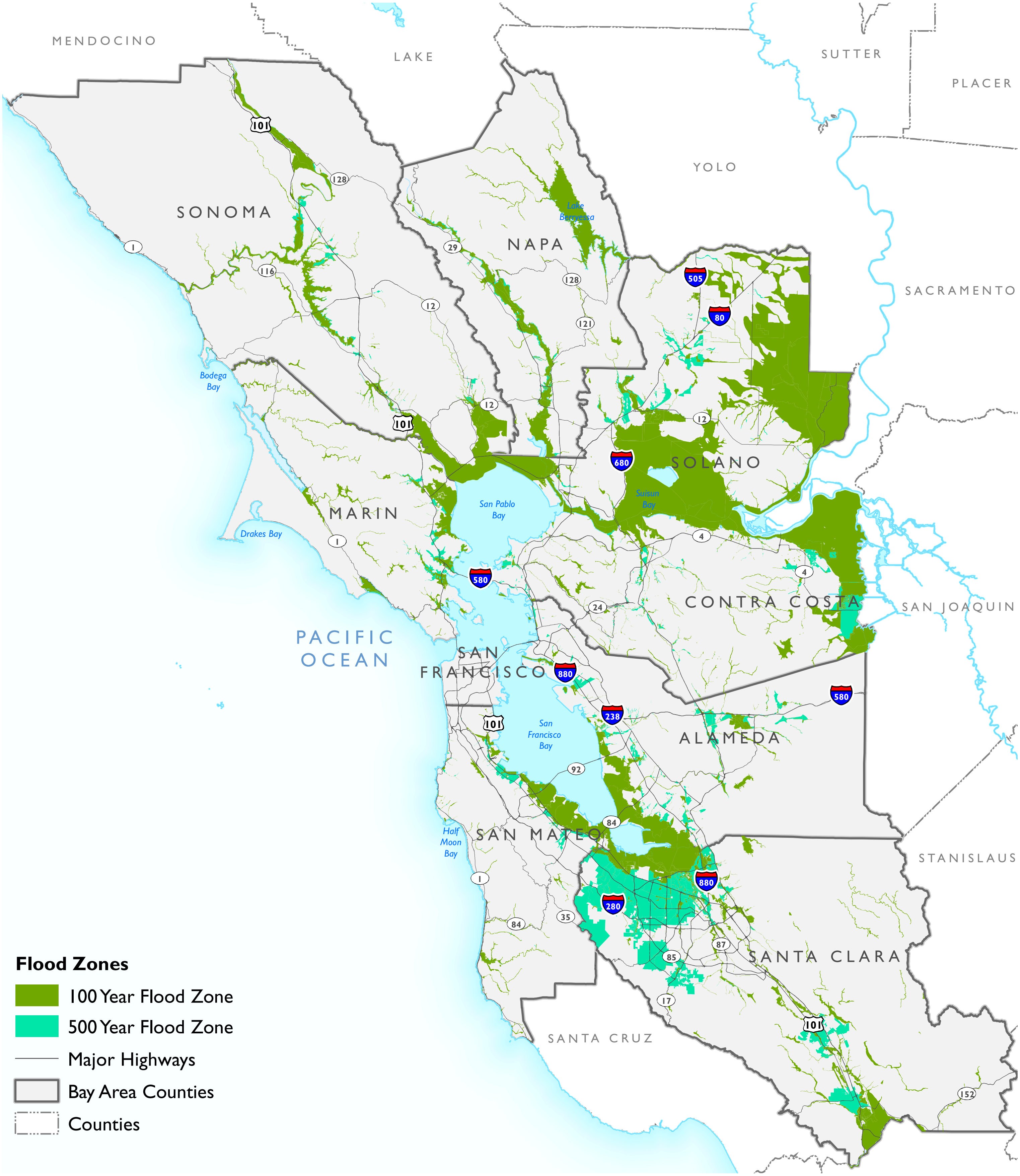
[5] Ibid.

Figure 2.8-3
Flood Hazard Areas



Data Source: Federal Emergency Management Agency (FEMA), 2007-2010; ESA, 2012;
Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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TABLE 2.8-2: FLOOD HAZARD ZONE CLASSIFICATION

Zone	*Description*
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.
High Risk Coastal Areas	
V	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
VE, V1 - 30	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

All local jurisdictions regulate development within floodplains. Construction standards are established within local ordinances and planning elements to reduce flood impedance, safety risks, and property damage. Historic floods in the Bay Area have been devastating. In response, local flood control agencies and the U.S. Army Corps of Engineers have established extensive flood control projects, including dams and improved channels many of which continue to be repaired, constructed, and completed. Concrete and riprap levees and river bottoms have significantly reduced riparian habitats throughout the region.

Seiches and Tsunamis

A seiche is defined as a surface water free or standing wave oscillation that is contained within a partially or completely enclosed basin. Seiche is initiated by some event occurring within the enclosed basin – commonly meteorological (e.g., wind or pressure changes), geologic (e.g., earthquake), or other mass movement such as a surface or subsurface landslide, which results in a sloshing of water within the basin as it reflects off the perimeter of the basin. San Francisco Bay is partially enclosed, with outlets to San Pablo Bay, as well as the Pacific Ocean via the Golden Gate, and is relatively shallow, with a mean depth of approximately 27.6 feet.[6] Geologic-induced seiche events have not been documented in San Francisco Bay and meteorological effects are quickly dissipated due to the connection with the Pacific Ocean.

A tsunami is a series of waves generated in a body of water by a rapid disturbance (e.g., submarine seismic, volcanic, or landslide event) that vertically displaces water. Tsunamis affecting the Bay Area can result from offshore earthquakes within the Bay Area or from distant events. While it is most common for tsunamis to be generated by subduction faults such as those in Washington and Alaska, local tsunamis can be generated from strike-slip faults (such as the small one that was triggered by the 1906 San Andreas earthquake). The 1964 Alaska earthquake caused extensive tsunami damage that flooded and heavily damaged coastal northern California near Crescent City. Along the coast of San Francisco, Marin and Sonoma counties, maximum wave heights of 1.1 meters were recorded and no significant damage was experienced during that 1964 event. The 2011 Honshu, Japan, earthquake caused tsunami damage in Santa Cruz, Crescent City, and Berkeley.

REGULATORY SETTING

Federal Regulations

Clean Water Act

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into "waters of the United States." The Act specifies a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. Some of these tools include:

- Section 303(d) – Total Maximum Daily Loads (TMDLs)
- Section 401 – Water Quality Certification
- Section 402 – National Pollutant Discharge Elimination System (NPDES) Program
- Section 404 – Discharge of Dredge or Fill Material

Section 303(d) requires states, territories, and authorized tribes to develop a list of water-quality limited segments of rivers and other water bodies under their jurisdiction. These waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for

[6] Calculated from U.S. Geological Survey. San Francisco Bay Bathymetry 2007. http://sfbay.wr.usgs.gov/sediment/sfbay/geostat.html.

waters on the list and develop action plans, called Total Maximum Daily Loads, to improve water quality. These are action plans designed to improve the quality of water resources. As part of the TMDL process, municipalities must examine the water quality problems and identify sources of pollutants in order to create specific actions designed to improve water quality.

Section 401 requires every applicant for a federal permit or license for any activity that may result in a discharge to a water body to obtain a water quality certification that the proposed activity will comply with applicable water quality standards.

Section 402 regulates point-source discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program. In California, the State Water Resources Control Board (State Water Board or SWRCB) oversees the NPDES program, which is administered by the Regional Water Quality Control Boards (RWQCBs). The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits. The NPDES program covers municipalities, industrial activities, and construction activities. The NPDES program includes an industrial stormwater permitting component that covers ten categories of industrial activity that require authorization under an NPDES industrial stormwater permit for stormwater discharges. Construction activities, also administered by the State Water Board, are discussed below. Section 402(p) of the federal Clean Water Act, as amended by the Water Quality Act of 1987, requires NPDES permits for stormwater discharges from municipal separate storm sewer systems (MS4s), stormwater discharges associated with industrial activity (including construction activities), and designated stormwater discharges, which are considered significant contributors of pollutants to waters of the United States. On November 16, 1990, USEPA published regulations (40 CFR Part 122), which prescribe permit application requirements for MS4s pursuant to CWA 402(p). On May 17, 1996, USEPA published an Interpretive Policy Memorandum on Reapplication Requirements for Municipal Separate Storm Sewer Systems, which provided guidance on permit application requirements for regulated MS4s. MS4 permits include requirements for post-construction control of stormwater runoff in what is known as Provision C.3. The goal of Provision C.3 is for the Permittees to use their planning authorities to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flows from new development and redevelopment projects. This goal is to be accomplished primarily through the implementation of low impact development (LID) techniques.

Section 404 establishes a permit program, administered by the United States Army Corps of Engineers (USACE), to regulate the discharge of dredge or fill materials into waters of the U.S., including wetlands. Activities in waters of the U.S. that are regulated under this program include fills for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry. CWA Section 404 permits are issued by USACE.

Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act, administered by USACE, requires permits for all structures (such as riprap) and activities (such as dredging) in navigable waters of the U.S.

Executive Order 11990 - Protection of Wetlands

This Executive Order is an overall wetlands policy for all agencies managing federal lands, sponsoring federal projects, or providing federal funds to state or local projects. This Executive Order requires that when a construction project involves wetlands, a finding must be made by the federal agency that there is no practicable alternative to such construction, and that the proposed action includes all practicable measures to minimize impacts to wetlands resulting from such use.

Executive Order 11988 - Floodplain Management

Executive Order 11988 directs federal agencies to avoid to the extent practicable and feasible short- and long-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Further, this Executive Order requires the prevention of uneconomic, hazardous, or incompatible use of floodplains; protection and preservation of the natural and beneficial floodplain values; and consistency with the standards and criteria of the National Flood Insurance Program (NFIP).

Federal Highway Administration regulations require that a local hydraulic study and risk assessment be performed where a planned facility or action would encroach on a base floodplain or support incompatible floodplain development. When the hydraulic study indicates significant encroachment, findings must be made that it is the only practicable alternative. The hydraulic study and risk assessment protocol are set forth in the Caltrans Highway Design Manual (Caltrans 2010). This manual provides guidance and procedures whenever an encroachment permit is anticipated.

National Flood Insurance Act

The U.S. Congress passed the National Flood Insurance Act (NFIA) in 1968 and the Flood Disaster Protection Act in 1973 to restrict certain types of development on floodplains and to provide for a national flood insurance program (NFIP). The purpose of these acts is to reduce the need for large, publicly funded flood control structures and disaster relief. The NFIP is a federal program administered by the Flood Insurance Administration of FEMA. It enables individuals who have property (a building or its contents) within the 100-year floodplain to purchase insurance against flood losses. Community participation and eligibility, flood hazard identification, mapping, and floodplain management aspects are administered by state and local programs and support directorate within FEMA. FEMA works with the states and local communities to identify flood hazard areas and publishes a flood hazard boundary map of those areas. Floodplain mapping is an ongoing process in the Bay Area and flood maps must be regularly updated for both major rivers and tributaries as land uses and development patterns change.

State Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act established the State Water Resources Control Board and divided the state into nine regions, each overseen by a regional water quality control board (RWQCB). The nine regional boards have the primary responsibility for the coordination and control of water quality within their respective jurisdictional boundaries. Under the Porter-Cologne Water Quality Control Act, water quality objectives are limits or levels of water quality constituents or characteristics established for the purpose of protecting beneficial uses. The Act requires the RWQCBs to establish water quality objectives while acknowledging that water quality may be changed to some degree without unreasonably affecting beneficial uses. Designated beneficial uses, together with the corresponding water quality objectives, also constitute water quality standards under the federal Clean Water Act. Therefore, the water quality objectives form the regulatory references for meeting state and federal requirements for water quality control.

Each RWQCB is required to prepare and update a Basin Plan for their jurisdictional area. Pursuant to the CWA NPDES program, the RWQCB also issues permits for point source discharges that must meet the water quality objectives and must protect the beneficial uses defined in the Basin Plan.

Construction General Permit

The California Construction Stormwater Permit (Construction General Permit)[7], adopted by the State Water Resources Control Board, regulates construction activities that include clearing, grading, and excavation resulting in soil disturbance of at least one acre of total land area. The Construction General Permit authorizes the discharge of stormwater to surface waters from construction activities. It prohibits the discharge of materials other than stormwater and authorized non-stormwater discharges and all discharges that contain a hazardous substance in excess of reportable quantities established at 40 Code of Federal Regulations 117.3 or 40 Code of Federal Regulations 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

The Construction General Permit requires that all developers of land where construction activities will occur over more than one acre do the following:

- Complete a Risk Assessment to determine pollution prevention requirements pursuant to the three Risk Levels established in the General Permit;
- Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the Nation;
- Develop and implement a Stormwater Pollution Prevention Plan (SWPPP), which specifies Best Management Practices that will reduce pollution in stormwater discharges to the Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology standards; and
- Perform inspections and maintenance of all BMPs.

In order to obtain coverage under the NPDES Construction General Permit, the Legally Responsible Person must electronically file all Permit Registration Documents with the SWRCB prior to the start of construction. Permit Registration Documents must include:

- Notice of Intent;
- Risk Assessment;
- Site Map;

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[7] *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities,* Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ, National Pollutant Discharge Elimination System No. CAS000002.

- SWPPP;
- Annual Fee; and
- Signed Certification Statement.

Typical BMPs contained in Stormwater Pollution Prevention Plans are designed to minimize erosion during construction, stabilize construction areas, control sediment, control pollutants from construction materials, and address post construction runoff quantity (volume) and quality (treatment). The Stormwater Pollution Prevention Plan must also include a discussion of the program to inspect and maintain all BMPs.

Caltrans NPDES Permit

Caltrans was originally issued a statewide NPDES permit (Order 99-06-DWQ) in 1999, which requires Caltrans to regulate nonpoint source discharge from its properties, facilities, and activities. The Caltrans permit requires development of a program for communication with local agencies, and coordination with other MS4 programs where those programs overlap geographically with Caltrans facilities. As part of the permit, Caltrans is required to create and annually update a Stormwater Management Plan (SWMP) that is used to outline the regulation of pollutant discharge caused by current and future construction and maintenance activities. SWMP requirements apply to discharges from Caltrans stormwater conveyances, including catch basins and drain inlets, curbs, gutters, ditches, channels, and storm drains. The SWMP applies to discharges consisting of stormwater and non-stormwater resulting from the following:

- Maintenance and operation of state-owned highways, freeways, and roads;
- Maintenance facilities;
- Other facilities with activities that have the potential for discharging pollutants;
- Permanent discharges from subsurface dewatering;
- Temporary dewatering; and
- Construction activities.

The discharges addressed by the SWMP flow through municipal stormwater conveyance systems or flow directly to surface water bodies in the state. These surface water bodies include creeks, rivers, reservoirs, lakes, wetlands, lagoons, estuaries, bays, and the Pacific Ocean and tributaries.

This SWMP applies to the oversight of outside agencies' or non-Caltrans entities' (third parties) activities performed within Caltrans' MS4 to ensure compliance with stormwater regulations. Non-Caltrans activities include highway construction and road improvement projects, as well as residential use and business operations on leased property.

The SWMP must be approved by the SWRCB and, as specified in the permit, it is an enforceable document. Compliance with the permit is measured by implementation of the SWMP. Caltrans' policies, manuals, and other guidance related to stormwater are intended to facilitate implementation of the SWMP. Caltrans also requires all contractors to prepare and implement a program to control water pollution effectively during the construction of all projects.

In lieu of the more recently adopted General Construction Permit as described above, Caltrans continues to modify its current policies and procedures to be consistent with the new permit.

Cobey-Alquist Floodplain Management Act

The Cobey-Alquist Floodplain Management Act (California Water Code 8400-8415) and Executive Order B-39-77 give support to the National Flood Insurance Program. The Act encourages local governments to plan, adopt, and enforce land use regulations for floodplain management, in order to protect people and property from flooding hazards. The Act also identifies requirements that jurisdictions must meet in order to receive State financial assistance for flood control. In 2002, the California Floodplain Management Task Force created and recommended a proposed revised Executive Order for the State's consideration.

California Department of Fish and Wildlife

The California Department of Fish and Wildlife is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. To meet this responsibility, the Fish and Game Code (Section 1602) requires an entity to notify the Department of any proposed activity that may substantially modify a river, stream, or lake. Notification is required by any person, business, state or local government agency, or public utility that proposes an activity that will:

- Substantially divert or obstruct the natural flow of any river, stream or lake;
- Substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or
- Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

The notification requirement applies to any work undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel. This includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It may also apply to work undertaken within the flood plain of a body of water.

Regional and Local Regulations

McAteer-Petris Act / San Francisco Bay Conservation and Development Commission

The McAteer-Petris Act is a provision under California law that preserves San Francisco Bay from indiscriminate filling. The Act established the San Francisco Bay Conservation and Development Commission (BCDC) as the agency charged with preparing a plan for the long-term use of the Bay and regulating development in and around the Bay while the plan was being prepared. The San Francisco Bay Plan, completed in January 1969, includes policies on 18 issues critical to the wise use of the bay, ranging from ports and public access to design considerations and weather. The McAteer-Petris Act authorizes BCDC to incorporate the policies of the Bay Plan into state law. The Bay Plan has two features: policies to guide future uses of the bay and shoreline, and maps that apply these policies to the bay and shoreline. BCDC conducts the regulatory process in accordance with the Bay Plan policies and maps, which guide the protection and development of the bay and its tributary waterways, marshes, managed wetlands, salt ponds, and shoreline.

General Plan Safety Elements

Government Code Section 65302, as amended (2007 Cal. Stat. 369) requires that on or after January 1, 2009, the updated safety elements of general plans must incorporate significantly enhanced geographic data, goals, and policies related to flood hazards. This enhanced assessment of flood hazards will include, but is not limited to: flood mapping information from multiple agencies including FEMA, the Army Corps of Engineers, the Office of Emergency Services, the Department of Water Resources, and any applicable regional dam, levee, or flood protection agencies; historical data on flooding; an inventory of existing and planned development (including transportation infrastructure) in flood zones; and new policies that comprehensively address existing and future flood risk in the planning area.

Impact Analysis

SIGNIFICANCE CRITERIA

Implementation of the proposed Plan would have a potentially significant adverse impact on water resources in the Bay Area if it would:

Criterion 1: Violate any water quality standards or waste or stormwater discharge requirements.

Criterion 2: Substantially interfere with or reduce rates of groundwater recharge due to the increased amount of impervious surfaces, such that there would be a net deficit in aquifer volume or a lowering of the groundwater table.

Criterion 3: Increase erosion by altering the existing drainage patterns of a site, contributing to sediment loads of streams and drainage facilities, and thereby affecting water quality.

Criterion 4: Increase non-point pollution of stormwater runoff due to litter, fallout from airborne particulate emissions, or discharges of vehicle residues, including petroleum hydrocarbons and metals, that would impact the quality of receiving waters.

Criterion 5: Increase non-point-source pollution of stormwater runoff from construction sites due to discharges of sediment, chemicals, and wastes to nearby storm drains and creeks.

Criterion 6: Increase rates and amounts of runoff due to additional impervious surfaces, higher runoff values for cut-and-fill slopes, or alterations to drainage systems that could cause potential flood hazards and effects on water quality.

Criterion 7: Place within a 100-year flood hazard area structures which would impede or redirect flows.

Criterion 8: Expose people to a significant risk of loss, injury, or death involving flooding (including flooding as a result of the failure of a levee or dam), seiche, tsunami, or mudflow.

METHOD OF ANALYSIS

This is a program-level analysis of potential impacts associated with hydrological resources in the Bay Area. Impacts are determined for the proposed Plan as a whole, including land use development projects and specific transportation projects involving new construction as compared to existing conditions (2010). Projects and proposed new land uses are analyzed based upon their location relative to surface water bodies, 100-year floodplains, and impaired water bodies. Those projects that conflict with these resources in terms of water quality and also quantity are determined to potentially result in significant hydrologic impacts.

SUMMARY OF IMPACTS

Impacts on water resources are associated with future land development and with transportation improvements under the proposed Plan that could have the potential to impact water quality, reduce groundwater recharge, alter drainage patterns, create higher erosion rates, increase non-point pollution, increase runoff, and increase exposure to floods. Under the proposed Plan, future land development is focused in Priority Development Areas (PDAs), meaning new development will largely occur in urbanized areas already covered by impervious surfaces. However, some new development in PDAs, as well as much development outside of PDAs including transportation projects, is likely to result in creation of additional impervious surfaces. The resulting changes in drainage patterns can have effects both as a potential source of new pollution in stormwater runoff and increased runoff volumes and rates. Increased runoff could also lead to increased flooding hazards if infrastructure is not sized to accommodate the additional flows or exacerbate existing problem areas.

Projects that do not include the construction of infrastructure, such as land designation changes (e.g., General Plan revision or rezoning), alteration of bus line schedules or routes, local road maintenance, wheelchair curb ramps, or traffic light coordination would utilize existing transportation infrastructure and would not alter drainage patterns. Other projects would involve new development in areas served by existing infrastructure and may need to accommodate changes in drainage patterns. Potential changes to short or long-term stormwater runoff originating from these activities are therefore negligible. The creation of new impervious surfaces associated with construction projects and the subsequent changes to the quality and volume of stormwater runoff could result in water quality impacts.

Exposure to seiches, tsunamis, and mudflow as a result of the proposed Plan is anticipated to be minimal.

Direct Impacts

Implementation of the proposed Plan could result in both short-term and long-term impacts on water resources. Short-term impacts would be temporary and generally related to construction activities, which could result in erosion of disturbed soils and sedimentation effects on receiving water bodies. Long-term effects would be related to the intensification of regional urban uses associated with the creation of new impervious surfaces through residential and non-residential development, expansion of roadways, and other proposed transportation improvements. Runoff from new structures and facilities could increase non-point-source pollutant concentrations in stormwater regionally, as well as in groundwater basins through infiltration. The creation of new impervious surfaces could also decrease the amount of precipitation that filters into the ground. In addition to water quality impacts, the proposed Plan may also affect flooding, as increased runoff associated with paving may contribute to downstream flooding hazards and some projects are located in 100-year flood hazard areas.

Indirect Impacts

The projected population increase in the Bay Area will result in more residents and increased travel on all modes of transportation. As a result, there would be an increased risk of exposure of people and property to the potentially damaging effects of flooding if not managed appropriately. Long-term effects on water quality of receiving waters could also adversely affect beneficial uses of hydrological resources in the Planning Area. In general, the indirect impacts from the proposed Plan are essentially the same as the direct impacts outlined above.

IMPACTS AND MITIGATION MEASURES

Impact

2.8-1: Implementation of the proposed Plan could violate water quality standards or waste or stormwater discharge requirements.

Impacts of Land Use Projects

Land development under the proposed Plan would likely result in incremental increases in the amount of impervious surfaces in the region, such as new paved areas, building rooftops, parking lots, etc. This increase in the amount of impervious surface has the potential to generate additional stormwater pollution in runoff during storm events and could therefore present the potential for accumulation and release of petroleum hydrocarbons, lubricants, sediments, and metals (generated by the wear of automobile parts), which if not managed appropriately could violate water quality standards. The management of landscaped areas would also present the potential for increased runoff and infiltration of herbicides and pesticides into groundwater.

These types of common urban pollutants could be transported in runoff, washed by rainwater from rooftops and landscaped areas into onsite and local drainage networks, and potentially adversely affecting the quality of receiving surface waters or groundwater.

Pollutant concentrations in runoff from a site depend on numerous factors, including:

- Land use conditions;
- Implementation of best management practices (BMPs);
- Site drainage conditions;
- Intensity and duration of rainfall; and
- Climatic conditions preceding a rainfall event.

In general, existing local stormwater management plans and policies and State Water Board requirements, which implement federal Clean Water Act requirements, would prevent these potential impacts from rising to a level of significance through regulations that minimize the creation of pollution generating surfaces. Clean Water Act Section 402 NPDES MS4 Phase I and Phase II permits, which cover all jurisdictions as well as large institutional users, require stormwater management plans, which in turn require source and treatment control measures. In many cases, stormwater drainage control/LID measures and compliance with RWQCB Municipal Regional Stormwater Permit Order No. 2011-0083 Provision C.3 (Provision C.3) may already be required by local jurisdictions as standard conditions of approval for building permit applications.

Because individual projects under the proposed Plan have the potential to adversely affect water quality at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described below.

Impacts of Transportation Projects

Transportation projects would include a variety of improvements such as new express lanes, auxiliary lanes, roadway widening, increased transit service, and other maintenance and rehabilitation projects that would increase the amount of impervious surface in the region. Transportation projects would require similar drainage control measures as those described above for land use projects, including LID measures. Projects such as the creation of express lanes, or repaving projects where there is no substantial change in the drainage patterns or exposure to stormwater pollutants, would have no effect on water quality in stormwater runoff. New impervious surfaces required for streets or highways could have minor effects on the receiving waters, water that filters into the ground, and groundwater basins, all of which could be affected by pollutants in the runoff from proposed future projects.

Because individual projects under the proposed Plan have the potential to adversely affect water quality at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described below.

Combined Effects

The combined effects of the land use and transportation projects would likely result in a net increase of impervious surfaces that would have the potential to increase stormwater pollutants in runoff. Therefore, the proposed Plan would have a potentially significant (PS) impact. Mitigation Measure 2.8(a) is discussed below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.8(a) To reduce the impact associated with potential water quality standards violations or waste or stormwater discharge requirement violations, implementing agencies shall require project sponsors to comply with the State, and federal water quality regulations for all projects that would alter existing drainage patterns in accordance with the relevant regulatory criteria including but not limited to the National Pollution Discharge Elimination System (NPDES) program, Provision C.3, and any applicable Stormwater Management Plans. Erosion control measures shall be consistent with NPDES General Construction Permit requirements including preparation and implementation of a Stormwater Pollution Prevention Plan, and final drainage plans shall be consistent with the San Francisco Regional MS4 NPDES permit or any applicable local drainage control requirements that exceed or reasonably replace any of these measures to project receiving waters from pollutants.

Implementing agencies shall require project sponsors to commit to best management practices (BMPs) that would minimize or eliminate existing sources of polluted runoff during both construction and operational phases of the project. Implementing agencies shall require projects to comply with design guidelines established in the Bay Area Stormwater Management Agencies Association's *Using Start at the Source to Comply with Design Development Standards* and the California Stormwater Quality Association's *California Stormwater Best Management Practice Handbook for New Development and Redevelopment* to minimize both increases in the volume and rate of stormwater runoff, and the amount of pollutants entering the storm drain system. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to water quality or stormwater management.

Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

Construction

- Limiting excavation and grading activities to the dry season (April 15 to October 15) to the extent possible in order to reduce the chance of severe erosion from intense rainfall and surface runoff, as well as the potential for soil saturation in swale areas.
- Regulating stormwater runoff from the construction area through a stormwater management/erosion control plan that may include temporary on-site silt traps and/or basins with multiple discharge points to natural drainages and energy dissipaters if excavation occurs during the rainy season. This control plan should include requirements to cover stockpiles of loose material, divert runoff away from exposed soil material, locate and operate sediment basin/traps to minimize the amount of offsite sediment transport, and removing any trapped sediment from the basin/ trap for placement at a suitable location on-site, away from concentrated flows, or removal to an approved disposal site.
- Providing temporary erosion control measures until perennial revegetation or landscaping is established and can minimize discharge of sediment into receiving waterways.
- Providing erosion protection on all exposed soils either by revegetation or placement of impervious surfaces after completion of grading. Revegetation shall be facilitated by mulching, hydroseeding, or other methods and initiated as soon as possible after completion of grading and prior to the onset of the rainy season (by October 15).
- Using permanent revegetation/landscaping, emphasizing drought-tolerant perennial ground coverings, shrubs, and trees.
- Ensuring BMPs are in place and operational prior to the onset of major earthwork on the site. The construction phase facilities shall be maintained regularly and cleared of accumulated sediment as necessary.
- Storing hazardous materials such as fuels and solvents used on the construction sites in covered containers and protected from rainfall, runoff, and vandalism. A stockpile of spill cleanup materials shall be readily available at all construction sites. Employees shall be trained in spill prevention and cleanup, and individuals should be designated as responsible for prevention and cleanup activities.

Operation

- Designing drainage of roadway and parking lot runoff, wherever possible to run through grass median strips which are contoured to provide adequate storage capacity and to provide overland flow, detention, and infiltration before runoff reaches culverts, or into detention basins. Facilities such as oil and sediment separators or absorbent filter systems should be designed and installed within the storm drainage system to provide filtration of stormwater prior to discharge and reduce water quality impacts whenever feasible.
- Implementing an erosion control and revegetation program designed to allow re-establishment of native vegetation on slopes in undeveloped areas as part of the long-term sediment control plan.

- Using alternate discharge options to protect sensitive fish and wildlife populations in areas where habitat for fish and other wildlife would be threatened by transportation facility discharge. Maintenance activities over the life of the project shall include use of heavy-duty sweepers, with disposal of collected debris in sanitary landfills to effectively reduce annual pollutant loads where appropriate. Catch basins and storm drains shall be cleaned and maintained on a regular basis.
- Using Integrated Pest Management techniques (methods that minimize the use of potentially hazardous chemicals for landscape pest control and vineyard operations) in landscaped areas. The handling, storage, and application of potentially hazardous chemicals shall take place in accordance with all applicable laws and regulations.

Significance after Mitigation

As required by Provision C.3, new development in the region that would introduce 10,000 or more square feet of new impervious surfaces must incorporate LID strategies—such as stormwater reuse, onsite infiltration, and evapotranspiration—as initial stormwater management strategies. Secondary methods that could be incorporated include the use of natural, landscape based stormwater treatment measures, as identified by Provision C.3. Stormwater treatment measures may also be required in the final design plans in accordance with local stormwater management plans. The treatment measures may vary from "local" improvements at individual building sites to "area wide" concepts such as stormwater treatment wetlands with large open space areas. Treatment control measures may include use of vegetated swales and buffers, grass median strips, detention basins, wet ponds, or constructed wetlands, infiltration basins, and other measures. Filtration systems may be either mechanical (e.g., oil/water separators) or natural (e.g., bioswales and settlement ponds).

Redevelopment projects may result in improved water quality compared to existing conditions where existing development was constructed under older, less stringent stormwater requirements. Selection and implementation of LID measures (such as those required by NPDES Provision C.3) would occur on a project-by-project basis depending on project size and stormwater treatment needs as required to meet NPDES or any other local permitting requirements.

Such stormwater quality measures are also required for Regulated Projects-Special Land Use Category (uncovered parking structures, restaurants, auto service, and auto gasoline facilities) that would construct 5,000 or more square feet of uncovered parking lots that are stand-alone or part of any other development project. In addition, Provision C.3 of the regional NPDES permit requires that projects with more than one acre of impervious surface submit a hydromodification plan to demonstrate that development would not increase long-term runoff rates on a property beyond existing conditions.

Transportation projects that fall under Caltrans jurisdiction would be covered by the Caltrans NPDES Stormwater Program. As described in the Regulatory Setting section above, this NPDES permit regulates all stormwater discharges from Caltrans-owned conveyances, maintenance facilities and construction activities. Caltrans also has a Stormwater Management Plan that describes the procedures and practices used to reduce or eliminate the discharge of pollutants to storm drainage systems and receiving waters. Guidance documents have also been developed by Caltrans to implement stormwater BMPs in the design, construction and maintenance of highway facilities.

Transportation projects where local agencies are the lead agency are subject to local and State regulations for post-construction runoff management requirements. The NPDES permit requirements described above also apply to transportation impacts (project design including general site design control measures, LID features, treatment control measures, ordinances and regulations to reduce the discharge of sediments and other pollutants).

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.8(a), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.8-2: Implementation of the proposed Plan could substantially interfere with or reduce rates of groundwater recharge due to the increased amount of impervious surfaces, such that there could be a net deficit in aquifer volume or a lowering of the groundwater table.

Impacts of Land Use Projects

Regional development associated with the proposed Plan may result in the addition of new impervious surface areas. Increasing the total area of impervious surfaces can result in a reduction in the amount of precipitation infiltrating into underlying groundwater resources. Infiltration rates can vary widely and largely depend on the characteristics of the exposed overlying soils and vegetation. In general, sandy soils have higher infiltration rates and can contribute to significant amounts of ground water recharge; clay soils tend to have lower percolation potentials; and impervious surfaces such as pavement substantially reduce infiltration capacity.

Most future land development under the proposed Plan is anticipated to occur within PDAs. In general, the PDAs are located in urbanized areas and likely to already be widely covered by impervious surfaces, although some development may be located on areas that are currently permeable (e.g., open space, vacant lots, etc.), both inside and outside of PDAs.

Many PDAs—as well as much of the non-PDA development expected—are located within developed areas (e.g., San Francisco, much of Contra Costa, San Mateo, and Alameda counties) where groundwater is not used as a water supply source but is considered by the RWQCB as a potential resource. In the Planning Area, groundwater use only accounts for about five percent of the total water usage. Generally, where groundwater is used for supply purposes the water accessed is relatively deep and associated designated groundwater recharge areas are not available for future development. However, for the bulk of the Planning Area, many of the aquifers are relatively thin and intrusion of brackish Bay water has affected water quality that precludes use of the aquifers as a reliable water supply resource. The larger groundwater basins in the region, including Santa Clara Valley, Napa-Sonoma Valley, and Petaluma Valley, do represent areas where groundwater supplies are an important source of water supply that would generally be more sensitive to alterations in groundwater recharge.

As new development and redevelopment occurs, on-site drainage plans would be designed to retain, capture and convey increased runoff in accordance with the local city or county design standards (e.g., Alameda Countywide Clean Water Program, Contra Costa Clean Water Program, Santa Clara Clean Water Program, etc.) and State requirements such as Provision C.3 site control features. These requirements generally require or encourage the use of LID features such as vegetated swales, permeable paving, use of landscaping for infiltration, and other measures that would retain runoff as much as possible and allow for onsite infiltration.

Therefore, considering the existing level of development, the fact that groundwater use only accounts for five percent of the total water usage, and the regulatory framework that currently exists for new development, the potential to interfere with groundwater recharge from implementation of the proposed Plan at the regional and local level is considered less than significant (LS) for Impact 2.8-2. No mitigation is required.

Impacts of Transportation Projects

As stated in Impact 2.8-1, the proposed transportation projects may result in some increases in impervious surfaces. However, many of the proposed transportation facilities already are located on or adjacent to existing highways, streets, and roads in which most of the surfaces are already paved or impervious. In addition, extensive storm drainage systems present in these areas currently intercept rainfall and runoff waters, thus limiting the amount of groundwater recharge that occurs. Local agency standards (e.g., Alameda Countywide Clean Water Program, Contra Costa Clean Water Program, Santa Clara Clean Water Program, as well as any City drainage control requirements) and Caltrans standards, combined with State and federal regulations and BMPs, require drainage studies for transportation projects. These studies address drainage issues, including incorporation of infiltration systems where appropriate to limit offsite runoff volumes.

Therefore, considering that most of the transportation projects would occur on existing impervious surfaces, only five percent of water usage comes from groundwater supplies, and the existing regulatory requirements, the potential to interfere with groundwater recharge from implementation of the proposed Transportation projects at the regional and local level is considered less than significant (LS) for Impact 2.8-2. No mitigation is required.

Combined Effects

The combined effects of land development and transportation projects would likely increase the total amount of impervious surfaces in the region and as a result reduce the amount of precipitation that is available for groundwater recharge. However, existing regulatory requirements at the local, State, and federal level include measures to minimize any increases in offsite stormwater runoff through encouraging onsite infiltration, which would minimize the potential reduction in groundwater recharge. Therefore, the proposed Plan would have a less than significant impact (LS). No mitigation is required.

Mitigation Measures

None required.

Impact

2.8-3: Implementation of the proposed Plan could increase erosion by altering the existing drainage patterns of a site, contributing to sediment loads of streams and drainage facilities, and thereby affecting water quality.

Impacts of Land Use Projects

As noted above, implementation of the proposed Plan would result in new development concentrated within PDAs. New development will not necessarily substantially alter the existing drainage pattern, especially in urbanized areas where the PDAs are generally located. Some development will also occur outside of PDAs, and in some cases outside of urbanized areas. The proposed growth in either urbanized or non-urbanized areas would not result in substantially increased rates of stormwater runoff in a manner that could result in substantial erosion or siltation because of federal, State, and local regulations described above under Impact 2.8-1.

The potential for increased erosion is typically highest during the construction phase of development or redevelopment when underlying soils or vegetated soils can become exposed to the effects of wind and water erosion. If not protected, these exposed soils can cause sedimentation of stormwater runoff that adversely affects receiving waters. In order to receive an NPDES Construction General Permit (as described below in Impact 2.8-5 and in the Regulatory Setting), project proponents must develop a stormwater pollution prevention plan with appropriate erosion control BMPs that are proven measures designed to minimize sedimentation of stormwater runoff.

In general, the PDAs are located within urbanized areas that are already currently urbanized, where it is unlikely that there would be substantial exposed soil that is subject to erosion. Areas outside of PDAs would still be required to adhere to erosion control requirements and drainage control requirements such as those administered under the NPDES program. NPDES MS4 permittees must develop standard urban runoff mitigation plans and manuals that continue to control stormwater runoff once projects are constructed such that sedimentation is minimized. Local stormwater management plans and manuals specify BMPs and additional regulations to mitigate runoff, further reducing the likelihood of substantial erosion or siltation.

In addition, NPDES Provision C.3 requirements address post-construction drainage control requirements that address not only the water quality of stormwater runoff but also reducing the volume of offsite flows, which can be effective in reducing the sedimentation effects of downstream receiving waters. The requirements are intended to address nonpoint source pollution through implementation of BMPs, regulatory based encouragement of BMPs, and adopted effluent limits. Project proponents are required to plan, design, and develop sites to: (1) Protect areas that provide important water quality benefits, necessary to main riparian and aquatic biota, and/or are particularly susceptible to erosion and sediment loss; (2) Limit increases of impervious areas; (3) Limit land disturbance activities such as clearing and grading, and cut-and-fill to reduce erosion and sediment loss; (4) Limit disturbance of natural drainage features and vegetation; and (5) Reduce erosion and, to the extent practicable, retain sediment on site during and after construction.

For some projects, NPDES permits and regulations include hydromodification requirements where project proponents must study the potential impacts of proposed channelization and channel modification, and then develop and implement plans to protect against undesirable impacts, including erosion.

At the regional and local level, implementation of the proposed Plan would result in new development and redevelopment that would have the potential to disturb underlying soils and result in changes to existing drainage patterns. Because individual projects under the proposed Plan have the potential to adversely affect water quality at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described above.

Impacts of Transportation Projects

Not all of the transportation projects would involve earthwork activities and some, such as changes to HOV and HOT lane designations, would have no changes to drainage patterns when compared to existing conditions. Transportation projects that would have the potential to alter drainage patterns, such as road widening or construction of other additional impervious surfaces, would be subject to local, regional and state requirements such as local Stormwater Drainage Master Plans, regional MS4 permit requirements and any Caltrans drainage requirements that would include BMPs and drainage requirements that minimize exposed soils and the potential for offsite transport of sediments.

Because individual transportation projects have the potential to adversely affect water quality at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described above.

Combined Effects

The combined effects of the land development and transportation projects would have the potential to result in changes in the existing drainage patterns. Because individual projects under the Plan have the potential to adversely affect water quality at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described above.

Mitigation Measures

Implement Mitigation Measure 2.8(a).

Significance After Mitigation

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.8(a), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.8-4: Implementation of the proposed Plan could increase non-point pollution of stormwater runoff due to litter, fallout from airborne particulate emissions, or discharges of vehicle residues, including petroleum hydrocarbons and metals that would impact the quality of receiving waters.

Impacts of Land Use Projects

Development associated with implementation of the proposed Plan would result in a net increase in the area of paved and other impervious surfaces (structures, rooftops, parking lots, etc.). Construction of the proposed projects combined with an increase in overall regional traffic could increase non-point pollutant concentrations in stormwater regionally. These nonpoint source pollutants could include oil and grease, petroleum hydrocarbons, and metals that would be transported by stormwater runoff to receiving water bodies.

As discussed above, operational phases of new development and redevelopment generally require drainage control measures in accordance with local, State, and federal regulatory requirements. These requirements include measures to limit the potential sources of pollution in non-point stormwater runoff sources as well as point sources. Post-construction measures that are required under Provision C.3 of the regional NPDES MS4 permit would include implementation of LID drainage control features. These source control measures could include incorporation of permeable paving, vegetated swales, rooftop gardens, infiltration retention basins, and other features that have proven successful in minimizing pollution of stormwater runoff and protecting receiving waters. For redevelopment projects, implementation of LID source control drainage features could represent an improvement over existing stormwater drainage infrastructure. Without such measures, new development and redevelopment could create new sources of non-point pollution in stormwater runoff.

Because individual projects under the proposed Plan have the potential to adversely affect water quality at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described above.

Impacts of Transportation Projects

Transportation projects under the proposed Plan would result in a net increase in the area of paved surfaces (roads, transit stations, park and ride lots, etc.). Construction of the proposed projects combined with increased overall regional traffic could increase non-point pollutant concentrations in stormwater regionally. The paving required for highway projects could also have minor effects on the amount of surface water that filters into the ground, and groundwater basins could be affected by pollutants in the runoff from proposed transportation facilities. These non-point pollutants could include oil and grease, petroleum hydrocarbons, and metals that could be transported by stormwater runoff to receiving water bodies. As new roads, lanes, or other new impervious surfaces are added to accommodate projected additional vehicular traffic, the potential also increases for associated stormwater pollutants to enter receiving waters of the Bay Area.

As mentioned above, and in Impact 2.8-1, operational phases of new transportation projects generally require drainage control measures in accordance with local, state, and federal regulatory requirements. These requirements include measures to limit the potential sources of pollution from both non-point and point sources of stormwater runoff. The NPDES permit requirements described in the land use discussion above also apply to transportation impacts (project design including general site design control measures, treatment control measures, ordinances and regulations to reduce the discharge of sediments and other pollutants, SWPPP including BMPs). Because individual projects under the proposed Plan have the potential to adversely affect water quality at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described above.

Combined Effects

The combined effects of the land development and transportation projects would likely result in a net increase of impervious surfaces which would have the potential to increase stormwater pollutants in runoff. Because individual projects under the proposed Plan have the potential to adversely affect water quality at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described above.

Mitigation Measures

Implement Mitigation Measure 2.8(a).

Significance After Mitigation

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.8(a), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.8-5: Implementation of the proposed Plan could increase non-point-source pollution of stormwater runoff from construction sites due to discharges of sediment, chemicals, and wastes to nearby storm drains and creeks.

Impacts of Land Use Projects

Construction and grading activities associated with development of the proposed Plan could require temporary disturbance of underlying soils through excavation, soil stockpiling, boring, and/or grading activities that strip existing vegetation or pavement prior to commencing with construction of proposed improvements. These activities could result in exposure of soil to runoff, potentially causing erosion and entrainment of sediment and contaminants in the runoff. Soil stockpiles and excavated areas could be exposed to runoff and, if not managed properly, the runoff could cause erosion and increased sedimentation and pollutants in stormwater. The potential for chemical releases is present at most construction sites given the types of materials used, including fuels, oils, paints, and solvents. Once released, these substances could be transported to the receiving waters in stormwater runoff, potentially incrementally reducing water quality.

All development within the region that would disturb one acre or more would be required to prepare and implement a SWPPP, in accordance with the NPDES General Construction Permit, which would greatly diminish potential impacts because only small projects would be exempt from this requirement. The SWPPP could include BMP erosion control measures such as those listed in Mitigation Measure 2.8(a) above.

Because individual projects under the proposed Plan have the potential to adversely affect water quality at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described above.

Impacts of Transportation Projects

Transportation projects that disturb more than one acre would be required to adhere to the same NPDES General Construction Permit requirements as land development projects discussed above. The permit requirements include preparation and implementation of a SWPPP detailing BMPs that would be employed to control onsite stormwater drainage during construction. Components of SWPPPs typically include project risk determination (categorized into Risk Levels 1, 2 and 3), visual inspection requirements, identification of sampling locations, collection and handling procedures (for Risk Level 2 and Risk Level 3 projects), and specifications for BMPs to be implemented during project construction for the purpose of minimizing the discharge of pollutants in stormwater from the construction area. Projects that fall under Caltrans jurisdiction are also required to adhere to the Caltrans NPDES permit.

Because individual transportation projects have the potential to adversely affect water quality at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described above.

Combined Effects

Impacts related to land development and transportation projects have the potential to adversely affect water quality at a project-specific level, and therefore impacts are considered potentially significant (PS). Both land development and transportation projects would be subject to the same regulatory requirements, which would apply to all projects that meet the one acre threshold of disturbance.

Mitigation Measures

Implement Mitigation Measure 2.8(a).

Significance After Mitigation

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.8(a), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.8-6: Implementation of the proposed Plan could increase rates and amounts of runoff due to additional impervious surfaces, higher runoff values for cut-and-fill slopes, or alterations to drainage systems that could cause potential flood hazards and effects on water quality.

Impacts of Land Use Projects

Implementation of the proposed Plan could result in new development that would increase the total amount of impervious surfaces. While many PDAs are located in urbanized areas with substantial areas of existing impervious surfaces, some new development may also occur outside of PDAs, and new development or redevelopment (both within and outside of PDAs) could result in a net increase in such impervious surfaces. Increases in impervious surfaces would have the potential to increase rates and amounts of stormwater runoff, compared to existing conditions that could exceed the capacity of current systems. However, local and State drainage control requirements would apply to most improvements where both rates and volumes of runoff would be required to be meet minimum thresholds such that potential flood hazards as well as effects on water quality are minimized. Once constructed, the NPDES Provision C.3 requirements for new development would include source control measures in site designs to address both soluble and insoluble stormwater runoff pollutant discharges. In some cases, adherence to these requirements may result in improved retention of stormwater rates and volumes, compared to existing conditions, through implementation of LID drainage control measures.

Because individual projects under the proposed Plan have the potential to adversely affect capacity of existing drainage systems at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described above.

Impacts of Transportation Projects

Transportation projects would be required to adhere to the same regulatory requirements as described above for land use projects where new impervious surfaces are constructed or replaced. Projects that fall under Caltrans jurisdiction would adhere to the Caltrans Stormwater Program, which includes measures to control stormwater volumes as well as stormwater quality.

Drainage systems are designed on a site-specific basis in accordance with the findings of the studies and the regulations of the applicable local flood control agencies and flood control design criteria. Adherence to local and State regulations would help prevent substantial alterations to the existing drainage pattern of the site or area and avoid substantial increases in the rate or amount of surface runoff in a manner that would result in on- or off-site flooding, or substantial siltation or erosion.

Transportation projects where local agencies are the lead agency are subject to local and State regulations for construction and non-construction runoff prevention. The NPDES permit requirements described in the land use discussion above also apply to transportation impacts. The regional MS4 NPDES permit would also apply to transportation projects, unless under Caltrans jurisdiction. Caltrans regulations combined with federal and State regulations require that engineered conveyances integrate energy dissipation protection, streambank erosion protection, and other design controls to minimize erosion or the transport of sediment or silt to downstream areas. The Caltrans Highway Design Manual requires that: road storm drain systems are designed to safely drain the 25-year return interval storm; cross-culverts are designed to safely drain the 10-year interval storm; and the headwater depth for the 100-year interval storm must not overtop freeways.

Because individual projects under the proposed Plan have the potential to adversely affect capacity of existing drainage systems at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described above.

Combined Effects

There are many different watersheds and subwatersheds within the region with different susceptibilities to increases in stormwater runoff. All projects implemented under the proposed Plan would be required to adhere to the appropriate local and State requirements that are designed to ensure that flooding conditions are not exacerbated and water quality is not affected. Because individual projects under the proposed Plan have the potential to adversely affect capacity of existing drainage systems at a project-specific level, these impacts are considered potentially significant (PS). Mitigation measure 2.8(a) is described above.

Mitigation Measures

Implement Mitigation Measure 2.8(a).

Significance After Mitigation

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.8(a), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.8-7: Implementation of the proposed Plan could place within a 100-year flood hazard area structures which would impede or redirect flows.

Impacts of Land Use Projects

Despite efforts to improve regional drainage control infrastructure, there are locations throughout the Planning Area that are susceptible to flooding during heavy storm events. **Figure 2.8-3** shows 100-year flood hazard areas that are located within the region.

While the majority of growth under the proposed Plan will take place outside these hazard areas, there are areas within PDAs that have been mapped as being in the 100-year flood hazard zone (see Appendix G). Development outside of the PDAs is widely dispersed but would also include areas located within 100-year flood zone areas. Siting structures in flood zones can result in direct impacts on new development related to flooding where substantial damage can occur. In addition, structures that impede flood flows can cause a backwater effect by potentially raising flood levels, causing more severe flooding impacts to existing vulnerable areas or by exposing new areas that would not have previously flooded to new flooding impacts.

A total of 139 of the PDAs intersect 100-year flood zone areas as mapped by FEMA. The North San José PDA shows the most intersection with mapped 100-year flood zones with approximately 1,120 acres (which can include existing surface waters and open channels). For most of these PDAs within flood zones, the amount of area that is considered part of the 100-year flood zone is relatively small and accounts for fewer than 20 acres (see Appendix G). As a result, most of the land development associated with the proposed Plan would likely be located outside of the 100-year flood zone.

Any developments proposed within the 100-year flood zone would be required to meet local, State and federal flood control design requirements. In general, local jurisdictions have flood control policies that require new construction in flood-prone areas to be built to flood-safe standards, such as ensuring that ground levels of living spaces are elevated above anticipated flood elevations. Local jurisdictions also often require adequate storm drainage capacities and retention such that new development does not exacerbate any existing problem areas. At the regional scale, the proposed Plan could increase the amount of housing in flood hazard areas, but state regulations (e.g., Cobey-Alquist Floodplain Management Act), in combination with local floodplain ordinances and federal regulations (such as NFIP), would minimize the risk associated with housing in these areas. In addition, many current ongoing improvements to flood protection infrastructure, such as the Guadalupe River Park and Flood Protection Project, should help alleviate flood conditions.

Without these floodplain development requirements, continuing flood protection programs, and the drainage requirements as described above, impacts related to proposed development within the 100-year floodplain from implementation of the proposed Plan at the regional and local level would be considered potentially significant (PS). Mitigation measure 2.8(b) is described below.

Impacts of Transportation Projects

Some of the transportation projects included in the proposed Plan intersect areas mapped within the 100-year flood hazard area, thus potentially increasing the ability to obstruct or exacerbate floodwaters. According to a GIS comparison of all the mapped linear transportation projects and the designated 100-year flood zones in the Planning Area, a total of 170 projects are located within or partially within the flood hazard areas (see Appendix G). However, most of these linear projects only intersect in relatively small geographical areas and total a little over 210 acres for the entire region, according to GIS data. Those projects that do intersect could involve support structures or other above ground improvements in the floodway that could potentially obstruct floodwaters at some locations. Placement of structures within a floodplain can displace floodwaters and alter the base flood elevations in the surrounding areas. As described under the land use discussion above, structures can form a backwater effect, resulting in an increase in the flood elevation level upstream and in neighboring areas.

Drainage areas could also be altered by highway corridors, in which floodwaters could be detained by medians and along the roadside. Proposed bridge supports could block debris in waterways, creating obstructions and further elevating upstream flood levels.

The regulatory requirements listed under land use also apply to transportation improvements. Local, State and federal floodplain requirements combined with ongoing flood protection projects would minimize the potential impact of the transportation projects at the regional and local level. Without such measures, the potential impacts would be considered potentially significant (PS). Mitigation Measure 2.8(b) is provided below.

Combined Effects

Land development and transportation projects would be subject to implementation of local, State, and federal flood protection regulations. Without such measures, individual projects located within the 100-year flood zone would be subject to potentially significant (PS) impacts related to flooding. Mitigation Measure 2.8(b) is provided below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.8(b) To reduce the impact of flood hazards, implementing agencies shall conduct or require project-specific hydrology studies for projects proposed to be constructed within floodplains to demonstrate compliance with Executive Order 11988, the National Flood Insurance Program, National Flood Insurance Act, Caltrans Highway Design Manual, Cobey-Alquist Floodplain Management Act, as well as any further Federal Emergency Management Agency (FEMA) or State requirements that are adopted at the local level. These studies shall identify project design features or mitigation measures that reduce impacts to either floodplains or flood flows to a less than significant level such as requiring minimum elevations for finished first floors, typically at least one foot above the 100-year base flood elevation, where feasible based on project- and site-specific considerations. For the purposes of this mitigation, less than significant means consistent with these federal, State, and local regulations and laws related to development in the floodplain. Local jurisdictions shall, to the extent feasible, appropriate, and consistent with local policies, prevent development in flood hazard areas that do not have demonstrable protections.

Significance after Mitigation

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.8(a), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.8-8: Implementation of the proposed Plan could expose people to a significant risk of loss, injury, or death involving flooding (including flooding as a result of the failure of a levee or dam), seiche, tsunami, or mudflow.

Impacts of the environment on a project or plan (as opposed to impacts of a project or plan on the environment) are beyond the scope of required CEQA review. "[T]he purpose of an EIR is to identify the significant effects of a project on the environment, not the significant effects of the environment on the project." (*Ballona Wetlands Land Trust v. City of Los Angeles* (2011) 201 Cal.App.4th 455, 473.) The impacts discussed in this section related to increased exposure of people or structures to risks associated with flooding are the effects of preexisting environmental hazards, as explicitly found by the court in the *Ballona* decision, and therefore "do not relate to environmental impacts under CEQA and cannot support an argument that the effects of the environment on the project must be analyzed in an EIR." (*Id.* at p. 474.) Nonetheless, an analysis of these impacts is provided for informational purposes.

Impacts of Land Use Projects

There are a total of 267 dams located within the Planning Area that fall under the jurisdiction of the State of California or are owned and operated by a federal agency. The California Department of Water Resources, Division of Safety of Dams (DSOD) oversees the design, construction, and annual inspection of dams statewide. DSOD imposes strict standards for the design, maintenance, and monitoring of dams under its jurisdiction to ensure that they meet static and seismic standards to prevent catastrophic failure. Periodically, some of these dams will receive modifications, such as the San Pablo Dam, which has recently undergone a seismic upgrade to increase its stability and minimize the potential for liquefaction to cause any slump or failure of the embankment. DSOD requirements for siting, engineering, construction, and monitoring of dams are continually improved as knowledge increases as to how and why dams fail. Since 1950, there have been nine dam failures statewide, with one of the incidents resulting in three deaths. The most recent failure of a dam causing flooding hazards occurred in 1965, though a partial failure of a spillway gate at Folsom Lake Dam occurred in 1995. Based on these statistics, dam failure is a relatively low likelihood event.

Counties are required by State regulation to map potential dam inundation areas and prepare emergency plans and procedures for preparing and responding to a dam breach as part of their Multi-Hazard Mitigation Plans (Cal. Code Regs., tit. 19 § 2575). Additionally, the Federal Energy Regulatory Commission is required to approve local Emergency Action Plans for dams with the potential to cause massive damage. Emergency Action Plans outline notification procedures for people and property owners within a potential inundation area. Due to the large number of dams within the Planning Area, many of the proposed development areas both in and outside of the PDAs would likely be located within one or more inundation areas. There is no policy or regulatory requirement restricting development within potential dam inundation areas largely due to the continued maintenance and oversight which results in a relatively low risk for damage or injury.

Substantial precipitation, major storm events, or seismic events have the potential to cause any of the many levees in the Planning Area to fail. Specific projects developed under the proposed Plan may create structures or obstructions to flood flows from levee failures. However, any projects constructed within areas subject to flooding due to levee failure, as mapped by FEMA, must be built in compliance with standard building codes and federal, State, and local regulations. Specifically, the State and federal regulations for 100-year flood protection assess the adequacy of protection, including from levees. The proposed land uses, when implemented locally, must comply with these state and federal regulations.

In addition, the following regulations would further reduce potential exposure of people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam: California Building Code, State and federal regulations to control stormwater runoff and limit drainage pattern alteration described under Impacts 2.8-6 and 2.8-7, and State real estate disclosure laws requiring notification to new property owners for property that lies within any dam inundation area and/or floodplain.

Tsunamis are a series of large waves created by an underwater disturbance such as an earthquake, landslide, volcanic eruption, or meteorite. In general, a tsunami can move hundreds of miles per hour in the open ocean and reach land with waves as high as 100 feet or more. Most of the PDAs are located inland, although the Planning Area includes Pacific Ocean coastline as well as the San Francisco Bay shoreline, where the potential for inundation due to tsunami exists. A total of 51 tsunamis have been recorded or observed within the San Francisco Bay since 1850.[8,9] Of these, only the tsunamis generated by the 1960 Chile earthquake and the 1964 Alaska earthquake caused damage in San Francisco Bay. The 1964 tsunami event caused the most damage of these events and had a recorded amplitude of approximately 3.7 feet (1.1 meters) at the Presidio in San Francisco. According to newspaper articles in the San Francisco Chronicle (March 29, 1964) and Marin Independent Journal (March 30, 1964), damage in San Francisco Bay was largely isolated to small boats.

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[8] This total does not include the more recent March 2011 earthquake in Japan, which produced a small but noticeable tsunami wave that entered the San Francisco Bay, but caused no reported damage.

[9] California Geological Survey (CGS), *Tsunamis*, www.consrv.ca.gov/cgs/geologic_hazards/tsunami/pages/about_tsunamis.aspx, compiled in 2005.

Given the history of tsunamis in San Francisco Bay, which has never reported any significant damage from tsunamis, the risk of a tsunami exceeding the height observed in 1964 within the Planning Area is considered low (CGS, 2005). The potential hazard related to tsunamis within the Bay Area has been analyzed in regional studies and mapped, and generally shows more risk for coastal areas that are adjacent to the Pacific Ocean than for internal Bay shoreline areas where tsunami waves would be expected to attenuate after passing through the narrow Golden Gate.

According to the United States Geological Survey, a seiche is a standing wave in an enclosed or partly enclosed body of water. Seiches are normally caused by an earthquake or high wind activity and can affect harbors, bays, lakes, rivers and canals. However, no seismically induced seiche waves have been documented in San Francisco Bay throughout history, which may be due to the size of the Bay such that waves that would cause damage are not produced.

Mudflows are characterized by a downhill movement of soft wet earth and debris, made fluid by rain or melted snow and often building up great speed. Mudflows occur on steep slopes where vegetation is not sufficient to prevent rapid erosion but can occur on gentle slopes if other conditions are met. Other factors are heavy precipitation in short periods and an easily erodible source material. Mudflows can be generated in any climatic regime but are most common in arid and semiarid areas and can be associated with volcanic events. Considering the geologic context of the Planning Area and the developed nature of the region, the potential for mudslides to affect land development would be considered very low. See *Chapter 2.7: Geology and Seismicity*, where landslides are discussed.

Therefore, considering the existing regulatory framework, physical context of the Planning Area and proposed areas of improvements, the land use impacts associated with implementation of the proposed Plan at the regional and local level are considered less than significant (LS).

Impacts of Transportation Projects

Some of the transportation projects included in the proposed Plan would be placed within the 100-year flood hazard area and potential inundation areas from the 267 dams located within the Planning Area, potentially exposing people or structures to a significant risk of loss, injury or death involving flooding from failure of a dam or levee, seiches, tsunamis, or mudflows. In addition, improvements located in the immediate vicinity of shoreline areas may be exposed to inundation from tsunami or seiche waves. As noted above, new transportation structures proposed within a floodplain or inundation areas would be required to adhere to State and federal regulations described under the land use discussion which would mitigate against potential exposure of people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam. The majority of the transportation projects are otherwise located outside of shoreline areas that might be exposed to seiche or tsunami inundation. However, as discussed above, there is no documented history of significant damage from either tsunamis or seiches and the highest risk areas are generally limited to coastal areas of the Pacific Ocean.

Therefore, considering the existing regulatory framework, physical context of the Planning Area and proposed areas of improvements, the impacts associated with implementation of the proposed transportation projects at the regional and local level are considered less than significant (LS).

Combined Effects

Flooding risks from dam failure, tsunamis, seiches or mudflows are generally dependent on physical location and would not be increased by combining land use and transportation projects due to their evaluation on a case by case basis. In general, transportation projects are only temporarily affected by dam failure, tsunamis, seiches or mudflows that can limit use and access of existing roadways. However, land use projects can suffer more long term effects. However, as noted above, these events are considered a relatively low risk. Land development and transportation projects will both be subject to implementation of local, State, and federal floodplain regulations and project level review on an individual project basis that would ensure there is no potential for adverse effects from flooding from failure of levee or dam, tsunamis, seiches or mudflows. Therefore, considering the existing regulatory framework, physical context of the Planning Area and proposed areas of improvements, potential impacts related to Impact 2.8-8 would be less than significant (LS).

Mitigation Measures

None required.

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2.9 Biological Resources

This chapter outlines the biological resources (plants, wildlife, and wetlands) of the Bay Area, describing various natural communities, associated rare, threatened and endangered (special-status) species, and areas of ecological significance found in the region. The potential effects of the proposed Plan on sensitive species and their habitats, on jurisdictional waters, and with respect to the fragmentation of existing habitats, are identified and evaluated. The information and analysis presented are regional in scope as appropriate for a program-level EIR. The assessment is intended to assist area-wide issue identification as it relates to regional transportation and land use planning and to provide a basis for project-level analysis for projects implemented under the proposed Plan.

Environmental Setting

PHYSICAL SETTING

Natural Communities of the Bay Area

Driven by a complex interaction of soils, topography, and climate, the Bay Area supports numerous distinct natural communities comprised of a diversity of vegetative types that afford habitat for an equally diverse number of plant and wildlife species. Broad habitat categories in the region include grasslands, coastal scrubs and chaparral, woodlands and forests, riparian systems and freshwater aquatic habitat, and wetlands. Urban and otherwise highly-disturbed habitats, such as agricultural fields, also provide natural functions and values as wildlife habitat and are also considered in this EIR,[1] as are the aquatic resources of the San Francisco Bay-Delta estuary. The following discussion summarizes the natural communities located within the Bay Area and references special-status species associated with these communities.[2]

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1 Natural communities are assemblages of species that reoccur due to responses to similar combinations of environmental conditions and are not dependent on human intervention. For this discussion, native vegetation pertains to those species present in California prior to European colonization, while species such as wild oats and brome grasses, which were introduced with colonization dominate much of the current California landscape, are considered non-native. Vegetation communities that are dependent on human intervention, such as irrigated agriculture or landscaped or urbanized areas, are considered introduced communities.

2 Certain plant and wildlife species are protected pursuant to federal and/or State endangered species laws, or are otherwise protected through a variety of mechanisms. These species are collectively referred to as "special-status species." See Appendix H for a full definition of the term.

Grasslands

Natural Community Summary

Grasslands within the Bay Area include two basic types: non-native annual grasslands and perennial grasslands, including, among others, serpentine bunchgrass and valley needlegrass grasslands.[3] Non-native annual grasslands comprise the vast majority of grassland habitat occurring throughout the Bay Area and consist of a sparse to dense cover of primarily introduced annual grasses associated with a variety of broadleaf herbs and, occasionally native or introduced perennial grasses. The most abundant species are typically non-native annual grasses in the genera *Bromus, Avena, Festuca*, and *Hordeum*. Broadleaf species common to Bay Area grasslands are quite variable, but often include filaree (*Erodium* spp.), yellow-star thistle (*Centaurea solstitialis*), lupines (*Lupinus* spp.), peppergrass (*Lepidium* spp.), Indian paintbrush (*Castilleja* sp.), and California poppy (*Eschscholzia californica*). In addition to considerable site-to-site variation that is largely based on soils and management practices, there is also much year-to-year variation in species composition in response to the timing and amount of precipitation.

Serpentine bunchgrass and valley needlegrass grasslands are both native perennial grasslands with limited distribution in the Bay Area. The first has limited distribution due to its dependency upon serpentine soils, which are scattered throughout the Coast Ranges. Serpentine bunchgrass grasslands are most widespread in Marin County, on the San Mateo peninsula, and in southern Santa Clara County. This open grassland community is dominated by native perennial bunchgrasses of the genera *Bromus, Melica, Poa, Calamagrostis,* and *Festuca*. Native herbaceous associates include California poppy, tarweed (*Hemizonia* spp.), and lotus (*Lotus* spp.). Valley needlegrass grasslands typically occur on seasonally moist, fine-textured soils and often intergrade with oak woodland communities. This formerly extensive grassland type is dominated by clump-forming purple needlegrass (*Stipa pulchra*) and a variety of native and introduced grasses and herbs.

Grassland habitats of all types are utilized by a wide variety of wildlife. Reptile species typically found in grasslands include western fence lizard (*Sceloporus occidentalis*), western terrestrial garter snake (*Thamnophis elegans*), and western rattlesnake (*Crotalus viridis*). Mammals within this habitat include black-tailed jackrabbit (*Lepus californicus*), western harvest mouse (*Reithrodontomys megalotis*), California vole (*Microtus californicus*), and coyote (*Canis latrans*). Typical foraging birds include raptors such as turkey vulture (*Cathartes aura*), northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), and red-tailed hawk (*Buteo jamaicensis*), as well as a variety of insect and seed eating birds, such as white-crowned sparrows (*Zonotrichia leucophrys*), Brewer's blackbirds (*Euphagus cyanocephalus*), mourning doves (*Zenaida macroura*), meadowlarks (*Sturnella neglecta*), and lesser goldfinch (*Carduelis psaltria*).

Special-Status Plants

Special-status plant species typically only occur in specialized habitat within grasslands due to their inability to compete with introduced annual grasses and forbs. Many species are now restricted to serpentine soils or thin soils with low nutrient content that introduced species are unable to colonize. These include white-rayed pentachaeta (*Pentachaeta bellidiflora*), San Francisco popcorn flower (*Plagiobothrys diffusus*), most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*), Tiburon jewel-flower (*Streptanthus*

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[3] Holland, R.F., *Preliminary Descriptions of the Terrestrial Natural Communities of California*, Department of Fish and Game, Sacramento, CA, 1986.

niger), Tiburon Indian paintbrush (*Castilleja affinis* ssp. *neglecta*), Tamalpais lessingia (*Lessingia micradenia* var. *micradenia*), Contra Costa goldfields (*Lasthenia conjugens*), fountain thistle (*Cirsium fontinale* var. *fontinale*), Santa Cruz tarplant (*Holocarpha macradenia*), Marin western flax (*Hesperolinon congestum*), Brewer's western flax (*Hesperolinon breweri*), Diablo helianthella (*Helianthella castanea*), diamond-petaled California poppy (*Eschscholzia rhombipetala*), caper-fruited tropidocarpum (*Tropidocarpum capparideum*), and recurved larkspur (*Delphinium recurvatum*). Most of these species may also occur in vegetation communities other than grassland with their distribution generally restricted to specific soil types, hydrologic regimes, elevation range, and geographic distribution. See **Table H-1** in Appendix H for a complete list of special-status species with potential to occur in the Planning Area.

Special-Status Wildlife

A variety of special-status wildlife species are associated with grassland habitats of the Bay Area, including callippe silverspot butterfly (*Speyeria callippe callippe*), mission blue butterfly (*Icaricia icarioides missionensis*), bay checkerspot butterfly (*Euphydryas editha bayensis*), California tiger salamander (*Ambystoma californiense*), western spadefoot toad (*Scaphiopus hammondii*), California red-legged frog (*Rana aurora draytonii*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), San Joaquin whipsnake (*Masticophis flagellum ruddocki*), white-tailed kite (*Elanus leucurus*), golden eagle (*Aquila chrysaetos*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), and San Joaquin kit fox (*Vulpes macrotis mutica*).

Coastal Scrub and Chaparral

Natural Community Summary

Coastal scrub and sage scrub plant communities in the Bay Area are characterized on the basis of the dominant species: California buckwheat (*Eriogonum fasciculatum*), California sagebrush (*Artemesia californica*), coyote brush (*Baccharis pilularis*), black sage (*Salvia mellifera*), and purple sage (*Salvia dorrii*).[4] Coastal scrub communities are particularly dominant in the drier southern slopes and on exposed rocky slopes and bluffs within the Coast Ranges in the Bay Area. Coastal scrub is best considered as a collection or assemblage of different vegetation series, with various intergrades between the above-described plant communities. Coastal scrubs often intergrade with various chaparral types, and occur in a vegetative mosaic with grasslands and woodlands based on soil type, slope, aspect, and available moisture. Generally, these are communities of dense, low shrubs with sparse understory except in scattered grassy openings.

Chaparral is dominated by hard-leaved evergreen shrubs, generally with little or no herbaceous ground cover or overstory trees. Chamise (*Adenostoma fasciculatum)* and a variety of manzanita (*Arctostaphylos* spp.) are the dominant or codominant species throughout Bay Area chaparral communities. Gaps in chaparral support primarily grassland species, ranging from non-native herbaceous annuals and grasses to native perennial bunchgrasses, small ferns, and bulbiferous species.

Coastal scrub and chaparral habitat provide dense vegetative cover for many common small mammals and reptiles including deer mouse (*Peromyscus maniculatus*), California mouse (*Peromyscus californicus*), brush rabbit (*Sylvilagus bachmani*), western fence lizard, common garter snake (*Pituophis catenifer*), common

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[4] Sawyer, J.O. and T. Keeler-Wolf, *A Manual of California Vegetation.* California NativePlant Society. Sacramento, California, 1995.

kingsnake (*Lampropeltis getulus*), and western rattlesnake. Bird species that nest in shrub dominated habitats include California quail (*Callipepla californica*), western scrub-jay (*Aphelocoma californica*), bushtit (*Psaltriparus minimus*), California thrasher (*Toxostoma redivivum*), spotted towhee (*Pipilo maculatus*), sage sparrow (*Amphispiza belli*), and Bewick's wren (*Thryomanes bewickii*). Coastal scrub and chaparral provide important foraging habitat for black-tailed deer (*Odocoileus hemionus columbianus*) and other large mammals that prey upon smaller mammals and reptiles in scrub and chaparral habitat including coyote, gray fox (*Urocyon cinereoargenteus*), and raccoon (*Procoyon lotor*).

Special-Status Plants

Similar to Bay Area grasslands, distribution of rare plants and wildlife in scrub and chaparral communities often coincides with the distribution of uncommon geological features. In the case of coastal scrub plant communities, an array of plants and wildlife have adapted to serpentine-derived soils in both scrub habitats and grasslands. Conditions such as slope, aspect, precipitation, temperature, degree of exposure, and the presence of suitable soil conditions often control the distribution of rare species.

Special-status serpentine-adapted scrub species include: coyote ceanothus (*Ceanothus ferrisae*), Presidio clarkia (*Clarkia franciscana*), Mt. Diablo bird's beak (*Cordylanthus nidularius*), Marin checker lily (*Fritillaria affinis* var. *tristulis*), fragrant fritillary (*Fritillaria liliacea*), Crystal Springs lessingia (*Lessingia arachnoidea*), smooth lessingia (*Lessingia micradenia* var. *glabrata*), Marin checkerbloom (*Sidalcea hickmanii* var. *viridis*), San Francisco campion (*Silene verecunda* var. *verecunda*), and Tamalpais jewel-flower (*Streptanthus batrachopus*). Plants not specifically adapted to serpentine habitats include: pallid manzanita (*Arctostaphylos pallida*), San Francisco Bay spineflower (*Chorizanthe cuspidata* var. *cuspidata*), woolly-headed spineflower (*Chorizanthe cuspidata* var. *villosa*), yellow larkspur (*Delphinium luteum*), supple daisy (*Erigeron supplex*), Mt. Diablo buckwheat (*Eriogonum truncatum*), coast wallflower (*Erysisum ammophilum*), robust monardella (*Monardella villosa* var. *globosa*), Marin County navarretia (*Navarretia rosulata*), north coast phacelia (*Phacelia insularis* var. *continentis*), and Metcalf Canyon jewel flower (*Streptanthus albidus* ssp. *albidus*). In addition to these species there are twelve species of manzanita considered to be of special-status occurring in Bay Area chaparral habitats.

Special-Status Wildlife

There are relatively few special-status wildlife species within coastal scrub or chaparral habitats. Some of these are highly specialized invertebrates whose life histories are intimately dependent upon serpentine-associated species. These include callippe silverspot butterfly (*Speyeria callippe callippe*) and two non-serpentine-dependent species, San Bruno elfin butterfly (*Incisalia mossii bayensis*) and mission blue butterfly (*Icaricia icarioides missionensis*).

In Contra Costa, Alameda, and northeastern Santa Clara counties, chaparral and scrub habitats and adjacent grasslands support the federal and State threatened Alameda whipsnake (*Masticophis lateralis euryxanthus)*. Other special-status wildlife occurring in Bay Area chaparral and scrub communities include silvery legless lizard (*Aniella pulchra pulchra*), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), and coast horned lizard (*Phrynosoma blainvillii*). See **Table H-1** in Appendix H for a complete list of special-status species with potential to occur in the planning area.

Woodlands and Forest

Natural Community Summary

The diverse topography, soils, and climate of the Bay Area region support a wide range of woodland and forest types, from the oak savannas of the dry interior to the redwood forests of the coastal hills and mountains.

Bay Area woodlands are either dominated by a single oak species, including coast live oak (*Quercus agrifolia*), blue oak (*Q. douglasii*), California black oak (*Quercus kelloggii*), or valley oak (*Quercus lobata*), or are classified as mixed hardwood woodlands comprised of a variety of tree species including one or more oaks, and most often, big-leaf maple (*Acer macrophyllum*), tan-oak (*Notholithocarpus densiflorus*), California bay (*Umbellaria californica*), madrone (*Arbutus menziesii*), and California buckeye (*Aesculus californica*). Woodland understory vegetation is dependent on canopy cover, which can range from oak savanna with widely spaced trees and annual grasslands as understory, to a denser but still relatively open mixed woodland canopy often seen on north and east facing slopes or in canyons, which supports both shrubs and herbaceous vegetation. Here the shrub layer of the understory often contains toyon (*Heteromeles arbutifolia*), snowberry (*Symphoricarpos albus*), poison oak (*Toxicodendron diversilobum*), gooseberry (*Ribes* spp.), ocean spray (*Holodiscus discolor*), and California blackberry (*Rubus ursinus*). The herb layer can consist of non-native grasses such as soft chess (*Bromus mollis*) and ripgut brome (*Bromus diandrus*) and perennial native bunchgrasses such as blue wildrye (*Elymus glaucus*), intermixed with native and non-native wildflowers including mission bells (*Fritillaria affinis*), chickweed (*Stellaria media*), bedstraw (*Galium aparine*), mugwort (*Artemesia douglasiana*), fiesta flower (*Pholistoma auritum*), and miner's lettuce (*Claytonia perfoliata*). Where canopy cover is most dense, understory is sparse or absent and is typically made up of herbaceous species.

Bay Area oak and mixed woodlands provide water, foraging, nesting, cover, and migratory and dispersal corridors for a variety of wildlife species. Insect eaters such as ash-throated flycatcher (*Myiarchus cinerascens*), plain titmouse (*Parus inornatus*), and dark-eyed junco (*Junco hyemalis*) are woodland foliage gleaners. Bark gleaner species, such as scrub jay, Steller's jay (*Cyanocitta stelleri*), and acorn woodpecker (*Melanerpes formicivorus*), feed on insects as well as acorns. California quail and California towhee (*Pipilo crissalis*) are ground foragers in this habitat. Cooper's hawk and sharp-shinned hawk are often associated with woodland habitat, where they hunt small birds. Mammals such as gray squirrel (*Sciurus griseus*) forage and nest in the canopy of the trees, while long-tailed weasels (*Mustela frenata*) hunt on the ground for shrews (*Sorex* sp.) and California voles (*Microtus californicus*). Larger mammals such as black-tailed deer utilize the oak understory for shelter and food from acorns, berries, and foliage. Amphibians such as Pacific slender salamander (*Batrachoseps attenuatus*), arboreal salamander (*Aneides lugubris*), and ensatina (*Ensatina eschscholtzii*) live under the cover of fallen leaf litter.

Bay Area forest types are generally found at higher elevations of the Coast Ranges in areas with adequate moisture and are either dominated by a mix of hardwood species on drier slopes, as noted above for mixed woodlands, sometimes with one or more coniferous tree species, including coast redwood (*Sequoia sempervirens*) and Douglas fir (*Pseudotsuga menziesii*) or are dominated by conifers, with tan-oak and big-leaf maple as common associates. Typical understory species include wood rose (*Rosa gymnocarpa*), coastal wood fern (*Dryopteris arguta*), ocean spray, bracken fern (*Pteridium aquilinum*), yerba buena (*Clinopodium douglasii*), hazelnut (*Corylus cornuta*), creeping snowberry (*Symphoricarpos mollis*), and poison oak. Blue blossom (*Ceanothus thyrsiflorus*) and toyon are common in sunnier openings.

Redwood forest typically occupies coastal areas where fog drip and precipitation create moist and humid conditions. Redwood and Douglas fir dominate the canopy, their fallen needles forming a thick layer of duff. Several hardwood tree species are also associated with redwood forest including tan oak, California bay, big-leaf maple, madrone, and several oak species. The redwood forest understory is often sparse where canopy is dense and slopes are steep, but contains a diversity of species generally not found in adjacent plant communities. These include huckleberry (*Vaccinium ovatum*), hazelnut, thimbleberry (*Rubus parviflorus*), sword fern (*Polystichum munitum*), and redwood sorrel (*Oxalis oregana*). Redwood violet (*Viola sempervirens*), western trillium (*Trillium ovatum*), red clintonia (*Clintonia andrewsiana*), and several fern species often occur on moister slopes along ravines.

Mixed hardwood forest wildlife is similar to that described above for woodland habitats. Redwood and Douglas fir forest wildlife is generally lower in diversity than other forest types, in part because the canopy density of second-growth forest precludes the establishment of many understory plants. Moist conditions in the understory support amphibians, such as yellow-eyed salamander (*Ensatina eschscholzii xanthopicta*), California slender salamander (*Batrachoseps attenuatus*), and giant salamander (*Dicamptodon ensatus*), as well as coastal rubber boa (*Charina bottae*). Birds found in the redwood forest include brown creeper (*Certhia americana*), varied thrush (*Ixoreus naevius*), chestnut-backed chickadee (*Poecile rufescens*), and Steller's jay.

Special-Status Plants

Special-status plant species associated with woodland habitats are often also found in adjacent chaparral and scrub habitats. In the Bay Area, these species include: rayless ragwort (*Senecio aphanactis*), hooked popcorn-flower (*Plagiobothrys uncinatus*), Mt. Diablo phacelia (*Phacelia phacelioides*), Baker's navarretia (*Navarretia leucocephala* ssp. *bakeri*), showy madia (*Madia radiata*), Mt. Hamilton lomatium (*Lomatium observatorium*), Jepson's linanthus (*Linanthus jepsonii*), coast lily (*Lilium maritimum*), Contra Costa goldfields (*Lasthenia conjugens*), drymaria-like western flax (*Hesperolinon drymarioides*), Diablo helianthella (*Helianthella castanea*), talus fritillary (*Fritillaria falcata*), Hillsborough chocolate lily (*Fritillaria biflora* var. *ineziana*), San Mateo woolly sunflower (*Eriophyllum latilobum*), Brandegee's eriastrum (*Eriastrum brandegeae*), western leatherwood (*Dirca occidentalis*), Hospital Canyon larkspur (*Delphinium californicum* ssp. *interius*), robust spineflower (*Chorizanthe robusta* var. *robusta*), big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*), Marin manzanita (*Arctostaphylos virgata*), Mt. Diablo fairy lantern (*Calochortus pulchellus*), large-flowered fiddleneck (*Amsinckia grandiflora*), and Sharsmith's onion (*Allium sharsmithae*).

Special-Status Wildlife

Special-status woodland wildlife species include those described for grassland and riparian habitats in addition to purple martin (*Progne subis*), and species such as tree swallow (*Tachycineta bicolor*), Bullock's oriole (*Icterus bullockii*), and many other nesting birds, which are protected under the Migratory Bird Treaty Act and the California Fish and Game Code (see the Regulatory Setting later in this section). Bay Area forests in San Mateo, Marin, Sonoma and Napa Counties support the federally and State listed marbled murrelet (*Brachyramphus marmoratus*) and the federally listed and California species of special concern Northern spotted owl (*Strix occidentalis caurina*).

Riparian

Natural Community Summary

Riparian plant communities are tree- or shrub-dominated communities that occur along streams and rivers. Riparian forests, woodlands, and scrub are often separated from one another depending on the amount and density of tree canopy versus shrub canopy. Forests support a closed or nearly closed canopy of trees with variable understory, while woodlands have an open canopy of trees with an understory that is primarily grassy or herbaceous. Shrubs, rather than trees, dominate riparian scrub habitat, which is common both in the coastal mountains of San Mateo, Marin, and Sonoma counties, and in the more arid regions of the east and south Bay Area. The composition and density of riparian vegetation is very much dependent upon the duration of flowing or near-surface water, the amplitude and periodicity of flow (brief, high-velocity flows versus more sustained flows), and the texture of the substrate (cobble, gravel, sand, silt, clay). Different reaches of a stream may support different types of riparian vegetation. The major rivers, streams, and other surface waters that support riparian vegetation in the Bay Area are presented in **Figure 2.8-1** of *Chapter 2.8: Water Resources*. The most well developed riparian vegetation occurs in relatively undisturbed reaches of the largest Bay Area streams, including Sonoma Creek, the Russian River, the Napa River, Putah Creek, Alameda Creek, Coyote Creek, the Guadalupe River, San Francisquito Creek, Llagas Creek, and others listed in *Chapter 2.8*.

Typical dominant species in the forests, woodlands, and scrubs along Bay Area rivers and streams are Fremont cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*), various species of willow (*Salix* spp.), coast live oak, valley oak, and white alder (*Alnus rhombifolia*). Where they are not modified by urbanization, lower stream reaches typically intergrade into broad freshwater to brackish emergent wetlands dominated by cattails and bulrush (*Scirpus* spp.). Where the riparian habitat has been degraded, either through alteration of the hydrology or direct disturbance to vegetation, including along many urban stream reaches, the non-native blue gum eucalyptus (*Eucalyptus globulus*), fennel (*Foeniculum vulgare*), poison hemlock (*Conium maculatum*), perennial pepperweed (*Lepidium latifolium*), giant reed (*Arundo donax*), or French broom (*Genista monspessulana*) are often dominant, as seen in portions of most large Bay Area streams. Upper stream reaches are also often lacking riparian cover due to long-standing grazing, agricultural practices, or channelization due to urbanization. Most remaining riparian vegetation is afforded regulatory protection by the California Department of Fish and Wildlife (CDFW). A discussion of specific regulations is provided in the Regulatory Setting below.

Within the urbanized portions of the Bay Area, riparian habitats, even though often degraded, support the densest and most diverse wildlife communities available. The diversity of plant species, multilayered vegetation, and perennial water provides a variety of foods and microhabitat conditions for wildlife. Mature willows, oaks, sycamores, and other riparian trees provide high-quality nesting habitat for the region's avifauna.

Special-Status Plants

Special-status riparian plants in the Bay Area include western leatherwood (*Dirca occidentalis*), Mason's lilaeopsis (*Lilaeopsis masonii*), Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*), and Davidson's bush mallow (*Malacothamnus davidsonii*). See **Table H-1** in Appendix H for a complete list of special-status species with potential to occur in the planning area.

Special-Status Wildlife

Special-status avifauna that nest in Bay Area riparian corridors include yellow warbler (*Dendroica petechia*), yellow-breasted chat (*Icteria virens*), and accipiters such as Cooper's hawk (*Accipiter cooperii*), and sharp-shinned hawk (*A. striatus*). Habitat destruction, habitat fragmentation, and nest parasitism by the brown-headed cowbird (*Molothrus ater*) are suspected causes of the two former species' decline. The western red bat (*Lasiurus blossevillii*), a California species of special concern, often roosts in tree foliage in riparian corridors.

The federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is dependent upon the elderberry bush (*Sambucus nigra* ssp. *caerulea*) throughout its entire life history. Elderberry bushes occur statewide and commonly occur in riparian corridors, but may also be present in isolated stands or in woodlands outside riparian habitats. The range of the valley elderberry longhorn beetle includes portions of Solano County and eastern Contra Costa and Alameda counties.

Aquatic Habitat

Natural Community Summary

Rivers and Streams

Rivers and streams of the Bay Area have several common ecological attributes:

- As a result of urbanization, many smaller streams on the San Francisco Peninsula, south San Francisco Bay, East Bay, and in portions of the North Bay have been channelized or otherwise developed for flood control or agriculture.
- Most of these waterways are small, seasonal streams, and in the case of urbanized streams, many maintain perennial flows from urban runoff sources during late summer months.
- There are a handful of native streams and rivers in each county that account for the majority of freshwater flows to San Francisco Bay and provide the greatest opportunities for special-status plants and wildlife species.

The Bay Area is drained by many small to mid-sized rivers and creeks spread throughout the region. The Sacramento-San Joaquin River Delta contributes the majority of the freshwater input to San Francisco Bay; however, this discussion concentrates on other tributaries in the region that provide important riverine and aquatic habitat. In the North Bay, Petaluma River, Sonoma Creek, and Napa River account for much of the freshwater flows into San Pablo Bay. Relatively smaller, though biologically important contributions are made by Gallinas Creek, Novato Creek, Corte Madera Creek, and Miller Creek in Marin County. In general, there are few impediments or obstructions in these creeks, and their watersheds. These tributaries are less channelized, offering habitat for listed native salmonids including coho salmon (*Oncorhynchus kisutch*) and steelhead (*Oncorhynchus mykiss irideus*). The Russian River in Sonoma County also provides good habitat for salmonids. Solano County watersheds are also relatively undeveloped, including the Putah Creek watershed. Lake Berryessa limits the availability of headwater habitats in Putah Creek to anadromous fish, but this creek still provides valuable aquatic resources.

Stream resources in the East Bay, South Bay, and San Francisco Peninsula have been degraded by urban development, particularly adjacent to and within stream courses. As a result of these changes, only a handful of major streams in these areas support native fisheries and special-status fisheries. These include

Alameda Creek, which drains the largely undeveloped watershed of the Sunol Valley and Livermore-Amador Valley, Coyote Creek, Guadalupe River, and Los Gatos Creek in the South Bay, and San Francisquito Creek, Permanente Creek, and San Mateo Creek on the San Francisco Peninsula. In Gilroy and Morgan Hill, Llagas Creek transports flows southward to the Pajaro River. Major dams or other fish impediments that prevent fish from reaching the upper watersheds are present in all of these streams, with the exception of San Francisquito Creek.

Habitat for common fish species occurs primarily in the streams listed in *Chapter 2.8*: *Water Resources* though other smaller streams in the Bay Area can and do support them.

Lacustrine

Lacustrine habitats are permanent water bodies that do not support emergent vegetation (except around their margins) and are not subject to tidal exchange; they include natural and man-made lakes and ponds, oxbows, flooded gravel pits, and flooded islands. Vegetation can include submerged plants such as pondweeds (*Potamogeton* spp.) and algae in deepwater habitat, while near shore habitat may support smartweeds (*Polygonum* spp.), cattails (*Typha* spp.), spikerush (*Eleocharis* spp.), and other freshwater wetland vegetation. Lakes and ponds may support willow scrub along the shoreline. Bay Area reservoirs are typically stocked with game fish, including rainbow trout (*Oncorhynchus mykiss*), striped bass (*Morone saxatilis*), largemouth bass (*Micropterus salmoides*), sunfish (*Lepomis* sp.), brown bullhead catfish (*Ameiurus nebulosus*), and channel catfish (*Ictalurus punctatus*), among others. Resident waterfowl using lacustrine habitat include a variety of ducks such as mallard (*Anas platyrhinchos*) and American coot (*Fulica americana*), Canada geese (*Branta canadensis*), and wading birds, such as great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), and great egret (*Ardea alba*).

Special-Status Plants

With the exception of several species, such as eel-grass pondweed (*Potamogeton zosteriformis*) there are few special-status plants occurring in freshwater aquatic habitat of the region.

Special-Status Wildlife

As noted above, special-status fish occur in a limited number of rivers and streams in the Bay Area. Species include the federally listed tidewater goby (*Eucyclogobius newberryi*), coho salmon—central California Evolutionarily Significant Unit (ESU), steelhead—northern California Distinct Population Segment (DPS), central California coast DPS, and south/central California coast DPS, chinook salmon—California coast ESU (*Oncorhynchus tshawytscha*), and Sacramento splittail (*Pogonichthys macrolepidotus*). Several species of limited distribution and rarity occur exclusively in the lower reaches of drainages near and within the Delta, such as longfin smelt (*Spirinichus thaleichthys*) and the State- and federally listed threatened Delta smelt (*Hypomesus transpacificus*).

Suitable steelhead and coho spawning habitat is found in streams and rivers where there is less development. Several small, cool-water drainages in Marin County support coho salmon, which apparently do not successfully reproduce south of the Golden Gate.[5] Steelhead require higher gradient,

[5] Federal Register, *Designated Critical Habitat for Central California Coast and Southern Oregon/Northern California Coasts Coho Salmon.* Federal Register, Vol. 64, No. 86, May 5, 1999, p. 24049, 1999.

upper reaches of streams, with access to the ocean during emigration and spawning, and cool year-round water temperatures for the juveniles' rearing habitat. Steelhead populations are documented from San Francisquito Creek, Green Valley Creek, Suisun Creek, San Pablo Creek, Coyote Creek, Steven's Creek, Guadalupe River, Corte Madera, Miller Creek, Novato Creek, Sonoma Creek, Napa River, Huichica Creek, Petaluma River, San Lorenzo Creek, San Leandro Creek, and Alameda Creek, and they are known to sporadically migrate into and occasionally breed in smaller streams throughout the Bay Area.

The federally listed endangered California freshwater shrimp (*Syncaris pacifica*) occurs in low gradient, structurally diverse perennial streams in the northern Bay Area.[6] Of the 17 streams that support this species, those in the Bay Area include Sonoma Creek, the Napa River, and Huichica Creek, which drain to San Pablo Bay; and Laguna de Santa Rosa (Santa Rosa Creek) and its tributaries, which drain to the Russian River. The 1998 Recovery Plan for this species seeks the long-term protection of aquatic and riparian habitat as criteria for species delisting.

Bridges of various rivers and streams provide nesting opportunities for birds protected under the federal Migratory Bird Treaty Act and the California Fish and Game Code (see the Regulatory Setting later in this section), including barn swallows (*Hirundo rustica*) and cliff swallows (*Petrochelidon pyrrhonota*), and the purple martin (*Progne subis*), a California species of special concern. These species build cup- and gourd-shaped nests, respectively, using mud as their primary construction material. Bat colonies may also roost under bridges in the Bay Area, including *Myotis* species, Mexican free-tailed bats (*Tadarida brasiliensis*), and Townsend's big-eared bats. Breeding and non-breeding bat roosts are protected by California Fish and Game Code Section 4150.

The federally threatened California red-legged frog still breeds in the upper reaches of most Bay Area riparian corridors and in the lower reaches within select drainage systems and ponds. The greatest concentrations of this species in the Bay Area occur near Sears Point, several drainages and channels that traverse I-580 in the Livermore-Amador Valley, and in drainages on the San Francisco Peninsula, though potential and occupied habitat occur elsewhere throughout the region.

The federal- and State-listed endangered San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) occurs on the San Francisco Peninsula, where riparian habitats meet open water and freshwater marshlands. Habitats within the Peninsula corridor occur in marshlands near San Francisco International Airport and in tributary streams to the Crystal Springs Reservoir (near Interstate 280). Some riparian habitats in the Bay Area also support small populations of western pond turtle (*Actinemys marmorata*).

Special-status birds that use lacustrine habitat in the Bay Area include the State endangered and fully protected bald eagle (*Haliaeetus leucocephalus*) and osprey (*Pandion halietus*), protected under Section 3503.5 of the California Fish and Game Code (see the Regulatory Setting later in this section for further details). Migratory waterfowl species that forage, overwinter, rear their brood, or otherwise rely on lacustrine habitat in the Bay Area at some time during the year include the wood duck (*Aix sponsa*), gadwall (*Anas strepera*), American wigeon (*A. americana*), northern pintail (*A. acuta*), green-winged teal (*A. carolinensis*), canvasback (*Aythya valisineria*), bufflehead (*Bucephala albeola*), common goldeneye (*B. clangula*), hooded

[6] USFWS, *California Freshwater Shrimp (Syncaris pacifica) Recovery Plan.* U.S. Fish and Wildlife Service, Portland, Oregon, 94 pp.,1998.

merganser (*Lophodytes cucullatus*), common merganser (*Mergus merganser americanus*), and ruddy duck (*Oxyura jamaicensis*). See **Table H-1** in Appendix H for a complete list of special-status species with potential to occur in the Planning Area.

San Francisco Bay Aquatic Resources

Natural Community Summary

The San Francisco Bay and Delta make up the Pacific Coast's largest estuary, encompassing roughly 1,600 square miles of waterways and draining over 40 percent of California's fresh water. The Sacramento and San Joaquin Rivers flow from Northern California's inland valleys into the Delta's winding system of islands, sloughs, canals, and channels, before emptying into San Francisco Bay and the Pacific Ocean. Major transportation corridors bridge the open waters of San Francisco Bay, and many others are located in close proximity to the Bay.

The marine environment varies widely between the six transportation corridors that cross the open waters of the San Francisco Bay. Most of the transbay corridors consist of open water habitat; that is, habitat below the low-tide line (also known as subtidal habitat).

Eelgrass (*Zostera marina*) may occur near the footings of bridges in the transbay corridors and is considered a sensitive habitat by CDFW. Eelgrass is an important habitat for many organisms and may influence benthic community structure by stabilizing sediments, providing forage and detritus food sources, and creating a refuge and nursery for small organisms. Eelgrass beds also provide an important attachment substrate for Pacific herring eggs and thus support an important Bay Area commercial fishery.[7]

More than 100 species of fish are described from the San Francisco Bay system.[8] The majority of these are native species that live year-round in San Francisco Bay, though a few, such as striped bass (*Morone saxatilis*), have been introduced. Anadromous fish also use San Francisco Bay seasonally during their migrations to and from spawning grounds throughout the Bay Area and in California's Central Valley. The species composition within the Bay varies by season and regularly changing physical conditions created by the freshwater flow from the San Joaquin and Sacramento Rivers and other tributaries into San Francisco Bay. Native fish commonly found within the Bay include such diverse species as starry flounder (*Platichthys stellatus*), California halibut (*Paralichthys californicus*), leopard shark (*Triakis semifasciata*), tule perch (*Hysterocarpus traski*), Pacific herring (*Clupea harengus pallasi*), northern anchovy (*Engraulis mordax*), and sturgeons (*Acipenser* spp.). Non-native fish species in the Bay include largemouth bass (*Micropterus salmoides*), threadfin shad (*Dorosoma petenense*), and yellowfin goby (*Acanthogobius flavimanus*).

The benthic invertebrate community of the Bay is composed of various annelids, mysid shrimp, copepods, amphipods, shrimp, crabs, and other macroinvertebrates. All of these organisms provide important food sources for estuary fish and bird species.

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7 USFWS, *The Ecology of Eelgrass Meadows in the Pacific Northwest: A Community Profile.* FWS/OBS-84/24, 85 pp., 1994.

8 U.S. Fish and Wildlife Service (USFWS), The Ecology of San Francisco Bay Tidal Marshes: A Community Profile. FWS/OBS-83/23. October. 1983.

Riprap occurs along many areas of the bay shore and can provide some, but not all, of the habitat values and functions that naturally occurring rocky shore habitat would provide, including a substrate for marine plant and sessile intertidal organisms such as mussels (*Mytilus* sp.) and barnacles. Rocky shore habitat also provides cover for invertebrates such as rock crabs (*Cancer antennarius* and *C. productus*) and for fish such as plainfin midshipmen (*Porichthys notatus*), which are known to seek cover and to spawn under concrete slabs. The marine plants, clams, mussels, barnacles, annelids, and crustaceans inhabiting rocky shore habitat are food sources for larger marine invertebrates, fishes, birds, and marine mammals.

Special-Status Wildlife

The two marine mammals most commonly found in San Francisco Bay are the California sea lion (*Zalophus californianus*) and the harbor seal (*Phoca vitulina*). Both species forage in the open waters of the Bay and bask on exposed rocks, piers, or wharves throughout the Bay. The Marine Mammal Protection Act protects both species.

The National Marine Fisheries Service (NMFS) recognizes several threatened and endangered species that occur in San Francisco Bay. These include the Steller sea-lion (*Eumetopias jubatus*), loggerhead sea turtle (*Caretta caretta*), leatherback turtle (*Dermochelys coriacea*), olive ridley sea turtle (*Lepidochelys olivacea*), and several fish species, including coho salmon, steelhead, delta smelt, and Sacramento splittail. The goby, smelt, and splittail are resident species; the salmonids, however, are only expected to use open water habitats of the Bay seasonally or infrequently. The brown pelican (*Pelecanus occidentalis*), although recently delisted, is still a fully protected species under the California Fish and Game Code.

Wetlands

Natural Community Summary

Coastal Marsh and Estuaries

Coastal salt marshes around San Francisco Bay (including historically diked tidal marshes) are dominated by perennial pickleweed (*Salicornia pacifica*), alkali heath (*Frankenia salina*), spearscale (*Atriplex triangularis*), marsh gumplant (*Grindelia stricta* var. *angustifolia*), saltgrass (*Distichlis spicata*), and other salt-tolerant plants that are also tolerant of regular inundation or soil saturation. Tidal salt marshes are typically bisected by a network of sloughs and small channels that facilitate tidal reach into the interior of the marsh. These channels are subject to more frequent and deeper flooding and therefore support different plant species, such as smooth cordgrass (*Spartina foliosa*) and alkali bulrush (*Scirpus maritimus*). As tidal effects and salinity decrease coastal salt marsh intergrades with brackish marsh, especially in areas where larger rivers meet the Bay.

In more extensive slough systems, such as those in the North Bay and South Bay, the transition zones between sloughs and creeks are increasingly dominated by brackish and freshwater-adapted species such as California bulrush (*Scirpus californicus*) and cattails (*Typha* sp.). Extensive coastal marsh communities are present in the lower reaches of Sonoma Creek and the Napa River, and in patches along U.S. Highway 101 in Palo Alto and Mountain View.

There are relatively few terrestrial animals in the salt marsh, however, the non-native red fox (*Vulpes vulpes*) and house mouse (*Mus musculus*), as well as the native California vole (*Microtus californicus*) and black-tailed jackrabbit (*Lepus californicus*) can be found in marshes around the Bay. Resident bird species include marsh wren (*Cistothorus palustris*) and raptors typical of Bay Area salt marsh habitats include northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), and American kestrel (*Falco sparverius*). Migratory shorebirds that forage in the mudflats during low tide include black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa*), and several sandpipers. During high tide, a few of the ducks that may be found in salt marsh environments include northern shoveler, American wigeon, northern pintail, gadwall (*Anas strepera*), and canvasback.

Freshwater Wetlands

Freshwater emergent wetlands, or marshes, occur along slow moving streams and rivers, along lakeshores, and in stockponds and other artificial waterbodies and are dominated by perennial vegetation such as cattails, bulrush, or spikerush. Freshwater marsh habitat provides nesting and foraging opportunities, as well as cover, for a number of bird species, amphibians, and small mammals. Species commonly associated with freshwater emergent wetlands include great blue heron, great egret, black phoebe (*Sayornis nigricans*), red-winged blackbird (*Agelaius phoeniceus*), raccoon, Sierran treefrog (*Pseudacris sierra*), and California vole. Larger mammals may use these wetlands for water or forage.

Freshwater seeps and wet meadows occur on permanently moist soil and are dominated by perennial grasses, sedges (*Carex* spp.), and rushes (*Juncus* spp.). In the Bay Area, these wetlands typically occur on grazed hillsides or at the base of grassland slopes. Seasonal wetland habitat consists of vernal pools, alkali marshes, alkali sink scrub habitats, and other seasonal wetlands with intermittent hydrologic conditions. Seasonal wetlands are dominated by herbaceous vegetation and pond surface water or maintain saturated soils at the ground surface for enough of the year to support facultative or obligate wetland plant species.

Vernal pools are seasonal freshwater pools that form in depressions over an impermeable soil layer (claypan or hardpan) or parent material. The vegetation in vernal pools consists primarily of annuals with low cover and a short life cycle. Vernal pools support a distinctive flora with a high number of endemic and rare species. Ephemeral seasonal wetlands habitat that supports vernal pool species occurs in the eastern Livermore-Amador Valley, Solano County, the city of Fremont, the Brentwood area, near the Napa County Airport, and the Santa Rosa Plain. In addition, alkali meadows and seeps in Contra Costa County support a similar assemblage of vernal pool endemic species.

Special-Status Plants

Special-status plants found in Bay Area salt marshes include Point Reyes bird's beak (*Chloropyron maritimum ssp. palustre*), soft bird's beak (*Chloropyron molle* ssp. *molle*), Humbodlt bay owl's clover (*Castielljia ambigua* ssp. *humboldtiensis*), and California seablite (*Suaeda californica*). Rare plants in brackish marshes include Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*), and Suisun marsh aster.

Special-status plants of seasonal wetlands and vernal pools include Solano grass (*Tuctoria mucronata*), vernal pool smallscale (*Atriplex persistens*), San Joaquin saltbush (*Atriplex joaquiniana*), Congdon's tarplant *Centromadia parryi* ssp. *congdonii*), Contra Costa goldfields (*Lasthenia conjugens*), and alkali milk vetch (*Astragalus tener* var. *tener*). Several highly endangered species occur in vernal pools of the Santa Rosa Plain, including Burke's goldfields (*Lasthenia burkei*), Sebastopol meadowfoam (*Limnanthes vinculans*), and Sonoma sunshine (*Blennosperma bakeri*), which are all listed as federal and State endangered species.

Special-Status Wildlife

Rare and endangered wildlife species that occur in tidal marshes of the Bay Area include California clapper rail (*Rallus longirostris obsoletus*), California black rail (*Laterallus jamaicensis coturniculus*), western snowy plover (*Charadrius alexandrinus nivosus*), Alameda song sparrow (*Melospiza melodia pusillula*), San Pablo song sparrow (*Melospiza melodia samuelis*), salt marsh common yellowthroat (*Geothlypis trichas sinuosa*), salt marsh harvest mouse (*Reithrodontomys raviventris*), San Pablo vole (*Microtus californicus sanpabloensis*), Suisun shrew (*Sorex ornatus sinuosus*), and salt marsh wandering shrew (*Sorex vagrans*).

Freshwater emergent wetlands and adjacent grassland habitats in Solano County support populations of the federal and State threatened giant garter snake (*Thamnophis gigas*). Freshwater emergent wetlands throughout the region support California red-legged frog and vernal pools and other seasonal wetlands of sufficient depth and duration of inundation support California tiger salamander in the Santa Rosa Plain, East Bay, and elsewhere. Special-status invertebrates found in seasonal wetlands and vernal pools, primarily in the East Bay and Solano County, include longhorn fairy shrimp (*Branchinecta longiantenna),* vernal pool fairy shrimp (*Branchinecta lynchi*), and vernal pool tadpole shrimp (*Lepidurus packardi*).

Jurisdictional Waters

As described in detail in the Regulatory Setting below, activities such as discharge of fill or alteration that would affect most streams, rivers, and wetlands in the Bay Area are regulated by the U.S. Army Corps of Engineers (Corps), the San Francisco Regional Water Quality Control Board (SFRWQCB), and CDFW. The Bay Conservation and Development Commission (BCDC) regulates activities in and adjacent to San Francisco Bay and the California Coastal Commission regulates activities along the California coast.

Jurisdictional wetlands in the Bay Area include tidal, brackish, and freshwater marshes, seasonal wetlands, seeps, and vernal pools. Rivers and streams are considered "other waters" and are regulated as such by the wetland permitting agencies. Compliance with regulations concerning wetlands and other waters would be required on a project-level basis under the proposed Plan.

Urban/Agricultural/Ruderal

Natural Community Summary

Urban

Urban development and landscaped areas support few biological resources and provide limited wildlife habitat but do provide foraging or nesting habitat for generalist,[9] and sometimes non-native, wildlife species that can tolerate human presence and activities. These include birds and small mammals such as western scrub jay, California towhee, house finch (*Carpodacus mexicanus*), English sparrow (*Passer domesticus*) raccoon, opossum (*Didelphis virginica*), and house mouse. Although these areas often do not provide suitable habitat for many specialized species of native wildlife due to higher human activity levels and the resources available, they may support a greater diversity of native wildlife species under appropriate conditions.

[9] "Generalist" species can occupy and thrive in a variety of natural or developed areas.

Agricultural

The Bay Area supports agricultural lands farmed for feed and grain, produce, orchards, vineyards and other crops, such as commercial nurseries. Agricultural lands do not typically provide habitat for a wide variety of species but when situated in proximity to undeveloped open space, rivers, and marshes may attract many of the wildlife species associated with these habitats to forage in croplands. Common species occurring in agricultural lands include small mammals such as voles and mice, and birds such as mourning doves, European starlings (*Sturnus vulgaris*), and several blackbird species. Croplands are also important foraging habitats for numerous raptors including the red-tailed hawk, northern harrier, and white-tailed kite.

Ruderal

Ruderal (disturbed and weedy) habitats are most prevalent in areas subject to frequent and often severe vegetation and soil disturbances including overgrazed rangeland, disked or fallow fields, construction sites, levees, vehicle parking lots, and railroad or other public utility rights of way. This habitat type occurs throughout the region and is replacing annual grasslands where pressures are particularly high. Where vegetated, these sites are dominated by opportunistic, weedy non-native plant species such as perennial pepperweed, black mustard (*Brassica nigra*), mayweed (*Anthemis cotula*), and bristly ox-tongue (*Picris echioides*), wild radish (*Raphanus sativus*), yellow star thistle, Italian thistle (*Carduus pycnocephalus*), fennel, poison hemlock, pampas grass (*Cordateria jubata*), and bristly ox-tongue (*Helminthotheca echioides*).

Ruderal habitats provide limited foraging or nesting habitat for disturbance tolerant and non-native birds and small mammals such as English sparrow, European starling, house finch, mourning dove, golden-crowned sparrow (Zonotrichia atricapilla), Norway rat (*Rattus norvegicus*), house mouse (*Mus musculus*), and California ground squirrel (*Spermophilus beechyi*) and other rodents. Killdeer (*Charadrius vociferous*) commonly forage and nest on gravel or bare ground, including open dirt and fractured pavement. Ruderal habitat can also provide refuge for reptiles such as western fence lizard, alligator lizard (*Elgaria multicarinata)*, and gopher snake.

Special-Status Plants

Special-status plants are not expected to occur in urban, agricultural, or ruderal environments due to the degree of disturbance to soils and vegetation, as well as habitat fragmentation, found in these areas.

Special-Status Wildlife

In general, most special-status wildlife species are not expected to occur in urban or other highly disturbed areas. The exception to this would be bats and birds. For example, bats could use underutilized or abandoned buildings in urban areas for roosting and raptors such as Cooper's hawk and red-tailed hawk are known to nest with regularity in urban areas as well. Bats and raptors are also known to forage in agricultural fields.

Special-Status Species

As noted previously, the high diversity of vegetation and wildlife found in the Bay Area is a result of soils, topographic, and micro-climate diversity that combine to promote relatively high levels of endemism.[10] This, in combination with the rapid pace of development in the region, has resulted in a relatively high degree of endangerment for local flora and fauna. Numerous species known to occur in the region are protected pursuant to federal and/or State endangered species laws, or are otherwise protected. These species are collectively referred to as "special-status species."

Generalized habitat for special-status plant and wildlife species listed above in the *Natural Community Summary* section and their listing status is provided in **Table H-1** in Appendix H. Occurrences of special-status species throughout the Bay Area region as documented in the California Natural Diversity Database (CNDDB) are shown in **Figures 2.9-1** through **2.9-4**.[11]

Critical Habitat

The U.S. Fish and Wildlife Service (USFWS) and NMFS designate critical habitat for certain species that they have listed as threatened or endangered. "Critical habitat" is defined in Section 3(5)(A) of the Federal Endangered Species Act as those lands (or waters) within a listed species' current range that contain the physical or biological features that are considered essential to the species' conservation, as well as areas outside the species' current range that are determined to be essential to its conservation. Critical habitat has been designated for 24 species in the Bay Area. Of these, critical habitat units for California red-legged frog, California tiger salamander, Central Coast steelhead, Alameda whipsnake, and marbled murrelet are the most widespread throughout the region.

Currently, critical habitat for northern spotted owl does not occur within the planning area. However, a revision of critical habitat was proposed by USFWS in March 2012 and will likely be accepted during the lifetime of the proposed Plan. Proposed revisions include the designation of State, federal, and private lands as critical habitat in Marin, Sonoma, and Napa counties.

See **Figures 2.9-5** through **2.9-8** for the locations of critical habitat units throughout the Bay Area and **Table 2.9-1** for a summary of critical habitat by county.

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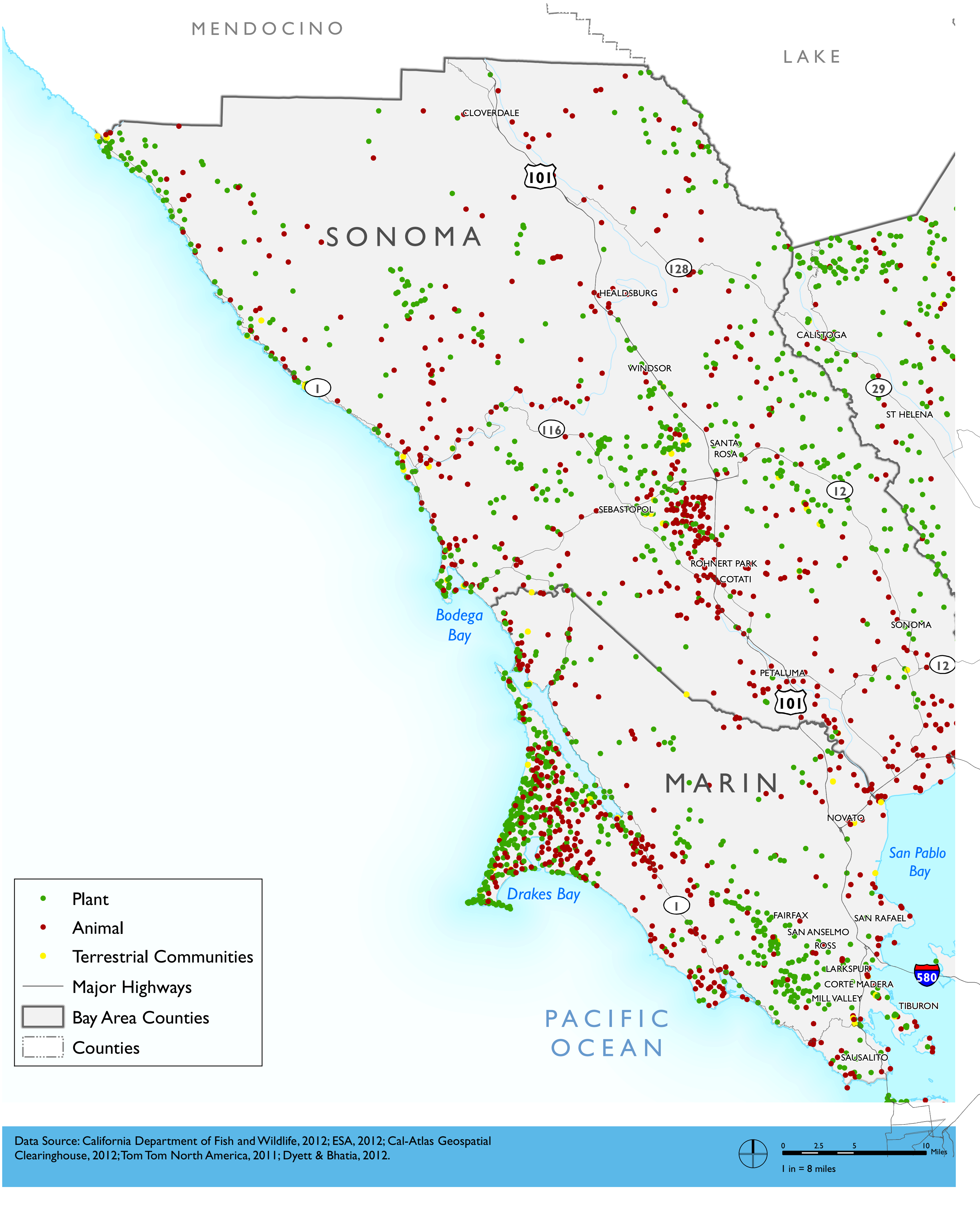
[10] Endemism refers to the degree to which organisms or taxa are restricted to a geographical region or locality and are thus individually characterized as endemic to that area.

[11] CDFW, CNDDB Special Status Species Occurrences [GIS Shapefiles], California Department of Fish and Wildlife, Biogeographic Data Branch, Sacramento, CA, 2012.

Figure 2.9-1

CNDDB Documented Sensitive Biological Resources: North Bay



Data Source: California Department of Fish and Wildlife, 2012; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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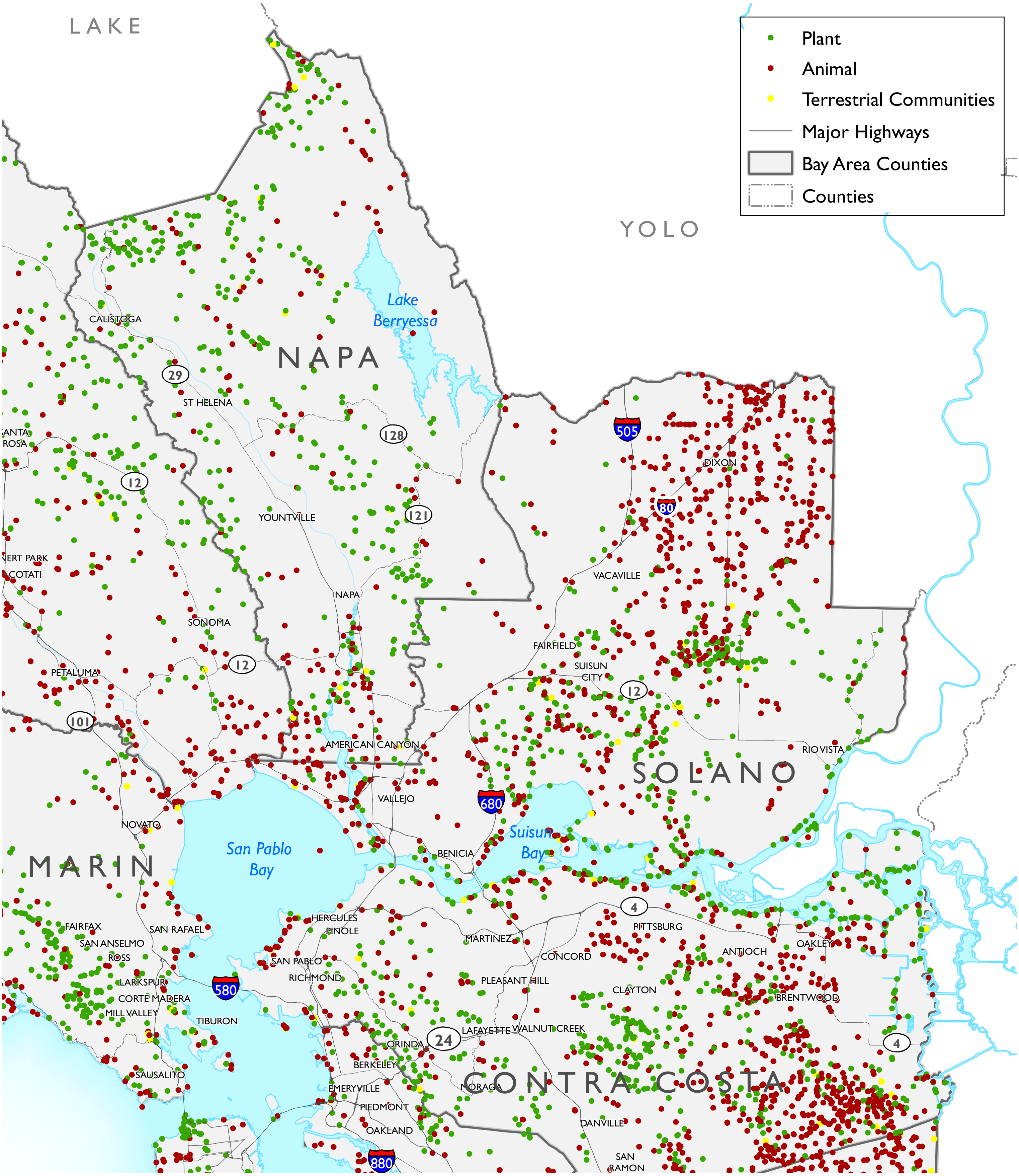
Figure 2.9-2

CNDDB Documented Sensitive Biological Resources: East Bay



Data Source: California Department of Fish and Wildlife, 2012; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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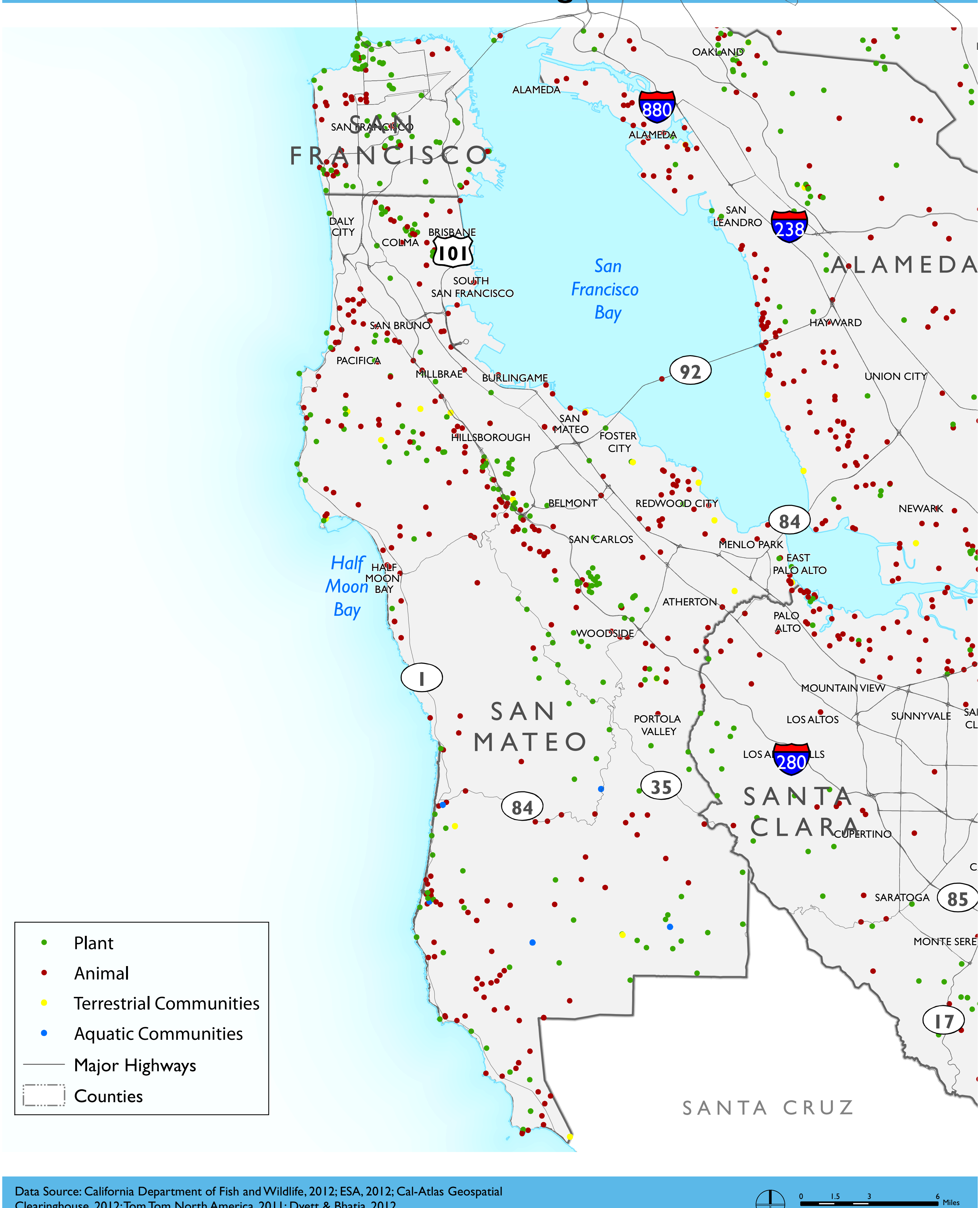
Figure 2.9-3

CNDDB Documented Sensitive Biological Resources: Peninsula



Data Source: California Department of Fish and Wildlife, 2012; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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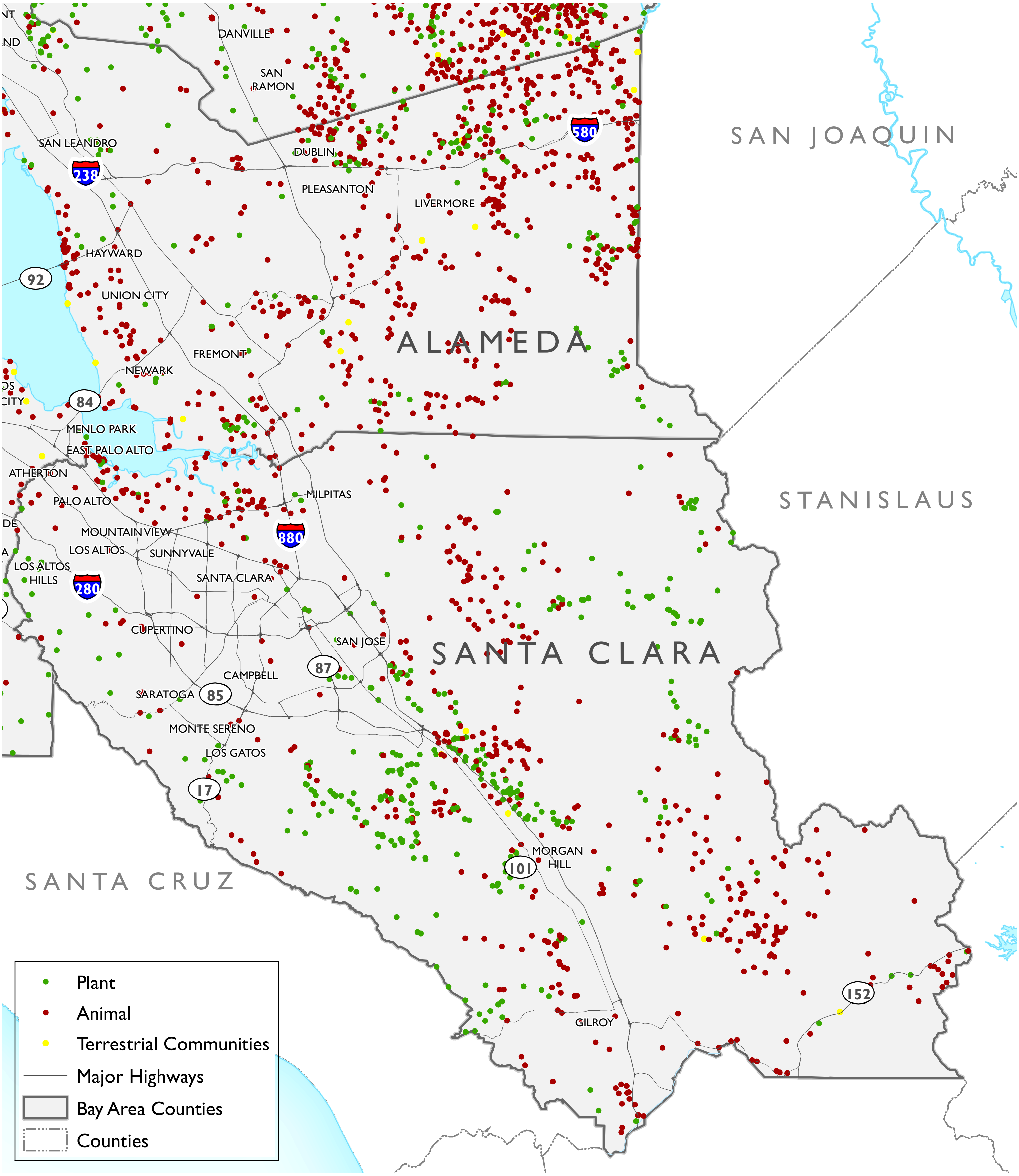
Figure 2.9-4

CNDDB Documented Sensitive Biological Resources: South Bay



Data Source: California Department of Fish and Wildlife, 2012; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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TABLE 2.9-1: CRITICAL HABITAT IN THE BAY AREA

Species	*County*								
	Contra Costa	**Alameda**	**Santa Clara**	**San Mateo**	**San Francisco**	**Marin**	**Sonoma**	**Napa**	**Solano**
Antioch Dunes evening primrose	√								
Baker's larkspur						√	√		
Contra Costa goldfields	√	√						√	√
Contra Costa wallflower	√								
Santa Cruz tarplant	√								
Soft bird's beak	√							√	√
Yellow larkspur						√	√		
Delta smelt	√								√
Chinook salmon - CA Coast ESU							√		
Steelhead - N. CA DPS							√		
Steelhead – South/Central CA Coast DPS			√						
Steelhead – Central CA Coast DPS			√	√		√	√	√	
Steelhead – CA Central Valley DPS	√								√
Tidewater goby						√			
Bay checkerspot butterfly			√	√					
Conservancy fairy shrimp									√
Longhorn fairy shrimp	√	√							
Vernal pool fairy shrimp	√	√						√	√
Vernal pool tadpole shrimp									√
California red-legged frog	√	√	√	√		√	√	√	√
California tiger salamander		√	√				√		√
Alameda whipsnake	√	√							
Marbled murrelet				√		√	√		
Northern spotted owl (proposed 2012)						√	√	√	
Western snowy plover						√			

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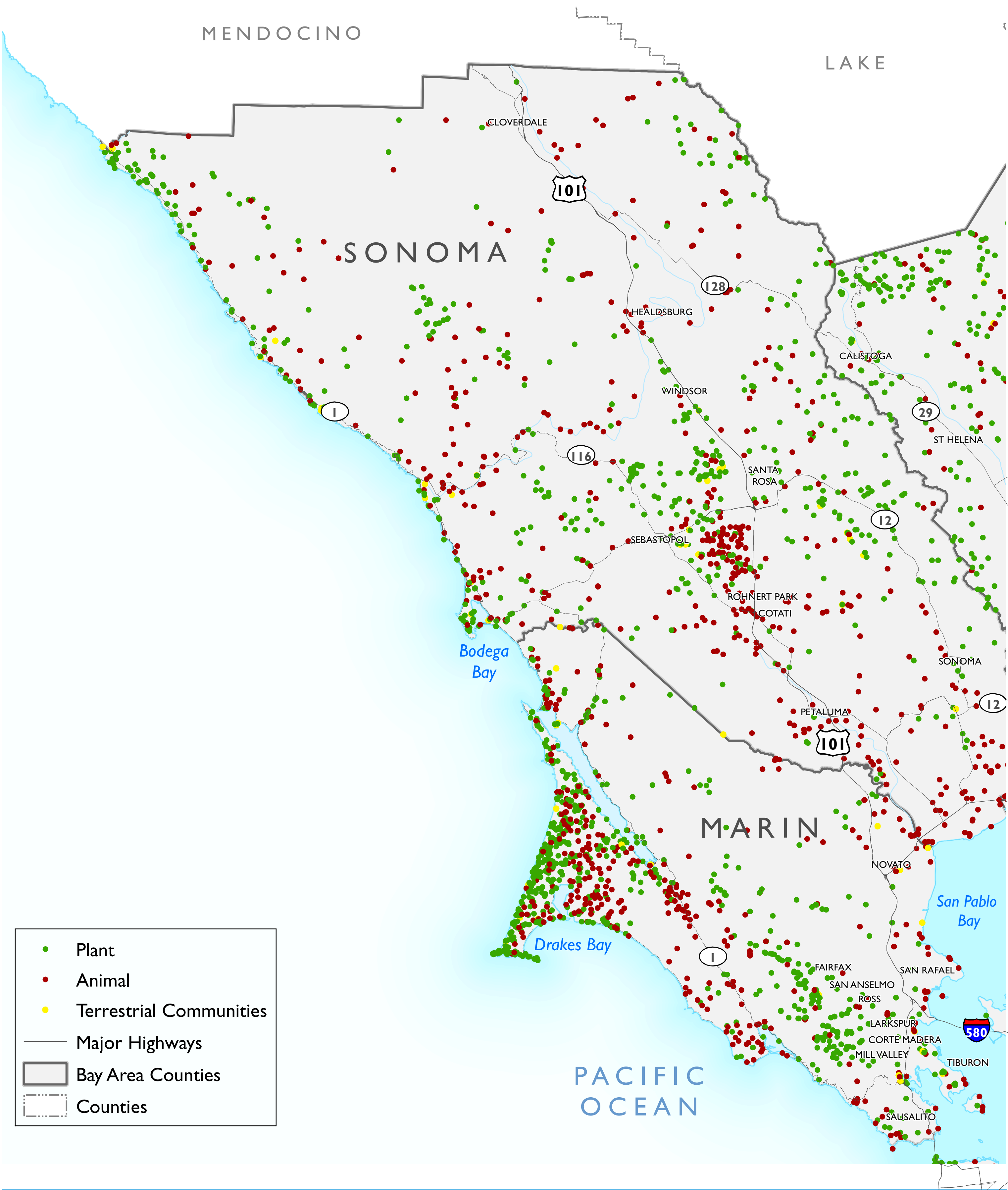
Figure 2.9-1

CNDDB Documented Sensitive Biological Resources: North Bay



Data Source: California Department of Fish and Wildlife, 2012; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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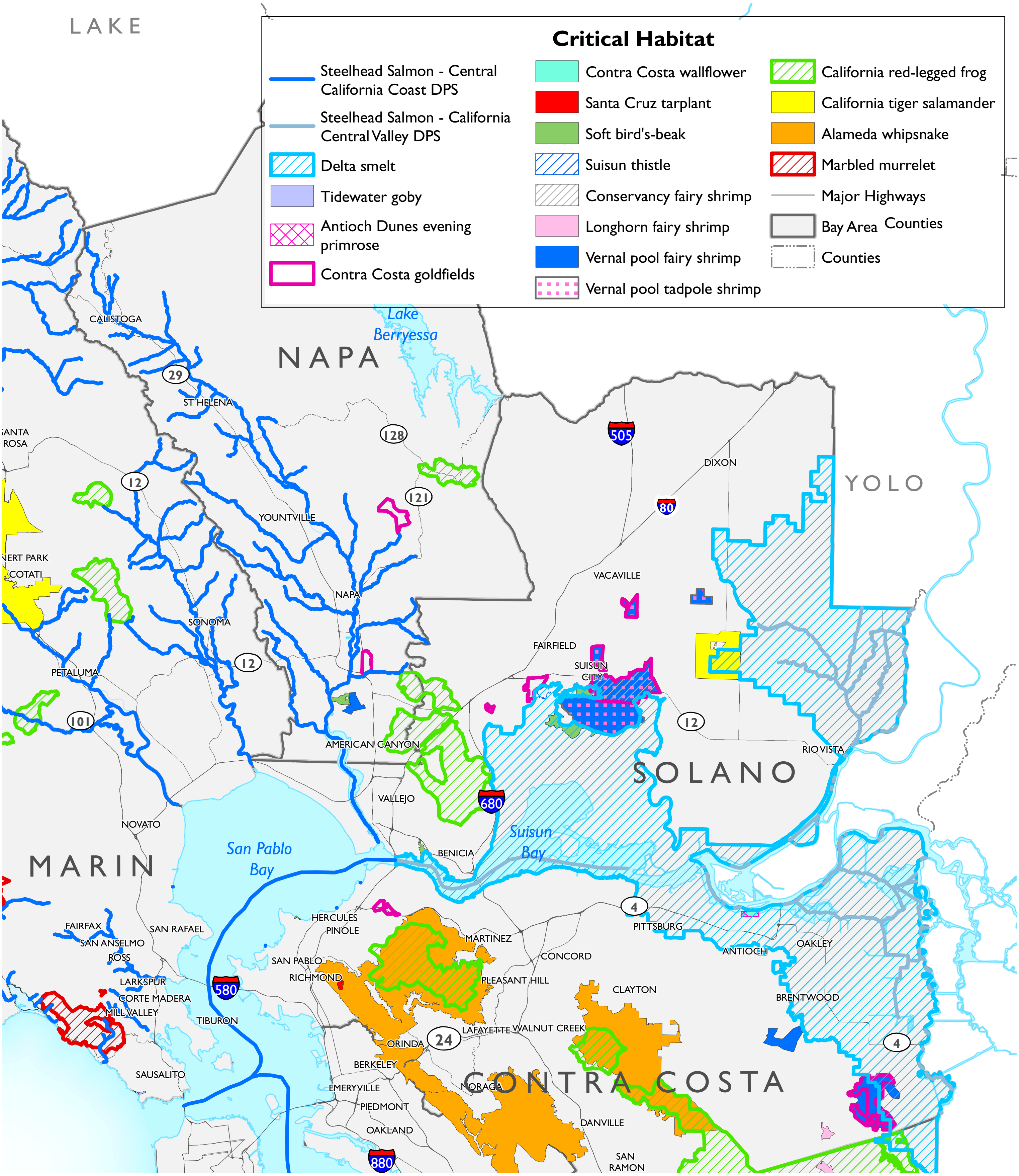
Figure 2.9-6
Critical Habitat: East Bay



Data Source: U.S. Fish and Wildlife Service, 2012; ; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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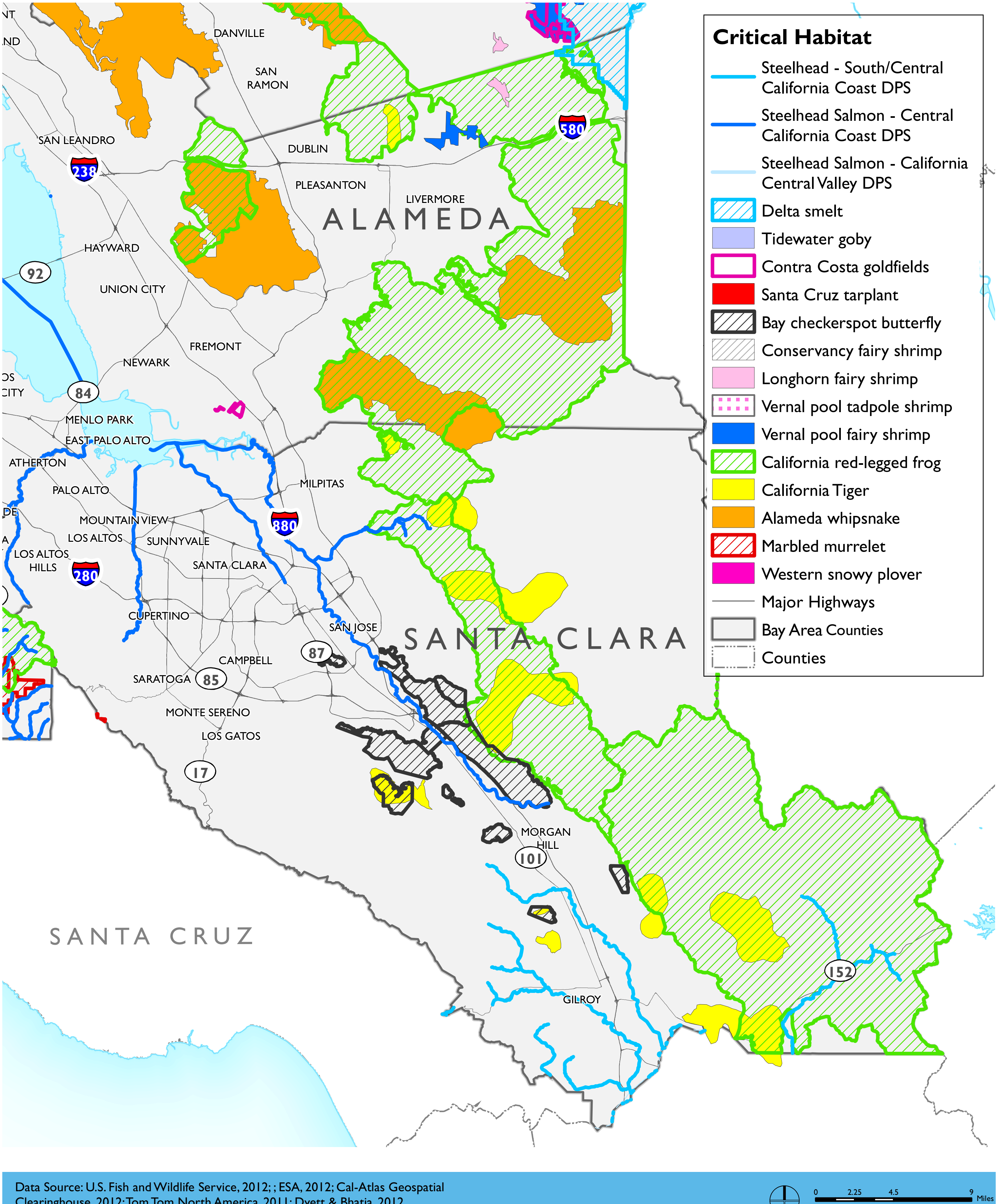
Figure 2.9-7
Critical Habitat: South Bay



Data Source: U.S. Fish and Wildlife Service, 2012; ; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Figure 2.9-8
Critical Habitat: Peninsula

Data Source: U.S. Fish and Wildlife Service, 2012; ; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Special-Status Natural Communities

Sensitive natural communities are designated as such by various resource agencies, such as the CDFW, or in local policies and regulations, and are generally considered to have important functions or values for wildlife and/or are recognized as declining in extent or distribution, and are considered threatened enough to warrant some sort of protection. For example, many local agencies in California consider protection of oak woodlands important, and federal, State, and most local agencies also consider wetlands and riparian habitat as sensitive communities. CDFW tracks communities it believes to be of conservation concern through its *List of California Terrestrial Communities* and the CNDDB, and these communities are typically considered special-status for the purposes of CEQA analysis.[12,13] Some of these natural communities have a rich complement of sensitive species and species-oriented programs that will protect them due to the habitat that they afford. Other communities do not support rare species and, therefore, species-oriented protection cannot be invoked. Sensitive communities in the Bay Area include coastal salt marsh; brackish and freshwater wetlands including marshes, seasonal wetlands, and vernal pools; riparian forests and woodlands; and several types of coastal scrub, chaparral, and perennial grasslands.

Migratory Corridors and Linkages

The Bay Area encompasses large areas of wildlands that provide habitat for both common and rare plants and wildlife. Some of these areas were mapped as Essential Connectivity Areas (ECA) for the California Essential Habitat Connectivity Project, which was commissioned by the California Department of Transportation (Caltrans) and CDFW with the purpose of making transportation and land-use planning more efficient and less costly, while helping reduce dangerous wildlife-vehicle collisions.[14] The ECAs were not developed for the purposes of defining areas subject to specific regulations by CDFW or other agencies.

The ECAs are not regulatory delineations but are identified as lands likely important to wildlife movement between large, mostly natural areas at the statewide level. The ECAs form a functional network of wildlands that are considered important to the continued support of California's diverse natural communities. The ECAs were not developed for the needs of particular species but were based primarily on the concept of ecological integrity, which considers the degree of land conversion, residential housing impacts, road impacts, and status of forest structure (for forested areas).[15] In addition, consideration was given to the degree of conservation protection and areas known to support high

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[12] CDFW, *List of Terrestrial Natural Communities*, available online: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_comm_list.asp, accessed March 2013, 2010.

[13] CDFW, *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities*, available online: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/protocols_for_surveying_and_evaluating_impacts.pdf, accessed March 2013, 2009.

[14] Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler, *California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California*, Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration, 2010.

[15] Ibid.

biological values, such as mapped critical habitat and hotspots of species endemism.[16] ECAs were mapped on a state-wide level and should be considered coarse-scale polygons that can inform land-planning efforts, but that should eventually be replaced by more detailed linkage designs, developed at finer resolution at the regional and ultimately local scale based on the needs of particular species and ecological processes. There are a total of 13 ECAs mapped within the nine-county Bay Area (see **Figure 2.9-9**). As seen in this figure, ECAs occur within all nine Bay Area counties and are typically centered along the region's mountain ranges. These areas are comprised primarily of wildlands, but may also include some agricultural and developed areas (mostly rural residential) and many are bisected by major roadways.

[16] Ibid.

Figure 2.9-9
Essential Connectivity Areas

Data Source: California Department of Fish and Wildlife, 2010; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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REGULATORY SETTING

The regulations and policies of various federal and State agencies (e.g., the Corps, U.S. Environmental Protection Agency (EPA) and USFWS mandate protection of wetlands, special-status plant and wildlife species, and aquatic and terrestrial communities in the region. The Corps has primary federal responsibility for administering regulations that concern waters and wetlands, while the USFWS, NMFS, and CDFW have lead responsibility for determining potential project effects on federal- and State-listed species and other species of concern.

Federal Regulations

National Environmental Policy Act

The National Environmental Policy Act of 1969 (NEPA) was one of the first laws to establish a broad national framework for protecting the environment. Its purposes include: "To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; [and] to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." NEPA assures that all branches of government give proper consideration to the environment prior to undertaking major federal actions that could significantly affect the environment.

Environmental assessments (EAs) and environmental impact statements (EISs), which assess the likelihood of impacts from alternative courses of action, are required from all federal agencies and are the most visible NEPA requirements. The documents must include discussion of the environmental impacts of the alternatives, including the proposed action; any adverse environmental effects that cannot be avoided should the proposal be implemented; the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity; and any irreversible or irretrievable commitments of resources that would be involved in the proposal should it be implemented.

Federal Endangered Species Act

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce have joint authority to list a species as threatened or endangered (16 United States Code [USC] 1533[c]). Pursuant to the requirements of FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed or proposed species may be present in the project region, and whether the proposed project would result in a "take"[17] of such species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under FESA, or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3][4]). Project-related impacts on these species or their habitats would be considered significant in this EIR. The "take" prohibition of

[17] "Take," as defined in Section 9 of the FESA, is broadly defined to include intentional or accidental "harassment" or "harm" to wildlife. "Harass" is further defined by the U.S. Fish and Wildlife Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, and sheltering. "Harm" is defined as an act which actually kills or injures wildlife. This may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

FESA applies to any action that would adversely affect a single member of an endangered or threatened species.

Proposed and Candidate Species for Listing as Endangered or Threatened

Proposed species are granted limited protection under FESA and must be addressed in Biological Assessments (under Section 7 of the act); proposed species otherwise have no protection from "take" under federal law, except emergency-listed species.[18] Candidate species are afforded no protection under the act. The USFWS typically reviews project plans and species information to determine the effects of federal actions on a proposed or candidate species. Any recommendations to modify or abandon the project and/or undertake protective measures for proposed or candidate species are not mandatory on the federal agency conferring with the USFWS. The USFWS recommends that candidate species and species proposed for listing also be considered in informal consultation during a project's environmental review. This is recommended because, in the event that a species were to be listed during the design or construction phases of a project (i.e., before occupancy), new studies and restrictions could be imposed.

Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

The federal Migratory Bird Treaty Act (16 USC, Section 703, Supplement I, 1989) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs.

The federal Bald and Golden Eagle Protection Act prohibits persons within the United States (or other places subject to U.S. jurisdiction) from "possessing, selling, purchasing, offering to sell, transporting, exporting or importing any bald eagle or any golden eagle, alive or dead, or any part, nest or egg thereof." This act also prohibits "taking" of bald and golden eagles, which is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturbance includes direct injury, decrease in productivity, or causing nest abandonment.

Clean Water Act

The Clean Water Act is a 1977 amendment to the Federal Water Pollution Control Act of 1972, which set the basic structure for regulating discharges of pollutants to waters of the United States. Although the purpose of the act is primarily to maintain water quality for both human and environmental benefits, regulations developed pursuant to this act deal extensively with permitting of actions in wetlands. These regulations provide more specific protection for wetland habitats—most of which are important ecologically—than any other laws. The U.S. Environmental Protection Agency (EPA) has primary authority under the Clean Water Act to set standards for water quality and for effluents, but the U.S. Army Corps of Engineers has responsibility for permitting dredge and fill in wetlands.

Marine Protection, Research, and Sanctuaries Act of 1972

This legislation allowed for establishment of marine sanctuaries, such as the Cordell Bank, Gulf of the Farallones, and Monterey Bay National Marine Sanctuaries off the coast of Marin and Sonoma Counties and the San Francisco Peninsula, respectively. This act provides increased protection from a variety of

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[18] Note, however, that protection from "take" begins at this stage under state law.

human influences on the marine resources within the sanctuaries. Among their important uses, the National Marine Sanctuaries provide an essential fishery, recreational opportunities, and habitat for a myriad of rare and common shorebirds, marine mammals, and other wildlife. Section 103 of this act regulates the transportation of dredged materials in ocean waters. This act is implemented through a permit granted by the Corps, which uses the EPA's ocean disposal criteria to regulate the disposal of dredged materials.

Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act prohibits the obstruction or alteration of any navigable water of the United States. Under this act, the Corps must authorize any excavation or deposition of materials into such waters, or for any work that could affect the course, location, condition, or capacity of such waters.

Coastal Zone Management Act of 1972

This act established the authority for creating coastal zone management areas and the California Coastal Commission. Coastal zone management criteria are established by the Commission and must be followed by federal, other government, or private entities performing any activities within the coastal zone.

Federal Agencies Responsible For Managing Biological Resources

U.S. Fish and Wildlife Service

The mission of USFWS is to conserve, protect, and enhance the nation's fish and wildlife and their habitats for the continuing benefit of people. USFWS programs include management of wildlife sanctuaries, regulation of international and intrastate commerce related to wildlife, management of migratory species that move between states, wildlife management research, and identification and protection of endangered species.

National Marine Fisheries Service

NOAA's National Marine Fisheries Service is the federal agency, a division of the Department of Commerce, responsible for the stewardship of the nation's living marine resources and their habitat. NMFS is responsible for the management, conservation and protection of living marine resources within the United States' Exclusive Economic Zone (water three to 200 miles offshore). Using the tools provided by the Magnuson-Stevens Act, NMFS assesses and predicts the status of fish stocks, ensures compliance with fisheries regulations and works to reduce wasteful fishing practices. Under the Marine Mammal Protection Act and the Endangered Species Act, NMFS recovers protected marine species (i.e. whales, turtles) without unnecessarily impeding economic and recreational opportunities. NMFS works to promote sustainable fisheries and to prevent lost economic potential associated with overfishing, declining species and degraded habitats.

State Regulations

California Environmental Quality Act

The intent of the California Environmental Quality Act (CEQA) is to maintain "high-quality ecological systems and the general welfare of the people of the state." It is the policy of the State to "prevent the elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities and examples of the major periods of California history." CEQA forbids agencies from approving projects with significant adverse impacts when feasible alternatives or feasible mitigation measures can substantially lessen such impacts.[19]

CEQA directs each State agency to consult with the California Department of Fish and Wildlife on any project an agency initiates that is not statutorily or categorically exempt from CEQA. CEQA *Guidelines* (Section 15065a) indicate that impacts to rare, threatened, or endangered plants or animals are significant. This finding of significance can be applied directly to State- and federally listed species. Impacts to other species that may generally meet these criteria but are not officially listed may be considered significant by the lead agency (for an EIR), depending on the applicability of other laws (e.g., Migratory Bird Treaty Act) and the discretion of the agency. The CDFW interprets Lists 1A, 1B, and 2 of the California Native Plant Society's *Inventory of Rare and Endangered Vascular Plants of California* to consist of plants that, in a majority of cases, would qualify for listing as rare, threatened, or endangered. However, the determination of whether an impact is significant is a function of the lead agency, absent the protection of other laws. Projects subject to CEQA review must specifically address the potential impact of the listed species and provide mitigation measures, if the impact is significant.

California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFW has the responsibility for maintaining a list of threatened and endangered species (California Fish and Game Code 2070). The CDFW also maintains a list of "candidate species," which are species formally noticed as being under review for addition to either the list of endangered species or the list of threatened species. In addition, CDFW maintains lists of "species of special concern," which serve as "watch lists." Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species could be present on the project site and determine whether the proposed project could have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any proposed project that may impact a candidate species. Project-related impacts on species on the CESA endangered or threatened lists would be considered significant in this EIR. Impacts on "species of concern" would be considered significant under certain circumstances, discussed below.

California Native Plant Protection Act

State listing of plant species began in 1977 with the passage of the California Native Plant Protection Act (NPPA), which directed the CDFW to carry out the legislature's intent to "preserve, protect, and enhance endangered plants in this state." The NPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting, transporting, or selling such plants. The California Endangered Species Act expanded upon the original NPPA and enhanced legal protection for plants. CESA established threatened and endangered species categories,

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[19] CEQA also provides that a project might be approved in spite of residual, unmitigated significant impacts, by adoption of a statement of overriding social and economic considerations in situations where mitigations or alternatives are deemed infeasible.

and grandfathered all rare animals—but not rare plants—into the act as threatened species. Thus, there are three listing categories for plants in California: rare, threatened, and endangered.

California Coastal Act

The California Legislature enacted the California Coastal Act in 1976 in order to regulate coastal development throughout the state. The Act created a "coastal management zone" that generally extends three miles seaward and up to five miles inland from the mean high tide line. In particularly important and generally undeveloped areas where there can be considerable impact on the coastline from inland development, the coastal zone may extend to a maximum allowable limit. In developed urban areas, the coastal zone generally extends inland for a much shorter distance. Each city or county government whose jurisdiction includes land in the coastal zone must develop a Local Coastal Program (LCP) for the area, which guides planning, conservation, and use of coastal resources, must be consistent with the Coastal Act, and must be certified by the California Coastal Commission (CCC). Any person wishing to develop land within the coastal zone must obtain a permit from the relevant city or county, and the development plan must be consistent with the policies of the Act.

California Senate Bill 375

SB 375 (Chapter 728, Statutes of 2008) directs the California Air Resources Board to set regional targets for reducing greenhouse gas emissions. The new law establishes a "bottom up" approach to ensure that cities and counties are involved in the development of regional plans to achieve those targets. SB 375 builds on the existing framework of regional planning to tie together the regional allocation of housing needs and regional transportation planning in an effort to reduce greenhouse gas (GHG) emissions from motor vehicle trips.

While SB 375 amended the California Public Resources Code to allow exemption from the CEQA process for Transit Priority Projects (TPP), if a TPP site contains wetlands or riparian areas, has significant value as wildlife habitat, or harms protected species, the TPP does not qualify for CEQA exemption.

Local/Regional Regulations and Plans

Habitat Conservation Plans

East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) (2006)

The East Contra Costa County HCP/NCCP, overseen by the East Contra Costa County Habitat Conservancy, covers the eastern one-third of Contra Costa County (174,018 acres). It allows Contra Costa County, the Contra Costa County Flood Control and Water District, the East Bay Regional Park District, and the cities of Brentwood, Clayton, Oakley, and Pittsburg to streamline environmental permitting for activities and projects in the region that are covered by the HCP. The HCP also provides for comprehensive species, wetlands, and ecosystem conservation, and contributes to the recovery of endangered species in California, while allowing for limited take[20] of 28 listed and non-listed ("covered")

[20] See definition of "take" under the Federal Endangered Species Act.

species. By implementing the HCP, the above-mentioned signatories will have a 30-year permit from USFWS and CDFW that authorizes take of covered species, and will avoid project-by-project permitting that is generally costly and time consuming.

Santa Clara Valley Habitat Conservation Plan/Natural Communities Conservation Plan – Administrative Draft (2008)

The City of San José, Santa Clara County, Santa Clara Valley Transportation Authority, Santa Clara Valley Water District, City of Gilroy, and City of Morgan Hill have initiated a collaborative process to prepare and implement an HCP/NCCP for the Santa Clara Valley. The final HCP/NCCP and associated EIR were released in 2012 and are undergoing review by the partner agencies. The HCP/NCCP targets specific areas of the county where land development activities and the continued survival of endangered, threatened, or other species of concern are in conflict. The goal of this HCP/NCCP is to provide the means for conservation of these species, thereby contributing to their recovery while allowing for compatible and appropriate development to occur.

Conservation Strategies

Draft East Alameda County Conservation Strategy

The East Alameda County Conservation Strategy (EACCS) is a collaborative effort to preserve endangered species by developing and adopting a guide to long-term protection of endangered species. The inventory area for this conservation strategy includes the cities of Dublin, Pleasanton, and Livermore, as well as unincorporated areas of eastern Alameda County. Annual grassland, seasonal and permanent wetlands, riparian woodland, oak woodland, and scrub communities within the inventory area are known to support several listed or sensitive wildlife species, including California tiger salamander (*Ambystoma californiense*), San Joaquin kit fox (*Vulpes macrotis mutica*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), and California red-legged frog (*Rana draytonii*).

The EACCS describes current biological conditions in the region, which present a baseline for species habitat with which to compare future development. The EACCS also provides a long-term regional conservation strategy to protect species by prioritizing habitats that should be protected or restored.

From a regulatory perspective, the EACSS is intended to streamline and simplify the issuance of Section 404 permits for future projects. The EACCS aims to standardize avoidance, minimization, mitigation, and compensation requirements to comply with federal, State, and local laws and regulations relating to biological and natural resources in the study area. The core of the EACCS for the covered species is the application of standardized mitigation ratios for each species in order to offset project impacts. In May 2012 the USFWS issued a Programmatic Biological Opinion (Programmatic BO) for U.S. Army Corps of Engineers permitted projects utilizing the EACCS for projects that may affect one or more of the species covered in the EACCS and Programmatic BO. The Programmatic BO is issued to the Corps for permits, enforcement actions, or mitigation banks that are under their jurisdiction. Eligible projects may be appended to the Programmatic BO in order to obtain individual incidental take authorization. In order to be eligible, individual projects must be consistent with the EACCS and fall under the list of activities covered by the Programmatic BO. Covered activities include residential, commercial and industrial development and associated infrastructure (roads and utilities); infrastructure projects such as transmission lines, road construction and maintenance, trail construction and maintenance, bridge construction and maintenance, solar projects, wind energy projects, and culvert installation and maintenance; and restoration projects, including pond and stream restoration and enhancement, fish barrier removal and modification, and wetland construction and maintenance.

Santa Rosa Plain Conservation Strategy (2005)

The Santa Rosa Plain Conservation Strategy seeks to create a long-term program to mitigate potential adverse effects on listed species due to future development on the Santa Rosa Plain, which is located in central Sonoma County, bordered on the south and west by the Laguna de Santa Rosa, on the east by the foothills, and on the north by the Russian River. The Plain and adjacent areas are characterized by vernal pools, seasonal wetlands, and associated grassland habitat, which supports several species of flora and fauna that are listed by the FESA as threatened or endangered, including the federally threatened California tiger salamander (CTS) and four federally endangered plant species—Burke's goldfields (*Lasthenia burkei*), Sonoma sunshine (*Blennosperma bakeri*), Sebastapol meadowfoam (*Limnanthes vinculans*), and many-flowered navarretia (*Navarretia leucocephala* ssp. *plieantha*).

The Conservation Strategy was created to (1) provide a plan for local agencies, developers, and community groups that would preserve and enhance populations and habitat of the listed species; (2) support the issuance of a USFWS authorization for incidental take of CTS and listed plants that may occur in the course of carrying out a broad range of activities on the Plain; and (3) protect stakeholder's (public and private) interests. It is based in part on the Santa Rosa Plain Vernal Pool Ecosystem Preservation Plan (1995).

The Conservation Strategy addresses various aspects of urban and rural growth and its effects on the above-listed species, mitigation for impacts to these listed species and wetlands, and the conservation and recovery of the listed species and their habitat. The Conservation Strategy identified the Southwest Santa Rosa Preserve System and nine "Conservation Areas" throughout the Plain, where mitigation for project-related impacts to listed species and vernal pools should be directed. The designation of Conservation Areas is based on the following factors: (1) known distribution of CTS; (2) presence of suitable CTS habitat; (3) presence of large blocks of natural or restorable land; (4) adjacency to existing preserves; and (5) known location of the listed plants. A critical component of the Conservation Strategy is that 350-900 acres of actual preserve land ultimately will be established within each Conservation Area.

While local jurisdictions participating in the conservation strategy have adopted the Santa Rosa Plain Conservation Strategy Planning Agreement, numerous important implementation issues still must be resolved before the Conservation Strategy can be put into full effect. However, the USFWS Programmatic Biological Opinion (2007) can still be invoked for projects that have suitable habitat for CTS, Burke's goldfields, Sonoma sunshine, Sebastapol meadowfoam, and many-flowered navarretia, and that impact wetlands in the Santa Rosa Plain.

Bay Conservation and Development Commission Acts and Plans

Suisun Marsh Preservation Act of 1977 and Suisun Marsh Protection Plan

The *Nejedly-Bagley-Z'berg Suisun Marsh Act* was enacted in 1974 to require the San Francisco BCDC and the CDFW to prepare a plan (later called the *Suisun Marsh Protection Plan*) to preserve the integrity and assure continued wildlife use of the Suisun Marsh, approximately 85,000 acres of tidal marsh, managed wetlands, and waterways in southern Solano County, which is the largest remaining brackish wetland complex in San Francisco Bay, more than ten percent of California's remaining wetland area, and a wildlife habitat of international importance. The Suisun Marsh Preservation Act (Cal. Pub. Res. Code Sections 29000–

29612) was enacted in 1977 to incorporate the findings and policies contained in the *Suisun Marsh Protection Plan* of 1976 into State law, and to empower BCDC to implement the plan through its regulatory authority.

The Suisun Marsh Protection Plan, in brief, proposes (1) a primary management area encompassing the 89,000 acres of tidal marsh, managed wetlands, adjacent grasslands, and waterways over most of which BCDC now has jurisdiction, and (2) a secondary management area of approximately 22,500 acres of significant buffer lands. Under specific guidelines in each area, Solano County would be responsible for preparing and administering a local protection program. BCDC would represent the State's interest, serving as the land use permitting agency for major projects in the primary management area, and as an appellate body with limited functions in the secondary management area.

The San Francisco Bay Plan

The San Francisco Bay Plan (Bay Plan) was developed by the BCDC in 1968, and its provisions are currently maintained and carried out by the BCDC. Since the adoption of the Bay Plan, implementing legislation has been amended several times, but the general character, scope of authority, and area of jurisdiction are largely unchanged. The Bay Plan provides the findings and policies to guide future uses of the Bay and shoreline, certain waterways, salt ponds and managed wetlands, and the maps that apply these policies to the BCDC's jurisdiction.

State Agencies Responsible For Managing Biological Resources

California Department of Fish and Wildlife

The mandate of CDFW (formerly CDFG) is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. In particular, CDFW is required under CESA, NEPA, CEQA, and the Natural Community Conservation Planning Act to conserve species through listing, habitat acquisition and protection, review of local land use planning, multi-species conservation planning, stewardship, recovery, research, and education.

California Coastal Commission

The mission of the California Coastal Commission (CCC), as the lead agency responsible for carrying out California's coastal management program, is to plan for and regulate development in the coastal zone consistent with the policies of the California Coastal Act. The CCC is also one of two designated State coastal management agencies established for the purpose of administering the federal Coastal Zone Management Act in California. The San Francisco Bay Conservation and Development Commission (discussed below) has authority over federal activities and federally licensed or assisted activities within San Francisco Bay, many of which are not otherwise subject to State control. The California Coastal Commission has the same authority over federal activities and federally licensed or assisted activities elsewhere in the California coastal zone. The basic goals of the State for the coastal zone are to:

- Protect, maintain, and, where feasible, enhance and restore the overall quality of the coastal zone environment and its natural and artificial resources;
- Assure orderly, balanced use and conservation of coastal zone resources, taking into account the social and economic needs of the people of the State;

- Maximize public access to and along the coast and maximize public recreational opportunities in the coastal zone consistent with sound resource conservation principles and constitutionally protected rights of private property owners;
- Assure priority for coastal-dependent and coastal-related development over other development on the coast; and
- Encourage State and local initiatives and cooperation in preparing procedures to implement coordinated planning and development for mutually beneficial uses, including educational uses, in the coastal zone.

Bay Conservation and Development Commission

The San Francisco Bay Conservation and Development Commission (BCDC) was created by the California Legislature in 1965 by the McAteer-Petris Act, in response to public concern over the future of the San Francisco Bay. BCDC regulates filling and dredging in the San Francisco Bay including San Pablo Bay, Suisun Bay and sloughs, and certain creeks and tributaries that are part of the Bay system, as well as a 100-foot-wide coastline immediately bordering the Bay. Specifically, BCDC's responsibilities include: (1) regulating filling and dredging in the San Francisco Bay; (2) regulating new development within the first 100 feet inland from the Bay shoreline to ensure that maximum feasible public access to the Bay is provided; (3) protecting the Suisun Marsh; (4) ensuring that the limited amount of shoreline area suitable for high priority water-oriented uses is reserved for ports, water-related industries, water-oriented recreation, airports and wildlife refuges; (5) pursuing an active planning program to study Bay issues so that Commission plans and policies are based upon the best available current information; (5) administering the federal Coastal Zone Management Act within the San Francisco Bay segment of the California coastal zone to ensure that federal activities reflect Commission policies; (6) participating in the regionwide State and federal Long-Term Management Strategy for dredging and dredge material disposal in the San Francisco Bay; and (7) participating in California's oil spill prevention and response program.

California Department of Parks and Recreation

The California Department of Parks and Recreation provides sites for a variety of recreational and outdoor activities. Natural resource management and protection is also a part of the mission of Department. Park designations such as *natural preserve*, *state park*, *state reserve,* and *state wilderness* indicate that the area has outstanding natural features. By contrast, a designated *state historic preserve*, *state recreation area*, *state beach,* and *state vehicular recreation area* indicates the State has placed a higher priority on historic or recreational activities, although they may contain areas designated and protected for their natural features. State parks adjacent to transportation corridors include Olompali State Park in Marin County, Candlestick Point SRA in San Francisco County, and the Eastshore State Park between the Bay Bridge in Oakland and Marina Bay in Richmond in Alameda and Contra Costa Counties.

Biological Resources Protected By Statute and Policy

Special-Status Natural Communities

Special-status natural communities are identified as such by CDFW's Natural Heritage Division. These communities include those that are both naturally rare and those that have been greatly diminished through changes in land use. The CDFW tracks 135 such natural communities in the same way that it tracks occurrences of special-status species: information is maintained on each site in terms of its location, extent, habitat quality, level of disturbance, and current protection measures. The CDFW is mandated to seek the long-term perpetuation of the areas in which these communities occur. In some cases, these areas have been established as protected reserves. There is no statewide law that requires protection of all special-status natural communities, but CEQA requires consideration of the potential impacts of a project to biological resources of statewide or regional significance.

Special-Status Plant and Wildlife Species

A number of species known to occur in the Bay Area are accorded "special-status" because of their recognized rarity or vulnerability to habitat loss or population decline. Some of these species are listed and receive specific protection defined in federal or State endangered species legislation. Other species have not been formally listed as threatened or endangered, but have been designated as "rare" or "sensitive" on the basis of adopted policies and expertise of State resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. These species are referred to collectively as "special-status species" following a convention that has developed in practice but has no official sanction. Special-status species in the Bay Area are subject to the following:

- The California Native Plant Protection Act (California Fish and Game Code 1900 et seq.) protects endangered and "rare" species, subspecies, and varieties of plants.
- The California Endangered Species Act lists plants and wildlife as threatened or endangered (California Fish and Game Code 2070).
- The Federal Endangered Species Act (FESA), the Secretary of Commerce, and the Secretary of the Interior list plants and wildlife as threatened or endangered (16 USC 1533[a]; 16 USC 1533[a] [2]; 16 USC 1533 [c] [1]).
- The California Environmental Quality Act (CEQA), *Guidelines* Section 15380 includes plants and wildlife that may be considered rare or endangered if the species meets certain specified criteria.
- The California Native Plant Society designates rare, threatened, or endangered plants as List 1 and List 2, and plants about which more information is needed and plants with limited distributions as List 3 and List 4.
- The California Department of Fish and Wildlife (CDFW) designates plants and wildlife as "species of special concern" and protects the destruction of nests and eggs of any bird (Section 3503).
- The federal Bald Eagle Protection Act prohibits persons within the United States (or places subject to U.S. jurisdiction) from "possessing, selling, purchasing, offering to sell, transporting, exporting or importing any bald eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof."
- The Migratory Bird Treaty Act (16 USC, Section 703, Supplement I, 1989) prohibits killing, possessing, or trading of migratory non-game birds.
- The California Fish and Game Code (Section 3503.5, 1992) protects birds of prey from unlawful take, possession, or destruction of any birds in the order Falconiformes or Strigiformes (birds of prey) and prohibits the possession or destruction of the nests or eggs of any such bird.

- The California Fish and Game Code (Section 3511 [birds], Section 5050 [reptiles and amphibians], and Section 4700 [mammals]) designates certain wildlife species as fully protected in California.

Protected Plant and Wildlife Areas

CDFW protects rare, threatened, and endangered species by managing habitat in legally designated ecological reserves or wildlife areas. Several of these reserves are located in the Bay Area. Likewise, the USFWS maintains the National Wildlife Refuge system that includes units in the Bay Area. Additional tracts of open space in the Bay Area, supporting valuable wildlife resources, are administered by other federal and State agencies, including the National Park Service and California Department of Parks and Recreation.

The counties and many cities in the Bay Area have established major parklands that sustain important wildlife resources. There are other quasi- and non-governmental organizations that oversee the management and protection of critical plant and wildlife communities, including the East Bay Regional Park District, San Francisco Public Utilities Commission, National Audubon Society, and The Nature Conservancy.

Wetlands

Wetlands are ecologically productive habitats that support a rich variety of both plant and animal life. The importance and sensitivity of wetlands has increased with the recognition of their value as recharge areas and filters for water supplies. In a jurisdictional sense, there are two definitions of a wetland, one definition adopted by federal agencies and a separate definition adopted by the State of California. Both definitions are presented below.

Within California, approximately 95 percent of the state's historic wetlands have been converted to other land uses. An estimated 5 million acres of wetlands were present in California in the 1780s; by the 1980s, the acreage of wetlands in California had been reduced to only 450,000 acres. The loss of wetlands has been pronounced in the Bay Area because of urban development, the intense diking of shoreline wetlands in the Delta for agriculture as well as for salt production throughout San Francisco Bay, and as a result of hydraulic mining operations in the mid-1800s that lasted until at least the late 1800s.

Federal Wetland Definition

Wetlands are a subset of waters of the United States and receive protection under Section 404 of the Clean Water Act. The term "waters of the United States" as defined in the Code of Federal Regulations (33 CFR 328.3[a]; 40 CFR 230.3[s]) includes:

1. All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.
2. All interstate waters including interstate wetlands. (Wetlands are defined by the federal government [CFR, Section 328.3(b), 1991] as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.)

3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce, including any such waters that are or could be used by interstate or foreign travelers for recreational or other purposes; or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce.
4. All impoundments of waters otherwise defined as waters of the United States under the definition.
5. Tributaries of waters identified in paragraphs (1) through (4).
6. Territorial seas.
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (1) through (6).

Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA [328.3(a)(8) added 58 CFR 45035, August 25, 1993].

The regulations and policies of various federal agencies (e.g., the Corps, U.S. Department of Agriculture [USDA], NRCS (Natural Resources Conservation Service), EPA, USFWS, National Marine Fisheries Service) mandate that the filling of wetlands be avoided to the extent possible. The Corps has primary federal responsibility for administering regulations that concern wetlands within the area. The Corps acts under the authority of the Clean Water Act (Section 404), which governs specified activities in "waters of the United States," including wetlands.

California Wetland Definition

The CDFW and the CCC have adopted the USFWS Cowardin (1979) definition of wetlands. While the federal definition of wetlands requires three wetland identification parameters to be met, the Cowardin definition can be satisfied under some circumstances with the presence of only one parameter. Thus, identification of wetlands by State agencies may include areas that are permanently or periodically inundated or saturated and without wetland vegetation or soils, such as rocky shores, or areas that presume wetland hydrology based on the presence of at least one of the following: a) a seasonal or perennial dominance by hydrophytes[21] *or* b) the presence of hydric soils.[22] CDFW does not normally assert jurisdiction over wetlands unless they are subject to Streambed Alteration Agreements (CDFW Code Sections 1600–1616) or they support State-listed endangered species.

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[21] A *hydrophyte* is, literally, a water-loving plant, i.e., one that is adapted to growing in conditions where the soil lacks oxygen, at least periodically during the year, due to saturation with water.

[22] A *hydric* soil is one that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile.

Regulation of Activities in Wetlands

The Corps and the USEPA regulate the discharge of dredged or fill material into waters of the United States, including wetlands, under Section 404 of the CWA. Projects that would result in the placement of dredged or fill material into waters of the United States require a Section 404 permit from the Corps. Some classes of fill activities may be authorized under General or Nationwide permits if specific conditions are met. Nationwide permits do not authorize activities that are likely to jeopardize the existence of a threatened or endangered species (listed or proposed for listing under the FESA). In addition to conditions outlined under each Nationwide Permit, project-specific conditions may be required by the Corps as part of the Section 404 permitting process. When a project's activities do not meet the conditions for a Nationwide Permit, an Individual Permit may be issued.

Section 401 of the CWA requires an applicant for a Corps permit to obtain State certification that the activity associated with the permit will comply with applicable State effluent limitations and water quality standards. In California, water quality certification, or a waiver, must be obtained from the Regional Water Quality Control Board (RWQCB) for both Individual and Nationwide Permits.

The Corps also regulates activities in navigable waters under Section 10 of the Rivers and Harbors Act. The construction of structures, such as tidegates, bridges, or piers, or work that could interfere with navigation, including dredging or stream channelization, may require a Section 10 permit, in addition to a Section 404 permit if the activity involves the discharge of fill.

Finally, the federal government also supports a policy of minimizing "the destruction, loss, or degradation of wetlands." Executive Order 11990 (May 24, 1977) requires that each federal agency take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In recent years several Supreme Court cases have challenged the scope and extent of USACE jurisdiction over waters of the United States and have led to several reinterpretations of that authority. The most recent of these decisions are the cases of *Solid Waste Agency of Northern Cook County* (SWANCC) *v. the Army Corps of Engineers* (January 9, 2001) and *Rapanos v. United States* (June, 2006). The SWANCC decision found that jurisdiction over non-navigable, isolated, intrastate waters could not be based solely on the use of such waters by migratory birds. The reasoning behind the SWANCC decision could be extended to suggest that waters need a demonstrable connection with a 'navigable water' to be protected under the CWA. The introduction of the term 'isolated' has led to the consideration of the relative connectivity between waters and wetlands as a jurisdictionally relevant factor. The more recent *Rapanos* case further questioned the definition of "waters of the United States" and the scope of federal regulatory jurisdiction over such waters but resulted in a split decision which did not provide definitive answers but expanded on the concept that a 'significant nexus' with traditional navigable waters was needed for certain waters to be considered jurisdictional.

On June 5, 2007, the USEPA and the Corps released guidance on CWA jurisdiction in response to the Rapanos Supreme Court decisions, which can be used to support a finding of CWA coverage for a particular water body when either a) there is a significant nexus between the stream or wetland in question and navigable waters in the traditional sense; or b) a relatively permanent water body is hydrologically connected to traditional navigable waters and/or a wetland has a surface connection with that water.

State Policies and Regulations

State regulation of activities in waters and wetlands resides primarily with CDFW and the State Water Resources Control Board (SWRCB). In addition, the CCC has review authority for wetland permits within its planning jurisdiction. CDFW provides comment on Corps permit actions under the Fish and Wildlife Coordination Act. CDFW is also authorized under the California Fish and Game Code, Sections 1600-1616, to enter into a Streambed Alteration Agreement with applicants and to develop mitigation measures when a proposed project would obstruct the flow or alter the bed, channel, or bank of a river or stream in which there is a fish or wildlife resource, including intermittent and ephemeral streams. The SWRCB, acting through the nine RWQCBs, must certify that a Corps permit action meets State water quality objectives (Section 401, Clean Water Act).

Impact Analysis

SIGNIFICANCE CRITERIA

Implementation of the proposed Plan would have a potentially significant impact on biological resources if it would:

Criterion 1: Have a substantial adverse effect: either directly or through habitat modifications, on a) any species identified as candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW) or U.S. Fish and Wildlife Service (USFWS); b) designated critical habitat for federally listed plant and wildlife species; or c) non-listed nesting raptor species considered special-status by CDFW under CDFW Code 3503.5 and non-listed nesting bird species considered special-status by the USFWS under the federal Migratory Bird Treaty Act, and by CDFW under CDFW Code 3503 and 3513.

Criterion 2: Have a substantial adverse effect on riparian habitat, federally protected wetlands as defined by section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.), or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service, through direct removal, filling, hydrological interruption, or other means.

Criterion 3: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites.

Criterion 4: Conflict with adopted local conservation policies, such as a tree protection ordinance, or resource protection and conservation plans, such as a Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other adopted local, regional, or state habitat conservation plan.

METHOD OF ANALYSIS

This program-level analysis presents a general analysis of potential regional and local impacts on biological resources based on the location of proposed land use changes and transportation projects relative to the known and potential distribution of sensitive biological resources throughout the Bay Area. For this impact assessment, the locations of proposed land use changes and transportation projects were compared with documented locations of sensitive species and their general habitats, critical habitat for federal listed species, and wetlands and other waters. Potential impacts were determined by evaluating whether proposed development and transportation improvements would occur within the potential range of a special-status species, whether projects would potentially directly encroach upon an area of ecological significance (e.g. sensitive natural community, designated critical habitat, etc.), or whether the projects could involve the filling of wetlands. Resources used to identify potentially affected biological resources included the California Natural Diversity Database, National Wetland Inventory Maps, published environmental impact reports and plans, and standard biological literature.

In the case of residential, commercial, and other development that could occur both in PDAs and, to a lesser extent, outside of PDAs, the details of future individual and site-specific projects in local jurisdictions throughout the Bay Area are not known at this time. Therefore, this impact analysis relies largely on the potential for biological resource impacts based on proximity to sensitive resources, an analysis method that inherently tends to inflate the potential for adverse effects. A GIS-based analysis was performed by overlaying resource layers (documented special-status species locations, designated critical habitat, wetlands, and streams and rivers) with PDA boundaries to obtain general information, such as how many PDAs have the potential to impact special-status species or wetlands and whether those impacts might be greater in one part of the Bay Area when compared to another (See Appendix H for tables presenting the results of the GIS-based analysis). A quantitative analysis of the potential for impacts (e.g., acres of critical habitat or linear feet of streams impacted) was performed when feasible to help answer some of these questions.

Acreages were obtained where PDA polygons overlapped sensitive resource polygons (e.g., wetlands, special-status species) and road and stream mileage was obtained when linear features traversed polygon features (e.g., mileage for a transportation improvement project within a special-status species polygon). Quantitative measures could not be obtained from the intersection of two linear features or when point features were used; however, these analyses provided information on the number of projects potentially affecting a given resource. Potential development outside PDAs was not quantified because it would simply not be practical to evaluate possible future development locations throughout the entire Bay Area, given that development is not reasonably foreseeable on the vast majority of land outside of PDAs. However, GIS layers depicting such potential development locations were examined in association with the resources layers in order to inform this analysis and evaluate the general order of magnitude of possible impacts.

The GIS-based analysis greatly overestimates actual impact acreages due to the coarse level of the analysis. For example, many special-status species polygons from the CNDDB are non-specific polygons and simply indicate that a species was documented somewhere within the general area depicted. In addition, many CNDDB species locations are historical and habitat no longer occurs for the species due to urbanization. Therefore, a PDA polygon intersection with a special-status species polygon simply indicates that the species does, or did once, occur in that area and that projects within that PDA may have impacts on that species if habitat for the species still occurs within or adjacent to the specific project site. Even if the species is currently present, impacts would not necessarily ensue since, while PDAs are proposed to absorb the great majority of future development under the proposed Plan, designation of a PDA does not imply that the entirety of that area will undergo development during the timeframe of the proposed Plan.

Impacts would be most likely to occur where development and transportation projects could have an effect upon ecologically sensitive or significant areas. Most likely to affect sensitive biological resources are projects involving major ground-disturbing activity, including within PDAs that contain open space or otherwise undeveloped lands inside their boundaries, or adjacent to such lands, and projects outside PDAs occurring in non- or lightly urbanized areas. Road widenings, highway extensions, interchange projects, bridges, and rail extensions in rural areas or over waterbodies or wetlands also have a higher likelihood of affecting sensitive biological resources. Laws and regulations protecting special-status species, areas of ecological significance, and wetland resources are effective incentives for project proponents to design alternatives that either avoid or substantially reduce impacts on these resources. Therefore, upon subsequent project-level review it is anticipated that actual impacts of specific future projects will generally be far less substantial than would be suggested by any quantitative analysis at this stage.

The actual footprints and other design details of most proposed transportation projects are not known because the projects are in the early stages of planning. Similar to the PDA analysis, a GIS-based analysis was performed by overlaying resource layers with transportation project alignments to ascertain which projects would likely have impacts, how many projects would have impacts, and where the majority of those impacts might occur. As noted above, where linear transportation features crossed polygon features, it was possible to obtain a coarse level quantification of road miles within, for example, a special-status species or wetland polygon. Transportation projects under the proposed Plan that would not directly expand transportation-dedicated lands were assumed to have minimal potential biological impacts. Such projects include signal and traffic operational improvements, rail extensions along existing rights-of-way, and road widening in urban areas or within existing rights of way. However, CEQA may require more detailed evaluations on a project-by-project basis at the time of project approval by local agencies to determine the exact resources found within proposed road or rail alignments. Since the specific details of many projects are not yet known, this assessment identifies general locations of potential adverse effects.

This impact analysis assumes that biological resources could be indirectly or directly affected by activities associated with proposed land use changes and transportation projects under Plan Bay Area. Potential impacts on biological resources include, but are not limited to the following:

- Direct and indirect effects on special-status species, including mortality, loss of reproductive potential due to disturbance, population decline and/or extirpation, and displacement due to habitat loss.
- Direct and indirect impacts on special-status species and their habitat, including federally designated critical habitat, through conversion of wildlands or rural/agricultural areas as a result of proposed changes in land use, including intensification of land use resulting from population or employment growth.
- Direct and indirect impacts on special-status species and federally designated critical habitat through direct loss of habitat associated with roadway widening, new transportation facilities, or interchange, rail, pedestrian, and bicycle improvements.
- Direct and indirect impacts on riparian and other sensitive natural communities, including degradation of vegetation due to invasive species introduction, habitat fragmentation, and herbicide application and removal of vegetation as part of landscaping and road maintenance.

Direct and indirect impacts on federal and state waters through fill of wetlands and waters, long-term changes in hydrology and runoff due to increased impervious surfaces and degradation of water quality in wetlands and waterways resulting from road runoff containing petroleum products (*Chapter 2.8*: *Water Resources*, discusses runoff and water quality degradation and associated mitigation measures). The sections below analyze impacts on biological resources associated with land use change and transportation network improvements (when impacts are different on the regional and local levels they are discussed separately), and then the combined potential effect of both the land use changes and transportation projects for each significance criterion.

SUMMARY OF IMPACTS

The proposed Plan would primarily encourage and consolidate regional growth and land use changes, as well as transportation improvements, along existing transportation corridors and in already urbanized areas rather than the more rural areas of the Bay Area. This overall strategy would generally serve to minimize impacts on biological resources resulting from proposed Plan implementation region-wide.

However, future growth under the proposed Plan, in addition to the various transportation improvements necessary to accommodate that growth, would result in conversion of, or indirect impacts on, some undeveloped land that currently contains biological resources. Impacts on resources located in and around proposed projects in rural areas would likely tend to be more severe than impacts to resources in already urban areas.

The implementation of development and transportation improvements under the proposed Plan would increase building and roadway footprints in the Bay Area and could incrementally impact adjacent wetlands, forested areas, grasslands, and other areas and the associated plant and wildlife species. Because the proposed PDA-focused development and transportation improvements are mainly concentrated along existing transportation corridors and in previously developed areas, the overall habitat loss and fragmentation is considered lower than if projects were located in undeveloped areas.

Direct Impacts

Short Term Impacts

Short-term impacts resulting from implementation of proposed Plan projects include the temporary loss and/or degradation of wetlands and sensitive natural communities, and disturbance of special-status plant and wildlife species. Such impacts could result from construction noise, light, and increased human activity, or from erosion or other indirect project effects. Temporary impacts may include noise associated with temporary pile driving equipment in streams or other sensitive areas during bridge construction, temporary loss of breeding or foraging habitat for wildlife, short-term fill of wetlands, or the inadvertent release of soils or other materials into a jurisdictional wetland during construction activities.

Long Term Impacts

Direct long-term impacts on natural communities, such as conversion of habitat to developed areas, include effects on both common and special-status plant and wildlife species. This is due, in part, to the difficulty in constructing successful habitat replacement for natural areas such as wetlands, riparian forests, and native grasslands. Development and transportation improvements in the proposed Plan that occur within or adjacent to grassland, oak woodland, shrublands, or coastal marsh and/or estuarine habitats have the potential to decrease and degrade habitat and result in significant long-term impacts on special-status plant and wildlife species. Other proposed development and transportation projects could also contribute incrementally to habitat loss or degradation for special-status plant or wildlife species.

Long-term increases in the volume of vehicular traffic and expansion of existing roads or development of new roads in rural areas are expected to result in increased road casualties to common and special-status wildlife species. This effect would be most pronounced in rural areas, where roads traverse natural habitats. Such changes may also affect the volume of grease, oil, gasoline, and other contaminants entering Bay Area streams and San Francisco Bay and have deleterious effects on fisheries.

Indirect Impacts

Implementation of proposed Plan development and transportation projects could result in indirect biological resource impacts by accommodating new urban development that could have the potential to degrade wetlands and other sensitive natural communities and affect special-status plant and wildlife species. Potential indirect and cumulative effects on special-status species could occur as a result of habitat fragmentation, increased human intrusion into wildland areas, introduction of invasive species, disruption of migratory corridors, and a resulting regional reduction in biological diversity. In addition, by improving regional mobility, transportation improvements implemented under the proposed Plan would serve not only PDA areas, but also non-PDA development of rural environs – eastern Contra Costa County, southern Santa Clara County, the US 101 corridor in Marin and Sonoma counties, etc. Other transportation improvements in the proposed Plan not identified as having a direct impact on biological resources in the regional context may result in individually minor impacts locally. Collectively, these individually minor impacts on biological resources may aggregate to become regionally significant over time.

IMPACTS AND MITIGATION MEASURES

Impact

The first Impact Criterion is separated into three impact statements, each of which is directly related to impacts on special-status species. Impact Statement 2.9-1a addresses impacts on special-status species, with the exception of nesting birds. Impact Statement 2.9-1b discusses impacts to critical habitat designated for federally-listed species, and Impact Statement 2.9-1c addresses impacts and mitigation measures specific to nesting raptors and other birds that are protected through mechanisms other than federal or state listing.

2.9-1a Implementation of the proposed Plan could have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

Special-status species with the greatest potential to be affected by proposed Plan projects are listed in **Table H-1** in Appendix H. **Tables H-1a** through **H-1d** in Appendix H list approximately 171 PDAs and 350 transportation projects that have the potential to impact special-status plant or wildlife species. These project lists were generated from a GIS-based analysis of project proximity to documented special-status species occurrences and the presence of potentially suitable habitat for special-status species, as well as proximity to USFWS and NMFS designated critical habitat.[23] Additional development, as described in *Chapter 1.2: Overview of the Proposed Plan Bay Area*, would occur outside the PDAs in all parts of the Bay Area and would also have impacts on special-status species, but to a substantially lesser degree, given the focus of the proposed Plan on development within PDAs. Additional, non-listed species (i.e., not listed under the FESA or CESA) that are not consistently tracked by CDFW in the CNDDB but are afforded protections under the California Fish and Game Code and/or the Migratory Bird Treaty Act were also considered. For example, it is assumed that nearly all proposed projects have the potential to affect nesting birds (see Impact 2.9-1c for further discussion of impacts on nesting birds). As noted under Method of Analysis, above, the GIS-based analysis overestimates the acreage likely to be affected, because it simply represents the intersection of areas where species are, or have been, present and areas where development is likely to occur. Because the analysis at this regional level is necessarily very coarse-grained, the actual acreage anticipated to be affected by future development projects would likely be far less than indicated in the tables, due to the potential absence of species and/or habitat from specific development sites.

Focused surveys to determine the locations and extent of special-status species populations have not been conducted in support of this programmatic EIR; detailed and site-specific surveys are more appropriately conducted when project level detail is available. Analysis in this EIR therefore conservatively assumes that special-status species would be present within the impact footprint of regional growth/land use changes or a transportation project if the project is mapped as occurring within or transecting a known species occurrence. Known occurrences are those mapped in reliable data sources (e.g., CNDDB). However, CNDDB includes historical occurrences for species that may no longer be extant at a given location and this likely leads to an overestimation of development impacts on special-status species in this EIR. **Tables H-1a** through **H-1d** in Appendix H list the PDAs, as well as proposed transportation projects, that could affect special-status plant and/or wildlife species based on the GIS analysis. As noted above, additional development would occur outside the PDAs in all parts of the Bay Area, and would also have impacts on special-status species. While less development is expected to occur outside PDAs it would have the same general types of impacts and, when situated in more rural areas where habitat is less degraded than in heavily urbanized areas, could have a greater relative effect than development in PDAs.

Impacts of Land Use Projects

Regional Effects

As noted in *Chapter 1.2: Overview of the Proposed Plan Bay Area*, growth forecasts for the Bay Area project that by 2040 the region will support an additional two million residents and 1.1 million jobs, resulting in 700,000 new households. The proposed Plan calls for focused housing and job growth concentrated primarily in already urbanized areas and along existing transit corridors. The proposed Plan would focus 80 percent of new housing and 66 percent of new jobs in PDAs and the majority of Plan growth would be focused in San Francisco, Oakland, San José, and other, medium-size cities throughout the region. As a result, the North Bay counties would support only a small portion of growth under the proposed Plan

[23] California Natural Diversity Database, 2012; United States Fish and Wildlife Service, 2012; NMFS, 2005.

and about 99 percent of the region's growth would be focused in already urbanized areas. In addition, the proposed Plan identifies Priority Conservation Areas (PCAs), which are regionally significant open space areas for which there exists broad consensus for long-term protection but which face development pressures in the near-term. Protection of PCAs, if implemented in the future, could expand the regional greenbelt, protecting agricultural interests and wildlands that support special-status plants and wildlife. Nonetheless, implementation of the land use development pattern under the proposed Plan could result in regional impacts on special-status species. One 171 PDAs (see **Table H-1a** in Appendix H) were identified as occurring in proximity to known special-status species occurrences. Approximately 60 percent of these PDAs are located in Contra Costa, Alameda, and San Mateo counties. Substantially less development would be expected to occur outside PDAs, but in some cases such development would occur in or near sensitive habitat. Potential regional effects on special-status species could occur as a result of habitat fragmentation, increased human intrusion into wildland areas, introduction of invasive species, disruption of migratory corridors, and a resulting regional reduction in biological diversity.

Because land use changes under the proposed Plan may result in adverse effects on special-status plants and wildlife at the regional level, these impacts are considered potentially significant (PS). Mitigation Measure 2.9(a) is described below.

Localized Effects

Impacts on special-status species could occur within each of the proposed Plan project areas but would be most severe in areas that would experience the most extensive land use change and development. Potential localized effects on special-status species include the temporary and permanent removal or conversion of vegetation and habitat necessary for species breeding, feeding, dispersal or sheltering. Construction and/or ongoing operations could result in direct mortality of special-status plants and wildlife, entrapment in open trenches, and general disturbance due to noise or vibration during pile-driving, earthmoving, and other construction activities. Construction-generated fugitive dust accumulation on surrounding vegetation and construction-related erosion, runoff, and sedimentation could degrade the quality of adjacent vegetation communities, affecting their ability to support special-status plants and wildlife. Regional impacts as noted above, such as habitat fragmentation and disruption of migratory corridors, would also occur on a local level, potentially affecting local populations by making them more vulnerable to extirpation.

Because land use changes under the proposed Plan may result in adverse effects on special-status plants and wildlife at the local level, these impacts are considered potentially significant (PS). Mitigation Measure 2.9(a) is described below and Mitigation Measure is described under Impact 2.9-1a..

Impacts of Transportation Projects

Regional and Localized Effects

The implementation of proposed transportation improvements would increase roadway footprints throughout the Bay Area and would incrementally impact adjacent wetlands, woodlands, shrublands, and grasslands, as well as associated plant and wildlife species. Because the proposed transportation improvements are mainly concentrated along existing transportation corridors, where existing conditions in adjacent habitat areas typically represent the result of past and ongoing disturbance, regional habitat loss and fragmentation is expected to be lower than if projects were entirely new construction or sited in previously undeveloped areas. Nonetheless, approximately 350 proposed transportation improvements (see **Tables H-1b** through **H-1d** in Appendix H) could contribute to regional and local habitat loss and fragmentation. Nearly 70 percent of these transportation improvements are located in Santa Clara, San Mateo, Contra Costa, and Alameda Counties.

Long-term regional increases in the volume of vehicular traffic and major expansions of existing roads or development of new roads in rural areas are expected to result in increased vehicle-related casualties of common and special-status wildlife species. This effect would be most pronounced in rural areas, where roads traverse larger expanses of natural habitats. Increases in traffic may also affect the volume of grease, oil, gasoline, and other contaminants entering Bay Area streams and San Francisco Bay and have adverse effects on fisheries.

Because the proposed Plan transportation investments may result in adverse impacts on special-status plants and wildlife at the regional and local levels, these impacts are considered potentially significant (PS). Mitigation Measure 2.9(a) is described below.

Combined Effects

The combined effects of land development and transportation improvements under the proposed Plan would be generally similar to those described above. Localized impacts of development and transportation projects, particularly with respect to habitat loss and degradation, would aggregate to produce impacts on special-status species on a regional scale. Because the proposed Plan projects may result in impacts on special-status plants and wildlife at both regional and the local levels, these impacts are considered potentially significant (PS). Mitigation Measure 2.9(a) is described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.9(a) Implementing agencies shall require project sponsors to prepare biological resources assessments for specific projects proposed in areas containing, or likely to contain, habitat for special-status plants and wildlife. The assessment shall be conducted by qualified professionals pursuant to adopted protocols and agency guidelines. Where the biological resources assessment establishes that mitigation is required to avoid direct and indirect adverse effects on special-status plant and wildlife species, mitigation shall be developed consistent with the requirements of CEQA, USFWS, and CDFW regulations and guidelines, in addition to requirements of any applicable and adopted HCP/NCCP or other applicable plans developed to protect species or habitat. Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- In support of CEQA, NEPA, CDFW and USFWS permitting processes for individual Plan Bay Area projects, biological surveys shall be conducted as part of the environmental review process to determine the presence and extent of sensitive habitats and/or species in the project vicinity. Surveys shall follow established methods and shall be undertaken at times when the subject species is most likely to be identified. In cases where impacts to State- or federal-listed plant or wildlife species are possible, formal protocol-level surveys may be required on a species-by-species basis to determine the local distribution of these species. Consultation with the USFWS and/or CDFW shall be conducted early in the planning process at an informal level for projects that could adversely affect federal or State candidate, threatened, or endangered species to determine the need for further consultation or permitting actions. Projects shall obtain incidental take authorization from the permitting agencies as required prior to project implementation.

- Project designs shall be reconfigured, whenever practicable, to avoid special-status species and sensitive habitats. Projects shall minimize ground disturbances and construction footprints near sensitive areas to the extent practicable.
- Where habitat avoidance is infeasible, compensatory mitigation shall be implemented through preservation, restoration, or creation of special-status wildlife habitat. Loss of habitat shall be mitigated at an agency approved mitigation bank or through individual mitigation sites as approved by USFWS and/or CDFW. Compensatory mitigation ratios shall be negotiated with the permitting agencies. Mitigation sites shall be monitored for a minimum of five consecutive years after mitigation implementation or until the mitigation is considered to be successful. All mitigation areas shall be preserved in perpetuity through either fee ownership or a conservation easement held by a qualified conservation organization or agency, establishment of a preserve management plan, and guaranteed long-term funding for site preservation through the establishment of a management endowment.
- Project activities in the vicinity of sensitive resources shall be completed during the period that best avoids disturbance to plant and wildlife species present (e.g., May 15 to October 15 near salmonid habitat and vernal pools) to the extent feasible.
- Individual projects shall minimize the use of in-water construction methods in areas that support sensitive aquatic species, especially when listed species could be present.
- In the event that equipment needs to operate in any watercourse with flowing or standing water, a qualified biological resource monitor shall be present at all times to alert construction crews to the possible presence of California red-legged frog, nesting birds, salmonids, or other aquatic species at risk during construction operations.
- If project activities involve pile driving or vibratory hammering in or near water, interim hydroacoustic threshold criteria for fish shall be adopted as set forth by the Interagency Fisheries Hydroacoustic Working Group, as well as other avoidance methods to reduce the adverse effects of construction to sensitive fish, piscivorous birds, and marine mammal species.
- Construction shall not occur during the breeding season near riparian habitat, freshwater marshlands, and salt marsh habitats that support nesting bird species protected under the Endangered Species Act, Migratory Bird Treaty Act, or California Fish and Game Code (e.g., yellow warbler, tricolored blackbird, California clapper rail, etc.).
- A qualified biologist shall locate and fence off sensitive resources before construction activities begin and, where required, shall inspect areas to ensure that barrier fencing, stakes, and setback buffers are maintained during construction.
- For work sites located adjacent to special-status plant or wildlife populations, a biological resource education program shall be provided for construction crews and contractors (primarily crew and construction foremen) before construction activities begin.
- Biological monitoring shall be particularly targeted for areas near identified habitat for federal- and state-listed species, and a "no take" approach shall be taken whenever feasible during construction near special-status plant and wildlife species.

- Efforts shall be made to minimize the negative effects of light and noise on listed and sensitive wildlife.
- Compliance with existing local regulations and policies, including applicable HCP/NCCPs, that exceed or reasonably replace any of the above measures protective of special-status species.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Impact

2.9-1b Implementation of the proposed Plan could have substantial adverse impacts on designated critical habitat for federally listed plant and wildlife species.

Impacts of Land Use Projects

Regional and Localized Effects

As shown in **Table H-2a** in Appendix H, 21 PDAs lie within, or are adjacent to, areas that are designated by the USFWS as critical habitat for federally listed species. Critical habitat for most species occurs within local units distributed throughout the region. Thus, were local impacts to occur they could potentially aggregate to produce region-wide effects on the amount and quality of critical habitat. The majority of potential impacts are related to critical habitat for California tiger salamander on the Santa Rosa Plain in Sonoma County and Delta smelt in Contra Costa and Solano Counties. Development within PDAs could also potentially impact smaller amounts of critical habitat for several other species, including California red-legged frog, bay checkerspot butterfly, Contra Costa goldfields, vernal pool tadpole shrimp, and vernal pool fairy shrimp in Alameda, Santa Clara, and Solano counties. In addition, **Table H-3a** in Appendix H shows that development in 17 PDAs located primarily in Santa Clara and San Mateo counties could potentially impact critical habitat designated by NMFS for Central Coast steelhead. Throughout the region, substantially less development would be expected to occur outside PDAs, but in some cases such development would also occur in or near designated critical habitat and may have disproportionally greater effects than PDA development when it occurs in rural areas. The USFWS reviews projects that may adversely modify federally designated Critical Habitat, just as it reviews projects that may affect federally listed species. While both federal and non-federal actions that may affect listed species require consultation with the USFWS, only federal actions that may adversely modify federally designated Critical Habitat require consultation with the USFWS. However, any federal nexus (federal involvement) is sufficient to federalize a proposed action. Some examples of actions with a federal nexus are as follows: actions on federal land; actions that require a federal permit (such as a wetland permit); actions that require a federal license; and actions using federal funds. Projects without a federal nexus may impact critical habitat and these effects could aggregate to significant levels under CEQA when considered on a regional basis.

As noted under the Method of Analysis, above, the GIS-based analysis overestimates the acreage likely to be affected, because it simply represents the intersection of areas where species are, or have been, present and areas where development is likely to occur. Because the analysis is at a regional level and necessarily very coarse-grained, the actual acreage anticipated to be affected by future development projects would likely be far less than indicated in the tables, due to the potential absence of species and/or habitat from specific development sites.

Impacts on critical habitat could include temporary or permanent habitat loss. Degradation of areas that have high conservation value for these species could also occur in association with proposed Plan development, where such development occurs within or adjacent to critical habitat, through the introduction of night lighting, increases in ambient noise levels, and the introduction of invasive species and predators. Plan development could also result in the introduction of, or increases in, additional vehicular or recreational pressures in areas designated as critical habitat where they do not currently exist. Potential impacts on salmonid critical habitat could include stream degradation in association with increased impervious surfaces and surface runoff, decreases in water quality due to increased point source pollution, and erosion and sedimentation during construction.

Because the land use changes and development under the proposed Plan may result in impacts on designated critical habitat for federal listed plant and wildlife species at the regional and local levels, these impacts are considered potentially significant (PS). Mitigation Measure 2.9(b) is described below and Mitigation Measure 2.9 (a) is described under Impact 2.9-1a.

Impacts of Transportation Projects

Regional and Localized Effects

Approximately 50 transportation projects included in the proposed Plan lie within or adjacent to areas that are designated by the USFWS as critical habitat for federally listed species (see Tables H-2b-c). As noted in the land use discussion above, critical habitat for some species occurs within local units distributed throughout the region and therefore local impacts could potentially combine to produce regional effects. The majority of potential impacts are related to critical habitat for California red-legged frog, California tiger salamander and Delta smelt. Impacts would occur primarily in Contra Costa County. Transportation projects could also potentially impact smaller amounts of critical habitat for several other species, including Alameda whipsnake, Contra Costa goldfields, vernal pool tadpole shrimp, and vernal pool fairy shrimp in Alameda, Santa Clara, San Mateo, Napa, Sonoma, and Solano Counties. In addition, **Table H-3b** in Appendix H shows that implementation of nearly 60 transportation projects region-wide could potentially impact critical habitat designated by NMFS for Central Coast steelhead. Approximately 50 percent of these projects are located in Santa Clara County.

Potential effects of transportation projects on designated critical habitat are generally similar to those described above for development under the proposed Plan. In this case, most impacts to critical habitat for terrestrial species would occur in association with widening (or otherwise expanding) roads that are currently on the boundary of, or that traverse, critical habitat into the critical habitat unit. Potential impacts on salmonid habitat include numerous creek and stream crossings that are not expected to impede fish passage or reduce the critical habitat acreage, but which may have temporary, indirect adverse impacts to aquatic habitat if projects result in increased sedimentation or other fill into these waters during construction activities.

Because the proposed Plan transportation projects may result in permanent and/or temporary impacts on designated critical habitat for federal listed plant and wildlife species at the regional and local levels, these impacts are considered potentially significant (PS). Mitigation Measure 2.9(b) is described below and Mitigation Measure 2.9 (a) is described under Impact 2.9-1a.

Combined Effects

The combined effects of land development and transportation projects on critical habitat would be generally similar to those described above. Localized impacts of development and transportation projects, particularly with respect to habitat loss and degradation, could aggregate to produce impacts to critical habitat for one or more species on a regional scale. Because the proposed Plan projects may result in impacts on critical habitat at both regional and local levels, these impacts are considered potentially significant (PS). Mitigation Measure 2.9(b) is described below and Mitigation Measure 2.9 (a) is described under Impact 2.9-1a.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigation measures including but not limited to those identified below.

2.9(b) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Informal consultation with the USFWS and/or NMFS shall be conducted early in the environmental review process to determine the need for further mitigation, consultation, or permitting actions. Formal consultation is required for any project with a federal nexus.
- Project designs shall be reconfigured to avoid or minimize adverse effects on the primary constituent elements of designated critical habitats when they are present in a project vicinity.
- Compliance with existing local regulations and policies, including applicable HCP/NCCPs. that exceed or reasonably replace any of the above measures protective of critical habitat.

Additionally, implementation of Mitigation Measure 2.9(a), above, which includes an initial biological resource assessment and, if necessary, compensatory mitigation for loss of habitat, is expected to reduce impacts on critical habitat.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Impact

2.9-1c Implementation of the proposed Plan could result in construction activities that could adversely affect non-listed nesting raptor species considered special-status by CDFW under CDFW Code 3503.5 and non-listed nesting bird species considered special-status by the USFWS under the federal Migratory Bird Treaty Act, and by CDFW under CDFW Code 3503 and 3513.

Impacts of Land Use Projects

Regional Effects

While the proposed Plan calls for region-wide construction of housing, office, retail, and industrial development primarily focused within PDAs, the projects are distributed throughout the Bay Area and expected to occur through the year 2040. Since the impacts are directly related to construction and construction would be spread throughout the region spatially and temporally, neither residential nor non-residential development would be expected to have a substantial adverse effect on regional avian reproductive success. Therefore this would be a less than significant (LS) impact on the regional level and no mitigation is required.

Localized Effects

Nesting habitat for raptors (birds of prey), which are protected under Section 3503.5 of the California Fish and Game Code, could occur in the vicinity of most, if not all, proposed Plan Bay Area development projects. While some species, such as golden eagles, northern harriers or short-eared owls require relatively undisturbed wildland habitats for nesting, other species, such as red-tailed hawks, Cooper's hawks, and great horned owl, are more adaptable and are increasingly found inhabiting and reproducing in urban areas. Construction disturbance during the breeding season could result in the direct loss of fertile eggs or nestlings, or otherwise lead to nest abandonment through indirect disturbance. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered a "take" by the CDFW and would be considered a significant impact.

Nesting habitat for birds protected under the federal Migratory Bird Treaty Act and Sections 3503 and 3513 of the California Fish and Game Code occurs in both undisturbed and urban habitats of all kinds. Construction disturbance during the breeding season could result in the direct loss of nests, fertile eggs, or nestlings, or otherwise lead to nest abandonment, and would be considered a significant impact.

Because most, if not all, individual projects under the proposed land development pattern would have the potential to adversely affect nesting birds at a project-specific level, and because some development would also occur outside PDAs and in some cases would occur in or near sensitive habitat, these impacts are considered potentially significant (PS). Mitigation measure 2.9(c) is described below.

Impacts of Transportation Projects

Regional Effects

While the proposed Plan calls for region-wide construction of transportation improvements, the projects are distributed throughout the Bay Area and expected to occur through the year 2040. Since the impacts are directly related to construction and construction would be spread throughout the region spatially and temporally, construction of transportation improvements would not be expected to have a substantial adverse effect on regional avian reproductive success. Therefore this would be a less than significant (LS) impact on the regional level and no mitigation is required.

Localized Effects

Similar to the construction impacts noted above for land development, construction of most, if not all, proposed transportation projects has the potential for adverse effects on the reproductive success of raptors and other birds protected under the Migratory Bird Treaty Act and the California Fish and Game Code. These impacts are considered potentially significant (PS) on a project and localized level. Mitigation Measure 2.9(c) is described below.

Combined Effects

As described above, the combined effects of development and transportation project construction on avian reproductive success is less than significant on a regional level. On the other hand, localized effects are potentially significant for land development and transportation projects under the proposed Plan. However, these effects can be mitigated to less than significant levels on a project-by-project basis as described below in Mitigation Measure 2.9(c).

Mitigation Measure

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.9(c) Implementing agencies shall require project sponsors to conduct a pre-construction breeding bird surveys for specific projects proposed in areas containing, or likely to contain, habitat for nesting birds. The survey shall be conducted by appropriately trained professionals pursuant to adopted protocols agency guidelines. Where a breeding bird survey establishes that mitigation is required to avoid direct and indirect adverse effects on nesting raptors and other protected birds, mitigation will be developed consistent with the requirements of CEQA, USFWS, and CDFW regulations and guidelines, in addition to requirements of any applicable and adopted HCP/NCCP or other applicable plans developed to protect species or habitat. Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Perform preconstruction surveys not more than two weeks prior to initiating vegetation removal and/or construction activities during the breeding season (i.e., February 1 through August 31).
- Establish a no-disturbance buffer zone around active nests during the breeding season until the young have fledged and are self-sufficient, when no further mitigation would be required.

Typically, the size of individual buffers ranges from a minimum of 250 feet for raptors to a minimum of 50 feet for other birds but can be adjusted based on an evaluation of the site by a qualified biologist in cooperation with the USFWS and/or CDFW.

- Provide buffers around nests that are established by birds after construction starts. These birds are assumed to be habituated to and tolerant of construction disturbance. However, direct take of nests, eggs, and nestlings is still prohibited and a buffer must be established to avoid nest destruction. If construction ceases for a period of more than two weeks, or vegetation removal is required after a period of more than two weeks has elapsed from the preconstruction surveys, then new nesting bird surveys must be conducted.
- Comply with existing local regulations and policies, including applicable HCP/NCCPs, that exceed or reasonably replace any of the above measures protective of nesting birds.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.9-2 Implementation of the proposed Plan could have a substantial adverse effect on riparian habitat, federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.), or other sensitive natural communities identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service, through direct removal, filling, hydrological interruption, or other means.

Impacts of Land Use Projects

Regional Effects

Jurisdictional Waters

Tables H-4a and **H-5a** in Appendix H summarize the potential impacts PDA development could have on jurisdictional waters, including wetlands, "other waters" (streams, rivers, lakes, San Francisco Bay, etc.), and riparian habitat. Based on the comprehensive project list, 88 PDAs, located primarily in Alameda, Contra Costa, Santa Clara, and San Mateo Counties, were identified where individual projects could have the potential to directly or indirectly impact wetlands (see **Table H-4a** in Appendix H). The majority of potentially affected wetlands were associated with estuarine and marine deepwater habitats around San Francisco Bay and the Carquinez Strait, or freshwater emergent wetlands and freshwater ponds in a variety of locations. In addition, 127 PDAs were identified that could potentially affect other waters (see **Table H-5a** in Appendix H). It is likely that there is some overlap between these two analyses as wetlands are often associated with streams and rivers and therefore impacts on jurisdictional waters may be overstated and thus conservative. The jurisdictional waters impact assessment in these tables was developed using a GIS-based analysis that compared PDA proximity to blueline streams and wetlands, where the PDA either intersects, bridges, or could otherwise impact jurisdictional waters. Because the analysis examined only mapped streams and wetlands, numerous smaller features that could be affected are not reflected. Conversely, proximity of a PDA to jurisdictional waters provides only a coarse indicator of actual impacts. However, although substantially less development would be expected to occur outside PDAs, in some cases such development would occur in or near jurisdictional waters as well. As noted under Method of Analysis, above, the GIS-based analysis overestimates the acreage likely to be affected, because it simply represents the intersection of areas where jurisdictional waters are present and areas where development is likely to occur. Because the analysis at this regional level is necessarily very coarse-grained, the actual acreage anticipated to be affected by future development projects would likely be far less than indicated in the tables, due to the potential absence of jurisdictional waters from specific development sites.

Potential impacts include the temporary disturbance, or permanent loss, of jurisdictional waters, including wetlands; loss or degradation of stream or wetland function; incremental degradation of wetland habitats; and fragmentation of streams and wetlands. Jurisdictional waters in the region vary from relatively small, isolated roadside areas, wet meadows, and vernal pools to major streams and rivers, bays and estuaries, to tidal, brackish, and freshwater marshes. Any fill of jurisdictional waters associated with proposed land development would be considered a significant impact.

In addition to direct habitat loss, implementation of development under the proposed Plan could increase the potential for stormwater runoff to carry a variety of pollutants into wetlands, rivers, streams, and San Francisco Bay through increases in impervious surfaces. Construction runoff often carries grease, oil, and heavy metals (due to ground disturbance) into natural drainages. Furthermore, particulate materials generated by construction could be carried by runoff into natural waterways and could increase sedimentation impacts. In accordance with Corps, EPA, USFWS, RWQCB, and CDFW guidelines, a goal of "no net loss" of wetland acreage and value is required, wherever possible, through avoidance of the resource. Where avoidance is not possible, mitigation for wetland impacts would be based on project-specific wetland mitigation plans, subject to approval by the Corps, RWQCB, CDFW, and the BCDC and CCC where applicable. Regional impacts on jurisdictional waters could be potentially significant (PS). Mitigation measure 2.9(d) provides measures for the protection of jurisdictional waters.

Special-Status Natural Communities

As noted in the *Environmental Setting* section above, there are a number of sensitive natural communities considered special-status by CDFW due to their rarity or unique biological functions and values, or otherwise considered sensitive and protected under State or local plans and ordinances. Protected natural communities in the region include, but are not limited to, oak woodlands, serpentine chaparral, northern maritime chaparral, coastal terrace prairie, serpentine bunchgrass, California bay forest, and eelgrass beds.[24]

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[24] CDFW, *List of Terrestrial Natural Communities*, available online: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_comm_list.asp, accessed March 2013, 2010.

Development under the proposed Plan located near or adjacent to protected plant communities could cause an incremental direct loss of these community types through conversion or removal of natural vegetation, which would constitute a significant impact. In general, the proposed projects are not located in areas that support protected sensitive communities that would not otherwise be regulated as special-status species habitat (e.g., vernal pools and associated uplands) or wetlands (including riparian habitat regulated by CDFW) with the exception of oak woodlands. Impacts on such communities would be addressed in coordination with CDFW, through an HCP/NCCP permitting process, or through compliance with local ordinances or plans.

The regional magnitude of development impacts on special-status communities is not known, but is expected to be relatively minor since the majority of regional development under the proposed Plan would occur in already urbanized areas and most special-status communities are relatively rare and occur primarily in wildland areas. Therefore, the regional impacts of land development on special-status communities are considered less than significant (LS).

Localized Effects

Jurisdictional Waters

As noted in the regional impacts discussion, **Tables H-4a** and **H-5a** in Appendix H summarize the potential impacts PDA development could have on jurisdictional waters, including wetlands, "other waters" (streams, rivers, lakes, San Francisco Bay, etc.), and riparian habitat. As noted in the regional discussion, impacts to jurisdictional water are likely inflated due to the coarse level of analysis. However, localized effects are expected to occur in each of the PDAs identified.

Potential localized effects on jurisdictional waters are similar to those described in the regional discussion. In accordance with Corps, EPA, USFWS, RWQCB, and CDFW guidelines, a goal of "no net loss" of wetland acreage and value is required, wherever possible, through avoidance of the resource. Where avoidance is not possible, mitigation for wetland impacts would be based on project-specific wetland mitigation plans, subject to approval by the Corps, RWQCB, CDFW, and the BCDC and CCC where applicable. Localized impacts on jurisdictional waters could be potentially significant (PS). Mitigation Measure 2.9(d) provides supplemental measures for the protection of jurisdictional waters.

Special-Status Natural Communities

As noted in the regional discussion there are a number of sensitive natural communities considered of special-status by CDFW due to their rarity or unique biological functions and values, or otherwise considered sensitive and protected under State or local plans and ordinances.

Potential localized effects of land use development under the proposed Plan located near or adjacent to protected plant communities would be similar to those described above under regional effects and are potentially significant (PS) on a project by project basis. Localized impacts on special-status plant communities are generally expected to occur only when projects are developed in previously undeveloped areas in the more rural or wildland portions of the Bay Area. However, since many special-status communities occur on unique soil types (e.g., serpentinite derived soils), which are known to occur in urban as well as non-urban areas throughout the region, the potential for impacts in more urbanized areas cannot be ruled out. As noted above, impacts on such communities would be addressed in coordination with CDFW, through an HCP/NCCP permitting process, or through compliance with local ordinances or plans. Therefore, the localized impacts of land development on special-status communities are considered potentially significant (PS). Mitigation Measure 2.9(d) is discussed below.

Impacts of Transportation Projects

Regional and Localized Effects

Jurisdictional Waters

Tables H-4b, H-4c, H-4d, and **H-5b** in Appendix H summarize the potential impacts proposed transportation investments could have on jurisdictional waters, including wetlands, "other waters" (streams, rivers, lakes, San Francisco Bay, etc.), and riparian habitat. Based on the comprehensive project list, nearly 90 transportation projects were identified that could have the potential to directly or indirectly impact wetlands (see **Tables H-4b** through **H-4d**). Approximately 85 percent of these projects are in Alameda and Santa Clara counties or span multiple counties. Approximately 190 transportation projects could have direct or indirect impacts on other waters within the region (see **Table H-5b** in Appendix H). While direct impacts are local in nature, if unmitigated such impacts could rise to the level of regional significance. Indirect impacts, such as degradation of water quality, are most likely to become regionally significant if unaddressed. As noted above, it is likely that there is some overlap between these two analyses as wetlands are often associated with streams and rivers and therefore impacts on jurisdictional waters may be overstated. As described above, the jurisdictional waters impact assessment in the tables cited was developed using a GIS-based analysis that compared transportation project proximity to blueline streams and other wetlands, where the project either intersects, bridges, or could otherwise impact jurisdictional waters. Because the analysis examined only mapped streams and wetlands, numerous smaller features that could be affected are not reflected. Conversely, proximity of a transportation project to jurisdictional waters provides only a coarse indicator of actual impacts.

Potential regional and local transportation project construction and operations are similar to those discussed above for land use changes and development. In accordance with Corps, EPA, USFWS, RWQCB, CDFW guidelines, a goal of "no net loss" of wetland acreage and value is required, wherever possible, through avoidance of the resource. Where avoidance is not possible, mitigation for wetland impacts would be based on project-specific wetland mitigation plans, subject to approval by the Corps, RWQCB, CDFW, and potentially CCC, and BCDC. Regional and local impacts on jurisdictional waters resulting from implementation of transportation projects could be potentially significant (PS). Mitigation Measure 2.9(d) provides measures for the protection of jurisdictional waters.

Special-Status Natural Communities

As noted in the *Environmental Setting* section above, there are numerous sensitive natural communities considered to be special-status by CDFW due to their rarity or unique biological functions and values, or otherwise considered sensitive and protected under State or local plans and ordinances. Protected natural communities in the region include, but are not limited to, oak woodlands, serpentine chaparral, northern maritime chaparral, coastal terrace prairie, serpentine bunchgrass, California bay forest, and eelgrass beds.

Transportation projects under the proposed Plan located near or adjacent to protected plant communities could cause an incremental direct loss of these community types through conversion or removal of natural vegetation, which would constitute a significant impact. In general, the proposed projects are not located in areas that support protected sensitive communities that would not otherwise be regulated as special-status species habitat (e.g., vernal pools and associated uplands) or wetlands (including riparian habitat regulated by CDFW) with the exception of oak woodlands. Impacts on such communities would be addressed in coordination with CDFW, through an HCP/NCCP permitting process, or through compliance with local ordinances or plans.

The regional magnitude of transportation impacts on special-status communities is not known. Many proposed projects include expansion of existing roadways, where adjacent habitat has already been degraded through past and ongoing disturbance. Although most special-status communities are relatively rare and occur primarily in wildland areas they can also occur in relatively undeveloped pockets in more urban areas. New roads or significant transportation expansions in these areas could have substantial impacts on special-status communities. Therefore, the regional impacts of the transportation projects in the proposed Plan on special-status communities are considered potentially significant (PS). Mitigation Measure 2.9(d) is discussed below.

Localized Effects

Special-Status Natural Communities

Potential localized effects of transportation projects under the proposed Plan that are located near or adjacent to protected plant communities would be similar to those described above under regional effects and are potentially significant (PS) on a project-level basis. Localized impacts on special-status plant communities are generally expected to occur only when projects are developed in previously undeveloped areas in the more rural or wildland portions of the Bay Area. However, since many special-status communities occur on unique soil types (e.g., serpentinite derived soils), which are known to occur in urban as well as non-urban areas throughout the region, the potential for impacts in more urbanized areas cannot be ruled out. Therefore, the localized impacts of transportation projects on special-status communities may be potentially significant (PS). Mitigation Measure 2.9(d) provides measures for the protection of special-status communities.

Combined Effects

Jurisdictional Waters

As noted above, land development and implementation of transportation projects have the potential to impact jurisdictional waters on a localized basis as well as region-wide. The combined effects of land development and transportation projects increase the potential for impacts to jurisdictional waters throughout the region. Mitigation Measure 2.9(d) is discussed below.

Special-status Natural Communities

Regional impacts on special-status plant communities resulting from land use development under the proposed Plan are considered to be less than significant based on the location of PDAs and other development relative to the overall general distribution of special-status plant communities outside of areas designated for development. However, regional impacts of transportation projects and localized effects of land and transportation development are considered potentially significant and, therefore, the aggregate potential effects would be incrementally greater and are thus also potentially significant (PS) on both the regional and local level. Mitigation Measure 2.9(d) provides measures for the protection of special-status communities.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.9(d) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Implementing agencies shall require project sponsors to prepare biological resource assessments for specific projects proposed in areas containing, or likely to contain, jurisdictional waters and/or other sensitive or special-status communities. The assessment shall be conducted by qualified professionals in accordance with agency guidelines and standards. The assessment shall identify specific mitigation measures for any impact that exceeds significant impact thresholds and said measures shall be implemented. Mitigation measures shall be consistent with the requirements of CEQA and wetland permitting agencies, and/or follow an adopted HCP/NCCP or other applicable plans promulgated to protect jurisdictional waters or other sensitive habitats.
- In keeping with the "no net loss" policy for wetlands and other waters, project designs shall be configured, whenever possible, to avoid wetlands and other waters and avoid disturbances to wetlands and riparian corridors in order to preserve both the habitat and the overall ecological functions of these areas. Projects shall minimize ground disturbances and construction footprints near such areas to the extent practicable.
- Where avoidance of jurisdictional waters is not feasible, project sponsors shall minimize fill and the use of in-water construction methods, and only place fill with express permit approval from the appropriate resources agencies (e.g., Corps, RWQCB, CDFW, BCDC, and CCC) and in accordance with applicable existing regulations, such as the Clean Water Act or local stream protection ordinances.
- Project sponsors shall arrange for compensatory mitigation in the form of mitigation bank credits, on-site or off-site enhancement of existing waters or wetland creation in accordance with applicable existing regulations and subject to approval by the Corps, RWQCB, CDFW, BCDC, and CCC. If compensatory mitigation is required by the implementing agency, the project sponsor shall develop a restoration and monitoring plan that describes how compensatory mitigation will be achieved, implemented, maintained, and monitored. At a minimum, the restoration and monitoring plan shall include clear goals and objectives, success criteria, specifics on restoration/creation/enhancement (plant palette, soils, irrigation, etc.), specific monitoring periods and reporting guidelines, and a maintenance plan. The following minimum performance standards (or other standards as required by the permitting agencies) shall apply to any wetland compensatory mitigation:
  - Compensation shall be provided at a *minimum* 1:1 ratio for restoration and preservation, but shall in all cases be consistent with mitigation ratios set forth in locally applicable plans (e.g., general plans, HCP/NCCPs, etc.), or in project-specific permitting documentation. Compensatory mitigation may be a combination of onsite restoration/creation/enhancement, offsite restoration, preservation and/or enhancement, or purchase of mitigation credits. Compensatory mitigation may also be achieved through Regional Advance Mitigation Planning (RAMP) banking, as deemed appropriate by the permitting agencies.

- In general, any compensatory mitigation shall be monitored for a minimum of five years and will be considered successful when at least 75 percent cover (or other percent cover considered appropriate for the vegetation type) of installed vegetation has become successfully established.

- In accordance with CDFW guidelines and other instruments protective of sensitive or special-status natural communities, project sponsors shall avoid and minimize impacts on sensitive natural communities when designing and permitting projects. Where applicable, projects shall conform to the provisions of special area management or restoration plans, such as the Suisun Marsh Protection Plan or the East Contra Costa County HCP, which outline specific measures to protect sensitive vegetation communities.
- If any portion of a special-status natural community is permanently removed or temporarily disturbed, the project sponsor shall compensate for the loss. If such mitigation is required by the implementing agency, the project sponsor shall develop a restoration and monitoring plan that describes how compensatory mitigation will be achieved, implemented, maintained, and monitored. At a minimum, the restoration and monitoring plan shall include clear goals and objectives, success criteria, specifics on restoration/creation/enhancement (plant palette, soils, irrigation, etc.), specific monitoring periods and reporting guidelines, and a maintenance plan. The following minimum performance standards (or other standards as required by the permitting agencies) shall apply to any compensatory mitigation for special-status natural communities:
  - Compensation shall be provided at a *minimum* 1:1 ratio for restoration and preservation, but shall in all cases be consistent with mitigation ratios set forth in locally applicable plans (e.g., general plans, HCP/NCCPs, etc.) or in project-specific permitting documentation. Compensatory mitigation may be a combination of onsite restoration/creation/enhancement, offsite restoration, preservation and/or enhancement, or purchase of mitigation credits. Compensatory mitigation may also be achieved through Regional Advance Mitigation Planning (RAMP) banking, as deemed appropriate by the permitting agencies.
  - In general, any compensatory mitigation shall be monitored for a minimum of five years and will be considered successful when at least 75 percent cover (or other percent cover considered appropriate for the vegetation type) of installed vegetation has become successfully established.
- Compliance with existing local regulations and policies, including applicable HCP/NCCPs. that exceed or reasonably replace any of the above measures protective of jurisdictional wetlands or special-status natural communities.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Impact

2.9-3 Implementation of the proposed Plan could interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites.

Impacts of Land Use Projects

Regional Effects

As noted in the *Environmental Setting* section above, the Bay Area encompasses large areas of wildlands that provide habitat for both common and rare plants and wildlife and some of these areas were mapped as Essential Connectivity Areas (ECA). The ECAs are not regulatory delineations but are identified as lands likely important to wildlife movement between large, mostly natural areas at the statewide level. ECAs were mapped on a state-wide level and should be considered coarse-scale polygons that can inform land-planning efforts, but that should eventually be replaced by more detailed linkage designs, developed at finer resolution at the regional and ultimately local scale based on the needs of particular species and ecological processes. As seen in **Figure 2.9-9**, a total of 13 ECAs occur within the nine Bay Area counties and are typically centered along the region's mountain ranges. These areas are comprised primarily of wildlands, but may also include some agricultural and developed areas (mostly rural residential) and many are bisected by major roadways.

Regional impacts of land development on ECAs would be minimal. Six PDAs in Napa (1), Solano (1), Contra Costa (3), and Santa Clara (2) counties are located within ECAs as mapped. However, these PDAs are primarily located in already urbanized corridors along major highways or other existing transportation routes where migratory corridors have already been fragmented and degraded to the point that their function as linkages is either limited or lost altogether. Substantially less development would be expected to occur outside PDAs, but in some cases such development would occur in or near ECAs. Therefore, the regional impact on ECAs from land development is considered potentially significant (PS). Mitigation Measure 2.9(e) is discussed below.

Localized Effects

As noted above, ECA's were mapped at the statewide level and further analysis is required on a regional and local level to identify landscape linkages at a finer scale more relevant to planning and identifying potential localized impacts. As noted above, most PDAs are located in already urbanized corridors along major highways or other existing transportation routes where many migratory corridors have already been fragmented and degraded to the point that their function as linkages is either limited or lost altogether. However, on a local level, areas including waterways, riparian corridors, and contiguous or semi-contiguous expanses of habitat, are likely to facilitate wildlife movement, even through urbanized areas throughout the region. In some cases, local development projects may directly encroach on wildlife corridors, particularly when direct habitat removal occurs or when sites are located adjacent to open space or streams. Substantial encroachment on local wildlife corridors would be considered a potentially significant (PS) impact. Mitigation Measure 2.9(e) is discussed below.

Impacts of Transportation Projects

Regional Effects

Regional impacts of transportation projects on ECAs could occur with roadway and rail expansions in Napa, Sonoma, Solano, Contra Costa, Alameda, San Mateo, and Santa Clara counties. The majority of potential impacts would occur in Solano, Alameda, and Santa Clara counties. However, many of these transportation projects are expansions or enhancements of existing highways or other transportation routes with existing urban corridors established along them. In these areas migratory corridors have already been fragmented and degraded to the point that their function as linkages is either limited or has been lost altogether. Therefore, the regional impact on ECAs from implementation of transportation improvements is considered less than significant (LS).

Localized Effects

As noted above, ECAs were mapped at the statewide level and further analysis is required on a regional and local level to identify landscape linkages at a finer scale more relevant to planning and identifying potential localized impacts. As also noted above, many transportation projects under the proposed Plan are expansions or enhancements of existing highways or other transportation routes with existing urban corridors established along them and, in these areas migratory corridor function is either limited or has been lost altogether. However, on a local level, areas including waterways, riparian corridors, and contiguous or semi-contiguous expanses of habitat, are likely to facilitate wildlife movement, even through urbanized areas throughout the region. As noted for land development, proposed transportation projects may directly encroach on local wildlife corridors, particularly when direct habitat removal occurs or when sites are located adjacent to open space or streams. Substantial encroachment on local wildlife corridors would be considered a potentially significant (PS) impact. Mitigation Measure 2.9(e) is discussed below.

Combined Effects

Regional impacts on ECAs resulting from implementation of transportation projects in the proposed Plan are considered to be less than significant, based on the location of ECAs relative to the distribution of proposed projects primarily along urbanized corridors. However, regional effects of land use changes and localized effects of both land and transportation development are considered potentially significant when considered separately and, therefore, the aggregate potential regional and localized effects on migratory corridors would be incrementally greater and are thus considered potentially significant (PS) on the regional and local level. Mitigation Measure 2.9(e) provides measures for the protection of special-status communities.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.9(e) Mitigation measures to reduce impacts on wildlife corridors that shall be required by implementing agencies where feasible based on project- and site- specific considerations include, but are not limited to the following. Implementing agencies shall require project sponsors to prepare detailed analyses for specific projects affecting ECA lands within their sphere of influence to determine what wildlife species may use these areas and what habitats those species require. Projects that would not affect ECA lands but that are located within or adjacent to open lands, including wildlands and agricultural lands, shall also assess whether or not significant wildlife corridors are present, what wildlife species may use them, and what habitat those species require. The assessment shall be conducted by qualified professionals and according to any applicable agency standards. Mitigation shall be consistent with the requirements of CEQA and/or follow an adopted HCP/NCCP or other relevant plans developed to protect species and their habitat, including migratory linkages.

Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Constructing wildlife friendly overpasses and culverts;
- Fencing major transportation corridors in the vicinity of identified wildlife corridors;
- Using wildlife friendly fences that allow larger wildlife such as deer to get over, and smaller wildlife to go under;
- Limiting wildland conversions in identified wildlife corridors; and
- Retaining wildlife friendly vegetation in and around developments.
- Compliance with existing local regulations and policies, including applicable HCP/NCCPs. that exceed or reasonably replace any of the above measures protective of jurisdictional wetlands or special-status natural communities.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Impact

2.9-4 Implementation of the proposed Plan could conflict with adopted local conservation policies, such as a tree protection ordinance, or resource protection and conservation plans, such as a Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other adopted local, regional, or state habitat conservation plan.

Impacts of Land Use Projects

Local Ordinances

Most counties and cities in the region have local ordinances and policies in place that protect native trees as well as non-native trees in urban landscapes, as well as unincorporated County lands. These ordinances and policies vary in their definitions of protected trees (e.g., certain species, minimum diameter at breast height (dbh), trees that form riparian corridors) and in the requirements for ordinance or policy compliance. Land use changes and development could result in removal of trees that are protected by local policies or ordinances. Implementation of the proposed Plan Bay Area development and transportation projects may also conflict with other local policies or ordinances that protect locally significant biological resources, such as creek or wetland protection ordinances. Impacts to biological resources protected by local policies or ordinances are site specific and the potential to impact these resources varies on a local level. Therefore, these impacts are primarily localized but also have the potential to aggregate to regional significance.

Therefore, land development impacts related to conflicts with local policies or ordinances protecting biological resources are considered potentially significant (PS) at the regional and local levels. Mitigation Measure 2.9(f) is discussed below.

HCPs and Other Approved Plans

The San Bruno Mountain Area Habitat Conservation Plan[25] was adopted by the County of San Mateo and the Cities of Brisbane, Daly City, and South San Francisco in 1982— however, there are no projects under the proposed Plan on lands covered under this HCP. Projects under the proposed Plan would occur on lands covered by several other adopted plans, as well as plans pending formal adoption, within the region. The East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan (ECCC HCP/NCCP)[26] was adopted by Contra Costa County and the Cities of Brentwood, Clayton, Oakley, and Pittsburg and went into effect in 2008. Development within ECCC HCP urban development areas, generally defined as the County urban limit line is a "covered activity." The Santa Clara Valley Habitat Conservation Plan (SCVHCP)[27] is nearing adoption by the County of Santa Clara, the Santa Clara Valley Transportation Authority, the Santa Clara Valley Water District, and the Cities of San Jose, Gilroy, and Morgan Hill. Development within PDAs under the proposed Plan in Santa Clara County is generally covered under the SCV HCP. The Santa Rosa Plain Conservation Strategy[28] and the East Alameda County Conservation Strategy[29] have not yet been adopted by their local agency partners, but nonetheless influence projects requiring Section 7 or 10 consultation under the FESA within their boundaries. Programmatic Biological Opinions have been issued in each case that guide the development of avoidance and minimization measures for projects within areas covered by

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[25] TRA Environmental Sciences, *San Bruno Mountain Area Habitat Conservation Plan*, 1982.

[26] ICF International, *East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan*, 2007.

[27] ICF International, *Santa Clara Valley Habitat Conservation Plan*, 2012.

[28] USFWS, et al., *Santa Rosa Plain Conservation Strategy*, 2005.

[29] ICF International, *East Alameda County Conservation Strategy*, 2010.

each Conservation Strategy, as well as compensatory mitigation measures. Finally, several projects occur within the California Coastal Zone and are subject to the requirements of Local Coastal Plans.

Projects in the proposed Plan that fall within the ECCC HCP boundaries must demonstrate consistency with the HCP. For example, sponsors of covered projects are required to comply with the ECCC HCP mitigation measures.[30] For the ECCC HCP, covered projects must submit a complete HCP/NCCP application package, submit required fees, fulfill the appropriate HCP survey requirements for wildlife, plants, wetland, and sensitive habitats, and comply with all applicable Conservation Measures, outlined in Chapter 6 of the HCP. Activities that are not covered under that plan, as well as other projects elsewhere in the region where plans are underway or have not yet formally been adopted must pursue individual project permitting for impacts to biological resources until such time as the specific activity/project is identified as a covered activity in an applicable plan. Typically, once a plan or conservation strategy has been developed for an area, wetland and wildlife agency permitting conditions and requirements for projects within that area will be consistent with that plan or strategy whether or not it has been adopted, as is the case for projects in the Santa Rosa Plain, for example. This, in effect, ensures consistency with the unadopted plan. However, this standard may not always be applied. For example, there may be some cases in which the local agency responsible for ensuring consistency may determine there are overriding considerations more important than consistency. HCPs, NCCPs and Conservation Strategies are typically regional in nature, covering multiple cities and/or counties. In addition, biological resources protected by Plans and Strategies are specific to the covered area and the potential to impact these resources thus varies on a local level. Therefore, the proposed land use impacts related to conflicts with the provisions of adopted HCPs, NCCPs, or other approved local, regional, or state habitat conservation plans may be potentially significant (PS) at the regional and local levels. Mitigation Measure 2.9(g) is discussed below.

In the Bay Area, Sonoma County, Marin County, the City and County of San Francisco, San Mateo County, and the cities of Daly City, Pacifica, and Half Moon Bay, all have certified local coastal programs (LCPs). According to GIS-based analysis, there could be land development projects under the proposed Plan that would occur throughout the region in the Coastal Zone. Compliance or non-compliance, however, would be local in nature and based on specific LCPs. Therefore, there could be potentially significant (PS) impacts related to LCP compatibility resulting from land use changes and development under the proposed Plan regionwide, as well as locally. Mitigation Measure 2.9(h) is discussed below.

Impacts of Transportation Projects

Local Ordinances

The regional and local land use change and development effects section describes the conditions that may result in a potentially significant impact related to conflicts with local policies or ordinances protecting biological resources. These impacts are generally similar to those that could result from implementation of transportation projects region-wide (e.g., tree removal). Therefore, the land use change regional and local analyses also apply to transportation projects and impacts related to conflicts with local policies or ordinances protecting biological resources are considered potentially significant (PS) at the regional and local levels. Mitigation Measure 2.9(f) is discussed below.

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[30] ICF International, *East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan*, 2007.

HCPs and Other Approved Plans

The regional and local land use change and development effects discussion describes the conditions that may result in a potentially significant impact related to conflicts with Bay Area approved and pending HCPs and Conservation Strategies. These impacts are generally similar to those that could result from transportation projects at a regional or local level. Therefore, the analysis also applies to development of transportation projects at the regional and local levels and impacts related to conflicts with HCPs and Conservation Strategies are considered potentially significant (PS) both regionally and locally. Mitigation Measure 2.9(g) is discussed below.

In the Bay Area, Sonoma County, Marin County, San Francisco County and City, San Mateo County, and the cities of Daly City, Pacifica, and Half Moon Bay, all have certified local coastal programs (LCPs). According to GIS-based analysis, there are two transportation projects that would occur in the Coastal Zone. These include implementation of operational and safety improvements along Highway 1 between Half Moon Bay and Pacifica in San Mateo County and a bridge replacement at Muir Beach in Marin County. Projects that are located within the Coastal Zone must be compatible with the Coastal Act and applicable county or city certified LCPs, which include guidance for appropriate wetland fill mitigation (usually more demanding than wetland mitigation in other parts of the State), as well as restrictions on agricultural land conversion, open space and public access protection, habitat conservation, and coastal safety concerns. Were these two projects to conflict with the LCPs it is expected to be less than significant (LS) on a regional level given the limited area of impact. However, since LCPs guide development on a local level, it follows that projects that are not compatible with uses under LCPs would be in conflict those programs, a potentially significant (PS) impact. Mitigation Measure 2.9(h) is discussed below.

Combined Effects

As noted above, the potential for land use development and implementation of transportation projects under the proposed Plan could each result in potentially significant conflicts with local ordinances or policies protective of biological resources and approved or as yet unadopted HCP/NCCPs, Conservation Strategies, and LCPs on a localized basis as well as region-wide. Therefore, the combined effects of land development and transportation project implementation increase the potential for such conflicts. Mitigation Measures 2.9(f) through 2.9(g) are discussed below.

The above analysis concludes that proposed Plan projects are not likely to conflict with certified LCPs on a regional basis but that there could be potentially significant conflicts on a local basis due to these projects. There would also be a combined effect because, although there are no PDAs located within the Coastal Zone, development outside PDAs would occur within the Coastal Zone. Mitigation Measure 2.9(h) is discussed below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.9(f) Implementing agencies shall require project sponsors to prepare biological resources assessments for specific projects proposed in areas containing, or likely to contain, protected trees or other locally protected biological resources. The assessment shall be conducted by qualified professionals in accordance with adopted protocols, and standards in the industry. Mitigation shall be consistent with the requirements of CEQA and/or follow applicable ordinances or plans developed to protect trees or other locally significant biological resources. Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Mitigation shall be implemented when significance thresholds are exceeded. Mitigation shall be consistent with the requirements of CEQA and/or follow applicable ordinances or plans developed to protect trees or other locally significant biological resources.
- Implementing agencies shall design projects such that they avoid and minimize direct and indirect impacts to protected trees and other locally protected resources where feasible.
- At a minimum, qualifying protected trees (or other resources) shall be replaced at 1:1, or as otherwise required by the local ordinance or plan, in locally approved mitigation sites.
- As part of project-level environmental review, implementing agencies shall ensure that projects comply with the most recent general plans, policies, and ordinances, and conservation plans. Review of these documents and compliance with their requirements shall be demonstrated in project-level environmental documentation.

2.9(g) During the design and CEQA review of individual projects under Plan Bay Area, implementing agencies and project sponsors shall modify project designs to ensure the maximum feasible level of consistency with the policies in adopted HCPs, NCCPs, or other approved local, regional, or state conservation plans, in areas where such plans are applicable. These measures apply to projects covered by the plans in question (i.e., projects assessed during plan environmental review), as well as non-covered projects within the Plan area. Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- If the project results in impacts on covered species habitat, or other habitat protected under the plan, the project sponsor shall coordinate with USFWS, CDFW, and the appropriate local agency to provide full compensation of acreage and preserve function. Projects shall follow adopted procedures to process an amendment to the conservation plan(s) if necessary. In addition, all habitat based mitigation required by the conservation plans shall be provided at ratios or quantities specified in the plans.
- Project design and implementation shall minimize impacts on covered species through implementation of Mitigation Measures 2.9(a), 2.9(b), 2.9(c), 2.9(d), and 2.9(e).
- Avoidance, minimization, and mitigation measures for covered species, consistent with adopted HCP and/or NCCPs, shall also be implemented as specified during project-specific environmental review and permitting. Avoidance and minimization measures to covered species and their habitats shall include adherence to land use adjacency guidelines as outlined in adopted HCP and/or NCCPs.

2.9(h) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Implementing agencies and project sponsors whose projects are located within the Coastal Zone or within BCDC jurisdiction shall carefully review the applicable local coastal program or San

Francisco Bay Plan for potential conflicts, and involve the California Coastal Commission or BCDC as early as possible in the project-level EIR process.

Significance after Mitigation

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measures 2.9(f), 2.9(g), and 2.9(h), the impact is found to be less than significant with mitigation (LS-M).

2.10 Visual Resources

The San Francisco Bay Area contains some of the most recognizable natural and built views in the world. Important views of natural features include the Pacific Coast, San Francisco Bay, Mount Tamalpais, Mount Diablo, and other peaks and inland valleys of the Coast Range. Enclosed views like those along roads winding through redwood groves, and broader views of the ocean and lowlands, such as along ridgelines, are in abundance in the Bay Area. Cityscape views offered by buildings and distinctive Bay Area bridges are also important built visual resources to the region. Both land use changes and transportation facilities proposed under Plan Bay Area have the potential to affect what is seen and how it is seen.

This chapter describes the visual resources of the Bay Area and assesses the potential the proposed Plan to affect the region's aesthetic environment. Aesthetic value is subjective, but it is typically used as a criterion for evaluating those elements that contribute to the quality that distinguishes an area. Most communities identify scenic resources as an important asset, although what is considered "scenic" may vary according to its environmental setting. It is useful to think of scenic resources in terms of "typical views" seen throughout the Bay Area because scenic resources are rarely encountered in isolation. A typical view may include several types of scenic resources, including both natural and man-made elements. The typical views seen in the Bay Area are outlined below.

It is important to distinguish between public and private views. Private views are those views seen from privately-owned land, including views from private residences, and are typically enjoyed by individuals. Public views are experienced by the collective public. These include views of significant landscape features such as the Golden Gate Bridge or Mount Diablo, as seen from public viewing spaces, not privately-owned properties. California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) case law has established that only public views, not private views, need be analyzed under CEQA. For example, in *Association for Protection etc. Values v. City of Ukiah (1991) 2 Cal. App. 4th 720 [3 Cal. Rptr.2d 488]* the court determined that "we must differentiate between adverse impacts upon particular persons and adverse impacts upon the environment of persons in general. As recognized by the court in *Topanga Beach Renters Assn. v. Department of General Services (1976) 58 Cal.App.3d 188 [129 Cal.Rptr. 739]:* '[A]ll government activity has some direct or indirect adverse effect on some persons. The issue is not whether [the project] will adversely affect particular persons but whether [the project] will adversely affect the environment of persons in general'" (California Environmental Quality Act, 2011). Therefore, for this analysis, only public views will be considered when analyzing the visual impacts of implementing the proposed Plan Bay Area.

Environmental Setting

PHYSICAL SETTING

The Bay Area is characterized by the diversity of urban development and the combination of rural and agricultural landscapes, as well as the natural beauty and wildlife provided by the surrounding mountain ranges and rich wildlife habitats. It stretches along the central northern Pacific coast of California, with several branches of the Coast Mountain Range dividing it into valleys, plains and water bodies. The largest of these valleys contains San Francisco Bay while at the eastern edge of the region is the great Central Valley, an extremely flat plain lying between the Coast Range and the Sierra Nevada Mountains. The hills of the Coast Range provide expansive views of the valleys and plains below, revealing a variety of development types, including urban areas along the Bay plains and inland valleys, agricultural lands and protected open space, and natural areas.

The landscapes of the San Francisco Bay Area are varied, unique, and recognized by many in the region and beyond. The basin formed by the coastal range, East Bay Hills, and the Bay itself are prominent physical features of the region. To the west, the Pacific Ocean and the Coastal Range dominate the visual setting, stretching from Mt. Tamalpais in the north to the Santa Cruz Mountains in the south. To the east, the Diablo Range, dramatically punctuated by Mount Diablo, provides a view of a much different character. In the north, the vineyards of Napa and Sonoma counties are unique and draw visitors from around the world. Many built features in the Bay Area, the Golden Gate and Bay Bridges and the San Francisco skyline in particular, are also of international renown. Bay Area residents and tourists alike treasure the variety and quality of the visual experiences that are found throughout the Bay Area, including from urban and rural public spaces and regional parks, as well as along many transportation corridors in the region, from heavily traveled freeways, transit lines, and ferries, to narrow country roads through secluded forests and agricultural areas. **Figure 2.10-1** depicts the locations of major scenic resources found in the Bay Area. Major land use and/or transportation projects may affect the visual experiences of travelers and the distinctive visual environment of the region.

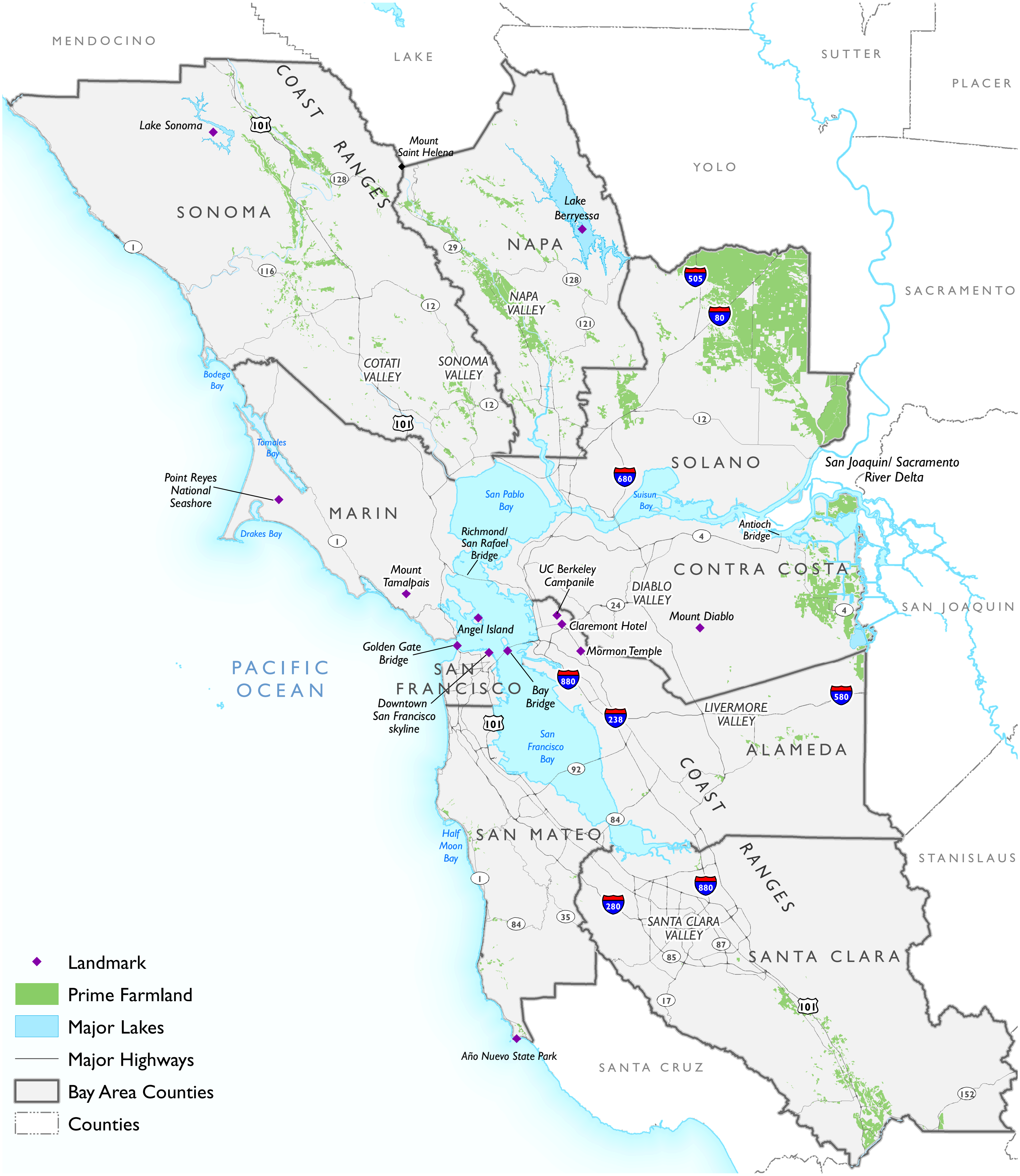
Hills and Valleys

The region contains several distinct mountain ranges and hills. Along the peninsula between the Pacific Ocean and San Francisco Bay lie the coastal hills of San Mateo, Santa Clara, and north of the Golden Gate, the hills of Marin County. The East Bay Hills rise steeply from the urbanized plain along the eastern edge of the Bay forming a several mile wide band that also defines the western edge of the Diablo and Livermore Valleys of Contra Costa and Alameda Counties. The rolling hills of the Diablo Range separate these valleys from the lowlands of the Central Valley. At the south end of the Bay Area in Santa Clara County, these hills converge. To the north, several ranges frame the Napa, Sonoma, and Cotati valleys.

Between these ranges and hills are numerous valleys, both broad and narrow. San Francisco Bay, for example, is bordered along the east and west by a narrow, heavily urbanized plain. This plain widens in the south into the Santa Clara Valley, which, until World War II, was primarily agricultural. The East Bay and coastal hills, which are visible throughout these lowlands, orient viewers and give a sense of scale to the surrounding urban areas. Likewise to the north, the hills forming the Sonoma, Napa, and Cotati valleys enclose these agricultural areas with urban pockets.

Figure 2.10-1

Major Bay Area Scenic Resources



Data Sources: California Department of Fish & Wildlife, 2012; Farmland Mapping & Monitoring Program (FMMP), Department of Conservation, State of California, 2008-2010; The Conservation Lands Network, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Landmarks and Gateways

Certain features of the Bay Area stand out as symbols and points of orientation (see **Figure 2.10-1**). These landmarks include the Golden Gate and Bay Bridges, San Francisco skyline, several large buildings in the East Bay Hills (the Campanile on the U.C. Berkeley campus, the Claremont Hotel and the Mormon Temple in Oakland, for example), and Mount Saint Helena at the northern end of the Napa Valley. These landmarks help visitors and residents to locate themselves within the region, and in the case of the Golden Gate Bridge, symbolize the Bay Area for the rest of the world.

Waterways

The Bay Area is home to a number of bodies of water and waterways that flow through or reside in the region. Estuaries, creeks, and man-made waterways are found throughout the region, as well as the dominant body of water, the San Francisco Bay, which reaches out to the northern and southernmost counties of the Bay Area. Most rivers and streams originating in each of the nine counties of the Bay Area flow into the San Francisco Bay, which provides access to the Pacific Ocean. There are also many smaller man-made reservoirs in the Bay Area that provide notable landscape features, as well as a few larger reservoirs, notably Lake Berryessa in Napa County and Lake Sonoma in Sonoma County.

Views from Travel Corridors

Many roadways and rail lines that intersect the landscapes of the Bay Area provide expansive, regional views of surrounding areas, often due to their wide rights-of-way, location along high points, elevation of the facilities, or a combination of these factors. Examples include I-280 along the Peninsula, Route 92 as it crosses the coastal range, I-80 near Rodeo, I-580 over the Altamont Pass and above Oakland, and the Route 24 corridor. Similarly, the rest area on I-80 above Vallejo, the west end of the Caldecott Tunnel, and "hospital curve" along US 101 in San Francisco offer dramatic views of notable Bay Area landscapes. The bridges crossing San Francisco Bay and the San Joaquin River offer similar experiences. Both the Bay and Golden Gate Bridges provide world-famous views of San Francisco while the Richmond-San Rafael Bridge includes sweeping views of the North Bay, including Mount Tamalpais and Angel Island. The Antioch Bridge allows views out over the Sacramento Delta.

Similarly, rail facilities (including BART) can provide travelers with broad views of the region or portions of it. The elevated BART lines through the East Bay, for example, give good views of the East Bay Hills and the neighborhoods of Oakland, Berkeley, El Cerrito, etc. The Amtrak rail lines along San Pablo Bay and the San Joaquin River also provide broad views of the water with the hills beyond.

Roads and rail lines also provide more intimate views of forested hills or narrow valleys. Highway 35 (along the crest of the San Mateo Peninsula) and Route 84 (through the narrows of Niles Canyon) are examples of such views. Similarly, Route 1 and Sir Francis Drake Boulevard run through the forests and grasslands of Marin County to the beaches, parks, and open space areas along the coast. Route 29 and the Silverado Trail through the Napa Valley and Route 12 through the Sonoma Valley provide dramatic views of enclosing hills, adjoining vineyards, and the wineries.

Finally, while carrying only a small portion of the region's travelers, the use of the Bay ferries can be attributed, in part, to the spectacular viewing experiences afforded by this mode of transport.

Views of Roads, Rail, and Buildings

Because the Bay Area contains a wide variety of densely populated metropolitan and urban centers, it is inevitable that roads, buildings, and railways are a part of the aesthetic landscape. Rural and natural landscapes can also be dramatically altered by the placement of roads, rail lines, and buildings. While roads and rail lines can provide access to views for travelers, these facilities can also detract from or block public views. A new or expanded roadway along a hillside can be visible from a great distance, changing the impression of the hillside for the viewer, particularly if the hillside is undeveloped. Also, new roads and rail lines are sometimes built above the level of existing development, which can overshadow nearby homes and businesses and limit views from them to the surrounding hills and valleys. Similarly, buildings can enhance or detract from the overall visual environment based on their design, location, and relationship to other structures and natural features.

REGULATORY SETTING

Federal Regulations

Moving Ahead for Progress in the 21st Century (MAP-21)

The Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law in July 2012 and reauthorized the federal highway and public transportation programs for 2013 and 2014 for a total of $105 billion, holding funding flat relative to prior years. However, the bill marks a notable departure from prior surface transportation acts in several respects, most notably its short duration, elimination of earmarks, consolidation of programs and introduction of performance measures into the federal transportation policy framework. While the bill retains many of the larger highway and transit programs of its predecessor—the Safe Accountable, Flexible, Efficient Transportation Equity Act, known as SAFETEA—it creates a new formula program called Transportation Alternatives that encompasses most activities funded under the Transportation Enhancements, Recreational Trails, and Safe Routes to Schools programs under SAFETEA that are related to scenic resources.

United States Department of Transportation Act, Section 4(f)

Section 4(f) of the Department of Transportation Act (DOT Act) of 1966 (49 U.S.C. § 303) was enacted to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites. Section 4(f) requires a comprehensive evaluation of all environmental impacts resulting from federal-aid transportation projects administered by the Federal Highway Administration, Federal Transit Administration, and Federal Aviation Administration that involve the use-or interference with use-of the following types of land:

- Public park lands;
- Recreation areas;
- Wildlife and waterfowl refuges; and
- Publicly- or privately-owned historic properties of federal, state, or local significance.

This evaluation, called the Section 4(f) statement, must be sufficiently detailed to permit the U.S. Secretary of Transportation to determine that:

- There is no feasible and prudent alternative to the use of such land;

- The program includes all possible planning to minimize harm to any park, recreation area, wildlife and waterfowl refuge, or historic site that would result from the use of such lands; or that
- If there is a feasible and prudent alternative, a proposed project using Section 4(f) lands cannot be approved by the Secretary; or if there is no feasible and prudent alternative, the proposed project must include all possible planning to minimize harm to the affected lands.

Detailed inventories of the locations and likely impacts on resources that fall into the Section 4(f) category are required in project-level environmental assessments.

In August 2005, Section 4(f) was amended to simplify the process for approval of projects that have only minimal impacts on lands affected by Section 4(f). Under the new provisions, the U.S. Secretary of Transportation may find such a minimal impact if consultation with the State Historic Preservation Officer (SHPO) results in a determination that a transportation project will have no adverse effect on the historic site or that there will be no historic properties affected by the proposed action. In this instance, analysis of avoidance alternatives is not required and the Section 4(f) evaluation process is complete.

State Regulations

California Scenic Highway Program

Recognizing the value of scenic areas and the value of views from roads in such areas, the State Legislature established the California Scenic Highway Program in 1963. This legislation sees scenic highways as "a vital part of the all encompassing effort…to protect and enhance California's beauty, amenity and quality of life."[1] Under this program, a number of State highways have been designated as eligible for inclusion as scenic routes. Once the local jurisdictions through which the roadway passes have established a corridor protection program and the Departmental Transportation Advisory Committee recommends designation of the roadway, the State may officially designate roadways as scenic routes. Interstate highways, State highways, and county roads may be designated as scenic under the program. The Master Plan of State Highways Eligible for Official Scenic Highway Designation maps designated highway segments, as well as those that are eligible for designation. Changes to the map require an act of the legislature.

As noted, a corridor protection program must be adopted by the local governments with land use jurisdiction through which the roadway passes as the first step in moving a road from "eligible" to "designated" status. Each designated corridor is monitored by the State and designation may be revoked if a local government fails to enforce the provisions of the corridor protection program. While there are no restrictions on scenic highway projects, local agencies and Caltrans must work together to coordinate transportation and development projects and ensure the protection of the corridor's scenic value to the greatest extent possible.[2] In some cases, local governments have their own land use and site planning regulations in place to protect scenic values along a designated corridor. At a minimum, each corridor protection program must include:

[1] California Senate Bill No. 1467 (Farr), 1963

[2] State law requires the undergrounding of all visible electric distribution and communication utilities within 1,000 feet of a Scenic Highway.

- Regulation of land use and density of development;
- Detailed land and site planning;
- Control of outdoor advertising devices;
- Control of earthmoving and landscaping; and
- Regulation of the design and appearance of structures and equipment.

The Master Plan of State Highways Eligible for Official Scenic Highway Designation requires that proposed realignments and route improvements be evaluated for their impact on the scenic qualities of the corridor.

The Bay Area includes numerous designated or eligible State Scenic Highways. Officially-designated State Scenic Highways are illustrated in **Figure 2.10-2**. All officially-designated and eligible State Scenic Highways in the Bay Area are listed in **Table 2.10-1**.

Counties and municipalities also may have scenic route components within their individual general plans, but a separate scenic highways element is no longer required. Policies usually encourage the designation of these roadways as scenic corridors, either by local action or through the State program. Counties and municipalities may also establish regulatory programs or recommend corridor studies to determine the appropriate regulatory program to preserve scenic quality.

TABLE 2.10-1: CALIFORNIA STATE SCENIC HIGHWAY SYSTEM OFFICIALLY DESIGNATED (OD) AND ELIGIBLE (E) ROUTES IN THE BAY AREA

Designation	*Route*	*County*	*Location*
OD	1	San Mateo	Santa Cruz County Line to S. City Limit Half Moon Bay
OD	9	Santa Clara	Santa Cruz County line/Saratoga Gap to Blaney Plaza Saratoga
OD	9	Santa Clara	Blaney Plaza in Saratoga to Los Gatos city limit
OD	12	Sonoma	Danielli Ave E. of Santa Rosa to London Way N. Agua Caliente
OD	24	Contra Costa	E. Portal Caldecott Tunnel to I-680 N. Walnut Creek
OD	35	San Mateo	Santa Cruz county line to Santa Clara county line
OD	35	San Mateo	Santa Clara county line to Half Moon Bay Road SR 92
OD	84	Alameda	SR 238 (Mission Blvd.) to I-680 near Sunol
OD	116	Sonoma	SR 1 to S. city limit of Sebastopol
OD	280	San Mateo	Santa Clara county line to N. city limit San Bruno
OD	580	Alameda	San Joaquin county line to SR 205
OD	580	Alameda	San Leandro city limit to SR 24 in Oakland
OD	680	Alameda	Mission Blvd. in Fremont to Bernal Ave near Pleasanton
OD	680	Alameda	Bernal Ave near Pleasanton to Contra Costa County Line
OD	680	Contra Costa	Alameda County Line to SR 24
E	1	Marin/ Sonoma/ Mendocino	SR 101 Near Marin City to SR 101 near Leggett
E	1	San Francisco	SR 35 in SF to SR 101 near Golden Gate Bridge in San Francisco
E	1	San Luis Obispo / San Mateo/ San Francisco	SR 101 Near San Luis Obispo to SR 35 near Daly City
E	4	Contra Costa	SR 160 Near Antioch to SR 84 near Brentwood
E	9	Santa Clara	SR 35 to SR 17 near Los Gatos
E	12	Sonoma	SR 101 near Santa Rosa to SR 121 near Sonoma
E	17	Santa Cruz/ Santa Clara	SR 1 near Santa Cruz to SR 9 near Los Gatos
E	24	Contra Costa	Alameda/Contra Costa county line to Rte. 680 in Walnut Creek
E	29	Napa/Lake	Trancas St. in Napa to SR 20 near Upper Lake
E	29	Solano/Napa	SR 37 near Vallejo to SR 221 near Napa
E	35	Santa Clara/ SantaCruz/ San Mateo/San Francisco	SR 17 to SR 92/I-280/SR 1 in San Francisco
E	37	Marin	SR 251 near Nicasio to SR 101 near Novato
E	37	Marin/ Sonoma/ Solano	SR 101 near Ignacio to SR 29 near Vallejo

TABLE 2.10-1: CALIFORNIA STATE SCENIC HIGHWAY SYSTEM OFFICIALLY DESIGNATED (OD) AND ELIGIBLE (E) ROUTES IN THE BAY AREA

Designation	*Route*	*County*	*Location*
E	80	San Francisco/Alameda	I-280 near First Street in San Francisco to SR 61 in Oakland
E	92	San Mateo	SR 1 N. Half Moon Bay to I-280 N. Crystal Springs Lake
E	101	Marin	Opposite San Francisco to SR 1 in Marin City
E	101	Marin	SR 37 near Ignacio to SR 37 near Novato
E	116	Sonoma	SR 1 near Jenner to SR 101 near Cotati
E	121	Napa	SR 221 near Napa St. Hosp. to near Trancas St. Napa
E	121	Sonoma	SR 37 near Sears Point to SR 12 near Sonoma
E	152	Santa Clara/ Merced	SR 156 near San Felipe to I-5
E	156	Monterey/ San Benito/ Santa Clara	SR 1 near Castroville to SR 152 NE of Hollister
E	160	Contra Costa/ Sacramento	SR 4 near Antioch to Sacramento
E	221	Napa	SR 29 at Suscol Rd to SR 121 in Napa
E	239	Alameda/ Contra Costa	I-580 W. of Tracy to SR 4 near Brentwood
E	251	Marin	SR 37 near Nicasio to SR 1 near Point Reyes
E	280	Santa Clara/ San Mateo/ San Francisco	SR 17 to I-80 near First Street in San Francisco
E	580	San Joaquin/ Alameda	I-5 SW of Vernalis to I-80
E	680	Alameda/ Contra Costa	Santa Clara county line to SR 24 in Walnut Creek

Source: Caltrans website, http://www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm, accessed July 2012.

Figure 2.10-2

State Designated and Eligible Scenic Highways

Data Source: Scenic Highways, Caltrans HQ Landscape Architecture, CalTrans TSI/GIS Data Branch, California Department of Transportation, 2009; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Caltrans Adopt-a-Highway Program

To improve and maintain the visual quality of California highways, Caltrans administers the Adopt-a-Highway program, which was established in 1989. The program provides an avenue for individuals, organizations, or businesses to help maintain sections of roadside within California's State Highway System. Groups have the option to participate as volunteers or to hire a maintenance service provider to perform the work on their behalf. Adoptions usually span a two-mile stretch of roadside, and permits are issued for five-year periods. Since 1989, more than 120,000 California residents have kept 15,000 shoulder miles of state roadways clean by engaging in litter removal, tree and flower planting, graffiti removal, and vegetation removal.

Open Space Easement Act of 1974

Cities and counties can use open space easements as a mechanism to preserve scenic resources, if they have adopted open-space plans, as provided by the Open Space Easement Act of 1974 (Gov. Code, §§ 51070.-51097). According to this Act, a city or county may acquire or approve an open-space easement through a variety of means, including use of public money.

California Code of Regulations Title 24 Part 6

The California Energy Code (Cal. Code Regs., tit. 24 § 6) creates standards in an effort to reduce energy consumption. The type of luminaries and the allowable wattage of certain outdoor lighting applications are regulated.

Local Regulations

City and County General Plans

City and county general plans may include policies for protection of scenic resources, such as hillsides, natural areas, landmarks, roads, and historic districts. Such policies may restrict new development in areas that maintain scenic vistas or areas that contain important character-defining structures. Additionally, design guidelines established at the local level may establish specific standards for addressing development where local character and/or important visual resources may be impacted.

Impact Analysis

SIGNIFICANCE CRITERIA

Implementation of the proposed Plan would have a potentially significant adverse impact if it would:

Criterion 1: Block panoramic views or views of significant landscape features or landforms (mountains, oceans, rivers, or significant man-made structures) as seen from the transportation facility or from public viewing areas.

Criterion 2: Substantially damage scenic resources (such as trees, rock outcroppings, and historic buildings) that would alter the appearance of or from state- or county-designated or eligible scenic highways.

Criterion 3: Create significant contrasts with the scale, form, line, color and/or overall visual character of the existing community.

Criterion 4: Add a visual element of urban character to an existing rural or open space area or add a modern element to a historic area.

Criterion 5: Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.

Criterion 6: Cast substantial shadow in such a way as to cause a public hazard or substantially degrade the existing visual/aesthetic character or quality of a public place for a sustained period of time.

METHOD OF ANALYSIS

The regional assessment includes an emphasis on places where substantive changes to scenic public views are anticipated as a result of implementation of the proposed Plan. Land use and transportation change areas are grouped based on likely magnitude of visual change, with more visual change anticipated where non-urbanized areas are to become urbanized, where urban areas would substantially intensify, or where transportation projects are more likely to require extensive physical infrastructural change. These change areas were also evaluated based on proximity to designated or eligible State Scenic Highways. Areas undergoing changes in transportation or land use that are not likely to involve visual effects (e.g., transportation projects for seismic upgrades, safety improvements, signalization, bicycle lanes, freeway carpool lanes that do not require roadway widening, or roadway rehabilitation, as well as low density infill development) are identified as such. It is noted that aesthetics and visual resources are generally subjective by nature, and therefore the level of the proposed Plan's visual impact is impossible to quantify. In addition, it is difficult to estimate the impact future development would have on scenic resources, since individual development projects have not been designed yet and future projects could enhance the aesthetic quality of an area, if properly planned and designed. As such, this analysis was conducted qualitatively, assessing potential implications of growth following the land use framework and transportation projects in the proposed Plan.

With regard to transportation projects, the visual impacts analyzed are of two general types: changes in scenic views from public viewing areas and changes that could adversely affect a community or region's visual character. Visual impacts associated with the proposed transportation improvements are assessed by comparing the proposed Plan transportation network to existing conditions. First, transportation projects that would not involve construction or would not significantly change the physical configuration of existing transportation facilities (examples described above) were eliminated from further consideration, since such projects are unlikely to have effects on views. Next, the remaining investment projects were reviewed to determine if they are located on designated or eligible State Scenic Highways or would interfere or degrade scenic views. Both the impact of a facility on the landscape as well as the visual appearance of a facility itself are considered.[3] Physical alteration may result in visual contrast, loss of vegetation, variation in design or streetscape, etc. These types of changes were also assessed for their potential effects on community and regional visual character.

While land use changes in the proposed Plan will result in new development, a land use strategy is proposed rather than site-specific projects. In order to assess the potential impacts on visual resources resulting from higher residential densities and commercial intensities, existing land uses are compared to proposed land uses to determine the general height and bulk of buildings that can be expected in areas of planned growth. Types of visual impacts are then identified that may occur at the local level. In addition, the combination of transportation improvements and land use development was assessed for impacts on visual character and scenic views, as well as light, glare and shadowing. This analysis focuses on impacts on public spaces.

SUMMARY OF IMPACTS

Many development projects and capacity-enhancing transportation improvements resulting from implementation of the proposed Plan would have an effect on the visual character of the surrounding area or on scenic views from a transportation facility itself. Projects that could significantly alter views from public viewing areas and transportation facilities in the Bay Area include new residential and commercial development, freeway and highway extensions and significant widening, grade changes, new freeway interchanges, and new rail lines (either light or heavy rail). Significant impacts would occur where the projects would block existing scenic views or alter the appearance of a scenic resource.

Implementation of the proposed Plan could result in both short-term and long-term visual impacts. The construction of proposed projects could result in short-term visual impacts from the blockage of views by construction equipment and scaffolding, the removal of landscaping, and other construction activities that impair local views, although such impacts would be temporary in nature. Long term impacts from the blockage of views are possible as a result of proposed transportation projects and where substantial land use changes are identified.

Transportation projects in the proposed Plan that would have a long-term visual impact include freeway or highway widenings on or adjacent to designated or eligible scenic highway segments, some interchange overcrossing projects, and some rail transit extensions and stations. New residential and commercial development could also have long-term visual impacts, particularly where it is adjacent to scenic highway segments, is of a large scale relative to its surroundings, and/or introduces new urban features into a scenic rural area.

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3 Caltrans. *Guidelines for Official Designation of Scenic Highways*. November 1990, p. 14.

Proposed Plan projects could also create contrasts with the visual character of existing communities in both urban and rural areas. Impacts resulting from transportation projects and where substantial land use changes are identified are potentially significant.

Finally, the construction of new residences, businesses, and transportation facilities may introduce new sources of light, glare, and/or shadow into the environment. Although most of this new development will occur in existing urbanized areas or rights-of-way, which are already impacted, some light and glare impacts could occur in rural or open space areas. Additionally, public spaces in urban areas could be impacted by shadows.

IMPACTS AND MITIGATION MEASURES

Impact

2.10-1 Implementation of the proposed Plan could affect visual resources by blocking panoramic views or views of significant landscape features or landforms (mountains, oceans, rivers, or significant man-made structures) as seen from a transportation facility or from public viewing areas.[4]

Impacts of Land Use Projects

Regional Effects

As indicated in **Table 2.10-3**, development resulting from the proposed Plan will convert approximately 7,500 acres from undeveloped to urbanized land over the course of the 28-year planning period. This could permanently affect visual resources by expanding development or transportation facilities and permanently blocking public views of landforms and significant structures.

At the regional scale, development resulting from the proposed Plan could cause regional short-term visual impacts due to the blockage of significant landscapes or structures by construction equipment and scaffolding, temporary lighting, and exposed excavation and slope faces. Major projects such as high density housing and high intensity commercial projects that require large-scale equipment such as construction cranes have the potential to result in substantial visual impacts during construction at the regional scale due to their height and bulk and the fact that they may be visible from public vantage points throughout the Bay Area. Construction on such projects could take several months to several years and result in short-term impacts, which, due to their temporary nature, would be considered less than significant. Construction activities associated with low or medium density infill development projects are not expected to result in significant visual impacts at the regional scale due to their relatively small size.

The greatest potential for long-term visual impacts will result from high density housing and high intensity commercial projects located in rural or open space areas or adjacent to visually significant structures such that they block scenic views from public viewing areas. Much of the developable flat land in the Bay Area has already been converted to urban use, so development opportunities include redevelopment of existing urban land as well as some hillside sites and rural land. However, urban limit lines have been established by many Bay Area communities to protect remaining open space, which will

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[4] Per CEQA case law, blocking a private view is not an environmental impact.

limit many unanticipated consequences of development and resulting visual impacts. Likewise, many Bay Area communities have established general plan policies and ordinances to protect view sheds, and have incorporated this consideration in their project review processes. **Table 2.10-3** indicates that the proportion of total land in the region that will be developed for urban uses is only expected to increase from 17.8 to 17.9 percent, which is related to the land use pattern included in the proposed Plan. Still, some development projects are anticipated to take place in rural or open space areas as part of the proposed Plan and could block panoramic views or views of significant landscapes or structures from public viewing areas. As a result, this impact is considered potentially significant (PS). Mitigation Measure 2.10(a) is described below.

TABLE 2.10-3: URBANIZED LAND BY COUNTY

County	*Land Acres*	*2010 Urban Footprint*[1]	*2010 Percent Urban Footprint*	*Increase in Urban Footprint*[2]	*2040 Percent Urban Footprint*
Alameda	470,867	146,069	31.0%	1,425	31.3%
Contra Costa	458,757	151,998	33.1%	1,979	33.6%
Marin	331,715	42,230	12.7%	311	12.8%
Napa	484,610	23,551	4.9%	162	4.9%
San Francisco	29,975	23,967	80.0%	187	80.6%
San Mateo	287,596	72,319	25.1%	643	25.4%
Santa Clara	826,500	191,402	23.2%	779	23.3%
Solano	528,208	59,436	11.3%	1,198	11.5%
Sonoma	1,009,967	75,210	7.4%	863	7.5%
Total	**4,428,195**	**786,182**	**17.8%**	**7,547**	**17.9%**

1. Data for San Francisco is from 2008.
2. Future urbanized footprint is based on modeled future development of over eight people per acre and/or 10 jobs per acre.

Note: numbers may not sum due to independent rounding.

Source: MTC, 2013; Urban and Built Up Land, Farmland Mapping and Monitoring Program, Department of Conservation, 2008- 2010; Census TIGER/Line Shapefiles, 2010.

Localized Effects

The construction of new development resulting from the proposed Plan could cause localized short-term visual impacts similar to those at the regional scale. Additional impacts at the local scale include the removal of landscaping, temporary traffic changes, temporary signage, and construction staging areas. Construction activities associated with low density infill development projects are expected to result in more substantial visual impacts at the local scale as compared to the regional scale due to their setting within local communities and proximity to local public viewing areas.

Long-term visual impacts resulting from development in the proposed Plan would be similar to those at the regional scale. However, most city and county general plans include policies, such as zoning and/or design guidelines, which ensure new development is visually compatible with the natural and built environments. Further, MTC and ABAG encourage the inclusion of pedestrian-oriented and human-scaled development standards and guidelines in PDA Plans funded by MTC/ABAG. Still, development resulting from the proposed Plan could result in long-term visual impacts and this impact remains potentially significant (PS). Mitigation Measure 2.10(a) is described below.

Impacts of Transportation Projects

Regional Effects

The construction of transportation projects in the proposed Plan could result in regional short-term visual impacts from the blockage of public views by construction equipment and scaffolding, temporary lighting, and exposed excavation and slope faces. Many of the transportation projects in the proposed Plan will not result in significant construction impacts, as they involve transit route improvements, road operations and maintenance, and pedestrian and bicycle improvements which all involve minimal construction, if any. However, major capital projects that require new construction have the potential to result in substantial regional visual impacts during construction due to their visibility from public vantage points throughout the Bay Area. Construction on such projects could take several months to several years. There are approximately 160 transportation investment projects in the Plan that involve some form of major new construction. Due to the short-term nature of construction-related impacts, this impact would be less than significant (LS).

Localized Effects

Local short-term visual impacts resulting from transportation projects are similar to those at the regional scale. Additional impacts at the local scale include the removal of landscaping, temporary traffic changes, temporary signage, and construction staging areas. Transportation-related construction activities are expected to result in more significant visual impacts at the local scale as compared to the regional scale due to their setting within local communities. Although major transportation projects are proposed for each of the nine Bay Area counties, as seen in **Figure 2.10-3**, they are clustered most densely in Santa Clara County around the densely populated areas of Santa Clara, Downtown San José, and Milpitas; in central and western Alameda County; and in San Francisco. There are also numerous projects along the Highway 101 corridor in Sonoma and Marin Counties, along the Interstate 80 corridor in Solano County, and along the Highway 4 corridor in Contra Costa County.[5]

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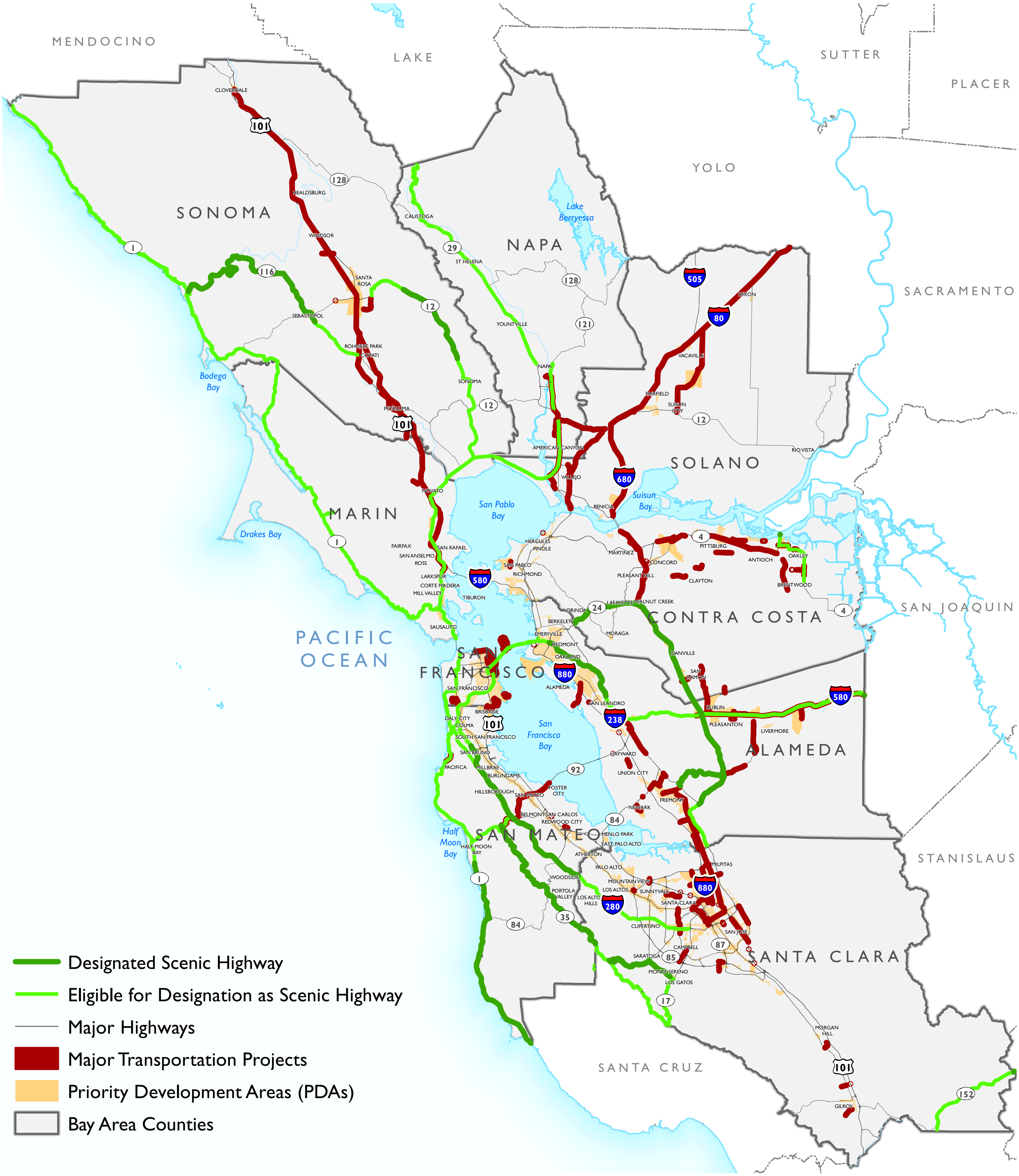
[5] "Major projects" defined as those which are listed in the RTP as expansion projects costing $10 million or more that include new roadway construction, road widening, or other ground-disturbing construction.

Figure 2.10-3

Proposed Major Transportation Projects, Scenic Highways, and PDAs



Data Source: Scenic Highways, Caltrans HQ Landscape Architecture, CalTrans TSI/GIS Data Branch, California Department of Transportation, 2009; Metropolitan Transportation Commission, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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As noted above, the majority of the 700 transportation projects within the proposed Plan would have no impact on visual resources. **Figure 2.10-3** identifies the 160 major projects that could result in potentially significant long-term visual impacts in the region. Included are 29 extension projects, 88 road widening projects, and 34 new roadway projects, as indicated in **Table 2.10-4**. The majority of these projects are along existing rights-of-way or in existing communities, although a few would add or expand roadways in rural or open space areas particularly in Solano, Contra Costa, and Alameda counties, which would result in a significant impact. There are also numerous projects along the Highway 101 corridor in Sonoma and Marin counties, along the Interstate 80 corridor in Solano County, and along the Highway 4 corridor in Contra Costa County. Highway widening and new construction associated with major transportation projects would have the potential to affect views of rural or open space areas.

Major transportation projects in the proposed Plan could block public views of significant landscapes and structures that are important landmarks. For example, a new highway overpass could interrupt the line of sight from a public viewing area toward a local or regional landmark. As a result, this impact remains potentially significant (PS). Mitigation Measure 2.10(a) is described below.

TABLE 2.10-4: TYPES OF PROJECTS POTENTIALLY DISRUPTING VISUAL RESOURCES

	Type of Project in Plan					
County	*Extension*	*Intersection*	*New*	*Widening*	*Other*	*Total*
Alameda	4	10	7	19	-	40
Contra Costa	5	5	9	24	2	45
Marin	-	-	-	1	-	1
Napa	1	-	-	-	1	2
San Francisco	4	-	6	1	-	11
San Mateo	2	1	1	4	1	9
Santa Clara	10	11	5	17	-	43
Solano	-	3	3	4	-	10
Sonoma	1	3	-	7	-	11
Regional/Multiple Counties[1]	2	-	3	11	1	17
Total	**29**	**33**	**34**	**88**	**5**	**189[2]**

1. This category includes projects such as BART, and other transit projects of a regional scale.
2. Total does not equal 160 due to the fact that some projects have multiple components that are categorized under more than one project type.

Source: Metropolitan Transportation Commission 2012; Dyett & Bhatia, 2012.

Combined Effects

As discussed above, development and transportation projects both have the potential to produce significant impacts. However, even where they are not significant, impacts could aggregate to produce permanent, potentially significant (PS) impacts on visual resources. Mitigation Measure 2.10(a) is described below. Note that in all cases, impacts of land use and transportation projects on private views do not constitute environmental impacts under CEQA.

Mitigation Measure

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.10(a) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Reduce the visibility of construction staging areas by fencing and screening these areas with low contrast materials consistent with the surrounding environment, and by revegetating graded slopes and exposed earth surfaces at the earliest opportunity.
- Site or design projects to minimize their intrusion into important viewsheds.
- Use see-through safety barrier designs (e.g. railings rather than walls) when feasible.
- Develop interchanges and transit lines at the grade of the surrounding land to limit view blockage wherever possible.
- Design landscaping along highway corridors in rural and open space areas to add significant natural elements and visual interest to soften the hard edged, linear travel experience that would otherwise occur.
- Identify, preserve, and enhance scenic vistas to and from hillside areas and other visual resources.
- Comply with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect visual resources.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.10-2 Implementation of the proposed Plan could affect visual resources by substantially damaging scenic resources (such as trees, rock outcroppings, and historic buildings) that would alter the appearance of or from state- or county-designated or eligible scenic highways.

Impacts of Land Use Projects

Regional and Localized Effects

Scenic resources that contribute to the visual character of scenic highways are by nature specific to their local context, and as such, impacts on these resources resulting from the proposed Plan would occur at the local level. Therefore, regional effects are not addressed separately. Development resulting from the proposed Plan could permanently affect visual resources by substantially altering the appearance of or from state- or county-designated or eligible scenic highways.

Development adjacent to scenic highways could cause short-term visual impacts resulting from construction equipment and scaffolding, temporary lighting, and exposed excavation and slope faces. In general, construction-related impacts to scenic highways would be the same as those under Impact 2.10-1 relating to the blockage of views. Large projects are most likely to have significant impacts on scenic highways, but even small projects could have impacts depending on their duration. In general, however, construction impacts are less than significant due to their temporary nature.

As under Impact 2.10-1, the greatest potential for long-term visual impacts on scenic highways will result from high density housing and high intensity commercial projects located adjacent to scenic highways that damage scenic resources or create visual contrast between the project and existing conditions. As seen in **Figure 2.10-3**, numerous designated and eligible scenic highways are adjacent to PDAs, where the majority of new development in the proposed Plan will be concentrated, and as a result, could be impacted. Overall, 18 miles of scenic highway pass through or are adjacent to PDAs, while another 34 miles of highways eligible for scenic designation do so. The Scenic Highway Guidelines adopted by Caltrans to protect scenic highway corridors, which include certain limits on land uses adjacent to the roadway, are implemented at the local level and are non-binding. Additionally, most city and county general plans include policies, such as zoning and/or design guidelines, which ensure new development is visually compatible with the natural and built environments. However, development resulting from the proposed Plan could result in long-term visual impacts on scenic resources and this impact would be potentially significant (PS). Mitigation Measure 2.10 (a) is described under Impact 2.10-1 and Mitigation Measure 2.10(b) is described below.

Impacts of Transportation Projects

Regional and Localized Effects

Short- and long-term visual impacts on scenic highways resulting from transportation projects are the same as those discussed under Impact 2.10-1. Many of the transportation projects in the proposed Plan Bay Area will not result in significant construction impacts, as they involve transit route improvements, road operations and maintenance, and pedestrian and bicycle improvements which all involve minimal construction, if any. However, major capital projects that require new construction have the potential to result in substantial visual impacts during construction. Construction of such projects could take several months to several years.

As seen in **Figure 2.10-3**, proposed transportation projects overlap with approximately five miles of designated scenic highway and 47 miles of highway eligible for scenic designation. These projects would have potentially significant effects on the visual character of land adjacent to designated scenic highways or highways eligible for designation. As noted above, highway widenings could result in substantial changes to the visual resources, particularly those directly adjacent to a scenic highway and/or alter the view as seen from a scenic highway. As a result, this impact would be potentially significant (PS). Mitigation Measure 2.10 (a) is described under Impact 2.10-1 and Mitigation Measure 2.10(b) is described below.

Combined Effects

As discussed above, development and transportation projects both have the potential to produce significant impacts. However, even where they are not significant, impacts could aggregate to produce short-term and permanent potentially significant (PS) impacts on visual resources. Mitigation Measure 2.10 (a) is described under Impact 2.10-1 and Mitigation Measure 2.10(b) is described below.

Mitigation Measure

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.10(b) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Project sponsors and implementing agencies shall complete design studies for projects in designated or eligible State Scenic Highway corridors. Implementing agencies shall consider the "complete" highway system and design projects to minimize impacts on the quality of the views or visual experience that originally qualified the highway for scenic designation.
- Contouring the edges of major cut and fill slopes to provide a more natural looking finished profile that is appropriate to the surrounding context, using natural shapes, textures, colors, and scale to minimize contrasts between the project and surrounding areas.
- Complying with existing local regulations and policies that exceed or reasonably replace measures that protect visual resources where feasible based on project- and site-specific considerations

Implementation of Mitigation Measure 2.10(a) shall also be considered to reduce impacts on scenic highways.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would normally be less than significant with mitigation (LS-M). However, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases. Further, there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less-than-significant levels. For purposes of a conservative analysis, therefore, this impact remains significant and unavoidable (SU).

Impact

2.10-3 Implementation of the proposed Plan could affect visual resources by creating significant contrasts with the scale, form, line, color, and/or overall visual character of the existing community.

Impacts of Land Use Projects

Regional Effects

Development resulting from the proposed Plan could cause significant visual impacts by creating or increasing contrasts with the visual character of an existing community. At the regional scale, the greatest impacts will result from high density housing and high intensity commercial projects located within existing communities where the visual contrast between the project and existing conditions will be the most apparent. To the extent that projects resulting from the proposed Plan, in aggregate, would result in new development that results in a substantial increase in current densities and intensities within existing communities, these projects may contribute to the cumulative regional visual resources impact. In addition, development in the proposed Plan not identified as having a direct visual impact in the regional context may result in individually minor visual impacts locally. Collectively, these individually minor visual impacts may become significant over time. As a result, this impact remains potentially significant (PS). Mitigation Measure 2.10(c) is described below.

Localized Effects

Development resulting from the proposed Plan could cause significant localized visual impacts similar to those at the regional scale. Additionally, development could impact local visual resources by visually disrupting the local character of the built environment if new development intensity and densities are substantially higher than existing development. While local standards and design guidelines (discussed below) would ultimately be the primary tools in shaping neighborhood character, changes in density would also play an important role. **Table 2.10-5** shows the existing and anticipated future densities under the proposed Plan in the 10 PDAs with the largest overall change in density. Seven of the 10 are in the major urban centers of Oakland, San Francisco, and San José while downtown and transit centers in Berkeley, Redwood City, and Millbrae round out the top 10 list. The PDA with the highest overall anticipated household density in 2040 as well as the greatest increase in density from existing conditions is the San Francisco Transbay Terminal, which could rise from five to 128 households per acre over the time horizon of the proposed Plan.

TABLE 2.10-5: HOUSEHOLD DENSITY BY PRIORITY DEVELOPMENT AREA

Priority Development Area	*Density (Households per Acre)*		*Difference (2040 – 2010 Density)*
	2010	*2040*	
San Francisco: Transbay Terminal	5	128	124
Redwood City: Downtown	7	46	39
Berkeley: Downtown	23	59	37
Millbrae: Transit Station Area	4	40	36
San José: Greater Downtown	8	42	34
San José: Capitol Corridor Urban Villages	4	36	32
Oakland: Downtown & Jack London Square	20	48	28
South San Francisco: Downtown	13	40	27
San José: Stevens Creek TOD Corridor	12	38	25
San Francisco: Market & Octavia	44	69	25

Source: MTC, 2012; Dyett & Bhatia, 2013.

In PDAs where density is anticipated to increase substantially, new development—and in some cases, new *types* of development—will be required to accommodate growth. Since no two neighborhoods are exactly alike in terms of their existing development and development potential, it is impossible to say precisely how new development might change the character of existing neighborhoods. Local jurisdictions maintain land use and design control over all development projects and will be responsible for approving development plans. However, MTC and ABAG do have the ability to provide input into local designs through the PDA/Station Area planning process. For example, MTC has developed a Station Area Planning Manual that includes principles—such as street-level improvements and pedestrian connectivity—meant to inform the development of station areas and PDAs and minimize community interruption.[6] The Manual provides character profiles of place types that consider numerous physical factors—including but not limited to predominant transit mode, land use, population density, employment intensity, housing type, height, and bulk—in an effort to affect neighborhood change that is compatible with existing community fabric.

While local jurisdictions are not required to utilize the Manual, many will receive MTC funds for their PDA and Station Area planning efforts, and as a result, MTC and ABAG will be able to offer guidance to ensure compatibility with appropriate design principles described in the Manual. Further, local jurisdictions have zoning in place that will ensure development conforms to local standards, and many have design guidelines that would ensure that new development not only meets local standards, but is consistent with and contributes to local character and quality. These policies will help ensure that new development, even where overall densities change, would not adversely impact local character.

Local land use agencies are ultimately responsible for the approval of the forecast urban development that contributes to this impact. These agencies are accountable to their communities to apply development standards and guidelines to maintain compatibility with existing communities, including site coverage, building height and massing, building materials and color, landscaping, site grading, etc., in

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[6] MTC, *Station Area Planning Manual*, 2007.

visually sensitive areas. Most city and county general plans include policies, such as zoning and/or design guidelines, which ensure new development is visually compatible with the natural and built environments. However, some new development may be out of character with existing communities. Therefore, this impact is considered potentially significant (PS). Mitigation Measure 2.10 (a) is described under Impact 2.10-1 and Mitigation Measure 2.10(c) is described below.

Impacts of Transportation Projects

The majority of the 700 transportation projects in the proposed Plan would have no impact on visual resources. These projects include operations, maintenance, minor rehabilitation, signal and signage improvements, and local arterial projects, for example. However, 160 transportation projects have been identified in the proposed Plan that could result in potentially significant visual impacts in the region. As seen in **Figure 2.10-3**, these major projects span all nine Bay Area counties, but are especially clustered in Santa Clara County around the densely populated areas of Santa Clara, Downtown San José, and Milpitas; in central and western Alameda County; and in San Francisco. These new projects could potentially impact the character of an existing community, although, in general, impacts from transportation projects would not be expected to have a substantial adverse impact due to the nature of the work, as described above, or because most proposed projects will take place in existing rights-of-way. However, some transportation projects in the proposed Plan that expand or extend existing rights-of-way could impact community character by increasing visual contrast in the community and therefore would constitute a potentially significant impact (PS). Mitigation Measure 2.10 (a) is described under Impact 2.10-1 Mitigation Measure 2.10(c) is described below.

Combined Effects

As discussed above, development and transportation projects both have the potential to produce significant impacts. However, even where they are not significant, impacts could aggregate to produce potentially significant (PS) permanent impacts on visual resources. Mitigation Measure 2.10 (a) is described under Impact 2.10-1 Mitigation Measure 2.10(c) is described below.

Mitigation Measure

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.10(c) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Designing projects to minimize contrasts in scale and massing between the project and surrounding natural forms and development.
- Requiring that the scale, massing, and design of new development provide appropriate transitions in building height, bulk, and architectural style that are sensitive to the physical and visual character of surrounding areas.
- Contouring the edges of major cut and fill slopes to provide a finished profile that is appropriate to the surrounding context, using shapes, textures, colors, and scale to minimize contrasts between the project and surrounding areas.

- Ensuring that new development in or adjacent to existing communities is compatible in scale and character with the surrounding area by:
  - Promoting a transition in scale and architecture character between new buildings and established neighborhoods; and
  - Requiring pedestrian circulation and vehicular routes to be well integrated.
- Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce visual contrasts.

Implementation of Mitigation Measure 2.10(a) shall also be considered to reduce impacts on visual resources created by significant contrasts in community visual character.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.10-4 Implementation of the proposed Plan could affect visual resources by adding a visual element of urban character to an existing rural or open space area or adding a modern element to a historic area.

Impacts of Land Use Projects

Development resulting from the proposed Plan could cause significant visual impacts by adding a visual element of urban character to an existing rural or open space area or adding a modern element to a historic area. The greatest impacts at the regional scale will result from high density housing and high intensity commercial projects located in low density, rural, or historic areas, where the visual contrast between the project and existing conditions will be the most apparent. In general, the proposed Plan focuses most new development within existing urban communities on infill sites where there would be less visual contrast with the immediate surroundings as compared to rural areas. However, as noted in **Table 2.10-3**, approximately 7,500 acres of non-urbanized land will be converted to urbanized land as a result of the proposed Plan and to the extent that land use projects, in aggregate, would result in new development adjacent to significant landscapes, these projects may contribute to the cumulative regional visual resources impact. In addition, development in the proposed Plan not identified as having a direct visual impact in the regional context may result in individually minor visual impacts locally. Further, in areas with historic districts or a large number of historic structures, density changes could result in a substantial change in local character (as discussed in Impact 2.10-3) or the introduction of a modern element to a historic area. While many local ordinances protect historic resources, these ordinances would not in all cases reduce potential impacts from adding a modern element to a historic area. Further discussion of impacts to historic resources is included in *Chapter 2.11: Cultural Resources*. Collectively, these individually minor visual impacts may become significant over time. As a result, this impact would be potentially significant (PS). Mitigation Measure 2.10(c) is described under Impact 2.10-3, and Mitigation Measure 2.10(d) is described below.

Impacts of Transportation Projects

The majority of the 700 transportation projects within the proposed Plan would have no impact on visual resources. These projects include operations, maintenance, minor rehabilitation, signal and signage improvements, and local arterial projects, for example. However, 160 transportation projects have been identified in the proposed Plan that could result in potentially significant visual impacts in the region. As seen in **Figure 2.10-3**, these major projects span all nine Bay Area counties, but are especially clustered in Santa Clara County around the densely populated areas of Santa Clara, Downtown San José, and Milpitas; in central and western Alameda County; and in San Francisco. These new projects could potentially impact the character of a historic district or neighborhood, although, in general, impacts from transportation projects would not be expected to have a substantial adverse impact in urbanized areas due to the nature of the work, as described above, or because most proposed projects will take place in existing rights-of-way. Furthermore, many local projects seek to improve streetscape quality and usability at the local level. However, a few of the transportation projects in the proposed Plan would introduce new roadways in rural, open space, or historic areas, which would constitute a significant impact.

Soundwalls are used to reduce noise levels in residential areas surrounding transportation infrastructure, usually high-speed or high-volume segments of roadways. Two major soundwall projects in the proposed Plan are to mitigate noise impacts of freeways and highway expansion projects that would affect the visual character of the streetscapes, highway, and freeway corridors where these soundwalls are constructed. Soundwalls reduce visual interest and sense of place, while also limiting views and sunlight from adjoining areas. In general, architectural relief, landscaping, and visual screening, which are now customary requirements for new soundwall programs, would soften the contrasts associated with soundwalls. Nonetheless, views into and out of affected neighborhoods would likely be blocked. Because the full scope of these programs has not yet been established, the extent of blocked views is unknown. Since there is only one proposed soundwall project in a rural area, however, it is expected that this impact can be reduced or avoided with appropriate mitigation. Still, sound walls could result in long-term visual impacts and, as a result, this impact remains potentially significant (PS). Mitigation Measure 2.10(c) is described under Impact 2.10-3, and Mitigation Measure 2.10(d) is described below.

Combined Effects

As discussed above, development and transportation projects both have the potential to produce significant impacts. However, even where they are not significant, impacts could aggregate to produce potentially significant (PS) permanent impacts to visual resources. Mitigation Measure 2.10(c) is described under Impact 2.10-3, and Mitigation Measure 2.10(d) is described below.

Mitigation Measure

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

In addition to Mitigation Measure 2.10(c), the following measure would apply to impacts on visual resources in rural or historic areas.

2.10(d) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Ensuring that new development in or adjacent to rural or historic areas is compatible in scale and character with the surrounding area by:
  - Promoting a transition in scale and architecture character between new buildings and established neighborhoods; and
  - Requiring pedestrian circulation and vehicular routes to be well integrated.
- Using soundwall construction and design methods that account for visual impacts as follows:
  - Use transparent panels to preserve views where soundwalls would block views from residences.
  - Use landscaped earth berm or a combination wall and berm to minimize the apparent soundwall height.
  - Construct soundwalls of materials whose color and texture complements the surrounding landscape and development.
  - Design soundwalls to increase visual interest, reduce apparent height, and be visually compatible with the surrounding area.
  - Landscape the soundwalls with plants that screen the soundwall, preferably with either native vegetation or landscaping that complements the dominant landscaping of surrounding areas.
- Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce visual impacts on rural and historic areas.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.10-5 Implementation of the proposed Plan could adversely affect visual resources by creating new substantial sources of light and glare.

Impacts of Land Use Projects

Regional Effects

Development resulting from the proposed Plan could create new substantial sources of light and glare at the regional scale that cause a public hazard, disrupt scenic vistas, and brighten the night sky. In portions of the region with significant existing development, increases would not cause a new public hazard or substantially degrade the visual character or quality of the area because existing sources of glare and light are already a dominant feature of the landscape. Thus, in urbanized areas,[7] this impact is less than significant (LS). In less developed areas of the region, where existing sources of light and glare are not as prevalent, the impact of new sources would be potentially significant (PS). Mitigation Measure 2.10(e) for rural areas is described below.

Localized Effects

Development projects resulting from the proposed Plan could create new substantial sources of light and glare at the local scale similar to those at the regional scale. In addition, the introduction of new sources of light and glare could impact local visual resources by altering the local character of the built environment. High density residential and high intensity commercial development, in particular, could have potentially significant (PS) light and glare impacts at the local level. Overall, local impacts are less than significant (LS) in urbanized areas and potentially significant (PS) in rural areas. Mitigation Measure 2.10(e) for rural areas is described below.

Impacts of Transportation Projects

It is not anticipated that transportation projects will significantly increase the amount of light and glare at the regional or local level, as most improvements will take place on existing facilities that have existing sources of light and glare (see **Figure 2.10-3**), although the limited number of new proposed roadways in rural areas could introduce a new source of light and glare. The marginal increases in light and glare from additional vehicle headlights, new reflective signage, new streetlights, new intersection control devices, and other improvements are considered less than significant. In most cases, new transportation projects will be aligned with planned development projects, and existing facilities, which will help to reduce aesthetic impacts; however, several transportation projects in rural areas could introduce light and glare to areas where no sources existed previously, which would constitute a potentially significant impact (PS). Impacts in urbanized areas would be less than significant (LS). Mitigation Measure 2.10(e) is described below.

Combined Effects

As discussed above, development and transportation projects both have the potential to produce significant impacts, primarily in rural areas. Even where they are not significant, impacts could aggregate to produce potentially significant (PS) light and glare-related impacts. Mitigation Measure 2.10(e) is described below.

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[7] "Urbanized area" is defined in CEQA Guidelines, Section 15387. "Urbanized area" means a central city or a group of contiguous cities with a population of 50,000 or more, together with adjacent densely populated areas having a population density of at least 1,000 persons per square mile.

Mitigation Measure

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.10(e) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Designing projects to minimize light and glare from lights, buildings, and roadways facilities.
- Minimizing and controlling glare from transportation projects through the adoption of project design features that reduce glare. These features include:
  - Planting trees along transportation corridors to reduce glare from the sun;
  - Landscaping off-street parking areas, loading areas, and service areas; and
  - Shielding transportation lighting fixtures to minimize off-site light trespass.
- Minimizing and controlling glare from land use and transportation projects through the adoption of project design features that reduce glare. These features include:
  - Limiting the use of reflective materials, such as metal;
  - Using non-reflective material, such as paint, vegetative screening, matte finish coatings, and masonry;
  - Screening parking areas by using vegetation or trees; and
  - Using low-reflective glass.
- Imposing lighting standards that ensure that minimum safety and security needs are addressed and minimize light trespass and glare associated with land use development. These standards include the following:
  - Minimizing incidental spillover of light onto adjacent private properties and undeveloped open space;
  - Directing luminaries away from habitat and open space areas adjacent to the project site;
  - Installing luminaries that provide good color rendering and natural light qualities; and
  - Minimizing the potential for back scatter into the nighttime sky and for incidental spillover of light onto adjacent private properties and undeveloped open space.
- Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce light and glare impacts.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.10-6 Implementation of the proposed Plan could cast a substantial shadow in such a way as to cause a public hazard or substantially degrade the existing visual/aesthetic character or quality of a public place for a sustained period of time.

Impacts of Land Use Projects

Shadows are by nature location-specific, and as such, shadows resulting from the proposed Plan would occur at the local level. Therefore, regional effects are not addressed separately. Development resulting from the proposed Plan could cast shadows in such a way as to cause a public hazard or substantially degrade the existing visual/aesthetic character or quality of a public place for a sustained period of time. It is noted that the casting of shadows on private property is not considered an impact and, as such, this analysis focuses on impacts to public spaces. In general, shadows are greatest in existing urbanized areas with high densities because structures there tend to be close together and contain multiple stories. Where shadow impacts are likely, they are typically addressed through local regulations. The impact of shadows on public space is likely to increase where household density and commercial intensity increase substantially. Existing urban centers are likely to experience the greatest impact from shadows as a result of the proposed Plan since the majority of new growth is focused in PDAs, although impacts should be marginal since much of the new development will be on infill sites. In rural and suburban areas where densities will remain relatively low and most development will be in the form of low-rise structures, shadow impacts on public spaces are not anticipated to be substantial. Overall, impacts from shadow are less than significant (LS) where they would not substantially degrade the existing visual/aesthetic character or quality of a public place. However, where shadows would potentially affect the quality of a public space, the impact is potentially significant (PS). Mitigation Measure 2.10(f) is described below.

Impacts of Transportation Projects

The proposed Plan includes new overpasses, bridges, or other freeway improvements that could introduce shadows in both urban and rural areas that create a public hazard or degrade the visual character of a site. However, it is not anticipated that the majority of transportation projects will significantly increase the amount of shadow at the regional or local level, as most improvements will take place on existing facilities where shadows may already be present. Overall, impacts from shadow are less than significant (LS) where they would not substantially degrade the existing visual/aesthetic character or quality of a public place. However, where shadows would potentially affect the quality of a public space, the impact is potentially significant (PS). Mitigation Measure 2.10(f) is described below.

Combined Effects

As discussed above, land use and transportation projects could have significant shadow impacts on public spaces, particularly in urban areas. Overall, impacts from shadow are less than significant unless (LS) where they would not substantially degrade the existing visual/aesthetic character or quality of a public place. However, where shadows would affect the quality of a public space, the impact is potentially significant (PS). Mitigation Measure 2.10(f) is described below.

Mitigation Measure

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.10(f) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Implementing agencies shall require project sponsors to conduct shadow studies for buildings and roadway facilities to identify and implement development strategies for reducing the impact of shadows on public open space. Study considerations shall include, but are not limited to, the placement, massing, and height of structures, surrounding land uses, time of day and seasonal variation, and reflectivity of materials. Study recommendations for reducing shadow impacts shall be incorporated into the project design as feasible based on project- and site-specific considerations. Further, implementing agencies shall require project sponsors to comply with existing local regulations and policies that exceed or reasonably replace the above measure that reduces shadow impacts where feasible based on project- and site-specific considerations.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

2.11 Cultural Resources

Cultural resources in the Bay Area reflect centuries of human settlement in the region and document the changing character of economic, social, and spiritual activities. There are several kinds of cultural resources in the Bay Area, including historic buildings and bridges, prehistoric archaeological sites, Native American sacred sites, native plants with important cultural significance to local tribes, as well as sensitive locations where resources are likely to be identified in the future, based on our existing knowledge of historic and prehistoric settlement patterns.

This chapter evaluates the potential cultural resource impacts resulting from the implementation of the proposed Plan. Cultural resources are the material remains identified with either the prehistoric inhabitants of the area (any time prior to the arrival of the Spanish in the latter half of the 18th century) or with the historic inhabitants. The historic period begins with the arrival of the Spanish and continues up to 45 years ago, a definition that is recognized under both CEQA and NEPA guidelines. While there are procedural differences between the State and federal guidelines, both establish the conditions under which a particular resource is determined to be significant and require mitigation as part of a proposed plan or project.

Environmental Setting

PHYSICAL SETTING

This section summarizes both historic and prehistoric resources and identifies the types of geographic areas within the Planning Area that may contain cultural resources.

Prehistoric Resources

Prehistoric cultural resources are composed of Native American structures or sites of historical or archaeological interest. These may include districts, buildings, objects, landscape elements, sites, or features that reflect human occupations of the region, such as villages and burial grounds.

The moderate climate, combined with the abundant natural resources found throughout the nine-county region, has supported human habitation for several thousand years Before Present (BP). Some theories suggest that the prehistoric bay and river margins were inhabited as early as 10,000 years ago.[1] Rising sea levels, the formation of the San Francisco Bay, and the resulting filling of inland valleys have covered

[1] EIP Associates, Rainier Avenue Cross Town Connector and U.S. 101 Interchange Project DEIR, prepared for the City of Petaluma, July 1993.

these early sites, which were most likely located along the then existing bay shore and waterways. Existing evidence indicates the presence of many village sites from at least 5,000 years BP in the region. The arrival of Native Americans into the Bay Area is associated with documented cultural resources from circa 5,500 BP.[2]

Six different groups of Native population, identified by their language, lived within the Bay Area, including Costanoan, Eastern Miwok, Patwin, Coast Miwok, Pomo and Wappo. These Native populations periodically increased between 5,000 BP and the arrival of the Spanish in the late 18th century. Native villages and campsites were inhabited on a temporary basis and are found in several ecological niches due to the seasonal nature of their subsistence base.

By the end of the first millennium A.D., population densities had grown to the point where less favorable environmental settings were being used for habitation. Traditional tribal territorial boundaries thus usually overlap; this is particularly the case in the South Bay. Groups competed for hunting grounds, seed and acorn gathering areas, and other areas necessary to a hunting-and-gathering culture. Remains of these early peoples indicate that main villages, seldom more than 1,000 residents, were usually established along water courses and drainages. Remains of satellite villages have been found in areas used for the procurement of food or other resources. By the late 1760s, about 300,000 Native Americans lived in California.[3]

Historic Resources

Historic resources are standing structures of historic or aesthetic significance. Architectural sites dating from the Spanish Period (1529–1822) through the late 1960s are generally considered for protection if they are determined to be historically or architecturally significant. These may include missions, historic ranch lands, and structures from the Gold Rush and the region's early industrial era. Post-Depression sites may also be considered for protection if they could gain historic significance in the future. Historic resources are often associated with archaeological deposits of the same age.

The arrival of the Spanish and the development of the mission system in the latter half of the 18th century permanently disrupted the indigenous societies flourishing in the area. Native American settlements were abandoned and replaced with agricultural land, housing, and military support for the missions. The San Francisco Mission (Mission San Francisco de Asisi or Mission Dolores) and the Presidio (Yerba Buena) were founded in 1776. Both the Mission Santa Clara and the Pueblo de San José de Guadalupe were founded in 1777 in Santa Clara County.

After the Mexican revolt against Spain in 1822, California lands came under Mexican rule, and large tracts of land, including the former missions, were granted to individual owners. It was during the Mexican era that most of the historic ranch lands and associated living quarters and operational structures originate.

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2 U.S. Dept. of Interior, Minerals Management Service, Pacific OCS Region. *California, Oregon, and Washington Archaeological Resource Study*, November 1990.

3 San Francisco Estuary Partnership, Land Use and Population Fact Sheet, www.sfestuary.org/userfiles/ddocs/Land_Use-Population.pdf, accessed August 2012.

Mexico ceded control of California to the United States at the end of the Mexican-American War (1846–1848), and the discovery of gold in the late 1840s brought thousands of prospectors and settlers into California. The Bay Area became the gateway to the gold of the Sierra Nevada, with rapid growth occurring in several of the region's fledgling cities, focusing in San Francisco as a shipping and financial center. Today the structures and sites from this Gold Rush period are often considered to be of historic significance.

An era of increased agricultural production followed the Gold Rush, with much of the region's inland valley natural grasslands plowed for wheat, orchard, and vegetable cultivation. Construction of levees in the Sacramento/San Joaquin delta reclaimed wetland areas for field crops and orchards, and lumbering, begun during the gold rush to supply mining operations, continued to supply a growing population. The completion of the intercontinental railroad in San Francisco in 1888 assured the Bay Area's continued prominence as an economic and population center for the West in general and for California.

In the early 1900s, the Bay Area's economic base continued to grow and diversify, with a maritime industry developing around the Bay and manufacturing, trade, and the lumber industry aiding in the growth and development of the region. Urban areas continued to grow in accordance with transportation corridors. The rail lines of the early 1900s supported new development along their routes, with residential and commercial centers at their stops. The arrival of the automobile and roadway construction allowed population and economic centers to develop in more dispersed patterns throughout the region. Cultural resources from this manufacturing era include sites and structures associated with industrial development (i.e., railroad and maritime industries) and with prominent citizens of the time.

Recorded Regional Resources

The interpretations and designations of archaeological resources in the Bay Area are documented at the Northwest Information Center (NWIC) at Sonoma State University. This information reflects the presence of known archaeological sites; known geological, soil, biological, hydrological, and topographical features; and the experience of archaeologists familiar with the field occurrences of such resources in the Bay Area.

As shown in **Table 2.11-1**, approximately 8,118 pre-historic and historic cultural sites have been recorded in the Bay Area and are listed with the California Historical Resources Information System (CHRIS), maintained at the NWIC. If one counts all historic and prehistoric recorded sites, buildings, and structures with and without trinomial numbers assigned, there are over 33,000 such sites, buildings, and structures in the Bay Area.

Of the 8,118 sites recorded in the nine-county Bay Area, there are currently 1,006 cultural resources listed on the California Register of Historic Resources, meaning that they are significant at the local, State, or national level as specified under a set of established criteria (see details in Regulatory Setting below); of those, 744 are also listed on the National Register of Historic Places. From this list, 249 resources are listed as California Historic Landmarks. Completed only once in 1976, the California Inventory of Historic Resources documents a total of about 818 historic buildings, sites, or objects and 2,340 archaeological sites. No comprehensive Bay Area historic or archaeological surveys have been conducted more recently. The greatest concentration of listed historic resources in the Bay Area occurs in San Francisco, with 181 sites on the National and California registers. Alameda County has the second highest number of Register-listed historic resources, at 147.

TABLE 2.11-1: RECORDED ARCHAEOLOGICAL AND HISTORICAL SITES IN THE BAY AREA

	County								
Source of Record	*Alameda*	*Contra Costa*	*Marin*	*Napa*	*San Francisco*	*San Mateo*	*Santa Clara*	*Solano*	*Sonoma*
Recorded Prehistoric and Historic Sites[1]	514	842	809	1,166	140	403	925	352	2,967
Total Recorded Resources (including buildings)[2]	11,242	3,060	2,775	1,517	4,873	2,252	2,599	747	4,304
Individually Listed Resources on the National Register of Historic Places ***and*** the California Register of Historic Resources[3]	147 BSO 0 AS	39 BSO 0 AS	41 BSO 5 AS	78 BSO 0 AS	181 BSO 5 AS	51 BSO 1 AS	104 BSO 2 AS	22 BSO 0 AS	64 BSO 4 AS
Individually Listed Resources ***Only*** on the California Register of Historic Resources	302 BSO 12 AS	18 BSO 41 AS	25 BSO 4 AS	18 BSO 11 AS	242 BSO 2 AS	32 BSO 0 AS	121 BSO 31 AS	66 BSO 5 AS	59 BSO 17 AS
California Historical Landmarks[4]	37	15	14	17	48	34	43	14	27
California Inventory (1976)[5]	221 BSO 344 AS	108 BSO 352 AS	30 BSO 413 AS	31 BSO 328 AS	141 BSO 26 AS	75 BSO 152 AS	149 BSO 61 AS	30 BSO 264 AS	33 BSO 400 AS
Historic Bridges Listed on the Caltrans Local Bridge Survey[6]	175	187	123	93	78	120	239	115	223

Abbreviations: BSO (Building, Site, or Object); AS (Archaeological Site).

Notes:

1. Northwest Information Center Database, August 2012.
2. Northwest Information Center Database, August 2012; number of all recorded sites including prehistoric and historic archaeological sites with and without trinomials, as well as recorded historic-period buildings and structures.
3. State Office of Historic Preservation's Quarterly Historic Property Directory, April 2012. Not included here are resources that have been listed as *contributors to* an Archaeological or Historic District, or resources that have been determined to be *eligible* for listing on the National Register or the California Register of Historical Resources.
4. State Office of Historic Preservation's Quarterly Historic Property Directory, August 2012. BSO and AS are reported together.
5. Listings on the California Inventory of Historic Resources. Please note this inventory was done one time in 1976.
6. Caltrans Local Bridge Survey, Update 2005, computer database, query only pre-1960 bridges. Please note, a previous "Category 3" used to compile prior RTP EIR listings no longer exists in this survey, with the result that this update may show lower totals compared to previous surveys reported in other EIRs.

Source: Northwest Information Center, Sonoma State University, 2012.

It is noted that the overall number of pre-historic and historic recorded cultural sites has decreased since the Transportation 2035 Plan was adopted in 2008. However, according to NWIC, this is not a result of cultural resources having been destroyed, but rather due to the fact that NWIC's system for assigning resource identification numbers has changed. As a result, certain resources may have been grouped inappropriately in the past, thus leading to over-counting.[4]

Locations of Sensitivity

Dense concentrations of Native American archaeological sites occur along the historic margins of San Francisco and San Pablo Bays. In addition, archaeological sites have also been identified in the following environmental settings in all Bay Area counties: near sources of water, such as vernal pools and springs; along ridgetops and on midslope terraces; and at the base of hills and on alluvial flats.

Native American archaeological sites have also been identified in the inland valleys of all Bay Area counties. Remains associated with a Native American archaeological site may include chert or obsidian flakes, projective points, mortars and pestles, and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials.

Dense concentrations of historic resources are often found in large urban areas and smaller cities that experienced growth and development during the historic period. Historic resources are also found in rural settings where homesteads, ranches, or farms were once present. Historic remains may include stone or adobe foundations or walls, structures and remains with square nails, and refuse deposits often in old wells and privies.

REGULATORY SETTING

Federal Regulations

The National Historic Preservation Act

The National Historic Preservation Act (NHPA) is the most prominent federal law dealing with historic preservation. The NHPA established guidelines to "preserve important historic, cultural, and natural aspects of our national heritage, and to maintain, wherever possible, an environment that supports diversity and a variety of individual choice." The NHPA includes regulations specifically for federal land-holding agencies, but also includes regulations (Section 106) which pertain to all projects that are funded, permitted, or approved by any federal agency and which have the potential to affect cultural resources. All projects that are subject to the National Environmental Policy Act (NEPA) are also subject to compliance with Section 106 of the NHPA. Furthermore, all projects that are carried out by Caltrans are also subject to Section 106. At the federal level, the Office of Historic Preservation (OHP) carries out reviews under Section 106 of the NHPA.

National Register of Historic Places

Additionally, the NHPA authorizes the Secretary of the Interior to establish a National Register of Historic Places (National Register), an inventory of districts, sites, buildings, structures, and objects significant on a national, state, or local level in American history, architecture, archeology, engineering,

[4] Much, Bryan. Northwest Information Center, email correspondence, 28 August 2012.

and culture. The National Register is maintained by the National Park Service, the Advisory Council on Historic Preservation, State Historic Preservation Office, and grants-in-aid programs.

State Regulations

Office of Historic Preservation

The mission of the Office of Historic Preservation (OHP) and the State Historical Resources Commission (SHRC) is to preserve and enhance California's irreplaceable historic heritage as a matter of public interest so that its vital legacy of cultural, educational, recreational, aesthetic, economic, social, and environmental benefits will be maintained and enriched for present and future generations.[5] California Public Resources Code 5024 requires consultation with the State Historic Preservation Officer (SHPO) when a project may impact historical resources located on State-owned land.

California Register of Historic Resources

The SHPO also maintains the California Register of Historic Resources (California Register). Historic properties listed, or formally designated for eligibility to be listed, on the National Register are automatically listed on the California Register (PRC Section 5024.1). State Landmarks and Points of Interest are also automatically listed. The California Register can also include properties designated under local preservation ordinances or identified through local historic resource surveys.

For a historic resource to be eligible for listing on the California Register, it must be significant at the local, State, or national level under one or more of the following four criteria:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;
2. It is associated with the lives of persons important to local, California, or national history;
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or
4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation (California Public Resources Code).

California Historical Resources Information System

The CHRIS is a statewide system for managing information on the full range of historical resources identified in California. CHRIS is a cooperative partnership between the citizens of California, historic preservation professionals, twelve Information Centers, and various agencies. This system bears the following responsibilities: integrate newly recorded sites and information on known resources into the California Historical Resources Inventory; furnish information on known resources and surveys to governments, institutions, and individuals who have a justifiable need to know; and supply a list of consultants who are qualified to do work within their area.

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[5] Office of Historic Preservation website: http://ohp.parks.ca.gov/?page_id=1066

California Environmental Quality Act

21083.2: Archaeological Resources

CEQA directs the lead agency on any project undertaken, assisted, or permitted by the State to include in its environmental impact report for the project a determination of the project's effect on unique archeological resources. Public Resources Code section 21083.2 defines unique archeological resource; enables a lead agency to require an applicant to make reasonable effort to preserve or mitigate impacts to any affected unique archeological resource; sets requirements for the applicant to provide payment to cover costs of mitigation; and restricts excavation as a mitigation measure.

21084.1: Historic Resources

CEQA establishes that an adverse effect on an historical resource qualifies as a significant effect on the environment; and defines historical resource.

CEQA Guidelines

Resource Significance

Section 15064.5 of CEQA guidelines defines three ways that a property can qualify as a significant historical resource for the purposes of CEQA review:

1. If the resource is listed in or determined eligible for listing in the California Register of Historical Resources (CRHR);
2. If the resource is included in a local register of historical resources, as defined in section 5020.1(k) of the Public Resources Code, or is identified as significant in a historical resource survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless a preponderance of evidence demonstrates that it is not historically or culturally significant; or
3. If the lead agency determines the resource to be significant as supported by substantial evidence (California Code of Regulations, Title 14, Division 6, Chapter 3, section 15064.5).

In addition to determining the significance and eligibility of any identified historical resource under CEQA and the California Register, historic properties must be evaluated under the criteria for the National Register should federal funding or permitting become involved in any undertaking subject to this document.

Mitigation of Cultural Resources Impacts

CEQA Guidelines Section 15126.4 states that "public agencies should, whenever feasible, seek to avoid damaging effects on any historical resources of an archaeological nature." The Guidelines further state that preservation-in-place is the preferred approach to mitigate archaeological resource impacts. However, according to Section 15126.4, if data recovery through excavation is "the only feasible mitigation," then a "data recovery plan, which makes provision for adequately recovering the scientifically consequential information from and about the historical resources, shall be prepared and adopted prior to any excavation being undertaken." Data recovery is *not* required for a resource of an archaeological nature if "the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource." The section further states that its provisions apply to those archaeological resources that also qualify as historic resources.

Paleontological Resources

Paleontological resources are afforded protection by CEQA. Appendix G (Part V) of the CEQA Guidelines provides guidance relative to significant impacts on paleontological resources, stating that a project will normally result in a significant impact on the environment if it will "directly or indirectly destroy a unique paleontological resource or site or unique geological feature." Section 5097.5 of the Public Resources Code specifies that any unauthorized removal of paleontological remains is a misdemeanor. Further, the California Penal Code Section 622.5 sets the penalties for the damage or removal of paleontological resources.

Native American Heritage Act

The Native American Heritage Act (NAHA) of 1976 established the Native American Heritage Commission (NAHC) and protects Native American religious values on State property (see California Public Resources Code 5097.9).

Public Notice to California Native American Indian Tribes

Government Code, Section 65092 includes California Native American tribes that are on the contact list maintained by the Native American Heritage Commission in the definition of "person" to whom notice of public hearings shall be sent by local governments.

Tribal Consultation Guidelines

Passed in 2004, Senate Bill (SB) 18 (Burton, D-San Francisco), now Government Code Section 65351 and 65352, establishes a procedure to help tribes and jurisdictions define tribal cultural resources and sacred areas more clearly and incorporate protection of these places earlier into local general plan and specific plan processes. The SB 18 process mirrors the federal 106 review process used by archaeologists as part of the environmental review conducted under NEPA (36 CFR Part 800.16) While not a component of CEQA review per se, the lead agency is required to request consultation with responsible and trustee agencies, such as NAHC and neighboring tribes, during the initial study and EIR process (PRC 21080.3, 21080.4). Tribal consultation conducted for this EIR is described in the Impact Analysis, under Method of Analysis.

Disposition of Human Remains

Health and Safety Code Section 7050.5 states that when an initial study identifies the existence, or the probable likelihood, of Native American human remains within the project, a lead agency shall work with the appropriate Native Americans as identified by the NAHC as provided in Public Resources Code 5097.98. The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains and any items associated with Native American burials. Furthermore, Section 7050.5 of the California Health and Safety Code requires that construction or excavation be stopped in the vicinity of discovered human remains until the county coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the NAHC.

Native American Graves Protection and Repatriation Act

Health and Safety Code Section 8010-8011 establishes a State repatriation policy intent that is consistent with and facilitates implementation of the federal Native American Graves Protection and Repatriation Act. The Act strives to ensure that all California Indian human remains and cultural items are treated with dignity and respect. It encourages voluntary disclosure and return of remains and cultural items by publicly funded agencies and museums in California. It also states the intent for the State to provide mechanisms for aiding California Indian tribes, including non-federally recognized tribes, in filing repatriation claims and getting responses to those claims.

Local Regulations

Historic Preservation Ordinances

In addition to national and State historic preservation legislation, many Bay Area counties and cities have adopted optional historic preservation general plan elements[6] or enacted local ordinances that recognize and preserve historic sites. At least 19 Bay Area cities participate in the Certified Local Government Program (CLG) through the OHP. The CLG program is a partnership among local governments, the OHP, and the National Park Service (NPS), which is responsible for administering the National Historic Preservation Program. Participating cities include: Alameda, Benicia, Berkeley, Campbell, Danville, Los Altos, Los Gatos, Napa, Oakland, Palo Alto, Redwood City, Richmond, San Francisco, San José, Santa Clara, Saratoga, Sausalito, Sunnyvale, and Vallejo.

Impact Analysis

SIGNIFICANCE CRITERIA

Implementation of the proposed Plan would have a potentially significant adverse impact on cultural resources in the Bay Area if it would:

Criterion 1: Cause a substantial adverse change in the significance of a historic resource, defined as physical demolition, destruction, relocation or alteration of the resource or its immediate surroundings such that the significance of the historic resource would be materially impaired (Guidelines Section 15064.5).

Criterion 2: Cause a substantial adverse change in the significance of a unique archaeological resource.

Criterion 3: Destroy, directly or indirectly, a unique paleontological resource or site or unique geologic feature.

Criterion 4: Disturb any human remains, including those interred outside of formal cemeteries.

METHOD OF ANALYSIS

The cultural resources analysis identifies the potential impacts of the transportation and land use program on archaeological, historical, and other cultural resources within the Bay Area based on anticipated changes to the existing condition. The analysis focuses on where land use changes are most evident (e.g.,

[6] For a complete list of California communities with optional historic preservation general plan elements, the State Office of Planning and Research maintains and updates an annual Book of Lists: www.opr.ca.gov/s_publications.php

non-urbanized areas to experience urbanization), or where transportation improvements would require ground disturbing activities that may threaten known or unknown archaeological or Native American cultural artifacts.

The methodology related to assessment of land use development and transportation project-related impacts recognizes that important cultural resources may be encountered during ground-disturbing construction work on land use development and transportation projects under the proposed Plan that involve physical construction. It also recognizes that projects associated with the operation and maintenance of the transportation system, such as signalization, equipment replacement, and pavement maintenance, would not directly affect cultural resources. Since the specific locations of some cultural resources are not mapped, and since the extent of ground disturbance associated with various land use development and transportation projects under the proposed Plan is unknown at this time, it is not possible to assess specific cultural resource impacts based on the location of these projects. For the same reasons, the analysis does not distinguish between regulatory conditions for privately- and publicly-owned land. Accordingly, no project-specific reviews or field studies are undertaken for this program EIR. The analysis is based on a review of the type and location of projects listed in the proposed Plan, and their potential to disturb both known and unknown cultural resources. Additionally, land use analysis assesses in a generalized way potential impacts on historic resources in existing urban areas likely to experience change as a result of destruction of a historic resource or construction of incompatible, adjacent development.

The initial step in addressing cultural resources involved contacting the appropriate CHRIS Information Center to conduct a record search. The record search summarized numbers of previously recorded resources and studies within the study area, not all of which are eligible for listing on the California Register. As shown in **Table 2.11-1**, the California Register is a subset of the total number of recorded sites, due to the higher threshold of eligibility.

The Notice of Preparation (NOP) of this EIR was distributed to the federally recognized tribes in the Bay Area. In a letter in response to the NOP, the California Valley Miwok Tribe requested notification of projects proposed within Alameda, Alpine, Calaveras, Contra Costa; Fresno, Madera, Merced, San Joaquin, Solano, and Stanislaus County. A more detailed description of the scoping process is found in *Chapter 1.1: Introduction and Study Approach*, and a record of the scoping comments are in Appendix B.

In addition, MTC and ABAG, in partnership with Caltrans District 4, held two tribal consultation meetings, on June 9, 2011, and March 20, 2012, at the National Indian Justice Center to discuss the transportation investment strategy and the Proposed Plan land use distribution. A third tribal consultation meeting will take place while the Draft Plan Bay Area and Draft EIR documents are in their public review periods.

SUMMARY OF IMPACTS

While project-specific studies will be necessary to determine the actual potential for significant cultural resource impacts resulting from the implementation of new development and transportation improvements under the proposed Plan, some general impacts can be assumed based on the type and location of future development anticipated in the proposed Plan.

Implementation of the proposed Plan could result in both short-term and long-term impacts related to cultural resources due to disturbance of known and unknown resources, artifacts, burial grounds, etc. during project construction. All counties in the Bay Area have the potential to yield undiscovered resources and, since most of the Bay Area has not been systematically surveyed for cultural resources, it is not possible within the context of this EIR to determine what the direct impacts would be in specific project areas, given both the need for site-specific surveys and project-specific details.

In general, projects that include ground-disturbing activities, such as grading, road widening, and excavation, have the potential to impact archaeological and paleontological resources and human burials. These projects may also impact historic resources if buildings or landmark structures are disturbed. Projects that include the introduction of new visual elements, such as new structures or highway segments, or involve visual alterations, have the potential to indirectly impact historic architectural resources by creating visual incompatibility in the surrounding environment. If these projects involve ground-disturbance, impacts on archaeological sites may also occur. Transportation projects that are limited to new or altered services but do not include ground-disturbing activities and do not include significant visual changes are unlikely to cause cultural resource impacts.

IMPACTS AND MITIGATION MEASURES

Impact

2.11-1 The proposed Plan could have the potential to cause a substantial adverse change in the significance of a historic resource such that the significance of the resource would be materially impaired.

Impacts of Land Use and Transportation Projects

The effects of development and transportation projects would be similar, and therefore the discussion of their impacts is combined below. Historic resources are by nature specific to their local context, and as such, impacts on these resources resulting from the proposed Plan would occur at the local level. Therefore, regional effects are not addressed separately as they are assumed to be the same.

Projects located in areas with known historical sites, or located in communities with established historic preservation programs, or involving activities that would introduce new visual elements or disturb the existing terrain have the potential to result in significant historic resource impacts. These projects could potentially reduce the aesthetic and physical integrity of historic districts and buildings. A higher incidence of conflict with historical sites is expected to occur in urban areas settled or developed more than 45 years ago. Projects located in or traversing rural lands could also have significant impacts related to sites that are singular examples of a historical setting or structures whose historic value and significance have not been previously evaluated and recognized.

Identification of the degree and extent of impact will depend upon project-specific analysis that includes a determination of the value—i.e., the eligibility for local, State, or national recognition—of any historic resource recognized within a proposed alignment or project area. However, given the magnitude and location of new development and transportation improvements involving construction activities in the proposed Plan, it is possible that significant impacts on historic resources could occur. Examples of potential impacts resulting from development or transportation projects include:

- Damage to or destruction of a structure or property that is a designated historic resource, eligible for listing as a historic resource, or as yet unrecognized historic resource.
- Infill development that is visually incompatible with a designated historic district.
- Roadway improvements that substantially alter the character of a designated historic structure or district.

Because proposed individual development projects have the potential to adversely affect historical resources on a regional and localized level, these impacts are considered potentially significant (PS). Mitigation measure 2.11(a) is described below.

Mitigation Measure

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.11(a) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Realign or redesign projects to avoid impacts on known historic resources where possible.
- Requiring an assessment by a qualified professional of structures greater than 45 years in age within the area of potential effect to determine their eligibility for recognition under State, federal, or local historic preservation criteria.
- When a project has been identified as potentially affecting a historic resource, a historical resources inventory should be conducted by a qualified architectural historian. The study should comply with CEQA Guidelines section 15064.5(b), and, if federal funding or permits are required, with section 106 of the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. § 470 et seq.). Study recommendations shall be implemented.
- If avoidance of a significant architectural/built environment resource is not feasible, additional mitigation options include, but are not limited to, specific design plans for historic districts, or plans for alteration or adaptive re-use of a historical resource that follows the Secretary of the Interior's *Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitation, Restoring, and Reconstructing Historic Buildings.*
- Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect historic resources.

Significance After Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.11-2 The proposed Plan could have the potential to cause a substantial adverse change in the significance of a unique archaeological resource.

Impacts of Land Use and Transportation Projects

Regional and Localized Effects

Archaeological artifacts are by nature specific to their local context, and as such, impacts on these resources resulting from the proposed Plan would occur at the local level. Therefore, regional effects are not addressed separately as they are assumed to be the same. New development and transportation improvements could result in archaeological impacts if construction activities include the disturbance of the native terrain. Projects involving excavation, grading or soil removal in previously undisturbed areas have the greatest likelihood to encounter significant archaeological resources. Likewise, the establishment of staging areas, temporary roads, and any other temporary facilities necessary for construction activities has the potential to impact these cultural resources.

Much of the developable flat land in the Bay Area has already been converted to urban use, so development opportunities include redevelopment of existing urban land as well as some hillside sites and rural land. Both rural land conversion and urban infill have the potential to disturb cultural resources, though impacts in rural areas are more likely. Development anticipated as part of the proposed Plan will convert approximately 7,500 acres from undeveloped to urbanized land over the course of the planning period. **Table 2.11-2** indicates that the proportion of total land in the region that will be developed for urban uses is only expected to increase from 17.8 to 17.9 percent.

TABLE 2.11-2: URBANIZED LAND BY COUNTY

County	*Land Acres*	*2010 Urban Footprint[1]*	*2010 Percent Urban Footprint*	*Increase in Urban Footprint[2]*	*2040 Percent Urban Footprint*
Alameda	470,867	146,069	31.0%	1,425	31.3%
Contra Costa	458,757	151,998	33.1%	1,979	33.6%
Marin	331,715	42,230	12.7%	311	12.8%
Napa	484,610	23,551	4.9%	162	4.9%
San Francisco	29,975	23,967	80.0%	187	80.6%
San Mateo	287,596	72,319	25.1%	643	25.4%
Santa Clara	826,500	191,402	23.2%	779	23.3%
Solano	528,208	59,436	11.3%	1,198	11.5%
Sonoma	1,009,967	75,210	7.4%	863	7.5%
Total	**4,428,195**	**786,182**	**17.8%**	**7,547**	**17.9%**

1. Data for San Francisco is from 2008.
2. Future urbanized footprint is based on modeled future development of over eight people per acre and/or 10 jobs per acre.

Note: numbers may not sum due to independent rounding.

Source: MTC, 2013; Urban and Built Up Land, Farmland Mapping and Monitoring Program, Department of Conservation; 2010 Census TIGER/Line Shapefiles.

Projects in locations of sensitivity, such as historic Bay margins, ridgetops, midslope terraces, hill bases, alluvial flats and inland valleys, are more likely to encounter cultural resources. Most transportation corridors follow valleys and drainage areas which often correspond with historic settlement patterns. Infill development and transportation projects involving improvements within existing urban areas, within existing transportation corridors, or to existing infrastructure or operations are less likely to impact archaeological resources since these projects are located in already-disturbed areas that may have been subject to previous cultural resource surveys.

The degree and extent of impacts will depend upon project locations. Project-specific analysis will be required to determine the precise area of impact and the value—i.e., the eligibility for local, State, or national recognition—of any archaeological resource identified within a proposed alignment or project area. Furthermore, all projects undertaken by Caltrans must abide by extensive procedures and policies, outlined in the *Caltrans Environmental Handbook, Volume 2*, which dictate the nature and extent of cultural resource protections consistent with federal law.

Because proposed individual development projects have the potential to adversely affect archaeological resources on a regional and localized level, these impacts are considered potentially significant (PS). Mitigation measure 2.11(b) is described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.11(b) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Pursuant to Government Code Sections 65351 and 65352, in-person consultation shall be conducted with Native American tribes and individuals with cultural affiliations where the project is proposed to determine the potential for, or existence of, cultural resources, including cemeteries and sacred places, prior to project design and implementation stages.
- Prior to construction activities, project sponsors shall retain a qualified archaeologist to conduct a record search at the appropriate Information Center of the California Archaeological Inventory to determine whether the project area has been previously surveyed and whether resources were identified. When recommended by the Information Center, project sponsors shall retain a qualified archaeologist to conduct archaeological surveys prior to construction activities.
- Preparation of a research design and testing plan should be developed in advance of implementation of the construction project, in order to efficiently facilitate the avoidance of cultural sites throughout the development process.
- If record searches and field surveys indicate that the project is located in an area rich with archaeological resources, project sponsors should retain a qualified archaeologist to monitor any subsurface operations, including but not limited to grading, excavation, trenching, or removal of existing features of the subject property.
- Written assessments should be prepared by a qualified tribal representative of sites or corridors with no identified cultural resources but which still have a moderate to high potential for containing tribal cultural resources.
- Upon "late discovery" of prehistoric archaeological resources during construction, project sponsors shall consult with the Native American tribe as well as with the "Most-Likely-Descendant" as designated by the Native American Heritage Commission pursuant to PRC 5097.
- Preservation in place is the preferred manner of mitigating impacts on archeological sites because it maintains the relationship between artifacts and the archeological context, and it may also avoid conflict with religious or cultural values of groups associated with the site. This may be achieved through incorporation within parks, green-space, or other open space by re-designing project using open space or undeveloped lands. This may also be achieved by following procedures for capping the site underneath a paved area. When avoiding and preserving in place are infeasible based on project- and site-specific considerations, a data recovery plan may be prepared according to CEQA Section 15126.4. A data recovery plan consists of: the documentation and removal of the archeological deposit from a project site in a manner consistent with professional (and regulatory) standards; the subsequent inventorying, cataloguing, analysis, identification, dating, and interpretation of the artifacts; and the production of a report of findings.

- Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect archaeological resources.

Significance After Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.11-3 The proposed Plan could have the potential to destroy, directly or indirectly, a unique paleontological resource or site or unique geologic feature.

Impacts of Land Use and Transportation Projects

Paleontological and geological resources are by nature specific to their local context, and as such, impacts on these resources resulting from the proposed Plan would occur at the local level. Therefore, regional effects are not addressed separately as they are assumed to be the same. In general, potential impacts on paleontological or geologic resources would be similar to those discussed for archaeological resource impacts under Impact 2.11-2. Projects involving excavation, grading or soil removal in previously undisturbed areas have the greatest likelihood to encounter these resources.

The degree and extent of impacts will depend upon project locations, and as such, project-specific analysis will be required to determine the precise area of impact and the value of any paleontological or geologic resource identified within a proposed alignment or project area. As noted under 2.11-2, all projects undertaken by Caltrans must abide by procedures and policies outlined in the *Caltrans Environmental Handbook, Volume 2*.

Because proposed individual development projects have the potential to adversely affect paleontological and geologic resources on a regional and localized level, these impacts are considered potentially significant (PS). Mitigation measure 2.11(c) is described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.11(c) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Prior to construction activities, project sponsors should retain a qualified paleontologist to conduct a record search using an appropriate database, such as the UC Berkeley Museum of Paleontology to determine whether the project area has been previously surveyed and whether resources were identified. As warranted, project sponsors should retain a qualified paleontologist to conduct paleontological surveys prior to construction activities.
- Preparation of a research design and testing plan should be developed in advance of implementation of the construction project, in order to efficiently facilitate the avoidance of cultural sites throughout the development process.
- If record searches and field surveys indicate that the project is located in an area rich with paleontological, and/or geological resources, project sponsors should retain a qualified paleontologist to monitor any subsurface operations, including but not limited to grading, excavation, trenching, or removal of existing features of the subject property.
- Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect paleontological or geologic resources.

Significance After Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.11-4 The proposed Plan could have the potential to disturb human remains, including those interred outside formal cemeteries.

Impacts of Land Use and Transportation Projects

Ground-disturbing effects of development and transportation projects would be similar, and therefore the discussion of their impacts is combined below. Impacts to human remains are by nature specific to their local context, and as such, impacts on these resources resulting from the proposed Plan would occur at the local level. Therefore, regional effects are not addressed separately as they are assumed to be the same. In general, potential impacts on human remains would be similar to those discussed for archaeological resource impacts discussed under Impact 2.11-2. New development and transportation improvements involving construction activities that would disturb native terrain, including excavation, grading, or soil removal, would have the greatest likelihood to encounter human remains. These impacts are considered potentially significant (PS). Mitigation measure 2.11(d) is described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.11(d) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Under Section 7050.5 of the California Health and Safety Code, as part of project oversight of individual projects, project sponsors can and should, in the event of discovery or recognition of any human remains during construction or excavation activities associated with the project, in any location other than a dedicated cemetery, cease further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until the coroner of the county in which the remains are discovered has been informed and has determined that no investigation of the cause of death is required.
- Under California Public Resources Code 5097.98, if any discovered remains are of Native American origin:
  - The coroner shall contact the Native American Heritage Commission in order to ascertain the proper descendants from the deceased individual. The coroner should make a recommendation to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods. This may include obtaining a qualified archaeologist or team of archaeologists to properly excavate the human remains; or
  - If the Native American Heritage Commission is unable to identify a descendant, or the descendant failed to make a recommendation within 24 hours after being notified by the commission, the landowner or their authorized representative shall obtain a Native American monitor, and an archaeologist, if recommended by the Native American monitor, and rebury the Native American human remains and any associated grave goods, with appropriate dignity, on the property and in a location that is not subject to further subsurface disturbance where the following conditions occur:
    - The Native American Heritage Commission is unable to identify a descendent;
    - The descendant identified fails to make a recommendation; or
    - The landowner or their authorized representative rejects the recommendation of the descendant, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.

For the purposes of this mitigation, less than significant means consistent with federal, State, and local regulations and laws related to human remains.

Significance After Mitigation

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.11(d), the impact is found to be less than significant with mitigation (LS-M).

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2.12 Public Utilities and Facilities

This chapter describes the environmental setting and assesses the potential for Plan Bay Area to impact public utilities, facilities, and services within the nine counties of the Bay Area. The public utilities, facilities, and services included in this EIR include water supply, wastewater/stormwater, and solid waste. The analysis is focused on those areas where demand for services may increase as a result of growth anticipated by Plan Bay Area. For a discussion of water quality see *Chapter 2.8: Water Resources*.

Environmental Setting

PHYSICAL SETTING

Water Supply

Climatic conditions and annual precipitation are described in *Chapter 2.8: Water Resources*.

San Francisco Bay Hydrologic Region

As defined by the San Francisco Bay Regional Water Quality Control Board (RWQCB), the San Francisco Bay Hydrologic Region (Bay Region) encompasses numerous individual watersheds that drain into the San Francisco Bay and directly into the Pacific Ocean. It covers approximately 4,550 square miles and includes portions of all nine Bay Area counties as well as Santa Cruz County. Bay Region watersheds are listed in **Table 2.12-1** and the largest watersheds are depicted in **Figure 2.12-1**.

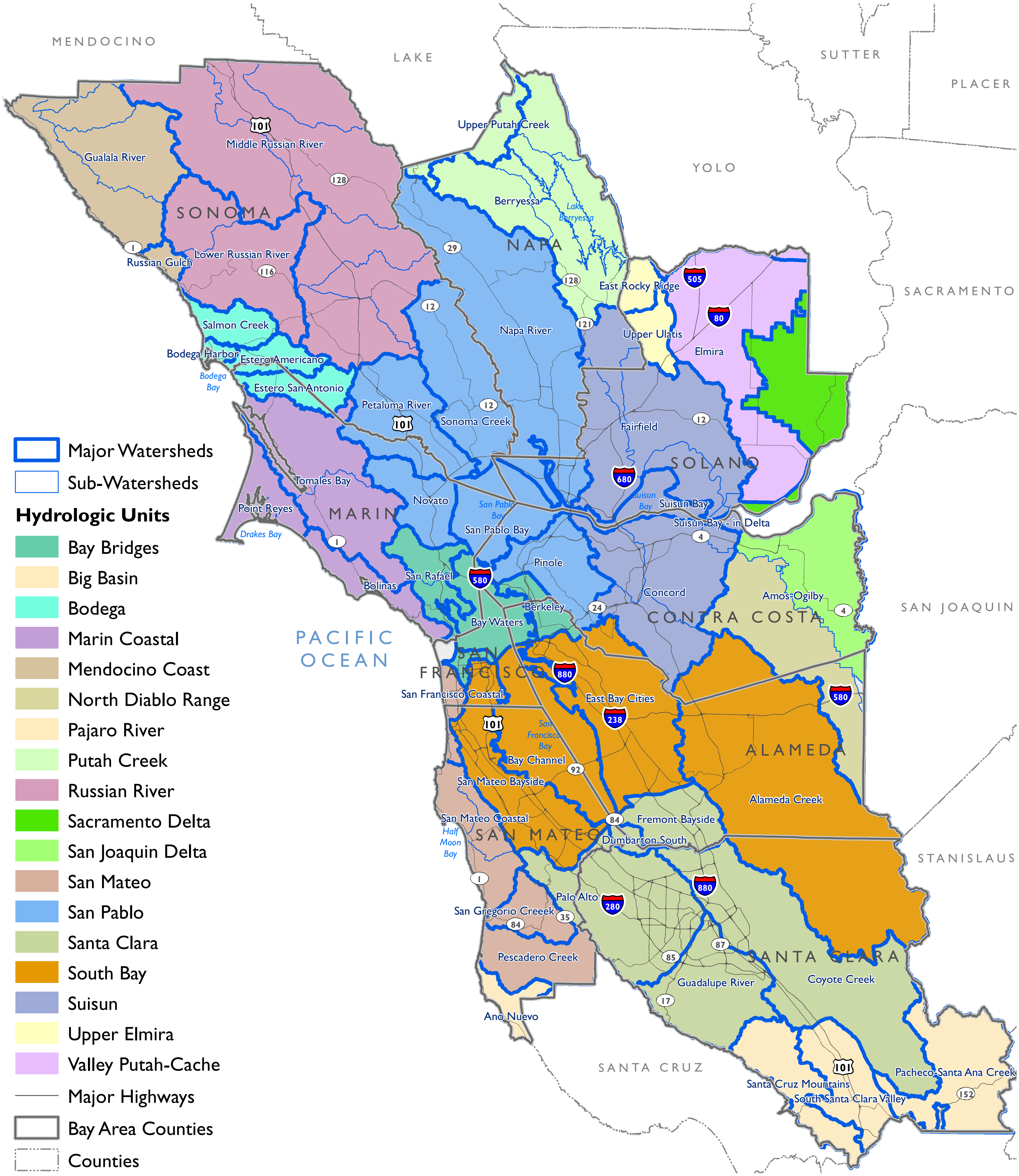
TABLE 2.12-1: WATERSHEDS OF THE SAN FRANCISCO BAY HYDROLOGIC REGION

North Bay	Corte Madera Creek watershed Novato Creek watershed Petaluma River watershed Sonoma Creek watershed Napa River watershed Marin and North Bay Coastal drainages (including Lagunitas Creek, Arroyo Corte Madera Creek, Miller Creek, etc.)
Suisun Bay	Green Valley/Suisun Creeks watersheds Walnut Creek watershed San Pablo/Wildcat Creeks watersheds Suisun Bay drainages (including Sulphur Springs Creek, Laurel Creek, Mt Diablo Creek, etc.)
East Bay	San Leandro Creek watershed San Lorenzo Creek watershed Alameda Creek watershed East Bay drainages (including Rodeo Creek, Cordonices Creek, Claremont Creek, Peralta Creek, Lake Merritt watershed, etc.)
South Bay	Coyote Creek watershed Guadalupe River watershed West Santa Clara Valley drainages (including Stevens Creek, Permanente Creek, Saratoga Creek, etc.)
Peninsula	San Francisquito Creek watershed San Mateo Creek watershed San Mateo and Peninsula Coastal drainages (including Cordilleras Creek, Colma Creek, Pilarcitos Creek, Pescadero Creek, San Gregorio Creek, etc.)

Source: California Department of Water Resources and the California Water Boards, "San Francisco Bay Area Integrated Regional Water Management Plan," 2006.

Figure 2.12-1

Major Local Watersheds in the SF Bay Hydrologic Region



- Major Watersheds
- Sub-Watersheds

Hydrologic Units

- Bay Bridges
- Big Basin
- Bodega
- Marin Coastal
- Mendocino Coast
- North Diablo Range
- Pajaro River
- Putah Creek
- Russian River
- Sacramento Delta
- San Joaquin Delta
- San Mateo
- San Pablo
- Santa Clara
- South Bay
- Suisun
- Upper Elmira
- Valley Putah-Cache
- Major Highways
- Bay Area Counties
- Counties

Data Source: CalWater 2.2.1, 2004; Cal-Atlas Geospatial Clearinghouse, 2012; The Conservation Lands Network, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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1 in = 16 miles

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Water Supply Agencies

Water supply for each county is provided by its respective water supply department or agency. Some counties contain several water providers. The focus of this EIR is on a regional analysis of water supply. According to the 2006 San Francisco Bay Integrated Water Management Plan[1], the agencies and departments included in this description are the major contributors to the water sources in each Bay Area county.

Alameda County Water District

The Alameda County Water District (ACWD) serves the cities of Fremont, Newark, and Union City. ACWD is a retail water purveyor that allocates 70 percent of its water to residential customers and approximately 30 percent to commercial, industrial, institutional, and large landscape customers. In the 2009-2010 fiscal year, it provided water for a total of 80,139 customers, or over 340,000 individuals.[2]

Contra Costa Water District

The Contra Costa Water District (CCWD) provides water to approximately 500,000 people in Contra Costa County, covering a total area of 140,000 acres. It operates and maintains a complex system of water transmission, treatment, and storage facilities to supply both treated and untreated (raw) water to its customers. It provides treated water to Clayton, Clyde, Concord, Pacheco, Port Costa and parts of Martinez, Pleasant Hill, and Walnut Creek. In addition, CCWD provides wholesale treated water to the City of Antioch, the Golden State Water Company in Bay Point, the Diablo Water District in Oakley, and the City of Brentwood. It also sells untreated water to the cities of Antioch, Martinez and Pittsburg, as well as to industrial and irrigation customers. CCWD pumps water from four intakes in the Sacramento-San Joaquin Delta. The intakes are located at Rock Slough, on Old River, on Victoria Canal and at Mallard Slough. The backbone of the district's water conveyance system is the 48-mile Contra Costa Canal, which starts at Rock Slough and ends at the Martinez Reservoir. In 2010, the CCWD served approximately 110,000 acre-feet of water to its customers.[3]

East Bay Municipal Utility District

The East Bay Municipal Utility District (EBMUD) serves Alameda, Alamo, Albany, Berkeley, Castro Valley, Crockett, Danville, Diablo, El Cerrito, El Sobrante, Emeryville, Hayward, Hercules, Kensington, Lafayette, Moraga, Oakland, Orinda, Piedmont, Pinole, Pleasant Hill, Richmond, Rodeo, San Leandro, San Lorenzo, San Pablo, San Ramon, Selby and Walnut Creek. EBMUD's principal water source is the Mokelumne River Basin in the Sierra Nevada Range. EBMUD has water rights and facilities to divert up to 325 million gallons per day (mgd) from the Mokelumne River, which comprises approximately 90 percent of the agency's water supply. EBMUD's Mokelumne River facilities include Pardee Dam and Reservoir located near Valley Springs, and Camanche Dam and Reservoir located ten miles downstream of Pardee. Snowmelt from Alpine, Calaveras and Amador counties that feeds the upper Mokelumne River is collected in Pardee and Camanche Reservoirs, where it is stored for use by EBMUD. Overall, the

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[1] Prepared by RMC for the California Department of Water Resources and the California Water Boards.

[2] Alameda County Water District, *Urban Water Management Plan 2010-2015*, 2011.

[3] Contra Costa Water District, *Urban Water Management Plan*, 2011.

Basin serves approximately 1.34 million people throughout areas of Alameda and Contra Costa counties, including services to residential, industrial, commercial, institutional, and irrigation waters.[4]

Marin Municipal Water District

The Marin Municipal Water District (MMWD) serves the populous eastern corridor of Marin from the Golden Gate Bridge northward up to, but not including, Novato, and is bounded by the San Francisco Bay on the east, and stretches through the San Geronimo Valley in the west. The incorporated cities and towns of San Rafael, Mill Valley, Fairfax, San Anselmo, Ross, Larkspur, Corte Madera, Tiburon, Belvedere and Sausalito are within the District's service area. The district covers approximately 147 square miles and serves a population of approximately 190,000 through about 61,000 service connections. MMWD's potable water distribution system includes approximately 941 miles of water mains, 90 pump stations, and 124 treated water storage tanks with a total storage capacity of 82 million gallons (MG).[5]

City of Napa Water Department

The City of Napa is a major water supply source in Napa County, receiving its annual State Water Project entitlement through the Napa County Flood Control and Water Conservation District, which is the contract administrator. The designated water service areas include most of the lower Napa Valley, the Rural Urban Limit Line, and all areas within the city limits of the City of Napa. The City exports water to the cities of American Canyon, St. Helena and Calistoga, the Town of Yountville, and the California Veterans Home. The predominant use of land in the area is residential development. As of 2010, the population served by the City of Napa Water Department was 86,743. The City of Napa currently meets its demands by supplying water from three major sources: Lake Hennessey, the Milliken Reservoir, and the State Water Project, as delivered through the North Bay Aqueduct.[6]

San Francisco Public Utilities Commission

The San Francisco Public Utilities Commission (SFPUC) operates the Regional Water System (RWS) that provides water to nearly 2.5 million people within San Francisco, San Mateo, Santa Clara, Alameda, and Tuolumne counties. The RWS consists of more than 280 miles of pipeline and 60 miles of tunnels, 11 reservoirs, five pump stations, and two water treatment plans. The SFPUC provides water to both retail and wholesale customers, totaling approximately 32 and 68 percent, respectively.

The Tuolumne River watershed on the western slope of the central Sierra Nevada, which provides water to the RWS, is comprised of three regional water supply and conveyance systems—the Hetch Hetchy System, the Alameda System, and the Peninsula System. The amount of Tuolumne River supplies delivered depends on annual water conditions. In normal years, approximately 80 to 85 percent of SFPUC water supply is provided by runoff from the upper Tuolumne River watershed.[7] This percentage may be reduced in dry years, based on the severity and timing of drought conditions. Three major reservoirs collect runoff: Hetch Hetchy Reservoir, Lake Lloyd, and Lake Eleanor. Water is diverted from

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[4] East Bay Municipal Utility District, *2010 Urban Water Management Plan,* 2011; U.S. Census 2010

[5] Marin Municipal Water District, *2010 Urban Water Management Plan*, 2011

[6] City of Napa*, Urban Water Management Plan 2010 Update*, 2011

[7] California Department of Water Resources and the California Water Boards, *San Francisco Bay Area Integrated Regional Water Management Plan*, 2006

the Hetch Hetchy reservoir into a series of tunnels, aqueducts and pipelines (the Hetch Hetchy System) that cross the San Joaquin Valley to facilities located in Alameda County (the Alameda System). The Alameda System includes conveyance facilities that connect the Hetch Hetchy System to facilities located in the San Francisco Peninsula (the Peninsula System), which also connects to the City and County of San Francisco's distribution system. This water supply serves customers in San Francisco, as well as 28 wholesale customers located in Alameda, Santa Clara, and San Mateo counties.

Reservoirs and tanks within San Francisco have the capacity to hold approximately 413 million gallons of water. The SFPUC estimates this capacity to be a five-day supply at the current average water consumption rate for the city. In addition, there is an emergency supply of existing non-potable water immediately available within the city at Lake Merced, which currently holds approximately 1.5 billion gallons of water. In 2010, the total retail demand for water in the city was 77.7 million gallons per day, and the non-residential demand was 23.5 million gallons per day (assuming successful SFPUC conservation programs).[8]

The primary water source for San Mateo County is SFPUC's Peninsula System. The system utilizes two reservoirs, Crystal Springs and San Andreas, which collect runoff from the San Mateo Creek Watershed. Water from the Pilarcitos Reservoir, on Pilarcitos Creek, directly serves one of the wholesale customers, the Coastside County Water District (which serves Half Moon Bay, Miramar, Princeton By The Sea, and El Granada), and can also deliver water to Crystal Springs and San Andreas Reservoirs. Wholesale customers of the SFPUC Peninsula System include: the cities of Burlingame, Daly City, East Palo Alto, Menlo Park, Millbrae, San Bruno, Redwood City, the Town of Hillsborough, the Coastside County Water District, the Mid-Peninsula Water District, and the North Coast County Water District. It also serves the California Water Service Company Bear Gulch and Bayshore Districts.

Santa Clara Valley Water District

The Santa Clara Valley Water District (SCVWD) is the county's primary water provider, serving Santa Clara County's population of 1,781,642.[9] The SCVWD encompasses all of the county's 1,300 square miles and serves its 15 cities. Although the City of Palo Alto and the Purissima Hills Water District are located within the County of Santa Clara and SCVWD's service area, most of the current water supply to these two agencies is from SFPUC. Both agencies, however, benefit from the comprehensive water management programs and services provided by SCVWD.[10]

The SCVWD manages groundwater and provides comprehensive water management as authorized by the Santa Clara Valley District Act. The SCVWD's water supply system is comprised of storage, conveyance, recharge, treatment, and distribution facilities that include 11 local reservoirs, the groundwater basin, groundwater recharge facilities, treatment plants, imported supply, and raw treated water conveyance facilities. The primary source of water for the SCVWD is the use of groundwater and surface water stored in the reservoirs. The reservoirs store up to 25 percent of Santa Clara County's water supply. The capacity of all the local reservoirs of the SCVWD is 169,009 acre-feet, with 113,758 acre-feet of restricted capacity.

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[8] San Francisco Public Utilities Commission, *2010 Urban Water Management Plan*, 2011.

[9] U.S. Census, 2010.

[10] California Department of Water Resources and the California Water Boards, *San Francisco Bay Area Integrated Regional Water Management Plan*, 2006.

The primary source of water in the Santa Clara Valley is the use of groundwater aquifers that underlie Santa Clara County. Groundwater pumping provides up to half of the county's water supply during normal years. The SCVWD utilizes conjunctive use methods–the practice of storing surface water in a groundwater basin in wet years and withdrawing from the basin in the dry years–in order to ensure proper protection of groundwater aquifers in Santa Clara County. The SCVWD manages two groundwater subbasins that transmit, filter, and store water—the Santa Clara Subbasin and the Llagas Subbasin. The County of Santa Clara also imports water supplies from the Sacramento-San Joaquin Delta through three main pipelines: the South Bay Aqueduct, which carries water from the State Water Project (SWP), and the Santa Clara Conduit and Pacheco Conduit, both of which bring water from the federal Central Valley Project (CVP). Water imported from the CVP and SWP provide, on average, 40 percent of the supplies used annually in the county.[11]

Solano County Water Agency

The Solano County Water Agency (SCWA) is a wholesale water agency that provides untreated water to cities and agricultural districts in Solano County and parts of Yolo County from the Federal Solano Project and the North Bay Aqueduct (NBA) of the State Water Project (SWP). The SCWA's service area population in 2010 was 413,300. It has water contracts to deliver water to Fairfield, Suisun City, Vacaville, Vallejo, Solano Irrigation District, Maine Prairie Water District, the University of California, Davis, and the California State Prison in Solano. The SWP has rights to water originating from the Sacramento and San Joaquin Rivers, and it stores water on Lake Oroville on the Feather River. The SWP provides water to the SCWA through the NBA, a 27-mile long pipeline that delivers untreated municipal water from Barker Slough in the Sacramento-San Joaquin delta to Napa and Solano Counties.

The major facilities of the Solano Project are the Monticello Dam, which captures water from Putah Creek in Lake Berryessa, the Putah Diversion Dam, which diverts water out of lower Putah Creek, and the Putah South Canal, which delivers water to local agencies. The Putah South Canal is 33 miles long.

The SCWA has contracted with the Department of Water Resources (DWR) for an ultimate allocation of 47,756 acre-feet of water per year from the SWP. In 2010, the SCWA delivered a total of 195,361 acre-feet of water to its respective agencies.[12]

Sonoma County Water Agency

The Sonoma County Water Agency (SCWA) serves a large portion of Sonoma County as well as the northern portion of Marin County. The primary water source for the SCWA is the Russian River. The Russian River originates in central Mendocino County and discharges into the Pacific Ocean near Jenner, about 20 miles west of Santa Rosa, and is approximately 110 miles in length. Additionally, the Santa Rosa Plain provides groundwater. Groundwater is an important source of water in Sonoma County because it provides the domestic water supply for most of the unincorporated portion of the County, and is a primary source of water for agricultural users. Three Water Agency wells located along the Russian River-Cotati Intertie Pipeline in the Santa Rosa Plain also provide a portion of the Water Agency's water supply. The Water Agency diverts water from the Russian River and delivers it to customers through a transmission system. The transmission system consists of six radial collector wells at the Wohler and Mirabel production facilities adjacent to the Russian River. In 2010, the Sonoma County Water Agency

[11] Santa Clara Valley Water District, 2010 *Urban Water Management Plan*, 2011.

[12] Solano County Water Agency, *2010 Urban Water Management Plan*, 2011.

provided 50,796 acre feet of water per year (AFY) to its customers and contractors (including surplus and non-surplus customers).[13]

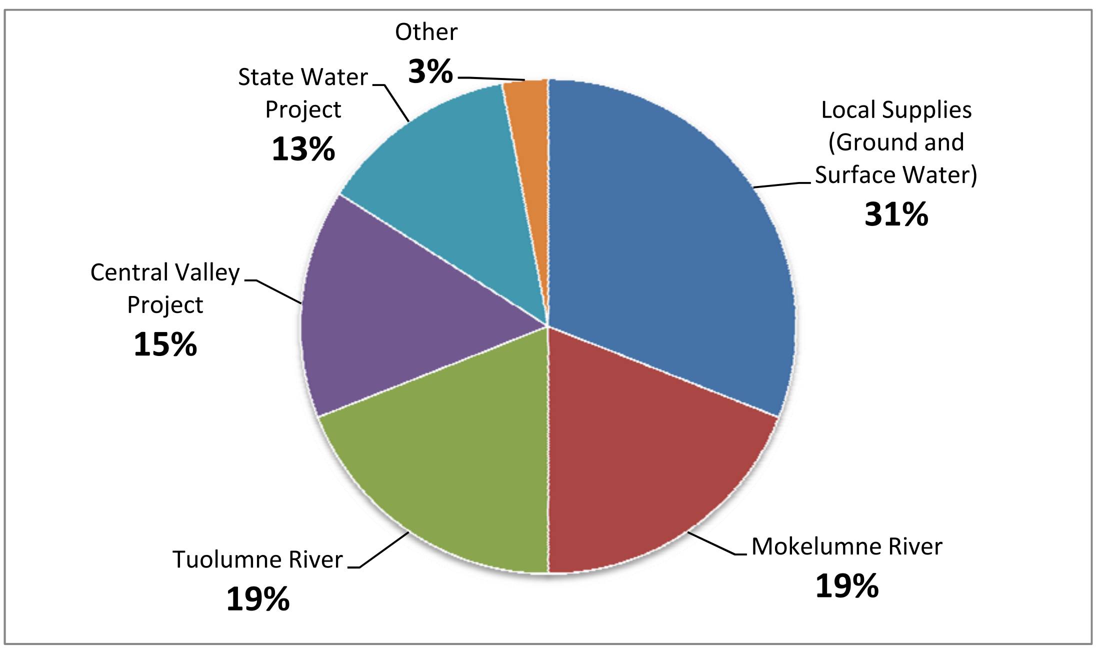
Zone 7 Water Agency

Zone 7 Water Agency's (Zone 7) water service area is located about 40 miles southeast of San Francisco, and encompasses an area of approximately 425 square miles of the eastern portion of Alameda County, including the Livermore-Amador Valley, Sunol Valley, and portions of the Diablo Range. Zone 7's service area also overlies the Alameda Creek Watershed. This watershed encompasses almost 700 square miles, and extends from Altamont Pass to the east, San Francisco Bay to the west, Mount Diablo to the north, and Mount Hamilton to the south. Zone 7 is the water wholesaler for the Livermore-Amador Valley as well as the area's flood control agency. It supplies untreated water for agriculture and treated drinking water to the California Water Service Company, Dublin San Ramon Services District, the City of Livermore, and the City of Pleasanton.[14]

Regional Water Supply

In order to service the region's residential, commercial, and agricultural water needs, Bay Area water agencies must manage a diverse range of water supplies. These include supplies from local and imported sources, as well as through methods such as desalination and recycled water. **Figure 2.12-2** shows the breakdown of typical Bay Area water use by source of supply.

Figure 2.12-2: Bay Area Water Use by Supply Source



Source: California Department of Water Resources and the California Water Boards, San Francisco Bay Area Integrated Regional Water Management Plan, 2006.

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[13] Sonoma County Water Agency, *2010 Urban Water Management Plan*, 2011.

[14] Zone 7 Water Agency, *2010 Urban Water Management Plan*, 2010.

Local Water

Local water supplies come from two interconnected sources: surface water and ground water. Surface water is water that collects above ground in a stream, river, lake, wetland, or ocean. Ground water is water that has infiltrated into the subsurface that completely fills (saturates) the void space of rocks or sediment. They are physically connected in the hydrologic cycle when, at certain locations or times of the year, water infiltrates the bed of a stream to recharge ground water or, at others, ground water discharges, contributing to the base flow of a stream. A long-term threat to ground water sources is overdraft. Overdraft is the condition of a groundwater basin in which the amount of water withdrawn by pumping over the long term exceeds the amount of water that recharges the basin. Overdraft is characterized by groundwater levels that decline over a period of years and never fully recover, even in wet years. Overdraft can lead to increased extraction costs, land subsidence, water quality degradation, and environmental impacts. Although the Bay Region was not identified in the California Department of Water Resources' last statewide report on groundwater sources in 2003 as an area that is at short-term risk for widespread overdraft conditions, many strategies identified in the Bay Area Integrated Regional Water Management Plan aim to reduce the likelihood of overdraft.[15]

Together, surface water and ground water currently supply approximately 31 percent of Bay Area water.[16] Surface water from local rivers and streams (including the Delta) is an important source for all Bay Area water agencies, but particularly so in the North Bay counties, where access to imported water is more limited due to infrastructure limitations. The Bay Area has 28 primary groundwater basins, which underlie approximately 30 percent of the region (see **Figure 2.12-3**). The basins that are most intensively used for water supply are the Santa Clara, Napa-Sonoma Valley, Petaluma Valley, Niles Cone, and Livermore Valley basins.[17]

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[15] California Department of Water Resources, *California's Groundwater—Bulletin 118 Update*, 2003

[16] California Department of Water Resources and the California Water Boards, *San Francisco Bay Area Integrated Regional Water Management Plan*, 2006

[17] Department of Water Resources, *California Water Plan Update 2009, San Francisco Bay Integrated Water Management—Bulletin 160-09, Volume 3 Regional Reports*, 2009

Figure 2.12-3

Bay Area Groundwater Basins

Groundwater Basin

Major Highways

Bay Area Counties

Counties

Data Source: Department of Water Resources, State of California, 2003, 2010; Cal-Atlas Geospatial Clearinghouse, 2012; The Conservation Lands Network, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Imported Water

The greatest proportion of Bay Area water is imported from Sierra Nevada and Delta sources, comprising approximately 66 percent of supply.[18] As described under the agency descriptions of the SFPUC and EBMUD above, the primary Sierra Nevada sources are the Mokelumne River and Tuolumne River watersheds. Several Bay Area water agencies receive Delta water through the State Water Project (SWP) and Central Valley Project (CVP), which comprise a vast network of canals and aqueducts for the delivery of water throughout the Bay Area and the Central Valley. Major water conveyance infrastructure delivering water through the SWP and CVP is described in the infrastructure section below.

Recycled Water

In the 1990s, a number of local agencies joined with the California Department of Water Resources (DWR) and the United States Bureau of Water Reclamation to study the feasibility of using high-quality recycled water to augment water supplies and help the Bay-Delta ecosystem. This cooperative effort, known as the Bay Area Regional Water Recycling Program (BARWRP), produced a Master Plan for regional water recycling in 1999 for the five South Bay counties. Since then, local water agencies have built a number of projects consistent with BARWRP and recycled water has come to be widely used in the Bay Area for a number of applications, including landscape irrigation, agricultural needs, commercial and industrial purposes, and as a supply to the area's wetlands. The 2006 Bay Area Integrated Regional Water Management Plan (IRWMP) identified 43 potential recycled water projects that could be implemented by the year 2020.[19] The potential market for recycled water is estimated to be 240,000 acre-feet per year by 2025.[20]

Desalination

Bay Area agencies have increasingly been exploring desalination as an alternative source of drinking water. In 2003, a number of water agencies formed the Northern California Salinity Coalition to formally join together to research and identify regional approaches for addressing salinity impacts as well as the use and application of desalination. In 2005-2006, MMWD operated a desalination pilot, enabling it to conduct environmental studies, test equipment, refine operating costs, and demonstrate the technology to MMWD customers. The agency used the results of the pilot plant operations to refine the design requirements and costs of a full-scale desalination facility. An environmental impact report for the project has been prepared but is under judicial review.

In 2003, the ACWD opened the Newark Desalination Facility, the first brackish water desalination facility in Northern California, with a capacity of 5 mgd and plans to double capacity. The five largest water agencies in the Bay Area (CCWD, EBMUD, SFPUC, SCVWD, and Zone 7) are currently studying the feasibility of constructing a 20 mgd desalination facility at CCWD's Mallard Slough Pump Station in eastern Contra Costa County. The proposed Regional Desalination Project would operate continuously in all year-types (i.e., wet and drought), with the possibility of storing water (including by exchange or transfer) in CCWD's Los Vaqueros Reservoir when demand from the parties is less than plant capacity.

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[18] Ibid.

[19] Bay Area Clean Water Agencies, *Bay Area Integrated Regional Management Water Plan, Wastewater and Recycled Water Functional Area Document*, 2006.

[20] Department of Water Resources, *California Water Plan Update 2009, San Francisco Bay Integrated Water Management—Bulletin 160-09, Volume 3 Regional Reports*, 2009.

Storage in Los Vaqueros Reservoir could provide flexibility to optimize the Project yield. Pilot plant testing at Mallard Slough was conducted in 2008-2009 and the Project partners have executed a memorandum of agreement to conduct a site-specific analysis to further evaluate the proposed Plan.[21]

Water Transfers

Water transfers allow suppliers with excess water supplies to sell their water to those agencies in need. In addition, agriculture-to-urban transfers can allow agricultural districts with marginal lands to be fallowed (taken out of production). Water transfers also provide reduced vulnerability to water shortages resulting from drought, catastrophic events, and system security breaches. Bay Area water agencies have a number of transfer agreements to improve water supply in the region.

Water Conservation

Reducing water demand through conservation is a key component of improving water supply reliability in the Bay Area. All of the ten major water agencies in the region are members of the California Urban Water Conservation Council, which promotes the development and implementation of conservation Best Management Practices (BMPs) such as metering, public information programs, conservation pricing, and washing machine rebates. Many local water agencies are also implementing conservation projects and programs that extend beyond these baseline BMPs. It is anticipated that regional water agencies will see more than 150,000 AFY of conservation-related savings by 2020.[22]

Water Supply Infrastructure

As noted above, approximately two-thirds of the water used by Bay Area water agencies comes from non-local sources, primarily the Sierra Nevada and the Sacramento-San Joaquin Delta (Delta). As a result, the region relies on a diverse network of water infrastructure including aqueducts and storage facilities to convey supplies to its residents. Major facilities include:[23]

- **Contra Costa Canal.** Originally constructed to serve agricultural needs, the Contra Costa Canal now comprises the backbone of the Contra Costa Water District (CCWD) transmission system. The canal spans 48 miles, conveying water from the Delta to CCWD's treatment facilities and raw water customers.
- **Delta-Mendota Canal.** The Delta-Mendota Canal is a 120-mile segment of the Central Valley Project, which provides water to much of the Central Valley. It runs south along the western edge of the San Joaquin Valley and conveys water to the San Luis reservoir, which stores water supplies for Santa Clara Valley Water District customers.
- **Hetch Hetchy Aqueduct.** The 156-mile Hetch Hetchy Aqueduct roughly parallels the Tuolomne River, conveying San Francisco Public Utilities Commission supplies from the Hetch Hetchy Reservoir across the San Joaquin River and San Francisco Bay, up the peninsula and into Upper Crystal Springs Reservoir, located north of Redwood City.

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[21] Bay Area Regional Desalination Project website, www.regionaldesal.com, accessed July 2012.

[22] California Department of Water Resources and the California Water Boards, *San Francisco Bay Area Integrated Regional Water Management Plan*, 2006.

[23] California Department of Water Resources and the California Water Boards, *San Francisco Bay Area Integrated Regional Water Management Plan*, 2006.

- **Mokelumne Aqueducts.** The three aqueducts which comprise the Mokelumne Aqueduct System convey most of East Bay Municipal Utility District's supply 87 miles from Pardee Reservoir on the Mokelumne River to Walnut Creek.
- **North Bay Aqueduct.** The North Bay Aqueduct (NBA) is an underground pipeline operated remotely by the Department of Water Resources (DWR). The NBA extends from the Delta to Napa County, Vallejo and Benicia. Solano County Water Agency and the Napa County Flood Control Water and Conservation District, which includes the City of Napa as a member agency, receive Delta supplies through the NBA.
- **Russian River Transmission Facilities.** Sonoma County Water Agency operates diversion facilities at the Russian River and an aqueduct system comprised of pipelines, pumps, and storage tanks.
- **South Bay Aqueduct.** The South Bay Aqueduct (SBA) conveys water from the Delta through over 40 miles of pipelines and canals. Alameda County Water District, Zone 7 Water Agency, and Santa Clara Valley Water District receive State Water Project supplies conveyed through the SBA.

A schematic of these facilities and major rivers located in and around the Bay Area is presented in **Figure 2.12-4.** In addition to pipelines and aqueducts, each Bay Area water agency has its own extensive network of surface water storage reservoirs, groundwater extraction wells, water treatment plants, and distribution pipelines.

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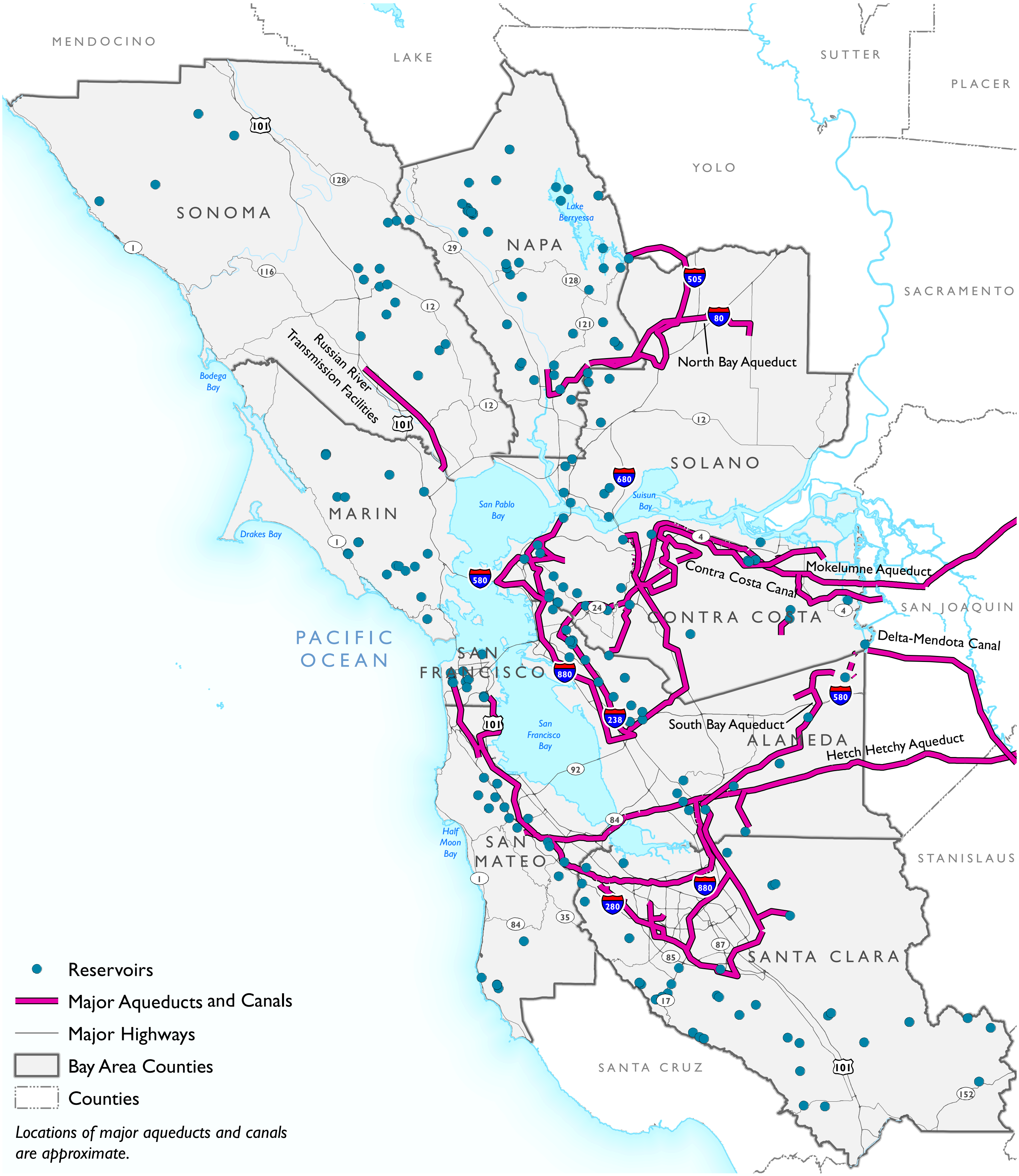
Figure 2.12-4

Major Water Infrastructure Serving the Bay Area



Data Source: National Hydrography Dataset, U.S. Geological Survey, 2011; The Conservation Lands Network, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Regional Demographics and Water Demand

While numerous factors influence water demand including employment growth, socio-economic characteristics, geographic distribution of the population, variation in precipitation levels, and water conservation practices, overall population growth is the most important factor. In general, demand management strategies should allow Bay Area water agencies to continue to meet projected demand through 2030 in average years. For example, between 1986 and 2003, demand management and conservation programs helped keep the overall increase of water use in the Bay Area to less than one percent, despite a 23 percent increase in population (see **Figure 2.12-5**).

Table 2.12-2 shows the projected water supplies and demands from the 2010 Urban Water Management Plans (UWMPs) for normal years in the near future (2015) and over the next twenty years (2030 or 2035); none of the UWMPS extends to 2040, the time horizon of the proposed Plan. All of the water districts except for the Solano County Water Agency will be able to provide adequate water supplies to meet projected demand in a year of normal precipitation, although doing so requires some districts to acquire additional supplies. EBMUD sets supply equal to demand for normal years, storing any additional supply. EBMUD notes that it "can meet customer demands through the year 2040 during normal year conditions; therefore, the available supply is considered equal to or greater than demand. However…the frequency of normal year-types will decrease in the future. The frequency of dry years that require customer rationing is expected to increase." Santa Clara Valley Water District's UWMP says, "The District cannot meet total projected demands after 2025 without the implementation of overly restrictive water shortage action unless additional supplies are secured."

Important to note, however, is the fact that the 2035 population projections used by the water agencies for their 2010 Urban Water Management Plans, shown in **Table 2.12-3**, are in aggregate significantly higher than the regional population projected by ABAG for 2040. The region's UWMPs estimate a 2035 total regional population of 9,883,000, more than 7 percent higher than the 2040 regional population projected by ABAG for Plan Bay Area of 9,196,000, which suggests that any water shortfalls may actually be less severe than projected.

TABLE 2.12-2: PROJECTED NORMAL YEAR SUPPLY AND DEMAND (AF/YEAR)

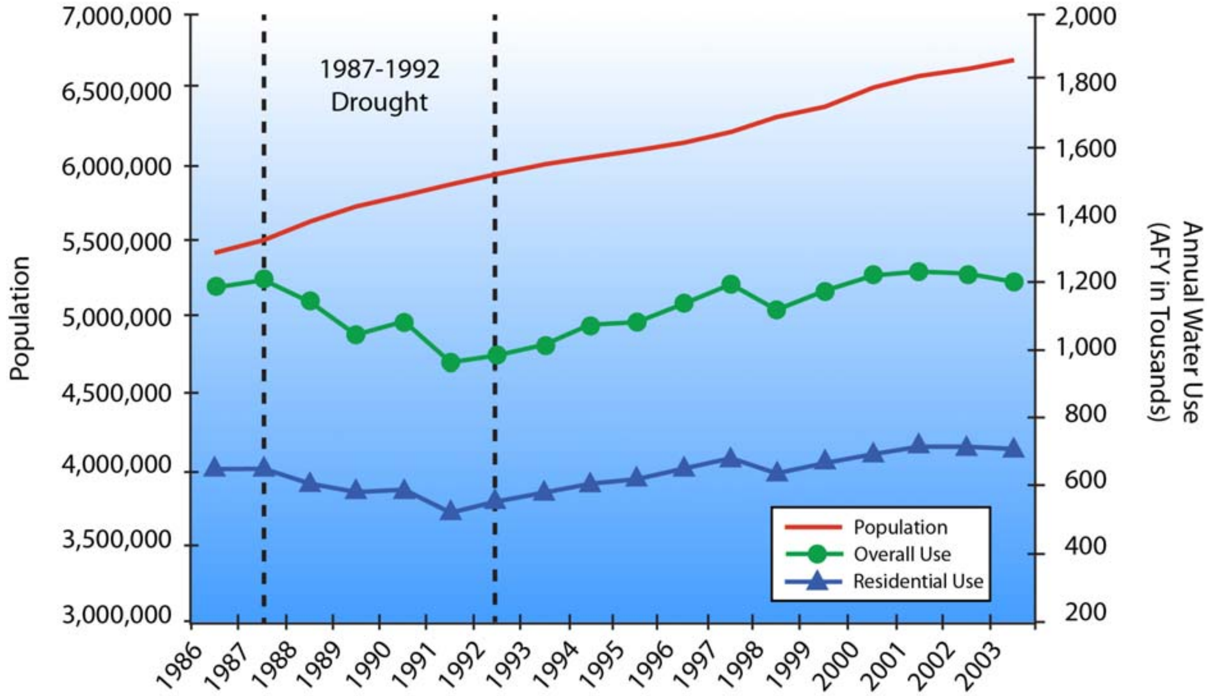
	Current Supply (2015)	*Current Demand (2015)*	*Future Supply (2035)*	*Future Demand (2035)*
Alameda County WD	78,000	66,000	78,000	73,000
Contra Costa WD	213,000	156,000	226,000	187,000
East Bay Municipal Utility District	250,000	250,000	256,000	256,000
Marin Municipal WD	29,000	29,000	29,000	28,000
City of Napa	52,000	14,000	52,000	15,000
San Francisco PUC	97,000	90,000	101,000	91,000
Santa Clara Valley WD	397,000	376,000	423,000	423,000
Solano County WA[1]	255,000	255,000	255,000	255,000
Sonoma County WA	77,000	71,000	82,000	82,000
Zone 7 WA[1]	72,000	66,000	83,000	76,000 to 83,000

Note:

1. Future supply and demand projections are for the year 2030.

Sources:
Alameda County Water District, 2010-2015 Urban Water Management Plan, 2011
Contra Costa Water District, 2010 Urban Water Management Plan, 2011
East Bay Municipal Utility District, 2010 Urban Water Management Plan, 2011
East Bay Municipal Utility District, All About EBMUD, http://www.ebmud.com/sites/default/files/pdfs/All-About-EBMUD-2011.pdf, accessed July 2012
Marin Municipal Water District, 2010 Urban Water Management Plan, 2011
City of Napa Water Department, 2010 Urban Water Management Plan, 2011
San Francisco Public Utilities Commission, 2010 Urban Water Management Plan, 2011
Santa Clara Valley Water District, 2010 Urban Water Management Plan, 2011
Solano County Water Agency, 2010 Urban Water Management Plan, 2011
Sonoma County Water Agency, 2010 Urban Water Management Plan, 2011
Zone 7 Water Agency, 2010 Urban Water Management Plan, 2010

Figure 2.12-5: Population and Water Demand Trends



Source: California Department of Water Resources and the California Water Boards, San Francisco Bay Area Integrated Regional Water Management Plan, 2006

TABLE 2.12-3: PROJECTED SERVICE AREA POPULATION OF MAJOR BAY AREA WATER AGENCIES

Agency	*Projected 2035 Population*[1]
Alameda County Water District	411,000
Contra Costa Water District	635,000
East Bay Municipal Utility District	1,751,000
Marin Municipal Water District	207,000
City of Napa Water Department	94,000
San Francisco Public Utilities Commission[2]	3,080,000
Santa Clara Valley Water District	2,431,000
Solano County Water Agency[4]	454,000
Sonoma County Water Agency[3]	529,000
Zone 7 Water Agency[5]	291,000
TOTAL	**9,883,000**

Notes:

1. Except where noted, projections are from 2009 ABAG population projections.
2. Sum of population figures from Table 3 and Table 5 of the SFPUC UWMP.
3. Sonoma County Water Agency is a wholesale water provider to MMWD. However, the agencies' service populations are listed separately.
4. California Department of Finance, 2010; projected 2030 population
5. California Water Service Company, Dublin San Ramon Services District, City of Livermore, and City of Pleasanton; projected 2030 population

Sources are the same as those in Table 2.12-2.

Some Bay Area water agencies are projecting future water supply shortfalls in dry years, and some are already seeing such shortfalls, as shown in **Table 2.12-4**. Other agencies anticipate being able to handle a single dry year, largely due to reservoirs or other storage capacity. The severity and timing of dry year shortfalls differ greatly among the agencies due to the wide variation of supply sources, types of use, and climates within the region.

TABLE 2.12-4: YEAR OF PROJECTED WATER SHORTAGES (SINGLE DRY YEAR)

Agency	*First year in which demand is expected to outpace supply during single dry years*
Alameda County Water District	2010
Contra Costa Water District	2025
East Bay Municipal Utility District	2010
Marin Municipal Water District	none
City of Napa Water Department	2015
San Francisco Public Utilities Commission	none
Santa Clara Valley Water District	none
Solano County Water Agency	Now (2010)
Sonoma County Water Agency	2015
Zone 7 Water Agency	none

Sources are the same as those in Table 2.12-2.

Wastewater Treatment

Wastewater is generated by residential, commercial and industrial sources throughout the Bay Area. Treatment of wastewater provides protection for human health and receiving water bodies, preservation of the health of aquatic and riparian species, as well as improved supply reliability through the removal of harmful pollutants from discharges.

Urbanized and unincorporated areas of cities and counties throughout the Bay Area provide wastewater treatment facilities. These facilities include systems made up of pipelines, pipe stations, interceptor stations and discharge stations. Treatment plants usually send wastewater through three treatment processes, as well as disinfection, storage, and eventual possible reclamation. Many of the Bay Area's wastewater treatment plants include primary and secondary treatment for wastewater, as well as recycled water programs that produce tertiary treated recycled water for various uses. In many cases, secondary effluent is discharged into the San Francisco Bay, and wastewater from Solano County is pumped into the Delta. Wastewater is also recycled for other uses such as agriculture, irrigation, or landscaping.

Wastewater treatment in the Bay Area is provided by various agencies as well as individual city and town wastewater treatment systems. **Table 2.12-5** lists the large (more than 10 mgd) and small (10 mgd or less) wastewater treatment plants in each county in the Bay Area as well as their service areas. Bay Area Wastewater Treatment Facilities are shown in **Figure 2.12-6**.

TABLE 2.12-5: FLOW AND CAPACITY OF WASTEWATER TREATMENT FACILITIES IN THE REGION

Treatment Plant	*Service Area*	*Facility Capacity (dry weather, mgd)*	*Average Flow per Day (dry weather, mgd)*	*Excess Capacity (dry weather, mgd)*
Alameda County				
City of Hayward	City of Hayward	18.50	12.20	6.30
City of Livermore	Livermore city limits, Ruby Hills in Pleasanton, Lawrence Livermore and Sandia National Laboratories	8.50	6.43	2.07
City of San Leandro, Environmental Services Division	City of San Leandro	7.60	4.90	2.70
Dublin San Ramon Services District	Cities of Pleasanton and Dublin	17.00	11.48	5.52
East Bay Municipal Utility District	Cities of Alameda, Albany, Berkeley, Emeryville, Oakland Piedmont	320.00	80.00	240.00
Oro Loma Sanitary District	San Lorenzo, Ashland, Cherryland, Fairview, and portions of Castro Valley, San Leandro and Hayward	20.00	12.60	7.40
Union Sanitary District	Cities of Fremont, Newark and Union City	33.00	25.10	7.90
Subtotal - Alameda County		***424.60***	***152.71***	***271.89***
Contra Costa County				
Central Contra Costa Sanitary District	Alamo, Clayton, Concord, Danville, Lafayette, Moraga, Orinda, Pleasant Hill, San Ramon, Walnut Creek	53.80	39.10	14.70
City of Brentwood	Brentwood	5.00	3.35	1.65
City of Hercules / City of Pinole	City of Hercules	4.06	3.20	0.86
City of Richmond Municipal Services District	Central Richmond	9.00	8.00	1.00
Crockett-Valona Sanitary District	Unincorporated Town of Crockett	1.81	0.35	1.46
Delta Diablo Sanitation District	Area bounded by Antioch, Pittsburg, Bay Point and the San Joaquin River	16.50	14.20	2.30

TABLE 2.12-5: FLOW AND CAPACITY OF WASTEWATER TREATMENT FACILITIES IN THE REGION

Treatment Plant	*Service Area*	*Facility Capacity (dry weather, mgd)*	*Average Flow per Day (dry weather, mgd)*	*Excess Capacity (dry weather, mgd)*
East Bay Municipal Utility District	El Cerrito and parts of Richmond	*Listed under Alameda County*		
Ironhorse Sanitary District	Oakley, Bethel Island	4.30	2.60	1.70
Mt. View Sanitary District	Eastern unincorporated Martinez and parts of the City of Martinez bordered by Pine Street, Bush, Vine Hill Way and Waterbird Way	3.20	2.00	1.20
Rodeo Sanitation District	Unincorporated Rodeo area	1.14	0.60	0.54
West County Wastewater District	northern portions of Richmond, El Sobrante	12.50	7.90	4.60
Subtotal - Contra Costa County		***111.31***	***81.30***	***30.01***
Marin County				
Central Marin Sanitation Agency	Area bounded by San Rafael, Fairfax and Corte Madera	30.00	10.00	20.00
Las Gallinas Valley Sanitary District	Northern half of San Rafael, plus county area south of Novato	2.92	2.15	0.77
Marin County Sanitary District #5	Tiburon Peninsula	2.30	0.80	1.50
Novato Sanitary District	City of Novato, Bel Marin, Ignacio and Hamilton	9.00	5.40	3.60
Sausalito Marin City Sanitary District	Marin City and the City of Sausalito	6.00	1.30	4.70
Sewerage Agency of Southern Marin	Mill Valley and surrounding unincorporated areas	3.60	3.27	0.33
Subtotal - Marin County		***53.82***	***22.92***	***30.9***
Napa County				
City of American Canyon	American Canyon	2.5	1.90	0.60
City of Calistoga	City of Calistoga	0.84	0.51	0.33
City of St. Helena	City of St. Helena	0.50	0.42	0.08
Napa Sanitation District	Napa city limits, Silverado Country Club area, and the Napa Industrial Park area	15.40	12.60	2.80

TABLE 2.12-5: FLOW AND CAPACITY OF WASTEWATER TREATMENT FACILITIES IN THE REGION

Treatment Plant	*Service Area*	*Facility Capacity (dry weather, mgd)*	*Average Flow per Day (dry weather, mgd)*	*Excess Capacity (dry weather, mgd)*
Town of Yountville	Yountville	0.62	0.42	0.20
Subtotal - Napa County		***19.86***	***15.85***	***4.01***
San Francisco				
San Francisco Public Utilities Commission	City and County of San Francisco	106.40	79.10	27.30
San Mateo County				
City of Burlingame	Cities of Burlingame and Hillsborough, and Burlingame Hills	4.70	3.30	1.40
City of Millbrae	Area north of Burlingame and south of San Bruno	3.00	2.00	1.00
City of Pacifica	City of Pacifica	3.30	2.50	0.80
City of San Mateo	City of San Mateo and Foster City	13.60	10.80	2.80
Cities of South San Francisco-San Bruno	Cities of South San Francisco, San Bruno, Colma, southern part of Daly City	13.00	8.20	4.80
North San Mateo County Sanitation District	Daly City and parts of Westborough	8.00	7.60	0.40
Sewer Authority Mid-Coastside	City of Half Moon Bay, Granada, Moss Beach and Montero	2.00	1.30	0.70
San Francisco Public Utilities Commission	Brisbane, portions of Daly City	*Listed under San Francisco*		
South Bayside System Authority	Belmont, San Carlos, Redwood City, Menlo Park, Atherton, Portola Valley and Woodside	29.00	15.90	13.10
Subtotal - San Mateo County		***76.60***	***51.60***	***25.00***
Santa Clara County				
City of Sunnyvale Water Pollution Control Plant	Area bounded by Highway 85, Highway 280 and Great American Parkway	29.50	14.20	15.30
Palo Alto Regional Water Quality Control Plant	East Palo Alto, Los Altos, Los Altos Hills, Mountain View, Palo Alto and Stanford University	39.00	22.50	16.50

TABLE 2.12-5: FLOW AND CAPACITY OF WASTEWATER TREATMENT FACILITIES IN THE REGION

Treatment Plant	*Service Area*	*Facility Capacity (dry weather, mgd)*	*Average Flow per Day (dry weather, mgd)*	*Excess Capacity (dry weather, mgd)*
San José/ Santa Clara Water Pollution Control Plant	City of San José, County Sanitation Districts 2 and 3, West Valley Sanitation District including Campbell, Saratoga, Monte Sereno, Los Gatos, Burbank and Sunol Sanitary Districts, Cupertino, and Milpitas	167.00	112.00	55.00
South County Regional WasteWater Authority	Morgan Hill, Gilroy	8.50	6.80	1.70
Subtotal - Santa Clara County		***244.00***	***155.50***	***88.50***
Solano County				
City of Benicia	City of Benicia	4.50	2.96	1.54
City of Dixon	Dixon	2.00	1.30	0.70
City of Rio Vista	Rio Vista	1.65	0.39	1.27
City of Vacaville	City of Vacaville	15.00	10.00	5.00
Fairfield-Suisun Sewer District	Fairfield and Suisun	17.50	16.00	1.50
Vallejo Sanitation and Flood Control District	Vallejo area	15.50	9.30	6.20
Subtotal - Solano County		***56.15***	***39.95***	***16.21***
Sonoma County				
City of Cloverdale	Cloverdale	1.00	0.30	0.70
City of Petaluma	Petaluma and Pengrove	6.70	5.00	1.70
Sonoma County Water Agency	The Town of Sonoma, Guerneville, Geyserville, and surrounding unincorporated areas	3.00	2.70	0.30
Sub-regional Reclamation Facility/ Laguna Treatment Plant	Cities of Santa Rosa, Rohnert Park, Sebastopol and Cotati	21.00	17.50	3.50
Town of Windsor	Windsor	1.90	1.37	0.53
Subtotal - Sonoma County		***33.60***	***26.87***	***6.73***
BAY AREA TOTAL		**1,126.34**	**625.80**	**500.55**

TABLE 2.12-5: FLOW AND CAPACITY OF WASTEWATER TREATMENT FACILITIES IN THE REGION

Treatment Plant	*Service Area*	*Facility Capacity (dry weather, mgd)*	*Average Flow per Day (dry weather, mgd)*	*Excess Capacity (dry weather, mgd)*

Sources:
Alameda County:
State Water Resources Control Board NPDES Permit for East Bay Dischargers Authority, 2012.
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Central Valley RWQCB, Cease and Desist Order for the City of Dixon WWTF, 2008.
2010-11 Solano County Grand Jury, http://solano.courts.ca.gov/materials/Rio%20Vista%20WWTP%20Report.pdf
City of Vacaville Website, www.ci.vacaville.ca.us, 2012, accessed July 30, 2012.
Vallejo Sanitation and Flood Control District Website, 2010, accessed July 30, 2012.
California Regional Water Quality Control Board, San Francisco Bay Region, Staff Summary Report, February 8, 2012.

TABLE 2.12-5: FLOW AND CAPACITY OF WASTEWATER TREATMENT FACILITIES IN THE REGION

Treatment Plant	*Service Area*	*Facility Capacity (dry weather, mgd)*	*Average Flow per Day (dry weather, mgd)*	*Excess Capacity (dry weather, mgd)*

Sonoma County:
City of Cloverdale, NDPES Permit, 2012.
City of Petaluma Website, www.cityofpetaluma.net, 2011, accessed July 30, 2012.
Sonoma County Water Agency Website, www.scwa.ca.go, accessed July 30, 2012.
City of Santa Rosa Website, 2004, www.ci.santa-rosa.ca.us, accessed July 30, 2012.
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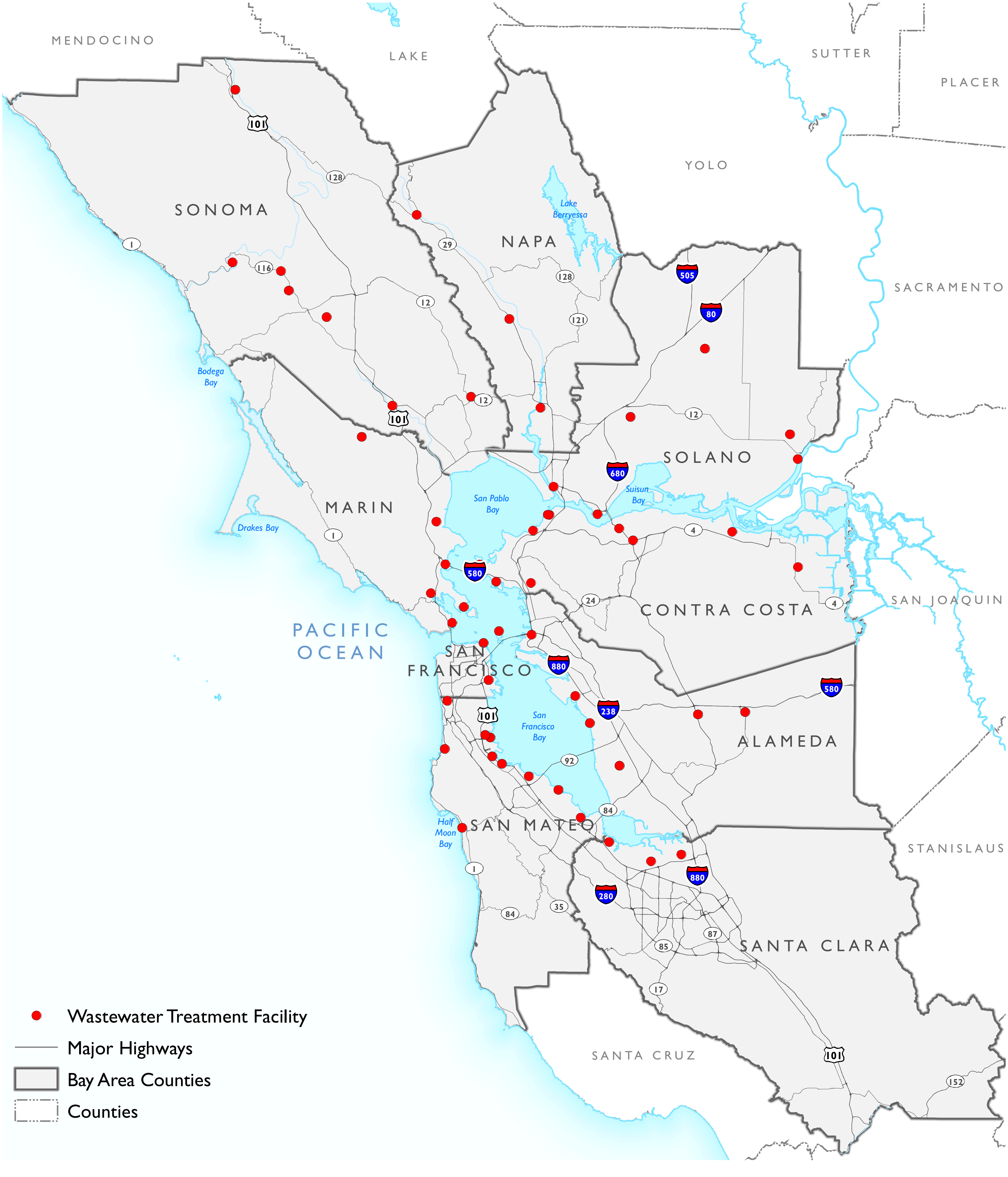
Figure 2.12-6

Wastewater Treatment Plants in the Bay Area



Data Source: Wastewater Treatment Plants, Pacific Institute, 2009; The Conservation Lands Network, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Stormwater Treatment

Stormwater has been identified as urban runoff by the U.S. Environmental Protection Agency (EPA). After a precipitation event, polluted runoff is discharged over land or through storm sewer systems, often untreated with direct flow into water bodies. If left uncontrolled, this polluted water can result in the destruction of wildlife and aquatic ecosystems and can threaten public health. Capture and management of stormwater is used to ensure protection of water quality, aquatic life, and public health throughout the Bay Area. The National Pollutant Discharge Elimination System (NPDES) permitting program provides implementation measures for controlling potentially harmful pollutants found in stormwater runoff from entering water bodies or affecting public health. Additionally, stormwater capture systems assist in maintaining flood protection and create opportunities for ecosystem protection and restoration.

The Bay Area regulates stormwater at the regional, county, and city level. In the early 1990s, RWQCB issued countywide municipal stormwater permits to operators of Municipal Separate Storm Sewer Systems (MS4s) serving populations over 100,000. Subsequently, in 2009, the RWQCB re-issued these countywide municipal stormwater permits as one Municipal Regional Stormwater NPDES Permit to regulate stormwater discharges from municipalities and local agencies in Alameda, Contra Costa, San Mateo, and Santa Clara Counties, as well as the cities of Fairfield, Suisun City, and Vallejo. MS4s are defined as conveyance systems that are owned by cities or other public entities, designed to collect or convey stormwater (including gutters, storm drains, pipes, ditches, etc.), and are not part of a combined sewer or a publicly owned sewage treatment plant.

Additionally a General Permit for Discharge of Stormwater from small MS4s regulates the discharge of stormwater for the following municipalities: Marin County and its cities, Napa County and its cities, the City and County of San Francisco, Solano County and the City of Benicia, and Sonoma County and the Cities of Petaluma and Sonoma.

Additionally, each county has its own stormwater pollution prevention programs, which aim to facilitate compliance with State and federal regulations through coordination with local municipalities, local residents, businesses and schools. These programs provide initiatives for preventing stormwater pollution, protecting and enhancing water quality in watersheds, waterways, creeks and wetlands, as well as water pollution prevention in the San Francisco Bay and Pacific Ocean.

Solid Waste Disposal

Each Bay Area county, plus the cities of Berkeley, Pittsburg, and San José, has a local enforcement agency (LEA) covering all solid waste facilities in the region. LEA's are responsible for ensuring the correct operation and closure of solid waste facilities in the state, as well as for guaranteeing the proper storage and transportation of solid wastes. In concurrence with the California Department of Resources Recycling and Recovery (CalRecycle), LEA's issue operating permits to facilities including landfills, transfer stations, material recovery, and composting facilities.

Solid waste is the garbage, refuse, and other discarded solid materials generated by residential, commercial, and industrial activities. CalRecycle identifies 10 categories of wastes: paper, glass, metal, electronics, plastic, other organic, construction and demolition (C&D), household hazardous waste, special waste, and mixed residue. Solid waste generation is measured by disposal and diversion. The California Public Resources Code Section 40192 defines disposal as "the final deposition of solid wastes onto land, into the atmosphere, or into the waters of the state." Solid waste that is disposed in landfills is measured in volume (cubic yards) and weight (tons). Diversion includes programs and practices such as waste prevention and source reduction, recycling, reuse, and composting that reduce the total amount of waste that requires disposal.

Landfills

The Bay Area is currently served by sixteen privately operated landfills and one operated by the Sonoma County Public Works Department. The seventeen landfills have a total remaining capacity of 321,816,851cubic yards, a total daily throughput of 46,374 tons per day, and an estimated average of 63 percent remaining capacity. **Table 2.12-6** shows the remaining capacity of landfills located in the Bay Area and their estimated date of closure.

TABLE 2.12-6: ACTIVE BAY AREA LANDFILLS

Facility	*Operator*	*SWIS Number*	*Estimated Closure Date*[1]	*Max. Through-put (tons/day)*	*Total Capacity (Cu Yd)*	*Remaining Capacity (Cu Yd)*	*% Capacity Remaining*
Tri-Cities Landfill	Waste Management of Alameda County	01-AA-0008	12/01/2008	2,346	19,271,000	880,000	5%
Altamount Landfill	Waste Management of Alameda County	01-AA-0009	01/01/2025	11,500	62,000,000	45,720,000	74%
Vasco Road Landfill	Republic Services of California Inc.	01-AA-0010	08/31/2019	2,250	32,970,000	9,871,000	30%
Acme Landfill	Acme Fill Corporation	07-AA-0002	06/01/2021	1,500	268,700	175,000	65%
Keller Canyon Landfill	Keller Canyon Landfill Co.	07-AA-0032	12/31/2030	3,500	75,018,000	63,408,000	85%
USS-Posco Industries Unit II	US Steel – Posco Industries	07-AC-0042	01/01/2118	8	86,000	not available	not available
Redwood Landfill	Redwood Landfill Inc.	21-AA-0001	01/01/2039	2,300	19,100,000	12,900,000	68%
Clover Flat Landfill	Clover Flat Landfill Inc.	28-AA-0002	01/01/2021	600	5,100,000	2,599,000	51%
Ox Mountain Sanitary Landfill	Republic Services of California Inc.	41-AA-0002	01/01/2018	3,598	37,900,000	44,646,000	118%[2]
Zanker Material Processing Facility	Zanker Road Resource Management Ltd.	43-AN-0001	12/31/2018	350	540,000	540,000	100%
Newby Island Sanitary Landfill	International Disposal Corporation	43-AN-0003	06/01/2025	4,000	50,800,000	18,275,000	36%
Zanker Road Class III Landfill	Zanker Road Resource Management Ltd.	43-AN-0007	12/12/2003	1,300	1,300,000	700,000	54%
Kirby Canyon Recycling and Disposal Facility	Waste Management of California Inc.	43-AN-0008	12/31/2022	2,600	36,400,000	57,272,000	157%[2]
Guadalupe Sanitary Landfill	Guadalupe Rubbish Disposal Co, Inc.	43-AN-0015	01/01/2048	1,300	28,600,000	11,055,000	39%
Recology Hay Road	Recology Hay Road	48-AA-0002	01/01/2077	2,400	37,000,000	30,433,000	82%
Potrero Hills Landfill	Potrero Hills Landfill Inc.	48-AA-0075	02/14/2048	4,330	83,100,000	13,872,000	17%

TABLE 2.12-6: ACTIVE BAY AREA LANDFILLS

Facility	*Operator*	*SWIS Number*	*Estimated Closure Date*[1]	*Max. Through-put (tons/day)*	*Total Capacity (Cu Yd)*	*Remaining Capacity (Cu Yd)*	*% Capacity Remaining*
Central Disposal Site	County Of Sonoma Public Works Dept.	49-AA-0001	01/01/2014	2,500	19,779,250	9,471,000	48%
TOTAL[3]				**46,374**	**509,147,330**	**321,816,851**	**63%**

Notes:

1. Date is found in or estimated from information in the current permit or permit application, including the approved closure plan for the facility. Some facilities may still be active even if estimated closure date has expired.
2. Permitted amounts; design amounts not yet permitted.
3. Excludes USS-Posco Industries Unit II facility due to missing data.

Source: California Department of Resources Recycling and Recovery, Solid Waste Information System, www.calrecycle.ca.gov/SWFacilities/Directory/Search.aspx, accessed July 2012

Collection, Transfer, Recycling, and Material Recovery Facilities

There are 49 transfer stations in the Bay Area that receive solid waste and transfer it into containers or vehicles before it is finally disposed of in a landfill or transformation facility. Two additional facilities are proposed for Santa Clara and Sonoma Counties. The total maximum combined daily throughput capacity of transfer stations in the Bay Area is 46,974 tons per day. **Table 2.12-7** identifies the daily throughput of transfer facilities in the region. Several of the listed facilities also handle recycling services.

TABLE 2.12-7: ACTIVE BAY AREA TRANSFER/PROCESSING FACILITIES

Facility	*Operator*	*SWIS Number*	*Max. Throughput (tons/day)*
Pleasanton Garbage Service Solid Waste Transfer Station	Pleasanton Garbage Service, Inc.	01-AA-0003	720
Davis Street Transfer Station/Resource Recovery Complex	Waste Management of Alameda County	01-AA-0007	5,600
Alameda County Industries Direct Transfer Facility	Alameda County Industries	01-AA-0290	250
Fremont Recycling and Transfer Station	BLT Enterprises of Fremont, Inc.	01-AA-0297	2,400
Berkeley Solid Waste Transfer Station	City Of Berkeley Solid Waste Management Division	01-AC-0029	560
Contra Costa TS And Recovery	Allied Waste Industries, Inc.	07-AA-0027	1,900
Central Processing Facility	West County Resource Recovery Inc.	07-AA-0034	1,200
WCCSLF Organic Materials Processing	West Contra Costa Sanitary Landfill Inc.	07-AA-0044	196
Brentwood Solid Waste Transfer Station	City Of Brentwood, Public Service Dept.	07-AA-0053	400
Golden Bear Waste Recycling Center	Golden Bear Transfer Services, Inc.	07-AA-0056	1,000
Recycling Center and Transfer Station	Contra Costa Waste Services, Inc.	07-AC-0043	1,500
El Cerrito Recycling Center	City of El Cerrito	07-AA-0063	99
Marin Sanitary Service Transfer Station	Marin Sanitary Service	21-AA-0005	2,640
Devlin Road Transfer Station	Napa-Vallejo Waste Management Authority	28-AA-0027	1,440
City of Napa Material Diversion Facility	Napa Recycling and Waste Services, LLC	28-AA-0030	360
Steele Canyon Road Transfer Operation	Berryessa Garbage Service, Inc	28-AA-0034	not available

TABLE 2.12-7: ACTIVE BAY AREA TRANSFER/PROCESSING FACILITIES

Facility	*Operator*	*SWIS Number*	*Max. Throughput (tons/day)*
Pacific Union College Transfer Facility	Pacific Union College	28-AA-0036	90
San Francisco Solid Waste Transfer and Recycling Center	Sanitary Fill Company	38-AA-0001	3,000
Recycle Central at Pier 96	Norcal Waste Systems, Inc.	38-AA-0012	2,100
Oliver Padilla Small Volume CD/I Operation	OP Trucking CDI Operations	38-AA-0014	25
Big for Hauling and Demolitions	Big for Hauling and Demolitions	38-AA-0018	25
Smart Demolition	Smart Demolition	38-AA-0019	25
San Bruno Transfer Station	San Bruno Garbage Company, Inc	41-AA-0014	120
Mussel Rock Transfer Station	Allied Waste Industries, Inc.	41-AA-0015	500
Shoreway Environmental Center	Allied Waste Industries, Inc.	41-AA-0016	3,000
Blue Line MRF And TS	Blue Line Transfer, Inc.	41-AA-0185	1,200
Pescadero Transfer Station	Browning-Ferris Industries, San Carlos	41-AA-0018	10
Peninsula Sanitary Services Direct Transfer Facility	Peninsula Sanitary Services, Inc.	43-AA-0032	149
Green Team MRF Direct Transfer Facility	Waste Connections of California, Inc.	43-AN-0020	149
Recology San Martin Transfer Station	Recology South Valley	43-AA-0003	500
Sunnyvale MRF and Transfer Station	Bay Counties Waste Services	43-AA-0009	1,500
Z-Best Composting Facility	Zanker Road Resource Management, Ltd.	43-AA-0015	not available
Zanker Material Processing Facility	Zanker Road Resource Management, Ltd.	43-AN-0001	1,250
Zanker Road Class III Landfill	Zanker Road Resource Management, Ltd.	43-AN-0007	1,300
BFI`s Recyclery	International Disposal Corporation	43-AN-0014	1,600
Guadalupe Sanitary Landfill	Guadalupe Rubbish Disposal Co, Inc.	43-AN-0015	3,650
Greenwaste Recovery Facility	Green Waste Recovery	43-AN-0019	934
Premier Recycling Facility	Premier Recycling	43-AN-0023	300
California Waste Solutions, Inc.	California Waste Solutions, Inc.	43-AN-0024	530
Mission Trail Transfer Station	Mission Trail Waste Systems	43-AO-0002	375

TABLE 2.12-7: ACTIVE BAY AREA TRANSFER/PROCESSING FACILITIES

Facility	*Operator*	*SWIS Number*	*Max. Throughput (tons/day)*
Pacific Coast Recycling	Pacific Coast Recycling, Inc.	43-AA-0021	480
Rogers Avenue Transfer Station	Recology Silicon Valley	43-AN-0025	99
Guerneville Transfer Station	County Of Sonoma Public Works Department	49-AA-0139	160
Sonoma Transfer Station	County Of Sonoma Public Works Department	49-AA-0144	760
Healdsburg Transfer Station	County Of Sonoma Public Works Department	49-AA-0245	720
Global Materials Recovery Systems	Global Materials Recovery Systems	49-AA-0390	544
Central Transfer Station	County of Sonoma	49-AA-0404	1,500
Sonoma Vermiculture	Sonoma Vermiculture, LLC	49-AA-0405	15
Annapolis Transfer Station	County Of Sonoma Public Works Department	49-AA-0364	99
TOTAL[1]			**46,974**

Note:

1. Excludes Steele Canyon Road Transfer Operation and Z-Best Composting Facility due to missing data.

Source: California Department of Resources Recycling and Recovery, Solid Waste Information System, www.calrecycle.ca.gov/SWFacilities/Directory/Search.aspx, accessed July 2012

Composting, Chipping, and Grinding

There are 50 active composting facilities in the region that collect, grind, mix, pile, and add moisture and air to organic materials to speed natural decay and produce a soil amendment. Another 23 chipping and grinding facilities in the region are designed to reduce the size of compostable material.[24] Recycling, composting, chipping, and grinding all reduce the amount of solid waste that must be disposed of in a landfill.

Construction and Demolition and Inert Debris Facilities

Construction and Demolition (C&D) materials include lumber, drywall, metals, masonry (brick, concrete, etc.), carpet, plastic, pipe, rocks, dirt, paper, cardboard, or green waste related to land development. Metals are the most commonly recycled material while lumber makes up the majority of debris that still goes to a landfill. There are 19 C&D recyclers and inert fill-disposal operations in the Bay Area.[25]

[24] California Department of Resources Recycling and Recovery, Solid Waste Information System, www.calrecycle.ca.gov/SWFacilities/Directory/Search.aspx, accessed July 2012

[25] Ibid.

REGULATORY SETTING

Federal Regulations and Authorities

Safe Drinking Water Act (SDWA)

Passed in 1974 and amended in 1986 and 1996, the SDWA gives the EPA the authority to set drinking water standards. Drinking water standards apply to public water systems, which provide water for human consumption through at least 15 service connections, or regularly serve at least 25 individuals. There are two categories of drinking water standards, the National Primary Drinking Water Regulations (NPDWR) and the National Secondary Drinking Water Regulations (NSDWR). The NPDWR are legally enforceable standards that apply to public water systems. NPDWR standards protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health and are known or anticipated to occur in water.

Clean Water Act (CWA)

Section 402 of the CWA establishes the NPDES permit program to regulate the discharge of pollutants from point sources. The CWA defines point sources of water pollutants as "any discernible, confined, and discrete conveyance" that discharges or may discharge pollutants. These are sources from which wastewater is transmitted in some type of conveyance (pipe and channel) to a waterbody, and are classified as municipal or industrial. Municipal point sources consist primarily of domestic treated sewage and processed water, including municipal sewage treatment plant outfalls and stormwater conveyance system outfalls. These outfalls contain harmful substances that are emitted directly into waters of the U.S. Without a permit, the discharge of pollutants from point sources into navigable waters of the U.S. is prohibited. NPDES permits require regular water quality monitoring. In California, the NPDES permit program is administered by the State Water Resources Control Board.

Provision C.3

On May 17, 1996, EPA published an Interpretive Policy Memorandum on Reapplication Requirements for Municipal Separate Storm Sewer Systems, which provided guidance on permit application requirements for regulated MS4s. MS4 permits include requirements for post-construction control of stormwater runoff in what is known as Provision C.3. The goal of Provision C.3 is for the Permittees to use their planning authorities to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flows from new development and redevelopment projects. This goal is to be accomplished primarily through the implementation of low impact development (LID) techniques.

Resource Recovery and Conservation Act (RCRA) of 1976

RCRA Subtitle D focuses on state and local governments as the primary planning, regulating, and implementing entities for the management of nonhazardous solid waste, such as household garbage and nonhazardous industrial solid waste. To promote the use of safer units for solid waste disposal, Subtitle D provides regulations for the generation, transportation, and treatment, storage, or disposal of hazardous wastes. EPA developed federal criteria for the proper design and operation of municipal solid waste landfills (MSWLFs) and other solid waste disposal facilities, but state and local governments are the primary planning, permitting, regulating, implementing, and enforcement agencies for management and disposal subject to approval by EPA. EPA approved the State of California's program, a joint effort of the CIWMB, SWRCB, RWQCBs, and LEAs, on October 7, 1993.

State Regulations and Authorities

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act established the State Water Resources Control Board and divided the state into nine regions, each overseen by a regional water quality control board (RWQCB). Each RWQCB region is required to prepare and update a Basin Plan for their jurisdictional area. The RWQCBs also issue waste discharge requirements for discharges of privately- or publicly-treated domestic wastewater to locations other than surface water, such as groundwater basins. The Planning Area is largely within the San Francisco Bay RWQCB, with portions in the North Coastal, Central Coastal, and Central Valley RWQCBs.

Construction General Permit

The California Construction Stormwater Permit (Construction General Permit)[26], adopted by the State Water Resources Control Board, regulates construction activities that include clearing, grading, and excavation resulting in soil disturbance of at least one acre of total land area. The Construction General Permit authorizes the discharge of stormwater to surface waters from construction activities. It prohibits the discharge of materials other than stormwater and authorized non-stormwater discharges and all discharges that contain a hazardous substance in excess of reportable quantities, unless a separate NPDES Permit has been issued to regulate those discharges. The Construction General Permit requires that all developers of land where construction activities will occur over more than one acre do the following:

- Complete a Risk Assessment to determine pollution prevention requirements pursuant to the three Risk Levels established in the General Permit;
- Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the Nation;
- Develop and implement a Stormwater Pollution Prevention Plan (SWPPP), which specifies BMPs that will reduce pollution in stormwater discharges to the Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology standards; and
- Perform inspections and maintenance of all BMPs.

In order to obtain coverage under the NPDES Construction General Permit, the Legally Responsible Person must electronically file all Permit Registration Documents with the SWRCB prior to the start of construction. Permit Registration Documents must include:

- Notice of Intent;
- Risk Assessment;

[26] *General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities,* Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ, National Pollutant Discharge Elimination System No. CAS000002.

- Site Map;
- SWPPP;
- Annual Fee; and
- Signed Certification Statement.

Typical BMPs contained in Stormwater Pollution Prevention Plans are designed to minimize erosion during construction, stabilize construction areas, control sediment, control pollutants from construction materials, and address post construction runoff quantity (volume) and quality (treatment). The Stormwater Pollution Prevention Plan must also include a discussion of the program to inspect and maintain all BMPs.

Caltrans NPDES Permit

Caltrans was originally issued a statewide NPDES permit (Order 99-06-DWQ) in 1999, which requires Caltrans to regulate nonpoint source discharge from its properties, facilities, and activities. The Caltrans permit requires development of a program for communication with local agencies, and coordination with other Municipal Separate Storm Sewer Systems (MS4) programs where those programs overlap geographically with Caltrans facilities. As part of the permit, Caltrans is required to create and annually update a Stormwater Management Plan (SWMP) that is used to outline the regulation of pollutant discharge caused by current and future construction and maintenance activities. SWMP requirements apply to discharges from Caltrans stormwater conveyances, including catch basins and drain inlets, curbs, gutters, ditches, channels, and storm drains. The SWMP applies to discharges consisting of stormwater and non-stormwater resulting from the following:

- Maintenance and operation of state-owned highways, freeways, and roads;
- Maintenance facilities;
- Other facilities with activities that have the potential for discharging pollutants;
- Permanent discharges from subsurface dewatering;
- Temporary dewatering; and
- Construction activities.

The discharges addressed by the SWMP flow through municipal stormwater conveyance systems or flow directly to surface water bodies in the state. These surface water bodies include creeks, rivers, reservoirs, lakes, wetlands, lagoons, estuaries, bays, and the Pacific Ocean and tributaries.

This SWMP applies to the oversight of outside agencies' or non-Caltrans entities' (third parties) activities performed within Caltrans' MS4 to ensure compliance with stormwater regulations. Non-Caltrans activities include highway construction and road improvement projects, as well as residential use and business operations on leased property.

The SWMP must be approved by the SWRCB and, as specified in the permit, it is an enforceable document. Compliance with the permit is measured by implementation of the SWMP. Caltrans' policies, manuals, and other guidance related to stormwater are intended to facilitate implementation of the

SWMP. Caltrans also requires all contractors to prepare and implement a program to control water pollution effectively during the construction of all projects.

In lieu of the more recently adopted General Construction Permit as described above, Caltrans continues to modify its current policies and procedures to be consistent with the new permit.

California Administrative Code, Title 22

Under Title 22, the State Department of Health establishes State-wide effluent bacteriological and treatment reliability standards for recycled water uses. The standards are based on the potential for human contact with recycled water. The Regional Water Quality Control Board (RWQCB) has established and enforces requirements for the application and use of recycled water. Permits are required from RWQCB for any recycling operation. Applicants for a permit are required to demonstrate that the proposed recycled water operation is in compliance with Title 22 and will not exceed the ground and surface water quality objectives in the regional basin management plan.

The Water Conservation Act of 2009 (Senate Bill X7-7 2009)

These sections of the Water Code, enacted as SB X7-7—The Water Conservation Act of 2009, set water conservation targets and efficiency improvements for urban and agricultural water suppliers, Sections 10608.16 and Sections 10608.48, respectively. The legislation establishes a State-wide target to reduce urban per capita water use by 20 percent by 2020. Urban retail water suppliers are required, individually or on a regional basis, to develop an urban water use target by December 31, 2010, to meet their target by 2020, and to meet an interim target (half of their 2020 target) by 2015. Urban water suppliers cannot impose conservation requirements on process water (water used in production of a product) and are required to employ two critical efficient water management practices—water measurement and pricing. Urban retail water suppliers must include in a water management plan, to be completed by July 2011, the baseline daily per capita water use, water use target, interim water use target, and compliance daily per capita water use.

California Urban Water Management Planning Act

This part of the State Water Code (Section 10610) states that each urban water supplier that provides water to 3,000 or more customers, or that provides over 3,000 AF of water annually, should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry years by preparing a UWMP and updating it every five years. The Act describes the contents of UWMPs, and requires each agency's UWMP to assess the reliability of the agency's water resources over a 20-year planning horizon.

California Senate Bill (SB) 610

Referred to as SB 610, the intent of this part of the State Water Code is to ensure that sufficient water supplies are available for growing communities. Water Code Section 10910 requires any project subject to CEQA of a specified minimum size to require a local public water provider with more than 3,000 service connections to prepare a Water Supply Assessment (WSA) for the project. The WSA must document sources of water supply, quantify water demands, and compare future water supply and demand to show that sufficient water will be available to serve the development project. Water supply must be assessed for normal, single dry, and multiple dry water years during a 20-year forecast. If supplies are found to be insufficient to serve the project, the WSA must include plans for acquiring sufficient supplies. The WSA must be included in the CEQA document for the project.

California Senate Bill (SB) 221

SB 221 applies to subdivisions of more than 500 dwelling units (Water Code Section 10912). Like SB 610, it is intended to ensure an adequate water supply for new development. SB 221 requires that approval of a tentative map showing the design and improvement of a proposed subdivision shall include a requirement that a sufficient water supply is available.

California Groundwater Management Act

The Groundwater Management Act (AB 3030, Water Code Sections 10750 et seq.) provides guidance for applicable local agencies to develop voluntary Groundwater Management Plans (GMP) in State-designated groundwater basins. GMPs can allow agencies to raise revenue to pay for measures influencing the management of the basin, including extraction, recharge, conveyance, facilities' maintenance and water quality.

State Water Resources Control Board and Regional Water Quality Control Boards

The SWRCB issues individual and general NPDES permits for wastewater and stormwater through the authorization of EPA. Discharges that may impact surface or groundwater, and which are not regulated by an NPDES permit, are issued a waste discharge requirement (WDR) that serves as a permit under the authority of the California Water Code. The RWQCBs issue Land Disposal WDRs that permit certain solid and liquid waste discharges to land to ensure that wastes do not reach surface water or groundwater. Land Disposal WDRs contain requirements for liners, covers, monitoring, cleanup, and closure. The RWQCBs also permit certain point source discharges of waste to land that have the potential to affect surface or groundwater quality. This category of discharges, known as "Non-15" WDR, are the most diverse and include sewage sludge and biosolids, industrial wastewater from power plants, wastes from water supply treatment plants, treated wastewater for aquifer storage and recovery, treated groundwater from cleanup sites, and many others.

Related to wastewater collection and treatment facilities, stormwater drainage facilities, and landfills the SWRCB has issued the following regulations:

- Caltrans NPDES Permit (Order 99-06-DWQ): Requires Caltrans to regulate nonpoint source discharge from its properties, facilities, and activities. Among other requirements, Caltrans must annually update an enforceable Stormwater Management Plan (SWMP).
- Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (Order No. 2006-0003-DWQ): Requires all federal and State agencies, municipalities, counties, districts, and other public entities that own, operate, or are otherwise responsible for sanitary sewer systems greater than one mile in length that collect and/or convey untreated wastewater to a publicly owned treatment facility in California to prepare sewer system management plans and report all sanitary sewer overflows (SSOs) to the SWRCB. Order No. WQ 2008-0002-EXEC, amended the statewide Monitoring and Reporting Program for SSOs that reach surface waters or storm drains. The RWQCB issued Order No. R9-2007-0005 to reaffirm the prohibition of SSOs upstream of a wastewater treatment facility.

AB 885 - On-Site Wastewater Treatment Systems (OWTS)

AB 885 (Chapter 781, Statutes of 2000) required the SWRCB to draft and implement regulations for siting, installation, operation, and maintenance of OWTS. Proposed regulations were issued in 2009 and adopted in June 2012.[27]

Integrated Waste Management Act of 1989 (AB 939 or IWMA)

The IWMA was enacted by the California legislature to reduce dependence on landfills as the primary means of solid waste disposal, and to ensure an effective and coordinated approach to safe management of all solid waste generated within the State. The IWMA establishes a hierarchy of preferred waste management practices: (1) source reduction (waste prevention), to reduce the amount of waste generated at its source; (2) recycling (or reuse) and composting; (3) transformation; and (4) disposal by landfilling. The IWMA required disposal of waste by the local jurisdictions to be cut by 25 percent by 1995 and by 50 percent by 2000. Waste disposal levels from the year 1990 were used as the base, adjusted for population and economic conditions.

The IWMA also requires the preparation of a Countywide Integrated Waste Management Plan (CIWMP), including a Countywide Siting Element that must demonstrate a remaining landfill disposal capacity of at least 15 years to serve all the jurisdictions in the county. The Countywide Siting Element includes a combination of strategies to demonstrate adequate capacity, including existing, proposed, and tentative landfills or expansions; increased diversion efforts; and the export of solid waste for disposal. As part of the CIWMP, the IWMA also requires that each jurisdiction (cities and the county) prepare a Source Reduction and Recycling Element (SRRE), a Household Hazardous Waste Element (HHWE), and a Non-Disposal Facility Element (NDFE).

Title 14, California Code of Regulations

CalRecycle regulations pertaining to nonhazardous waste management in California include minimum standards for solid waste handling and disposal; regulatory requirements for composting operations; standards for handling and disposal of asbestos containing waste; resource conservation programs; enforcement of solid waste standards and administration of solid waste facility permits; permitting of waste tire facilities and waste tire hauler registration; special waste standards; used oil recycling program; electronic waste recovery and recycling; planning guidelines and procedures for preparing, revising, and amending countywide IWMP; and solid waste cleanup program.

Title 27, California Code of Regulations

CalRecycle and the SWRCB jointly issue regulations pertaining to waste disposal on land, including criteria for all waste management units, facilities and disposal sites; documentation and reporting; enforcement, financial assurance; and special treatment, storage, and disposal units.

California Department of Water Resources (DWR)

The DWR is responsible for the planning, construction, and operation of State Water Project (SWP) facilities. It also sets conditions on use of SWP facilities. In addition, DWR is responsible for statewide water planning, evaluating urban water management plans, overseeing dam safety and flood control, and transfer of certain water rights permits (e.g., pre-1914).

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[27] http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2012/0032owts.pdf

Local Regulations and Authorities

Planning for water management, wastewater and stormwater management, and solid waste disposal are prepared by local agencies to support their long-term resource planning and ensure adequate service to meet existing and future demands. In addition to federal and state regulations governing these planning efforts, cities, counties, and water districts may also provide regulatory advisement on water resources, treatment, and solid waste disposal. Many jurisdictions incorporate policies relating to these topic areas in their municipal codes, development standards, or other regulations.

Impact Analysis

SIGNIFICANCE CRITERIA

Implementation of Plan Bay Area would have a potentially significant adverse impact if the proposed Plan would:

Criterion 1: Result in insufficient water supplies available to serve development implemented as part of the Plan from existing entitlements and resources.

Criterion 2: Result in a determination by the wastewater treatment provider which serves or may serve development implemented as part of the Plan that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

Criterion 3: Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

Criterion 4: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

Criterion 5: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.

Criterion 6: Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and comply with federal, state, and local statutes and regulations related to solid waste.

METHOD OF ANALYSIS

This analysis includes a program-level assessment of impacts related to water supply, wastewater/stormwater, and solid waste. The assessment of available water supply considers the current regional demand and supply of water based on analyses available in current Urban Water Master Plans (UWMPs) for major water providers (e.g., East Bay Municipal Utilities District, San Francisco Public Utilities Commission, Santa Clara Valley Water District, Sonoma County Water Agency, Marin Municipal Water District, etc.). The EIR identifies areas where (1) there is an existing forecasted shortage in long-term supplies that will need to be met by imported water or additional water conservation, reuse and recycling; or (2) where the proposed Plan projects population or jobs beyond what is assumed in current UWMPs and results in a potential shortage. This requires a survey of the region's UWMPs and summary of where shortages or other inconsistencies exist or are identified in these plans. This analysis does not address small jurisdictions with no or very low growth projected.

Impacts related to wastewater, stormwater, and solid waste are more localized in nature, and therefore the analysis is qualitative and focuses on the existing regulations, standards and policy measures to address these localized impacts.

SUMMARY OF IMPACTS

Land development and transportation projects under the proposed Plan may result in insufficient water supplies and require additional capacity in water treatment, wastewater treatment, stormwater drainage, and landfill facilities. Some public utility systems, such as wastewater treatment, may have adequate capacity regionwide but experience shortages in supply or capacity in localized areas.

The urbanized nature of the proposed Plan, placing 99 percent of future growth within already-developed areas, will tend to limit the need for new "wet" facilities as infill development and redevelopment will usually be able to connect to existing public utility systems; expanded capacity may be needed in some areas to handle increased flows, however. Compliance with existing federal and State regulations will mitigate many impacts. In order to reduce localized impacts to a less than significant level, land use and transportation projects developed under the proposed Plan can incorporate construction, design, siting, and operational strategies that will mitigate their impacts.

It is not expected that the proposed Plan will lead to any exceedance of wastewater treatment requirements.

IMPACTS AND MITIGATION MEASURES

Impact

2.12-1 The proposed Plan could result in insufficient water supplies from existing entitlements and resources to serve expected development.

Impacts of Land Use Projects

As seen in **Table 2.12-2**, the major water suppliers in the region—except the Solano County Water Agency—can supply adequate water for their projected service populations through 2035 during normal years. Adequate supplies for many districts also rely on successful achievement of water conservation targets and the completion of supply expansion projects, such as new water contracts, land acquisition, groundwater recharge, and reclaimed water distribution. In some areas, such as the Santa Clara Valley, adequate supply through 2040 is not guaranteed without significant water conservation efforts. All water suppliers should be pursuing the water conservation targets set by the State under SB X7-7 and regularly updating their Urban Water Management Plans. The enforcement of SB 610 and SB 221 by local jurisdictions should ensure that an adequate water supply is available for large residential developments prior to their approval.

Some water suppliers should be able to meet demands of growth under the proposed Plan, such as the Alameda County Water District, City of Napa, and San Francisco PUC, although these will need to take measures to address water conservation during dry years. Other water suppliers, such as the Contra Costa Water District and Solano County Water Agency, will likely need to pursue additional sources to accommodate expected growth. Portions of the region may also have a difficult time providing adequate water supplies during a single dry year. As shown in **Table 2.12-4**, major water supply agencies in Alameda, Contra Costa, Napa, Solano, and Sonoma counties expect demand to exceed supply during a single dry year before the time horizon of the proposed Plan, the year 2040. Therefore, in localized parts of the region, there is an existing forecasted shortage in long-term supplies during a single dry year that will need to be met by imported water or additional water conservation, reuse, and recycling.

The combined population projections of the agencies for 2035 exceed the 2040 regional population projections used for the proposed Plan, as seen in **Table 2.12-3**. As a result, there may be adequate water supplies across the entire region to serve expected growth under the proposed Plan. For example, EMBUD identifies a potential dry year shortage in 2005, although water supply is expected to meet demand during regular years. EMBUD's 2035 projection (1,751,000) exceeds the projection used for the proposed Plan Bay Area for 2040 for the same set of cities (1,684,000),[28] indicating that the proposed Plan would not worsen the current water shortage concerns in the District. Other major growth areas include San José, served by the Santa Clara Valley Water District, and San Francisco, served by the San Francisco Public Utilities Commission, both of which project no water shortages during a single dry year prior to 2040, largely due to supplies from reservoir storage. Projected growth under the proposed Plan will not be spread evenly around the region, so it is possible that some agencies may have accurate or low population projections, meaning that the proposed Plan may result in population or job growth beyond what is assumed in current UWMPs and could result in a localized water supply shortage.

Therefore, at a regional level, because the land use pattern of the proposed Plan may result in insufficient water supplies, requiring the acquisition of additional water sources and the imposition of conservation requirements, these impacts are considered potentially significant (PS). Mitigation Measures 2.12(a), 2.12(b), and 2.12(c) are described below.

More locally, land development through 2040 served by the Marin Municipal Water District, San Francisco Public Utilities Commission, Santa Clara Valley Water District, or Zone 7 Water Agency should have adequate water supplies in both regular and single dry years. Therefore, development in those areas should have impacts that are less than significant (LS).

Impacts of Transportation Projects

The construction of new roadway capacity, bicycle and pedestrian facilities, transit facilities; maintenance on existing transportation facilities; and operation of new and existing facilities could increase the demand for water for activities such as concrete mixing, dust settling, landscape irrigation, customer services such as restrooms and drinking water, etc. Although these increases in demand are anticipated to be small on a per project basis, the collective demand from all of the projects taken together could increase water demand in such a way as to exceed water supply agencies' projected demand. Because transportation projects under the proposed Plan may be constructed in locations with constrained water

[28] The unincorporated areas of Diablo, El Sobrante, Kensington, and Selby are served by EBMUD but population estimates for these jurisdictions are not identified in the proposed Plan.

supplies, especially during a dry year, these impacts are considered potentially significant (PS). Mitigation Measures 2.12(a), 2.12(b), and 2.12(c) are described below.

Combined Effects

Almost all of the potential impacts on water supplies could come from land development under the proposed Plan. Given the relatively small permanent demand on potable water supplies required by transportation projects, it is unlikely that they could contribute to a significant impact. It is possible that the construction phase of a transportation project (water for mixing concrete, watering down topsoil, initial irrigation needs) could exceed local water supplies on a temporary basis, however, especially during dry years. It is also possible that a transportation project that features significant landscaping that is not drought-resistant could significantly impact local water supplies over a longer term; this impact could be mitigated by using drought-resistant plantings and/or connecting to a reclaimed water distribution system. However, because the proposed Plan overall may result in insufficient water supplies, requiring the acquisition of additional water sources and the imposition of conservation requirements, these impacts are considered potentially significant (PS). Measures 2.12(a), 2.12(b), and 2.12(c) are described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.12(a) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Implementing water conservation measures which result in reduced demand for potable water. This could include reducing the use of potable water for landscape irrigation (such as through drought-tolerant plantings, water-efficient irrigation systems, the capture and use of rainwater) and the use of water-conserving fixtures (such as dual-flush toilets, waterless urinals, reduced flow faucets).
- Coordinating with the water provider to identify an appropriate water consumption budget for the size and type of project, and designing and operating the project accordingly.
- Using reclaimed water for non-potable uses, especially landscape irrigation. This strategy may require a project to be located in an area with existing reclaimed water conveyance infrastructure and excess reclaimed water capacity. If a location is planned for future reclaimed water service, projects should install dual plumbing systems in anticipation of future use. Large developments could treat wastewater onsite to tertiary standards and use it for non-potable uses onsite.
- Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures that reduce demand for potable water.

2.12(b) MTC shall require the construction phase of transportation projects to connect to reclaimed water distribution systems for non-potable water needs, when feasible based on project- and site-specific considerations.

2.12(c) MTC shall require transportation projects with landscaping to use drought-resistant plantings or connect to reclaimed water distribution systems for irrigation and other non-potable water needs when available and feasible based on project- and site-specific considerations.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.12-2 The proposed Plan could result in inadequate wastewater treatment capacity to serve new development.

Impacts of Land Use Projects

Regional Effects

Table 2.12-5 lists the flow and existing capacity of the wastewater treatment systems in the region. All of the systems currently have capacity beyond average demand. This extra capacity must be adequate to meet projected growth and peak demands, as required by the NPDES permit for each wastewater treatment facility.

As **Table 2.12-5** shows, taken as a whole the region's wastewater treatment facilities handle around 626 mgd with a combined capacity of 1,126 mgd during dry weather. Assuming that wastewater flows increase at the same rate as population growth, by 2040 the average flow per day will rise to 813 mgd across the region, still within existing regionwide capacity as shown in **Table 2.12-8**. Water conservation efforts underway across the region are likely to result in wastewater flows increasing at a lower rate than population and job growth, as well.

Localized Effects

Under the proposed Plan, population and job growth will not be spread evenly. Some counties are projected to grow more than the regionwide rate of 30 percent, such as San Francisco at 35 percent, while others will grow less, such as Marin at 11 percent. **Table 2.12-8** shows how existing wastewater treatment capacity for each county, as listed in **Table 2.12-5**, compares to future average daily flows, assuming that existing wastewater flows grow by the same percentage as the projected county population.

All counties have enough existing overall wastewater treatment capacity to meet future projections except for San Francisco. San Francisco could take steps to reduce per person wastewater flows, such as through water conservation measures, to ensure that its projected population can be served by its existing wastewater treatment capacity.

TABLE 2.12-8: PROJECTED FLOW VS. EXISTING CAPACITY OF WASTEWATER TREATMENT AT A COUNTY LEVEL (DRY WEATHER, MGD)

County	*Aggregate Existing Treatment Capacity*	*Projected Population Growth*	*Aggregate Projected Future Flow*	*Projected Countywide Excess Capacity*
Alameda County	424.60	31%	200.05	224.55
Contra Costa County	111.31	27%	103.25	8.06
Marin County	53.82	11%	25.44	28.38
Napa County	19.86	19%	18.86	1.00
San Francisco	106.40	35%	106.79	-0.38
San Mateo County	76.60	26%	65.02	11.58
Santa Clara County	244.00	36%	211.48	32.52
Solano County	56.15	23%	49.13	7.02
Sonoma County	33.60	23%	33.05	0.55
BAY AREA TOTAL	**1,126.34**	**30%**	**813.07**	**313.28**

Source: Dyett & Bhatia, 2013.

The ability of individual wastewater treatment facilities to meet projected population growth within their service districts is difficult to assess and beyond the range of this EIR. However, it is likely that some treatment facilities will need to expand their capacity to meet actual population growth, or to respond to RWQCB requirements to provide capacity to receive their NDPES permit, such as expanding capacity during the timeframe of the proposed Plan in order to meet additional future growth beyond the time horizon.

Because the land use pattern of the proposed Plan may result in insufficient wastewater treatment capacity, these impacts are considered potentially significant (PS). Mitigation Measure 2.12(d) is described below.

Impacts of Transportation Projects

It is not anticipated that transportation projects could have an effect on wastewater treatment capacity, except in circumstances where an area has a combined stormwater and wastewater conveyance system. In those instances, extra stormwater runoff caused by additional impervious surface from roadway and some transit projects may require additional wastewater treatment capacity in localized locations. As a result of the possibility of impacts on combined drainage systems resulting in insufficient wastewater treatment capacity, these impacts are considered potentially significant (PS). In this case, mitigation of stormwater drainage system capacity impacts will also mitigate wastewater treatment capacity impacts. Mitigation for stormwater runoff into wastewater systems from transportation projects is discussed under Impact 2.12-3; mitigation measures 2.12(f) and 2.12(g) will mitigate these impacts.

Combined Effects

Almost all of the potential impacts on wastewater treatment capacity could come from land development under the proposed Plan. Given the relatively small permanent generation of wastewater by transportation projects, it is unlikely that they could contribute to a significant impact; the exception could be if stormwater runoff was collected by a combined wastewater/storm sewer system, which could lead to aggregate impacts that are potentially significant (PS). Mitigation Measure 2.12(d) is described below.

Mitigation Measure

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.12(d) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Undertaking environmental assessments of land use plans and developments to determine whether sufficient wastewater treatment capacity exists for a proposed project. These environmental assessments must ensure that the proposed development can be served by its existing or planned treatment capacity, and that the applicable NPDES permit does not include a Cease and Desist Order or any limitations on existing or future treatment capacity. If adequate capacity does not exist, the implementing agency must either adopt mitigation measures or consider not proceeding with the project as proposed.
- Complying with existing local regulations and policies that exceed or reasonably replace the above measure in a manner that reduces impacts on wastewater treatment capacity.

Implementing agencies shall also require compliance with Mitigation Measure 2.12(a), and MTC shall require implementation of Mitigation Measures 2.12(b), and/or 2.12(c) listed under Impact 2.12-1, as feasible based on project- and site-specific considerations, which will help reduce water usage and, subsequently, wastewater flows.

Transportation projects could only cause impacts on wastewater treatment capacity in the case of excess stormwater runoff into a combined wastewater/stormwater conveyance system. Therefore, mitigation of stormwater drainage system capacity impacts will also mitigate wastewater treatment capacity impacts. Mitigation for stormwater runoff into wastewater systems from transportation projects is discussed under Impact 2.12-3; mitigation measures 2.12(f) and 2.12(g) will mitigate these impacts.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.12-3 Development under the proposed Plan could require and result in the construction of new or expanded stormwater drainage facilities, which could cause significant environmental impacts.

Impacts of Land Use Projects

The proposed Plan could urbanize approximately 7,547 acres of land, a roughly one percent increase over existing conditions. This development outside of urban areas could be comprised of a variety of land uses and impervious surfaces (paved areas, building rooftops, parking lots, etc.) that could result in incremental increases in the volume and rate of stormwater runoff, and possibly require the expansion or construction of new stormwater drainage facilities. Subsequently, most if not all of this development will require new stormwater drainage facilities.

Urban infill can also increase impervious surfaces by converting permeable vacant or underutilized parcels into land with more paving or structures; some redevelopment can reduce the amount of impervious surface, however, by converting pavement or buildings into permeable paving or landscape. Redevelopment can also increase the amount and rate of runoff by discharging greater amounts of water on a site than existing prior to development, typically due to excessive landscape irrigation. However, most stormwater drainage systems should have been designed to handle runoff from those infill sites, and properly operated and maintained stormwater drainage systems should not require expansion to accommodate infill development. However, aging infrastructure may require upgrades. The majority, 99 percent, of future development under the proposed Plan is expected to occur within urbanized areas.

The successful and continued implementation of Provision C.3 requirements should help mitigate increases in runoff flows from new development and redevelopment projects through post-construction controls such as low impact development (LID) techniques. As required by Provision C.3, for new development that would introduce 10,000 square feet of new impervious surfaces, the specific project applicant would incorporate LID strategies, such as stormwater reuse, onsite infiltration, and evapotranspiration as initial stormwater management strategies. Secondary methods that could be incorporated include the use of natural, landscape based stormwater treatment measures, as identified by Provision C.3.

Redevelopment projects may even result in improved water quality compared to existing conditions where existing development was constructed under older less stringent stormwater requirements. Selection and implementation of these measures could occur on a project-by-project basis depending on project size and stormwater treatment needs as well as what may be necessary to meet NPDES or any other local permitting requirements.

Construction activities can also be a major source of stormwater runoff. Unprotected soil can easily erode during rains or spraying with water. The submission of and compliance with a Storm Water Pollution Prevention Plan (SWPPP) to the SWRCB should mitigate impacts on stormwater drainage facilities for projects over one acre in size. An SWPPP is not required for projects under one acre in size, but such projects on their own are unlikely to cause significant impacts.

The infill nature of the proposed Plan's development pattern, combined with existing stormwater regulations, will likely result in less than significant impacts on the stormwater capacity of existing systems. However, development outside of urbanized areas will almost certainly require the construction of new stormwater drainage systems, and existing regulations generally do not cover developments less than one acre in size, so as a result the impact is potentially significant (PS). Mitigation Measures 2.12(e), 2.12(f), and 2.12(g) are described below.

Impacts of Transportation Projects

The proposed Plan's new roadway projects could create new impervious areas by converting existing permeable surfaces into impervious surfaces through the expansion of existing roadways and construction of new traffic lanes. The proposed Plan calls for the addition of 687 lane miles to be constructed in the region, a three percent increase over existing conditions. Any projects undertaken by Caltrans, or by a third party operating within its stormwater system, are subject to its Stormwater Management Plan which regulates discharges from Caltrans stormwater conveyances.

Transit projects may also increase impervious surfaces, although many rail systems are below ground (subways), use existing roadways (light rail), or are elevated, and so make little to no contribution to impervious surfaces; some at-grade rail lines may be largely permeable.

As with land development, the construction activities associated with transportation projects can be a major source of additional stormwater runoff. In locations with a combined stormwater and wastewater conveyance system, this increase in runoff could impact wastewater treatment capacity as well, as discussed under Impact 2.12-2. Regulations already exist to mitigate stormwater runoff from transportation projects, however:

- Transportation projects that fall under Caltrans jurisdiction would be covered by the Caltrans NPDES Stormwater Program. As described in the regulatory setting for the State Water Board, this NPDES permit regulates all stormwater discharges from Caltrans-owned conveyances, maintenance facilities and construction activities. Caltrans also has a Storm Water Management Plan that describes the procedures and practices used to reduce or eliminate the discharge of pollutants to storm drainage systems and receiving waters. Guidance documents have also been developed by Caltrans to implement stormwater BMPs in the design, construction and maintenance of highway facilities.
- Transportation projects where local agencies are the lead agency are subject to local and state regulations for post-construction runoff management requirements. The NPDES permit requirements described in the land use discussion above (project design including general site design control measures, LID features, treatment control measures, ordinances and regulations) also apply to transportation impacts in order to reduce the discharge of sediments and other pollutants. If stormwater drainage facilities must be built or expanded, the implementing agency must undertake project-level environmental review of the construction and operation of the facilities to assess and mitigate potential environmental impacts, per CEQA.

Overall, while existing regulations may mitigate many impacts, the more stringent and effective Caltrans NPDES Stormwater Regulations only apply to some transportation projects. In addition, new roadway lane miles in areas lacking adequate stormwater drainage capacity will likely require expanded systems regardless of regulations. As a result, the potential stormwater capacity impacts related to transportation improvements from implementation of the proposed Plan at the regional and local level are considered potentially significant (PS). Mitigation Measures 2.12(e), 2.12(f), and 2.12(g) are described below.

Combined Effects

All of the potential impacts on stormwater drainage capacity could come from land development under the proposed Plan, and only in localized areas with development outside of the existing urban footprint. Impacts from transportation projects should be largely mitigated by existing stormwater regulations. Together the proposed Plan creates impacts that are potentially significant (PS). Mitigation Measures 2.12(e), 2.12(f), and 2.12(g) are described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.12(e) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Complying with all existing applicable federal and State regulations, including Provision C.3 of the EPA's Interpretive Policy Memorandum on Reapplication Requirements for Municipal Separate Storm Sewer Systems, NPDES permit requirements, the submission of and adherence to a Storm Water Pollution Prevention Plan, Water Quality Control Policy for Siting, Design, Operation, and Maintenance of onsite Wastewater Treatment Systems, and/or other relevant current State Water Resource Control Board policy adopted for the purpose of reducing stormwater drainage impacts.
- For projects less than one acre in size, reducing stormwater runoff caused by construction by implementing stormwater control best practices, based on those required for a Storm Water Pollution Prevention Plan.
- To the extent possible, siting or orienting the project to use existing stormwater drainage capacity.
- Constructing permeable surfaces, such as stormwater detention facilities, playing fields, landscaping, or alternative surfaces (vegetated roofs, pervious paving).
- Modeling and implementing a stormwater management plan or site design that prevents the post-development peak discharge rate and quantity from exceeding pre-development rates.
- Capturing rainwater for on-site re-use, such as for landscape irrigation or inside non-potable uses such as toilet flushing.
- Capturing and infiltrating stormwater runoff on site with rain gardens, vegetated swales, constructed wetlands, etc.
- Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures in reducing impacts on stormwater drainage facilities.

2.12(f) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Transportation projects shall incorporate stormwater control, retention, and infiltration features, such as detention basins, bioswales, vegetated median strips, and permeable paving, early into the design process to ensure that adequate acreage and elevation contours are planned. Implementing agencies shall require project sponsors to comply with existing local regulations and policies that exceed or reasonably replace measures that reduce stormwater drainage impacts.

2.12(g) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. All transportation projects constructed, operated, or funded by MTC shall adhere to Caltrans' Stormwater Management Plan, which includes best practices to reduce the volume of stormwater runoff and pollutants in the design, construction and maintenance of highway facilities.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.12-4 Development under the proposed Plan could require and result in the construction of new or expanded water and wastewater treatment facilities, which could cause significant environmental impacts.

Impacts of Land Use Projects

It is possible that the increase in population in the region will result in a need for new or expanded water and wastewater treatment facilities to accommodate demand that exceeds the capacity at existing facilities, as described under Impacts 2.12-1 and 2.12-2. Much of the new treatment capacity is likely to be through expansion of existing facilities, since 99 percent of future development is expected to occur within the existing urban footprint and therefore could connect to existing conveyance and treatment systems.

It is possible that some wastewater treatment facilities will be unable to expand their discharge capacity due to EPA limits on the amount of treated water that can be discharged to a body of water. In these instances, wastewater treatment capacity may need to be expanded through retention ponds, reclaimed water distribution, or groundwater recharge.

Environmental impacts could occur from both the construction process and the conversion of undeveloped land to accommodate expanded facilities. The construction process could lead to a wide range of environmental effects such as negative impacts on air quality, stormwater runoff, and noise. The conversion of underdeveloped land could result in the loss of agricultural land, increased stormwater runoff, loss of habitat, and damage to visual and cultural resources, among other impacts. Because site specific information is needed to assess impacts, project level environmental review will be required for construction of new water and wastewater facilities.

Because the land use pattern of the proposed Plan may result in construction of new or expanded water and wastewater treatment facilities, the construction of which may have site specific impacts, these impacts are considered potentially significant (PS). Mitigation Measure 2.12(h) is described below.

Impacts of Transportation Projects

It is not anticipated that transportation projects could have an effect on water treatment demand and therefore could not require new or expanded facilities. It is not anticipated that transportation projects could have an effect on wastewater treatment demand, except in circumstances where an area has a combined stormwater and wastewater conveyance system, where these impacts are considered potentially significant (PS). Mitigation Measure 2.12(h) is described below.

Combined Effects

Almost all of the potential impacts on water and wastewater treatment facilities capacity could come from development under the land use pattern of the proposed Plan; impacts from transportation projects could only occur in the case of a combined stormwater and wastewater conveyance system. Therefore, the combined impact will generally be the same as from land use development, and considered potentially significant (PS). Mitigation Measure 2.12(h) is described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.12(h) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. For projects that could increase demand on water and wastewater treatment facilities, project sponsors shall coordinate with the relevant service provider to ensure that the existing public services and utilities could be able to handle the increase in demand. If the current infrastructure servicing the project site is found to be inadequate, infrastructure improvements for the appropriate public service or utility shall be identified in each project's CEQA documentation. The relevant public service provider or utility shall be responsible for undertaking project-level review as necessary to provide CEQA clearance for new facilities.

Further, all of the mitigation measures listed under Impact 2.12-1 and Impact 2.12-2 will help reduce water demand and wastewater generation, and subsequently help reduce the need for new or expanded water and wastewater treatment facilities. The mitigation measures listed under Impact 2.12-3 will also help mitigate the impact of additional stormwater runoff from land use and transportation projects on existing wastewater treatment facilities.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.12-5 Development under the proposed Plan could exceed wastewater treatment requirements of the RWQCBs.

Although increased wastewater treatment may be required, it is not anticipated that the land development and transportation projects developed under the proposed Plan will exceed, or result in the violation of, the established wastewater treatments standards of the Regional Water Quality Control Boards. The urbanized portions of the region—both incorporated and unincorporated—are covered by an extensive network of wastewater treatment plants which are regulated by the appropriate RWQCB. Existing and future land use plans, and development proposed under these plans, have been and will continue to undergo environmental assessment under CEQA that ensures that new development will not exceed a system's ability to meet wastewater treatment requirements per the system's NPDES permit.

Rural development typically utilizes individually owned and operated septic tanks rather than centralized treatment plants. However, septic systems are generally overseen by local authorities, not the RWQCB, so the threshold of significance would not apply. Furthermore, the proposed Plan is not expected to increase the amount of development in un-urbanized areas, with 99 percent of future development expected to occur within the urban footprint, and therefore its wastewater will almost certainly be handled by a regulated wastewater treatment system. Therefore, this impact is determined to be less than significant (LS).

Mitigation Measures

None Required.

Impact

2.12-6 The proposed Plan could result in insufficient landfill capacity to serve new development while complying with applicable regulations.

Impacts of Land Use Projects

The existing population and jobs of the region will continue to generate solid waste that requires disposal in a licensed and regulated landfill. These current levels of solid waste production will increase due to the expected growth in the region's population, which is expected to increase from 7,151,000 to 9,299,000 during the lifetime of the proposed Plan. The California Department of Resources Recycling and Recovery (CalRecycle) estimates that the average resident in California disposes of 4.5 pounds of trash per day as of 2010.[29] Assuming an average diversion rate of 50 percent, as required by AB 939, the region will go from generating around 8,050 tons of solid waste per day and 2.94 million tons per year, to around 10,500 tons per day and 3.82 million tons per year. In addition, the construction process of

[29] CalRecycle, California's Statewide Per Resident, Per Employee, and Total Disposal Since 1989, available at: http://www.calrecycle.ca.gov/lgcentral/goalmeasure/disposalrate/graphs/disposal.htm, accessed January 2013.

building new housing and non-residential uses will generate solid waste from activities such as demolition, grading, and excavation.

Landfill closure dates typically reflect the year a landfill is projected to reach capacity and take many factors into account, including rates of solid waste generation, rates of diversion, and projected growth. All but four of the seventeen landfills active in the region, listed in **Table 2.12-5**, have an estimated closure date before the year 2040, which is the time horizon of the proposed Plan. It is unlikely these four remaining landfills, which make up around 13 percent of the region's existing remaining capacity, could handle the solid waste disposal needs of the entire region.

Countywide Integrated Waste Management Plans must demonstrate a remaining landfill disposal capacity of at least 15 years to serve all the jurisdictions in the county, so insufficient landfill capacity should be identified well ahead of time. The region may need to expand existing or construct new landfills, identify waste disposal capacity outside of the region, and/or significantly reduce solid waste generation or diversion rates in order to serve the projected level of development.

Because the land use pattern of the proposed Plan may result in insufficient landfill capacity, these impacts are considered potentially significant (PS). Mitigation Measures 2.12(i) and 2.12(j) are described below.

Impacts of Transportation Projects

Roadway and transit construction and maintenance projects in the proposed Plan have the potential to generate a substantial amount of solid waste during construction. This waste can come from typical construction activities, such as grading, excavation, and removal of existing structures. The operation of transportation facilities may also generate solid waste. The amount of this waste is difficult to predict, but its disposal will face the same landfill capacity issues as land development projects.

Because the transportation projects of the proposed Plan may result in insufficient landfill capacity, these impacts are considered potentially significant (PS). Mitigation Measures 2.12(i) and 2.12(j) are described below.

Combined Effects

Taken together, the solid waste generated by both land use and transportation projects may reduce the capacity of existing landfills faster than anticipated. This may lead to earlier closure dates and a need for larger new landfill capacity sooner.

These impacts are considered potentially significant (PS). Mitigation Measures 2.12(i) and 2.12(j) are described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.12(i) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. Countywide Integrated Waste Management Plans and Source Reduction and Recycling

Elements shall take the growth patterns projected by the proposed Plan into account in their evaluation of landfill disposal capacity and determination of strategies to implement to enhance capacity.

2.12(j) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Providing an easily accessible area that is dedicated to the collection and storage of non-hazardous recycling materials, where feasible.
- Maintaining or re-using existing building structures and materials during building renovations and redevelopment, where feasible.
- Using salvaged, refurbished or reused materials, to help divert such items from landfills, where feasible.
- Diverting construction waste from landfills, where feasible, through means such as:
  - The submission and implementation of a construction waste management plan that identifies materials to be diverted from disposal.
  - Establishing diversion targets, possibly with different targets for different types and scales of development.
  - Helping developments share information on available materials with one another, to aid in the transfer and use of salvaged materials.
- Applying the specifications developed by the Construction Materials Recycling Association (CMRA) to assist contractors and developers in diverting materials from construction and demolition projects, where feasible.[30]
- Complying with existing local regulations and policies that exceed or reasonably replace any of the above measures in reducing impacts on landfills.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

In addition, while individual land development and transportation projects can mitigate their impacts on landfill capacity, the combined and cumulative impacts of the proposed Plan will still be significant and unavoidable (SU) given the expected closure of most of the landfills in the Bay Area during the project

[30] The CMRA specifications are available on the CalRecycle website at: www.calrecycle.ca.gov/conDemo/specs/CMRA.htm

horizon. While there are potential mitigations to this impact, such as the expansion of existing landfills, opening of new landfills, use of landfills in other regions, and mandated rates of diversion, such actions will require regional cooperation by multiple agencies unrelated to MTC and ABAG.

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2.13 Hazards

This chapter evaluates the potential impacts related to Hazards resulting from the implementation of the proposed Plan. This section describes the existing conditions for hazardous materials, airports, emergency planning, and wildland fires in the Bay Area region. Environmental impacts associated with implementation of the proposed Plan as they relate to these conditions are provided below.

Environmental Setting

PHYSICAL SETTING

Materials and waste may be considered hazardous if they are poisonous (toxicity), can be ignited by open flame (ignitability), corrode other materials (corrosivity), or react violently, explode or generate vapors when mixed with water (reactivity). The term "hazardous material" is defined in law as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment.[1] In some cases, past industrial or commercial uses on a site can result in spills or leaks of hazardous materials and petroleum causing contamination of underlying soil and groundwater. Federal and State laws require that soils and groundwater having concentrations of contaminants such as lead, gasoline, or industrial solvents that are higher than certain acceptable levels must be handled and disposed as hazardous waste during excavation, transportation, and disposal. The California Code of Regulations (CCR), Title 22, Sections 66261.20–24 contains technical descriptions of characteristics that would cause a soil to be classified as a hazardous waste. The use of hazardous materials and disposal of hazardous wastes are subject to numerous laws and regulations at all levels of government (see the Regulatory Setting section below).

Generation and Disposal of Hazardous Materials and Waste

Various hazardous materials are commonly transported, stored, used, and disposed of in activities such as construction, industry (both light and heavy), dry cleaning, film processing, landscaping, automotive maintenance and repair, and common residential/commercial maintenance activities. The use, transport, storage and disposal of hazardous materials is regulated by the United States Environmental Protection Agency (EPA) and California EPA (Cal/EPA) plus six boards, departments and offices: Air Resources Board, Department of Pesticide Regulation, Department of Toxic Substances Control (DTSC), Office of Environmental Health Hazard Assessment (OEHHA), State Water Resources Control Board, and the Department of Public Health Center for Environmental Health (DPHCEH). In addition, the DPHCEH

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1 State of California, Health and Safety Code, Chapter 6.95, Section 25501(o).

and other local regulatory agencies closely monitor businesses and industry in the control of hazardous materials. Hazardous materials require special methods of disposal, storage, and treatment, and any unintentional release of hazardous materials requires an immediate response to protect human health and safety, and/or the environment. Improper disposal can harm the environment and people who work in the waste management industry.

Generators of hazardous waste fall into two categories: large-quantity generators (LQGs) and small-quantity generators (SQGs). An LQG is defined as a person or facility generating more than 1,000 kilograms (kg) (2,200 pounds) of hazardous waste per month. An SQG is defined as generating greater than 100 kilograms and less than 1,000 kg of hazardous waste per month. LQGs include industrial and commercial facilities, such as manufacturing companies, petroleum refining facilities, and other heavy industrial businesses.

LQGs must comply with general federal and State requirements for managing hazardous waste. LQGs need an EPA identification number that is used to monitor and track hazardous waste activities. SQGs include facilities such as service stations, automotive repair, dry cleaners, and medical offices. The regulatory requirements for SQGs are less stringent than the requirements for LQGs. However, SQGs must also obtain an EPA identification number, which must be used for traceability on all hazardous waste documentation.

Pursuant to federal law, all hazardous waste generators must register with EPA for record-keeping and recording. The EPA Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of six environmental and emergency response programs related to hazardous materials and hazardous waste. The state agencies responsible for these programs set the standards for their program while local governments implement the standards. Cal/EPA oversees the implementation of the program as a whole. The Unified Program is implemented at the local level by 84 government agencies certified by the Secretary of Cal/EPA. These Certified Unified Program Agencies (CUPAs) have typically been established as a function of a local environmental health or fire department.

The CUPA is the local administrative agency that coordinates the following six programs regulating hazardous materials and hazardous wastes:

- Hazardous Materials Release Response Plans and Inventories (Business Plans)
- California Accidental Release Prevention (CalARP) Program
- Underground Storage Tank Program
- Aboveground Petroleum Storage Act Program
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs
- California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements

Transportation of Hazardous Materials and Waste

Transportation of hazardous materials and hazardous waste is carried out by individuals or entities that move hazardous materials and waste from one site to another by highway, rail, water, or air (see 40 CFR 260.10). This includes transporting hazardous waste from a generator's site to a facility that can recycle, treat, store, or dispose of the waste. It can also include transporting treated hazardous waste to a site for further treatment or disposal. Transportation of hazardous materials is required by law to occur in accordance with the Hazardous Waste Manifest System which is a set of forms, reports, and procedures that track hazardous waste from the time it leaves the generator facility until it reaches the waste management facility that receives it.

Transportation of hazardous materials by truck and rail is regulated by the United States Department of Transportation (USDOT). The USDOT regulations establish criteria for safe handling procedures. Federal safety standards are also included in the California Administrative Code. The California Health Services Department regulates the haulers of hazardous waste. According to the USDOT, Office of Hazardous Materials Safety's most recent Biennial Report on Hazardous Materials Transportation, highway transportation accounts for the largest share of incidents, deaths, and injuries associated with hazardous materials transportation. Rail accounts for the next largest portion, followed by air and water modes of transport. Highway incidents also account for the largest share of economic damage among modes of transport. While hazardous waste incidents account for a small percentage of overall highway incidents, the impact of those incidents can be more significant due to the nature of the material(s) involved. Specific programs have been developed by various responsible agencies to limit or prevent the impact to human health and the environment when hazardous materials/waste incidents occur.

In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by the DTSC. The DTSC maintains a list of active registered hazardous waste transporters throughout California. Shipments of hazardous materials and wastes include a wide variety of chemicals, such as petroleum products, medical waste, and radioactive materials. Each movement of hazardous materials/wastes implies a degree of risk, depending on the material being moved, the mode of transport, and numerous other factors. On a tonnage basis, petroleum products make up the majority—more than 80 percent—of hazardous material moved around the state.

Aside from rail and pipeline, hazardous materials transported within the Bay Area region use many of the same freeways, arterials, and local streets as other traffic. This creates a risk of accidents and associated release of hazardous materials for other drivers and for people along these routes, as does the use of rail modes for hazardous materials shipments.

Potential Presence of Hazardous Materials in Soil and Groundwater

Hazardous materials, including but not limited to pesticides and herbicides, heavy metals, volatile organic compounds, oil and gas, may be present in soil and groundwater in areas where land uses have resulted in leaking fuel or chemical storage tanks or other releases of hazardous materials have occurred. Land uses that typically involve the handling of hazardous materials include commercial or industrial operations, as well as agricultural areas where soils may contain pesticides and herbicides.

Various federal, State, and local regulatory agencies maintain lists of hazardous materials sites where soil and/or groundwater contamination is known or suspected to have occurred, typically as a result of leaking storage tanks or other spills. These facilities are readily identified through regulatory agency database searches, such as the State Water Board GeoTracker online database, the Cal/EPA DTSC Envirostor online database, and several other federal, State and local regulatory agency databases. **Table 2.13-1** identifies key database references for hazardous materials.[2]

TABLE 2.13-1: DESCRIPTION OF REGULATORY AGENCY DATABASES

Acronym	*Name and Description of Database*
CALSITES	List of hazardous waste and substances sites from the DTSC Envirostor database.
CDO and CAO	Cease and Desist Orders and Cleanup and Abatement Orders that do not concern the discharge of wastes that are hazardous materials identified by the State Water Board.
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System. An EPA maintained database that contains information on hazardous waste sites, potentially hazardous waste sites and remedial activities, including sites on the National Priorities List (see below).
CORRACTS	List of hazardous waste facilities subject to corrective action identified by DTSC.
CORTESE	Cortese Hazardous Waste and Substances Site List. An historical compilation of sites listed in the LUST, Solid Waste Information System (SWF/LF), and CALSITES databases. This database is no longer updated.
DPR	California Department of Pesticide Regulation provides data and information related to pesticide registration, licensing, pesticide use, environmental effects, and enforcement.
LUST	Leaking Underground Storage Tanks. Maintained by the State Water Board it includes a list of leaking USTs. Found on the Geotracker Database
NPL	National Priorities List. Maintained by the EPA, the database lists priority cleanup sites under the federal Superfund Program.
PPIS	Pesticide Product Information System. EPA maintained database that contains information concerning all pesticide products registered in the U.S.
RCRAInfo	Resource Conservation and Recovery Act Information. RCRA gives the EPA authority to control the generation, transportation, treatment, storage and disposal of hazardous waste. The information database provides access to information about RCRA and the management of hazardous waste.
SCP	Site Cleanup Program (formerly the Spills, Leaks, Investigation, and Cleanup Cost Recovery Listing) is maintained by the State Water Board. Provides information on site investigation and corrective action on sites not overseen by the Underground Tank Program and the Well Investigation Program. Found on the Geotracker Database.
SWIS	Solid waste facilities and landfills that are active, closed, or inactive, maintained by the California Department of Resources Recycling and Recovery.

[2] CalEPA, 2010. Cortese List Data Resources, available online at http://www.calepa.ca.gov/SiteCleanup/CorteseList/default.htm.

TABLE 2.13-1: DESCRIPTION OF REGULATORY AGENCY DATABASES

Acronym	*Name and Description of Database*
Toxic Pits	Maintained by the State Water Board, the Toxic Pits database lists sites suspected of containing hazardous substances that have not yet been cleaned up.
US Brownfields	Maintained by the EPA, the U.S. Brownfields database lists abandoned sites that have known or suspected contamination that are currently underutilized.
VCP	Voluntary Cleanup Program Properties. Low-threat properties with either confirmed or unconfirmed releases, where the project proponents have requested that the DTSC oversee investigation and/or cleanup activities.

Source: State Water Board, U.S. EPA, DTSC 2010.

For the Bay Area region, the number of sites listed on these databases would be too numerous to list here, but in general the majority of sites of known releases of hazardous materials occur in the more densely populated areas of light and heavy industrial uses.

Naturally Occurring Asbestos

Asbestos is not a formal mineralogical term, but rather a commercial and industrial term historically applied to a group of silica-containing minerals that form long, very thin mineral fibers, which generally form in bundles, once widely used in commercial products.[3] Commercial-grade asbestos was highly regarded for its high tensile strength, flexibility, and resistance to heat, chemicals, and electricity. However, mounting evidence in the 20th century indicated that inhalation of asbestos fibers caused respiratory diseases that have seriously affected many workers who were working closely with asbestos. Once disturbed, microscopic fibers can become airborne and then lodged in the lungs. Exposure to asbestos has been linked to numerous serious health problems and diseases, including asbestosis, lung cancer, and mesothelioma.

Naturally occurring asbestos (NOA) includes minerals described as asbestos that are found in place in their natural state, such as in bedrock or soils. Natural occurrences of asbestos are of concern due to potential exposures to the tiny fibers that can become airborne if asbestos-bearing rocks are disturbed by natural erosion or human activities such as road building, excavations, and other ground disturbing activities. In California, concern over potential public exposure to NOA has led to guidance documents and various regulations for NOA. In 1986, asbestos was identified as a toxic air contaminant by the California Air Resources Board (CARB). In 1990, CARB issued an Airborne Toxic Control Measure (ATCM), which prohibited the use of serpentine aggregate for surfacing if the asbestos content was 5 percent or more.

Government agency and general public concerns about public health resulting from exposure to asbestos led to new regulations and guidance regarding NOA:

[3] United States Geological Survey, Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California, Open File Report 2011-1188, 2011.

- In July 2000, CARB adopted amendments to the existing ATCM prohibiting the use or application of serpentine, serpentine-bearing materials and asbestos-containing ultramafic rock for covering unpaved surfaces unless it has been tested using an approved asbestos bulk test method and determined to have an asbestos content that is less than 0.25 percent. These amendments took effect on November 13, 2001.
- In July 2001, CARB adopted a new ATCM for construction, grading, quarrying, and surface mining operations in areas with serpentine or ultramafic rocks. This ATCM became effective on November 19, 2002.
- In October 2000, the Governor's Office of Planning and Research issued a memorandum providing guidance to Lead Agencies in analyzing the impacts of naturally occurring asbestos on the environment through the California Environmental Quality Act (CEQA) review process.
- In November 2000, the California Department of Real Estate added a section to subdivision forms that included questions related to NOA on property proposed for development.
- In 2004, as part of its school-site review program, the California Department of Toxic Substances Control's School Property Evaluation and Cleanup Division released interim guidance on evaluating NOA at school sites.

Overall, 53 of the 58 California counties, including all nine Bay Area counties, contain reported asbestos occurrences and/or ultramafic rocks such as serpentinite that can contain asbestos fibers.[4] As shown in **Figure 2.13-1**, most of the reported asbestos occurrences are located in San Francisco and Marin counties while ultramafic rock occurrences are most prominent in Napa County but also located throughout the other counties. In general, NOA fibers do not pose a threat unless disturbed and/or introduced into the air as fugitive dust.

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[4] Ibid.

Figure 2.13-1

Naturally Occurring Asbestos and Ultramafic Rocks

Data Source: US Geological Survey, 2011; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

0 5 10 20 Miles

1 in = 16 miles

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Schools

CEQA Guidelines require EIRs to assess whether a project would emit hazardous air emissions or involve the handling of extremely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school (see CEQA Sections 21151.2 and 21151.4; Appendix G of the CEQA Guidelines). Children are particularly susceptible to long-term impacts from emissions of hazardous materials from roadways near schools as well as high-volume motor vehicle travel on roadways through residential areas. There are numerous schools located throughout the Bay Area region. DTSC has created the School Property Evaluation and Cleanup Division that is responsible for assessing, investigating, and cleaning up proposed school sites. The Division ensures that selected properties are free of contamination or, if the properties were previously contaminated, that they have been cleaned up to a level that protects the students and staff who will occupy a new school. All proposed school sites that will receive State funding for acquisition or construction are required to go through a rigorous environmental review and cleanup process under DTSC's oversight.

School districts conduct environmental assessments to provide basic information for determining if there has been a release of hazardous material at the sites, or if a naturally occurring hazardous material that presents a risk to human health or the environment may be present. Outreach activities integrated into the process allow a more active role for stakeholders in the selection process for school sites. Through the environmental review process, DTSC ensures protection of children, staff and the environment from the potential effects of exposure to hazardous materials.

Airports

There are 26 public use airports in the Bay Area that serve commercial and general aviation users (see **Table 2.13-2** and **Figure 2.13-2**). This regional airport system forms an integral part of the Bay Area's transportation network by providing links to communities throughout the United States and abroad. Bay Area communities must consider housing and economic development along with airport interests in making decisions concerning the amount and type of new development to allow in and near airport flight corridors. Development that is not compatible with aviation activity, due to noise or safety factors, can lead to strained relations between an airport operator and surrounding communities as well as create long-term operational problems for the airport. Potential hazards in relationship to airport operations are generally regulated by the Federal Aviation Administration (FAA), with local planning and evaluation of proposed projects (in terms of a proposed project's compatibility in relationship to air and ground operations and the safety of the public) under the authority of the applicable Airport Land Use Commission (ALUC) through Airport Land Use Compatibility Plans (ALUCPs).

TABLE 2.13-2: LIST OF PUBLIC USE AIRPORTS AND MILITARY AIRFIELDS IN THE SAN FRANCISCO BAY AREA

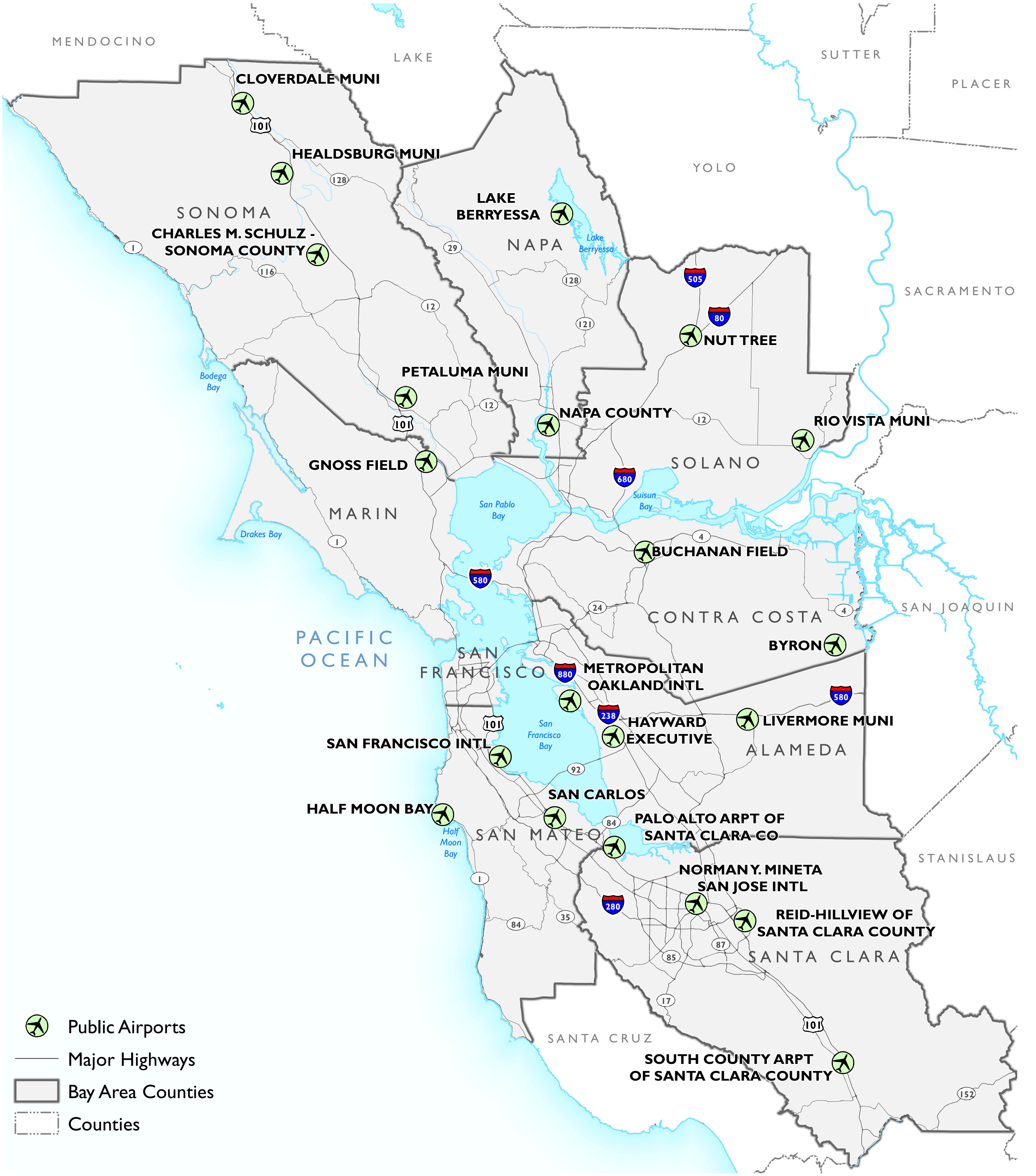
County	*Airport Name*	*Three Letter ID*	*Caltrans Classification*
Alameda	Hayward Executive Airport	HWD	Metropolitan
Alameda	Livermore Municipal Airport	LVK	Metropolitan
Alameda	Metropolitan Oakland International Airport	OAK	Commercial/Primary
Contra Costa	Buchanan Field Airport	CCR	Metropolitan
Contra Costa	Byron Airport	C83	Community
Marin	Gnoss Field Airport	DVO	Regional
Napa	Angwin Parrett Field Airport	2O3	Limited Use*
Napa	Napa County Airport	APC	Regional
San Mateo	Half Moon Bay Airport	HAF	Regional
San Mateo	San Carlos Airport	SQL	Metropolitan
San Mateo	San Francisco International Airport**	SFO	Commercial/Primary
Santa Clara	Moffett Federal Airfield	NUQ	Military/NASA
Santa Clara	Norman Y. Mineta San José Int'l Airport	SJC	Commercial/Primary
Santa Clara	Palo Alto Airport	PAO	Metropolitan
Santa Clara	Reid-Hillview Airport	RHV	Metropolitan
Santa Clara	San Martin Airport	E16	Regional
Solano	Nut Tree Airport	VCB	Regional
Solano	Rio Vista Municipal Airport	O88	Regional
Solano	Travis Air Force Base	SUU	Military/NASA
Solano	University Airport	EDU	Community
Sonoma	Charles M. Schulz - Sonoma County Airport	STS	Commercial/Primary
Sonoma	Cloverdale Municipal Airport	O60	Community
Sonoma	Healdsburg Municipal Airport	HES	Community
Sonoma	Petaluma Municipal Airport	O69	Regional
Sonoma	Sonoma Skypark	0Q9	Community
Sonoma	Sonoma Valley Airport	0Q3	Community

There are no public use airports within the City and County of San Francisco.

* Privately-owned airport that is open to the general public. Owned by Pacific Union College.

** The City and County of San Francisco owns and operates San Francisco International Airport.

Figure 2.13-2
Public Airports



Data Source: Federal Aviation Administration, 2011; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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Emergency Services

The California Emergency Management Agency (Cal EMA) was established as part of the Governor's Office on January 1, 2009, merging the duties, powers, purposes, and responsibilities of the former Governor's Office of Emergency Services with those of the Governor's Office of Homeland Security. Cal EMA is responsible for the coordination of overall State agency response to major disasters in support of local government. The Agency is responsible for assuring the State's readiness to respond to, and recover from, all hazards—natural, man-made, and war-caused emergencies and disasters—and for assisting local governments with emergency preparedness, response, recovery, and hazard mitigation efforts (California Emergency Management Agency, 2011).

Each county has a local Office of Emergency Services (OES), which coordinates with the State during emergency situations. When local and mutual aid resources are exhausted, the State coordinates its emergency resources through its State Operations Center in Sacramento and its multiple Emergency Operations Centers (EOCs) throughout the region.

In coordination with the local OES, jurisdictions house EOCs, which are command centers where emergency service providers (many from the local OES) meet and coordinate response, recovery, and resources during disasters. The following functions are performed in the EOC, as necessary:

- Receiving and disseminating warnings;
- Managing emergency operations;
- Developing emergency response and recovery policies;
- Collecting intelligence from, and disseminating information to, the various EOC representatives, and assuring coordination between the Field Operations Center locations, building managers, and departmental safety representatives throughout the regional system;
- Coordinating information with Cal EMA, the Federal Emergency Management Agency, and other appropriate outside agencies;
- Preparing intelligence/information summaries, situation reports, operation progress reports and other reports as required;
- Preparing incident action plans;
- Maintaining general and specific maps, information display boards, and other data pertaining to emergency operations;
- Continuing analysis and evaluation of all data pertaining to emergency operations; and
- Controlling and coordinating, within established policy, the operations and logistical support of resources committed to the EOC.

Wildland Fire

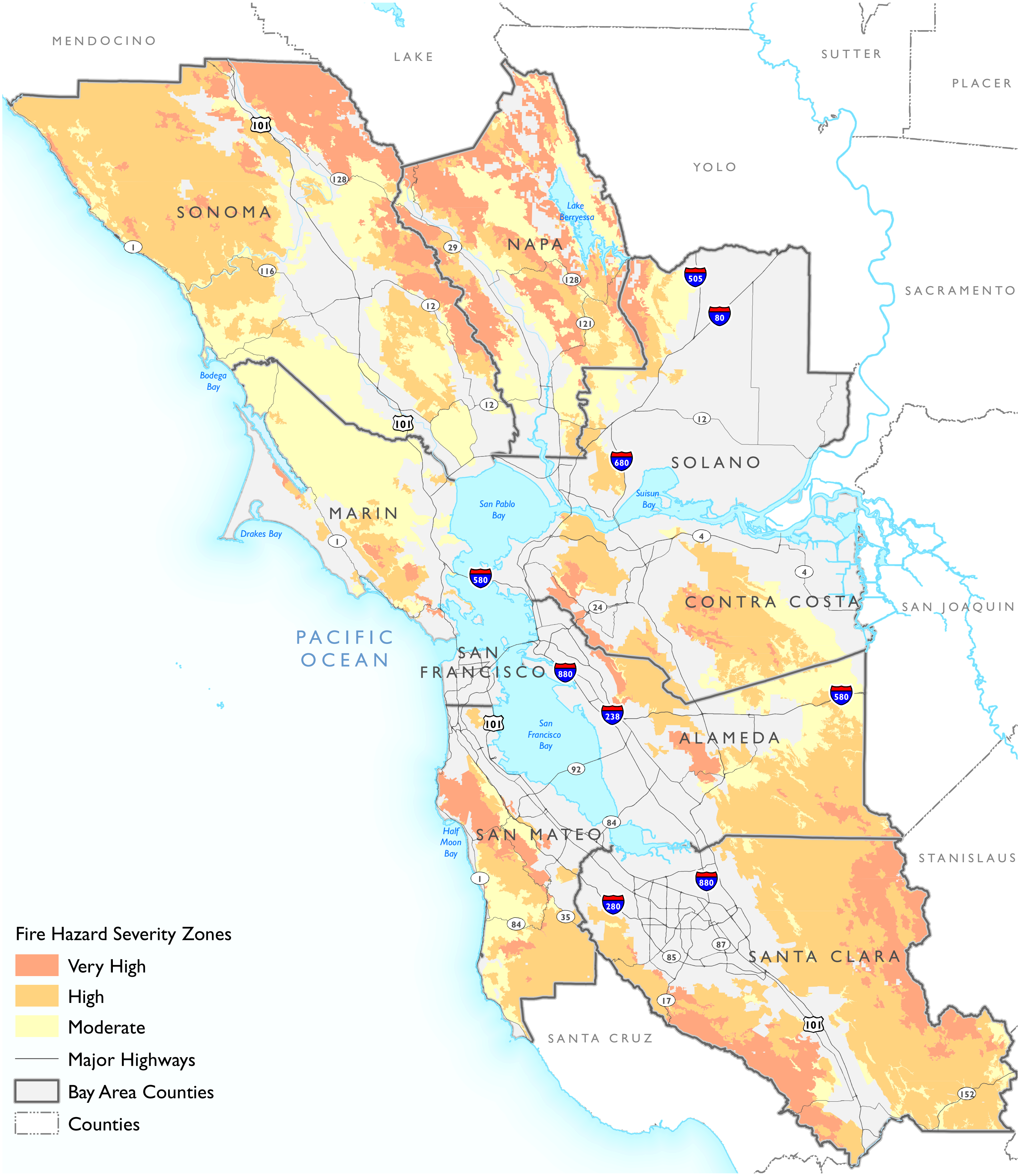
The California Department of Forestry and Fire Protection has identified two types of wildland fire risk areas: (1) Wildland Areas That May Contain Substantial Forest Fire Risks and Hazards, and (2) Very High Fire Hazard Severity Zones. Each risk area carries with it code requirements to reduce the potential risk of wildland fires.

While all of California is subject to some degree of fire hazard, there are specific features that make certain areas more hazardous. The California Department of Forestry and Fire Protection (CAL FIRE) is required by law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors (Public Resources Code 4201-4204 and Government Code 51175-89). Factors that increase an area's susceptibility to fire hazards include slope, vegetation type and condition, and atmospheric conditions. Throughout the Bay Area Region, there is a full range of conditions and fire hazards as indicated in **Figure 2.12-3,** with all Bay Area counties except San Francisco having areas of High and Very High Fire Hazard in areas of CAL FIRE responsibility. The areas of greatest hazard are concentrated in the hillside areas of San Mateo, Santa Clara, Sonoma, and Napa counties, with smaller hazard areas in Marin County, the East Bay Hills of Alameda and Contra Costa counties, and on the slopes of Mount Diablo. The more intensively developed, urbanized portions of the Bay Area are within Local Responsibility Areas and have not been mapped by the State for fire hazard zones.[5] However, CAL FIRE maintains a shared responsibility in these Local Responsibility Areas to transmit information regarding areas of Very High Fire Hazards.

Development that has spread into less densely populated, often hilly areas has increased the number of people living in heavily-vegetated areas where wildlands meet urban development, also referred to as the wildland-urban interface. This trend is spawning a third classification of fires: the urban wildfire. The 1991 Oakland Hills fire above Berkeley and Oakland is an example of an urban wildfire. A fire along the wildland-urban interface can result in major losses of property and structures.

[5] Department of Forestry and Fire Protection (CAL FIRE), 2007. Fire and Resources Assessment Program, *Draft Fire Hazard Severity Zones in Local Responsibility Areas*, May 2007, available online at http://frap.cdf.ca.gov/webdata/maps/statewide/fhszsra_map.pdf, accessed August 8, 2012.

Figure 2.13-3
Fire Hazards



Data Source: CalFire, 2007; ESA, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

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REGULATORY SETTING

Federal Regulations

The U.S. EPA is the lead agency responsible for enforcing federal regulations that affect public health or the environment. The primary federal laws and regulations include the Resource Conservation and Recovery Act of 1976 (RCRA) and the Hazardous and Solid Waste Amendments enacted in 1984; the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA); and the Superfund Act and Reauthorization Act of 1986 (SARA). Federal statutes pertaining to hazardous materials and wastes are contained in the Code of Federal Regulations (CFR), Title 40 - Protection of the Environment.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act was adopted in 1976. RCRA Subtitle C regulates the generation, transportation, treatment, storage and disposal of hazardous waste by "large-quantity generators" (1,000 kilograms per month or more) through comprehensive life cycle or "cradle to grave" tracking requirements. The requirements include maintaining inspection logs of hazardous waste storage locations, records of quantities being generated and stored, and manifests of pick-ups and deliveries to licensed treatment/storage/disposal facilities. RCRA also identifies standards for treatment, storage, and disposal, which is codified in CFR Title 40 Part 260.

According to RCRA Subpart C and the US EPA, materials and waste are considered hazardous based on four characteristics:

- ***Ignitability.*** Ignitable wastes can create fires under certain conditions, are spontaneously combustible, or have a flash point less than 60 degrees Celsius (140 degrees Fahrenheit). Examples include waste oils and used solvents.
- ***Corrosivity.*** Corrosive wastes are acids or bases (pH less than or equal to 2, or greater than or equal to 12.5) that are capable of corroding metal containers, such as storage tanks, drums, and barrels. Battery acid is an example.
- ***Reactivity.*** Reactive wastes are unstable under "normal" conditions. They can cause explosions, toxic fumes, gases, or vapors when heated, compressed, or mixed with water. Examples include lithium-sulfur batteries and explosives.
- ***Toxicity.*** Toxic wastes are harmful or fatal when ingested or absorbed (e.g., containing mercury, lead, etc.)

Comprehensive Environmental Response Compensation and Liability Act

CERCLA, commonly known as Superfund, is the legal framework for the identification and restoration of contaminated property. In addition, CERCLA:

- Established prohibitions and requirements concerning closed and abandoned hazardous waste sites; and
- Provided for liability of persons or entities responsible for releases of hazardous waste at these sites.

Generally, CERCLA authorizes two kinds of response actions:

- Short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response.
- Long-term remedial response actions, that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening.

Superfund Amendments and Reauthorization Act of 1986

Congress enacted CERCLA, setting up what has become known as the Superfund program, in 1980 to establish prohibitions and requirements concerning closed and abandoned hazardous waste sites; provide for liability of persons responsible for releases of hazardous waste at these sites; and establish a trust fund to provide for cleanup when no responsible party can be identified. SARA amended the CERCLA in 1986, emphasizing the importance of permanent remedies and innovative treatment technologies to clean up hazardous waste sites; requiring Superfund actions to consider the standards and requirements found in other state and federal environmental laws and regulations; providing new enforcement authorities and settlement tools; increasing involvement of the states in every phase of the Superfund program; increasing the focus on human health problems posed by hazardous waste sites; encouraging greater citizen participation in making decisions on how sites should be cleaned up; and increasing the size of the trust fund to $8.5 billion.

Emergency Planning Community Right-to-Know Act (EPCRA)

EPCRA, or SARA Title III, was enacted in October 1986. SARA Title III requires any infrastructure at the state and local levels to plan for chemical emergencies, including identifying potential chemical threats. Reported information is then made publicly available so that interested parties may become informed about potentially dangerous chemicals in their community. EPCRA Sections 301 through 312 are administered by USEPA's Office of Emergency Management. USEPA's Office of Information Analysis and Access implements EPCRA's Section 313 program. In California, SARA Title III is implemented through the California Accidental Release Prevention Program.

Federal Aviation Administration (FAA)

The Federal Aviation Administration's primary role is to promote aviation safety and control the use of airspace. Public use airports that are subject to the FAA's grant assurances must comply with specific FAA design criteria, standards, and regulations. Land use safety compatibility guidance from the FAA is limited to the immediate vicinity of the runway, the runway protection zones at each end of the runway, and the protection of navigable airspace. The FAA enforces safety standards and investigates and corrects violations as appropriate.

Federal regulations and FAA Advisory Circulars applicable to compatible land use and/or safety include, but are not limited to, 14 Code of Federal Regulations Part 77 (14 CFR Part 77), Safe, Efficient Use, and Preservation of the Navigable Airspace; FAA Advisory Circular 150/5200-33B, Hazardous Wildlife Attractants on or near Airports; and FAA Order 5200.5A, Waste Disposal Sites on or near Airports.

14 Code of Federal Regulations Part 77

Code of Federal Regulations, Title 14, Part 77, *Safe Efficient Use and Preservation of the Navigable Airspace* (14 CFR Part 77) establishes the federal review process for determining whether proposed development activities in the vicinity of an airport have the potential to result in a hazard to air navigation. 14 CFR Part 77 identifies criteria that govern which projects require notice to be filed with the FAA as well as identifying standards for determining whether a proposed project would represent an obstruction "that may affect safe and efficient use of navigable airspace and the operation of planned or existing air navigation and communication facilities." Objects that are identified as obstructions based on these standards are presumed to be hazards until an aeronautical study conducted by the FAA determines otherwise.

FAA Notification

14 CFR Part 77.9 "Construction or Alteration Requiring Notice" indicates that notice must be filed with the FAA for any construction or alteration of objects within 20,000 feet of a public use airport runway when the height of the objects exceeds (i.e., is taller than) an imaginary surface with a 100:1 (1 foot upward per 100 feet horizontally) slope from the nearest point of the nearest runway. This requirement applies when the airport has at least one runway that exceeds 3,200 feet in length; for shorter runways the notification surface has a 50:1 slope and extends 10,000 feet from the runway. For heliports, the notification surface has a 25:1 slope and extends 5,000 feet from the helicopter takeoff and landing area, commonly referred to as final approach and takeoff area. The notification requirements apply to all public-use airports, military airports, and heliports. When FAA notification is required it must be provided using FAA Form 7460-1, Notice of Proposed Construction or Alteration.

Federal Disaster Mitigation Act of 2000

The Disaster Mitigation Act of 2000 provided a new set of mitigation plan requirements that encourage state and local jurisdictions to coordinate disaster mitigation planning and implementation. States are encouraged to complete a "Standard" or an "Enhanced" Natural Mitigation Plan. "Enhanced" plans demonstrate increased coordination of mitigation activities at the state level and, if completed and approved, would increase the amount of funding through the Hazard Mitigation Grant Program. California's updated State Hazard Mitigation Plan was adopted on October 8, 2007, and approved by FEMA Region IX on December 17, 2007.

Under the auspices of the Disaster Mitigation Act of 2000, ABAG has adopted a multi-jurisdictional FEMA-approved 2010 Local Hazard Mitigation Plan Update, which cities and counties can adopt and use, in full or in part, in lieu of preparing all or part of a Local Hazard Mitigation Plan themselves.[6] Participating local county and city governments in the Bay Area prepare an Annex to this plan to explain how the plan specifically applies to that agency.

Federal Response Plan

The Federal Response Plan of 1999 is a signed agreement among 27 federal departments and agencies, including the American Red Cross, that (1) provides the mechanism for coordinating delivery of federal

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[6] Multi-Jurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area, ABAG 2010, http://quake.abag.ca.gov/wp-content/documents/ThePlan-Chapters-Intro.pdf

assistance and resources to augment efforts of state and local governments overwhelmed by a major disaster or emergency; (2) supports implementation of the Robert T. Stafford Disaster Relief and Emergency Act, as well as individual agency statutory authorities; and (3) supplements other federal emergency operations plans developed to address specific hazards. The Federal Response Plan is implemented in anticipation of a significant event likely to result in a need for federal assistance or in response to an actual event requiring federal assistance under a Presidential declaration of a major disaster or emergency.

Hazardous Materials Transportation Act

The transportation of hazardous materials is regulated by the Hazardous Materials Transportation Act (HMTA), which is administered by the Research and Special Programs Administration (RSPA) of USDOT. HMTA provides USDOT with a broad mandate to regulate the transport of hazardous materials, with the purpose of adequately protecting the nation against risk to life and property, which is inherent in the commercial transportation of hazardous materials. The HMTA governs the safe transportation of hazardous materials by all modes, excluding bulk transportation by water. RSPA carries out these responsibilities by prescribing regulations and managing a user-funded grant program for planning and training grants for states and Indian tribes. USDOT regulations that govern the transportation of hazardous materials are applicable to any person who transports, ships, causes to be transported or shipped, or who is involved in any way with the manufacture or testing of hazardous materials packaging or containers. USDOT regulations pertaining to the actual movement govern every aspect of the movement, including packaging, handling, labeling, marking, placarding, operational standards, and highway routing. Additionally, USDOT is responsible for developing curriculum to train for emergency response, and administers grants to states and Indian tribes for ensuring the proper training of emergency responders. HMTA was enacted in 1975 and was amended and reauthorized in 1990, 1994, and 2005.

International Fire Code

The International Fire Code (IFC), created by the International Code Council, is the primary means for authorizing and enforcing procedures and mechanisms to ensure the safe handling and storage of any substance that may pose a threat to public health and safety. The IFC regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. The IFC and the International Building Code use a hazard classification system to determine what protective measures are required for fire and life safety. These measures may include construction standards, separations from property lines, and specialized equipment. To ensure that these safety measures are met, the IFC employs a permit system based on hazard classification. The IFC is updated every three years, and is the basis for the California Fire Code (also updated triennially). Local jurisdictions, including Bay Area cities and counties, then adopt the California Fire Code, in some cases with local amendments.

National Fire Plan

The Department of the Interior's National Fire Plan is intended to ensure an appropriate federal response to severe wildland fires, reduce fire impacts to rural communities, and ensure sufficient firefighting capacity in the future. The Rural Fire Assistance program is funded to enhance the fire protection capabilities of rural fire districts and safe and effective fire suppression in the wildland/urban interface. The program promotes close coordination among local, state, tribal, and federal firefighting resources by conducting training, equipment purchase, and prevention activities on a cost-shared basis.

State Regulations

California Emergency Services Act

The California Emergency Services Act provides the basic authority for conducting emergency operations following a proclamation of emergency by the governor and/or appropriate local authorities. Local government and district emergency plans are considered to be extensions of the California Emergency Plan, established in accordance with the Emergency Services Act. California Fire Code (CFC). The CFC is Chapter 9 of CCR Title 24. It is created by the California Building Standards Commission and it is based on the IFC created by the International Code Council. It is the primary means for authorizing and enforcing procedures and mechanisms to ensure the safe handling and storage of any substance that may pose a threat to public health and safety. The CFC regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. The CFC and the California Building Code use a hazard classification system to determine what protective measures are required to protect fire and life safety. These measures may include construction standards, separations from property lines, and specialized equipment. To ensure that these safety measures are met, the CFC employs a permit system based on hazard classification. The CFC is updated every three years.

California Unified Program Administration

The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of six environmental and emergency response programs (see below). The Unified Program Administration and Advisory Group (UPAAG) was created to foster effective working partnerships between local, State and federal agencies. The UPAAG's goals and objectives are listed in the UPAAG Strategic Plan. The six programs are:

- Hazardous Materials Release Response Plans and Inventories (Business Plans)
- California Accidental Release Prevention Program
- Underground Storage Tank Program
- Aboveground Petroleum Storage Act Program
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs
- California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements

The State agency partners involved in the Unified Program have the responsibility of setting program element standards, working with Cal/EPA on ensuring program consistency, and providing technical assistance to the certified unified program agencies. The following State agencies are involved with the Unified Program:

- **California Environmental Protection Agency.** The Secretary of the California Environmental Protection Agency is directly responsible for coordinating the administration of the Unified Program. The Secretary certifies Unified Program Agencies. The Secretary has certified 83 CUPAs to date. These 84 CUPAs carry out the responsibilities previously handled by approximately 1,300 State and local agencies.

- **Department of Toxic Substances Control.** DTSC provides technical assistance and evaluation for the hazardous waste generator program including onsite treatment (tiered permitting).
- **Governor's Office of Emergency Services.** The Governor's Office of Emergency Services is responsible for providing technical assistance and evaluation of the Hazardous Material Release Response Plan (Business Plan) Program and the California Accidental Release Response Plan (CalARP) Programs.
- **Office of the State Fire Marshal.** The Office of the State Fire Marshal is responsible for ensuring the implementation of the Hazardous Material Management Plans and the Hazardous Material Inventory Statement Programs. These programs tie in closely with the Business Plan Program.
- **State Water Resources Control Board.** The State Water Resources Control Board provides technical assistance and evaluation for the underground storage tank program in addition to handling the oversight and enforcement for the aboveground storage tank program.

Under Title 22 of the California Code of Regulations and the California Hazardous Waste Control Law, Chapter 6.5, DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. Both RCRA and the Hazardous Waste Control Law impose "cradle to grave" regulatory systems for handling hazardous waste in a manner that protects human health and the environment. Cal/EPA has delegated some of its authority under the Hazardous Waste Control Law to county health departments and other CUPAs.

California Human Health Screening Levels

The California Human Health Screening Levels (CHHSLs) were developed as a tool to assist in the evaluation of contaminated sites for potential adverse threats to human health. Preparation of the CHHSLS was required by the California Land Environmental Restoration and Reuse Act of 2001 (SB 32 (Chapter 764, Statutes of 2001) (Cal-EPA 2005). The CHHSLs are concentrations of 54 hazardous chemicals in soil or soil gas the Cal/EPA considers to be below thresholds of concern for risks to human health. The CHHSLs were developed by OEHHA, an agency under the umbrella of Cal/EPA, and are contained in its report entitled *Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil* (OEHHA and CEPA 2004). The thresholds of concern used to develop the CHHSLs are an excess lifetime cancer risk of one in 1 million and a hazard quotient of 1.0 for noncancer health effects. The CHHSLs were developed using standard exposure assumptions and chemical toxicity values published by USEPA and Cal/EPA. The CHHSLs can be used to screen sites for potential human health concerns where releases of hazardous chemicals to soils have occurred. Under most circumstances, the presence of a chemical in soil, soil gas, or indoor air at concentrations below the corresponding CHHSLs can be assumed to not pose a significant health risk to people who may live (residential CHHSLs) or work (commercial/industrial CHHSLs) at the site.

Emergency Response to Hazardous Materials Incidents

The California Emergency Management Agency was established as part of the Governor's Office on January 1, 2009—created by Assembly Bill 38 (Nava), which merged the duties, powers, purposes, and responsibilities of the former Governor's Office of Emergency Services with those of the Governor's Office of Homeland Security.

Cal EMA is responsible for the coordination of overall State agency response to major disasters in support of local government. The Agency is responsible for assuring the State's readiness to respond to and recover from all hazards—natural, manmade, war-caused emergencies and disasters—and for assisting local governments in their emergency preparedness, response, recovery, and hazard mitigation efforts.

The State of California and local governments throughout the Bay Area have made significant investments in the planning and resources necessary to respond to natural and human-caused emergencies and disasters by recognizing the potential severities that may be possible. Consequently, the State of California Governor's Office of Emergency Services and its local government partners developed the Bay Area Regional Emergency Coordination Plan to provide a framework for collaboration and coordination during regional events. The Regional Emergency Coordination Plan (RECP) has been prepared in accordance with national and state emergency management systems and plans. The RECP provides an all hazards framework for collaboration among responsible entities and coordination during emergencies in the Bay Area. The RECP defines procedures for regional coordination, collaboration, decision-making, and resource sharing among emergency response agencies in the Bay Area.

The RECP does not replace existing emergency response systems. Rather, it builds on the Standardized Emergency Management System and the California State Emergency Plan to provide methods for cooperation among Operational Areas and the Governor's OES, Coastal Region. The RECP provides critical linkages to ensure that existing Bay Area emergency response systems work together effectively during the response to an event. In addition, the RECP complies with the requirements of the National Incident Management System and is consistent with the National Preparedness Goal.

Title 23 of the California Code of Regulations, Underground Storage Tank (UST) Act

The UST monitoring and response program is required under Chapter 6.7 of the California Health and Safety Code and Title 23 of the CCR. The program was developed to ensure that the facilities meet regulatory requirements for design, monitoring, maintenance, and emergency response in operating or owning USTs. The County Department of Environmental Health is the local administering agency for this program.

Title 27 of the California Code of Regulations, Solid Waste

Title 27 of the CCR contains a waste classification system that applies to solid wastes that cannot be discharged directly or indirectly to waters of the State and that, therefore, must be discharged to waste management sites for treatment, storage, or disposal. The California Integrated Waste Management Board and its certified local enforcement agency regulate the operation, inspection, permitting, and oversight of maintenance activities at active and closed solid waste management sites and operations.

SB 1889, Accidental Release Prevention Law/California Accidental Release Prevention Program

SB 1889 required California to implement a new federally mandated program governing the accidental airborne release of chemicals promulgated under Section 112 of the Clean Air Act. Effective January 1, 1997, CalARP replaced the previous California Risk Management and Prevention Program and incorporated the mandatory federal requirements. CalARP addresses facilities that contain specified hazardous materials, known as "regulated substances," that, if involved in an accidental release, could result in adverse off-site consequences. CalARP defines regulated substances as chemicals that pose a threat to public health and safety or the environment because they are highly toxic, flammable, or explosive.

California Department of Transportation

In addition to its role in planning and operating certain key parts of the roadway system serving the State, the California Department of Transportation (Caltrans) is involved in state aviation system planning and research through its Division of Aeronautics and its Office of Research and New Technology. Caltrans prepares and regularly updates the California Aviation System Plan, the vehicle by which Caltrans conducts continuous aviation system planning and guides aviation infrastructure investment priorities (Caltrans, 2003).

California State Aeronautics Act

The purpose of the California State Aeronautics Act pursuant to Public Utilities Code Section 21001 et seq. "is to protect the public interest in aeronautics and aeronautical progress." The California Department of Transportation, Division of Aeronautics, administers much of this statute. The protection of public interest in aeronautics and aeronautical progress is achieved partly through:

- Fostering and promoting safety in aeronautics.
- Effecting uniformity of the laws and regulations relating to aeronautics consistent with federal aeronautics laws and regulations.
- Granting to a state agency powers, and imposing upon it duties, so that the state may properly perform its functions relative to aeronautics and effectively exercise its jurisdiction over persons and property, assist in the development of a statewide system of airports, encourage the flow of private capital into aviation facilities, and cooperate with and assist political subdivisions and others engaged in aeronautics in the development and encouragement of aeronautics.
- Establishing only those regulations which are essential and clearly within the scope of the authority granted by the Legislature, in order that persons may engage in every phase of aeronautics with the least possible restriction consistent with the safety and the rights of others.
- Providing for cooperation with the federal authorities in the development of a national system of civil aviation and for coordination of the aeronautical activities of those authorities and the authorities of this state.
- Assuring that persons residing in the vicinity of airports are protected to the greatest possible extent against intrusions by unreasonable levels of aircraft noise.
- Developing, in cooperation with the private sector, airport management, local jurisdictions, federal authorities, and the general public, informational programs to increase the understanding of current air transportation issues including, but not limited to, aviation safety, planning, airport noise, airport development and management, and the role of aviation in the economic development of the state, as an integral part of the state's transportation system.
- Sponsoring or cosponsoring, with representatives of the aerospace and aviation industry, aviation educational and informational seminars which meet the needs of pilots and other members of the industry for current information on aviation safety, planning, and airport development and management.

CEQA Section 21098

CEQA Section 21098 requires lead agencies to submit a notice to the military service that would be affected by a proposed General Plan Amendment; project of statewide, regional, or areawide significance; or a project that must be referred to the airport land use commission when the project is located within specific boundaries of a low-level flight path, military impact zone, or special use airspace. Noticing is required when a Notice of Preparation of an EIR is issued and when environmental documents are released for public review. Government Code Section 65352 requires that, prior to action by a legislative body to adopt or substantially amend a general plan, the lead agency shall refer the proposed action to various entities, including the branches of the United States Military that have provided the Office of Planning and Research with a mailing address, when the proposed action is:

- Located within 1,000 feet of a military installation;
- Located beneath a low-level flight path; or
- Within special use airspace as defined in CEQA Section 21098.

Title 14 Division 1.5 of the California Code of Regulations

CCR Title 14 Division 1.5 establishes the regulations for CAL FIRE and is applicable in all State Responsibility Areas—areas where CAL FIRE is responsible for wildfire protection. Most of the unincorporated areas of the Bay Area are State Responsibility Areas and any development in these areas must comply with these regulations. Among other things, Title 14 establishes minimum standards for emergency access, fuel modification, setback to property line, signage, and water supply.

Government Code Section 65962.5

Government Code Section 65962.5 is commonly referred to as the "Cortese List" (after the Legislator who authored the legislation that enacted it). The list, or a site's presence on the list, has bearing on the local permitting process as well as on compliance with the CEQA. However, because this statute was enacted over twenty years ago, some of the provisions refer to agency activities that were conducted many years ago and are no longer being implemented and, in some cases, the information to be included in the Cortese List does not exist.

Government Code § 65962.5 was originally enacted in 1985, and per subsection (g), the effective date of the changes called for under the amendments to this section was January 1, 1992. While Government Code Section 65962.5 makes reference to the preparation of a "list," many changes have occurred related to web-based information access since 1992 and this information is now largely available on the Internet sites of the responsible organizations. A centralized list is no longer compiled and those requesting a copy of the Cortese "list" are now referred directly to the appropriate information resources contained on the Internet web sites of the boards or departments that are referenced in the statute.

Impact Analysis

IMPACT SIGNIFICANCE CRITERIA

Implementation of the proposed Plan would have a potentially significant adverse impact in the Bay Area if it would:

Criterion 1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Criterion 2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

Criterion 3: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

Criterion 4: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.

Criterion 5: Result in a safety hazard for people residing or working in the planning area for projects located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport.

Criterion 6: Result in a safety hazard for people residing or working in the planning area for projects within the vicinity of a private airstrip.

Criterion 7: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

Criterion 8: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

METHOD OF ANALYSIS

This program-level analysis of potential impacts associated with hazardous materials considers how implementation of the proposed Plan's changes to the land use pattern and transportation network may encounter hazardous materials through ground disturbances or demolition. In addition, changes in land use could result in changes in the transport, storage, and disposal of hazardous materials. Impacts are identified based on the nature of the proposed improvements as compared to currently existing conditions. Impacts are identified for the proposed Plan as a whole and for areas where new development or transportation infrastructure projects are proposed.

The analysis also includes an evaluation of proposed changes in land use patterns that would place development in proximity to major airports and wildfire areas. Safety hazards related to potential development within an airport land use plan area are addressed in general terms and focus on the major airports in areas with highest projected growth (i.e., San Francisco, Oakland, and San José). The analysis also evaluates hazards associated with the Bay Area's busiest general aviation airports, such as Palo Alto, San Carlos, Reid-Hillview in San José, Gnoss Field in Novato, and Buchanan Field in Concord. The evaluation of hazards and hazardous materials impacts assumes that the construction and development under the proposed Plan will adhere to the latest federal, State, and local regulations, and conform to the latest required standards in the industry, as appropriate for individual projects.

SUMMARY OF IMPACTS

Implementation of the proposed Plan would result in increased population and associated traffic that could result in increased transport, use, storage and disposal of hazardous materials. If not packaged, stored, handled, or disposed of in a manner that is appropriate for the materials in question, there could be adverse effects on human health or the environment. In addition, construction activities or new land uses in areas where previous activities have released hazardous materials or wastes into the subsurface, could expose workers, the public or the environment to adverse effects. New hazardous materials transport, use, storage, and disposal associated with the land use patterns and new transportation facility designs under the proposed Plan would be required to adhere to a strict regimen of hazardous materials regulations that are designed to minimize exposure. For historic releases of hazardous materials, project-specific studies will be necessary to determine the actual potential for significant impacts.

Direct Impacts

Implementation of the improvements in the proposed Plan could result in both short term and long term impacts related to hazardous materials and wastes due to increases in hazardous materials needs and disturbance of potential historic releases during project construction. Direct short and long term impacts could result from upset and accident conditions that release hazardous materials and expose the public and the environment to adverse effects. Direct impacts could also be realized from individual projects that are sited near schools, interfere with airport operations, conflict with emergency plans, or are located adjacent to fire prone areas. However, existing regulatory requirements are in place to prevent adverse effects from any of these potential hazards.

Indirect Impacts

The projected population increase in the Bay Area will result in more residents and increased travel on all modes of transportation. As a result, there would be an increased risk of exposure of people and property to the potentially damaging effects of hazardous materials or wastes if not managed appropriately. Chronic health effects can occur over long time periods of exposure to hazardous materials at relatively lower levels of exposure than where acute effects are observed. However, current standards of practice under the federal, State, and local regulatory framework have been developed to protect human health and the environment in accordance with recent scientific findings. In general, potential indirect adverse effects from hazardous materials are essentially the same as the direct impacts outlined above.

Impact

2.13-1: Implementation of the proposed Plan could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Impacts of Land Use Projects

Development associated with the proposed Plan would increase density and population, and would comprise a variety of land uses ranging from residential areas to commercial or industrial areas. New developments could include residential and commercial uses, including specific uses such as dry cleaners, gas stations, and certain industrial uses, all of which could involve routine transport, use, and disposal of hazardous materials such as household hazardous wastes (e.g., paints, cleaning supplies, solvents, and petroleum products) and commercial and industrial hazardous waste. Proposed land uses are identified in general terms, as the specific, parcel-level future land uses are not defined. Routine transportation, use or disposal of hazardous materials poses a potential risk to residents within the planning area by using trucks, rail, and other modes that are shared with the public, through direct contact, inhalation, or ingestion. Exposure to hazardous materials could cause various short-term and/or long-term health effects. Possible health effects could be acute (immediate, or of short-term severity), chronic (long-term, recurring, or resulting from repeated exposure), or both. Acute effects, often resulting from a single exposure, could result in a range of effects from minor to major, such as nausea, vomiting, headache, dizziness, or burns. Chronic exposure could result in systemic damage or damage to organs, such as the lungs, liver, or kidneys. Health effects would be specific to each hazardous material.

The operation of businesses that use, create, or dispose of hazardous materials is regulated and monitored by federal, state, and local regulations and policies to provide a high level of protection to the public and the environment from the hazardous materials manufactured within, transported to, and disposed within the region.

Therefore, hazardous materials impacts related to implementation of the proposed Plan at the regional and local level are potentially significant (PS) for Impact 2.13-1. Mitigation Measure 2.13(a) is discussed below.

Impacts of Transportation Projects

Transportation projects in the proposed Plan include a variety of transportation modifications and improvements such as new Express Lanes, auxiliary lanes, roadway widening, increased transit service and expansion, and other maintenance and rehabilitation projects. The proposed projects and improvements may increase the capacity to transport hazardous materials. Roadway improvements in the proposed Plan would also improve road safety, as well as pedestrian and bicycle safety, thereby potentially reducing the potential for transportation-related hazardous materials risks.

Hazardous materials impacts related to transportation improvements from implementation of the proposed Plan are potentially significant (PS) for Impact 2.13-1. Mitigation Measure 2.13(a) is discussed below.

Combined Effects

The combined effects of land use and transportation projects could increase the routine transport, use, storage, and disposal of hazardous wastes in the region. Therefore, the proposed Plan would have a potentially significant (PS) impact. Mitigation Measure 2.13(a) is discussed below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.13(a) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce the impacts associated with the routine transit, use, or disposal of hazardous materials, implementing agencies shall require project sponsors to comply with the Resource Conservation and Recovery Act, Title 22 of the California Code of Regulations, California Hazardous Waste Control Law, Cal/EPA requirements, HAZMAT training requirements, and any local regulations such as city or county Hazardous Materials Management Plans regulating the generation, transportation, treatment, storage, and disposal of hazardous materials and waste. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to the transport, use, or disposal of hazardous materials.

Significance after Mitigation

As stated in the *Environmental Setting*, RCRA, Title 22 of the CCR, and the Hazardous Waste Control Law regulate the generation, transportation, treatment, storage, and disposal of hazardous waste. These laws impose regulatory systems for handling hazardous waste in a manner that protects human health and the environment, including requirements for the classification of materials, packaging, hazard communication, transportation, handling HAZMAT employee training, and incident reporting. Transport of hazardous materials is regulated by USDOT, through Caltrans and the California Highway Patrol (CHP). The California Health Services Department regulates the haulers of hazardous waste. A valid registration issued by the DTSC is required, unless specifically exempted, to transport hazardous wastes. The CHP also publishes a list of restricted or prohibited highways. Cal/EPA oversees the regulation and management of hazardous materials on a statewide level through DTSC. Use of hazardous materials on-site requires permits and monitoring to avoid hazardous waste release through the local CUPA. DTSC is responsible for the enforcement and implementation of hazardous waste laws and regulations, codified in Title 22 of the CCR. Additionally, businesses that generate hazardous waste are required to have an EPA identification number to monitor and track hazardous waste activities.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.13(a), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.13-2: Implementation of the proposed Plan could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

Impacts of Land Use Projects

As noted in Impact 2.13-1, regional land development associated with the proposed Plan would increase transport, use, and disposal of hazardous materials such as household hazardous wastes and commercial and industrial hazardous waste. With increases in hazardous materials, the potential for upset or accident conditions involving the release of hazardous materials into the environment may also be increased. For example, releases of gas or oil spilling from vehicle accidents or a tanker truck overturning on a highway could release substantial hazardous materials. Businesses that store small or large quantities of hazardous materials (e.g., service stations, gas storage facilities, chemical warehouses, etc.), could potentially experience accidents or upset conditions that result from transporting, pumping, pouring, emptying, injecting, spilling, and dumping or disposing, which could release hazardous materials into the environment. The severity of potential effects varies with the activity conducted and the concentration and type of hazardous materials involved. The possible adverse effects on the public or environment from these and other activities would more likely be acute (immediate, or of short-term severity) as a result of short-term exposure but in some cases could result in chronic or long-term effects.

Hazardous materials impacts related to land use changes from implementation of the proposed Plan at the regional and local level are considered potentially significant (PS) for Impact 2.13-2. Mitigation Measure 2.13(b) is discussed below.

Impacts of Transportation Projects

The proposed transportation projects involve the expansion or extension of the transportation system (e.g., new Express Lanes, auxiliary lanes, roadway widening, increased transit service, and other maintenance and rehabilitation projects), which may increase the capacity to transport hazardous materials. Any increases in hazardous material transport could conceivably result in increased upset and accident conditions. Transportation improvements that expand the transportation system and extend it to new areas expose more adjoining land uses to risks associated with risk of upset on the roadway, highway, or railroad.

Hazardous materials impacts related to transportation improvements from implementation of the proposed Plan at a regional and local level would be potentially significant (PS) for Impact 2.13-2. Mitigation Measure 2.13(b) is discussed below.

Combined Effects

The combined effects of development and transportation projects could increase the routine transport, use, storage, and disposal of hazardous wastes in the planning area and as a result increase the potential for unintentional upset and accident conditions. Therefore, the proposed Plan would have a potentially significant (PS) impact. Mitigation Measure 2.1(b) is discussed below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.13(b) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce the impacts associated with the release of hazardous materials into the environment, implementing agencies shall require project sponsors to comply with Senate Bill 1889, Accidental Release Prevention Law/California Accidental Release Prevention Program (CalARP) regulating the generation, transportation, treatment, storage, and disposal of hazardous materials and waste. In addition, project sponsors shall comply with United States Department of Transportation regulations regarding the transport of hazardous materials and wastes such that accidental upset conditions are minimized. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to upset and accident conditions involving the release of hazardous materials into the environment.

Significance after Mitigation

Local government jurisdictions are required to adopt emergency plans, which are considered to be extensions of the California Emergency Plan, established in accordance with the Emergency Services Act. Cal EMA administers the Emergency Response Plan to respond to hazardous materials incidents that may occur. CalARP, established by the EPA, applies to a wide variety of facilities that contain regulated substances and aims to prevent accidental releases of hazardous materials into the environment through adoption of proper storing, containing, and handling procedures.

To prevent or minimize the accidental release of hazardous materials into the environment, precautions—such as proper securing of the materials and proper container design—are required by CalARP. CalARP also manages risks associated with accidental release through development of its programs and requirements. CHP also publishes a list of restricted or prohibited highways. In addition, roadway improvements in the proposed Plan would generally improve road safety, thereby reducing the potential for accidents related to hazardous materials. The USDOT enforces the HMTA by regulating transportation of hazardous materials by truck and rail, and governs every aspect of the movement of hazardous materials from packaging, to labeling and shipping.

With implementation of federal, State, and local requirements such as CalARP, the Regional Emergency Coordination Plan (RECP), USDOT, and Caltrans regulations would minimize potential exposure to the public and the environment from accidental releases.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.13(b), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.13-3: Implementation of the proposed Plan could result in hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

Impacts of Land Use Projects

As noted above, development associated with the land use plan would increase density and population through a variety of different land uses. This increase could result in an increase in hazardous materials use which in turn increases the potential for hazardous emissions within one-quarter mile of an existing or proposed school. Children are particularly susceptible to long-term impacts from emissions of hazardous materials including those from high-volume motor vehicle travel on roadways near schools. There are numerous schools located throughout the San Francisco Bay Area region and new ones that will be built over the course of the proposed Plan timeframe.

Therefore, hazardous materials impacts related to land use changes from implementation of the proposed land use plan at the regional and local level are considered potentially significant (PS) for Impact 2.13-3. Mitigation Measure 2.13(c) is discussed below.

Impacts of Transportation Projects

The proposed transportation projects could include transportation system expansions or other improvements near schools. These transportation improvements may increase the capacity to transport hazardous materials. Therefore, the hazardous materials impacts related to transportation improvements from implementation of the proposed transportation projects at the regional and local level are considered potentially significant (PS) for Impact 2.13-3. Mitigation Measure 2.13(c) is discussed below.

Combined Effects

The combined effects of development and transportation projects could increase the routine transport, use, storage, and disposal of hazardous wastes in the vicinity of new or proposed schools. Therefore, the proposed Plan would have a potentially significant (PS) impact. Mitigation Measure 2.13(c) is discussed below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.13(c) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce the impacts associated with handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed schools, implementing agencies shall require project sponsors to comply with DTSC School Property Evaluation and Cleanup Division regulations regarding the cleanup of existing contamination at school sites and requirements for the location of new schools that would minimize potential exposure of hazardous emissions to students, staff, and visitors to existing and planned school sites. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to hazardous materials near schools.

Significance after Mitigation

DTSC has created the School Property Evaluation and Cleanup Division that is responsible for assessing, investigating, and cleaning up proposed school sites. This Division ensures that selected properties are free of contamination or, if the properties were previously contaminated, that they have been cleaned up to a level that protects the students and staff who will occupy a new school. All proposed school sites that will receive State funding for acquisition or construction are required to go through a rigorous environmental review and cleanup process under DTSC's oversight.

School districts also conduct environmental assessments to provide basic information for determining if there has been a release of hazardous material at the sites, or if a naturally occurring hazardous material that presents a risk to human health or the environment may be present. Impacts 2.13-1 and 2.13-2 document an extensive set of existing federal and state regulations controlling emissions and the handling of hazardous materials. Through the environmental review process, DTSC ensures protection of children, staff and the environment from the potential effects of exposure to hazardous materials. Additionally, individual hazardous materials emitters or handlers must adhere to permitting requirements (CEQA Section 21151.4) that require evaluation and notification of where potential materials handling and emissions could occur within one-quarter mile proximity of existing or proposed schools.

For transportation impacts, these impacts are addressed through CalARP, which manages risks associated with accidental release, and CEQA Section 21151.4. To prevent or minimize the accidental release of hazardous materials into the environment, precautions such as proper securing of the materials and container design are required by CalARP. California Vehicle Code and CHP outline general routing and parking restrictions for hazardous material and hazardous waste shipments; the CHP also publishes a list of restricted or prohibited highways. Additionally, roadway improvements in the proposed Plan would improve road safety, thereby reducing the potential for accidents in proximity of schools related to hazardous materials.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.13(c), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.13-4: Implementation of the proposed Plan could result in projects located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.

Impacts of Land Use Projects

Throughout the Planning Area there are many sites where historical releases of hazardous materials or wastes have occurred; these are listed in environmental databases pursuant to Government Code Section 65962.5. These sites can range from small releases that have had localized effects on private property which have already been remediated to large scale releases from long term historical industrial practices that have had wider ranging effects on groundwater. Development of vacant or previously developed lots that have been impacted by petroleum hydrocarbons from leaking underground storage tanks or other chemical constituents could expose individuals to hazardous conditions at the site or on neighboring properties that involve the use of hazardous materials or hazardous wastes.

A common practice and typically required by lending institutions when properties change hands is for a Phase I Environmental Site Assessment (ESA) to be prepared in order to research and disclose the prior uses of the site and the likelihood that residual hazardous materials and/or waste might be present in underlying soil and/or groundwater. Also, in many instances implementing agencies will require submittal of a Phase I report prior to approval or implementation of a project. These studies include research in a variety of government databases to determine whether the site has had prior underground tanks or other industrial uses that could result in hazardous materials on or below the ground surface.

The American Society for Testing and Materials has developed widely accepted practice standards (ASTM E-1527-05) for the preparation of Phase I ESAs. These include an on-site visit to determine current conditions; an evaluation of possible risks posed by neighboring properties; interviews with persons knowledgeable about the site's history; an examination of local planning files to check prior land uses and permits granted; file searches with appropriate agencies having oversight authority relative to water quality and/or soil contamination; examination of historic aerial photography of the site and adjacent properties; a review of current topographic maps to determine drainage patterns; and an examination of chain-of-title for environmental lines and/or activity and land use limitations. Preparation of and compliance with a Phase I ESA for properties at risk of potential hazardous materials and/or waste contamination will avoid adverse impacts associated with build-out of land uses. If a Phase I ESA indicates the presence, or potential presence of contamination, a site-specific Phase II ESA could then test soil and/or groundwater. Based on the outcome of a Phase II ESA, remediation of contaminated sites under federal and State regulations, administered at the local level, could be required prior to development. Phase I ESA's can also be used to identify the potential for presence of hazardous building materials in situations where older structures intended for demolition could contain lead-based paint, asbestos containing materials, mercury, or polychlorinated biphenyls.

In addition, construction activities that disturb subsurface materials could encounter previously unidentified contamination from past practices or placement of undocumented fill or even unauthorized disposal of hazardous wastes. Encountering these hazardous materials could expose workers, the public or the environment to adverse effects depending on the volume, materials involved, and concentrations. Soil Management Plans or Soil Contingency Plans can include procedural measures to protect and isolate suspected contaminated materials to avoid adverse effects to the workers or public. Soil Management Plans can also be used to identify appropriate procedures that minimize disturbance of any naturally occurring asbestos in subsurface materials.

There is no regulatory requirement to conduct a Phase I ESA or Phase II ESA, nor requirements for soil management contingency plans in the event of encountering hazardous materials. Therefore, the hazard impacts related to land use changes from the implementation of the proposed Plan at the regional and local level are considered potentially significant (PS) for Impact 2.13-4. See Mitigation Measure 2.13(d) below.

Impacts of Transportation Projects

Transportation projects under the proposed Plan would include earthwork activities that would disturb underlying soils and possibly groundwater during construction potentially resulting in exposure to previously released hazardous materials. As with land use projects and development, exposure to these hazardous materials and wastes could cause adverse effects to construction workers, the public, or the environment.

As described above, a common practice when property changes hands for the purpose of development is the preparation of a Phase I ESA in order to research and disclose the prior uses of the site and the likelihood that residual hazardous materials and/or waste might be present. In many instances implementing agencies will require submittal of a Phase I report prior to approval of or implementation of a project.

Preparation of and compliance with a Phase I ESA for properties at risk of potential hazardous materials and/or waste contamination would avoid adverse impacts associated with build-out of transportation uses. If a Phase I ESA indicates the presence, or potential presence of contamination, a site-specific Phase II ESA could then test soil and/or groundwater. Based on the outcome of a Phase II ESA, remediation of contaminated sites under federal and State regulations, administered at the local level, could be required prior to development.

In addition, construction activities that have soil contingency plans in place can avoid potential exposure of unidentified hazardous materials if suspected contaminated subsurface materials are handled appropriately.

As mentioned above, not all proposed transportation projects will necessarily include a Phase I ESA, Phase II ESA, or soil management contingency plan and therefore the hazard impacts related to transportation improvements from implementation of the proposed Plan at the regional level are considered potentially significant (PS) for Impact 2.13-4. See Mitigation Measure 2.13(d) below.

Combined Effects

The potential for encountering hazardous materials or wastes would be dependent on site-specific conditions. The potential impact is considered potentially significant (PS) for Impact 2.13-4. See Mitigation Measure 2.13(d) below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.13(d) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Determining whether specific land use and transportation project sites are listed as a hazardous materials and/or waste site pursuant to Government Code Section 65962.5.
- Requiring preparation of a Phase I ESA in accordance with the American Society for Testing and Materials' ASTM E-1527-05 standards for any listed sites or sites with the potential of residual hazardous materials and/or waste as a result of location and/or prior uses. For work requiring any demolition or renovation, the Phase I ESA shall make recommendations for any hazardous building materials survey work that shall be done.
- Implementing recommendations included in a Phase I ESA prepared for a site.
- If a Phase I ESA indicates the presence or likely presence of contamination, the implementing agency shall require a Phase II ESA, and recommendations of the Phase II ESA shall be fully implemented.
- For work requiring any demolition or renovation, the Phase I ESA shall make recommendations for any hazardous building materials survey work that shall be done.

- Requiring construction contractors to prepare and implement soil management contingency plans which provide procedural guidance on the handling, notification, and protective measures to be taken in the event of encountering suspected contamination or naturally occurring asbestos.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that this mitigation measure would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.13-5: Implementation of the proposed Plan could result in a safety hazard for people residing or working in the planning area for projects located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport.

Impacts of Land Use Projects

As noted above in the setting, there are 26 public use airports in the Bay Area that serve commercial and general aviation users (shown in **Table 2.13-2** and **Figure 2.13-2).** Land development associated with the proposed Plan would likely occur in and near airport flight corridors and within areas subject to policies contained in an ALUCP. PDA areas intersect airport influence areas for the three major airports (San Francisco, Oakland, and San José) as well as those for San Carlos, Hayward, Reid-Hillview in San José, Buchanan Field in Concord, Moffett Airfield, Travis Air Force Base, Nut Tree Airport in Vacaville, and Livermore. Development that is not compatible with aviation activity (e.g., tall structures, land uses that produce glint/glare, land uses that attract wildlife that can be hazardous to aircraft, noise sensitive land uses, etc.) may lead to conflict between an airport operator and surrounding communities as well as create long-term operational problems for the airport. In California, potential hazards to airport operations are generally regulated by the Federal Aviation Administration (FAA) (14 Code of Federal Regulations Part 77 (14 CFR Part 77)), with local planning and evaluation of proposed projects (in terms of a proposed project's compatibility in relationship to air and ground operations and the safety of the public) under the authority of the applicable Airport Land Use Commission through ALUCPs.

Potential adverse hazard impacts related to land use changes from implementation of the proposed Plan are considered potentially significant (PS) for Impact 2.13-5. Mitigation Measure 2.13(e) is discussed below.

Impacts of Transportation Projects

For proposed transportation projects that would lie within or intersect an airport influence area or be located within two miles of an airport, there could potentially be incompatibility issues with the associated ALUCP. Transportation projects are located within two miles of all three major airports (San Francisco, Oakland, and San José) as well as Hayward, Reid-Hillview in San José, San Carlos, Livermore, Buchanan, Moffett Airfield, and Travis Air Force Base. However, improvements included in the proposed Plan are more likely to improve safety (through improvements to the roadway network and public transportation) than cause hazards or interfere with airport operations.

Nonetheless, potential adverse hazard impacts related to transportation improvements from the proposed Plan are considered potentially significant (PS) for Impact 2.13-5. Mitigation Measure 2.13(e) is discussed below.

Combined Effects

Both land use development and transportation projects would have a potentially significant (PS) impact. Mitigation Measure 2.13(e) is discussed below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.13(e) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce the impacts associated with people residing or working in the planning area for projects located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, implementing agencies shall require project sponsors to comply with any applicable Airport Land Use Compatibility Plan requirements as well as any Federal Aviation Administration (14 CFR Part 77) requirements. Projects shall not be approved by local agencies until project design plans have been reviewed and approved by the Airport Land Use Commission such that proposed projects would not adversely affect subject airport operations. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to development near a public airport.

Significance after Mitigation

The proposed land uses that fall within ALUCP zones and boundaries could potentially result in adverse safety hazard impacts, as discussed above. Implementing agencies are responsible for analyzing compliance with ALUCPs as a part of their land use approval authority. CEQA Section 21096 requires that when preparing an environmental impact report for any project situated within an airport influence area as defined in an ALUC compatibility plan (or, if a compatibility plan has not been adopted, within two nautical miles of a public-use airport), lead agencies shall utilize the California Airport Land Use Planning Handbook as a technical resource with respect to airport noise and safety compatibility issues.

Military airfields, such as Travis Air Force Base and Moffett Airfield, are required to adopt Air Installation Compatible Use Zone (AICUZ) studies to evaluate compatible land uses in the vicinity of military airfields. Hazards associated with development in the proximity of military airports would be reduced through CEQA Section 21098. The FAA also requires notice of proposed construction for projects located within 20,000 feet (less for runways under 3,200 feet in length) of a public use airport, and other projects that may pose a potential hazard for people residing or working in the project area, due to height, visual hazard, or the attraction of wildlife.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.13(e), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.13-6: Implementation of the proposed Plan could result in a safety hazard for people residing or working in the planning area for projects within the vicinity of a private airstrip.

Impacts of Land Use Projects

Implementation of the proposed Plan could result in development located in the vicinity of private airstrips, creating hazards from tall structures, glare-producing objects, bird and wildlife attractants, radio waves from communication centers, or other features that have the potential to interfere with take-off or landing procedures and pose a risk to aircrafts and the public. However, the activity level and accessibility of private airstrips is typically very limited, and these airstrips affect less land than public airports, thus the safety hazards are comparatively less than public or public use airports. Nonetheless the potential for adverse private airstrip impacts related to land use changes from implementation of the proposed Plan at the regional and local level is considered potentially significant (PS) for Impact 2.13-6. Mitigation Measure 2.13(f) is discussed below.

Impacts of Transportation Projects

In general, many of the transportation projects such as roadway widening and addition of express lanes would have no impact on airstrip operations but some may be subject to regulatory compliance.

The potential for adverse private airstrip impacts related to changes from implementation of the proposed transportation projects at the regional and local level is considered potentially significant (PS) for Impact 2.13-6. Mitigation Measure 2.13(f) is discussed below.

Combined Effects

Potential impacts related to projects located in the vicinity of private airstrips would be potentially significant (PS). Mitigation Measure 2.13(f) is discussed below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.13(f) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce impacts associated with people residing or working in the planning area for projects within the vicinity of a private airstrip implementing agencies shall require project sponsors to comply with any applicable local land use regulations and federal aviation guidelines as well as any Federal Aviation Administration (14 CFR Part 77) requirements applicable to projects located within two miles of a private airstrip. Projects shall not be approved by local agencies until project design plans can demonstrate compliance with subject airstrip, local and federal aviation requirements. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to development near a private airstrip.

Significance after Mitigation

Implementing agencies are responsible for analyzing safety and compatibility issues associated with approval of land use and transportation project development proximate to private airstrips for which operation is to continue. Furthermore, Caltrans requires operators to obtain a permit from the Division of Aeronautics prior to air operations, and FAA regulation (14 C.F.R. Section 77) includes provisions that apply to public as well as private airstrips. Although the regulatory environment for private airstrips is not as explicit as for public airstrips, adherence to state and local permits, existing regulations, and FAA requirements would reduce the potential for a safety hazard for people residing or working in the vicinity of private airstrips.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.13(f), the impact is found to be less than significant with mitigation (LS-M).

Impact

2.13-7: Implementation of the proposed Plan could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

Impacts of Land Use Projects

By 2040, the region is projected to support an additional two million residents and 1.1 million new jobs. Implementation of the proposed Plan would focus growth in PDAs and as a result would result in relatively more compact development compared to existing conditions.

Public service standards, performance measures, and related policies are usually set in city and county general plans. For fire, police, and emergency services these standards usually take the form of response times or service ratios. To meet increased demand, existing facilities would likely need additional personnel and equipment to maintain adequate service levels. In some cases, depending on the pattern of development, it might be necessary to construct new facilities to maintain adequate response times, capital capacity, equipment, and personnel. Given that no specific locations for such facilities can be identified at this time, it would be speculative to attempt to analyze the impacts of such construction.

Emergency response and emergency evacuation plans are designed by the Office of Emergency Services for each county in the region to respond to a possible emergency situation (e.g., fires, floods, earthquakes, etc.). These plans cover all of the land within the region including both incorporated and unincorporated areas. These plans provide a process for evacuating people from danger, preventing or minimizing loss of life and property. The management of emergency and emergency evacuation plans includes regular updates to these plans that incorporate new or proposed developments into the plans. Development under the proposed Plan would increase population and residential densities which would be reflected in updated emergency and evacuation plans.

Therefore, given the emergency plans and programs in place on a countywide and individual jurisdictional basis, and the project-level review required for all individual projects to ensure adequate levels of emergency response, the potential for adverse emergency services and emergency evacuation plan impacts related to land use changes from the implementation of the proposed Plan at the regional level are considered less than significant (LS) for Impact 2.13-7. No mitigation is required.

Impacts of Transportation Projects

The proposed transportation projects would include improvements to existing networks through construction of new Express Lanes, auxiliary lanes, roadway widening, increased transit service, and other transit projects that would generally increase circulation capacity and thereby have the potential to improve response times for police, fire, and emergency service providers, especially in heavily-congested areas where such projects will strive to alleviate bottlenecks and reduce congestion. Overall, congestion for the region is projected to increase over the proposed Plan time horizon, with total vehicle hours of delay increasing by 49 percent and the average delay per vehicle increasing from 4.6 to 5.6 minutes. Regardless, emergency and evacuation plans are regularly updated to incorporate current conditions and the proposed transportation projects do not otherwise physically interfere with emergency or evacuation plans. Also, with implementation of the proposed transportation projects that include improved transit opportunities, more people would be able to move through the regional transportation system and implementation of the proposed transportation projects will result in the construction of roadway projects that coincide with new housing and employment developments, thereby facilitating efficient access to these developments by public service providers.

Transit projects could also increase the size of the service areas of police, fire, and emergency services providers, as new stations and transfer points will require patrolling in order to maintain public safety. Development of proposed transportation projects in the region would improve overall transportation system efficiency and in some instances improve capacity. As such, the transportation projects in the proposed Plan would have beneficial effects on emergency response and evacuation.

Therefore, with the improved transportation system efficiency, the potential for adverse emergency services and emergency evacuation plan impacts related to transportation improvements from the implementation of the proposed Plan at the regional and local level is considered less than significant (LS) for Impact 2.13-7. No mitigation is required.

Combined Effects

Both land use and transportation projects would be subject to implementation of State and federal regulations as well as local/regional requirements for adequate emergency response and emergency evacuation plans, such as those required by the California Emergency Services Act and California

Emergency Management Agency. These plans are periodically updated and would include measures that would accommodate growth associated with the proposed Plan. Therefore, potential impacts related to interference with emergency response and evacuation plans would be less than significant (LS) impact. No mitigation is required.

Mitigation Measures

None required.

Impact

2.13-8: Implementation of the proposed Plan could expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Impacts of the Land Use Projects

Wildfires can cause injury, loss of life, and significant damage to property if conditions are present such that they spread quickly across large areas. Land development under the proposed Plan could pose a hazard if it results in the loss, injury, or death and damage to property adjacent to wildlands or where residences are intermixed with wildlands.

In general, PDAs are located within urbanized areas not immediately adjacent to upland areas where there is more of a wildfire threat. However, as was experienced in 1991 during the East Bay Hills fire, loss of life and significant damage can occur in relatively urbanized areas that are adjacent to open space areas with high fuels (e.g., dry vegetation). A list of PDAs—where the majority of land use changes would occur under the proposed Plan—located within a fire hazard zone is provided in Appendix I. According to this data, 8 PDAs are located within or partially within wildfire hazard zones ranging from moderate to very high.

Therefore, the potential for wildland fire hazard impacts related to land use changes from implementation of the proposed Plan at the regional and local level are considered potentially significant (PS) for Impact 2.13-8. Mitigation Measure 2.13(g) is discussed below.

Impacts of Transportation Projects

The proposed transportation projects generally involve the expansion or extension of the transportation system, which is not typically considered to be at risk from wildland fires in terms of potential injury, loss of life, or damage to improvements. Transportation improvements that expand the transportation system into new areas or areas closer to open spaces with higher fire hazards, however, can expose more urban-adjoining land uses to risks associated with wildland fires, although they would also provide better access to evacuate should a wildfire occur. The sum total of linear mileage of proposed transportation projects located within moderate to very high hazard areas for the entire proposed Plan is approximately 155 miles. The full list of transportation projects located within wildfire hazard zones ranging from moderate to very high is provided in Appendix I.

Transportation improvements, especially capacity improvements, generally improve the transportation network to move people more efficiently, in case there is a need to evacuate due to a wildfire. The potential for wildfire hazard impacts related to improvements associated with the transportation projects in the proposed Plan at the regional and local level is considered potentially significant (PS) for Impact 2.13-8. Mitigation Measure 2.13(g) is discussed below.

Combined Effects

Both land use development and transportation projects would have a potentially significant (PS) impact. Mitigation Measure 2.13(e) is discussed below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.13(g) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to the following. To reduce wildland fire impacts, implementing agencies shall require project sponsors to comply with safety measures that minimize the threat of fire as stated in the California Fire Code as well as compliance with Title 14 of the California Code of Regulations, Division 1.5 to minimize exposing people and structures to loss, injury, or death and damage. Projects shall not be approved by local agencies until project design plans can demonstrate compliance with fire safety requirements. For the purposes of this mitigation, less than significant means consistent with federal, state, and local regulations and laws related to wildfire hazards.

Significance after Mitigation

New construction is subject to the California Fire Code, which includes safety measures to minimize the threat of fire. The threat of wildfires from development of areas or transportation improvements within CAL FIRE's responsibility, which include non-federal lands in unincorporated areas with watershed value, is addressed through compliance with Title 14 of the CCR, Division 1.5 to minimize exposing people and structures to loss, injury, or death and damage. Title 14 sets forth the minimum development standards for emergency access, fuel modification, setback, signage, and water supply, which help prevent damage to structures or people by reducing wildfire hazards.

In addition, wildfire prevention is a shared responsibility between federal, State, and local agencies including local city and county fire departments. Federal lands fall under Federal Responsibility Areas, most of the unincorporated areas of the Bay Area are State Responsibility Areas, and generally all incorporated areas and some unincorporated lands are classified as Local Responsibility Areas which are typically addressed by city and county fire departments. The National Fire Plan does provide the necessary coordination between agencies in areas of federal lands. However, the majority of the Planning Area is covered by CAL FIRE and local fire agencies.

To the extent that an individual project adopts all feasible mitigation measures described above, the impact would be less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure(s) described above to address site-specific conditions. Further, because the measure is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of mitigation measure 2.13(g), the impact is found to be less than significant with mitigation (LS-M).

2.14 Public Services and Recreation

This chapter evaluates the potential impacts on schools, emergency services (including disaster response, fire protection, and police protection), and recreation facilities that could result from the implementation of the proposed Plan.

Environmental Setting

PHYSICAL SETTING

Schools

Although the California public school system is under the policy direction of the Legislature, the California Department of Education relies on local control for the management of school districts. School district governing boards and district administrators allocate resources among the schools of the district and set educational priorities for their schools. Each jurisdiction in the nine-county region of the Bay Area provides residents with local public education facilities and services, including elementary, middle, secondary, and post-secondary schools, as well as special and adult education.

As of the 2010-2011 school year, there were 1,730 public schools in the Bay Area, with 986,050 enrolled students, and 43,312 teachers. **Table 2.14-1** lists the number of K-12 public schools within each county.

TABLE 2.14-1: BAY AREA PUBLIC SCHOOLS AND ENROLLMENT BY COUNTY, 2010-2011

County	*K-12 Schools*	*K-12 Enrollment*	*K-12 Teachers*[1]
Alameda	384	216,194	9,576
Contra Costa	261	168,228	7,129
Marin	75	30,574	1,563
Napa	43	20,582	914
San Francisco	121	56,758	2,674
San Mateo	175	92,097	4,133
Santa Clara	391	266,256	11,541
Solano	102	64,494	2,655
Sonoma	178	70,867	3,127
Total:	**1,730**	**986,050**	**43,312**

1. Full-Time Equivalent Teachers, which include those assigned to a particular type of school; district and county office of education teachers not associated with a school are excluded.

* Table includes charter schools.

Source: Ed-Data County Reports, www.ed-data.k12.ca.us, accessed January 2013.

Emergency Services

This section provides information on emergency services in the Bay Area, including existing disaster response, fire protection, and police protection.

Disaster Response

Each county in California has its own Office of Emergency Services (OES), which is part of the overall emergency response hierarchy in the State. This hierarchy is in place to assist the organization and movement of resources to areas of need. When a city or special district cannot effectively handle a crisis with its own available resources and organization, it requests OES assistance. The OES provides whatever available resources and assistance that can be mobilized locally from county assets and from other cities and special districts within the county. Should additional resources and assistance be needed, the OES requests help from the California Emergency Management Agency (Cal EMA). Cal EMA is divided into three response support regions. The Coastal Region is comprised of the sixteen coastal counties from Del Norte to Monterey, including all Bay Area counties. Any assistance requests from the Bay Area go directly to the Coastal Region which immediately canvasses the 16 coastal counties for needed resources and assistance. Should more assistance be needed, the Coastal Region contacts the Cal EMA in Sacramento which, in turn, canvasses the other regions in the state. The Federal Emergency Management Agency (FEMA) provides an additional layer of emergency resources should they be needed.[1]

[1] Humboldt County Sheriff's Office website, http://co.humboldt.ca.us/sheriff/oes/, accessed August 2012

In coordination with the local OES, each county has an Emergency Operations Center (EOC), where emergency service providers coordinate response, recovery, and resources during disasters. Specific functions can include:[2]

- Developing emergency response and recovery policies;
- Assisting in coordination and communication between Mutual Aid Coordinators and the Cal EMA during county-wide and state-wide emergency response and recovery operations;
- Gathering and processing information to and from counties, cities, schools, special districts, businesses, volunteer organizations, individuals, and state and federal government agencies; and
- Managing the tactical operations of regional resources.

Fire Protection

The Bay Area faces a number of fire threats, including urban, wildland-urban interface, and wildland fires. According to the California Department of Forestry and Fire Protection (CALFIRE), fire threat in the region ranges from low to extreme depending on factors such as fuel rank, topography, presence of urban development, and expected fire frequency.[3] For a detailed discussion of fire hazard risk in the Bay Area, see *Chapter 2.13: Hazards*.

Fire protection services are managed at the local level, typically by municipalities, counties, fire protection districts, or volunteer fire companies. California Government Code Section 38611 states that any city organized under general law (i.e. has not adopted a city charter) must establish a fire department unless it is included within the boundaries of an established fire protection district. State and federal lands are generally served by State and federal fire agencies (e.g., CALFIRE, National Park Service), and in some cases, businesses and native tribes manage their own fire departments. Each fire protection agency is responsible for serving its own prescribed area, but mutual aid agreements are in wide use across the region such that agencies can rely on assistance from neighboring agencies in the case of overwhelming demand. In an effort to prevent fire-related emergencies altogether, most fire departments and agencies sponsor prevention programs (e.g., public education, vegetation clearance, etc.) and enforce fire code regulations in built structures.

Fire protection service performance is typically measured by emergency response times or the ratio of service personnel to service area population. Due to the varying needs and challenges of each jurisdiction, however, performance measures differ among agencies, particularly when comparing urban and rural agencies. Fire departments are assigned a Public Protection Classification (PPC™) from ISO, a private company that provides information about insurance risk. In order to assess fire protection agencies, ISO uses information about emergency dispatch, the number and location of engine companies, the amount of water needed to fight a fire, as well as local water supply, pressure, and flow. Local fire departments receive a classification from one to ten; a classification of one being the highest, and a classification of ten indicating that fire suppression capabilities do not meet ISO's minimum standard.

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[2] Orange County Emergency Management Bureau website, http://egov.ocgov.com/ocgov/Info%20OC/Departments%20&%20Agencies/Emergency%20Operations%20Center%20-%20Orange%20County%20Disaster%20Preparedness, accessed August 2012

[3] California Department of Forestry and Fire Protection, Fire and Resource Assessment Program, Statewide Fire Threat Map, 2007

Police Protection

Police services are provided on the State, county, and local levels. Police services provide law enforcement in areas such as crime prevention, traffic and congestion control, safety management, emergency response, and homeland security.

The California Highway Patrol (CHP) is responsible for police protection along the sections of the interstate highway system that traverse the Bay Area. It provides services for the management of traffic, emergency accident response, and protection of the highway system through safety enforcement on interstate roads. CHP services also include various programs and initiatives aimed at improving road safety and awareness for many categories of drivers. Through collaboration with local, State, and federal public safety agencies, its purpose is to minimize exposure of the public to unsafe conditions resulting from emergency accidents and highway impediments.[4]

Each of the nine counties in the Bay Area has its own sheriff's department responsible for police protection in unincorporated areas of each county. Additionally, each incorporated city and town has a police department responsible for police protection within its own jurisdiction. Unincorporated areas or areas such as transit districts may also contract with county sheriff departments for police services instead of providing their own. Cities and towns may also contract with the county sheriff department to provide law enforcement services.

Police service performances vary by jurisdiction, but are typically measured in terms of response times, calculated in minutes it takes a police officer to respond to an incident.

Recreation

The Bay Area contains over one million acres of parks and open space across its nine counties (see **Table 2.14-2** and **Figure 2.3-4** in *Chapter 2.3: Land Use*). According to the Bay Area Protected Areas Database complied by the Bay Area Open Space Council and GreenInfo Network, 147,000 acres of new parkland were added to the region's open space inventory between 2002 and 2011, representing a 26-percent increase.[5] Additionally, approximately 200,000 acres of privately owned land are held in permanent reserve as of 2011. While access by the general public to these reserve areas is restricted, they are important for the preservation of wildlife habitats and the protection of the environmental and rural characteristics of various parts of the region.

Parks and open space are generally categorized according to their size and amenities. Smaller parks such as pocket parks, neighborhood parks, community parks, urban forests, and community gardens serve local communities, typically are located in urbanized areas, and often include a wide range of improvements from playing fields and picnic areas to playgrounds and fitness trails. These parks are most often managed by local park districts or municipalities, which typically set minimum standards for park acreage based on their population. Larger open space areas such as regional parks, greenbelts, trails and pathways, natural and wildlife preserves, some private farmlands, some public rangelands, State parks, and federal parks serve a broader geographic range, typically are located outside of major urbanized areas,

[4] California Highway Patrol, "Mission Statement and Organizational Goals," accessed August 14, 2012, http://www.chp.ca.gov/html/mission.html

[5] Bay Area Open Space Council and GreenInfo Network, Bay Area Protected Areas Database, 2011.

and generally include fewer improvements. Management of these parks is divided among a range of organizations and agencies including regional park districts, State and federal government, private individuals, and non-profit land trusts.

TABLE 2.14-2: BAY AREA PARKS AND OPEN SPACE

County	*Parks and Open Space (acres)**
Alameda	116,000
Contra Costa	130,000
Marin	162,000
Napa	129,000
San Francisco	6,000
San Mateo	108,000
Santa Clara	201,000
Solano	53,000
Sonoma	110,000
TOTAL	**1,015,000**

* Includes publicly owned lands and privately owned lands that are accessible to the public.

Note: Figures may not sum due to independent rounding.

Source: Bay Area Open Space Council and GreenInfo Network, Bay Area Protected Areas Database, 2011

REGULATORY SETTING

Federal Regulations and Agencies

Federal Emergency Management Agency (FEMA)

In March 2003, the Federal Emergency Management Agency (FEMA) became part of the U.S. Department of Homeland Security. FEMA's continuing mission within the new department is to lead the effort to prepare the nation for all hazards and effectively manage federal response and recovery efforts following any national incident. FEMA also initiates proactive mitigation activities, trains first responders, and manages the National Flood Insurance Program and the U.S. Fire Administration.

Disaster Mitigation Act of 2000

The Disaster Mitigation Act of 2000 (Public Law 106-390) provides the legal basis for FEMA mitigation planning requirements for state, local and Indian Tribal governments as a condition of mitigation grant assistance. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by repealing the previous mitigation planning provisions and replacing them with a new set of requirements that emphasize the need for state, local, and Indian Tribal entities to closely coordinate mitigation planning and implementation efforts. The requirement for a state mitigation plan is continued as a condition of disaster assistance, adding incentives for increased coordination and integration of mitigation activities at the state level through the establishment of requirements for two different levels of state plans. DMA 2000 also established a new requirement for local mitigation plans and authorized up to 7 percent of Hazard Mitigation Grant Program funds available to a state for development of state, local, and Indian Tribal mitigation plans.

United States Department of Transportation Act of 1966, Section 4(f) (amended 2005)

The Department of Transportation Act (DOT Act) of 1966 included a special provision - Section 4(f) - which stipulated that the Federal Highway Administration (FHWA) and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

- There is no feasible and prudent alternative to the use of land.
- The action includes all possible planning to minimize harm to the property resulting from use.

The first substantive revision to Section 4(f) since enactment of the DOT Act was made in 2005; it simplified the process and approval of projects that have only minimal impacts on lands protected by Section 4(f). Under the new provisions, once the US DOT determines that a transportation use of Section 4(f) property results in a minimal impact, analysis of avoidance alternatives are not required and the Section 4(f) evaluation process is complete.

Land and Water Conservation Fund Act, Section 6(f)(3)

Section 6(f)(3) of the Land and Water Conservation Fund Act (LWCF Act) of 1965 (16 U.S.C. § 460l et seq.) contains provisions to protect federal investments in park and recreation resources and the quality of those assisted resources. The law recognizes the likelihood that changes in land use or development may make park use of some areas purchased with LWCF Act funds obsolete over time, particularly in rapidly changing urban areas, and provides for conversion to other use pursuant to certain specific conditions.

Section 6(f)(3) states that no property acquired or developed with assistance under Section 6(f)(3) shall, without the approval of the Secretary, be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he or she finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he or she deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location.

This requirement applies to all parks and other sites that have been the subject of LWCF Act grants of any type, and includes acquisition of park land and development or rehabilitation of park facilities. If a transportation project would have an effect upon a park or site that has received LWCF Act funds, the requirements of Section 6(f)(3) would apply.

State Regulations

California Government Code Section 65995

California Government Code Section 65995 is found in Title 7, Chapter 4.9 of the California Government Code and authorizes school districts to collect impact fees from developers of new residential and commercial/industrial building space. Senate Bill 50 (SB 50), discussed below, amended Government Code Section 65995 in 1998.

Senate Bill 50 (Leroy Greene School Facilities Act of 1998)

The Leroy Greene School Facilities Act of 1998 (Ed. Code, §§ 17070.10-17079.30) eliminated the ability of cities and counties to require full mitigation of school impacts and replaced it with the ability for school districts to assess fees directly to offset the costs associated with increasing school capacity as a result of new development. The Act states that payment of developer fees is "deemed to be complete and full mitigation" of the impacts related to planning, new development, or change in government organization relating to educational facilities.

Assembly Bill 2926

In 1986, Assembly Bill No. 2926 (Stats. 1986, ch. 887) (AB 2926) authorized the levy of statutory development fees, as well as placed a cap on the amount of fees that could be levied, on new residential and commercial/industrial development in order to pay for school facilities. Its overall purpose was to enable school districts to impose developer fees to pay for new school construction (Government Code 53080).

Class Size Reduction Kindergarten-University Public Education Facilities Bond Act of 1998

Proposition 1A, the Class Size Reduction Kindergarten-University Public Education Facilities Bond Act of 1998 (Ed. Code, §§ 100400 - 100405) is a school construction funding measure that was approved by the voters on the November 3, 1998, ballot. The Act created the School Facility Program which allowed for eligible school districts to obtain state bond funds for the construction and modernization of educational facilities and accommodate for growth and overcrowding in educational facilities.

California Education Code

School facilities and services in California are subject to the rules and regulations of the California Education Code and governance of the State Board of Education (SBE). The SBE is the eleven-member governing and policy making body of the California Department of Education (CDE) that sets K-12 education policy relating to standards, instructional materials, assessment, and accountability. The CDE and the State Superintendent of Public Instruction are responsible for enforcing education law and regulations; and for continuing to reform and improve public elementary school, secondary school, and child care programs, as well as adult education and some preschool programs. The CDE's mission is to provide leadership, assistance, oversight, and resources so that every Californian has access to an education that meets world-class standards.[6] The core purpose of the CDE is to lead and support the continuous improvement of student achievement, with a specific focus on closing achievement gaps.[7]

California Emergency Management Agency

In 2008, Governor Schwarzenegger signed AB 38, the California Emergency Services Act, which merged the duties, powers, purposes, and responsibilities of the Governor's Office of Emergency Services and the Governor's Office of Homeland Security into a new cabinet-level agency called the California Emergency Management Agency (Cal EMA). The legislation authorizes Cal EMA to prepare a Standard Emergency Management System (SEMS) program, which sets forth measures by which a jurisdiction should handle emergency disasters. Non-compliance with SEMS could result in the State withholding disaster relief from the non-complying jurisdiction in the event of an emergency disaster.

Cal EMA serves as the lead State agency for emergency management and coordinates the State response to major emergencies in support of local government. The primary responsibility for emergency management resides with local government. SEMS provides the mechanism by which local government requests assistance from Cal EMA, and as such, Cal EMA maintains oversight of the State's mutual aid system. Cal EMA may task State agencies to perform work outside their day-to-day and statutory responsibilities and serves as the lead agency for obtaining federal resources.

California Fire Code

Title 24, Part 9 of the California Code of Regulations (CCR) is the California Fire Code, which sets forth regulations regarding building standards, fire protection and notification systems, fire protection devices such as fire extinguishers and smoke alarms, high-rise building standards, and fire suppression training. The Office of the State Fire Marshal, along with other State agencies, is in the process of developing and proposing Building Standards for the 2013 California Building Standards Codes. The general purpose is principally intended to update and codify a new edition of the California Building Standards Code (California Code of Regulations, Title 24) that adopts by reference more current editions of the model codes. Development under the proposed Plan Bay Area would be subject to applicable regulations of the California Fire Code.

Quimby Act

The 1975 Quimby Act (California Government Code section 66477) authorized cities and counties to pass ordinances requiring that developers set aside land, donate conservation easements, or pay fees for park improvements. The Act states that the dedication requirement of parkland can be a minimum of

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6 California Department of Education, "Roles and Responsibilities," accessed August 13, 2012, http://www.cde.ca.gov/eo/mn/rr/

7 California Department of Education, "Belief and Purpose," accessed August 13, 2012, http://www.cde.ca.gov/eo/mn/mv/

three acres per thousand residents or more, up to five acres per thousand residents if the existing ratio is greater than the minimum standard. Revenues generated through in lieu fees collected under the Quimby Act cannot be used for the operation and maintenance of park facilities. In 1982, the Act was substantially amended. The amendments further defined acceptable uses of or restrictions on Quimby funds, provided acreage/population standards and formulas for determining the exaction, and indicated that the exactions must be closely tied (nexus) to a project's impacts as identified through studies required by the California Environmental Quality Act (CEQA).

State Open Space Standards

State planning law (Government Code Section 65560) provides a structure for the preservation of open space by requiring every city and county in the State to prepare, adopt, and submit to the Secretary of the Resources Agency a "local open-space plan for the comprehensive and long-range preservation and conservation of open-space land within its jurisdiction." The following open space categories are identified for preservation:

- *Open space for public health and safety,* including, but not limited to, areas that require special management or regulation due to hazardous or special conditions.
- *Open space for the preservation of natural resources,* including, but not limited to, natural vegetation, fish and wildlife, and water resources.
- *Open space for resource management and production,* including, but not limited to, agricultural and mineral resources, forests, rangeland, and areas required for the recharge of groundwater basins.
- *Open space for outdoor recreation,* including, but not limited to, parks and recreational facilities, areas that serve as links between major recreation and open space reservations (such as trails, easements, and scenic roadways), and areas of outstanding scenic and cultural value.
- *Open space for the protection of Native American sites,* including, but not limited to, places, features, and objects of historical, cultural, or sacred significance such as Native American sanctified cemeteries, places of worship, religious or ceremonial sites, or sacred shrines located on public property (further defined in California Public Resources Code Sections 5097.9 and 5097.993).

State Public Park Preservation Act of 1971

The primary instrument for protecting and preserving parkland is the State Public Park Preservation Act of 1971 (Pub. Resources Code, §§ 5400-5409). Under the Act, cities and counties may not acquire any real property that is in use as a public park for any non-park use unless compensation or land, or both, are provided to replace the parkland acquired. This ensures no net loss of parkland and facilities.

Local Regulations

General Plans

State law requires every city and county to adopt a general plan that expresses the community's development goals and embodies public policy relative to the distribution of future land uses, both public and private.[8] Included in the general plan are potential hazards, policies, and mitigation measures related

[8] Office of Planning and Research Website, accessed August 15, 2012, http://opr.ca.gov/docs/General_Plan_Guidelines_2003.pdf

to recreation as well as public services and safety. The elements contained in the general plan aim to promote the highest quality of life in a given jurisdiction.

Each general plan is required to have an open space element that guides the comprehensive and long-range preservation and conservation of "open space land." A wide range of topics are addressed in the open-space element, including: open space for the preservation of natural resources; open space used for the managed production of resources; open space for outdoor recreation; open space for public health and safety; demands for trail-oriented recreational use; the retention of all publicly owned corridors for future use; and the feasibility of integrating city and county trail routes with appropriate segments of the California Recreational Trails System.

Each general plan is also required to have a safety element, which describes plans to promote safety within the jurisdiction as well as the services available in order to maintain safety. The purpose of the safety element is to reduce the possible risks related to death, injuries, property damage, and economic and social dislocation resulting from fired, floods, earthquakes, landslides, and other hazards. Included in the safety element is the emergency response section, which describes the service areas of emergency services, including fire, police, and ambulance, and an evaluation of the adequacy of the existing service and the demand for additional emergency services.[9]

In addition, CCR Section 65302 (g) states that a city may adopt a county's safety element, "to the extent that the county's safety element is sufficiently detailed and contains appropriate programs and policies for adoption by a city."[10]

Emergency Operations Plans

Local jurisdictions maintain emergency operations plans that detail how emergency and disaster situations are to be handled within that jurisdiction. Jurisdictions may also have Multi-Hazard Emergency Plans that address various threats to the jurisdiction.

Fire District Master Plans

Many jurisdictions and fire districts in the region have adopted or are planning to adopt Fire Department (District) Master Plans. A master plan addresses staffing needs, facility needs, and service goals for the service area and serves as a guiding document for the organization and daily functions of the department.

Recreation and Parks Master Plans

These plans outline projected recreation facility needs and strategies for fulfilling those needs. The main purpose of the plans is to provide guidance for addressing preservation, use, development, and administration of recreation facilities. These policy and action documents ensure the preservation of the naturalistic environment, while providing developments to facilitate human enjoyment of the parks and recreation areas. Plans can target goals and future actions for a specific park or be generalized to a collection of parks in a larger system.

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[9] Ibid.

[10] California Government Code, Section 65032(g), accessed August 15, 2012, http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=65001-66000&file=65300-65303.4

Impact Analysis

SIGNIFICANCE CRITERIA

Implementation of the proposed Plan would have a potentially significant adverse impact if it would:

Criterion 1: Result in the need for new or expanded facilities, the construction of which causes significant environmental impacts, in order to maintain adequate schools, emergency services, police, fire, and park and recreation services as a result of Plan Bay Area.

Criterion 2: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

METHOD OF ANALYSIS

This analysis includes a qualitative assessment of impacts related to construction of new or expansion of existing facilities to maintain adequate schools, emergency services, police and fire protection, and park and recreation services as a result of implementation of the proposed Plan. The analysis assesses the amount and location of growth under the proposed Plan, as compared to existing conditions, and considers how that growth might impact the provision of services as it relates to requiring new or expanded facilities. This analysis is qualitative in nature, addressing generally the types of impacts (not site specific) that could be expected for each service. The assessment describes impacts related to implementation of the proposed Plan's land use pattern, as well as impacts from the proposed transportation projects. The analysis also considers potential impacts from increased use of parks and recreational facilities that could be caused by change in development patterns under the proposed Plan.

SUMMARY OF IMPACTS

Implementation of the proposed Plan could result in the need for new or expanded public facilities, the construction of which could lead to associated environmental impacts, or the accelerated degradation of recreational facilities. Proposed transportation projects are not expected to increase demand on public services or recreational space. However, impacts could result from land use projects that increase housing and employment throughout the Bay Area. Because standards for both public services and for recreational facilities are determined at the local level, and because impacts to existing services and facilities would vary substantially throughout the region, it is infeasible at the regional scale to determine the exact scale and location of impacts.

IMPACTS AND MITIGATION MEASURES

Impact

2.14-1 Implementation of the proposed Plan could result in the need for expanded facilities, the construction of which causes significant environmental impacts, in order to maintain adequate schools, emergency services, police, fire, and park and recreation services.

Impacts of Land Use Projects

Regional Impacts

By 2040, the Bay Area is expected to grow by approximately 2.1 million people, 1.1 million jobs, and about 700,000 housing units. Implementation of the proposed Plan would convert roughly 7,500 acres of undeveloped land, which represents a one percent increase in the amount of developed land over existing conditions. Comparatively, the projected housing unit growth represents a 27 percent increase over existing conditions and the projected number of jobs represents a 33 percent increase over existing conditions, indicating that implementation of the proposed Plan will result in more compact development than existing conditions, largely in Priority Development Areas (PDAs) and as infill development. This type of growth pattern should allow jurisdictions to leverage existing facilities and absorb some of the increased demand with facilities that are currently underutilized. Overall, the higher density of new growth in the region should limit the number of new facilities needed to maintain adequate levels of service, since more residents will have access to these services within the same service area. While overall service levels may need to grow, in many cases this could be accomplished utilizing existing facilities and infrastructure. At the same time, the higher density of new growth will reduce per capita costs to construct and maintain any new facilities that are built. However, depending on the growth and housing patterns, some school, library, and recreation facilities may become overused. In these cases, implementation of the proposed Plan would require additional facilities to ensure acceptable levels of service.

The impact of the proposed Plan was evaluated individually for each public service addressed: schools, emergency, police, fire, and park and recreation. However, at the regional scale it is impossible to make clear distinctions related to this impact due to the large number of jurisdictions in the Bay Area and the differing service standards for each service across jurisdictions. Public service standards, performance measures, and policies related to police and fire are typically set by local jurisdictions and agencies; library and recreation facilities are typically set in city and county general plans. For schools, standards relating to class size are primarily determined at the state level, although local school districts are responsible for the planning and construction of school facilities. To meet increased demand for these facilities, existing facilities would likely need additional personnel and equipment to maintain adequate service levels as the number of residents and jobs increases. In some cases, depending on the pattern of development, it will be necessary to construct new facilities to maintain adequate capital capacity, equipment, and personnel.

The land use strategy outlined in the proposed Plan includes new development needed to accommodate necessary increases in public service facilities. In particular, modeling for the region identifies 439,000 new Health, Educational, and Recreational Services jobs for the region and accounts for the new facilities needed to accommodate them. Increases in these sectors occur in every county, with San Francisco, Santa Clara, and Alameda counties forecast to continue to have the greatest share of these types of jobs and will see the largest increase in total numbers, consistent with the largest increases in total population. The largest percent increase in Health, Educational, and Recreational Services jobs will occur in San Mateo, Contra Costa, and Napa counties. Additionally, the proposed Plan accommodates nearly 950,000 jobs classified in ABAG's "Other" category, which includes jobs in the construction, information, and public administration sectors. Police and fire service jobs are classified along with other government-related employment under public administration, but a detailed breakdown of this sector by sub-sector is not available. At the regional scale, the impacts related to the additional jobs required to maintain service levels at public service facilities and any associated construction of new facilities is assumed in the analysis conducted throughout this EIR, thereby addressing the potential construction related impacts of new public service facilities. Such construction could have impacts on aesthetics, air quality, cultural resources, geology, land use, noise, transportation, utilities, and other related impacts. Therefore, impacts related to schools, emergency, police, fire, and park and recreation are considered potentially significant (PS). Mitigation measure 2.14(a) is described below.

Localized Impacts

Priority Development Areas are nominated by local jurisdictions as appropriate places to concentrate future growth. PDAs are existing neighborhoods served by transit and supported by local plans to provide a wider range of housing options along with amenities and services to meet the day-to-day needs of residents in a pedestrian-friendly environment. In order to support new development, improved (or new) infrastructure and services must be funded and maintained. For instance, additional fire service capacity may be needed to serve high rise development as compared to existing low and mid-rise development.

The proposed Plan assumes an increase in public service facilities and infrastructure as the population increases. However, public services are regulated by local jurisdictions, which often have differing goals, standards, and policies related to the provision of public services. Police, fire, school, and fire service effects may also vary in different locations, with locations experiencing more growth likely requiring additional services. A detailed assessment of local needs is infeasible at the regional scale. Impacts at the regional and local levels are potentially significant (PS). Mitigation measure 2.14(a) is discussed below.

Impacts of Transportation Projects

Under the proposed Plan, the region will see 687 lane miles of additional capacity over existing conditions, including freeway, Express Lanes, arterial, and collector street lane miles. Projects that increase capacity, such as road widenings, newly constructed roads and bike lanes, and Express Lanes, have the potential to improve access for school, library, and parks and recreation facilities. For example, Safe Routes to School projects will improve pedestrian and bicycle facilities surrounding schools, thereby providing non-motorized access for schoolchildren. Similarly, implementation of the region's transit projects will increase access to public services by increasing the frequency of transit service and expanding the service area to include new public service facilities. Local service providers should coordinate with agencies implementing transportation infrastructure improvements to ensure that the siting of future public service facilities takes into account access issues, including access by persons dependent on public transportation.

An increase in roadway capacity may heighten the demand for police, fire, and emergency services, but most of this increase will occur in areas that are already covered by existing services. Since roadway lane capacity will increase only three percent, the increase in demand is expected to be small when compared to baseline conditions and may not require additional services beyond what is currently provided. However, as discussed above in the land use analysis, the land use growth footprint of the proposed Plan includes the land supply needed to accommodate necessary increases in public services facilities, including police, fire, and emergency services. Schools, libraries, parks, and social services would not be needed to support the transportation facilities themselves, only the increase in population, as described in the land use analysis above.

Conversely, the increases in total regional travel activity are expected to result in an increase in vehicle hours of delay (VHD) and increase in LOS F (see *Chapter 2.1: Transportation*). These delays are largely due to projected regional growth in population, jobs, and workers, rather than the proposed Plan's land use and transportation infrastructure. Nonetheless, increases in congestion could impact service levels for fire and police services, thereby requiring additional facilities or staffing in order to meet service standards on congested roadways.

Because congestion is not a result of the transportation improvement investment strategy, but rather of regional growth, and the proposed Plan otherwise improves access to services, the impacts on public services as a result of transportation improvements in the proposed Plan are considered less than significant (LS). No mitigation measures are required.

Combined Effects

While impacts from transportation projects are expected to be less than significant, development projects have the potential to produce significant impacts. However, even where they are not significant, impacts could aggregate to produce potentially significant (PS) impacts related to public service provision. Mitigation measure 2.14(a) is discussed below.

Mitigation Measure

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.14(a) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Ensuring that adequate public services, and related infrastructure and utilities, will be available to meet or satisfy levels identified in the applicable local general plan or service master plan prior to approval of new development projects.
- Complying with existing local regulations and policies that exceed or reasonably replace measures that reduce public service impacts.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that these mitigation measures would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Impact

2.14-2 Implementation of the proposed Plan could result in increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Impacts of Land Use Projects

Currently, the nine-county Bay Area contains approximately 1,015,000 acres of open space and parkland and 7,091,000 people, resulting in about 143 acres per thousand residents, with acreage per resident varying substantially by county, as shown in **Table 2.14-3**. Open space resources, however, serve residents from throughout the region, so park acreage in Marin or Napa, for instance, is actually serving residents throughout the region. Implementation of the proposed Plan would increase the number of residents making use of existing parkland and could cause accelerated physical deterioration of parks and recreational facilities as a result. Most local jurisdictions have their own goals and standards for acceptable amounts of parkland, typically in terms of acres per 1,000 residents or per capita. Local jurisdictions strive to ensure that new developments make adequate provisions for new parkland. However, there is no similar regional goal for per capita open space and parkland acreage.

TABLE 2.14-3: BAY AREA PARKS AND OPEN SPACE AND ACREAGE PER 1,000 RESIDENTS, BY COUNTY

County	*Parks and Open Space (acres)**	*2010 Population*	*2010 Acres Per 1,000 Residents*
Alameda	116,000	1,497,000	77
Contra Costa	130,000	1,044,000	125
Marin	162,000	246,000	659
Napa	129,000	134,000	965
San Francisco	6,000	800,000	7
San Mateo	108,000	715,000	151
Santa Clara	201,000	1,772,000	113
Solano	53,000	403,000	132
Sonoma	110,000	480,000	230
TOTAL	**1,015,000**	**7,091,000**	**143**

* Includes publicly owned lands and privately owned lands that are accessible to the public.

Source: Bay Area Open Space Council and GreenInfo Network, Bay Area Protected Areas Database, 2011

Historically, local jurisdictions have accommodated increases in demand for parks and recreation facilities by constructing new facilities and leveraging existing facilities, equipment, and personnel as available. Future increases in demand would likely be handled in the same way. Funding for new parks may be generated at the local level through in lieu fees collected under the Quimby Act (described above in the Regulatory Setting). The timing, siting, and project-specific details of individual development projects will dictate the necessity of increasing recreational services in existing service areas or expanding service to new areas.

While the proposed Plan assumes an increase in parks and recreation facilities as part of complete communities in the PDAs and regional conservation strategies, land use is regulated by local jurisdictions, which often have differing goals, standards, and policies related to the provision of parks and recreation facilities. As a result, this impact is considered potentially significant (PS). Mitigation Measure 2.14(b) is discussed below.

Impacts of Transportation Projects

New and expanded capacity roadway projects, bicycle and pedestrian improvements, and increased transit service have the potential to improve access to existing neighborhood and regional parks or other recreational facilities for residents in the region. Better access could lead to increased use and, as discussed under land use impacts above, result in an accelerated rate of deterioration of these facilities. However, this increase in park use is ultimately a result of regional growth rather than the addition of improved access. Further, most local jurisdictions have their own goals and standards for acceptable amounts of parkland based on per capita standards and strive to ensure that new developments make adequate provisions for new parkland. Where local jurisdictions have park standards related to access, the standards generally seek to ensure adequate proximity or access to park and recreational facilities. In most cases, improved access to existing or proposed recreational facilities would be desirable. Therefore, the impacts on parks and recreational facilities as a result of transportation improvements in the proposed Plan are considered less than significant (LS). No mitigation measures are required.

Combined Effects

While impacts from transportation projects are expected to be less than significant, development projects have the potential to produce significant impacts. However, even where they are not significant, impacts could aggregate to produce potentially significant (PS) impacts related to the maintenance of public parks. Mitigation Measure 2.14(b) is discussed below.

Mitigation Measures

Implementing agencies and/or project sponsors shall consider implementation of mitigations measures including but not limited to those identified below.

2.14(b) Mitigation measures that shall be considered by implementing agencies and/or project sponsors where feasible based on project-and site-specific considerations include, but are not limited to:

- Ensuring that adequate parks and recreational facilities will be available to meet or satisfy levels identified in the applicable local general plan or service master plan prior to approval of new development.
- Complying with existing local regulations and policies that exceed or reasonably replace measures that reduce impacts on recreational facilities.

Significance after Mitigation

Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. To the extent that an individual project adopts and implements all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore it cannot be ensured that these mitigation measures would be implemented in all cases, and this impact remains significant and unavoidable (SU).

Part Three

Alternative and CEQA-Required Conclusions

3.1 Alternatives to the Proposed Plan

This chapter documents the alternatives development and screening process and fully analyzes four additional alternatives to the proposed Plan Bay Area. Key features of each alternative are presented, and potential impacts are discussed and compared to the impacts of the proposed Plan Bay Area (also described as the proposed Plan alternative).

The CEQA Guidelines require EIRs to describe a reasonable range of potentially feasible alternatives to a proposed project or program. That is, the EIR needs to analyze those alternatives that will help decision-makers make reasoned choices. The range of alternatives shall include those that "would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project" (CEQA Guidelines, Section 15126.6(a)). "Feasible" means that the alternatives "are capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social and technological factors" (CEQA Guidelines, Section 15364). The proposed Plan's objectives are provided in *Chapter 1.2, Overview of the Proposed Plan Bay Area*. In addition, the EIR must evaluate the No Project alternative, which allows decision makers to compare the impacts of approving the project with the impacts of not approving the project.

If the alternatives themselves would have significant environmental impacts, the EIR must identify them. The alternatives may result in new impacts that do not result from the proposed Plan Bay Area. Quantified information on the alternatives is presented where available; however, in some cases only partial quantification can be provided because of data or analytical limitations. In such cases, a qualitative analysis is provided.

Finally, the CEQA Guidelines require each EIR to identify the environmentally superior alternative among the alternatives analyzed. The environmentally superior alternative is selected based on a comparative assessment of the overall environmental impacts of each alternative and identification of the alternative with the fewest or least severe environmental impacts overall. If the No Project alternative is the environmentally superior alternative, the EIR must select another alternative from among the alternatives analyzed.

Alternatives Screening

MTC and ABAG conducted an extensive screening process to identify potential Plan alternatives and to ultimately identify a reasonable range of alternatives for full evaluation in this EIR.

Multiple rounds of transportation and land use scenario analyses were conducted between 2010 and 2012 by MTC and ABAG to inform Plan Bay Area. The Current Regional Plans, analyzed in February 2011 and the Initial Vision Scenario, released in March 2011, provided a starting point for conversations with local governments and Bay Area residents about where new development should occur, and how new long-term transportation investments can serve this new growth. Input from local jurisdictions was gathered (see *Chapter 1.2, Overview of the Proposed Plan Bay Area* for detailed information on this process) to create a range of alternative land use development scenarios, primarily focused around various levels of projected growth in the urban, suburban, and rural areas. Two transportation networks were also developed by MTC in the initial round of scenario analyses: one that continued the investment strategy of the existing Regional Transportation Plan (Transportation 2035), with significant funding for operations and maintenance of the existing system and limited expansions of highway and transit networks; and one that significantly increased transit service frequencies along the core transit network, kept Transportation 2035 investment levels for maintenance and bike/pedestrian projects, and reduced Transportation 2035 roadway expansion investments. These scenarios and networks informed the development of the proposed Plan as well as the alternatives included for evaluation in this EIR.

Subsequently, as part of the investment tradeoffs and policy-making process that is described in *Chapter 1.2: Overview of the Proposed Plan Bay Area,* ABAG and MTC developed the Jobs-Housing Connection Strategy and the Transportation Investment Strategy respectively, which together comprise the proposed Plan.

In light of the alternative scenario analyses, MTC and ABAG generated a preliminary range of alternatives for consideration in the EIR, and included those in the Notice of Preparation (NOP) in June 2012 for public comments (see Appendix A). These preliminary alternatives—the No Project alternative, Jobs-Housing Connection Strategy (the preferred Plan), Lower Concentrations of PDA Growth, Eliminate Inter-Regional Commute, and Environment, Equity, and Jobs—were designed to achieve most of the Plan Bay Area performance targets, and thus the project objectives, particularly the GHG emissions reduction target through alternative land use patterns and by providing additional investment in transit service and implementing various road pricing strategies on the transportation network. Two of the alternatives were developed by stakeholder groups. The Eliminate Inter-Regional Commute, which became Alternative 4, was developed by representatives of the business community. The Equity, Environment and Jobs alternative, which became Alternative 5, was developed by a group of equity stakeholders including Public Advocates, Urban Habitat and Transform. MTC and ABAG discussed these preliminary alternatives with the MTC Planning Committee, Policy Advisory Committee, ABAG Administrative Committee, planning directors from the region's CMAs and major cities, and stakeholders from the equity and business communities. In addition, MTC and ABAG presented these alternatives at four public EIR scoping meetings across the region. Several comment letters and oral comments from members of the public and public agencies included recommendations regarding alternatives. These are included in Appendix D.

Approach to Assessing Alternatives

MITIGATION MEASURES

Mitigation measures, as identified for the proposed Plan in *Part Two: Settings, Impacts, and Mitigation Measures* of this EIR, would apply to all alternatives other than the No Project, since the No Project alternative would not include adoption of a new plan. The No Project alternative is assumed to implement existing regulations. Projects taking advantage of CEQA Streamlining provisions of SB 375 can and should apply the mitigation measures described in *Part Two*, as feasible, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore this EIR finds that it cannot be ensured that this mitigation measures would be implemented in all cases, and therefore, many impacts would remain significant. Where existing regulatory requirements (i.e., for hazards or water resources) or permitting requirements exist (i.e., for biological resources), it is assumed that since these regulations are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented, thereby reducing impacts to less than significant where relevant.

MODELING

See *Chapter 1.2: Overview of the Proposed Plan Bay Area* for a detailed overview of the modeling methodology.

Travel Demand Forecasting Model – Travel Model One

The MTC travel demand model, Travel Model One, is a regional activity-based travel model for the San Francisco Bay Area. This model produced all of the key outputs used in assessing the significance of transportation impacts for all alternatives, including outputs such as vehicle miles traveled, vehicle hours of delay, and accessibility, as well as other outputs such as volume to capacity ratios and level of service.

Land Use Forecasting Model – UrbanSim

ABAG developed regional control totals—forecasted numbers of households and employed residents—for the time period between 2010 and 2040, as described in *Chapter 1.2*. UrbanSim, the regional land use forecasting model, relied upon these regional control totals as model inputs. Based on the assumed levels of household and job growth in the region, UrbanSim analyzed the impact of specific policy inputs for each of the alternatives, such as zoning, fees, incentives, and growth boundaries, on the regional development pattern.

Subsequently, GIS raster data was developed by MTC using UrbanSim land use outputs, including the forecast location of new jobs and housing throughout the region for each alternative. Due to modeling constraints, adjustments were made to the proposed Plan model outputs to better reflect the land use pattern of the proposed Plan, which went through an extensive planning process involving refinements by local jurisdictions.

Adjustments were not made for the other alternatives given that they did not have the same degree of pre-defined land use outcome targets (alternatives are defined by policy inputs, as described above).

Using these data, urbanized land footprints were developed for each alternative1 and land use impacts were analyzed using the parcel dataset.

Detailed information on modeling processes, including adjustments and outputs, is included in the Summary of Predicted Land Use Responses supplemental document, released in March 2013. This data and other documents can be obtained from the MTC/ABAG Library, or from OneBayArea website at onebayarea.org.

Integration of Travel Model One and UrbanSim

In order to appropriately consider the symbiotic relationship of transportation and land use, Travel Model One and UrbanSim are unified in an integrated model framework. This allowed for analysis of how transportation projects affect the surrounding land use pattern, as well as how changes to household and employment locations affect transportation demand. See *Chapter 1.2: Overview of the Proposed Plan Bay Area* for more detail on this process.

For calculations relying on outputs from Travel Model One and population totals (i.e., per capita VMT or per capita energy use), model-simulated population levels were used to ensure consistency. Simulated population may be slightly different than overall population forecasts for the proposed Plan and alternatives due to slight variability in modeling tools. Further clarification on this issue is in the Plan Bay Area EIR technical appendices.

References

The Summary of Predicted Traveler Responses and Summary of Predicted Land Use Responses supplemental documents, released in March 2013, provide detail regarding the modeling assumptions and outputs for Plan Bay Area. Raster land use data development is outlined in an appendix to the Summary of Predicted Land Use Responses. MTC and ABAG also have a large body of detailed published documentation regarding the integrated travel demand and land use model. This data and other documents can be obtained from the OneBayArea website at onebayarea.org.

Alternatives Analyzed in this EIR

This EIR evaluates the No Project alternative as required by CEQA, as well as three other alternatives refined through the scoping process. The descriptions of the alternatives are provided below, followed by an analysis that compares the environmental impacts of each alternative to the proposed Plan. A complete listing of projects by alternative is provided in Appendix C.

Consistent with the Notice of Preparation (NOP) of this EIR, the alternatives are listed and referred to in the following order:

1. No Project alternative,

[1] Future urbanized footprints apply a density threshold of 4 households per acre and 10 jobs per acre to the 2040 growth areas.

2. Alternative 2: Proposed Plan,
3. Alternative 3: Transit Priority Focus,
4. Alternative 4: Enhanced Network of Communities, and
5. Alternative 5: Environment, Equity and Jobs.

Descriptions of the key policies of each alternative follow, emphasizing where they deviate from the proposed Plan.

ALTERNATIVE 1: NO PROJECT

The No Project alternative represents the potential scenario if Plan Bay Area is not implemented. Under this alternative, no new regional policies would be implemented in order to influence local land use patterns and no uncommitted transportation investments would be made. The key elements of the No Project alternative that vary from the proposed Plan include the following:

- **Land Use Policies:** No new regional land use plan would be developed and no new policies would be implemented to influence the locations of housing and employment centers in the region. No new fees, subsidies, or land development incentives would be provided on the regional level. Urban growth boundaries would be assumed to expand at historical rates, allowing for additional development potential in greenfield locations.
- **Transportation Investments:** Projects and programs that are identified as "committed" in MTC Resolution 4006 Committed Projects and Programs Policy are included in this alternative – this is similar but not identical to the list of projects in Transportation 2035. The transportation network in this alternative would therefore not be equivalent to existing conditions. The committed projects and programs include transportation projects/programs that were sufficiently through the environmental review process as of May 2011 and had full funding plans in place. In addition, regional programs with executed contracts or funding already secured are considered committed and included in the No Project alternative, through the existing contract period for each program. However, Express Lane projects in MTC's regional network are listed as committed but technically are uncommitted;[2] all of the MTC Network Express Lane projects are therefore excluded from the No Project alternative (VTA's Express Lane Network is a fully committed project and included in every alternative).
- **Transportation Policies:** Tolls would remain the same as measured in constant year dollars. Parking prices would remain the same as measured in constant year dollars, and localized parking minimums would remain the same for new development.

ALTERNATIVE 2: PROPOSED PLAN

Alternative 2, proposed as the Jobs-Housing Connection in the NOP, was selected by MTC and ABAG as the preferred plan option for Plan Bay Area, and is the proposed Plan evaluated throughout this EIR.

[2] The region's two Express Lane networks—MTC's regional network and VTA's network—are each viewed as a project made up of individual project segments. Unless the entire network is fully funded and committed, the entire network, or "project", is uncommitted. As a result, MTC's Express Lane Network is an uncommitted project; VTA's Express Lane Network is a fully committed project.

See the Project Description in *Chapter 1.2* for a detailed description of this alternative, which includes both the Jobs-Housing Connection and the Transportation Investment Strategy.

ALTERNATIVE 3: TRANSIT PRIORITY FOCUS

The Transit Priority Focus alternative seeks to develop a focused growth pattern primarily in the region's urban core by relying on Transit Priority Project eligible areas (TPPs), which are areas with high-frequency transit service that are eligible for higher-density development streamlining, as per SB 375. The TPP framework is meant to leverage the significant investment the region has made and continues to make in transit service. This alternative was referred to as "Lower Concentrations of PDA Growth" in the NOP. Key components of this alternative that vary from the proposed Plan include the following:

- **Land Use Policies:** Rather than the Priority Development Area (PDA)-based framework of the proposed Plan, this alternative would emphasize future development in TPPs. Defined by SB 375 as growth emphasis areas, local jurisdictions would be encouraged to up-zone these areas in order to encourage growth around high-frequency transit services (especially fixed-guideway assets). Additionally, a regional development fee based on vehicle miles traveled would be implemented to discourage low-density suburban and rural development, with proceeds used to subsidize urban infill development areas.
- **Transportation Investments:** The transportation network for Alternative 3 revises the Transportation Investment Strategy identified in the proposed Plan to place a greater emphasis on supporting the urban core. This alternative slightly scales back the Regional Express Lane Network by removing proposed express lanes at the fringe of the region. In addition, funding is shifted from other priorities (the Freeway Performance Initiative and OneBayArea grants) to support additional investment in BART service in the core of the region (the BART Metro project) and increased AC Transit bus service in the urban core.
- **Transportation Policies:** This alternative would increase the San Francisco-Oakland Bay Bridge toll to $8 at peak hours. The higher bridge toll is intended to reduce congestion and encourage transit ridership in the bridge corridor and support investment in transit service on the Bay Bridge corridor.

ALTERNATIVE 4: ENHANCED NETWORK OF COMMUNITIES

This alternative seeks to provide sufficient housing for all people employed in the San Francisco Bay Area and allows for more dispersed growth patterns than the proposed Plan. This alternative reflects input from the region's business community, which requested an alternative that mirrors the land use pattern previously identified in Current Regional Plans/Projections 2011 (CRP).[3] This alternative is based on the "Eliminate Inter-Regional Commuting" alternative presented in the NOP, based on feedback to incorporate a less-focused growth pattern with higher regional household projections. Key components of this alternative that vary from the proposed Plan include the following:

- **Demographics:** This is the only alternative that includes different and higher population and employment projections within the region, which reflect an elimination of in-commuting from neighboring regions. All other alternatives assume that the Bay Area will continue to import

[3] See Supplemental Report, *Current Regional Plans Technical Report,* on onebayarea.org.

workers from adjacent counties at the current rate of in-commuting. This higher regional population will lead to a higher number of jobs in the region, as more residents consume services which require employees. As a result, this alternative also has a higher number of jobs than the proposed Plan.

- **Land Use Policies:** The land use is based on CRP, which focuses growth around PDAs, but at a lower level than in the proposed Plan. The distribution of future housing and jobs is based on Projections 2009, adjusted to reflect local jurisdiction input and to extend the forecast from 2035 to 2040. When developing CRP, CMAs and local jurisdictions were asked to review and provide comments on Projections 2009 to improve the spatial distribution of housing and job growth. In some cases, local feedback included updates to forecasts at the census tract level, while in other cases local planners identified allocations of future growth at the neighborhood or city level. Responses were not comprehensive across all jurisdictions. Growth levels in CRP were adjusted proportionally to achieve consistency with the regional projections for housing and jobs assumed in this alternative. Subsidies were applied as necessary to achieve the growth distribution desired in this alternative. This alternative will include OBAG incentives for development in targeted locations, but unlike the proposed Plan would not include incentives for redevelopment.
- **Transportation Investments:** The transportation investments for both road and transit networks would remain consistent with the proposed Plan with the exception of shifting $70 million from the Climate Initiatives Policies to local road and state highway maintenance and dedicating revenues from the bridge toll increase (see below) to state highway maintenance.
- **Transportation Policies:** Like Alternatives 3 and 5, this alternative will increase the San Francisco-Oakland Bay Bridge toll to $8 at peak hours.

ALTERNATIVE 5: ENVIRONMENT, EQUITY, AND JOBS

This alternative reflects the development proposal presented by Public Advocates, Urban Habitat, and TransForm during the scoping period. This alternative seeks to maximize affordable housing in high-opportunity urban and suburban areas through incentives and housing subsidies. The suburban growth is supported by increased transit service to historically disadvantaged communities through a Vehicle Miles Traveled (VMT) tax and higher bridge tolls. Key components of this alternative that vary from the proposed Plan include the following:

- **Land Use Policies:** The intent of this alternative is to reduce residential displacement and support affordable housing in both PDAs and "high-opportunity" suburban locations. This alternative would encourage intensification of land use beyond PDAs to include jobs-rich, high-opportunity TPPs not currently identified as PDAs. Based on criteria specified by the equity stakeholders, these additional areas would include locations that are generally rich in employment and good schools but lack affordable housing. Select PDAs in rural or exurban areas would also be disqualified for upzoning or OBAG funding, as identified by equity stakeholders, in order to discourage growth far away from existing job centers.This alternative would also include a modified OneBayArea grant program focused on affordable housing and anti-displacement policies as pre-conditions for subsidies and incentives (due to modeling limitations, these incentives did not impact modeling outputs). The reinstatement of some form of redevelopment financing would help support infill development in this alternative, while subsidies would be used to support programs that minimize displacement. Unlike Alternatives 3 and 4, this alternative would discourage CEQA streamlining for TPP-eligible areas. While streamlining would still be legal, as per SB 375, based on the input of the EEJ stakeholders, this alternative would not reference TPPs, thus making it impossible for project sponsors to streamline. The modeling analysis for this alternative therefore did not include any benefits from CEQA streamlining to encourage development.

- **Transportation Investments:** This alternative seeks to strengthen public transit by significantly boosting service frequencies in most suburban and urban areas, other than on Muni, BART or Caltrain, and providing free transit passes to youth throughout the region. This alternative includes a reduced scope highway network which excludes all uncommitted road projects, other than maintenance projects, from the Transportation Investment Strategy. As with Alternative 1, the No Project alternative, all of the MTC Network Express Lane projects are excluded as they are considered uncommitted (VTA's Express Lane Network is a fully committed project and included in every alternative). As such, this alternative does not include the Regional Express Lanes Network, with the exception of committed projects.
- **Transportation Policies:** Most notably, this alternative includes the implementation of a vehicle miles traveled (VMT) tax to fund the expanded investments in public transit. This tax, assumed at a rate of one cent per mile on annual vehicle miles traveled within the region, would provide a substantial revenue source, while also discouraging residents from driving; exemptions from the tax would be provided for low-income households. Furthermore, the San Francisco-Oakland Bay Bridge would have an increased peak-period toll of $8, consistent with Alternatives 3 and 4, providing additional revenue in the Transbay corridor.

ALTERNATIVES COMPARISONS

Table 3.1-1 provides an overview comparison of the land use policies, transportation investments, and transportation policies proposed in the five Plan Bay Area alternatives. The full list of which transportation projects are included in each alternative is provided in Appendix C.

TABLE 3.1-1: POLICY MEASURE COMPARISON

	Alt 1 No Project	*Alt 2 Proposed Plan*	*Alt 3 Transit Priority*	*Alt 4 Enhanced Net*	*Alt 5 Environment, Equity, and Jobs*
LAND USE POLICIES					
Zoning					
Existing General Plans	•				
PDA-Focused Growth		•		•	•
TPP-Focused Growth			•		•
Growth Boundaries					
Current Trends Continue	•				
Strict Boundaries		•	•	•	•
Fees and Subsidies					
No New Fees	•				
Subsidies for PDA Growth		•		•	

TABLE 3.1-1: POLICY MEASURE COMPARISON

	Alt 1 No Project	*Alt 2 Proposed Plan*	*Alt 3 Transit Priority*	*Alt 4 Enhanced Net*	*Alt 5 Environment, Equity, and Jobs*
Subsidies for Urban Core			•		
Subsidies for PDA/TPP Opportunity Areas					•
Fee on High VMT Area			•		
Incentives					
None	•				
OneBayArea Grants		•	•	•	•
CEQA Streamlining		•	•	•	(see table note 1)
TPP Redevelopment		•	•		•
TRANSPORTATION INVESTMENTS					
Road Network					
Committed Projects Only	•				
Preferred		•		•	
Preferred w/ Reduced Express Lanes			•		
Preferred w/o Highway Expansion or Operational Projects					•
Transit Network					
Committed Projects Only	•				
Preferred		•		•	
Increased Funding for BART, AC Transit			•		
Additional Service for All Major Transit Operators other than Muni, BART or Caltrain					•
Climate Initiates					
Regional Electric Vehicle Public Charger Network		•	•	•	•
Vehicle Buy-Back & Plug-In or Electric Vehicles Purchase Incentives		•	•	•	•
Car Sharing	•	•	•	•	•
Vanpool Incentives		•	•	•	•
Clean Vehicles Feebate		•	•	•	•

TABLE 3.1-1: POLICY MEASURE COMPARISON

	Alt 1 No Project	*Alt 2 Proposed Plan*	*Alt 3 Transit Priority*	*Alt 4 Enhanced Net*	*Alt 5 Environment, Equity, and Jobs*
Program					
Smart Driving Strategy		•	•		•
Commuter Benefits Ordinance	•	•	•	•	•
TRANSPORTATION POLICIES					
Road Pricing					
None	•	•			
Higher Peak Toll on Bay Bridge			•	•	•
VMT Tax					•
Parking Policies					
Status Quo	•				
Reduced Minimums		•	•	•	•

1. Unlike Alternatives 3 and 4, Alternative 5 would discourage CEQA streamlining for TPP-eligible areas. While streamlining would still be legal, as per SB 375, based on the input of the EEJ stakeholders, the Plan would not reference TPPs, thus making it impossible for project sponsors to streamline.

Comparative Demographic Forecasts

All of the alternatives, except for Alternative 4, are designed to accommodate the same population and employment in the year 2040 based on forecasts developed by ABAG, with varying locational distributions of growth.

Unlike all other alternatives, Alternative 4 has different levels of household and employment growth in the region. Compared to the proposed Plan, it includes four percent more households and one percent more jobs. This higher growth total reflects the Senate Bill 375 requirement to house the region's entire population (i.e., provide a house for every household employed in the region).

Table 3.1-2 displays the differences in demographics between the various alternatives. As a result of the lower levels of transit infrastructure investment and more dispersed land use pattern under the No Project alternative, the share of households with zero cars is slightly lower than the proposed Plan (nine percent versus 11 percent). Otherwise, the other three alternatives have similar car ownership rates as compared to the proposed Plan.

TABLE 3.1-2: BAY AREA DEMOGRAPHIC FORECASTS (2010-2040)

	2010	*2040 Plan (Alt 2)*	*2040 No Project (Alt 1)*	*% Difference from Proposed Plan*	*2040 Transit Priority Focus (Alt 3)*	*% Difference from Proposed Plan*	*2040 Enhanced Network of Communities (Alt 4)*	*% Difference from Proposed Plan*	*2040 Environment, Equity, and Jobs (Alt 5)*	*% Difference from Proposed Plan*
Total Population	7,091,000	9,196,000	9,196,000	0%	9,196,000	0%	9,535,000	+4%	9,196,000	0%
Total Employment	3,385,000	4,505,000	4,505,000	0%	4,505,000	0%	4,550,000	+1%	4,505,000	0%
Employed Residents	3,269,000	4,350,000	4,350,000	0%	4,350,000	0%	4,513,000	+4%	4,350,000	0%
Total Households	2,608,000	3,308,000	3,308,000	0%	3,308,000	0%	3,431,000	+4%	3,308,000	0%
% of Households with Zero Autos	9%	11%	9%	N/A	10%	N/A	11%	N/A	10%	N/A
% of Households with One Auto	33%	33%	33%	N/A	33%	N/A	33%	N/A	33%	N/A
% of Households with Multiple Autos	58%	56%	58%	N/A	57%	N/A	57%	N/A	57%	N/A
Average Vehicles per Household	1.78	1.75	1.81	+3%	1.76	+1%	1.77	+1%	1.77	+1%

Sources: Association of Bay Area Governments, 2012; Metropolitan Transportation Commission Travel Forecasts, 2012

Households

Table 3.1-3 compares the household distribution in the years 2010 and 2040 for each alternative, along with each county's proportion of the region's population, as modeled by UrbanSim after taking each scenario's land use and transportation policies and transportation projects into account. For the draft Plan and Alternative 4, the housing and job allocations in PDAs were made to match the Jobs-Housing Connection and Current Regional Plans adopted by ABAG. Growth in areas outside of PDAs and the distribution within PDAs were modeled by UrbanSim. Each county is projected to gain households between 2010 and 2040 in every alternative, although by varying degrees. A few outcomes of note:

- The distribution of the region's households by county generally stays the same across time.
- For most counties—particularly Marin and Napa—there is relatively little difference between the alternatives. The largest range of possible outcomes is seen in San Mateo and Santa Clara counties.
- Contra Costa, Marin, and Napa counties maintain or reduce their proportion of the region's households in all alternatives (that is, grow at or below the regionwide rate). San Francisco, San Mateo, and Solano counties maintain or increase their proportion of the region's households in all alternatives.
- The No Project alternative results in the most new households for the North Bay—Napa, Solano, and Sonoma counties (16 percent of the region's total population, compared to 14 percent in the proposed Plan and 13 percent in Alternatives 3, 4, and 5) due to the urban growth boundaries in that alternative expanding at historic rates and reflective of recent trends of strong growth in the North Bay.
- Alternative 2, the proposed Plan, is the alternative that is the closest to maintaining the existing county-level distribution of households.
- Alternatives 3 and 5 deviate the most from the existing distribution of households. Alternative 3, Transit Priority Focus, pushes growth away from the East Bay and North Bay and into San Francisco, San Mateo, and Santa Clara counties. Alternative 5, Environment, Equity, and Jobs, pushes growth into Alameda and San Mateo counties.
- Alternative 4, the Enhanced Network, would result in most future household growth going to three counties: Alameda, Contra Costa and Santa Clara.

Jobs

Similar to population and household growth, the alternatives all accommodate the same number of jobs in the year 2040, with Alternative 4 the exception (the additional regional population will lead to greater local demand for services, leading to more jobs). **Table 3.1-4** shows the projected job distribution by county for each alternative. As with households, each county gains jobs in every alternative and generally maintains its 2010 proportion of the region's jobs. Deviations from this pattern include:

- The distribution and growth of jobs does not necessarily match the location and growth in households in all areas, although ideally it would in order to reduce commuting distances and the related GHG emissions, as per the goals of SB 375.

- Contra Costa and San Mateo add jobs at or above the regionwide rate in all alternatives. Marin, Napa, and Solano grow at around the regional rate in all alternatives. San Francisco and Sonoma add jobs at or below the regional rate of growth in all alternatives. The rate of jobs growth varies more significantly in Alameda and Santa Clara.
- The No Project alternative results in the highest job growth scenarios for Napa, San Mateo, Solano, and Sonoma counties and the lowest growth scenario for Santa Clara.
- Alternative 2, the proposed Plan, is the only alternative that maintains the current distribution of jobs across counties.
- Alternative 3 pushes job growth away from Alameda and San Francisco and toward Contra Costa, Napa, and Santa Clara.
- Alternative 4 largely maintains the current distribution of jobs, although with proportional gains in Contra Costa offsetting slower growth in Alameda.
- Alternative 5 results in greater job growth in the East Bay (Alameda, Contra Costa) and slower job growth in San Francisco, Santa Clara, Solano, and Sonoma.

TABLE 3.1-3: YEAR 2040 HOUSEHOLDS BY COUNTY

County	*Year 2010*	*%*	*Alt 1 No Project*	*%*	*Alt 2 Proposed*	*%*	*Alt 3 Transit*	*%*	*Alt 4 Enhanced*	*%*	*Alt 5 EEJ*	*%*
Alameda	545,137	21%	667,351	20%	705,289	21%	676,693	20%	738,991	22%	719,958	22%
Contra Costa	375,364	14%	472,450	14%	463,062	14%	413,724	13%	490,651	14%	422,539	13%
Marin	103,210	4%	111,509	3%	112,021	3%	105,702	3%	111,224	3%	108,135	3%
Napa	48,876	2%	66,410	2%	56,285	2%	57,008	2%	53,240	2%	57,315	2%
San Francisco	345,813	13%	435,869	13%	447,248	14%	450,813	14%	439,163	13%	441,464	13%
San Mateo	257,837	10%	336,495	10%	315,735	10%	363,812	11%	332,967	10%	386,026	12%
Santa Clara	604,207	23%	739,151	22%	819,138	25%	868,528	26%	875,388	26%	795,303	24%
Solano	141,758	5%	211,897	6%	168,643	5%	166,336	5%	172,214	5%	167,793	5%
Sonoma	185,825	7%	266,989	8%	220,699	7%	205,505	6%	217,904	6%	209,588	6%
Bay Area	*2,608,027*	*100%*	*3,308,120*	*100%*	*3,308,120*	*100%*	*3,308,120*	*100%*	*3,431,742*	*100%*	*3,308,120*	*100%*

TABLE 3.1-4: YEAR 2040 JOBS BY COUNTY

County	*Year 2010*	*%*	*Alt 1 No Project*	*%*	*Alt 2 Proposed*	*%*	*Alt 3 Transit*	*%*	*Alt 4 Enhanced*	*%*	*Alt 5 EEJ*	*%*
Alameda	694,433	21%	921,759	20%	947,604	21%	871,452	19%	924,433	20%	987,579	22%
Contra Costa	344,914	10%	539,131	12%	465,471	10%	566,992	13%	501,219	11%	508,291	11%
Marin	110,741	3%	126,343	3%	129,110	3%	133,703	3%	156,472	3%	124,095	3%
Napa	70,651	2%	106,519	2%	89,572	2%	106,630	2%	82,413	2%	99,911	2%
San Francisco	568,728	17%	711,917	16%	760,237	17%	656,685	15%	763,323	17%	695,149	15%
San Mateo	345,201	10%	506,139	11%	445,472	10%	494,868	11%	462,121	10%	492,403	11%
Santa Clara	926,265	27%	1,135,257	25%	1,229,758	27%	1,248,658	28%	1,215,969	27%	1,188,672	26%
Solano	132,345	4%	190,133	4%	180,162	4%	186,790	4%	179,170	4%	175,861	4%
Sonoma	192,003	6%	268,021	6%	257,832	6%	239,441	5%	264,886	6%	233,257	5%
Bay Area	*3,385,281*	*100%*	*4,505,218*	*100%*	*4,505,218*	*100%*	*4,505,218*	*100%*	*4,550,006*	*100%*	*4,505,218*	*100%*

PDA Growth

A major strategy of the proposed Plan is the direction of future residential and employment growth into PDAs, locally-identified locations with existing or future transit service for infill development and redevelopment. Across the region, around 99,900 acres of land are designated as PDAs. Around 70 percent of land in PDAs is TPP-eligible.

The proposed Plan and the alternatives (except Alternative 4) all accommodate the same number of future households and jobs, but the distribution of this growth varies depending on the mix of land use and transportation policies and transportation investments in each scenario. **Table 3.1-5** shows the expected distribution of household growth for each alternative; **Table 3.1-6** shows the expected distribution of employment growth.

Currently, around 26 percent of households and 45 percent of jobs in the Bay Area are located within PDAs. Overall the proposed Plan would result in the largest share of development within PDAs, placing 77 percent of new household growth and 63 percent of new employment growth within PDAs. This would increase the regional share of housing in PDAs to 37 percent and of jobs to 49 percent. Comparatively, Alternative 3 places 53 percent of new households and 33 percent of new jobs into PDAs; Alternative 4 would locate 46 percent of new households and 38 percent of new jobs into PDAs; and Alternative 5 would locate 57 percent of new households and 33 percent of new jobs into PDAs. Meanwhile, the No Project alternative is projected to result in the most dispersed growth pattern as compared to existing conditions, with only 24 percent of new households and 20 percent of new jobs located in PDAs.

Overall, all alternatives would result in some increase in the share of households in PDAs, except for the No Project alternative, which would maintain the existing share. However, the share of jobs located in PDAs would drop below the existing share in all alternatives except for the proposed Plan.

TABLE 3.1-5: TOTAL HOUSEHOLDS AND HOUSEHOLD GROWTH BY SHARE IN PDAS

Alternative	*Total Households*	*Total Households in PDAs*	*% of Households in PDA*	*New Regional Househol d Growth*	*New Household Growth in PDAs*	*% of New Household Growth in PDAs*
Year 2010 Baseline	2,608,000	679,187	26%	n/a	n/a	n/a
1 - No Project 2040	3,308,000	849,787	26%	700,000	170,600	24%
2 –Proposed Plan 2040	3,308,000	1,217,155	37%	700,000	537,968	77%
3 - Transit Priority 2040	3,308,000	1,049,878	32%	700,000	370,691	53%
4 – Connected 2040	3,432,000	1,055,533	31%	824,000	376,346	46%
5 – EEJ 2040	3,308,000	1,079,635	33%	700,000	400,448	57%

Source: MTC, 2013.

TABLE 3.1-6: TOTAL JOBS AND JOB GROWTH BY SHARE IN PDAS

Alternative	*Total Jobs*	*Total Jobs in PDAs*	*% Jobs in PDAs*	*New Regional Job Growth*	*New Job Growth in PDAs*	*% of New Job Growth in PDAs*
Year 2010 Baseline	3,385,000	1,525,415	45%	n/a	n/a	n/a
1 - No Project 2040	4,505,000	1,749,774	39%	1,120,000	224,359	20%
2 –Proposed Plan 2040	4,505,000	2,227,918	49%	1,120,000	702,503	63%
3 - Transit Priority 2040	4,505,000	1,891,757	42%	1,120,000	366,342	33%
4 – Connected 2040	4,550,000	1,971,957	43%	1,165,000	446,542	38%
5 – EEJ 2040	4,505,000	1,889,874	42%	1,120,000	364,459	33%

Source: MTC, 2013.

Urbanized Footprint

As of 2010, the Bay Area had 786,000 acres of urbanized land, representing 17.75% of the region's land area of 4.4 million acres. The five alternatives are all projected to increase the region's urbanized footprint to varying degrees, though differences between the proposed Plan, Alternative 3, Alternative 4, and Alternative 5 are marginal. The No Project alternative is expected to convert the greatest number of acres to urbanized land as compared to the other alternatives.

- The No Project alternative would add a total of 20,702 new acres of urbanized land, which is more than twice the amount of any of the other alternatives, and would result in an urbanized footprint of 18.22% of the region's total area.
- The proposed Plan (Alternative 2) has the lowest projected increase, adding a total of 7,547 urbanized acres. This would result in an urbanized footprint of 17.92% of the region's total land area.
- Alternative 3 would add 8,113 new acres of urbanized land, increasing the urbanized footprint to 17.94% of the region's total area.
- Alternative 4 would have an impact similar to that of the proposed Plan. It would result in 7,586 new acres of urbanized land. The urbanized footprint resulting from Alternative 4 would cover 17.93% of the regions total area.
- Alternative 5 would result in an increase of 9,596 acres, increasing the urbanized footprint to 17.97% of the region's total area.

Transportation System Capacity Increases

Table 3.1-7 presents the differences in the supply of the transportation system among the alternatives. While all of the alternatives have a heavy emphasis on maintaining and operating the existing transportation system, several alternatives identify new funding sources to boost the region's state of good repair and/or increase public transit operations beyond what is included in the proposed Plan.

- **Alternative 1 – No Project:** As the No Project alternative only includes committed projects, it does not include some of the region's most significant capacity-increasing projects, such as the Regional Express Lanes Network, BART to San Jose, and Caltrain Electrification/Frequency

Improvements. This alternative represents a significantly lower level of road and transit capacity compared to the proposed Plan; road lane-miles are two percent less than the proposed Plan and transit seat-miles are 10 percent less than the proposed Plan. Commuter rail and express bus services are particularly affected, with service levels at least 20 percent lower than the proposed Plan.

- **Alternative 3 – Transit Priority Focus:** While this alternative's transportation investments are largely the same as the proposed Plan, Transit Priority Focus scales back the scope of the Regional Express Lane Network, boosts AC Transit service levels, and funds BART Metro beyond what is in the proposed Plan. As a result, this alternative has one percent fewer highway lane-miles and four percent more transit seat-miles. The AC Transit frequency improvements can be evidenced by the three percent increase in local bus seat-miles and the one percent increase in express bus seat-miles, while the frequency improvements associated with BART Metro boost heavy rail seat-miles by seven percent.
- **Alternative 4 – Enhanced Network of Communities:** The transportation capacity investments for this alternative are fully consistent with the proposed Plan; therefore, Alternative 4 has approximately the same number of road lane-miles and transit seat-miles as the proposed Plan.
- **Alternative 5 – Environment, Equity, and Jobs:** This alternative's transportation capacity levels differ most significantly from the proposed Plan. Since Alternative 5 cancels all uncommitted highway projects (both expansion and operational improvements), the alternative includes two percent fewer road lane-miles than the proposed Plan; this is relatively consistent with the No Project alternative. The alternative also leverages new funding sources, including a VMT tax and funding from canceled highway projects, to expand transit operations on urban and suburban transit operators in all counties of the region, except San Francisco. This service increase expands the region's transit seat-miles by eight percent, boosting local bus seat-miles by 11 percent, express bus seat-miles by 13 percent, and light rail seat-miles by 19 percent. Similar to Transit Priority Focus, this alternative funds BART Metro beyond what is in the proposed Plan, increasing heavy rail seat-miles by seven percent.

TABLE 3.1-7: TRANSPORTATION SYSTEM CAPACITY (2010-2040)

	2010	*2040 Plan (Alt 2)*	*2040 No Project (Alt 1)*	*Change from Proposed Plan*	*2040 Transit Priority Focus (Alt 3)*	*Change from Proposed Plan*	*2040 Enhanced Network of Communities (Alt 4)*	*Change from Proposed Plan*	*2040 Environment, Equity, and Jobs (Alt 5)*	*Change from Proposed Plan*
Freeway Lane-Miles	5,495	6,056	5,806	-4%	5,998	-1%	6,056	0%	5,806	-4%
Expressway Lane-Miles	1,019	1,132	1,032	-9%	1,132	0%	1,132	0%	1,032	-9%
Arterial Lane-Miles	8,710	8,749	8,715	0%	8,749	0%	8,749	0%	8,683	-1%
Collector Lane-Miles	5,528	5,502	5,514	0%	5,502	0%	5,502	0%	5,509	0%
Total Roadway Lane-Miles	**20,751**	**21,438**	**21,067**	**-2%**	**21,381**	**0%**	**21,438**	**0%**	**21,030**	**-2%**
Daily[1] Local Bus Seat-Miles	34,477,000	37,828,000	36,570,000	-3%	39,039,000	+3%	37,809,000	0%	41,887,000	+11%
Daily Express Bus Seat-Miles	7,560,000	9,050,000	6,753,000	-25%	9,136,000	+1%	9,045,000	0%	10,232,000	+13%
Daily Light Rail Seat-Miles	8,114,000	10,781,000	8,848,000	-18%	10,781,000	0%	10,781,000	0%	12,814,000	+19%
Daily Heavy Rail Seat-Miles	44,134,000	56,743,000	53,090,000	-6%	60,499,000	+7%	56,743,000	0%	60,499,000	+7%
Daily Commuter Rail Seat-Miles	14,463,000	22,842,000	18,277,000	-20%	22,842,000	0%	22,842,000	0%	22,842,000	0%
Daily Ferry Seat-Miles	4,612,000	7,099,000	5,821,000	-18%	7,099,000	0%	7,099,000	0%	7,099,000	0%
Total Daily Transit Seat-Miles	**113,361,000**	**144,344,000**	**129,359,000**	**-10%**	**149,397,000**	**+4%**	**144,321,000**	**0%**	**155,374,000**	**+8%**

1. Daily metrics are measured for a typical weekday.

Source: Metropolitan Transportation Commission Travel Forecasts, 2012

Comparative Impact Analysis of Alternatives

This section identifies and compares the environmental impacts of each alternative to the proposed Plan, by resource issue area. Impact discussions in each issue area correspond to the impact categories assessed for the proposed Plan in *Part Two: Settings, Impacts, and Mitigation Measures*.

TRANSPORTATION

As shown in **Table 3.1-8**, Alternatives 3 and 5 have lower levels of total VMT compared to the proposed Plan, while Alternative 4 has significantly higher levels of total VMT when compared to the proposed Plan. Of the alternatives analyzed, Alternative 3 has the least vehicle delay (4 percent less than the proposed Plan), while Alternative 5 has the greatest transit ridership (5 percent more than the proposed Plan). These differences in travel behavior reflect the land use and transportation components of each alternative.

For all of the transportation impacts examined in *Part Two*, the effects of each alternative are summarized in data tables at the end of this section:

- **Table 3.1-9** shows relative differences in per-trip **travel time for commute purposes** between the various alternatives. Alternative 3's strong emphasis on focused growth in the urban core, combined with significant improvements to BART and AC Transit service levels, leads to its stronger performance in comparison to the proposed Plan and all other alternatives. All other alternatives to the proposed Plan are either on par with, or feature longer travel times, than the proposed Plan. All alternatives are expected to have less than significant impacts related to commute travel times.
- **Table 3.1-10** lists the impacts of the various alternatives on **non-commute travel times**. While the No Project alternative and Alternative 4 have slightly greater non-commute travel times than the proposed Plan, the impacts of the land use and transportation investments are less significant than for commute trips. This is likely due to the fact that non-commute travel tends to be at times of day where there is less traffic congestion, such as midday and evening time periods. All of the alternatives, except for Alternative 3, have slightly longer average per-trip non-commute travel times than the proposed Plan. All alternatives are expected to have less than significant impacts related to non-commute travel times.
- **Table 3.1-11** demonstrates how the proposed Plan has significantly lower levels of **per-capita congested VMT** (per-capita vehicle miles traveled at level of service F) when compared to the No Project alternative and Alternative 4. In contrast, Alternative 3 performs much better than the proposed Plan, reducing daily per-capita congested VMT by 14 percent more than the proposed Plan, as a result of its emphasis on growth in existing urban centers with existing robust street grids and transportation alternatives. While mitigation measures would commit MTC and ABAG to advance bridge toll and commuter benefit policies to reduce levels of severe traffic congestion, it is not known at this time if these strategies would reduce the impact below the significance threshold of a five percent increase to a less than significant level. Furthermore, MTC and ABAG cannot guarantee that local jurisdictions or employers would implement such policies in the most effective manner possible, given political or financial limitations. As a result,

all alternatives are expected to have significant and unavoidable impacts related to per-capita congested VMT.

- **Table 3.1-12** highlights the differences in **per-capita VMT** between the various alternatives. While all of the alternatives considered have a reduction in per capita VMT compared to baseline conditions, the proposed Plan and Alternative 4 perform the best, reducing per-capita VMT by nine percent as a result of their focused growth patterns and emphasis on locating jobs in close proximity to housing. All alternatives are expected to no adverse impact related to per-capita VMT.
- **Table 3.1-13** reflects the **levels of regional transit utilization** (ratio of transit seat-miles demanded and transit seat-miles supplied) for each of the alternatives. Compared to the proposed Plan, the No Project alternative, Alternative 3, and Alternative 5 all have lower levels of transit utilization (as a share of supplied transit capacity), meaning there would be fewer local transit vehicles with potential for crowding. No alternatives evaluated have issues with excessive regional transit demand—for all modes during all time periods, transit utilization levels remain well below the 80 percent exceedance threshold. All alternatives are expected to have no adverse impact related to transit utilization.

Alternative 1– No Project

Due to the lower-density development pattern and limited investments in new public transit services, the No Project alternative has significantly less transit ridership than the proposed Plan (21 percent less) and much greater vehicle delay than the proposed Plan (34 percent more). The No Project alternative provides the greatest contrast with the proposed Plan, demonstrating how the proposed Plan shifts regional development and travel trends away from their historical trajectories.

As this alternative features fewer expansion projects for highway and transit facilities, and distributes more growth in suburban and exurban locations in the region, it exhibits travel times that are three percent longer than the proposed Plan during commute periods and one percent longer during non-commute periods. Most significantly, the No Project alternative increases single-occupant automobile travel times during commute periods by seven percent above the proposed Plan and transit travel times by five percent above the proposed Plan.

Lack of expansion projects also leads to increased levels of chronic congestion on the region's highway corridors. As a result, the No Project alternative leads to per-capita congested VMT levels that are 168 percent higher than the proposed project during the AM peak, 94 percent higher during the PM peak, and 123 percent higher over the course of a typical weekday. Per-capita VMT is six percent greater than the proposed Plan, resulting in the typical Bay Area resident driving approximately 21 miles per day. When compared to the proposed Plan and other focused growth alternatives, the No Project alternative indicates how more growth at the region's periphery would lead to higher levels of congestion and more miles of driving each day.

Similar to the proposed Plan, the No Project alternative exhibits no regional transit capacity impacts, as transit demand remains significantly below the level of transit service supplied. Overall transit utilization is generally lower due to fewer transit expansion projects and a less transit-supportive land use pattern. The No Project alternative reflects transit demand levels that are only 36 percent of the transit service supplied over the course of a typical weekday, compared to 39 percent utilization in the proposed Plan.

Only one transit mode has greater utilization than the proposed Plan – express bus – likely as a result of the more suburban land use pattern and its need for long-distance modes of public transit.

Alternative 3– Transit Priority Focus

This alternative shifts regional growth to the Transit Priority Project eligible areas, with the greatest emphasis on growth in the urban core close to high-frequency transit. While overall ridership of the region's transit system does not differ much from the proposed Plan, the more efficient land use pattern leads to five percent less daily vehicle hours of delay and one percent less overall daily VMT.

By emphasizing focused growth around high-capacity transit hubs in the core of the region, Alternative 3 features commute travel times that are three percent less than the proposed Plan. Furthermore, it holds the region's commute travel times at 2010 levels. This alternative exhibits the greatest benefits for transit commute travel times, reducing commute times by five percent as compared to the proposed Plan. With regard to non-commute travel times, Alternative 3 performs similarly to the proposed Plan.

While increasing BART and AC Transit services and emphasizing growth in areas well-served by transit only reduces total regional VMT by one percent from the levels of the proposed Plan, slight decreases in total VMT can significantly improve highly congested highway segments. This shift leads to per-capita congested VMT levels that are less than the proposed Plan (20 percent less in the AM peak, 12 percent less in the PM peak, and 14 percent less over the course of a typical weekday as compared to the proposed Plan). Conversely, greater levels of residential and commercial growth in the urban core leads to slightly longer commute distances for existing suburban residents, leading to per-capita VMT levels being two percent greater than the proposed Plan.

Similar to the proposed Plan, Alternative 3 exhibits no regional transit capacity impacts; overall transit utilization (as a share of supplied transit capacity) is lower than the proposed Plan even though overall transit ridership is slightly higher as a result of significant increases in high-demand services including AC Transit and BART. On a typical weekday PM peak period, transit demand would reflect 35 percent of transit service supplied, compared to 39 percent for the proposed Plan; this utilization ratio is the lowest of all alternatives evaluated. One notable exception is light rail, as its daily utilization ratio rises from 59 percent to 67 percent as a result of Alternative 3's greater levels of high-density TPP development near VTA light rail stations.

Alternative 4– Enhanced Network of Communities

As a result of the higher population and job growth projections, Alternative 4 has greater growth in overall VMT (four percent more VMT than the proposed Plan), greater growth in trip-making (five percent more vehicle-trips than the proposed Plan), and more vehicle delay (nine percent more than the proposed Plan). As the alternative features a slightly more dispersed growth pattern, transit ridership is slightly less than the proposed Plan (three percent less). By eliminating the net in-commute pattern from the region, interregional trips are reduced by five percent from the levels in the proposed Plan.

With regard to commute travel times, Alternative 4 performs on par with the proposed Plan. While per-trip travel times are slightly longer (one to two percent longer) for all modes, this alternative has somewhat greater mode share for auto-based modes (with shorter commute travel times). This leads to the average commute travel time for all modes remaining constant between the proposed Plan and this alternative. Non-commute travel times are expected to increase slightly more than the proposed Plan (one percent).

Higher population and job growth forecasts also impact per-capita congested VMT, as Alternative 4 does not proportionately increase transportation capacity (beyond what is in the proposed Plan) to accommodate such growth. As a result, per-capita congested VMT is significantly higher as more vehicles compete for the same amount of roadway space as in the proposed Plan; per-capita congested VMT levels are 36 percent higher in the AM peak, 54 percent higher in the PM peak, and 46 percent higher over the course of a typical weekday. As this alternative focuses growth in a relatively similar pattern to the proposed Plan (some growth in the region's core combined with additional growth in moderate-density suburban centers), per-capita VMT is reduced by the same amount as in the proposed Plan.

Alternative 4 exhibits no regional transit capacity impacts; transit utilization levels are relatively comparable to the proposed Plan. Heavy rail utilization levels are greatest in this alternative, with 50 percent of heavy rail seat-miles being filled by riders over the course of a typical weekday PM peak period.

Alternative 5– Environment, Equity, and Jobs

Due to the substantial investments in transit service frequency improvements, as well as a more focused growth pattern than forecasted No Project alternative conditions, Alternative 5 has the strongest transit ridership of all of the alternatives considered, five percent more than the proposed Plan. Additionally, its lack of highway expansion projects and implementation of a VMT tax causes the alternative to have the lowest level of VMT of all of the alternatives considered, two percent less than the proposed Plan. However, the lack of highway expansion projects causes this alternative to have more delay (seven percent more than the proposed Plan), even as total VMT and total trips are reduced.

While Alternative 5 invests substantially in the region's transit services and discourages auto travel by charging a VMT tax and not constructing roadway expansion projects, it also boosts growth in suburban locations, such as San Mateo County, at the expense of more centrally-located urban locations. These two elements of this alternative counteract one another and lead to commute travel times that are consistent with the proposed Plan. With regard to non-commute travel times, this alternative has slightly longer (one percent) travel times than the proposed Plan; this is most likely due to more congested roadway conditions and higher numbers of transit riders (who tend to have longer average travel times, regardless of trip purpose).

While this alternative has the lowest level of VMT of all alternatives (two percent less than the proposed Plan) as a result of a VMT tax and significant funding shifts towards transit services, its levels of per-capita congested VMT are higher than the proposed Plan. Alternative 5 exhibits congested VMT levels 18 percent higher in the AM peak, seven percent higher in the PM peak, and 11 percent higher over the course of a typical weekday. These higher levels of per-capita congested VMT are primarily the result of canceling all uncommitted highway projects (both expansion and operational improvements) for inclusion in the proposed Plan, many of which are designed to alleviate congested bottlenecks on the region's highway system. Per-capita VMT is approximately the same as the proposed Plan.

As mentioned above, Alternative 5 funds significant investments in frequency improvements for high-demand systems such as BART, AC Transit, and VTA, as well as for suburban operators such as SamTrans and County Connection. As such, Alternative 5 exhibits slightly lower ratios for transit utilization than the proposed Plan, even as it has much higher transit ridership than any other alternative evaluated. On a typical weekday PM peak period, transit demand would reflect 37 percent of transit service supplied, compared to 39 percent for the proposed Plan. Similar to the proposed Plan, Alternative 5 exhibits no regional transit capacity impacts.

TABLE 3.1-8: BAY AREA TRAVEL BEHAVIOR, 2010-2040

	2010	*2040 Plan*	*2040 No Project (Alt 1)*	*% Difference from Proposed Plan*	*2040 Transit Priority Focus (Alt 3)*	*% Difference from Proposed Plan*	*2040 Enhanced Network of Communities (Alt 4)*	*% Difference from Proposed Plan*	*2040 Environment, Equity, and Jobs (Alt 5)*	*% Difference from Proposed Plan*
Daily[1] Transit Boardings	1,581,000	3,054,000	2,426,000	-21%	3,055,000	0%	2,972,000	-3%	3,219,000	+5%
Daily Vehicle Miles of Travel (VMT)[2]	149,046,000	179,408,000	180,060,000	0%	178,264,000	-1%	185,839,000	+4%	175,948,000	-2%
Daily[2] Vehicle Miles of Travel[2] per Capita[3]	20.8	19.6	20.7	+6%	20.0	+2%	19.6	0%	19.7	+1%
Intraregional Daily Vehicle Trips[2]	14,830,000	17,858,000	17,598,000	-1%	17,713,000	-1%	18,843,000	+6%	17,538,000	-2%
Interregional Daily Vehicle Trips	631,000	854,000	854,000	0%	854,000	0%	814,000	-5%	854,000	0%
Airport Daily Vehicle Trips	102,000	169,000	169,000	0%	169,000	0%	169,000	0%	169,000	0%
Commercial Daily Vehicle Trips	1,349,000	1,796,000	1,772,000	-1%	1,785,000	-1%	1,822,000	+1%	1,779,000	-1%
Total Daily Vehicle Trips	**16,912,000**	**20,677,000**	**20,393,000**	**-1%**	**20,521,000**	**-1%**	**21,648,000**	**+5%**	**20,340,000**	**-2%**
Daily Vehicle Hours of Recurring Delay	266,000	409,000	534,000	+31%	392,000	-4%	471,000	+15%	439,000	+7%
Daily Vehicle Hours of Recurring Delay (Freeways)	141,000	208,000	268,000	+29%	194,000	-7%	238,000	+14%	214,000	+3%
Daily Vehicle Hours of Recurring Delay (Expressways and Arterials)	58,000	104,000	149,000	+43%	100,000	-4%	121,000	+16%	119,000	+14%
Daily Vehicle Hours of Recurring Delay (Other Facilities)	67,000	97,000	117,000	+21%	98,000	+1%	112,000	+15%	106,000	+9%
Daily Vehicle Hours of	108,000	147,000	203,000	+38%	138,000	-6%	169,000	+15%	156,000	+6%

TABLE 3.1-8: BAY AREA TRAVEL BEHAVIOR, 2010-2040

	2010	*2040 Plan*	*2040 No Project (Alt 1)*	*% Difference from Proposed Plan*	*2040 Transit Priority Focus (Alt 3)*	*% Difference from Proposed Plan*	*2040 Enhanced Network of Communities (Alt 4)*	*% Difference from Proposed Plan*	*2040 Environment, Equity, and Jobs (Alt 5)*	*% Difference from Proposed Plan*
Non-Recurrent Delay[3]										
Total Daily Vehicle Hours of Delay	**374,000**	**556,000**	**738,000**	**+33%**	**530,000**	**-5%**	**639,000**	**+15%**	**595,000**	**+7%**
Average Delay per Vehicle (Minutes)	**4.6**	**5.6**	**7.5**	**+34%**	**5.4**	**-4%**	**6.1**	**+9%**	**6.0**	**+7%**
Typical Weekday Intraregional Personal Trips	**23,592,000**	**29,426,000**	**28,383,000**	**-4%**	**29,024,000**	**-1%**	**30,615,000**	**+4%**	**28,957,000**	**-2%**

1. Daily metrics are measured for a typical weekday.
2. Only reflects interzonal trips (assigned directly to the highway network); includes intraregional, interregional, airport-bound, and commercial vehicle trips.
3. Total daily VMT is calculated using Travel Model One; therefore, to calculate per-capita VMT, it is essential to use simulated population levels to ensure consistency. Simulated population may be slightly different than overall population forecasts for Plan Bay Area EIR alternatives due to slight variability in modeling tools. Further clarification on this issue can be found in the Plan Bay Area EIR technical appendices.
4. Only includes non-recurrent delay on freeway facilities.

Source: Metropolitan Transportation Commission Travel Forecasts, 2012

TABLE 3.1-9: PER-TRIP COMMUTE TRAVEL TIME, BY MODE

Mode	*2010*	*2040 Plan*	*2040 No Project (Alt 1)*	*% Difference from Proposed Plan*	*2040 Transit Priority Focus (Alt 3)*	*% Difference from Proposed Plan*	*2040 Enhanced Network of Communities (Alt 4)*	*% Difference from Proposed Plan*	*2040 Environment, Equity, and Jobs (Alt 5)*	*% Difference from Proposed Plan*
Drive Alone	18.7	18.0	19.3	+7%	17.7	-2%	18.3	+2%	18.0	0%
Carpool	14.2	13.7	14.5	+6%	13.6	-1%	13.9	+1%	13.7	0%
Transit	44.0	44.3	46.3	+5%	42.3	-5%	45.0	+2%	43.9	-1%
Walk	19.5	19.3	19.5	+1%	19.4	+1%	19.5	+1%	19.4	+1%
Bike	12.5	12.8	12.8	0%	12.9	+1%	12.9	+1%	12.8	0%
All Modes	**19.8**	**20.4**	**21.1**	**+3%**	**19.8**	**-3%**	**20.5**	**0%**	**20.5**	**0%**

Source: Metropolitan Transportation Commission Travel Forecasts, 2012

TABLE 3.1-10: PER-TRIP NON-COMMUTE TRAVEL TIME, BY MODE

Mode	*2010*	*2040 Plan*	*2040 No Project (Alt 1)*	*% Difference from Proposed Plan*	*2040 Transit Priority Focus (Alt 3)*	*% Difference from Proposed Plan*	*2040 Enhanced Network of Communities (Alt 4)*	*% Difference from Proposed Plan*	*2040 Environment, Equity, and Jobs (Alt 5)*	*% Difference from Proposed Plan*
Drive Alone	11.6	11.4	11.6	+2%	11.5	+1%	11.6	+2%	11.5	+1%
Carpool	11.4	11.3	11.5	+2%	11.4	+1%	11.4	+1%	11.3	0%
Transit	36.2	35.5	36.3	+2%	35.1	-1%	35.8	+1%	35.3	-1%
Walk	18.3	18.1	18.2	+1%	18.1	0%	18.4	+2%	18.1	0%
Bike	11.0	11.1	11.1	0%	11.1	0%	11.3	+2%	11.1	0%
All Modes	**12.7**	**12.9**	**13.0**	**+1%**	**12.9**	**0%**	**13.0**	**+1%**	**13.0**	**+1%**

Source: Metropolitan Transportation Commission Travel Forecasts, 2012

TABLE 3.1-11: PER-CAPITA DAILY VEHICLE MILES OF TRAVEL BY LEVEL OF SERVICE (2010-2040)

LOS[1] (V/C Ratio)	*2010*	*2040 Plan*	*2040 No Project (Alt 1)*	*% Difference from Proposed Plan*	*2040 Transit Priority Focus (Alt 3)*	*% Difference from Proposed Plan*	*2040 Enhanced Network of Communities (Alt 4)*	*% Difference from Proposed Plan*	*2040 Environment, Equity, and Jobs (Alt 5)*	*% Difference from Proposed Plan*
AM Peak Period (6 AM to 10 AM)										
A-C (< 0.75)	4.19	3.70	3.65	-1%	3.84	+4%	3.66	-1%	3.67	-1%
D-E (0.75-1.00)	1.05	1.16	1.39	+20%	1.14	-2%	1.17	+1%	1.20	+4%
F (> 1.00)	**0.06**	**0.08**	**0.22**	**+168%**	**0.06**	**-20%**	**0.11**	**+36%**	**0.10**	**+18%**
Total	5.31	4.93	5.26	+7%	5.04	+2%	4.94	0%	4.97	+1%
PM Peak Period (3 PM to 7 PM)										
A-C (< 0.75)	4.68	4.11	3.98	-3%	4.19	+2%	4.01	-2%	3.99	-3%
D-E (0.75-1.00)	1.20	1.35	1.64	+21%	1.38	+2%	1.42	+5%	1.47	+9%
F (> 1.00)	**0.06**	**0.10**	**0.19**	**+94%**	**0.09**	**-12%**	**0.15**	**+54%**	**0.10**	**+7%**
Total	5.94	5.56	5.81	+5%	5.66	+2%	5.58	0%	5.56	0%
Daily										
A-C (< 0.75)	18.27	16.56	16.83	+2%	16.88	+2%	16.36	-1%	16.50	0%
D-E (0.75-1.00)	2.45	2.88	3.41	+18%	2.92	+1%	2.98	+3%	3.03	+5%
F (> 1.00)	**0.12**	**0.19**	**0.42**	**+123%**	**0.16**	**-14%**	**0.27**	**+46%**	**0.21**	**+11%**
Total	20.84	19.63	20.66	+5%	19.97	+2%	19.61	0%	19.75	+1%

1. LOS (level of service) measures traffic density with a range of A to F. LOS A-C reflect free-flow conditions with minimal delay. LOS D-E reflect somewhat congested conditions with some possible delays. LOS F reflects very congested conditions with significant volumes greater than roadway capacity, leading to significant delays.

Source: Metropolitan Transportation Commission Travel Forecasts, 2012

TABLE 3.1-12: DAILY VEHICLE MILES OF TRAVEL PER CAPITA (2010-2040)

	2010	*2040 Plan*	*2040 No Project (Alt 1)*	*% Difference from Proposed Plan*	*2040 Transit Priority Focus (Alt 3)*	*% Difference from Proposed Plan*	*2040 Enhanced Network of Communities (Alt 4)*	*% Difference from Proposed Plan*	*2040 Environment, Equity, and Jobs (Alt 5)*	*% Difference from Proposed Plan*
Daily[1] Vehicle Miles of Travel (VMT)[2]	149,046,000	179,408,000	180,060,000	0%	178,264,000	-1%	185,839,000	+4%	175,948,000	-2%
Simulated Population[3]	7,151,000	9,137,000	8,715,000	-5%	8,927,000	-2%	9,476,000	+4%	8,910,000	-2%
Daily[a] Vehicle Miles of Travel[2] per Capita[3]	20.8	19.6	20.7	+6%	20.0	+2%	19.6	0%	19.7	+1%

1. Daily metrics are measured for a typical weekday.
2. Only reflects interzonal trips (assigned directly to the highway network); includes intraregional, interregional, airport-bound, and commercial vehicle trips.
3. Total daily VMT is calculated using Travel Model One; therefore, to calculate per-capita VMT, it is essential to use simulated population levels to ensure consistency. Simulated population may be slightly different than overall population forecasts for Plan Bay Area EIR alternatives due to slight variability in modeling tools. Further clarification on this issue can be found in the Plan Bay Area EIR technical appendices.

Source: Metropolitan Transportation Commission Travel Forecasts, 2012

TABLE 3.1-13: PERCENT UTILIZATION[1] OF PUBLIC TRANSIT SYSTEMS, BY TECHNOLOGY (2010-2040)

Mode	*2010*	*2040 Plan (Alt 2)*	*2040 No Project (Alt 1)*	*2040 Transit Priority Focus (Alt 3)*	*2040 Enhanced Network of Communities (Alt 4)*	*2040 Environment, Equity, and Jobs (Alt 5)*
AM Peak Period (6 AM to 10 AM)						
Local bus	24%	42%	37%	41%	41%	41%
Light rail[2]	35%	57%	54%	65%	52%	56%
Ferry	19%	23%	20%	15%	20%	19%
Express bus	30%	44%	49%	37%	38%	43%
Heavy rail[3]	40%	57%	52%	45%	62%	50%
Commuter rail[4]	7%	22%	11%	21%	22%	22%
All technologies	**28%**	**44%**	**39%**	**39%**	**44%**	**41%**
PM Peak Period (3 PM to 7 PM)						
Local bus	25%	42%	36%	41%	42%	40%
Light rail[2]	34%	59%	55%	67%	54%	57%
Ferry	9%	12%	11%	8%	10%	10%
Express bus	26%	37%	43%	32%	31%	36%
Heavy rail[3]	36%	46%	47%	37%	50%	41%
Commuter rail[4]	5%	20%	9%	19%	20%	20%
All technologies	**25%**	**39%**	**36%**	**35%**	**39%**	**37%**
Daily						
Local bus	19%	34%	29%	33%	33%	33%
Light rail[2]	27%	49%	45%	55%	44%	47%
Ferry	8%	13%	10%	8%	11%	11%
Express bus	25%	36%	40%	30%	31%	35%

TABLE 3.1-13: PERCENT UTILIZATION[1] OF PUBLIC TRANSIT SYSTEMS, BY TECHNOLOGY (2010-2040)

Mode	*2010*	*2040 Plan (Alt 2)*	*2040 No Project (Alt 1)*	*2040 Transit Priority Focus (Alt 3)*	*2040 Enhanced Network of Communities (Alt 4)*	*2040 Environment, Equity, and Jobs (Alt 5)*
Heavy rail[3]	27%	36%	36%	32%	39%	35%
Commuter rail[4]	6%	17%	9%	17%	17%	17%
All technologies	**21%**	**33%**	**30%**	**30%**	**33%**	**32%**

1. Percent utilization measures the passenger seat-miles required by forecasted transit patrons as a percentage of total passenger seat-miles provided by transit operators (i.e. the percentage of seats on transit vehicles filled with passengers). Utilization levels greater than 80 percent reflect conditions where passengers either would have difficulty finding a seat or would have to stand during all or part of their ride.
2. Reflects utilization of Muni Metro and VTA light rail systems.
3. Reflects utilization of BART heavy rail system.
4. Reflects utilization of Caltrain, SMART, Capitol Corridor, and ACE commuter rail systems.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012

AIR QUALITY

Future Conditions (2040): Travel Data

Table 3.1-14 displays the travel data used in this air quality analysis. All alternatives, except for Alternative 4, have the same population and employment totals as the proposed Plan. Alternative 4 assumes higher levels of household and employment growth in the region. Compared to the proposed Plan, Alternative 4 would result in the highest amount of vehicles in use, VMT, and engine starts; Alternative 3 would result in the lowest amount of vehicles in use, VMT, and engine starts.

Consistency with Air Quality Plans

As described in *Chapter 2.2*, the applicable air quality plan for purposes of this analysis is the Bay Area 2010 Clean Air Plan (CAP). In determining consistency with the CAP, the proposed Plan and alternatives must support the primary goals and transportation/land use objectives of the CAP, include any applicable control measures from the CAP, and not disrupt or hinder implementation of any of the control measures within the CAP. See *Chapter 2.2* for a detailed discussion of the goals and control measures in the CAP. Key goals and transportation/land use objectives of the 2010 CAP include:

Goals:

- Protect Air Quality
- Protect Public health
- Protect the Climate

Transportation/Land Use Objectives:

- Reduce motor vehicle emissions by driving cleaner, driving smarter, and driving less
- Reduce per capita VMT and promote policies that reduce motor vehicle ownership
- Design communities where people can walk, bike, or use transit on a convenient basis
- Ensure that focused growth in PDAs is planned and designed so as to protect people from both existing and new sources of emissions.

The Consistency with Air Quality Plans impact analysis in *Chapter 2.2* concludes that the proposed Plan would result in a less than significant impact. Similarly, all alternatives except the No Project alternative are expected to have less than significant (LS) impacts related to consistency with Air Quality Plans.

Construction-Related Emissions

Construction-related emissions due to the implementation of projects in the proposed Plan and alternatives would constitute a direct but short-term impact as projects advance into construction at different times through 2040. Alternative 3 and Alternative 4 include similar transportation investments as the proposed Plan; however, the varying land use distributions and higher regional growth in Alternative 4 would result in greater levels of construction-related emissions. Alternative 1 and Alternative 5 would not include the construction of all the transportation investments in the proposed Plan, and as a result, would have lower construction-related emissions. While implementation of the best practice mitigation measures identified for the proposed Plan would reduce impacts to less than significant, this impact is considered potentially significant (PS) for all alternatives. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Criteria Pollutant Emissions

Table 3.1-15 shows the emissions estimates from criteria pollutants for the proposed Plan and alternatives. The proposed Plan would generally have lower emissions of criteria pollutants than the No Project alternative and Alternative 4, but would have higher emissions than Alternative 3 and Alternative 5 due to the land use patterns focused around transit stations and differences in transportation investments. All alternatives are expected to have no adverse impacts (NI) related to emissions of criteria pollutants ROG, NOx, CO, and $PM_{2.5}$ compared to existing conditions. However, all alternatives are expected to have significant and unavoidable (SU) impacts related to emissions of PM_{10}.

Regional Toxic Air Contaminant (TAC) Emissions

Table 3.1-16 identifies the emission levels for toxic air contaminants pollutants. The levels of TAC emissions decrease under the proposed Plan and alternatives compared to existing conditions mostly because of state laws and regulations aimed at identifying and reducing TACs, such as standards for low emission vehicles, clean fuels, reformulated gasoline, diesel fuel specifications, and CARB's Heavy Duty Diesel Inspection Programs. The No Project alternative and Alternative 4 would have higher levels of TAC emissions than the proposed Plan, and Alternative 3 and Alternative 5 would have lower levels of TAC emissions than the proposed Plan. All alternatives would have no adverse impact (NI) related to TAC emissions.

Local Pollutant Analysis

The proposed Plan and all the alternatives that direct new development within TPPs and urban core areas will potentially increase the number of sensitive receptors exposed to unhealthy levels of TACs and $PM_{2.5}$. The No Project alternative would probably result in fewer new sensitive receptors being exposed to TACs and $PM_{2.5}$ due to the somewhat more dispersed land uses associated with this alternative. However, sensitive receptors are currently being located within existing areas with unhealthy levels of TACs and $PM_{2.5}$ without any measures to lessen their exposure, and would continue to be located in urbanized areas under all alternatives. Development consistent with the proposed Plan and Alternatives 3, 4, and 5 that implements the mitigation measures identified for the proposed Plan would result in fewer sensitive receptors being exposed to unhealthy levels of TACs when compared to the No Project alternative. All alternatives are expected to have significant and unavoidable (SU) impacts related to localized net increase in sensitive receptors located in TPP corridors where TACs or $PM_{2.5}$ concentrations result in a cancer risk greater than 100/million or a concentration of $PM_{2.5}$ greater than 0.8 ug/m3. In addition, all alternatives are expected to have significant and unavoidable (SU) impacts related to localized net increases in sensitive receptors located in TPP corridors within set distances to mobile or stationary sources of TAC or $PM_{2.5}$ emissions. However, all of the alternatives are expected to have a less than significant (LS) impact related to localized net increases in sensitive receptors located in TPP corridors where TACs or $PM_{2.5}$ concentrations result in noncompliance with an adopted Community Risk Reduction Plan.

Disproportionally Impacted Communities (CARE)

Tables 3.1-17 through **3.1-21** illustrate the percent change estimated in on-road mobile source TAC and $PM_{2.5}$ emissions anticipated within CARE communities between the years 2010 and 2040 for the proposed Plan and the alternatives. In general, while the overall trends of TAC and PM emissions appear to be decreasing, the slight changes of TAC and $PM_{2.5}$ emissions within CARE communities versus non-CARE communities is essentially the same between 2010 and 2040. However, when re-entrained road dust is included with exhaust emissions in the 2040 estimates, there is an increase in Total $PM_{2.5}$ emissions for the CARE communities in Alameda County (2.49 percent), and Santa Clara County (10.53 percent) for the proposed Plan. **Table 3.1-22** compares increase in VMT as related to CARE communities. This impact is considered significant and unavoidable (SU) for all alternatives.

Alternative 1– No Project

The No Project alternative would result in higher vehicle use, VMT, and engine starts than the proposed Plan due to a more dispersed land use pattern and lower levels of transit infrastructure investment. As this alternative assumes continuation of currently-adopted general plans through 2040, there is a potential for this alternative to be inconsistent with goals and objectives of the CAP. For example, the more dispersed pattern of growth does not promote communities where people can walk, bike, or conveniently use transit, which is a key objective of the CAP, and thus would result in higher VMT per capita than the proposed Plan in 2040.

The absence of uncommitted transportation investments would increase car use, VMT, and worsen congestion. However, as a result of fewer transportation projects, this alternative would have lower construction-related emissions than the proposed Plan. Construction-related emissions from land use developments would be more dispersed throughout the region due do the land use pattern. Emissions of NOx (summertime and wintertime), CO, PM_{10}, $PM_{2.5}$, and TACs would be higher. Emissions of ROG would be slightly lower (0.2 percent) than the proposed Plan; while overall VMT would be higher than the proposed Plan. The addition of the Express Lanes Network in the proposed Plan would increase speeds and VMT in these corridors, causing slightly higher ROG emissions compared to the No Project alternative.

There is a potential for the No Project alternative to expose fewer new sensitive receptors than the proposed Plan to TAC or fine particulate matter ($PM_{2.5}$) concentrations that exceed thresholds. This is primarily due to a more dispersed land use pattern that would not actively guide future residents to the TPPs. The TPPs are in the urban core areas, and tend to have higher concentrations of stationary sources and transportation facilities that release TACs and $PM_{2.5}$. However, the existing dispersed pattern of development has placed sensitive receptors within close proximity to sources of TACs and $PM_{2.5}$ and could continue to do so at levels expected with the proposed Plan.

In the No Project alternative, the region-wide estimates of TAC and/or $PM_{2.5}$ exhaust emissions in CARE Communities compared to the non-CARE Communities are within a few percentage points of each other, with the difference being insignificant. However, when $PM_{2.5}$ emissions from re-entrained road dust are included with all other emissions, the No Project alternative results in a much smaller increase (or slight decrease region-wide) in Total $PM_{2.5}$ emissions when compared to the effects of the proposed Plan in Alameda County and Santa Clara County. While the No Project alternative performs better than the proposed Plan in reducing TAC and or $PM_{2.5}$ emissions in general, it is estimated to result in a smaller decrease in these emissions in Contra Costa County CARE community than the remainder of the County.

Alternative 3 – Transit Priority Focus

As a result of the more compact land use pattern and higher levels of transit infrastructure investment, Alternative 3 would have approximately 0.2 to 0.3 percent fewer vehicles in use, VMT, and engine starts compared to the proposed Plan. Higher densities around transit would be conducive to higher transit ridership and less automobile use. This alternative would focus residential and commercial growth in the region's urban core to a greater extent than the proposed Plan and would also include fees on development in regionally-inefficient locations. The fees generated would be used to further reduce mobile source emissions throughout the Planning Area. Therefore, this alternative is more consistent with the goals and transportation/land use objectives of the 2010 CAP.

Construction-related emissions would be comparable with the proposed Plan. Transportation investments would be identical to the proposed Plan, with the exception of two express lane expansion projects. Construction-related emissions from land use developments would be concentrated more around transit stations compared to the proposed Plan. Criteria pollutant and TAC emissions would all be slightly lower in Alternative 3 compared to the proposed Plan due to the emphasis on locating higher density development around transit stations and reducing vehicle use.

There is a potential for this alternative to expose even more new sensitive receptors than the proposed Plan to TAC or $PM_{2.5}$ concentrations that exceed thresholds, because the more concentrated land use pattern would place more sensitive receptors in the TPPs. The TPPs are in the urban core areas, and tend to have higher concentrations of stationary sources and transportation facilities that release TACs and $PM_{2.5}$.

In Alternative 3, the region-wide estimates of TAC and/or $PM_{2.5}$ exhaust emissions in CARE Communities compared to the non-CARE Communities are nearly identical. Within some counties however, there is a smaller decrease or larger increase in TAC and $PM_{2.5}$ emissions than in the remainder of the county (e.g., Santa Clara and Contra Costa).

Alternative 4– Enhanced Network of Communities

Because this alternative has higher levels of household and employment growth than the proposed Plan, Alternative 4 would have approximately four percent higher vehicles in use, VMT, and engine starts. Given the greater number of households and jobs in the region, combined with a more dispersed land use pattern than the proposed Plan, there would be a greater demand for travel and more vehicle use in this alternative. This alternative seeks to eliminate the net daily importing of workers to the region and includes a higher number of residents and housing units than the other alternatives. This increase in population is directed towards the urban core and near existing transit corridors. While overall region-wide VMT increases more under this alternative than the proposed Plan, per capita VMT is the same as that anticipated for the proposed Plan. Therefore, this alternative is consistent with the goals and transportation/land use objectives of the CAP and would not be inconsistent with the CAP.

Alternative 4 includes the same transportation investments as the proposed Plan, but includes higher regional growth. As a result, construction-related emissions from the increase in land use development would be higher than the proposed Plan to accommodate the additional growth. Emissions of criteria pollutants and TACs would be the highest compared to the proposed Plan. Since this alternative would not include any additional roadway or transit capacity beyond what is funded in the proposed Plan to accommodate the higher amount of growth, there would also be more congestion and greater emissions of criteria pollutants (approximately 3.5 percent higher for all criteria pollutants than the proposed Plan) in Alternative 4.

Similar to the proposed Plan, this alternative focuses growth in the region's core, as well as moderate-density suburban centers across the region. As a result, there is a potential for this alternative to expose even more new sensitive receptors than the proposed Plan to TAC or $PM_{2.5}$ concentrations that exceed thresholds. This is primarily due to this alternative's concentrated land use pattern that would place more sensitive receptors in the TPPs, which are in the urban core areas, and tend to have higher concentrations of stationary sources and transportation facilities that release TACs and $PM_{2.5}$.

In Alternative 4, the region-wide estimates of TAC and/or $PM_{2.5}$ exhaust emissions in CARE Communities compared to non-CARE Communities indicate a slightly larger decrease in exhaust emission for some TACs (Benzene) and slightly smaller decreases in others (exhaust only $PM_{2.5}$). However, when re-entrained road dust is combined with $PM_{2.5}$ from exhaust, this alternative is estimated to result in more than a seven percent increase in Total $PM_{2.5}$ when compared to the proposed Plan. Therefore, this alternative will have slightly larger impacts when compared to the proposed Plan on TAC and $PM_{2.5}$ emissions in CARE Communities.

Alternative 5– Environment, Equity and Jobs

Alternative 5 would have approximately two percent lower vehicles in use, VMT, and engine starts than the proposed Plan due to the funding shifts in transportation investments and emphasis on transit operations. Alternative 5 includes a VMT tax and would not include any uncommitted highway projects (including expansions and operational improvements); the VMT tax and unused highway funding would instead be redirected to transit operations. The land use pattern includes focused growth in both urban and suburban areas, with suburban growth supported by increased transit service to Communities of Concern. This alternative results in about the same per capita VMT as the proposed Plan in 2040. Therefore, this alternative would also be consistent with the goals and objectives of the CAP.

Alternative 5 would have lower construction-related emissions than the proposed Plan as a result of fewer roadway projects. Construction-related emissions from land use developments would be more dispersed throughout the region due to the land use pattern. The emphasis on increased transit capacity, combined with a VMT tax and shift in funding from roadway improvements towards transit services, would reduce overall VMT which would result in the lowest level of criteria pollutant emissions and TACs.

This alternative also emphasizes focused growth with an emphasis in high-opportunity suburban areas. There is a potential for this alternative to expose even more new sensitive receptors than the proposed Plan to TAC or $PM_{2.5}$ concentrations that exceed thresholds. This is primarily due to this alternative's concentrated land use pattern that would place more sensitive receptors in the TPPs, which are primarily in the urban core areas and along transit corridors, and tend to have higher concentrations of stationary sources and transportation facilities that release TACs and $PM_{2.5}$.

In Alternative 5, the region-wide estimates of TAC and/or $PM_{2.5}$ exhaust emissions in CARE Communities compared to non-CARE Communities are nearly identical for all emissions (less than one percent difference in all cases). In addition, this alternative's Total $PM_{2.5}$ with Road Dust estimates are substantially less than those estimated for the proposed Plan. However, this alternative does have some instances where within a county there are larger reductions estimated for TACs and $PM_{2.5}$ in some non-CARE communities (e.g., Santa Clara) than CARE Communities for some pollutants. These differences are slightly smaller than those estimated for the proposed Plan.

TABLE 3.1-14: TRAVEL DATA

	2010	2040	2040	Difference from Proposed Plan	2040	Difference from Proposed Plan	2040	Difference from Proposed Plan	2040	Difference from Proposed Plan
		Alternative 2: Proposed Plan	*Alternative 1: No Project*	*Percent*	*Alternative 3: Transit Priority*	*Percent*	*Alternative 4: Connected*	*Percent*	*Alternative 5: EEJ*	*Percent*
Vehicles in Use	4,608,722	5,463,760	5,493,962	0.5%	5,450,157	-0.2%	5,668,407	3.6%	5,380,224	-1.6%
Daily Vehicle Miles Traveled (VMT)	163,903,095	196,927,122	198,134,669	0.6%	196,371,589	-0.3%	204,179,341	3.6%	194,052,688	-1.5%
Engine Starts	30,834,375	36,362,648	36,478,594	0.3%	36,303,442	-0.2%	37,768,831	3.7%	35,771,643	-1.7%
Total Population	7,091,000	9,196,000	9,196,000	0.0%	9,196,000	0.0%	9,535,000	3.6%	9,196,000	0.0%
Total Employment	3,385,000	4,505,000	4,505,000	0.0%	4,505,000	0.0%	4,550,000	1.0%	4,505,000	0.0%

Source: Metropolitan Transportation Commission, 2012

TABLE 3.1-15: EMISSION ESTIMATES FOR CRITERIA POLLUTANTS USING EMFAC2011 EMISSION RATES (TONS PER DAY)

		2040	*2040*	*Difference from Proposed Plan*	*2040*	*Difference from Proposed Plan*	*2040*	*Difference from Proposed Plan*	*2040*	*Difference from Proposed Plan*
	2010	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*	*Percent*	*Alternative 3: Transit Priority*	*Percent*	*Alternative 4: Connected*	*Percent*	*Alternative 5: EEJ*	*Percent*
ROG	93.7	36.5	36.5	-0.2%	36.5	-0.2%	38.0	3.9%	35.8	-2.0%
NOx (Summertime)	164.3	48.5	48.7	0.4%	48.1	-0.8%	50.2	3.4%	47.6	-1.8%
CO	879.9	266.5	268.5	0.8%	265.9	-0.2%	277.0	3.8%	262.2	-1.6%
PM_{10}	36.4	41.0	41.3	0.9%	40.8	-0.3%	42.4	3.5%	40.3	-1.5%
$PM_{2.5}$	10.4	9.9	10.0	0.8%	9.9	-0.4%	10.3	3.5%	9.8	-1.6%
NOx (Wintertime)	185.3	53.7	53.9	0.4%	53.3	-0.8%	55.6	3.4%	52.8	-1.8%

Source: Metropolitan Transportation Commission, 2012

TABLE 3.1-16: EMISSION ESTIMATES FOR TOXIC AIR CONTAMINANTS POLLUTANTS (KILOGRAMS PER DAY)

		2040	*2040*	*Difference from Proposed Plan*	*2040*	*Difference from Proposed Plan*	*2040*	*Difference from Proposed Plan*	*2040*	*Difference from Proposed Plan*
	2010	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*	*Percent*	*Alternative 3: Transit Priority*	*Percent*	*Alternative 4: Connected*	*Percent*	*Alternative 5: EEJ*	*Percent*
Diesel PM	2,599.6	755.9	758.1	0.3%	746.9	-1.2%	779.6	3.0%	740.3	-2.1%
1,3 Butadiene	162.4	48.2	49.1	1.7%	48.0	-0.6%	49.8	3.0%	47.4	-1.8%
Benzene	731.2	219.3	224.2	2.2%	218.6	-0.3%	227.2	3.4%	216.2	-1.4%

Source: Metropolitan Transportation Commission, 2012

TABLE 3.1-17: EXHAUST ONLY $PM_{2.5}$ WITH ROAD-DUST PERCENT CHANGE 2010 - 2040

	Alternative 1: No Project	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority*	*Alternative 4: Connected*	*Alternative 5: EEJ*
Alameda: Care Community	-57.38%	-56.11%	-57.65%	-55.52%	-57.61%
Remainder of County	-57.10%	-55.13%	-56.72%	-53.92%	-56.39%
Contra Costa: Care Community	-56.04%	-57.54%	-56.61%	-55.92%	-59.15%
Remainder of County	-57.52%	-57.69%	-59.51%	-56.57%	-60.17%
Marin: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-60.66%	-61.29%	-62.33%	-60.39%	-63.36%
Napa: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-51.34%	-57.56%	-54.37%	-58.41%	-56.23%
San Francisco: Care Community	-53.05%	-53.23%	-53.98%	-52.18%	-54.24%
Remainder of County	-46.45%	-46.22%	-43.78%	-43.77%	-44.19%
San Mateo: Care Community	-55.08%	-56.91%	-55.63%	-56.07%	-54.20%
Remainder of County	-56.09%	-57.67%	-54.90%	-55.30%	-54.99%
Santa Clara: Care Community	-55.04%	-50.86%	-50.65%	-47.67%	-53.77%
Remainder of County	-55.47%	-54.14%	-53.64%	-52.74%	-55.09%
Solano: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-53.31%	-54.67%	-55.52%	-54.64%	-56.66%
Sonoma: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-47.83%	-53.20%	-56.38%	-53.00%	-56.68%
Regionwide: Care Community	-55.80%	-54.49%	-54.79%	-52.87%	-56.04%
Remainder of County	-55.60%	-55.64%	-56.09%	-54.48%	-56.75%
Regionwide Average	**-55.66%**	**-55.25%**	**-55.65%**	**-53.94%**	**-56.51%**

Source: Bay Area Air Quality Management District, 2013.

TABLE 3.1-18: TOTAL $PM_{2.5}$ WITH ROAD DUST PERCENT CHANGE 2010 - 2040

	Alternative 1: No Project	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority*	*Alternative 4: Connected*	*Alternative 5: EEJ*
Alameda: Care Community	-5.19%	-1.36%	-4.93%	0.16%	-4.97%
Remainder of County	-3.24%	2.49%	-1.55%	5.60%	0.13%
Contra Costa: Care Community	-0.34%	-3.64%	-1.32%	0.62%	-6.66%
Remainder of County	-3.25%	-3.70%	-8.04%	-0.43%	-8.86%
Marin: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-11.66%	-13.37%	-15.70%	-11.82%	-17.71%
Napa: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	8.33%	-5.55%	0.60%	-7.52%	-2.47%
San Francisco: Care Community	-3.13%	-3.62%	-4.88%	-1.54%	-5.08%
Remainder of County	-1.47%	-2.35%	1.73%	1.28%	1.04%
San Mateo: Care Community	2.02%	-1.53%	1.10%	-0.03%	4.28%
Remainder of County	-1.61%	-4.82%	1.72%	1.15%	1.19%
Santa Clara: Care Community	0.68%	10.53%	11.24%	17.94%	3.89%
Remainder of County	-1.48%	2.89%	3.84%	6.16%	0.25%
Solano: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	8.27%	2.24%	1.39%	1.89%	0.41%
Sonoma: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	12.33%	2.70%	-4.43%	2.95%	-4.78%
Regionwide: Care Community	-1.81%	1.65%	1.10%	5.49%	-1.81%
Remainder of County	-0.60%	-0.23%	-1.30%	2.58%	-2.43%
Regionwide Average	**-1.02%**	**0.42%**	**-0.47%**	**3.58%**	**-2.22%**

Source: Bay Area Air Quality Management District, 2013.

TABLE 3.1-19: EXHAUST DIESEL PM PERCENT CHANGE 2010 - 2040

	Alternative 1: No Project	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority*	*Alternative 4: Connected*	*Alternative 5: EEJ*
Alameda: Care Community	-70.11%	-69.23%	-69.99%	-69.07%	-70.39%
Remainder of County	-69.15%	-67.24%	-68.18%	-67.03%	-69.05%
Contra Costa: Care Community	-69.18%	-69.35%	-68.85%	-68.64%	-70.81%
Remainder of County	-68.87%	-68.71%	-69.39%	-68.07%	-70.31%
Marin: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-70.98%	-71.29%	-72.17%	-70.78%	-72.83%
Napa: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-65.86%	-68.71%	-66.72%	-69.46%	-68.46%
San Francisco: Care Community	-70.23%	-70.01%	-70.78%	-69.47%	-70.84%
Remainder of County	-69.26%	-69.78%	-68.35%	-68.17%	-68.43%
San Mateo: Care Community	-68.33%	-69.90%	-69.60%	-69.47%	-68.16%
Remainder of County	-68.42%	-69.16%	-67.57%	-67.65%	-67.95%
Santa Clara: Care Community	-67.84%	-66.16%	-65.89%	-64.30%	-67.36%
Remainder of County	-67.93%	-67.23%	-66.90%	-66.42%	-67.77%
Solano: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-64.87%	-64.68%	-65.37%	-64.79%	-66.56%
Sonoma: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-63.71%	-67.13%	-68.52%	-66.67%	-68.77%
Regionwide: Care Community	-69.12%	-68.43%	-68.58%	-67.60%	-69.37%
Remainder of County	-67.94%	-67.66%	-67.87%	-67.08%	-68.68%
Regionwide Average	**-68.33%**	**-67.91%**	**-68.10%**	**-67.25%**	**-68.91%**

Source: Bay Area Air Quality Management District, 2013.

TABLE 3.1-20: EXHAUST BENZENE PERCENT CHANGE 2010 - 2040

	Alternative 1: No Project	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority*	*Alternative 4: Connected*	*Alternative 5: EEJ*
Alameda: Care Community	-71.98%	-71.16%	-72.26%	-70.69%	-72.03%
Remainder of County	-70.56%	-69.27%	-70.41%	-68.14%	-69.80%
Contra Costa: Care Community	-70.61%	-71.82%	-71.12%	-70.57%	-72.81%
Remainder of County	-70.49%	-70.57%	-72.15%	-69.79%	-72.47%
Marin: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-73.00%	-73.32%	-73.87%	-72.58%	-74.64%
Napa: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-67.81%	-72.02%	-69.89%	-72.56%	-71.11%
San Francisco: Care Community	-73.81%	-74.02%	-74.33%	-73.42%	-74.51%
Remainder of County	-75.68%	-75.53%	-74.48%	-74.51%	-74.69%
San Mateo: Care Community	-69.62%	-70.68%	-69.49%	-70.07%	-68.77%
Remainder of County	-70.05%	-71.20%	-69.18%	-69.64%	-69.17%
Santa Clara: Care Community	-70.81%	-67.58%	-67.48%	-65.38%	-69.81%
Remainder of County	-70.61%	-69.55%	-69.21%	-68.60%	-70.21%
Solano: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-65.88%	-66.41%	-67.31%	-66.33%	-68.34%
Sonoma: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-67.17%	-70.39%	-72.64%	-70.39%	-72.84%
Regionwide: Care Community	-71.50%	-70.55%	-70.75%	-69.43%	-71.59%
Remainder of County	-70.03%	-69.97%	-70.36%	-69.13%	-70.73%
Regionwide Average	**-70.54%**	**-70.17%**	**-70.49%**	**-69.23%**	**-71.03%**

Source: Bay Area Air Quality Management District, 2013.

TABLE 3.1-21: EXHAUST 1, 3 BUTADIENE PERCENT CHANGE 2010 - 2040

	Alternative 1: No Project	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority*	*Alternative 4: Connected*	*Alternative 5: EEJ*
Alameda: Care Community	-72.38%	-71.56%	-72.64%	-71.13%	-72.41%
Remainder of County	-70.93%	-69.58%	-70.70%	-68.47%	-70.15%
Contra Costa: Care Community	-71.01%	-72.15%	-71.41%	-70.91%	-73.12%
Remainder of County	-70.84%	-70.84%	-72.35%	-70.06%	-72.72%
Marin: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-73.24%	-73.50%	-74.04%	-72.77%	-74.79%
Napa: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-68.22%	-72.23%	-70.13%	-72.76%	-71.37%
San Francisco: Care Community	-74.23%	-74.47%	-74.74%	-73.88%	-74.92%
Remainder of County	-75.94%	-75.80%	-74.76%	-74.80%	-74.96%
San Mateo: Care Community	-70.13%	-71.19%	-70.01%	-70.61%	-69.27%
Remainder of County	-70.40%	-71.51%	-69.53%	-70.01%	-69.53%
Santa Clara: Care Community	-71.27%	-68.08%	-67.99%	-65.96%	-70.27%
Remainder of County	-70.96%	-69.92%	-69.59%	-69.00%	-70.56%
Solano: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-66.26%	-66.55%	-67.50%	-66.47%	-68.58%
Sonoma: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	-67.52%	-70.64%	-72.85%	-70.63%	-73.06%
Regionwide: Care Community	-71.93%	-70.99%	-71.17%	-69.91%	-72.00%
Remainder of County	-70.38%	-70.27%	-70.64%	-69.44%	-71.03%
Regionwide Average	**-70.92%**	**-70.52%**	**-70.82%**	**-69.60%**	**-71.36%**

Source: Bay Area Air Quality Management District, 2013.

TABLE 3.1-22: VMT PERCENT CHANGE 2010 - 2040

	Alternative 1: No Project	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority*	*Alternative 4: Connected*	*Alternative 5: EEJ*
Alameda: Care Community	13.84%	18.64%	14.30%	20.48%	14.28%
Remainder of County	17.46%	24.69%	19.69%	28.61%	21.97%
Contra Costa: Care Community	18.49%	14.56%	17.41%	19.78%	11.11%
Remainder of County	16.42%	15.92%	10.62%	20.00%	9.77%
Marin: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	7.20%	5.12%	2.33%	6.94%	-0.07%
Napa: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	27.69%	11.34%	18.44%	9.01%	14.99%
San Francisco: Care Community	12.17%	11.57%	10.20%	13.97%	10.01%
Remainder of County	9.00%	7.89%	12.33%	11.76%	11.57%
San Mateo: Care Community	23.14%	19.00%	22.19%	20.73%	25.99%
Remainder of County	19.36%	15.53%	23.54%	22.87%	22.86%
Santa Clara: Care Community	19.71%	31.63%	32.50%	40.50%	23.65%
Remainder of County	17.51%	23.00%	24.12%	26.94%	19.75%
Solano: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	34.60%	26.60%	25.74%	26.11%	24.82%
Sonoma: Care Community	N/A	N/A	N/A	N/A	N/A
Remainder of County	31.40%	20.51%	12.06%	20.74%	11.69%
Regionwide: Care Community	16.85%	21.12%	20.41%	25.67%	17.02%
Remainder of County	19.51%	20.21%	18.96%	23.67%	17.70%
Regionwide Average	**18.58%**	**20.53%**	**19.47%**	**24.37%**	**17.46%**

Source: Bay Area Air Quality Management District, 2013.

LAND USE, HOUSING, AGRICULTURE, AND PHYSICAL DEVELOPMENT

All alternatives focus the majority of new growth into urbanized areas, with the No Project resulting in the largest conversion of land to urbanized land by 2040. The general distribution of growth throughout the region would vary somewhat by alternative based on county-by-county household and job growth, as shown in **Tables 3.1-3** and **3.1-4**. Alternatives also vary by their share of development within PDAs; alternatives that focus more growth in PDAs generally represent more compact and targeted growth scenarios. Targeted growth also occurs in TPPs. For a comparison of PDA-focused growth, see **Tables 3.1-5** and **3.1-6**. It is noted that MTC and ABAG have no land use authority and, as a result, cannot enforce mitigation measures related to land use development (outlined in *Chapter 2.3*), ultimately resulting in significant impacts for all alternatives for land use criteria related to displacement and disruption, community separation, conversion of agricultural land and open space, and conversion of forest and timberland.

Community Disruption/Displacement

Construction activities related to land use and transportation projects under all alternatives could result in short term local community disruption. The significance of construction disruption will depend upon the size and extent of the development, the nature of the disruption, and the duration of construction, as described in *Chapter 2.3*. Since all alternatives would accommodate projected population and employment growth in the region, new development would provide additional space for housing and businesses within the Bay Area adequate to avoid displacement on a regional scale. Locally, however, businesses may be disrupted and residents displaced as some areas transition to denser urban settings. Impacts of displacement or disruption would be most likely felt as a result of new development where the overall density changes most significantly, since in these areas the building type may change (e.g. from low or midrise to high rise buildings or from single family to multifamily housing). Under all alternatives, the biggest density changes occur in existing urbanized areas, particularly in San Francisco, Oakland, and San Jose. Other land use changes that could cause localized disruption would include the location of land uses that are incompatible with adjacent uses (such as industrial uses adjacent to residential neighborhoods). Typically, local zoning prevents these types of incompatibilities, though not in all cases. Impacts related to displacement and disruption would ultimately be site specific and therefore variations between alternatives cannot be analyzed in detail at the regional scale. Given the variation in local land use controls and standards related to new development, impacts related to disruption and displacement would be expected for all alternatives in localized areas. Further, while transportation projects are not likely to displace residents over the long-term, localized impacts may occur. This impact is considered potentially significant (PS) for all alternatives. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Community Separation

Potential impacts related to community separation would also be localized. Each alternative includes new household and employment development, focused in varying degrees within PDAs. Development within PDAs and TPPs would largely consist of urban infill sites that may be underutilized or vacant and currently act as physical barriers in individual communities; development of these sites could actually remove or decrease divisions and barriers between neighboring communities and amenities. However, some large projects could reduce connectivity—both inside and outside of PDAs—if they fail to include pedestrian amenities, close off existing roads, or otherwise result in development that restricts access within the community. Impacts related to community separation would ultimately be site specific and therefore variations between alternatives cannot be analyzed in detail at the regional scale. Given the uncertainty around local implementation of standards related to connectivity, each alternative may result in localized community separation impacts. Transportation projects are expected to increase connectivity rather than result in separation, so would likely have beneficial or have no adverse impacts on community separation. This impact is considered potentially significant (PS) for all alternatives. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Consistency with Local Plans

Development and transportation projects in each alternative have the potential to conflict with the land use portion of adopted local general plans or other applicable land use plans, including specific plans, existing zoning, or regional plans such as coastal plans or the Bay Plan. The No Project alternative land use scenario is based on existing general plans, and therefore is the closest of the alternatives to the existing general plans; as described in the *Alternatives Analyzed in this EIR* section above, all of the other alternatives, including the proposed Plan, vary from the No Project alternative land use scenario and may include land use patterns or densities and intensities that differ from existing general plans. However, any alternative adopted as the Plan Bay Area will not supersede existing general plans. In cases where there may be a conflict with local general plans, zoning or specific plans, the local jurisdictions and relevant permitting authorities (such as BCDC) would still retain ultimate land use authority. Land use patterns included in the adopted Plan Bay Area would only be implemented insofar as local jurisdictions adopt the policies and recommendations included in the proposed Plan. This impact is considered less than significant (LS) for all alternatives since local jurisdictions and relevant permitting authorities would still retain ultimate land use authority under all alternatives.

Conversion of Farmland, Open Space, and Timberland or Forestland

Development and transportation projects in each alternative would result in the conversion of important agricultural lands to non-agricultural use. As indicated in **Table 3.1-23**, the number of farmland acres potentially affected by modeled development would be similar across all five alternatives. At the regional level, Alternative 4 would have the least impact as a result of land use development and the No Project alternative would have the greatest impact due to land use development. It is noted that if only important farmlands (excluding grazing land) are considered, the proposed Plan has the fewest acres converted. At the local level, converted acres vary to a somewhat greater degree than at the regional level. In most cases, the greatest impact is on grazing lands.

Transportation projects would also convert agricultural land to urbanized use.[4] At the regional level, the No Project alternative would have the least impact since it includes only committed projects and excludes

[4] The acreage calculation is based on a 100 foot buffer on either side of the centerline of a linear project and a 100 foot radius around the center of a point project, such as an intersection improvement resulting in a new configuration.

many projects that would result in physical impacts.[5] The proposed Plan and Alternative 4 would have the greatest impact since they include the largest number of total projects as well as projects that are likely to result in physical impacts. In most cases, the greatest impact is on grazing lands.

With the exception of the No Project alternative, which impacts nearly twice the amount of land as the other alternatives, total regional acres of conversion are similar across the alternatives. This assumes that there are no overlapping acres of development between transportation and land use projects. This holds true even when grazing land—which bears the greatest impacts from conversion—is excluded from the calculation. When focusing only on farmland that is prime or unique, or of local or statewide importance, the No Project alternative results in the largest number of acres converted, and the proposed Plan results in the least. In all cases, the number of acres converted represents a negligible proportion of the 2,329,000 acres of agricultural land in the Bay Area (less than one percent in all cases). Regionally, 1,750,000 acres of all agricultural lands are classified as grazing land. However, since any amount of conversion is considered significant, this impact is considered potentially significant (PS) for all alternatives. Because MTC/ABAG cannot require local implementing agencies to adopt relevant mitigation measures, and because there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels this impact remains significant and unavoidable for all alternatives (SU).

[5] Projects likely to result in physical impacts include projects which are listed as expansion projects costing $10 million or more that include new roadway construction, road widening, or other ground-disturbing construction and exclude transit route improvements, road operations and maintenance, and pedestrian and bicycle improvements which all involve minimal construction, if any.

TABLE 3.1-23: POTENTIAL FARMLAND CONVERSION IN ACRES, BY TYPE AND ALTERNATIVE

Farmland Type	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment Equity and Jobs*
Land Use Projects					
Farmland of Local Importance	1,455	573	497	622	740
Farmland of Statewide Importance	280	165	81	89	134
Grazing Land	11,464	2,992	3,758	2,257	4,502
Prime Farmland	2,671	395	510	620	583
Unique Farmland	497	260	378	222	455
Land Use Subtotal	***16,367***	***4,385***	***5,224***	***3,810***	***6,414***
Transportation Projects					
Farmland of Local Importance	227	421	421	421	331
Farmland of Statewide Importance	19	54	54	54	45
Grazing Land	298	742	625	742	302
Prime Farmland	50	228	211	228	180
Unique Farmland	1	83	82	83	71
Transportation Projects Subtotal	***595***	***1,528***	***1,393***	***1,528***	***929***
Regional Total[1]	**16,962**	**5,913**	**6,617**	**5,338**	**7,343**
Regional Excluding Grazing Land	**5,200**	**2,179**	**2,234**	**2,339**	**2,539**

Note:
- Figures may not sum due to independent rounding.
- Modeling outputs reflect an approximate number of acres potentially converted. Modeling limitations result in a more conservative analysis for the proposed Plan than for the other alternatives.

1. Assuming no overlapping acreage between land use and transportation projects.

Sources: MTC 2013; Census TIGER/Line Shapefiles, 2010; Farmland Mapping and Monitoring Program, Department of Conservation, 2008- 2010.

As indicated in **Table 3.1-24**, Williamson Act lands comprise a relatively small amount of all farmland impacted by potential development across all alternatives. At the regional level, the proposed Plan and Alternative 4 would have the least impact related to land use development. The No Project alternative would result in the least number of impacted acres related to transportation projects.

Overall, Alternative 4 would impact the least amount of Williamson Act land, followed by the proposed Plan. The No Project alternative would result in the greatest overall impact. Under all alternatives, the number of acres converted represents a negligible proportion of all Williamson Act lands in the Bay Area, which cover 1,252,500 acres regionally. However, since any amount of converted land is considered significant, this impact is considered potentially significant (PS) for all alternatives. Because MTC/ABAG cannot require local implementing agencies to adopt relevant mitigation measures, and because there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels this impact remains significant and unavoidable for all alternatives (SU).

TABLE 3.1-24: WILLIAMSON ACT ACRES POTENTIALLY AFFECTED IN ACRES, BY ALTERNATIVE

	Alternative 1: No Project	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Land Use Development Subtotal	4,548	470	1,375	424	1,563
Transportation Projects Subtotal	118	252	238	252	192
Regional Total[1]	**4,666**	**724**	**1,615**	**678**	**1,755**

Note:

- Figures may not sum due to independent rounding.
- Modeling outputs reflect an approximate number of acres potentially converted. Modeling limitations result in a more conservative analysis for the proposed Plan than for the other alternatives.

1. Assuming no overlapping acreage between land use and transportation projects

Source: MTC 2013; Census TIGER/Line Shapefiles, 2010; Department of Conservation, Division of Land Resource Protection, Williamson Act Program, 2004-6006.

Land use development and transportation projects in each alternative would result in the conversion of protected open space[6] to urbanized use. As indicated below in **Table 3.1-25**, the number of protected open space acres potentially affected by proposed land use development would be relatively small across all alternatives. Alternative 4 would have the least impact related to land use development based on modeling outputs, while the proposed Plan would have the greatest impact, though in all cases the impact would be negligible as compared to total land acreage or total open space resources. The amount of protected open space land potentially affected by proposed transportation projects would also be relatively small across all five alternatives. The No Project alternative would have the least impact, while the proposed Plan and Alternative 4 would have the largest impacts.

The aggregate effect of land use and transportation development on open space lands would be the lowest under Alternative 4 and the greatest under the proposed Plan, based on conservative modeling outputs. In all cases, however, the number of acres converted represents a negligible proportion of all protected open space in the Bay Area, which covers 1,015,000 acres regionally. However, since any amount of converted land is considered significant, this impact is considered potentially significant (PS) for all alternatives. Because MTC/ABAG cannot require local implementing agencies to adopt relevant

[6] Protected open space includes lands protected primarily as open space by an ownership interest of a governmental agency or non-profit organization (fee or easement). These lands may or may not offer public access.

mitigation measures, and because there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels, this impact remains significant and unavoidable for all alternatives (SU).

TABLE 3.1-25: POTENTIAL OPEN SPACE CONVERSION IN ACRES, BY ALTERNATIVE

	Alternative 1: No Project	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Land Use Development Subtotal	1,786	2,115	1,572	1,163	1,667
Transportation Projects Subtotal	124	280	277	280	141
Regional Total[1]	**1,910**	**2,395**	**1,849**	**1,443**	**1,808**

Note:

- Figures may not sum due to independent rounding.
- Modeling outputs reflect an approximate number of acres potentially converted. Modeling limitations result in a more conservative analysis for the proposed Plan than for the other alternatives.

1. Assuming no overlapping acreage between land use and transportation projects

Sources: MTC, 2013; Farmland Mapping and Monitoring Program, Department of Conservation, 2008- 2010; California Protected Areas Database, 2012; USDA, National Agricultural Statistics Service, California Cropland Data Layer, 2011.

Based on model outputs, development and transportation projects in each alternative could result in the loss of forest land, conversion of forest land to non-forest use, or conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production. As shown in **Table 3.1-26**, the amount of forest land and timberland potentially affected by proposed development would be similar across all alternatives. At the regional level, Alternative 4 would have the least impact on forest land as a result of land use development, while the No Project alternative would have the largest impact.

Similarly, the amount of forest land and timberland potentially affected by proposed transportation projects would be relatively small across all alternatives. At the regional level, the No Project alternative would have the least impact since it includes the fewest transportation projects, while the proposed Plan, Alternative 3, and Alternative 4 would have the largest impacts since they include the largest number of transportation projects.

The aggregate impact of land use and transportation development on forest and timberland would be the least under Alternative 4, while the No Project alternative would have the potential to impact the most forest land and timberland, based on model outputs. In all cases, however, the number of acres converted represents a negligible proportion of all forest land in the Bay Area, which covers 1,233,000 acres regionally. However, since any amount of converted land is considered significant, this impact is considered potentially significant (PS) for all alternatives. Because MTC/ABAG cannot require local implementing agencies to adopt relevant mitigation measures, and because there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels, this impact remains significant and unavoidable for all alternatives (SU).

TABLE 3.1-26: POTENTIAL FOREST AND TIMBERLAND CONVERSION IN ACRES, BY ALTERNATIVE

	Alternative 1: No Project	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Land Use Development Subtotal	2,548	1,337	1,708	212	1,941
Transportation Projects Subtotal	29	58	58	58	40
Regional Total[1]	**2,577**	**1,395**	**1,766**	**270**	**1,981**

Note:

- Figures may not sum due to independent rounding.
- Modeling outputs reflect an approximate number of acres potentially converted. Modeling limitations result in a more conservative analysis for the proposed Plan than for the other alternatives.

1. Assuming no overlapping acreage

Source: MTC, 2013; USDA, National Agricultural Statistics Service, California Cropland Data Layer, 2011.

Alternative 1: No Project

Because overall population and job growth is the same under the No Project alternative as under the proposed Plan, regional impacts as a result of land use changes related to residential or business disruption, displacement of existing population and housing, or permanent alterations to an existing neighborhood or permanent separation of communities would be similar to the proposed Plan. Impacts as a result of transportation projects under the No Project alternative would be the least of all the alternatives since it only includes a total of 220 projects as compared to approximately 700 projects under Alternatives 2, 3, and 4. Alternative 5 includes approximately 460 transportation projects.

The No Project alternative does not propose any changes in land use, and therefore it would have the least potential for conflict with current local plans. This impact is considered less than significant for all alternatives.

Based on modeling outputs, the No Project alternative would result in the potential conversion of important agricultural lands, open space, and lands under Williamson Act contract to urbanized use. Out of all of the alternatives, the No Project alternative generally results in the largest amounts of total conversion of these lands, as indicated in **Tables 3.1-23** through **3.1-25**. The single exception is in the case of open space lands, in which the No Project alternative results in the second-largest amount of potential conversion.

The No Project alternative would also result in the highest conversion of forest and timberland to non-forest use.

Alternative 3: Transit Priority Focus

Because overall population and job growth is the same under Alternative 3 as under the proposed Plan, regional impacts as a result of land use changes related to residential or business disruption, displacement of existing population and housing, or permanent separation of communities would be similar to the proposed Plan. Impacts as a result of transportation projects under Alternative 3 would be slightly less than the proposed Plan and Alternative 4 since there are fewer projects with physical impacts, but greater than the No Project alternative and Alternative 5 which include fewer projects than Alternative 3.

The potential to conflict with the land use portion of adopted local general plans or other applicable land use plans, including specific plans, existing zoning, or regional plans such as coastal plans or the Bay Plan is considered less than significant for all alternatives since local jurisdictions and relevant permitting authorities would still retain ultimate land use authority under all alternatives.

As shown in **Tables 3.1-23** through **3.1-25**, Alternative 3 results in greater impacts on agricultural land overall as compared to the proposed Plan. However, total conversion of Williamson Act and open space land under Alternative 3 would be less than or equal to that of the proposed Plan.

Similarly, it would result in more acres of forest and timberland conversion as compared to the proposed Plan.

Alternative 4: Enhanced Network of Communities

With higher forecasts for population and employment growth, Alternative 4 has the potential to introduce more development overall. Therefore, it could result in greater impacts due to residential or business disruption, displacement of existing population and housing, or permanent separation or division of communities. Under Alternative 4, potential impacts resulting from transportation projects are similar to those resulting from the proposed Plan and likely to be greater than those resulting from the remaining alternatives.

The potential to conflict with the land use portion of adopted local general plans or other applicable land use plans, including specific plans, existing zoning, or regional plans such as coastal plans or the Bay Plan is considered less than significant for all alternatives since local jurisdictions and relevant permitting authorities would still retain ultimate land use authority under all alternatives.

As shown in **Tables 3.1-23** through **3.1-25**, Alternative 4 would result in the conversion of the fewest acres of agricultural land, Williamson Act land, and open space land. However, it would convert more prime and unique farmland, and farmland of state or local importance than the proposed Plan.

Alternative 4 would result in the lowest conversion of forest land and timberland to non-forest use, based on modeling outputs.

Alternative 5: Environment, Equity, and Jobs

Because overall population and job growth is the same under Alternative 5 as under the proposed Plan, regional impacts as a result of land use changes related to residential or business disruption, displacement of existing population and housing, or permanent separation of communities are expected to be similar to those of the proposed Plan. Impacts as a result of transportation projects under Alternative 5 would be less than the proposed Plan, and would be second-lowest of all alternatives after the No Project alternative.

The potential to conflict with the land use portion of adopted local general plans or other applicable land use plans, including specific plans, existing zoning, or regional plans such as coastal plans or the Bay Plan is considered less than significant for all alternatives since local jurisdictions and relevant permitting authorities would still retain ultimate land use authority under all alternatives.

Based on modeling outputs, land use impacts resulting from Alternative 5 are greater than those from the proposed Plan for agricultural and Williamson Act land. However, Alternative 5 has fewer impacts on open space lands than the proposed Plan.

Alternative 5 would also result in more acres of forest and timberland conversion as compared to the proposed Plan.

ENERGY

Land Use

As presented in **Table 3.1-27**, the land use energy consumption rate per capita, both direct and indirect, is largely the same as the proposed Plan across all alternatives. Alternative 4 would accommodate both larger population and employment growth than the other alternatives, and thus would use more electricity and natural gas overall; however, given the larger population, it would also result in the lowest per capita energy use. The No Project alternative would use more land use energy per capita than the proposed Plan and the other alternatives, as it would accommodate more single family homes, which use more energy than multifamily homes. Similarly, the construction energy use for single family homes is more than for multifamily, so indirect energy use is higher under Alternative 4.

Transportation

Direct transportation energy use per capita, which includes fuel consumption for on-road vehicles, is largely the same as the proposed Plan under all the alternatives with the exception of the No Project alternative. The on-road energy use per capita would be higher under the No Project alternative since the No Project alternative results in higher VMT due to a more dispersed land use pattern. Alternative 4 would use the most on-road transportation energy since it includes higher population and employment growth and thus more VMT, though VMT per capita would be similar to the proposed Plan.

Indirect energy use, which includes construction, manufacturing and maintenance of transportation infrastructure, is largely the same across all the alternatives, with the exception of the No Project alternative. The No Project alternative would include only committed transportation projects, and therefore less new construction, and thus would have lower construction energy use. Alternative 5 would invest more in existing transit service improvements than the other alternatives, and thus would not require as much energy for construction of new projects. Therefore, after the No Project alternative, Alternative 5 would have the lowest per capita indirect energy use.

Combined Effects

Across all alternatives, land use and direct transportation energy use have similar per capita outcomes, all of which are reduced as compared to existing conditions. Overall, Alternative 4 would result in the lowest per capita energy use, followed by Alternative 5. Only Alterative 3 would result in higher per capita energy use than the proposed Plan. For all alternatives, the impact is expected to be less than significant (LS).

TABLE 3.1-27: TOTAL ENERGY USE PER CAPITA IN THE BAY AREA BY ALTERNATIVE

Per Capita Daily Energy (BTU)	*2010*	*Alt. 1: No Project*	*Alt. 2: Proposed Plan*	*Alt. 3: Transit Priority Focus*	*Alt. 4: Enhanced Network of Communities*	*Alt. 5: Environment, Equity & Jobs*
Direct Energy Use						
Land Use	106,448	105,935	105,387	104,180	94,086	104,247
Transportation[1]	131,781	100,105	95,213	96,624	94,986	95,610
Subtotal: Direct	**238,229**	**206,040**	**200,600**	**200,804**	**189,072**	**199,857**
Indirect Energy Use						
Land Use	47	45	45	44	48	44
Transportation[1]	30,439	34,078	40,653	41,059	44,270	39,878
Subtotal: Indirect	**30,487**	**34,123**	**40,698**	**41,103**	**44,318**	**39,922**
Total (BTU)	**268,716**	**240,163**	**241,254**	**241,907**	**233,390**	**239,778**

Note: Btu –British thermal units

1. Total daily VMT for transportation energy was calculated using Travel Model One; therefore, to calculate per-capita VMT, it is essential to use simulated population levels to ensure consistency. Simulated population may be slightly different than overall population forecasts for Plan Bay Area EIR due to slight variability in modeling tools. Further clarification on this issue can be found in the Plan Bay Area EIR technical appendices.

Source: Environmental Science Associates, 2013; Metropolitan Transportation Commission Model Outputs, 2012

Alternative 1: No Project

Per capita energy consumption for land use under the No Project alternative would be slightly more than the proposed Plan. Although the overall growth in jobs and housing would be the same, the No Project alternative would have three percent more single family homes than the proposed Plan. A single family home uses nearly 3,000 Kilowatts (kW) more electricity in a year than a multi-family home, as they tend to be larger. Natural gas usage would also be greater, for the same reason. Indirect land use energy consumption would be the same as under the proposed Plan.

Although overall indirect transportation energy would be less than the proposed Plan as a result of less construction under the No Project alternative, the direct transportation energy would be higher as the No Project alternative has higher VMT due to dispersed land use patterns.

The overall combined energy use per capita would be less under the No Project alternative than the proposed Plan.

Alternative 3: Transit Priority Focus

Per capita energy land use consumption under Alternative 3 would be slightly less than the proposed Plan. Although the overall growth in jobs and housing would be the same, Alternative 3 would have six percent fewer single family homes than the proposed Plan, resulting in more efficient energy use. Indirect land use energy consumption would be slightly less than under the proposed Plan.

Alternative 3 would have similar direct transportation energy consumption per capita as the proposed Plan. Indirect energy consumption per capita would be more than the proposed Plan, as Alternative 3 would invest slightly more in transit infrastructure than the proposed Plan, resulting in more transit construction.

The overall combined energy use per capita would be slightly more under Alternative 3 than the proposed Plan.

Alternative 4: Enhanced Network of Communities

Per capita land use energy consumption under Alternative 4 would be six percent less than the proposed Plan. The overall growth in jobs and housing would be more across the board; including 16 percent more single family homes than the proposed Plan, which use more energy per household than a multifamily unit. However, because of higher population accommodation, the per capita energy consumption would be less than the proposed Plan. Indirect land use energy consumption would also be slightly higher than under the proposed Plan.

As a result of the higher population and job growth, Alternative 4 would result in greater transportation energy consumption overall, compared to the proposed Plan. However, per capita direct transportation energy use would be less. The indirect transportation energy would be more the proposed Plan, as maintenance energy would increase as the overall vehicle miles traveled increase would increase the need for roadway repair.

The overall combined energy use per capita would be three percent less under Alternative 4 than the proposed Plan and all other alternatives.

Alternative 5: Environment, Equity, and Jobs

Per capita energy land use consumption under Alternative 5 would be slightly less than the proposed Plan. Although the overall growth in jobs and housing would be the same, Alternative 5 would have six percent fewer single family homes than the proposed Plan, resulting in more efficient energy use. Indirect land use energy consumption would be slightly less than under the proposed Plan.

Alternative 5 would have similar direct transportation use per capita as compared to the proposed Plan, but less indirect transportation energy consumption per capita than the proposed Plan because it would invest in transit service (rather than infrastructure) improvements, thus reducing indirect energy use, since construction is more energy intensive than maintenance.

The overall combined energy use per capita would be slightly less under Alternative 5 than the proposed Plan.

CLIMATE CHANGE AND GREENHOUSE GASES

GHG Emissions

Table 3.1-28 shows total daily and per capita car and light duty truck GHG emissions, by alternative. It is emphasized that per SB 375 legislative requirements, this analysis does not include implementation of Pavley or Low Carbon Fuel Standards (LCFS). While total GHG emissions increase for all alternatives due to regional growth, per capita GHG emissions decline under all alternatives from 2005 to 2040. The year 2005 is used as the baseline for this criteria for consistency with SB 375 targets. This per capita decline is attributable to numerous factors, most importantly to the relatively compact growth anticipated under all the alternatives. Further, under the proposed Plan and Alterntives 3, 4, and 5, the per capita decline is attributable to an integrated land use and transporation plan in which the land use pattern focuses growth in higher-density locations near transit services further reduces per capita GHG emissions. The land use development pattern by alternative is described in greater detail in the *Alternatives Analyzed in this EIR* section, above.

The proposed Plan, Alternative 3, and Alterantive 5 all meet and/or surpass SB 375 targets for 2020 and 2035 (seven and 15 percent per capita below 2005, respectively). However, Alternative 4 fails to meet the target in 2035 since it does not include the full Climate Policy Initiatives program (as shown in **Table 3.1-1**, it does not include the Smart Driving Strategy). The No Project alternative fails to meet the target in both 2020 and 2035, since it does not include the full Climate Policy Initiatives program[7] and as a result of the relatively less compact growth and less focus on high density development near transit services. Therefore, for the proposed Plan, Alternative 3, and Alterantive 5, no adverse impact (NI) would occur, while Alternative 4 and the No Project would have significant and unavoidable impacts (SU).

[7] The No Project alternative only includes three of the seven initiatives: Car Sharing, Vanpool Incentives/Employer Shuttles, and the Commuter Benefits Ordinance.

TABLE 3.1-28: TOTAL AND PER CAPITA PASSENGER VEHICLE AND LIGHT DUTY TRUCK CO_2 EMISSIONS, BY ALTERNATIVE

Year	*Simulated Population*[1]	*Modeled GHG Emissions (daily tons of CO_2)*	*Climate Policy Initiatives Reduction (daily tons of CO_2)*[2]	*CO_2 Emissions Per Capita (lbs)*	*Per Capita CO_2 Emissions Relative to 2005*[3]
Alternative 1 - No Project					
2005	7,008,000	72,000	-	20.5	0.0%
2020	7,697,000	75,000	-1,600	19.2	**-6.2%**
2035	8,489,000	83,000	-2,000	19.0	**-7.0%**
2040	8,715,000	84,000	-2,000	18.9	-7.7%
Alternative 2 - Proposed Plan					
2005	7,008,000	72,000	-	20.5	0.0%
2020	7,694,000	75,000	-4,000	18.3	-10.3%
2035	8,749,000	81,000	-5,900	17.1	-16.4%
2040	9,137,000	83,000	-5,900	16.8	-18.0%
Alternative 3 - Transit Priority					
2005	7,008,000	72,000	-	20.5	0.0%
2020	7,710,000	74,000	-3,800	18.3	-10.5%
2035	8,613,000	80,000	-5,800	17.3	-15.4%
2040	8,927,000	82,000	-5,800	17.1	-16.2%
Alternative 4 - Network of Communities					
2005	7,008,000	72,000	-	20.5	0.0%
2020	7,799,000	75,000	-2,500	18.7	-8.5%
2035	9,028,000	83,000	-4,500	17.4	**-14.8%**
2040	9,476,000	86,000	-4,500	17.1	-16.3%
Alternative 5 - Environment, Equity, and Jobs					
2005	7,008,000	72,000	-	20.5	0.0%
2020	7,698,000	74,000	-3,800	18.2	-11.1%
2035	8,607,000	79,000	-5,800	17.1	-16.4%
2040	8,910,000	81,000	-5,800	17.0	-17.0%

1. CO_2 emissions are calculated using Travel Model One outputs; therefore, to calculate per-capita VMT, it is essential to use simulated population levels to ensure consistency. Simulated population may be slightly different than overall population forecasts for Plan Bay Area EIR alternatives due to slight variability in modeling tools. Further clarification on this issue is provided in the Supplemental Report, *Summary of Predicted Traveler Responses*.
2. MTC's Climate Policy Initiatives, which are part of the proposed Plan, include Regional Electric Vehicle Public Charger Network, Vehicle Buy-Back and Plug-In/ Electric Vehicles Purchase Incentives, Car Sharing, Vanpool Incentives, Clean Vehicles Feebate Program, Smart Driving Strategy, and Commuter Benefits Ordinance.
3. **Bold** numbers fail to meet SB 375 targets.

Source: MTC, 2013.

Total annual forecast GHG emissions (reported in metric tons of CO_2 equivalents or $MTCO_2e$) are expected to decline from 2010 to 2040 under all alternatives when considering ARB's scoping plan reductions for electricity and natural gas, recycling and waste, and implementation of Pavley and LCFS regulations, as shown in **Table 3.1-29**. The year 2010 is used as the baseline for this criterion as it is the most recent modeled year. These reductions, as well as methodology for calculating annual $MTCO_2e$, are described in detail in *Chapter 2.5*. Alternatives 3 and 5 are expected to result in the greatest reduction in land use GHG emissions from 2010 to 2040. The relatively lower increase in residential GHG emissions under these two alternatives is tied to an increase in the share of multifamily units, which require less electricity and natural gas to operate. Alternative 5 is expected to have the greatest reduction in on-road transportation GHG emissions from 2010 to 2040. A portion of this reduction is attributable to the substantial investments in transit service frequency improvements, as well as a focused growth pattern, resulting in the strongest transit ridership of all of the alternatives considered. Additionally, its lack of highway expansion projects and implementation of a VMT tax causes Alternative 5 to have the lowest level of VMT of all of the alternatives considered – one percent less than the proposed Plan.

Alternatives 3 and 5 are expected to result in the greatest overall combined reduction in GHG emissions from 2010 to 2040. Since all alternatives are expected to result in a decline in overall emissions as compared to 2010, there is no adverse impact (NI) for all alternatives.

TABLE 3.1-29: COMPARATIVE ANNUAL LAND USE GHG EMISSIONS ($MTCO_2E$)

GHG Source	*Existing Condition 2010*	*Alternative 1 - No Project*	*Alternative 2 - Proposed Plan*	*Alternative 3 - Transit Priority*	*Alternative 4 - Enhanced Network*	*Alternative 5 - EJJ*
Single Family Residential	8,473,000	9,833,000	9,570,000	9,021,000	11,050,000	9,052,000
Multifamily Residential	2,488,000	3,619,000	3,751,000	4,028,000	3,324,000	4,013,000
Residential Subtotal	***10,961,000***	***13,452,000***	***13,321,000***	***13,049,000***	***14,374,000***	***13,065,000***
Commercial	757,000	867,000	867,000	867,000	867,000	867,000
Office	6,568,000	9,360,000	9,360,000	9,360,000	9,454,000	9,360,000
Industrial	1,037,000	1,077,000	1,077,000	1,077,000	1,087,000	1,077,000
Non-Residential Subtotal	***8,362,000***	***11,304,000***	***11,304,000***	***11,304,000***	***11,408,000***	***11,304,000***
Waste	***4,943,000***	***6,410,000***	***6,410,000***	***6,410,000***	***6,646,000***	***6,410,000***
Scoping Plan Reductions	n/a	-9,633,000	-9,633,000	-9,633,000	-9,633,000	-9,633,000
Total Land Use GHG Emissions	**24,266,000**	**21,533,000**	**21,402,000**	**21,130,000**	**22,795,000**	**21,146,000**
Land Use GHG Emissions #Change 2010 to 2040	n/a	-2,733,000	-2,864,000	-3,136,000	-1,471,000	-3,120,000
Land Use GHG Emissions % Change 2010 to 2040	n/a	-11%	-12%	-13%	-6%	-13%
Passenger Vehicles	19,383,000	14,927,000	14,631,000	14,579,000	15,182,000	14,427,000
Trucks	4,447,000	6,250,000	6,217,000	6,148,000	6,411,000	6,091,000
Buses	615,000	578,000	571,000	568,000	588,000	565,000
Other Vehicles	136,000	161,000	159,000	159,000	165,000	156,000
MTC Climate Policy Initiative	n/a	-554,000	-1,636,000	-1,612,000	-1,257,000	-1,609,000
Total Vehicle GHG Emissions (Pavley I + LCFS)	**24,580,000**	**21,362,000**	**19,942,000**	**19,842,000**	**21,089,000**	**19,630,000**
On-Road GHG Emissions # Change 2010 to 2040	n/a	-3,218,000	-4,638,000	-4,738,000	-3,491,000	-4,950,000
On-Road GHG Emissions % Change 2010 to 2040	n/a	-13%	-19%	-19%	-14%	-20%
Total Regional GHG Emissions	**48,846,000**	**42,895,000**	**41,344,000**	**40,972,000**	**43,884,000**	**40,776,000**
Change from 2010 to 2040		**-5,951,000**	**-7,502,000**	**-7,874,000**	**-4,962,000**	**-8,070,000**
Percent Change from 2010 to 2040		**-12%**	**-15%**	**-16%**	**-10%**	**-17%**

Source: MTC, 2013; Dyett & Bhatia, 2013.

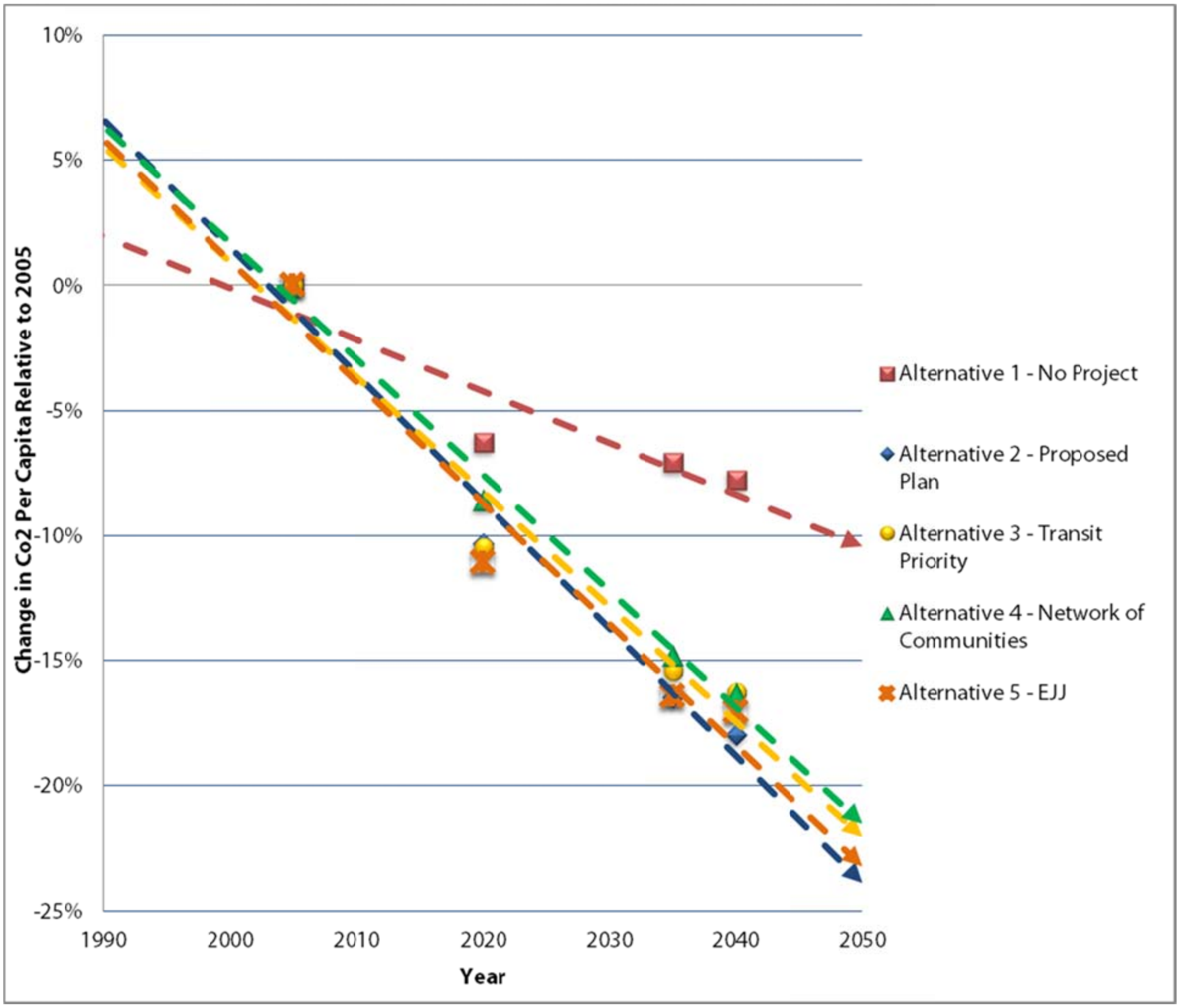
This assessment evaluates each alternative's likelihood to impede implementation of executive orders S-3-05 and B-16-2012, which both identify GHG reduction targets for 2050 (80 percent reduction as compared to 1990 levels for overall GHG emissions and transportation sector GHG emissions, respectively). Because these orders target a year beyond the life of each alternative, this assessment evaluates consistency by identifying whether or not implementation of each alternative is likely to impede attainment of the identified orders. The assessment considers the following factors:

- Per capita car and light duty truck GHG emissions decline from 2005 through 2040, and are expected to continue to decline farther into the future for all alternatives; however, GHG emissions for the No Project alternative and Alternative 4 are not expected to decline sufficiently to meet SB 375 targets.
- Total GHG emissions from land use and transportation are expected to decline from 2010 through 2040, and are expected to continue to decline farther into the future for all alternatives. This decline would be the steepest for Alternative 5, and the least for Alternative 4 and the No Project alternative.
- New innovations in technology and science are expected, along with continued market shift towards green building and zero emission vehicles.
- EMFAC does not account for some regulations that are already approved, such as the National Fuel Efficiency standards for manufacturer's year 2017-2025. This regulation would increase the emissions reductions in the out years.
- The RTP and SCS must be updated every four years, providing frequent opportunities to reevaluate progress towards executive order achievement.

Under all the alternatives GHG emissions are expected to decline, indicating that the Bay Area is expected to be heading in the direction of achieving the executive order goals, and does not impede achievement of these identified goals. The proposed Plan, Alternatives 3, and Alternative 5 have the steepest decline of total GHG emissions over time, as shown in **Figures 3.1-1** and **3.1-2**. Since all alternatives show a downward trajectory in emissions to 2050, the impact is considered less than significant (LS) for all alternatives.

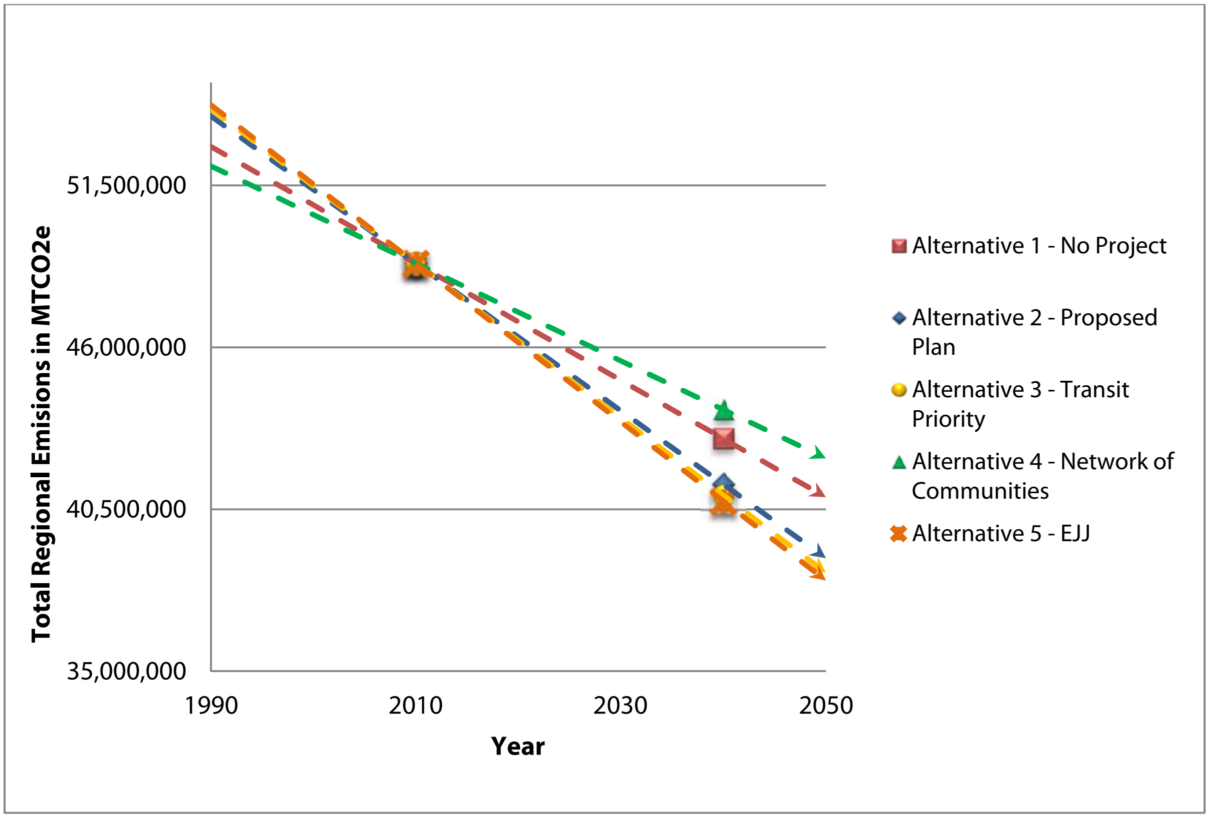
While some variations may exist between the proposed Plan and specific local Climate Action Plans, these variations would need to be assessed at the local level. On a whole, it is expected that local climate action plans would be complementary efforts with all of the alternatives towards the reduction of GHG emissions in line with State goals and mandates. The proposed Plan, Alternative 3, and Alternative 5 would be expected to be consistent with any other applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs, resulting in no adverse impact (NI) for this threshold. However, since the No Project and Alternative 4 are inconsistent with SB 375, meaning they do not achieve the GHG emissions reduction target, they are expected to have a significant and unavoidable impact related to achieving state goals and mandates.

Figure 3.1-1: Change in Per Capita Car and Light Duty Truck CO_2 Emissions, by Alternative



Source: MTC, 2013; D&B, 2013.

Figure 3.1-2: Total Annual Regional GHG Emissions ($MTCO_2e$), by Alternative



Source: MTC, 2013; D&B, 2013.

Sea Level Rise

All alternatives include new transportation projects and land-use development in areas that are projected to be inundated by mid-century sea level rise, although the number of transportation projects and the number of impacted people and land-use development projects varies by alternative. As described in *Chapter 2.5*, the assessments were conducted using GIS data. Land-use development is based on GIS raster data developed by MTC using UrbanSim land use outputs, as described in *Approach to Assessing Alternatives* section above. **Table 3.1-30** shows the transportation projects that fall within (partially or entirely) the areas projected to be inundated by future mid-century sea level rise, by alternative. Additional details, such as the percentage of each transportation project that is projected to be inundated, are included in *Chapter 2.5*. The proposed Plan, Alternative 3 and Alternative 4 each have 32 transportation projects that are anticipated to fall within the sea level rise inundation zone. Alternative 5 and the No Project alternative each contain a subset of these projects. Alternative 5 has 21 transportation projects that fall within the sea level rise inundation zone, while the No Project alternative has 15.

Table 3.1-31 shows the transportation projects that fall within (partially or entirely) the mid-century low-lying, hydraulically disconnected areas (areas that are currently protected from existing and/or future inundation from Bay waters by levees and/or other topographic features or structures that act to inhibit the conveyance of floodwaters inland). Although these projects are not projected to be within the sea level rise inundation zone, based on the existing level of protection, they are still at risk of inundation in the event that an existing structure (e.g., levee, roadway embankment) fails or is not properly maintained into the future, or the topographic feature that is providing protection erodes or is modified in a way that reduces is protective value. The proposed Plan, Alternative 3, and Alternative 4 have 21 transportation projects that are anticipated to fall within the mid-century low-lying, hydraulically disconnected zone, while Alternative 5 has 15, and the No Project alternative has 10.

The proposed Plan, Alternative 3, and Alternative 4 all perform the same with respect to the level of transportation investments made within areas projected to be inundated regularly with sea level rise by mid-century. Although the No Project alternative and Alternative 5 have fewer potentially impacted transportation projects, both alternatives also have a lower overall level of projected investments in transportation improvements, enhancements, and expansions of existing levels of services. *Chapter 2.5* presents mitigation measures and adaptation strategies that may reduce the impact associated with sea level rise to less than significant on a project-by-project basis. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

TABLE 3.1-30: PROPOSED TRANSPORTATION PROJECTS[1] WITHIN MID-CENTURY SEA LEVEL RISE INUNDATION ZONE

RTP Project ID	*County*	*Alt 1: No Project*	*Alt 2: Proposed Plan*	*Alt 3: Transit Priority*	*Alt 4: Network of Communities*	*Alt 5: Environment, Equity, Jobs*
21013	Bay Area Region / Multi-County	X	X	X	X	X
22001	Bay Area Region / Multi-County	X	X	X	X	X
230221	Bay Area Region / Multi-County	X	X	X	X	X
240736	Bay Area Region / Multi-County		X	X	X	X
230668	Bay Area Region / Multi-County		X	X	X	
230685	Bay Area Region / Multi-County		X	X	X	
230686	Bay Area Region / Multi-County		X	X	X	
240587	Bay Area Region / Multi-County		X	X	X	
240581	Bay Area Region / Multi-County		X	X	X	
22009	Alameda		X	X	X	X
22780	Alameda		X	X	X	X
98207	Alameda		X	X	X	X
230054	Alameda	X	X	X	X	X
240018	Alameda		X	X	X	X
98154	Marin	X	X	X	X	X
240552	Marin		X	X	X	X
240691	Marin		X	X	X	
21325	Marin		X	X	X	
21613	San Mateo		X	X	X	

TABLE 3.1-30: PROPOSED TRANSPORTATION PROJECTS[1] WITHIN MID-CENTURY SEA LEVEL RISE INUNDATION ZONE

RTP Project ID	*County*	*Alt 1: No Project*	*Alt 2: Proposed Plan*	*Alt 3: Transit Priority*	*Alt 4: Network of Communities*	*Alt 5: Environment, Equity, Jobs*
230428	San Mateo	X	X	X	X	X
240060	San Mateo		X	X	X	
240143	San Mateo	X	X	X	X	X
240176	San Mateo	X	X	X	X	X
230704	San Mateo	X	X	X	X	X
230267	Santa Clara	X	X	X	X	X
230531	Santa Clara	X	X	X	X	X
230532	Santa Clara	X	X	X	X	X
240436	Santa Clara		X	X	X	
240441	Santa Clara		X	X	X	
240463	Santa Clara	X	X	X	X	X
240466	Santa Clara	X	X	X	X	X
240481	Santa Clara	X	X	X	X	X
TOTAL		**15**	**32**	**32**	**32**	**21**

[1] Project Descriptions can be found in the Project Notebook supplemental report

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-31: PROPOSED TRANSPORTATION PROJECTS[1] WITHIN MID-CENTURY LOW-LYING ZONE

RTP Project ID	*County*	*Alt 1: No Project*	*Alt 2: Proposed Plan*	*Alt 3: Transit Priority*	*Alt 4: Network of Communities*	*Alt 5: Environment, Equity, Jobs*
21627	Bay Area Region / Multi-County		X	X	X	X
22001	Bay Area Region / Multi-County	X	X	X	X	X
240588	Bay Area Region / Multi-County		X	X	X	
21131	Alameda	X	X	X	X	X
22009	Alameda		X	X	X	X
98207	Alameda		X	X	X	X
240018	Alameda		X	X	X	X
240147	San Francisco		X	X	X	X
240358	San Francisco		X	X	X	
240163	San Francisco		X	X	X	
240400	San Francisco	X	X	X	X	X

TABLE 3.1-31: PROPOSED TRANSPORTATION PROJECTS[1] WITHIN MID-CENTURY LOW-LYING ZONE

RTP Project ID	*County*	*Alt 1: No Project*	*Alt 2: Proposed Plan*	*Alt 3: Transit Priority*	*Alt 4: Network of Communities*	*Alt 5: Environment, Equity, Jobs*
21608	San Mateo	X	X	X	X	X
21612	San Mateo		X	X	X	
21613	San Mateo		X	X	X	
230592	San Mateo	X	X	X	X	X
240060	San Mateo		X	X	X	
240133	San Mateo	X	X	X	X	X
240143	San Mateo	X	X	X	X	X
240374	Santa Clara	X	X	X	X	X
240466	Santa Clara	X	X	X	X	X
240481	Santa Clara	X	X	X	X	X
TOTAL		**10**	**21**	**21**	**21**	**15**

[1] Project descriptions can be found in the Project Notebook supplemental report

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

All Alternatives are projected to have an increase in the number of residents within the future sea level rise inundation zone compared to year 2010 baseline conditions. **Tables 3.1-32** through **3.1-34** show the number of residents projected to be within the mid-century sea level rise inundation zone within the PDAs, TPPs, and within the counties as a whole, respectively. Each Alternative is also compared to the proposed Plan, presented as the relative percent increase or decrease in residents projected to be within this zone. The increase in population under the proposed Plan (relative to baseline conditions) is presented in *Chapter 2.5*; an overview of population growth by alternative is included in the *Alternatives Analyzed in this EIR* section above. A positive percentage in **Tables 3.1-32** through **3.1-34** indicates that the alternative places more residents within the PDA, TPP, or within the county as a whole and within the sea level rise inundation zone than projected under the proposed Plan, while a negative percentage indicates that the alternative places fewer residents within the inundation area than projected under the proposed Plan. It should be noted that the PDAs and TPPs within each county may overlap, and the population calculated within the county as a whole contains the population within and outside of the PDAs and TPPs (within the sea level rise inundation zone).

Within the TPPs, Alternative 3 is projected to have the largest increase in residents within the sea level rise inundation zone (11 percent more than the proposed Plan, **Table 3.1-33**), while the proposed Plan has the largest increase in the number of residents within the future sea level rise inundation zone within the PDAs and the nine Bay Area counties as a whole (**Tables 3.1-32** and **3.1-34**). Alternative 5 has the smallest projected increase in residents within the future sea level rise inundation zone (12 percent fewer than projected under the proposed Plan).

While mitigation measures and adaptation strategies are identified in *Chapter 2.5*, because MTC/ABAG cannot require local implementing agencies to adopt relevant mitigation measures, and because there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels, this impact remains significant and unavoidable for all alternatives (SU).

TABLE 3.1-32: RESIDENTS WITHIN PDAS AND MID-CENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*		*Alternative 3: Transit Priority Focus*		*Alternative 4: Enhanced Network of Communities*		*Alternative 5: Environment, Equity and Jobs*	
	Within SLR Zone	*Within SLR Zone*	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]
Alameda	< 10	100	70	-24%	100	10%	70	-23%	80	-16%
Contra Costa	300	490	400	-19%	250	-50%	520	6%	310	-36%
Marin	120	430	280	-34%	650	51%	850	99%	410	-4%
Napa	< 10	10	< 10	-51%	< 10	-44%	10	0%	10	2%
San Francisco	30	970	540	-45%	1,480	52%	1,060	9%	620	-36%
San Mateo	210	710	460	-36%	660	-9%	1,000	40%	1,160	63%
Santa Clara	2,240	9,880	5,470	-45%	10,320	104 %	5,510	-44%	9,990	1%
Solano	1,680	3,240	2,620	-19%	1,750	-46%	2,890	-11%	2,210	-32%
Sonoma	< 10	20	10	-35%	< 10	-57%	30	41%	10	-29%
Bay Area	**4,600**	**15,850**	**9,850**	**-38%**	**15,220**	**-4%**	**11,940**	**-25%**	**14,800**	**-7%**

[1] % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-33: RESIDENTS WITHIN TPPS AND MID-CENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*		*Alternative 3: Transit Priority Focus*		*Alternative 4: Enhanced Network of Communities*		*Alternative 5: Environment, Equity and Jobs*	
	Within SLR Zone	*Within SLR Zone*	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]
Alameda	1,350	1,540	1,470	-4%	1,200	-22%	1,360	-12%	1,200	-22%
Contra Costa	10	80	80	-7%	20	-72%	< 10	-90%	30	-70%
Marin	7,920	9,000	8,440	-6%	7,520	-16%	9,530	6%	7,170	-20%
Napa	< 10	< 10	< 10	-51%	< 10	37%	< 10	-18%	< 10	27%
San Francisco	330	2,030	1,650	-19%	1,120	-45%	1,070	-47%	580	-72%
San Mateo	12,900	15,580	15,380	-1%	18,320	18%	17,650	13%	17,910	15%
Santa Clara	3,920	12,960	10,520	-19%	17,540	35%	5,820	-55%	7,210	-44%
Solano	0	0	0	0%	0	0%	0	0%	0	0%
Sonoma	< 10	10	< 10	-27%	< 10	-24%	10	17%	< 10	-26%
Bay Area	**26,450**	**41,220**	**37,550**	**-9%**	**45,740**	**11%**	**35,460**	**-14%**	**34,110**	**-17%**

[1] % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-34: RESIDENTS WITHIN COUNTIES[1] AND MID-CENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*	*Alternative 2: Proposed Plan*	*Alternative 1 No Project*		*Alternative 3: Transit Priority Focus*		*Alternative 4: Enhanced Network of Communities*		*Alternative 5: Environment, Equity and Jobs*	
	Within SLR Zone	*Within SLR Zone*	*Within SLR Zone*	*% Diff.[2]*	*Within SLR Zone*	*% Diff.[2]*	*Within SLR Zone*	*% Diff.[2]*	*Within SLR Zone*	*% Diff.[2]*
Alameda	1,450	1,630	1,590	-2%	1,320	-19%	1,520	-7%	1,540	-6%
Contra Costa	750	1,360	1,260	-7%	330	-76%	620	-54%	370	-73%
Marin	11,170	12,380	11,780	-5%	10,540	-15%	12,500	1%	10,250	-17%
Napa	100	120	110	-6%	140	15%	120	-3%	130	12%
San Francisco	340	1,930	1,580	-18%	1,060	-45%	950	-51%	570	-70%
San Mateo	50,680	56,320	54,820	-3%	57,440	2%	58,270	3%	57,820	3%
Santa Clara	11,930	26,820	21,690	-19%	30,420	13%	22,080	-18%	18,690	-30%
Solano	1,790	3,360	2,740	-19%	1,860	-45%	2,990	-11%	2,320	-31%
Sonoma	130	170	150	-6%	190	16%	180	10%	190	13%
Bay Area	**78,340**	**104,090**	**95,720**	**-8%**	**103,280**	**-1%**	**99,220**	**-5%**	**91,870**	**-12%**

[1] Includes all population within each county that are within the sea level rise inundation zone, including population within and outside of the PDAs and TPPs.

[2] % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

Tables 3.1-35 through **3.1-37** show the projected number of residents within the future low-lying, hydraulically disconnected areas within the PDAs, TPPs, and within the counties as a whole, respectively. The proposed Plan has the largest increase in population in the low-lying areas within the PDA's, TPPs and the counties as whole. Alternative 4 has the smallest increase in the projected population residing within the low-lying zone TPPs and the counties as a whole relative to the proposed Plan (51 percent and 43 percent fewer than projected under the proposed Plan, respectively).

TABLE 3.1-35: RESIDENTS WITHIN PDAS AND MID-CENTURY LOW-LYING ZONE

County	Year 2010	Alternative 2: Proposed Plan	Alternative 1 No Project		Alternative 3: Transit Priority Focus		Alternative 4: Enhanced Network of Communities		Alternative 5: Environment, Equity and Jobs	
	Within Low Zone	Within Low Zone	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]
Alameda	20	3,450	2,690	-22%	430	-87%	280	-92%	390	-89%
Contra Costa	0	30	30	-2%	0	-100%	30	-9%	20	-38%
Marin	< 10	< 10	< 10	-39%	40	4491%	50	5961%	< 10	473%
Napa	0	0	0	0%	0	0%	0	0%	0	0%
San Francisco	10	4,200	3,010	-28%	3,120	-26%	1,060	-75%	2,930	-30%
San Mateo	2,250	10.330	3,790	-63%	7,110	-31%	7,080	-31%	10,070	-3%
Santa Clara	2,140	2,210	1,330	-40%	3490	58%	2910	32%	3,200	45%
Solano	0	40	40	-15%	0	-100%	60	41%	< 10	-97%
Sonoma	0	0	0	0%	0	0%	0	0%	0	0%
Bay Area	**4,420**	**20,270**	**10,890**	**-46%**	**19,340**	**-30%**	**11,480**	**-43%**	**16,630**	**-18%**

1. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-36: RESIDENTS WITHIN TPPS AND MID-CENTURY LOW-LYING ZONE

County	Year 2010	Alternative 2: Proposed Plan	Alternative 1: No Project		Alternative 3: Transit Priority Focus		Alternative 4: Enhanced Network of Communities		Alternative 5: Environment, Equity and Jobs	
	Within Low Zone	Within Low Zone	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]
Alameda	1,130	2,210	1,860	-16%	1,650	-25%	1,480	-33%	1,460	-34%
Contra Costa	< 10	10	10	0%	< 10	-92%	< 10	-33%	< 10	-65%
Marin	1,470	1,480	1,410	-5%	1,060	-28%	1,500	1%	960	-35%
Napa	0	0	0	0%	0	0%	0	0%	0	0%
San Francisco	10	2,240	1,320	-41%	1,980	-11%	660	-71%	1,900	-15%
San Mateo	11,750	25,050	20,830	-17%	11,060	-56%	9,200	-63%	12,130	-52%
Santa Clara	2,610	2,890	1,990	-31%	8,270	186%	3,650	26%	4,320	49%
Solano	220	270	270	-15%	230	-26%	310	0%	240	-24%
Sonoma	0	0	0	0%	0	0%	0	0%	0	0%
Bay Area	**17,180**	**34,150**	**27,690**	**-19%**	**24,260**	**-29%**	**16,800**	**-51%**	**21,000**	**-39%**

1. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-37: RESIDENTS WITHIN COUNTIES[1] AND MID-CENTURY LOW-LYING ZONE

County	*Year 2010*	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*		*Alternative 3: Transit Priority Focus*		*Alternative 4: Enhanced Network of Communities*		*Alternative 5: Environment, Equity and Jobs*	
	Within Low Zone	*Within Low Zone*	*Within Low Zone*	*% Diff.*[2]	*Within Low Zone*	*% Diff.*[2]	*Within Low Zone*	*% Diff.*[2]	*Within Low Zone*	*% Diff.*[2]
Alameda	2,050	6,110	5,190	-15%	2,530	-59%	2,610	-57%	2,510	-59%
Contra Costa	< 10	50	50	-2%	10	-75%	50	-13%	30	-53%
Marin	3,060	3,180	3,030	-5%	2,450	-23%	3,300	4%	2,360	-26%
Napa	20	30	30	10%	30	11%	30	0%	30	-7%
San Francisco	10	3,910	2,800	-28%	3,120	-20%	920	-77%	2,930	-25%
San Mateo	23,790	41,950	34,320	-18%	23,980	-43%	22,500	-46%	27,580	-34%
Santa Clara	2,690	3,030	2,090	-31%	9,340	208%	3,680	22%	4,930	63%
Solano	280	340	330	-2%	310	-9%	390	14%	310	-7%
Sonoma	30	30	30	-1%	50	70%	30	11%	50	76%
Bay Area	**31,940**	**58,630**	**47,870**	**-18%**	**41,820**	**-29%**	**33,500**	**-43%**	**40,730**	**-31%**

1. Includes all population within each county that are within the sea level rise inundation zone, including population within and outside of the PDAs and TPPs.
2. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

Tables 3.1-38 through **3.1-40** show the projected number of employees within the future sea level rise inundation zone and the PDAs, TPPs, and the counties as a whole, respectively. The number of employees within a region is used as a surrogate for the increase in commercial and industrial land use density. The proposed Plan is projected to have the largest increase in commercial and industrial land use density within the future inundated areas within the PDAs and the counties as a whole. Alternative 3 is projected to have the largest increase in commercial and industrial land use density within the TPPs and the future sea level rise inundation zone (2 percent more than the proposed Plan). Within the counties as a whole, Alternative 4 has the smallest increase in commercial and industrial land use density within the sea level rise inundation zone (22 percent fewer than projected under the proposed Plan).

While mitigation measures and adaptation strategies are identified in *Chapter 2.5*, because MTC/ABAG cannot require local implementing agencies to adopt relevant mitigation measures, and because there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels, this impact remains significant and unavoidable for all alternatives (SU).

TABLE 3.1-38: EMPLOYMENT WITHIN PDAS AND MID-CENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*		*Alternative 3: Transit Priority Focus*		*Alternative 4: Enhanced Network of Communities*		*Alternative 5: Environment, Equity and Jobs*	
	Within SLR Zone	*Within SLR Zone*	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]
Alameda	120	370	270	-27%	190	-49%	90	-74%	190	-49%
Contra Costa	20	30	20	-40%	30	-17%	30	-8%	30	-16%
Marin	900	1,050	790	-24%	1,070	2%	1,070	2%	1,050	1%
Napa	< 10	< 10	< 10	-12%	< 10	-11%	< 10	12%	< 10	42%
San Francisco	160	690	520	-26%	210	-70%	330	-52%	210	-70%
San Mateo	1,250	1,940	1,400	-28%	1,770	-8%	1,150	-40%	1,480	-24%
Santa Clara	5,690	8,460	6,690	-21%	6,680	35%	8,890	6%	6,440	-24%
Solano	230	410	370	-10%	410	0%	340	-17%	390	-5%
Sonoma	10	30	20	-20%	10	-66%	10	-63%	10	-60%
Bay Area	**8,380**	**12,980**	**10,080**	**-22%**	**10,360**	**-20%**	**11,920**	**-8%**	**9,800**	**-24%**

1. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-39: EMPLOYMENT WITHIN TPPS AND MID-CENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*		*Alternative 3: Transit Priority Focus*		*Alternative 4: Enhanced Network of Communities*		*Alternative 5: Environment, Equity and Jobs*	
	Within SLR Zone	*Within SLR Zone*	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]	*Within SLR Zone*	*% Diff.*[1]
Alameda	1,090	1,430	1,380	-4%	1,630	14%	1,440	1%	1,530	7%
Contra Costa	340	520	520	0%	100	-82%	170	-67%	90	-82%
Marin	9,510	11,330	11,000	-3%	9,570	-15%	9,140	-19%	9,420	-17%
Napa	0	0	0	0%	0	0%	0	0%	0	0%
San Francisco	170	670	510	-23%	240	-64%	320	-53%	260	-61%
San Mateo	24,090	29,880	29,710	-1%	29,510	-1%	25,140	-16%	28,280	-5%
Santa Clara	5,090	6,770	5,160	-24%	10,380	53%	7,000	3%	10,350	53%
Solano	-1	10	< 10	0%	< 10	0%	< 10	0%	< 10	0%
Sonoma	10	30	20	-19%	< 10	-66%	10	-64%	10	-60%
Bay Area	**40,310**	**50,640**	**48,320**	**-5%**	**51,440**	**2%**	**43,220**	**-15%**	**49,960**	**-1%**

1. % Difference is calculated relative to Alternative 2: Proposed Plan

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-40: EMPLOYMENT WITHIN COUNTIES[1] AND MID-CENTURY SEA LEVEL RISE INUNDATION ZONE

County	Year 2010	Alternative 2: Proposed Plan	Alternative 1: No Project		Alternative 3: Transit Priority Focus		Alternative 4: Enhanced Network of Communities		Alternative 5: Environment, Equity and Jobs	
	Within SLR Zone	*Within SLR Zone*	*Within SLR Zone*	*% Diff.[2]*	*Within SLR Zone*	*% Diff.[2]*	*Within SLR Zone*	*% Diff.[2]*	*Within SLR Zone*	*% Diff.[2]*
Alameda	1,500	1,890	1,770	-6%	3,320	76%	1,860	-2%	3,220	70%
Contra Costa	1,390	2,020	1,980	-2%	400	-80%	790	-61%	410	-80%
Marin	11,510	13,720	13,380	-2%	11,840	-14%	10,980	-20%	11,420	-17%
Napa	30	30	30	-2%	50	41%	40	1%	40	13%
San Francisco	130	520	390	-25%	200	-62%	260	-51%	200	-61%
San Mateo	48,750	65,070	64,290	-1%	56,650	-13%	48,290	-26%	56,110	-14%
Santa Clara	16,890	24,500	21,990	-10%	23,500	-4%	21,730	-11%	23,110	-6%
Solano	450	680	640	-6%	560	-17%	420	-38%	530	-23%
Sonoma	280	350	340	-3%	390	11%	250	-28%	380	7%
Bay Area	**80,920**	**108,790**	**104,820**	**-4%**	**96,920**	**-11%**	**84,620**	**-22%**	**95,430**	**-12%**

1. Includes all population within each county that are within the sea level rise inundation zone, including population within and outside of the PDAs and TPPs.
2. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

Tables 3.1-41 through **3.1-43** show the projected number of employees within the low-lying, hydraulically disconnected areas and the PDAs, TPPs, and the counties as a whole, respectively. Within the low-lying areas, the proposed Plan has the largest increase in employment, and therefore the largest projected increase in commercial and industrial land use density within the PDAs, TPPs, and within the nine Bay Area counties. Alternatives 3, 4, and 5 all have similar increases in projected commercial and industrial land use densities within the low-lying areas compared to baseline (e.g., 2010) conditions.

TABLE 3.1-41: EMPLOYMENT WITHIN PDAS AND MID-CENTURY LOW-LYING ZONE

County	*Year 2010*	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*		*Alternative 3: Transit Priority Focus*		*Alternative 4: Enhanced Network of Communities*		*Alternative 5: Environment, Equity and Jobs*	
	Within Low Zone	*Within Low Zone*	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]
Alameda	260	800	620	-22%	460	-43%	530	-33%	370	-53%
Contra Costa	0	0	0	0%	0	0%	0	0%	0	0%
Marin	40	40	30	-23%	40	4%	40	10%	40	12%
Napa	260	0	0	0%	0	0%	0	0%	0	0%
San Francisco	780	2,670	2,070	-23%	1,080	-60%	1,220	-54%	950	-65%
San Mateo	6,130	11,500	6,750	-41%	6,490	-44%	5,950	-48%	6,410	-44%
Santa Clara	70	100	60	-37%	90	-14%	200	91%	90	-10%
Solano	60	90	80	-9%	110	26%	130	49%	80	-12%
Sonoma	0	0	0	0%	0	0%	0	0%	0	0%
Bay Area	**7,340**	**15,200**	**9,610**	**-37%**	**8,260**	**-46%**	**8,060**	**-47%**	**7,940**	**-48%**

1. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-42: EMPLOYMENT WITHIN TPPS AND MID-CENTURY LOW-LYING ZONE

County	*Year 2010*	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*		*Alternative 3: Transit Priority Focus*		*Alternative 4: Enhanced Network of Communities*		*Alternative 5: Environment, Equity and Jobs*	
	Within Low Zone	*Within Low Zone*	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]
Alameda	1,470	2,030	1,900	-7%	1,960	-3%	2,110	4%	1,740	-14%
Contra Costa	50	70	50	-26%	40	-41%	30	-60%	40	-36%
Marin	210	220	210	-5%	270	23%	290	28%	280	28%
Napa	0	0	0	0%	0	0%	0	0%	0	0%
San Francisco	900	2,660	2,060	-22%	1,130	-58%	1,300	-51%	1,000	-62%
San Mateo	6,280	9,490	8,060	-15%	5,570	-41%	4,430	-53%	5,750	-39%
Santa Clara	2,660	3,550	3,360	-5%	3,980	12%	5,360	51%	4,250	20%
Solano	870	1,020	1,010	-1%	1,090	7%	1,030	1%	980	-4%
Sonoma	0	0	0	0%	0	0%	0	0%	0	0%
Bay Area	**12,440**	**19,040**	**16,660**	**-12%**	**14,040**	**-26%**	**14,540**	**-24%**	**14,050**	**-26%**

1. % Difference is calculated relative to Alternative 2: Proposed Plan

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-43: EMPLOYMENT WITHIN COUNTIES[1] AND MID-CENTURY LOW-LYING ZONE

County	Year 2010	Alternative 2: Proposed Plan	Alternative 1: No Project		Alternative 3: Transit Priority Focus		Alternative 4: Enhanced Network of Communities		Alternative 5: Environment, Equity and Jobs	
	Within Low Zone	Within Low Zone	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]
Alameda	5,370	7,580	7,390	-3%	6,290	-17%	7,460	-2%	5,680	-25%
Contra Costa	410	420	370	-13%	100	-76%	130	-69%	110	-75%
Marin	1,000	1,100	1,090	-2%	1,560	41%	1,700	54%	1,310	19%
Napa	520	570	570	0%	190	-66%	580	2%	180	-68%
San Francisco	900	2,790	2,190	-22%	1,180	-58%	1,390	-50%	1,040	-63%
San Mateo	20,090	30,960	25,830	-17%	18,050	-42%	14,520	-53%	18,410	-41%
Santa Clara	2,830	3,850	3,630	-6%	4,560	19%	5,970	55%	4,920	28%
Solano	940	1,110	1,100	-1%	1,180	6%	1,150	4%	1,070	-3%
Sonoma	10	10	10	-2%	30	172%	10	6%	20	36%
Bay Area	**32,060**	**48,400**	**42,180**	**-13%**	**33,150**	**-32%**	**32,920**	**-32%**	**32,740**	**-32%**

1. Includes all population within each county that are within the sea level rise inundation zone, including population within and outside of the PDAs and TPPs.
2. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

Tables 3.1-44 through **3.1-46** show the number of households projected to be located within the areas inundated by mid-century sea level rise in the PDAs, TPPs, and the counties as a whole, respectively. The number of households is used a surrogate for an increase in residential land use density, or an increase in residential development. Alternative 3 is projected to have the largest increase in residential development within the future sea level rise inundation zone across the TPPs and the counties as a whole (15 percent and 2 percent more than projected under the proposed Plan, respectively). The proposed Plan has the largest increase in residential development across the PDAs, and the second largest increase within the TPPs and the nine Bay Area counties within the future sea level rise inundation zone when compared to baseline (e.g., 2010) conditions. Alternative 5 is projected to have the smallest increase in residential development within the future sea level rise inundation zone across the Bay Area as a whole (10 percent fewer than projected under the proposed Plan).

While mitigation measures and adaptation strategies are identified in *Chapter 2.5*, because MTC/ABAG cannot require local implementing agencies to adopt relevant mitigation measures, and because there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels, this impact remains significant and unavoidable for all alternatives (SU).

TABLE 3.1-44: HOUSEHOLDS WITHIN PDAS AND MID-CENTURY SEA LEVEL RISE INUNDATION ZONE

County	Year 2010	Alternative 2: Proposed Plan	Alternative 1: No Project		Alternative 3: Transit Priority Focus		Alternative 4: Enhanced Network of Communities		Alternative 5: Environment, Equity and Jobs	
	Within SLR Zone	Within SLR Zone	Within SLR Zone	% Diff.[1]	Within SLR Zone	% Diff.[1]	Within SLR Zone	% Diff.[1]	Within SLR Zone	% Diff.[1]
Alameda	< 10	30	20	-25%	40	16%	30	-14%	30	-12%
Contra Costa	90	140	110	-21%	80	-40%	160	20%	110	-22%
Marin	50	180	120	-33%	270	48%	320	80%	180	2%
Napa	< 10	< 10	< 10	-52%	< 10	-37%	< 10	-4%	< 10	8%
San Francisco	20	350	190	-45%	640	84%	370	6%	290	-17%
San Mateo	40	210	130	-38%	230	8%	270	25%	420	100%
Santa Clara	900	4,060	2,240	-45%	3,990	-2%	2,350	-42%	3,630	-11%
Solano	580	1,100	880	-20%	590	-47%	960	-13%	740	-33%
Sonoma	< 10	< 10	< 10	-37%	< 10	-53%	10	40%	< 10	-20%
Bay Area	**1,690**	**6,080**	**3,700**	**-39%**	**5,840**	**-4%**	**4,480**	**-26%**	**5,410**	**-11%**

1. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-45: HOUSEHOLDS WITHIN TPPS AND MID-CENTURY SEA LEVEL RISE INUNDATION ZONE

County	Year 2010	Alternative 2: Proposed Plan	Alternative 1: No Project		Alternative 3: Transit Priority Focus		Alternative 4: Enhanced Network of Communities		Alternative 5: Environment, Equity and Jobs	
	Within SLR Zone	Within SLR Zone	Within SLR Zone	% Diff.[1]	Within SLR Zone	% Diff.[1]	Within SLR Zone	% Diff.[1]	Within SLR Zone	% Diff.[1]
Alameda	510	570	540	-5%	470	-17%	510	-11%	470	-18%
Contra Costa	< 10	30	20	-10%	< 10	-66%	< 10	-84%	10	-60%
Marin	2,430	2,750	2,580	-6%	2,660	-3%	2,970	8%	2,500	-9%
Napa	< 10	< 10	< 10	0%	< 10	0%	< 10	0%	< 10	0%
San Francisco	160	800	660	-17%	480	-40%	370	-54%	260	-67%
San Mateo	5,570	6,400	6,320	-1%	7,270	13%	7,330	14%	7,100	11%
Santa Clara	1,460	4,760	3,750	-21%	6,780	43%	2,340	-51%	2,660	-44%
Solano	0	0	0	0%	0	0%	0	0%	0	0%
Sonoma	< 10	< 10	< 10	-30%	< 10	-11%	< 10	4%	< 10	-17%
Bay Area	**10,130**	**15,310**	**13,890**	**-9%**	**17,680**	**15%**	**13,530**	**-12%**	**13,010**	**-15%**

1. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-46: HOUSEHOLDS WITHIN COUNTIES[1] AND MID-CENTURY SEA LEVEL RISE INUNDATION ZONE

County	*Year 2010*	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*		*Alternative 3: Transit Priority Focus*		*Alternative 4: Enhanced Network of Communities*		*Alternative 5: Environment, Equity and Jobs*	
	Within SLR Zone	*Within SLR Zone*	*Within SLR Zone*	*% Diff.[1]*	*Within SLR Zone*	*% Diff.[1]*	*Within SLR Zone*	*% Diff.[1]*	*Within SLR Zone*	*% Diff.[1]*
Alameda	540	580	570	-2%	510	-11%	560	-3%	580	-1%
Contra Costa	230	440	410	-7%	110	-75%	200	-54%	130	-71%
Marin	3,760	4,110	3,930	-4%	3,900	-5%	4,180	2%	3,760	-9%
Napa	40	40	40	-6%	50	13%	50	4%	50	6%
San Francisco	160	760	630	-16%	460	-40%	330	-57%	260	-65%
San Mateo	19,620	21,290	20,670	-3%	21,810	2%	22,460	5%	22,110	4%
Santa Clara	4,300	9,890	7,780	-21%	11,550	17%	8,300	-16%	6,790	-31%
Solano	630	1,150	920	-20%	630	-45%	1,010	-13%	780	-32%
Sonoma	40	60	50	-10%	60	5%	60	12%	60	10%
Bay Area	**29,320**	**38,320**	**35,010**	**-9%**	**39,070**	**2%**	**37,140**	**-3%**	**34,510**	**-10%**

1. Includes all population within each county that are within the sea level rise inundation zone, including population within and outside of the PDAs and TPPs**.**

2. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

Tables 3.5-47 through **3.5-49** show the number of households projected to be located within the low-lying, hydraulically disconnected areas and the PDAs, TPPs, and the counties as a whole, respectively. The proposed Plan is projected to have the largest increase in the number of households, and thus residential development, within the low-lying areas of the PDAs, TPPs and the nine counties. Alternative 4 is projected to have the smallest increase in residential development within the low-lying, hydraulically disconnected areas across the Bay Area as a whole (44 percent fewer than projected under the proposed Plan).

TABLE 3.1-47: HOUSEHOLDS WITHIN PDAS AND MID-CENTURY LOW-LYING ZONE

County	*Year 2010*	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*		*Alternative 3: Transit Priority Focus*		*Alternative 4: Enhanced Network of Communities*		*Alternative 5: Environment, Equity and Jobs*	
	Within Low Zone	*Within Low Zone*	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]
Alameda	< 10	910	710	-22%	160	-82%	100	-89%	140	-84%
Contra Costa	0	10	10	-2%	0	-100%	10	18%	< 10	-21%
Marin	< 10	< 10	< 10	-37%	20	4051%	20	4874%	< 10	312%
Napa	0	0	0	0	0	0	0	0	0	0
San Francisco	< 10	1,400	970	-31%	1,360	-3%	430	-69%	1,300	-7%
San Mateo	850	3,990	1,400	-65%	2,870	-28%	2,630	-34%	4,050	2%
Santa Clara	890	910	550	-40%	1,370	270%	1,180	30%	1,270	40%
Solano	0	10	10	-14%	0	-100%	20	73%	< 10	-98%
Sonoma	0	0	0	0	0	0	0	0	0	0
Bay Area	**1,750**	**7,240**	**3,640**	**-50%**	**5,780**	**-20%**	**4,400**	**-39%**	**6,780**	**-6%**

1. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-48: HOUSEHOLDS WITHIN TPPS AND MID-CENTURY LOW-LYING ZONE

County	*Year 2010*	*Alternative 2: Proposed Plan*	*Alternative 1: No Project*		*Alternative 3: Transit Priority Focus*		*Alternative 4: Enhanced Network of Communities*		*Alternative 5: Environment, Equity and Jobs*	
	Within Low Zone	*Within Low Zone*	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]	*Within Low Zone*	*% Diff.*[1]
Alameda	390	740	620	-17%	580	-22%	500	-33%	500	-33%
Contra Costa	< 10	< 10	< 10	0%	< 10	-94%	< 10	-20%	< 10	-54%
Marin	600	580	540	-6%	450	-22%	610	6%	410	-29%
Napa	0	0	0	0%	0	0%	0	0%	0	0%
San Francisco	< 10	790	440	-44%	850	8%	280	-64%	820	5%
San Mateo	4,380	9,760	8,020	-18%	4,330	-56%	3,370	-65%	4,740	-51%
Santa Clara	1,100	1,270	910	-29%	3,200	151%	1,430	12%	1,680	32%
Solano	90	120	110	-2%	80	-27%	130	14%	80	-27%
Sonoma	0	0	0	0%	0	0%	0	0%	0	0%
Bay Area	**6,570**	**13,260**	**10,650**	**-20%**	**9,500**	**-28%**	**6,330**	**-52%**	**8,240**	**-38%**

1. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

TABLE 3.1-49: HOUSEHOLDS WITHIN COUNTIES[1] AND MID-CENTURY LOW-LYING ZONE

County	Year 2010	Alternative 2: Proposed Plan	Alternative 1: No Project		Alternative 3: Transit Priority Focus		Alternative 4: Enhanced Network of Communities		Alternative 5: Environment, Equity and Jobs	
	Within Low Zone	Within Low Zone	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]	Within Low Zone	% Diff.[1]
Alameda	710	1,820	1,540	-15%	900	-51%	880	-52%	870	-52%
Contra Costa	< 10	10	10	-2%	< 10	-69%	20	28%	< 10	-33%
Marin	1,240	1,260	1,180	-6%	1,030	-18%	1,330	5%	980	-22%
Napa	< 10	10	10	-2%	10	12%	10	-10%	10	0%
San Francisco	< 10	1,270	870	-31%	1,360	7%	360	-72%	1,300	3%
San Mateo	8,580	15,640	12,560	-20%	9,000	-42%	7,840	-50%	10,480	-33%
Santa Clara	1,120	1,330	950	-28%	3,600	170%	1,440	8%	1,910	43%
Solano	120	140	140	-2%	110	-17%	160	15%	120	-15%
Sonoma	10	10	10	-2%	20	70%	10	14%	20	60%
Bay Area	**11,800**	**21,490**	**17,290**	**-20%**	**16,030**	**-25%**	**12,040**	**-44%**	**15,700**	**-27%**

1. Includes all population within each county that are within the sea level rise inundation zone, including population within and outside of the PDAs and TPPs.
2. % Difference is calculated relative to Alternative 2: Proposed Plan.

Source: MTC, 2012; NOAA, 2012; AECOM 2013.

Alternative 1 – No Project

Alternative 4 is not consistent with SB 375, as modeled CO_2 emissions do not meet the SB 375 targeted reductions for per capita car and light duty truck GHG emissions in 2020 or in 2035. Reductions are nine percent less than under the proposed Plan. This is in part due to the less focused land use scenario which is not as closely tied to the transportation improvements, and in part due to the fact that the No Project alternative includes the lowest GHG emissions reductions from MTC's Climate Policy Initiatives since discretionary funds are not dedicated to these programs.

Total annual regional forecast GHG emissions from land use and on-road transportation are expected to decline by 12 percent from 2010 to 2040 under the No Project alternative. This is a three percent lower reduction than under than proposed Plan, and less than under Alternative 3, or Alternative 5, but two percent greater than under Alternative 4.

Per capita car and light duty truck CO_2 emissions decline from 2005 through 2040 under the No Project and total GHG emissions from land use and transportation are expected to decline from 2010 through 2040; both of these trends are expected to continue into the future. Therefore, the No Project is found to move the Bay Area in the direction of achieving the executive order goals, and does not impede achievement of these identified goals.

Because the No Project alternative fails to meet SB 375 goals, it is found to be inconsistent with State goals and mandates, resulting in a significant impact for this criterion. However, the No Project is not expected to conflict with local CAPs or GHG reduction plans as they are complimentary efforts towards the reduction of GHG emissions in line with State goals and mandates.

The No Project alternative has the smallest increase in the number of residents projected to be within the PDAs that are in the future sea level rise zone and the low-lying areas (38 percent and 46 percent fewer than the proposed Plan, respectively, as seen in **Table 3.1-32** and **Table 3.1-35**) . Within the TPPs, the No Project alternative is projected to have more residents within the sea level rise inundation zone than Alternatives 4 and 5, but fewer than Alternative 3, and nine percent fewer than the proposed Plan (**Table 3.1-33**). Within the Bay Area as a whole, the No Project alternative has eight percent fewer residents within the future sea level rise inundation zone than the proposed Plan, fewer residents than projected Alternatives 3 and 4, and more residents than projected under Alternative 5 (**Table 3.1-34**). The No Project alternative has 18 percent fewer projected residents within low-lying, hydraulically disconnected areas than the proposed Plan, but more than Alternatives 3, 4, and 5 (**Table 3.1-37**).

The No Project alternative is projected to have the second smallest increase in commercial and industrial development within the PDAs in the sea level rise inundation zone (**Table 3.1-38**), but within the nine Bay Area counties, the No Project alternative is projected to have the largest increase in commercial and industrial development with the exception of the proposed Plan (**Table 3.1-40**). The No Project alternative is projected to have 4 percent fewer employees located within the sea level rise inundation zone than the proposed Plan.

The No Project alternative is projected to have the smallest increase in residential development within the PDAs and the sea level rise inundation zone (39 percent fewer than projected under the proposed Plan, **Table 3.1-45**). Within the nine Bay Area counties, the No Project alternative is projected to have the second smallest increase in residential development (the smallest increase is associated with Alternative 5, see **Table 3.1-46**).

In general, because the No Project alternative results in increases (compared to existing conditions) in transportation investments, the number of residents, and land-use development within the future sea level rise inundation zone, this alternative results in significant impacts for all criteria related to sea level rise. In general, the impacts associated with the No Project alternative are less than those projected for the proposed Plan, due to reductions in transportation investments, and reductions in the number of residents and land use development when compared to the proposed Plan.

Alternative 3 – Transit Priority Focus

Alternative 3 is consistent with SB 375, as modeled CO_2 emissions meet the SB 375 targeted reductions for per capita car and light duty truck GHG emissions. Reductions are one percent less than under the proposed Plan.

Total annual regional forecast GHG emissions from land use and on-road transportation are expected to decline by 16 percent from 2010 to 2040 under Alternative 3. This is a one percent greater decline than under the proposed Plan, and one percent less than under Alternative 5.

Per capita car and light duty truck CO_2 emissions decline from 2005 through 2040 under Alternative 3 and total GHG emissions from land use and transportation are expected to decline from 2010 through

2040; both of these trends are expected to continue into the future. Therefore, Alternative 3 is found to move the Bay Area in the direction of achieving the executive order goals, and does not impede achievement of these identified goals.

Alternative 3 is also found to be consistent with State goals and mandates, comparable to the proposed Plan and Alternative 5. Further, it is not expected to conflict with local CAPs or GHG reduction plans as they are complimentary efforts towards the reduction of GHG emissions in line with State goals and mandates.

Alternative 3 has 32 transportation projects projected to be within the sea level rise inundation zone and 21 projected to be within the low-lying, hydraulically disconnected areas. The impacts associated with Alternative 3 are identical to those of the proposed Plan, which has the same impacted transportation projects as included under Alternative 3.

Alternative 3 also has impacts similar to the proposed Plan with respect to population, although the distribution of impacts does vary within the nine counties, as is shown in **Tables 3.1-32** through **3.1-37**. Alternative 3 has the largest increase in the number of residents projected to be within the TPPs and within the future sea level rise inundation zone (11 percent more than projected under the proposed Plan, see **Table 3.1-33**). Only the proposed Plan has a larger increase within the PDAs and Bay Area-wide within the future sea level rise inundated areas (**Tables 3.1-32** and **3.1-34**, respectively). Within the low-lying, hydraulically disconnected areas, Alternative 3 has 30 percent fewer residents projected to be within the PDAs and 29 percent fewer project to be within the TPPs and the Bay Area as a whole compared to the proposed Plan (**Tables 3.1-35**, **3.1-36**, **and 3.1-37**, respectively**).**

Alternative 3 is projected to have 20 percent fewer employees within the PDAs and within the sea level rise inundation zone than projected under the proposed Plan (**Table 3.1-38**), 2 percent more employees located within the TPPs and the sea level rise inundation zone (**Table 3.1-39**), and 11 percent fewer employees Bay Area-wide compared to the proposed Plan (**Table 3.1-40**). Within the low-lying, hydraulically disconnected areas, the increase in employment under Alternative 3 is comparable to that of Alternatives 4 and 5, and less than that projected within the proposed Plan and the No Project alternative (**Tables 3.1-41** through **3.1-43**).

Alternative 3 is projected to have the second largest increase in residential development within the sea level rise inundation zone in the PDAs (four percent fewer than the proposed Plan, **Table 3.1-44**), and the largest increase within the TPPs and the nine Bay Area counties as a whole (15 percent and two percent more than the proposed Plan, respectively, see **Tables 3.1-45** and **3.1-46**). Within the low-lying, hydraulically disconnected areas, the projected increase in residential development in Alternative 3 is 20 percent smaller within the PDAs (**Table 3.1-47**), 28 percent smaller within the TPPs (**Table 3.1-48**), and 25 percent smaller Bay Area-wide (**Table 3.1-49**) than projected under the proposed Plan.

In general, because Alternative 3 results in increases (compared to existing conditions) in transportation investment, the number of residents, and land-use development within the future sea level rise inundation zone, this alternative results in significant impacts for all criteria related to sea level rise. Overall, the impacts are similar to those reported for the proposed Plan in *Chapter 2.5*.

Alternative 4 – Enhanced Network of Communities

Alternative 4 is not consistent with SB 375, as modeled CO_2 emissions do not meet the SB 375 targeted reductions for per capita car and light duty truck GHG emissions in 2035. While SB 375 requires a 15% reduction in emissions by 2035, Alternative 4 would achieve a 14.8% reduction. This reduction is two percent less than under the proposed Plan. This is due mostly to a decrease in funding for the Climate Policy Initiatives when compared to the other alternatives. The business community stakeholders that developed Alternative 4 elected to alter the proposed Plan's investment strategy by shifting all funds from the Climate Policy Initiative's Smart Driving Program to local streets and roads, and state highway maintenance. This tradeoff increased the 2020 per capita GHG emissions by approximately 1.8% and the 2035 emissions by 1.6%. Had this funding not been redirected, the Alternative would have exceeded both the 2020 and 2035 GHG emissions reduction target. If the funds were returned the Climate Policy Initiative Smart Driving program then this finding would be changed to less than significant. However, it would still perform worse than the proposed Plan in terms of meeting the SB 375 goals.

Total annual regional forecast GHG emissions from land use and on-road transportation are expected to decline by 10 percent from 2010 to 2040 under Alternative 4. This is the least reduction of all the alternatives, five percent less than under the proposed Plan.

Per capita car and light duty truck CO_2 emissions decline from 2005 through 2040 under Alternative 4 and total GHG emissions from land use and transportation are expected to decline from 2010 through 2040; both of these trends are expected to continue into the future. Therefore, Alternative 4 is found to move the Bay Area in the direction of achieving the executive order goals, and does not impede achievement of these identified goals.

Because Alternative 4 fails to meet SB 375 goals, it is found to be inconsistent with State goals and mandates, resulting in a significant impact for this criterion. However, it is not expected to conflict with local CAPs or GHG reduction plans as they are complimentary efforts towards the reduction of GHG emissions in line with State goals and mandates.

Alternative 4 has 32 transportation projects projected to be within the sea level rise inundation zone and 21 projected to be within the low-lying, hydraulically disconnected areas. The impacts associated with Alternative 4 with respect to transportation investments are identical to those of the proposed Plan.

Alternative 4 has 25 percent fewer residents projected to be within the PDAs and within the sea level rise inundation zone than the proposed Plan, and fewer residents than projected in Alternatives 3 and 5 (**Table 3.1-32**). Alternative 4 also has 14 percent fewer residents projected to be within the TPPs and within the sea level rise inundation zone than the proposed Plan, and fewer residents than projected in the No Project alternative, and Alternative 3 (**Table 3.1-33**). Within the nine Bay Area counties as a whole, Alternative 4 has 5 percent fewer residents projected to be within the future sea level rise inundation zone than the proposed Plan, fewer than projected in Alternative 3, and a larger increase than the No Project alternative and Alternative 5 (**Table 3.1-34**).

Within the low-lying, hydraulically disconnected areas, Alternative 4 has the smallest increase in the number of residents projected to be within the PDAs (43 percent fewer than the proposed Plan), with the exception of the No Project alternative (**Table 3.1-35**). Alternative 4 has the smallest increase in the number of residents projected to be within the low-lying, hydraulically disconnected areas and TPPs and the counties as a whole (53 percent and 43 percent fewer than the proposed plan, respectively, see **Tables 3.1-36** and **3.1-37**).

Alternative 4 is projected to have 20 percent fewer employees within the PDAs and within the sea level rise inundation zone than the proposed Plan (**Table 3.1-38**). Alternative 4 has the smallest increase in the number of employees in the sea level rise inundation zone within the TPPs and the counties as a whole (15 percent and 22 percent fewer than the proposed Plan, see **Tables 3.1-39** and **3.1-40**, respectively). Based on modeled outputs, within the low-lying, hydraulically disconnected areas, the increase in employment under Alternative 4 is comparable to that of Alternatives 3 and 5, and less than that projected within the proposed Plan and the No Project alternative (see **Tables 3.1-41**, **3.1-42**, and **3.1-43**).

Alternative 4 is projected to have the second smallest increase in residential development within the sea level rise inundation zone and within the PDAs and TPPs (26 percent and 12 percent fewer than projected under the proposed Plan, **Tables 3.1-44** and **3.1-45**). Within the counties as a whole, Alternative 4 has a smaller increase than projected under the proposed Plan and Alternative 3, and a larger increase than projected under the No Project alternative and Alternative 5 (**Table 3.1-46**). Within the low-lying, hydraulically disconnected areas, Alternative 4 has the second smallest increase in residential development within the PDAs (39 percent fewer than the proposed Plan, **Table 3.1-47**) and the smallest increase within the TPPs and the counties as a whole (52 percent and 44 percent fewer than the proposed Plan, respectively, see **Tables 3.1-48 and 3.1-49**).

In general, because Alternative 4 results in increases (compared to existing conditions) in transportation investment, the number of residents, and land-use development within the future sea level rise inundation zone, this alternative results in significant impacts for all criteria related to sea level rise. The impacts associated with Alternative 4 are identical to the proposed Plan for transportation investments, but based on modeled outputs, the impacts are slightly less than projected under the proposed Plan with respect to population and land-use development because the number of impacted residents and the increases in land use development are smaller than projected under the proposed Plan.

Alternative 5 – Environment, Equity and Jobs

Alternative 5 is consistent with SB 375, as modeled CO_2 emissions meet the SB 375 targeted reductions for per capita car and light duty truck GHG emissions. Reductions are the same as under the proposed Plan (a reduction of 16.4 percent).

Total annual regional forecast GHG emissions from land use and on-road transportation are expected to decline by 17 percent from 2010 to 2040 under Alternative 5. This is a two percent greater decline than under the proposed Plan, and one percent greater than under Alternative 3.

Per capita car and light duty truck GHG emissions decline from 2005 through 2040 under Alternative 5 and total GHG emissions from land use and transportation are expected to decline from 2010 through 2040; both of these trends are expected to continue into the future. Therefore, Alternative 5 is found to move the Bay Area in the direction of achieving the executive order goals, and does not impede achievement of these identified goals. Alternative 5 is also found to be consistent with State goals and mandates, comparable to the proposed Plan and Alternative 3. Further, it is not expected that Alternative 5 would conflict with local CAPs or GHG reduction plans as they are complimentary efforts towards the reduction of GHG emissions in line with State goals and mandates.

Alternative 5 has 21 transportation projects projected to be within the sea level rise inundation zone (compared to 32 under the proposed Plan) and 15 projected to be within the low-lying, hydraulically disconnected areas (compared to 21 under the proposed Plan). These projects represent a subset of the transportation projects included within the proposed Plan; therefore, the transportation-related impacts are slightly lower under Alternative 5 than under the proposed Plan.

Alternative 5 has the smallest increase in the number of residents projected to be within the sea level rise inundation zone within the TPPs and counties as a whole (17 percent and 12 percent fewer than the proposed Plan, see **Tables 3.5-33** and **3.5-34**). Within the low-lying, hydraulically disconnected areas, Alternative 5 has 18 percent fewer residents projected to be within the PDAs, 39 percent fewer within the TPPs, and 31 percent fewer within the nine Bay Area counties as a whole, as compared to the proposed Plan (see Tables **3.5-35**, **3.5-36**, and **3.5-37**).

Alternative 5 is projected to have the smallest increase in the number of employees within the PDAs in the sea level rise inundation zone (24 percent fewer than the proposed Plan, see **Table 3.5-38**). Within the TPPs, the increase in the number of employees (and thus commercial and industrial development) within the sea level rise inundation zone under Alternative 5 is one percent less than projected under the proposed Plan. Within the counties as a whole, Alternative 5 has 12 percent fewer employees within the sea level rise inundation zone than the proposed Plan (**Table 3.5-40**). Within the low-lying, hydraulically disconnected areas, the increase in employment under Alternative 5 is comparable to that of Alternatives 3 and 4, and less than that projected within the proposed Plan and the No Project alternative (see **Tables 3.5-41**, **3.5-42**, and **3.5-43**).

Alternative 5 is projected to have the smallest increase in residential development within the sea level rise inundation zone in the TPPs and counties as a whole (15 percent and 10 percent fewer than the proposed Plan, **Tables 3.5-45** and **3.5-46**). Within the PDAs, Alternative 5 has a smaller increase than projected under the proposed Plan and Alternative 3 and a larger increase than projected under the No Project alternative and Alternative 4 (**Table 3.5-44**). Within the low-lying, hydraulically disconnected areas, Alternative 5 has 6 percent less residential development within the PDAs than the proposed Plan (**Table 3.5-47**), 38 percent less within the TPPs (**Table 3.5-48**), and 27 percent less residential development within the counties as a whole when compared to the proposed Plan (**Table 3.5-49**).

In general, Alternative 5 results in increases (compared to existing conditions) in transportation investments, the number of residents, and land-use development within the future sea level rise inundation zone; therefore, this alternative has significant impacts for all criteria related to sea level rise. The impacts associated with Alternative 5 are less than projected under the proposed Plan for transportation investments due to the reduced number of transportation projects within the sea level rise inundation zone (21 projects under Alternative 5, compared to 32 under Alternative 2).

The impacts are also slightly less than projected under the proposed Plan with respect to population and land-use development because the number of impacted residents and the increases in land use development are smaller than projected under the proposed Plan (12 percent fewer residents, 12 percent fewer employees, and 10 percent fewer households are projected to be within the sea level rise inundation zone than projected within the proposed Plan).

NOISE

As shown in **Table 3.1-50**, some the of the alternatives would result in an increase in the overall percentage of regional roadway miles exposed to noise levels at or above 66 dBA, compared to baseline (2010) conditions. The increase in regional roadway miles exposed to noise levels at or above 66 dBA for all future alternatives is to be expected due to planned regional population growth. The variation in these increases between the alternatives would be relatively marginal from a regional perspective, particularly for Alternatives 2, 3 and 5. The least increase in roadway miles exposed to 66 dBA or greater noise levels would occur under the No Project alternative condition (8.1 percent), while the proposed Plan would result in an 11.9 percent increase, Alternative 3 would result in an increase of 11.4 percent, Alternative 4 would result in an increase of 13.6 percent, and Alternative 5 would result in an increase of 11.1 percent. Thus, on a regional basis, the No Project alternative would result in the least severe increase in 66 dBA or greater noise levels. Of the action alternatives, Alternative 5 would result in the least severe increase in 66 dBA or greater noise levels.

Similar relationships between alternatives would prevail at the county level, although there would be some exceptions: for example, the No Project alternative and Alternative 5 would result in more miles exposed to 66 dBA or greater on San Mateo, Alameda and Solano County expressways than the proposed Plan, while Napa County arterials would fare best with Alternative 5 and worst with Alternative 3 (though it is noted that the differences are marginal from a regional perspective). Across all alternatives, impacts related to increased noise exposure from roadway noise are considered potentially significant. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Across all alternatives, impacts related to exposure of persons to or generation of temporary construction noise levels and/or groundborne vibration levels and increased traffic volumes that could result in roadside noise levels that approach or exceed the FHWA Noise Abatement Criteria are potentially significant. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Across all alternatives, impacts related to increased noise exposure from transit sources and increased vibration exposure from transit sources are considered potentially significant. Because MTC/ABAG cannot require local implementing agencies to adopt relevant mitigation measures, and because there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels, this impact remains significant and unavoidable for all alternatives (SU).

Impacts related to increased noise exposure from aircraft or airports would be considered less than significant for all alternatives.

TABLE 3.1-50: ROADWAY DIRECTIONAL MILES > 66 DBA NAC LEVEL, AND TOTAL DIRECTIONAL MILES, BY ROADWAY TYPE AND COUNTY

		Year 2010, Base Year			*Year 2040, Project*			*Alt 1: No Project*			*Diff. from Project*		*Alt. 3: Transit Priority Focus*			*Diff. from Project*	
County	*Roadway Type*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*% ≥ 66 dBA*
San Francisco	Freeways	43	43	99.7%	43	43	100.0%	43	43	99.7%	0	0.0%	43	43	100.0%	0	0.0%
	Expressways	2	2	100.0%	2	2	100.0%	2	2	100.0%	0	0.0%	2	2	100.0%	0	0.0%
	Arterials	140	315	44.3%	183	315	58.3%	178	315	56.5%	-6	-2.0%	183	315	58.1%	0	-0.2%
San Mateo	Freeways	158	165	95.8%	157	165	95.1%	165	165	99.6%	8	4.5%	157	165	95.1%	0	0.0%
	Expressways	31	33	95.8%	30	32	95.7%	31	31	98.4%	1	2.7%	31	31	98.4%	1	2.7%
	Arterials	125	441	28.3%	203	443	45.9%	168	441	38.1%	-35	-7.8%	208	443	47.1%	5	1.2%
Santa Clara	Freeways	436	478	91.3%	574	575	99.8%	570	571	99.7%	-5	-0.1%	556	560	99.3%	-18	-0.5%
	Expressways	224	277	80.7%	226	270	83.8%	233	272	85.7%	7	1.9%	233	270	86.3%	7	2.5%
	Arterials	402	1,160	34.7%	527	1,166	45.2%	466	1,161	40.1%	-61	-5.1%	557	1,166	47.7%	30	2.5%
Alameda	Freeways	356	369	96.5%	440	441	99.9%	384	384	100.0%	-56	0.1%	423	423	99.9%	-17	0.0%
	Expressways	37	40	92.5%	49	56	86.9%	36	39	92.4%	-13	5.5%	49	56	86.9%	0	0.0%
	Arterials	364	904	40.3%	507	903	56.2%	445	906	49.1%	-62	-7.1%	489	903	54.2%	-18	-2.0%
Contra Costa	Freeways	250	264	94.7%	291	292	99.7%	278	279	99.8%	-14	0.1%	291	292	99.7%	0	0.0%
	Expressways	39	44	89.8%	58	64	90.5%	35	37	92.6%	-23	2.1%	58	64	90.5%	0	0.0%
	Arterials	219	805	27.2%	295	798	37.0%	286	805	35.5%	-9	-1.5%	283	798	35.4%	-12	-1.6%
Solano	Freeways	176	182	96.3%	282	282	100.0%	184	184	100.0%	-98	0.0%	250	250	100.0%	-32	0.0%
	Expressways	55	65	85.5%	64	76	83.3%	31	32	98.4%	-33	15.1%	64	76	83.9%	0	0.6%
	Arterials	64	457	14.0%	118	463	25.6%	117	461	25.5%	-1	-0.1%	114	463	24.7%	-4	-0.9%
Napa	Freeways	24	24	100.0%	24	24	100.0%	24	24	100.0%	0	0.0%	24	24	100.0%	0	0.0%
	Expressways	34	37	91.3%	37	37	100.0%	37	37	100.0%	0	0.0%	37	37	100.0%	0	0.0%
	Arterials	38	114	33.6%	66	114	57.8%	60	114	52.7%	-6	-0.1%	66	114	58.4%	0	0.6%
Sonoma	Freeways	114	159	90.4%	188	188	99.7%	171	171	99.7%	-17	0.0%	188	188	99.7%	0	0.0%
	Expressways	20	20	100.0%	20	20	100.0%	20	20	100.0%	0	0.0%	20	20	100.0%	0	0.0%
	Arterials	146	591	24.8%	199	593	33.6%	203	595	34.3%	4	0.7%	186	593	31.2%	-13	-2.4%
Marin	Freeways	101	105	96.2%	121	121	99.9%	110	110	99.9%	-11	0.0%	121	121	99.9%	0	0.0%
	Arterials	40	143	27.7%	67	146	45.5%	43	146	29.3%	-24	-16.2%	67	146	45.5%	0	0.0%
Bay Area	Freeways	1,687	1,789	94.3%	2,119	2,131	99.5%	1,927	1,931	99.8%	-192	0.3%	2,051	2,065	99.3%	-68	-0.2%

TABLE 3.1-50: ROADWAY DIRECTIONAL MILES > 66 DBA NAC LEVEL, AND TOTAL DIRECTIONAL MILES, BY ROADWAY TYPE AND COUNTY

		Year 2010, Base Year			*Year 2040, Project*			*Alt 1: No Project*			*Diff. from Project*		*Alt. 3: Transit Priority Focus*			*Diff. from Project*	
County	*Roadway Type*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*% ≥ 66 dBA*
	Expressways	442	517	85.5%	486	557	87.2%	425	471	90.3%	-61	3.1%	493	557	88.7%	7	0.5%
	Arterials	1,538	4,930	31.2%	2,165	4,939	43.8%	1,966	4,944	39.8%	-199	-4.0%	2,152	4,939	43.6%	-13	-0.2%
	Combined	**3,667**	**7,236**	**50.7%**	**4,770**	**7,626**	**62.6%**	**4,319**	**7,345**	**58.8%**	-451	-3.8%	4,697	7,561	62.1%	-73	-0.5%

TABLE 3.1-50 (CONT'D.): ROADWAY DIRECTIONAL MILES > 66 DBA NAC LEVEL, AND TOTAL DIRECTIONAL MILES, BY ROADWAY TYPE AND COUNTY

		Alt. 4:Enhanced Network of Communities			*Diff. from Project*		*Alt. 5: Environment, Equity, and Jobs*			*Diff. from Project*	
County	*Roadway Type*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*% ≥ 66 dBA*
San Francisco	Freeways	43	43	100.0%	0	0.0%	43	43	100.0%	0	0.0%
	Expressways	2	2	100.0%	0	0.0%	2	2	100.0%	0	0.0%
	Arterials	181	315	57.6%	-2	-0.7%	182	315	57.8%	-1	-0.5%
San Mateo	Freeways	157	165	95.1%	0	0.0%	165	165	99.7%	8	4.6%
	Expressways	31	32	98.4%	1	2.7%	31	31	98.4%	1	2.7%
	Arterials	202	443	45.7%	-1	-0.2%	205	441	46.4%	2	0.5%
Santa Clara	Freeways	575	575	100.0%	1	0.2%	570	572	99.7%	-4	-0.1%
	Expressways	241	270	89.5%	15	5.7%	236	272	86.8%	10	3.0%
	Arterials	607	1,166	52.1%	80	6.9%	525	1,161	45.2%	2	0.0%
Alameda	Freeways	441	441	100.0%	1	0.1%	384	384	100.0%	44	0
	Expressways	49	56	86.9%	0	0.0%	36	39	92.4%	13	5.5%
	Arterials	537	903	59.5%	30	3.3%	518	906	57.3%	11	1.1%
Contra Costa	Freeways	291	292	99.7%	0	0.0%	278	279	99.5%	-13	-0.2%
	Expressways	58	64	90.5%	0	0.0%	34	37	90.8%	24	0.3%
	Arterials	329	798	41.3%	34	4.3%	317	805	39.3%	22	2.3%
Solano	Freeways	282	282	100.0%	0	0.0%	184	184	100.0%	-98	0.0%
	Expressways	68	76	89.0%	4	5.7%	31	31	98.4%	-33	15.1%

TABLE 3.1-50 (CONT'D.): ROADWAY DIRECTIONAL MILES > 66 DBA NAC LEVEL, AND TOTAL DIRECTIONAL MILES, BY ROADWAY TYPE AND COUNTY

		Alt. 4:Enhanced Network of Communities			*Diff. from Project*		*Alt. 5: Environment, Equity, and Jobs*			*Diff. from Project*	
County	*Roadway Type*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*Total*	*% ≥ 66 dBA*	*# ≥ 66 dBA*	*% ≥ 66 dBA*
	Arterials	118	463	25.6%	0	0.0%	117	461	25.4%	-1	-0.2%
Napa	Freeways	24	24	100.0%	0	0.0%	24	24	100.0%	0	0.0%
	Expressways	37	37	100.0%	0	0.0%	37	37	100.0%	0	0.0%
	Arterials	43	114	37.7%	-23	-20.1%	63	114	55.8%	-3	-2.0%
Sonoma	Freeways	188	188	99.7%	0	0.0%	171	171	99.7%	17	0.0%
	Expressways	20	20	100.0%	0	0.0%	20	20	100.0%	0	0.0%
	Arterials	188	593	31.6%	-11	-2.0%	189	595	31.7%	-10	-1.9%
Marin	Freeways	121	121	99.9%	0	0.0%	110	110	100.0%	-11	0.1%
	Arterials	73	146	50.3%	6	4.8%	67	146	45.5%	0	0.0%
Bay Area	Freeways	2,121	2,131	99.5%	2	0.0%	1,927	1,931	99.8%	-192	0.3%
	Expressways	506	557	90.9%	20	3.7%	427	471	90.8%	-59	3.6%
	Arterials	2,278	4,939	46.1%	113	2.3%	2,181	4,943	44.1%	16	0.3%
	Combined	4,905	7,626	64.3%	135	1.7%	4,535	7,345	61.8%	-235	-0.8%

Source: Environmental Science Associates 2012; Metropolitan Transportation Commission Model Outputs 2012

Alternative 1: No Project

Traffic distribution under the No Project alternative would differ from the proposed Plan because expansions to expressway and arterial roadways that would accommodate larger traffic volumes would not occur, primarily in Alameda, Marin, San Mateo and Santa Clara Counties. These reduced future traffic volumes would result in fewer miles of increased roadway noise compared to the proposed Plan.

The No Project alternative would only implement "committed" transportation improvement projects. Consequently, there would be a lesser extent of construction noise compared to the proposed Plan. However, due to the lack of new regional land use polices, the No Project alternative would result in new development occurring in a more dispersed pattern resulting in construction noise from development projects affecting a larger number of people. This impact could also likely occur in more quiet semi-rural areas where construction noise would be more noticeable.

Transit noise under the No Project alternative would be reduced compared to the proposed Plan because the proposed Plan envisions extension of numerous transit lines in the region that would not occur under the No Project alternative. By not extending transit lines in San Francisco, San Jose and Redwood City for example, this alternative would not result in transit noise occurring in new areas.

Environmental review determined that the Third Street Rail transit extension project in San Francisco which is listed as part of the proposed Plan would result in significant vibration impacts. If this project were not to go forward under the No Project alternative, this and potentially other vibration impacts of other rail extensions would not occur.

Alternative 3: Transit Priority Focus

Alternative 3 would result in fewer freeway miles travelled in Alameda, Santa Clara and Solano counties. As a result, a marginal reduction in region-wide roadway noise (0.5 percent) would occur under Alternative 3 compared to the proposed Plan. Alternative 3 would implement slightly fewer transportation investments than the proposed Plan (reduced number of express lanes) and construction noise would be similar to, but less extensive than, with the proposed Plan. Future development under Alternative 3 would result in greater land use development in Transit Priority Project (TPP) areas which cover a broader area than PDA's, consequently resulting in potential construction noise from development projects affecting a larger number of people than under the proposed Plan.

Transit noise under Alternative 3 would potentially be greater compared to the proposed Plan because the proposed Plan envisions funding for arterial signal coordination and express lanes projects that, under Alternative 3, would be used for investments in AC Transit and BART. By transferring funding mechanisms away from roadway improvements and channeling them to transit agencies, the potential exists for transit noise to increase under this alternative due to increased operations or extended service times or routes.

Vibration impacts associated with transit extension under Alternative 3 would also occur as under the proposed Plan.

Alternative 4: Enhanced Network of Communities

Traffic distribution under Alternative 4 would differ from the proposed Plan because of expansions to arterial roadways that would accommodate larger traffic volumes than would occur under the proposed Plan, primarily in Alameda, Contra Costa and Santa Clara Counties, due to larger regional population growth. Alternative 4 would result in greater arterial roadway miles travelled region-wide and hence, a marginal increase in region-wide roadway noise (1.7 percent) would occur as compared to the proposed Plan.

Alternative 4 includes the same transportation improvement investments as the proposed Plan. However, this alternative would accommodate a larger total population and larger proportion of single family dwelling units than the proposed Plan. Consequently, development under Alternative 4 would result in construction noise from development projects affecting a larger number of people.

Transit noise under the Alternative 4 would be similar to that of the proposed Plan because it would implement the same transportation improvement investments as the proposed Plan. Train horn noise impacts of the Sonoma-Marin Area Rail Transit District (SMART) Commuter Rail project, which would be significant under the proposed Plan, would still occur under this Alternative.

Vibration impacts associated with transit extension under Alternative 4 would also occur as under the proposed Plan.

Alternative 5: Environment, Equity, and Jobs

Alternative 5 would result in fewer freeway miles travelled region-wide and hence a marginal reduction in region-wide roadway noise (0.8 percent) would occur under Alternative 5 compared to the proposed Plan.

Alternative 5 would only implement "committed" transportation improvement projects. Consequently, there would be a lesser extent of construction noise associated with transportation projects compared to the proposed Plan. Alternative 5 envisions growth not only within PDAs but also within high-opportunity suburban locations, which would have the potential to result in construction noise from development projects affecting a larger number of people.

Transit noise under Alternative 5 would potentially be greater compared to the proposed Plan because the proposed Plan envisions funding for arterial signal coordination and express lanes that, under Alternative 5, would be used for investments to increase transit service in Communities of Concern. By transferring funding mechanisms away from roadway improvements and channeling them to transit agencies, the potential exists for transit noise to increase under this alternative due to increased operations or extended service times or routes.

Alternative 5 would extend additional transit service in communities of concern. If this were to include extension of rail corridors, additional significant vibration impacts beyond those that would result from implementation of the proposed Plan could occur.

GEOLOGY AND SEISMICITY

In general, while the entire Plan region is located in an area considered to have relatively high seismic activity, many of the geologic hazards such as liquefaction, landslides, and expansive soils can vary and depend on site specific conditions such that, ultimately, the risks would be determined on a project by project basis. However, development under all of the alternatives would be constructed to the same building code requirements as under the proposed Plan which would minimize the potential risks of damage and injury to less than significant levels, with regulations implemented as mitigation. For comparison purposes, the following analysis of the alternatives focuses on the distribution of new development and makes the assumption that the amount of development would be relatively correlated with projected population and employment growth. In addition, the assumption is made that most of the projects under all of the alternatives would meet the minimum threshold for requiring construction to adhere to the NPDES General Construction permit which minimizes the potential for erosion during construction to less than significant levels, with regulations implemented as mitigation.

All geology and seismicity impacts are considered less than significant with mitigation (LS-M) based on regulatory requirements for all alternatives. For the purposes of this analysis, less than significant means consistent with federal, state, and local regulations and laws related to building construction.

Alternative 1: No Project

Impacts associated with geology and soils under the No Project alterative could be greater than under the proposed Plan because this alternative assumes the same level of growth and development, but less focused in PDAs and therefore more dispersed over a greater area. Therefore, the potential for exposure to a greater proportion of existing hazards associated with a specific geologic unit or soil type (e.g. expansive or otherwise unstable soils, subsidence, liquefaction, lateral spreading, etc.) could increase under this alternative. The No Project alternative would also disperse construction over a wider area which would increase the potential for impacts related to erosion compared to the proposed Plan. However, as stated above, construction projects that meet the minimum ground disturbance threshold would be required to adhere to the NPDES General Construction Permit requirements.

Fewer transportation projects would occur under this alternative and as a result there would be less construction that would occur in identified areas at risk for hazards such as liquefaction, landslides, and unstable soils. According to the GIS data, there would be a reduction in the linear mileage of projects located in high liquefaction hazard areas and high landslide areas. However, to the extent that the No Project alternative would include fewer transportation improvements involving seismic upgrades than the proposed Plan, it could result in incrementally greater impacts. Fewer transportation projects would also result in fewer disturbances to soils and thus a reduction in erosion potential during construction.

Overall, the No Project alternative would result in the same population growth and, considering the entire planning area is considered at risk for ground shaking hazards from an earthquake on any of the active faults in the region, the potential risks would be similar, and are addressed by adherence to building code requirements.

Alternative 3: Transit Priority Focus

Impacts associated with geology and soils under this alterative would be generally similar to the proposed Plan because this alternative assumes the same population growth, but would focus development in TPPs rather than PDAs. Therefore, the potential for exposure to existing hazards associated with a specific geologic unit or soil type (e.g. expansive or otherwise unstable soils, subsidence, liquefaction, lateral spreading, etc.) would likely be similar to the proposed Plan since these hazards are present throughout the region. The amount of construction would be generally similar to the proposed Plan and therefore the potential impacts related to erosion would be considered the same.

Most of the transportation projects under the proposed Plan would occur under this alternative with a few exceptions and, as a result, there would be slightly less construction that would occur in identified areas at risk for hazards such as liquefaction and landslides. According to the GIS data, there would be a slight reduction in the linear mileage of projects located in high liquefaction hazard areas and high landslide areas as compared to the proposed Plan. The reduction in construction would reduce the potential for erosion impacts, though only a handful of transportation projects would not occur under this alternative compared to the proposed Plan.

Overall, this alternative would result in the same project population growth and, considering the entire planning area is considered at risk for ground shaking hazards from an earthquake on any of the active faults in the region, the potential risks would be considered the same, and are addressed by adherence to building code requirements.

Alternative 4: Enhanced Network of Communities

In general, impacts associated with geology and soils under this alterative would be greater than the proposed Plan because this alternative has a higher projected population growth and development would occur across a greater area (with a smaller share of new household growth located in PDAs). A larger population would then be located in the seismically active region which is anticipated to experience a significant earthquake sometime in the future. The potential for exposure to a greater proportion of existing hazards associated with a specific geologic unit or soil type (e.g. expansive or otherwise unstable soils, subsidence, liquefaction, lateral spreading, etc.) could increase under this alternative as more development would occur over a greater area as compared to the proposed Plan. The amount of construction would also be greater than under the proposed Plan to accommodate the higher population; however, potential risks would be addressed by adherence to building code requirements.

All of the transportation projects under the proposed Plan would occur under this alternative and would therefore have the same potential impacts related to exposure of geologic and seismic hazards as well as erosion from transportation projects.

Alternative 5: Environment, Equity, and Jobs

Development under this alternative would focus both on PDAs and TPPs with the same overall projected population growth as the proposed Plan. Impacts associated with geology and soils under this alterative would be generally similar to the proposed Plan but would, again, ultimately depend on site specific conditions determined on a project by project basis. The amount of construction would be generally similar to the proposed Plan and therefore the potential impacts related to erosion would be considered the same.

Fewer transportation projects would occur under this alternative and, as a result, there would be fewer projects located in identified hazard areas such as liquefaction, landslides, and expansive soils. According to the GIS data, there would be a reduction in the linear mileage of projects located in high liquefaction hazard areas and high landslide areas. However, to the extent that this alternative would include fewer transportation improvements involving seismic upgrades than the proposed Plan, it could result in incrementally greater impacts.

Overall, this alternative would result in the same project population growth and, considering the entire planning area is considered at risk for ground shaking hazards from an earthquake on any of the active faults in the region, the potential risks would be considered the same, and are addressed by adherence to building code requirements.

WATER RESOURCES

Under all alternatives, potential construction impacts related to erosion and offsite sedimentation would be addressed through compliance with the NPDES General Construction Permit, implemented as mitigation. Erosion control measures required under this permit would minimize the potential for offsite sedimentation that could affect receiving waters. Therefore, while the number and location of development and other ground disturbing projects would change between alternatives, all projects that meet the minimum threshold for the NPDES General Construction Permit would be required to implement erosion control measures that are protective of water quality during construction and are considered to be effectively the same for all alternatives. As a result, water resources impacts related to water quality and the placement of structures within a 100-year flood hazard area, are considered less than significant with mitigation (LS-M) based on regulatory requirements for all alternatives. Impacts related to groundwater recharge and exposure people to a significant risk of loss, injury, or death involving flooding, seiche, tsunami, or mudflow would be less than significant (LS) across all alternatives.

Alternative 1: No Project

Impacts associated with water resources under the No Project alterative could be slightly greater than the proposed Plan because this alternative assumes the same level of growth, but dispersed over a greater area (less growth focused in PDAs). Therefore, the potential for increasing impervious surfaces that could potentially affect stormwater quality, increase pollution in stormwater runoff, and decrease the amount of pervious surfaces that currently allow for groundwater recharge is potentially greater than under the proposed Plan. In addition, more widely dispersed development could potentially result in more structures built within the 100-year floodplain. The No Project alternative would also disperse construction over a wider area, which would increase the potential for impacts related to erosion during construction compared to the proposed Plan. Susceptibility to other hazards such as flooding from dam inundation, seiche, tsunami and mudflows would be determined on a site by site basis but could potentially increase with a more dispersed development scenario.

Fewer transportation projects would occur under this alternative and as a result there would be less construction that exposes soils to erosion that can lead to offsite sedimentation affecting water quality of receiving waters. This reduction in transportation projects would also likely result in a reduction in the amount of new impervious surfaces compared to the proposed Plan. A reduction in impervious surfaces would likely result in fewer sources of stormwater pollution and less reduction in groundwater recharge, compared to the proposed Plan. In addition, with fewer transportation projects there would also be fewer constructed within any flood hazard areas.

Alternative 3: Transit Priority Focus

Impacts associated with water resources under this alterative would be generally similar to the proposed Plan because this alternative projects the same population growth but would focus development in TPPs rather than PDAs. Therefore, it is assumed that the amount of new impervious surfaces would be relatively similar and present a comparable source of potential impacts to water quality, groundwater recharge, and increased runoff. Placement of structures within the 100-year floodplain would ultimately depend on site specific conditions determined on a project by project basis. Regardless, development that would occur under this alternative would still be constructed to the same drainage control requirements as under the proposed Plan, which would minimize the potential risks of pollution and sedimentation in runoff. The amount of construction would be generally similar to the proposed Plan and therefore the potential impacts related to groundwater recharge would be considered the same. Other flooding risks associated with dam failure, seiche, tsunami, and mudflows would also depend on site specific characteristics but would likely be relatively similar to the proposed Plan overall due to dam failure incident rates and generally low coastal location of development.

Most of the transportation projects under the proposed Plan would occur under this alternative as well with a few exceptions and, as a result, there would be slightly less impact related to water quality, groundwater recharge, and flooding hazards. Overall, the drainage patterns would be relatively similar to the proposed Plan. The slight reduction in construction would reduce the potential for water quality impacts, though only a handful of transportation projects would be excluded in this alternative.

Alternative 4: Enhanced Network of Communities

In general, impacts associated with water resources under this alterative would be greater than the proposed Plan because this alternative has higher projected population and employment growth which is assumed to require an increase in impervious surfaces. Therefore, the potential for increasing impacts on stormwater quality including pollution in stormwater runoff, and a decrease in groundwater recharge would occur compared to the proposed Plan. In addition, development under this alternative could potentially result in more structures built within the 100-year floodplain, though that would depend on individual project locations. This alternative would also require more construction, which would increase the potential for water quality impacts during construction compared to the proposed Plan. Susceptibility to other hazards such as flooding from dam inundation, seiche, tsunami and mudflows would be determined on a site by site basis but could potentially increase with increased development.

All of the transportation projects under the proposed Plan would occur under this alternative and would therefore have the same potential impacts related to water quality, groundwater recharge, erosion, increased pollution, increased runoff, flooding and dam inundation/seiche/tsunami/mudflow hazards.

Alternative 5: Environment, Equity, and Jobs

Development under this alternative would focus both on PDAs and TPPs with the same overall projected population growth as the proposed Plan. Impacts associated with water resources would be generally similar to the proposed Plan but would, again, ultimately depend on site specific conditions determined on a project by project basis. Identical growth projections would result in relatively similar new development and new impervious surfaces which are sources of potential water quality stressors. Regardless, development that would occur under this alternative would still be constructed to the same drainage control requirements as under the proposed Plan, which would minimize the potential risks of affecting water quality, groundwater recharge, increased runoff, and sedimentation in runoff. The amount of construction would be generally similar to the proposed Plan and therefore the potential impacts related to water quality during construction would be considered the same.

Fewer transportation projects would occur under this alternative and as a result there would be reduced impacts related to water quality, groundwater recharge, stormwater runoff pollution, sedimentation in runoff, flooding and dam failure/seiche/tsunami/mudflow hazards. According to the GIS data, there would be a reduction in the linear mileage of projects located in flood zone hazard areas.

BIOLOGICAL RESOURCES

The urban footprint remains comparable in all alternatives in 2040, with the exception of the No Project alternative, which has a slightly larger urban footprint. However, the focus for development changes, as does the number of transportation projects which would be funded, across alternatives. As noted in *Chapter 2.9*, the potential for project-specific impacts on biological resources will be greater in lightly developed and rural areas, since sensitive biological resources are less abundant in highly urbanized portions of the Bay Area. Therefore, alternatives that allow for expansion of existing urban growth boundaries and/or that allow for more dispersed patterns of growth have a greater potential to result in impacts on sensitive biological resources than those that focus on development in PDAs or TPPs and have strict growth boundaries.

Across all alternatives, impacts on species identified as candidate, sensitive, or special-status; critical habitat for federally listed plant and wildlife species; riparian habitats; or the movement of native or migratory fish or wildlife species are considered potentially significant (PS). Because MTC/ABAG cannot require local implementing agencies to adopt relevant mitigation measures, and because there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels, this impact remains significant and unavoidable for all alternatives (SU).

Across all alternatives, impacts on non-listed special-status raptor species are considered potentially significant for all alternatives (PS). While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Impacts related to conflict with adopted local conservation policies are considered than significant with mitigation (LS-M) based on regulatory requirements for all alternatives.

Alternative 1: No Project

Impacts on special-status species (including plants, wildlife, and fish) and designated critical habitat due to land use changes under the No Project alternative would be greater than under the proposed Plan because this alternative forecasts the same amount of growth, but more development would occur outside already heavily urbanized areas. While such development would be consistent with adopted existing general plans, which often have policies protective of biological resources, it would be more likely to impact special-status species and their habitat since the distribution of most sensitive biological resources is greater outside the urban Bay Area. In addition, the regional proportion of single family to multifamily dwellings is greater and more development would occur in the North Bay counties than under the proposed Plan, which would have a proportionally greater impact on biological resources as more development in rural areas would be expected when compared to the proposed Plan. Construction impacts on nesting birds and raptors can occur in both urban and rural areas but would be expected to be proportionally greater under the No Project alternative because of the greater amount of development that would occur outside heavily developed areas. The potential for urban growth boundaries to expand under the No Project alternative, where expansion would lead to conversion of previously undeveloped lands, would also lead to greater impacts on biological resources than under the proposed Plan.

The potential for impacts on jurisdictional waters and other special-status natural communities, as well as impacts to migratory wildlife corridors and native wildlife nursery sites would also be greater under the No Project alternative because more development would occur in less urbanized areas. However, fewer transportation projects are assumed for this alternative compared to the proposed Plan (see Table H-6A in Appendix H), which would reduce highway and transit related impacts on biological resources, such as temporary or permanent fill of streams and wetlands and fragmentation of wildlife habitat and corridors, compared to those expected under the proposed Plan.

The potential for conflict with local policies and ordinances that protect biological resources, and/or an adopted conservation plan, is likely to be greater under the No Project alternative, due to the greater amount of development in areas where protected resources are more abundant.

Relative to all alternatives, the No Project alternative has the greatest potential for impacts on biological resources due to development and the least potential for impacts due to transportation projects. Overall, this analysis assumes that, because land use impacts are potentially much wider ranging, geographically, than impacts related to transportation projects, the No Project alternative would result in more severe impacts on biological resources than all other alternatives, including the proposed Plan.

Alternative 3: Transit Priority Focus

Impacts on special-status species (including plants, wildlife, and fish) and designated critical habitat under Alternative 3 would be comparable to those under the proposed Plan because this alternative concentrates development in transit rich portions of what are primarily already highly urbanized areas. Similarly, construction impacts on nesting birds and raptors, and impacts on jurisdictional waters and other special-status natural communities, as well as impacts on migratory wildlife corridors and native wildlife nursery sites would also be comparable because most development would be concentrated in urbanized areas. While such development would be more dispersed than under the proposed Plan, it would still be concentrated in the urban core, where fewer biological resources are present. In addition, more multifamily dwelling units than single-family dwellings are forecast under this alternative, which also serves to concentrate growth.

Transportation project impacts on biological resources would also be comparable to those under the proposed Plan because this alternative would rely on the same basic transportation investment strategy.

The potential for conflict with local policies and ordinances that protect biological resources, and/or an adopted conservation plan, under Alternative 3 is also comparable to that under the proposed Plan, due to the similar focus of development in primarily already urbanized areas and implementation of the same transportation investment strategy.

Overall, under Alternative 3 the potential for impacts on biological resources would be comparable to the proposed Plan.

Alternative 4: Enhanced Network of Communities

Impacts on special-status species (including plants, wildlife, and fish) and designated critical habitat under Alternative 4 could be somewhat greater than those under the proposed Plan because this alternative increases regional population and jobs. While this alternative focuses development in PDAs, it does so at lower levels than under the proposed Plan. Therefore, more development could also occur outside PDAs and would be encouraged close to employment centers at the region's edges, which are generally less urbanized. For the same reasons, construction impacts on nesting birds and raptors, impacts on jurisdictional waters and other special-status natural communities, as well as impacts on migratory wildlife corridors and native wildlife nursery sites could also be greater. In addition, more single-family than multifamily dwelling units are forecast under this alternative, which results in a larger development footprint and greater overall impacts on biological resources. However, unlike the No Project alternative, strict urban growth boundaries would limit development in more rural areas and could thus reduce the potential for biological resources impacts in areas where they are likely to be proportionally greater than in highly urbanized areas.

Transportation project impacts on biological resources would be comparable to those under the proposed Plan because this alternative would rely on the same transportation investment strategy.

The potential for conflict with local policies and ordinances that protect biological resources, and/or an adopted conservation plan, under Alternative 4 is somewhat greater than that under proposed Plan, due to the reduced focus of development in PDAs combined with an increase in housing needed to accommodate higher population numbers.

Under Alternative 4, the overall potential for impacts on biological resources would be greater than those under the proposed Plan but less than those under the No Project alternative.

Alternative 5: Environment, Equity and Jobs

Impacts on special-status species (including plants, wildlife, and fish) and designated critical habitat under Alternative 5 would be comparable to those under the proposed Plan because this alternative concentrates development in transit rich portions of what are primarily already highly urbanized areas. Similarly, construction impacts on nesting birds and raptors, and impacts on jurisdictional waters and other special-status natural communities, as well as impacts on migratory wildlife corridors and native wildlife nursery sites would also be comparable because most development would be concentrated in already urbanized areas. While such development would be more dispersed throughout urban areas than under the proposed Plan, it would still be concentrated in PDAs, as well as "high opportunity" suburban locations that are considered TPP eligible areas, where fewer sensitive biological resources are present. More multifamily dwelling units than single-family dwellings are forecast under this alternative, which also serves to concentrate growth and, similar to the proposed Plan, Alternative 5 assumes strict compliance with existing urban growth boundaries.

Transportation project impacts on all biological resources would be less than those under proposed Plan because Alternative 5 relies more heavily on transit service improvements and would exclude uncommitted roadway projects from the transportation investment strategy. Therefore, direct and indirect impacts of highway improvements would be reduced compared to those under the proposed Plan.

The potential for conflict with local policies and ordinances that protect biological resources, and/or an adopted conservation plan, under Alternative 5 is comparable to that under the proposed Plan, due to the similar focus of development in primarily already urbanized areas.

Relative to all alternatives, Alternative 5 has the least overall potential for impacts on biological resources because, similar to the proposed Plan, development would be focused primarily in PDAs and TPPs and there would be strict urban growth boundaries, which would constrain most land use changes to already urban areas. In addition, there would be substantially fewer transportation projects implemented than the other alternatives, with the exception of the No Project alternative. Therefore, Alternative 5 is the environmentally preferred alternative for biological resources.

VISUAL RESOURCES

Across all alternatives, the majority of all new development would take place within already-urbanized areas, thereby minimizing new development in rural and open space areas. Nevertheless, there will be some conversion of undeveloped land by new development and transportation projects under all alternatives, which could impact visual resources, although the comparative difference between the alternatives is small. The general distribution of growth throughout the region would vary somewhat by alternative as shown in **Tables 3.1-3 and 3.1-4**. However, the precise location and appearance of new land development is not known at this time.

Impacts on scenic views will be greatest where existing suburban (low-rise), rural, or undeveloped areas with visual sensitivity (possessing appealing visual characteristics) are converted to higher density or urbanized land as a result of new development. Consequently, development within PDAs is expected to have less impact on visual resources than development outside of PDAs. Generally, the proposed Plan, Alternative 3, and Alternative 5 are expected to be more compact, with growth focused in PDAs and/or TPPs, while Alternative 4 is expected to be more dispersed with growth generally located within the urbanized footprint but outside of PDAs. The No Project alternative is expected to have the most dispersed growth, and the most development outside the existing urbanized footprint. For a comparison of PDA-focused growth, see **Tables 3.1-5 and 3.1-6**.

The location of transportation projects is known, however, and those located in rural or open space areas may particularly impact public views. The number and distribution of transportation projects with potential to impact visual resources varies by alternative. While the proposed Plan and Alternative 4 include the greatest number of total projects, a large number of proposed projects under each alternative would not result in significant physical impacts, as they involve transit route improvements, road operations and maintenance, and pedestrian and bicycle improvements which all involve minimal construction, if any. The number of total projects and "major projects" is listed in **Table 3.1-51**. Major projects have the greatest potential to impact public views because they introduce new or expanded facilities into the environment. The proposed Plan and Alternative 4 include the greatest number of major projects, while the No Project alternative has the fewest major projects.

TABLE 3.1-51: TRANSPORTATION PROJECTS, BY ALTERNATIVE

	Alternative 1: No Project	*Alternative 2: Proposed Plan (Jobs-Housing Connection)*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Major Projects*	60	160	158	160	71
Regional Total	220	700	698	700	459

*"Major projects" defined as those which are listed as expansion projects costing $10 million or more that include new roadway construction, road widening, or other ground-disturbing construction

Sources: MTC 2012; Dyett & Bhatia, 2013.

Overall, impacts related to blocking panoramic views or views of significant landscape features or landforms as a result of land use development or transportation investment projects are considered potentially significant (PS) for all alternatives. The No Project alternative and Alternative 4 are likely to have the greatest impact resulting from land development since they anticipate the most dispersed development patterns, while all other alternatives would likely have similar land development impacts relative to each other. On the transportation side, the proposed Plan, Alternative 3, and Alternative 4 are expected to have the greatest impact since they include the greatest number of overall and major projects. The No Project alternative would have the smallest transportation impact. In most cases, transportation projects would not have a substantial adverse impact due to the nature of the work or because most proposed projects will take place in existing rights-of-way. However, across all alternatives, transportation projects that expand or extend existing rights-of-way have the potential to block views. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Land development adjacent to or visible from scenic highways may create impacts on views from scenic highways. Scenic highways tend to run through open land outside of urbanized areas, although numerous designated and eligible scenic highways are adjacent to PDAs, where the majority of new development in the proposed Plan will be concentrated, and as a result, could be impacted. The No Project alternative and Alternative 4 are likely to have the greatest impact resulting from land development since they anticipate the most dispersed development patterns, while all other alternatives would likely have similar land development impacts relative to the proposed Plan. Transportation projects could also have a negative impact on scenic highways. There are 52 miles of eligible or designated scenic highway potentially impacted under the proposed Plan and Alternative 4, 41 miles potentially impacted under Alternative 3, and 21 miles potentially impacted by the No Project alternative and Alternative 5. However, it is not possible to determine whether these projects will have a negative impact, positive impact, or no effect on the visual resources of scenic highways. Transportation projects could enhance a scenic highway, or they could damage visual resources such as by impacting trees and views. Overall, impacts related to scenic highways are considered potentially significant (PS) for all alternatives Because MTC/ABAG cannot require local implementing agencies to adopt relevant mitigation measures, and because there may be instances in which site-specific or project-specific conditions preclude the reduction of all project impacts to less than significant levels, this impact remains significant and unavoidable for all alternatives (SU).

Development resulting from all of the alternatives could cause significant visual impacts by creating or increasing contrasts with the visual character of an existing community. At the regional scale, the greatest impacts will result from high density housing and high intensity commercial projects located within existing communities where the visual contrast between the project and existing conditions will be the most apparent. Because effects would be highly localized, variations between alternatives are not identifiable at the regional scale. Across all alternatives, given the variation in local context and development standards, impacts are expected to be potentially significant (PS). While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Development resulting from all of the alternatives could cause significant visual impacts by adding a visual element of urban character to an existing rural or open space area or adding a modern element to a historic area. The greatest land development impacts at the regional scale will result from high density housing and high intensity commercial projects located in low density, rural, or historic areas, where the visual contrast between the project and existing conditions will be the most apparent. The proposed Plan, Alternative 3, and Alternative 5 are expected to be more compact and therefore have fewer impacts on rural or open space areas, while Alternative 4 is expected to be more dispersed with growth generally located within the urbanized footprint but outside of PDAs, with potentially greater impacts on low density areas. The No Project is expected to have the greatest impact on rural and open space areas since it has the most dispersed land use pattern. Regarding transportation investments, the proposed Plan, Alternative 3, and Alternative 4 are expected to have the greatest impact on rural and historic areas since they include the greatest number of projects. The No Project alternative would have the smallest impact. In most cases, transportation projects would not have a substantial adverse impact due to the nature of the work or because most proposed projects will take place in existing rights-of-way, though projects that expand or extend existing rights-of-way could impact visual resources. Visual impacts on rural, open space or historic areas resulting from land development are potentially significant (PS) for all alternatives. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Land development and transportation investments resulting from all of the alternatives could create new substantial sources of light and glare in rural areas. The No Project alternative and Alternative 4 are likely to have the greatest impact resulting from land development since they anticipate the most dispersed development, while all other alternatives would likely have similar impacts relative to each other. Visual impacts related to light and glare resulting from land development are potentially significant (PS) for all alternatives. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Land development and transportation investments resulting from all of the alternatives could cast shadows that degrade the existing visual character of a public space. Shadow impacts on public spaces would primarily result from high density development consisting of tall or bulky buildings, most of which will be focused in existing urban locations where shadow impacts are typically already substantial.

Generally, the proposed Plan, Alternative 3, and Alternative 5 would be expected to result in the greatest shadow-related impacts on public space due to land development since they are expected to be more compact and include denser and taller development. Development resulting from the No Project alternative and Alternative 4 are expected to be more dispersed and in lower density areas where low rise development will be predominant. Across alternatives, shadow-related impacts are anticipated to be less than significant (LS) for transportation projects. Overall, impacts related to the casting of shadows are considered potentially significant (PS) for all alternatives where development occurs in close proximity to public spaces (such as public parks), but less than significant (LS) in all other areas. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Alternative 1: No Project

The No Project alternative would have the least amount of new household and job growth focused in PDAs of all the alternatives, meaning that development under the No Project alternative would generally be more dispersed than the other alternatives and would be more likely to impact public views; scenic highways; rural, open space, and historic areas; and result in new sources of light and glare. However, the dispersed nature of development under the No Project alternative would lead to the least impacts related to shadows compared to other alternatives.

This alternative would have the least impact related to transportation projects for all visual resource criteria, since it has the least number of major projects. This would result in the least impacts on rural areas and the fewest new sources of light and glare from transportation projects.

With land use and transportation effects combined, the development resulting from the No Project alternative would overall have a similar level of impact as under the proposed Plan, with more impacts from land development but fewer impacts from transportation projects.

Alternative 3: Transit Priority Focus

Alternative 3 is designed to focus growth in PDAs and TPPs. As such, it is considered a compact development scenario, and is expected to have similar land use impacts as the proposed Plan and Alternative 5 related to all of the visual resource criteria outlined above. Alternative 3 includes almost the same number of major transportation projects as the proposed Plan and Alternative 4, and so will have impacts comparable to the proposed Plan from these projects.

Alternative 4: Enhanced Network of Communities

Alternative 4 would result in a larger total number of new jobs and households throughout the region and a smaller percent of new households located within PDAs than any alternative besides the No Project alternative. Based on this higher total growth and more dispersed household land use scenario, this alternative would have more development outside of compact urban centers and more in low density urban areas such as suburbs and the urban fringe than under the proposed Plan, locations on which new development has a larger visual impact. As a result, Alternative 4 would have a larger impact on visual resources from land development than the other alternatives, with the exception of shadow- and community character-related impacts, for which it would have a lesser or comparable impact. Alternative

4 includes the same transportation projects as the proposed Plan and so will have the same impacts on visual resources from transportation projects.

Alternative 5: Environment, Equity, and Jobs

Alternative 5 is designed to focus growth in PDAs and TPPs. As such, it is considered a compact development scenario, and is expected to have similar land use impacts as the proposed Plan and Alternative 3 related to all of the visual resource criteria outlined above. Alternative 5 includes fewer major transportation projects than the proposed Plan and so would have fewer impacts on rural areas and fewer new sources of light and glare.

Given the compact development scenario and low number of transportation projects, Alternative 5 is expected to have the least impact on visual resources of all the alternatives.

CULTURAL RESOURCES

Across all alternatives, the majority of new development will take place in already-urbanized areas. Nevertheless, there will be some conversion of undeveloped land by new development and transportation projects, which could impact cultural resources, although the difference between the alternatives is small. Potential impacts on cultural resources include disturbance or destruction of historical resources and ground-disturbing activities and/or the introduction or alteration of visual elements with the potential to disturb, destroy, or significantly affect archaeological, paleontological and/or geological resources or human remains.

Projects may impact historic resources if buildings or landmark structures are disturbed. Projects that include the introduction of new visual elements, such as new structures or highway segments, or that involve visual alterations have the potential to indirectly impact historic architectural resources by creating visual incompatibility in the surrounding environment. If these projects involve ground-disturbance, impacts on archaeological sites may also occur.

In general, projects that include ground-disturbing activities, such as grading, road widening, and excavation, have the greatest potential to impact archaeological, paleontological, and geological resources and human remains. Impacts on these resources are generally more likely in undeveloped areas. The amount of new urbanized land is not substantial under any of the alternatives, and is relatively consistent across alternatives, with the greatest amount of newly urbanized land under the No Project. In general, impacts from ground disturbance are essentially the same across all the alternatives except the No Project, which would have greater potential impacts from land use. The number and distribution of transportation projects with potential to impact cultural resources vary by alternative. As shown in **Table 3.1-51** (above), the proposed Plan and Alternative 4 include the most projects, as well as the most major projects, which have the greatest potential to impact cultural resources because they introduce new or expanded facilities into the environment.[8] The No Project alternative has the fewest total projects, as well as the fewest major projects.

[8] "Major projects" are defined as those that are listed in the RTP as expansion projects costing $10 million or more that include new roadway construction, road widening, or other ground-disturbing construction. Major projects exclude transit route improvements, road operations and maintenance, and pedestrian and bicycle improvements.

Since growth is focused in urbanized areas where historic resources are likely to exist, regional impacts on historic resources from land use development are expected to be similar across all alternatives, with variations in localized effects that cannot be determined at the regional scale. The number and distribution of transportation projects with potential to impact cultural resources vary by alternative, as outlined above.

Overall, impacts related to the disturbance or destruction of significant historical resources, archeological resources, and paleontological and/or geologic resources are considered potentially significant (PS) for all alternatives. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Impacts on human remains are expected to be reduced to less than significant with mitigation (LS-M) based on regulatory requirements for all alternatives.

Alternative 1: No Project

The No Project may include the introduction of new visual elements, such as new structures or highway segments, or that involve visual alterations with the potential to indirectly impact historic architectural resources by creating visual incompatibility in the surrounding environment and thus impacts on cultural resources.

Of all of the alternatives, the No Project alternative would result in the highest amount of urbanization of undeveloped land. As impacts on archeological resources, unique paleontological resources, or geologic features are more generally more likely to affect undeveloped areas, the No Project alternative is expected to result in more land use-related impacts than the other alternatives, including the proposed Plan. It should be noted however, that the variations in undeveloped land converted to urbanized land is relatively small across all alternatives.

Transportation projects could also impact cultural resources. At the regional level, the No Project alternative would have the least impact for all cultural resource criteria, since it has the fewest number of major projects, while the proposed Plan, Alternative 3, and Alternative 4 would have the largest impact.

Alternative 3: Transit Priority Focus

Since growth is focused in urbanized areas where historic resources are likely to exist, regional impacts on historic resources from this alternative are expected to be similar to the proposed Plan, with variations in localized effects that cannot be determined at the regional scale. Alternative 3 would result in a similar amount of newly urbanized land as compared to the proposed Plan, Alternative 4, and Alternative 5. Because impacts on archeological resources, unique paleontological resources, or geologic features are generally more likely in undeveloped areas, Alternative 3 is likely to result in similar impacts from land use development as the other alternatives (except the No Project) related to these resource areas.

Alternative 3 includes almost the same number of major transportation projects as the proposed Plan and Alternative 4. At the regional level, impacts on cultural resources as a result of transportation projects would be greater than under the No Project alternative and Alternative 5, but slightly less than under the proposed Plan or Alternative 4, for all cultural resource criteria.

Alternative 4: Enhanced Network of Communities

Since growth is focused in urbanized areas where historic resources are likely to exist, regional impacts on historic resources from this alternative are expected to be similar to the proposed Plan, with variations in localized effects that cannot be determined at the regional scale. Alternative 4 would result in a similar amount of newly urbanized land as compared to the proposed Plan, Alternative 3, and Alternative 5. Because impacts on archeological resources, unique paleontological resources, or geologic features are generally more likely in undeveloped areas, Alternative 4 is likely to result in similar impacts from land use development as the other alternatives (except the No Project) related to these resource areas.

Along with the proposed Plan, Alternative 4 includes the greatest number of major transportation projects. At the regional level, impacts on cultural resources as a result of transportation projects under Alternative 4 would be the same as under the proposed Plan for all cultural resource criteria.

Alternative 5: Environment, Equity, and Jobs

Since growth is focused in urbanized areas where historic resources are likely to exist, regional impacts on historic resources from land use development are expected to be similar to the proposed Plan and all other alternatives, with variations in localized effects that cannot be determined at the regional scale. Alternative 5 would result in a similar amount of newly urbanized land as compared to the proposed Plan, Alternative 3, and Alternative 4. Because impacts on archeological resources, unique paleontological resources, or geologic features are generally more likely in undeveloped areas, Alternative 5 is likely to result in similar impacts from land use development as the other alternatives (except the No Project alternative) related to these resource areas.

Alternative 5 includes the fewest major transportation projects except for the No Project alternative. At the regional level, impacts on cultural resources as a result of transportation projects under Alternative 5 would be larger than under the No Project alternative, but smaller than under the proposed Plan, Alternative 3, or Alternative 4 for all cultural resource criteria.

Given the compact development scenario and low number of transportation projects, Alternative 5 is expected to have the least impact on visual resources of all the alternatives.

PUBLIC UTILITIES

Population and job growth forecasted for the region, along with the corresponding land use development, could result in significant impacts on public utilities. The distribution of growth varies among the alternatives and this variation would likely affect the amount of impact each alternative has on the public utilities available in each county and in localized areas. Impacts may also occur in local settings if development is not sited in locations with adequate public utilities, even if adequate wastewater treatment capacity, for example, may be available elsewhere nearby. In general, most of the alternatives will impact public utilities to the same extent as the proposed Plan, with the greater population growth of Alternative 4 resulting in greater potential impacts.

Overall, land development and transportation investment impacts related to water supplies, wastewater treatment capacity, stormwater drainage facilities, water and wastewater treatment facilities, and landfill capacity are considered potentially significant (PS) for all alternatives. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Impacts related to exceedance of wastewater treatment requirements of the RWQCBs is considered less than significant for all alternatives.

Alternative 1: No Project

Impacts on existing water supplies would be comparable to those under the proposed Plan, since this alternative would experience the same amount of population and job growth. Although the No Project alternative would see more residential development in single family homes, which tend to consume more water than multi-family dwellings, the difference is slight; the No Project alternative would result in around 1,913,000 single family housing units in the region, only 2.7 percent more than the proposed Plan's 1,862,000 single family housing units. That difference is unlikely to increase the overall impact. The smaller number of transportation projects under the No Project alternative may lead to slightly lower water consumption from that category of projects, but the impact from transportation projects on water supplies is expected to be minor overall.

Impacts on the capacity of wastewater treatment systems will be greater than under the proposed Plan, because this alternative would experience the same amount of growth but would distribute it more in areas that are expected to have less treatment capacity. Growth distributions under the No Project alternative at the county level are very different than in the proposed Plan, with higher growth in Napa, Solano, and Sonoma counties and lower growth in Santa Clara County. **Table 3.1-52** shows how existing wastewater treatment capacity for those counties compares to future average daily flows, assuming that existing wastewater flows grow by the same percentage as the projected county population. As the table shows, the distribution of growth under the No Project alternative would likely exceed wastewater treatment capacity in Napa, San Francisco, Solano, and Sonoma counties; the proposed Plan would only exceed capacity in San Francisco. As with the proposed Plan, it is also likely that some individual wastewater treatment facilities around the region, even in counties with adequate overall capacity, will need to expand their capacity to meet actual population growth, or to respond to RWQCB requirements to provide capacity to receive their NDPES permit. For example, facilities may need to expand capacity during the timeframe of the proposed Plan in order to meet additional future growth beyond the Plan's time horizon. As with the proposed Plan, it is not anticipated that transportation projects would have an effect on wastewater treatment capacity, except in circumstances where an area has a combined stormwater and wastewater conveyance system. In those instances, extra stormwater runoff caused by additional impervious surface from roadway and some transit projects may require additional wastewater treatment capacity in localized locations.

TABLE 3.1-52: ALTERNATIVE 1 AGGREGATE PROJECTED FLOW VS. EXISTING CAPACITY OF WASTEWATER TREATMENT (DRY WEATHER, MGD)

County	*Current Flow*	*Existing Treatment Capacity*	*Alt 1 – Projected Population Growth*	*Alt 1– Aggregate Projected Future Flow*	*Alt 1 – Projected Countywide Excess Capacity*	*Proposed Plan – Projected Excess Capacity*
Alameda	152.71	424.6	27%	194.02	230.58	224.55
Contra Costa	81.30	111.31	28%	104.45	6.86	8.06
Marin	22.92	53.82	16%	26.51	27.31	28.38
Napa	15.85	19.86	35%	21.36	-1.50	1.00
San Francisco	79.10	106.4	35%	106.80	-0.40	-0.38
San Mateo	51.60	76.6	31%	67.73	8.87	11.58
Santa Clara	155.50	244	22%	189.96	54.04	32.52
Solano	39.95	56.15	48%	59.18	-3.03	7.02
Sonoma	26.87	33.6	47%	39.56	-5.96	0.55
	625.80	**1,126.34**		**809.56**	**316.78**	**313.28**

Note: parenthesis indicate a negative number

Source: Dyett & Bhatia, 2013.

Impacts on stormwater drainage facilities, specifically regarding the need for new or expanded facilities, would be slightly more than under the proposed Plan because this alternative will place more future new development outside of the region's urbanized footprint. As a result, the No Project alternative would result in more impervious surface than the proposed Plan and therefore more stormwater runoff; however, it is expected that new growth would still be able to largely rely on existing stormwater drainage facilities. The No Project alternative, however, will add fewer lane miles of roadways to the region (316 lane miles vs. 687 in the proposed Plan), for a slightly smaller conversion of permeable surface to impervious surface. However, this difference is too minor to affect the overall impact, considering the entire region currently has 20,750 roadway lane miles.

Impacts related to the construction of new or expanded water and wastewater treatment facilities would be potentially greater than those under the proposed Plan because this alternative will place slightly more future new development outside the region's urbanized footprint. As a result, the No Project alternative will have less future growth that can be served by existing systems and more development that needs new or expanded systems. As with the proposed Plan, many locations in the region may need to expand or add water or wastewater treatment capacity in localized places based on future growth. Similar environmental impacts would occur under the No Project alternative as under the proposed Plan from both the construction process and the conversion of undeveloped land to accommodate expanded facilities. As with the proposed Plan, it is not anticipated that transportation projects would have an effect on water treatment demand and therefore would not require new or expanded facilities.

The impact of exceeding wastewater treatment requirements under the No Project alternative is expected to be less than significant, for the same reasons as described under the proposed Plan; this is the same across all alternatives.

The impact of insufficient landfill capacity to serve new development will be comparable to impacts under the proposed Plan because this impact is caused by regional population and job growth, which is the same under both the alternative and the proposed Plan. Roadway and transit construction and maintenance projects have the potential to generate a substantial amount of solid waste during construction, and the No Project alternative will have fewer of these projects than the proposed Plan, but the difference is not expected to change the scale of the impact.

Under the No Project alternative, the potential for impacts on public utilities would be somewhat greater than those under the proposed Plan due to the greater expected impact on wastewater treatment capacity.

Alternative 3: Transit Priority Focus

Impacts on existing water supplies would be comparable to those under the proposed Plan since this alternative would experience the same regional population and job growth. Although Alternative 3 would see less residential development than the proposed Plan in single family homes, which tend to consume more water than multi-family dwellings, the difference is modest—Alternative 3 would result in around 1,755,000 single family housing units in the region, about 5.7 percent below the proposed Plan's 1,862,000 single family housing units. That difference is not enough to reduce this impact to less than significant, as many of the impacts will be localized. The number of transportation projects under Alternative 3 will be similar to the proposed Plan, resulting in comparable impacts on water supplies.

Impacts on the capacity of wastewater treatment systems will be comparable to those under the proposed Plan, since this alternative would experience the same amount of growth and distribute growth in a similar way that matches existing treatment capacities. Growth distributions under Alternative 3 at the county level are different than in the proposed Plan, especially lower in Contra Costa and Sonoma counties and higher in San Mateo County. **Table 3.1-53** shows how existing wastewater treatment capacity for those counties compares to future average daily flows, assuming that existing wastewater flows grow by the same percentage as the projected county population. As the table shows, the distribution of growth under Alternative 3 would likely exceed wastewater treatment capacity in just San Francisco, same as the proposed Plan, albeit to a greater extent. As with the proposed Plan, it is also likely that some individual wastewater treatment facilities around the region, even in counties with adequate overall capacity, will need to expand their capacity to meet actual population growth. As with the proposed Plan, it is not anticipated that transportation projects would have an effect on wastewater treatment capacity, except in circumstances where an area has a combined stormwater and wastewater conveyance system. In those instances, extra stormwater runoff caused by additional impervious surface from roadway and some transit projects may require additional wastewater treatment capacity in localized locations.

TABLE 3.1-53: ALTERNATIVE 3 AGGREGATE PROJECTED FLOW VS. EXISTING CAPACITY OF WASTEWATER TREATMENT (DRY WEATHER, MGD)

County	*Current Flow*	*Existing Treatment Capacity*	*Alt 3 – Projected Population Growth*	*Alt 3– Aggregate Projected Future Flow*	*Alt 3 – Projected Countywide Excess Capacity*	*Proposed Plan – Projected Excess Capacity*
Alameda	152.71	424.6	29%	196.76	227.84	224.55
Contra Costa	81.30	111.31	14%	93.05	18.26	8.06
Marin	22.92	53.82	11%	25.33	28.49	28.38
Napa	15.85	19.86	21%	19.11	0.75	1.00
San Francisco	79.10	106.4	40%	110.41	-4.01	-0.38
San Mateo	51.60	76.6	41%	72.85	3.75	11.58
Santa Clara	155.50	244	40%	217.99	26.01	32.52
Solano	39.95	56.15	18%	47.09	9.06	7.02
Sonoma	26.87	33.6	15%	30.95	2.65	0.55
	625.80	**1,126.34**		**813.54**	**312.80**	**313.28**

Note: parenthesis indicate a negative number

Source: Dyett & Bhatia, 2013.

Impacts on stormwater drainage facilities, specifically regarding the need for new or expanded facilities, will be comparable to those under the proposed Plan because this alternative will place approximately the same amount of new development within the region's urbanized footprint. As a result, Alternative 3 will have around the same amount of impervious surface as the proposed Plan and the same amount of stormwater runoff; it will also be able to largely rely on existing stormwater drainage facilities. Alternative 3, however, will add slightly fewer lane miles of roadways to the region (630 vs. 687 in the proposed Plan), for a slightly smaller conversion of permeable surface to impervious surface. However, this difference is too minor to affect the overall impact.

Impacts related to the construction of new or expanded water and wastewater treatment facilities will be the same under Alternative 3 as under the proposed Plan because this alternative will place approximately the same amount of future new development within the region's urbanized footprint. As a result, Alternative 3 will have around the same amount of future growth that can be served by existing systems versus development that needs new or expanded systems. As with the proposed Plan, however, many locations in the region may need to expand or add water or wastewater treatment capacity in localized places based on future growth. The same environmental impacts would occur under Alternative 3 as under the proposed Plan from both the construction process and the conversion of undeveloped land to accommodate expanded facilities. As with the proposed Plan, it is not anticipated that transportation projects would have an effect on water treatment demand and therefore would not require new or expanded facilities.

The impact of exceeding wastewater treatment requirements under Alternative 3 is expected to be less than significant, for the same reasons as described under the proposed Plan.

The impact of insufficient landfill capacity to serve new development will be the same under Alternative 3 as under the proposed Plan because this impact is caused by regional population and job growth, which is the same for both this alternative and the proposed Plan. Roadway and transit construction and maintenance projects have the potential to generate a substantial amount of solid waste during construction, and Alternative 3 will have fewer of these projects than the proposed Plan, but the difference is not expected to change the scale of the impact.

Under Alternative 3, the potential for impacts on public utilities would be comparable to those under the proposed Plan. Mitigation measures identified for the proposed Plan would be applicable to Alternative 3.

Alternative 4: Enhanced Network of Communities

Impacts on existing water supplies would be greater than those under the proposed Plan since this alternative would experience more population and job growth. This alternative will see population growth within the region that is four percent higher and job growth that is one percent higher than the proposed Plan, leading to a greater demand on water supplies across the region. The result could be that water supplies reach capacity sooner during normal and dry years due to the higher regional population. Alternative 4 would also see more residential development than the proposed Plan in single family homes, which tend to consume more water than multi-family dwellings; Alternative 4 would result in around 2,150,000 single family housing units in the region, about 15.5 percent more than the proposed Plan's 1,862,000 single family housing units. The number of transportation projects under Alternative 4 is the same as under the proposed Plan, and so those projects will have comparable impacts on water supplies.

Impacts on the capacity of wastewater treatment systems may be slightly lower than under the proposed Plan, because, while this alternative would experience more growth, it would be distributed in a way that better matches the available wastewater treatment capacities in the region. In particular, Alternative 4 would add more growth to Santa Clara, Contra Costa, and Alameda counties, and less growth to Napa, San Francisco, and Sonoma counties—all of which have more limited remaining wastewater treatment capacity in aggregate. **Table 3.1-54** shows how existing wastewater treatment capacity for all counties compare to future average daily flows, assuming that existing wastewater flows grow by the same percentage as the projected county population. As the table shows, the distribution of growth under Alternative 4 would likely result in no need for additional wastewater treatment capacity, if growth is distributed within each county to locations with adequate capacity. As with the proposed Plan, it is also likely that some individual wastewater treatment facilities around the region, even in counties with adequate overall capacity, will need to expand their capacity to meet actual population growth. As with the proposed Plan, it is not anticipated that transportation projects would have an effect on wastewater treatment capacity, except in circumstances where an area has a combined stormwater and wastewater conveyance system. In those instances, extra stormwater runoff caused by additional impervious surface from roadway and some transit projects may require additional wastewater treatment capacity in localized locations.

TABLE 3.1-54: ALTERNATIVE 4 AGGREGATE PROJECTED FLOW VS. EXISTING CAPACITY OF WASTEWATER TREATMENT (DRY WEATHER, MGD)

County	*Current Flow*	*Existing Treatment Capacity*	*Alt 4 – Projected Population Growth*	*Alt 4– Aggregate Projected Future Flow*	*Alt 4 – Projected Countywide Excess Capacity*	*Proposed Plan – Projected Excess Capacity*
Alameda	152.71	424.6	37%	209.21	215.39	224.55
Contra Costa	81.30	111.31	34%	108.85	2.46	8.06
Marin	22.92	53.82	10%	25.10	28.72	28.38
Napa	15.85	19.86	11%	17.54	2.32	1.00
San Francisco	79.10	106.4	32%	104.32	2.08	-0.38
San Mateo	51.60	76.6	31%	67.79	8.81	11.58
Santa Clara	155.50	244	47%	228.47	15.53	32.52
Solano	39.95	56.15	23%	49.24	6.91	7.02
Sonoma	26.87	33.6	19%	32.11	1.49	0.55
	625.80	**1,126.34**		**842.63**	**283.71**	**313.28**

Source: Dyett & Bhatia, 2013.

Impacts on stormwater drainage facilities, specifically regarding the need for new or expanded facilities, will be comparable to those under the proposed Plan because this alternative will place approximately the same proportion of new development within the region's urbanized footprint. As a result, Alternative 4 will have about the same amount of impervious surface as the proposed Plan and the same amount of stormwater runoff; it will also be able to largely rely on existing stormwater drainage facilities. Alternative 4 will also add the same number of roadway lane miles to the region, resulting in a comparable impact to the proposed Plan from transportation projects.

Impacts related to the construction of new or expanded water and wastewater treatment facilities will be comparable to those under the proposed Plan because, while this alternative includes more growth overall, it will locate most of new development within the region's urbanized footprint. As a result, Alternative 4 will have around the same amount of future growth that can be served by existing systems versus development that needs new or expanded systems. As noted above, this alternative may place more pressure on water supplies and less pressure on wastewater treatment capacity than the proposed Plan. As with the proposed Plan, however, many locations in the region may need to expand or add water or wastewater treatment capacity in localized places based on future growth. The same environmental impacts would occur under Alternative 4 as under the proposed Plan from both the construction process and the conversion of undeveloped land to accommodate expanded facilities. As with the proposed Plan, it is not anticipated that transportation projects would have an effect on water treatment demand and therefore would not require new or expanded facilities.

The impact of exceeding wastewater treatment requirements under Alternative 4 is expected to be less than significant, for the same reasons as described under the proposed Plan.

The impact of insufficient landfill capacity to serve new development will be greater under Alternative 4 compared to the proposed Plan because this impact is caused by regional population and job growth, which will be four and one percent higher, respectively, under this alternative. As a result, landfill capacities will be met sooner under this alternative than under the proposed Plan. Roadway and transit construction and maintenance projects have the potential to generate a substantial amount of solid waste during construction; Alternative 4 has the same transportation projects as the proposed Plan so this component of the alternative will have impacts comparable to the proposed Plan.

Relative to all alternatives, Alternative 4 has the greatest potential for impacts on public utilities, due to its greater population and job growth. It will have comparable impacts on stormwater drainage, wastewater treatment requirements, and the need to expand water and wastewater treatment facilities, and a lesser impact on wastewater treatment capacity, but greater impacts on water supplies and landfill capacity.

Alternative 5: Environment, Equity, and Jobs

Impacts on existing water supplies would be comparable to those under the proposed Plan since this alternative would experience the same amount of population and job growth. Although Alternative 5 would see less residential development in single family homes, as compared to the proposed Plan, the difference is modest—Alternative 5 would result in around 1,761,000 single family housing units in the region, about 5.4 percent below the proposed Plan's 1,862,000 single family housing units. That difference is not expected to be enough to reduce this impact to less than significant, as many water resource impacts will be localized in nature. The number of transportation projects under Alternative 5 will be similar to those under the proposed Plan, and so those projects will have comparable impacts on water supplies.

Growth distributions under Alternative 5 would be lower in Contra Costa County and higher in San Mateo County as compared to the proposed Plan. **Table 3.1-55** shows how existing wastewater treatment capacity for those counties compares to future average daily flows, assuming that existing wastewater flows grow by the same percentage as the projected county population. As the table shows, the distribution of growth under Alternative 5 would likely exceed wastewater treatment capacity in San Francisco, same as the proposed Plan, as well as in San Mateo County, resulting in greater impacts on the capacity of wastewater treatment systems than under the proposed Plan. As with the proposed Plan, it is also likely that some individual wastewater treatment facilities around the region, even in counties with adequate overall capacity, will need to expand their capacity to meet actual population growth. As with the proposed Plan, it is not anticipated that transportation projects would have an effect on wastewater treatment capacity, except in circumstances where an area has a combined stormwater and wastewater conveyance system. In those instances, extra stormwater runoff caused by additional impervious surface from roadway and some transit projects may require additional wastewater treatment capacity in localized locations.

TABLE 3.1-55: ALTERNATIVE 5 AGGREGATE PROJECTED FLOW VS. EXISTING CAPACITY OF WASTEWATER TREATMENT (DRY WEATHER, MGD)

County	*Current Flow*	*Existing Treatment Capacity*	*Alt 5 - Projected Population Growth*	*Alt 5- Aggregate Projected Future Flow*	*Alt 5 - Projected Countywide Excess Capacity*	*Proposed Plan – Projected Excess Capacity*
Alameda	152.71	424.6	35%	206.84	217.76	224.55
Contra Costa	81.30	111.31	17%	95.27	16.04	8.06
Marin	22.92	53.82	13%	25.92	27.90	28.38
Napa	15.85	19.86	20%	19.09	0.77	1.00
San Francisco	79.10	106.4	35%	107.08	-0.68	-0.38
San Mateo	51.60	76.6	49%	76.82	-0.22	11.58
Santa Clara	155.50	244	31%	203.05	40.95	32.52
Solano	39.95	56.15	20%	47.84	8.31	7.02
Sonoma	26.87	33.6	17%	31.39	2.21	0.55
	625.80	**1,126.34**		**813.54**	**312.80**	**313.28**

Note: parenthesis indicate a negative number

Source: Dyett & Bhatia, 2013.

Impacts on stormwater drainage facilities, specifically regarding the need for new or expanded facilities, will be comparable to those under the proposed Plan because this alternative will place approximately the same amount of future new development within the region's urbanized footprint. As a result, Alternative 5 will have about the same amount of impervious surface as the proposed Plan and the same amount of stormwater runoff; it will also be able to largely rely on existing stormwater drainage facilities. Alternative 5, however, will add fewer lane miles of roadways to the region (279 vs. 687 in the proposed Plan), for a smaller conversion of permeable surface to impervious surface.

Impacts related to the construction of new or expanded water and wastewater treatment facilities will be comparable to the proposed Plan because this alternative will place approximately the same amount of future new development within the region's urbanized footprint. As a result, Alternative 5 will have around the same amount of future growth that can be served by existing systems versus development that needs new or expanded systems. As with the proposed Plan, however, many locations in the region may need to expand or add water or wastewater treatment capacity in localized places based on future growth. The same environmental impacts would occur under Alternative 5 as under the proposed Plan from both the construction process and the conversion of undeveloped land to accommodate expanded facilities. As with the proposed Plan, it is not anticipated that transportation projects would have an effect on water treatment demand and therefore would not require new or expanded facilities.

The impact of exceeding wastewater treatment requirements under Alternative 5 is expected to be less than significant, for the same reasons as described under the proposed Plan.

The impact of insufficient landfill capacity to serve new development will be comparable to the proposed Plan because this impact is caused by overall regional population and job growth, which is the same under this alternative and the proposed Plan. Roadway and transit construction and maintenance projects have the potential to generate a substantial amount of solid waste during construction, and Alternative 5 will have fewer of these projects than the proposed Plan, but the difference is not expected to change the scale of the impact.

Under Alternative 5 the potential for impacts on public utilities would be greater than those under the proposed Plan, with comparable impacts for every significance criterion except wastewater treatment capacity, which has a greater impact.

HAZARDS

Impacts related to hazards include the transport, use or disposal of hazardous materials; the release of hazardous materials into the environment; the handling of hazardous materials within one-quarter mile of a school; living and working within two miles of a public airport or private airstrip; and the risk of loss or injury due to wildland fires. These impacts are all highly regulated at the state and federal level, and as a result, are less than significant with mitigation (LS-M) through existing regulation for all alternatives.

Impacts related to the development of land use or transportation projects on sites listed as hazardous materials sites are considered potentially significant (PS) for all alternatives. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

The potential to impair implementation of an adopted emergency response plan is less than significant (LS) for all alternatives.

Alternative 1: No Project

The No Project alternative projects the same population growth as the proposed Plan but would not concentrate development in PDAs to the same extent. Despite having development dispersed over a wider area, the amount of hazardous materials would generally be similar to that required under the proposed Plan due to the same population growth estimates. The need to transport hazardous materials over a wider area could result in a slight increase in risks of upset and accident conditions compared to the proposed Plan. Covering a wider area could also result in development that is closer to existing schools, airports, and wildfire hazard areas. Emissions of hazardous materials would be relatively limited due to development consisting of primarily residential land uses as opposed to industrial uses where emissions are generally higher. However, all hazardous materials use, storage, transport, and disposal would be required to adhere to local, state, and federal requirements as stated in the mitigation measures that limit exposure from hazardous materials.

Hazards that occur due to proximity to schools, historical releases of hazardous materials, airports, airstrips, and wildfire areas would be dependent on the physical location of individual projects but would likely be relatively similar to the proposed Plan since existing regulatory requirements would still apply to reduce potential impacts. There would be no substantive change that would interfere with emergency plans or evacuation plans due to the existing regulatory standards and adaptive management measures that can accommodate future growth. However, the No Project alternative would lack the regional and community emergency plan coordination of the proposed Plan, and would also have fewer transportation investments and programs that would reduce congestion which, as a result, could potentially interfere with emergency response and evacuation. As a result, the No Project alternative would have a greater impact than the proposed Plan on emergency response and emergency evacuation plans.

Fewer transportation projects would occur under this alternative and, as a result, there would be less need for hazardous materials during construction and a reduced potential to encounter contaminated soils or groundwater during construction. Otherwise, there would be little difference when compared to the proposed Plan related to hazardous materials.

Alternative 3: Transit Priority Focus

Impacts associated with hazards materials under this alterative would be generally similar to the proposed Plan because this alternative projects the same population growth but would focus development in TPPs rather than PDAs. Therefore, it is assumed that the amount of hazardous materials that would be used, stored, transported, and disposed would be relatively similar and present a comparable risk of exposure even under accident and upset conditions.

Hazards that occur due to proximity to schools, historical releases of hazardous materials, airports, airstrips, and wildfire areas would be dependent on the physical location of individual projects but would likely be relatively similar to the proposed Plan since existing regulatory standards, as required by the mitigation measures, would still apply to reduce potential impacts. There would be no substantive change regarding potential impacts that would interfere with emergency plans or evacuation plans due to the existing regulatory requirements and adaptive management measures that can accommodate future growth.

Most of the transportation projects under the proposed Plan would occur under this alternative with a few exceptions and, as a result, there would be slightly less impact related to use of hazardous materials during construction and encountering historical releases. Overall, hazardous materials impacts would be relatively similar to the proposed Plan.

Alternative 4: Enhanced Network of Communities

Impacts associated with hazardous materials under this alternative would be greater than the proposed Plan because this alternative has a higher projected population growth, which is assumed to require an increase in hazardous materials use, storage, transport, and disposal. Therefore, the potential for increasing impacts to exposure or accidental release would occur compared to the proposed Plan, although adherence to regulatory standards, as required by the mitigation measures, would nonetheless minimize the risks. Increased development would also increase the potential to encounter historical releases of contamination during construction.

Hazards that occur due to proximity to historical releases of hazardous materials, schools, airports, airstrips, and wildfire areas would be dependent on physical location but could increase compared to the proposed Plan since more development may end up in the proximity to these areas. Potential impacts related to interference with emergency plans or evacuation plans could be slightly greater with the higher projected population and employment growth with this alternative.

All of the transportation projects in the proposed Plan would occur under this alternative and would therefore have the same potential impacts related to hazardous materials use, storage, transport, and disposal as well as upset conditions and encountering historical releases. Potential impacts related to proximity to schools, airports, airstrips, and wildfire areas would also be similar to the proposed Plan.

Alternative 5: Environment, Equity, and Jobs

Development under this alternative would focus both on PDAs and transit priority areas with the same overall projected population growth. Impacts associated with hazardous materials under this alternative would be generally similar to the proposed Plan with an assumed comparable level of hazardous materials use, storage, transport, and disposal. As a result there would be comparable risks of exposure from hazardous materials including from accident and upset conditions.

Hazards that occur due to proximity to schools, historical releases of hazardous materials, airports, airstrips, and wildfire areas would be dependent on physical location but would likely be relatively similar to the proposed Plan since existing regulatory standards, as required by the mitigation measures, would similarly apply to reduce potential impacts.

Fewer transportation projects would occur under this alternative and as a result there would be reduced impacts related to hazardous materials use, storage, transport, and disposal as well as upset conditions, and encountering historical releases. However, fewer transportation investments and programs would mean less reduction in congestion, which would interfere with emergency response and evacuation. As a result, this alternative would have a greater impact than the proposed Plan on emergency response or emergency evacuation plans. Potential impacts related to proximity to schools, airports, airstrips, and wildfire areas would be reduced compared to the proposed Plan because of the fewer number of transportation projects.

PUBLIC SERVICES AND RECREATION

Across all alternatives, the number of Bay Area residents and jobs is anticipated to grow by 2040, as indicated in **Tables 3.1-3 and 3.1-4**. Development and transportation projects could result in the need for additional service or recreational facilities that would require expanded facilities, the construction of which may cause significant environmental impacts, in order to maintain adequate schools, emergency services, police, fire, and park and recreation services. Potential environmental impacts from construction of new facilities are addressed for each environmental resource issue area.

The distribution of impacts throughout the region would vary somewhat by alternative based on county-by-county household and job growth. In general, however, new development will take place in already-urbanized areas, which will reduce the need for expanded service, since more residents and employees would have access to services within existing service areas, though this would vary at the local level. Alternative 4 is anticipated to result in a higher number of households (800,000) and jobs (45,000), requiring a greater number of new residences and employees that may place greater demand on public services, resulting in a potentially greater impact on public services. In all cases, infrastructure and services must be funded and maintained to support new development.

Public service and recreation standards, performance measures, and policies are set at the local level. There is currently no regional standard by which to analyze these topics, and a detailed quantitative assessment of local needs is not possible at the regional scale; therefore the analysis presented in the EIR is qualitative in nature, addressing generally the types of impacts that could be expected for each service. Impacts related to public services and recreation are considered potentially significant (PS) for all alternatives. While projects taking advantage of CEQA Streamlining provisions of SB 375 that implement all mitigation measures would be mitigated to less than significant with mitigation (LS-M), MTC/ABAG cannot require local implementing agencies to adopt mitigation measures, and therefore this impact remains significant and unavoidable (SU) for all alternatives.

Alternative 1: No Project

The No Project alternative includes the same number of Health, Educational, and Recreational Services jobs and "Other" category jobs that would fill service roles as the proposed Plan. However, overall growth would be the least focused in PDAs as compared to the proposed Plan and other alternatives, indicating that service needs may be more dispersed and therefore greater.

An increase in roadway capacity may heighten the demand for police, fire, and emergency services, but most of this increase will occur in areas that are already covered by existing services. Since roadway lane capacity will increase two percent over existing conditions (two percent less than the proposed Plan), the increase in demand is expected to be small and may not require additional services beyond what is currently provided. Out of approximately 700 total transportation projects in the proposed Plan, only 220 are included in the No Project alternative. Because the No Project alternative proposes the fewest transportation projects, it lacks many projects that improve the capacity and performance of the transportation network, resulting in the largest total vehicle hours of delay (both recurring and non-recurrent) of all alternatives. Increases in congestion could impact service levels for fire and police services, thereby requiring additional facilities or staffing in order to meet service standards on congested roadways. Further, the No Project alternative would do the least to improve travel by transit, on foot, and by bike, indicating that it would be the least efficient at connecting residents to services. In sum, however, transportation effects are expected to be less than significant, similar to under the proposed Plan.

Impacts on neighborhood and regional parks or other recreational facilities would be tied to regional population growth. While variations in the distribution of population growth may result in localized impacts, since regional population growth is consistent with the proposed Plan, this alternative would be expected to have similar impacts as the proposed Plan and Alternatives 3 and 5. Transportation improvements may improve access to recreational resources, but are not expected to have any adverse impact.

Alternative 3: Transit Priority

Alternative 3 also includes the same number of Health, Educational, and Recreational Services jobs and "Other" category jobs that would fill service roles as the proposed Plan. Alternative 3 focuses growth in urbanized areas (TPPs), indicating that overall service needs would be similar to the proposed Plan, and likely less than under the No Project alternative or Alternative 4.

An increase in roadway capacity may heighten the demand for police, fire, and emergency services, but most of this increase will occur in areas that are already covered by existing services. Since roadway lane capacity will increase three percent over existing conditions (the same as the proposed Plan), the increase in demand is expected to be small and may not require additional services beyond what is currently provided. The transportation program proposed under Alternative 3 is nearly identical to the proposed Plan except that it excludes two major expressway expansion projects in primarily rural areas along I-80 and I-580 and provides additional funding to transit services. Alternative 3 would result in the fewest total vehicle hours of delay (both recurring and non-recurrent) of all the alternatives. Increases in congestion could impact service levels for fire and police services, thereby requiring additional facilities or staffing in order to meet service standards on congested roadways; Alternative 3 would result in the least impact to congestion. Finally, additional transit access as well as pedestrian and bicycle projects throughout the region will help connect residents to local services. In sum, transportation effects are expected to be less than significant, similar to under the proposed Plan.

Impacts on neighborhood and regional parks or other recreational facilities would be tied to regional population growth. While variations in the distribution of population growth may result in localized impacts, since regional population growth is consistent with the proposed Plan, this alternative would be expected to have similar impacts as the proposed Plan, the No Project alternative, and Alternative 5. Impacts would be expected to be less than Alternative 4. Transportation improvements may improve access to recreational resources, but are not expected to have any adverse impact.

Alternative 4: Enhanced Network of Communities

With its higher anticipated population and employment growth, Alternative 4 would have the potential to introduce more development and result in greater public service and recreation demand. However, Alternative 4 also includes more Health, Educational, and Recreational Services jobs and "Other" category jobs that would fill service roles needed as a result of the larger population. Further, growth would be less focused in PDAs as compared to the proposed Plan and therefore more dispersed, indicating that service needs may also be more dispersed and therefore greater than under the proposed Plan since fewer services would be able to make use of facilities within existing service areas.

An increase in roadway capacity may heighten the demand for police, fire, and emergency services, but most of this increase will occur in areas that are already covered by existing services. Since roadway lane capacity will increase three percent over existing conditions (the same as the proposed Plan), the increase in demand is expected to be small and may not require additional services beyond what is currently provided. Alternative 4 includes the same transportation network as the proposed Plan, which would improve multimodal access to public facilities and services. However, as a result of the larger population making use of the network, total vehicle hours of delay (both recurring and non-recurrent) would be the second highest of all the alternatives, following the No Project alternative. Increases in congestion could impact service levels for fire and police services, thereby requiring additional facilities or staffing in order to meet service standards on congested roadways; Alternative 4 would result in the second highest impact to congestion as compared to all the alternatives. Finally, additional transit access as well as pedestrian and bicycle projects throughout the region will help connect residents to local services. In sum, transportation effects are expected to be less than significant, similar to under the proposed Plan.

Impacts on neighborhood and regional parks or other recreational facilities would be tied to regional population growth. While variations in the distribution of population growth may result in localized impacts, this alternative would be potentially greater than the proposed Plan, the No Project alternative, and Alternatives 3 and 5, due to the larger total population. Transportation improvements may improve access to recreational resources, but are not expected to have any adverse impact.

Alternative 5: Environment, Equity and Jobs

Alternative 3 includes the same number of Health, Educational, and Recreational Services jobs and "Other" category jobs that would fill service roles as the proposed Plan. Alternative 3 focuses growth in urbanized areas (PDAs and TPPs), indicating that overall service needs would be similar to the proposed Plan, and likely less than under the No Project alternative or Alternative 4.

An increase in roadway capacity may heighten the demand for police, fire, and emergency services, but most of this increase will occur in areas that are already covered by existing services. Since roadway lane capacity will increase only one percent over existing conditions (two percent less than the proposed Plan), the increase in demand is expected to be small and may not require additional services beyond what is currently provided. Alternative 5 proposes approximately 459 transportations projects, which is fewer than the proposed Plan or Alternatives 3 or 4, but more than the No Project alternative. Alternative 5 would result in more total vehicle hours of delay (both recurring and non-recurrent) than proposed Plan but less than the No Project alternative and Alternative 4. Increases in congestion could impact service levels for fire and police services, thereby requiring additional facilities or staffing in order to meet service standards on congested roadways; Alternative 5 would result in potentially greater impacts than the proposed Plan to congestion. Finally, additional transit access as well as pedestrian and bicycle projects throughout the region will help connect residents to local services. In sum, transportation effects are expected to be less than significant, similar to under the proposed Plan.

Impacts on neighborhood and regional parks or other recreational facilities would be tied to regional population growth. While variations in the distribution of population growth may result in localized impacts, since regional population growth is consistent with the proposed Plan, this alternative would be expected to have similar impacts as the proposed Plan, the No Project alternative, and Alternative 3. Impacts would be expected to be less than Alternative 4. Transportation improvements may improve access to recreational resources, but are not expected to have any adverse impact.

Summary of All Alternatives

The following table (**Table 3.1-56**) includes a summary of impacts related to the proposed Plan and each alternative by issue area. **Bold** cells indicate the alternative(s) that perform the best environmentally for each impact.

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Transportation					
Impact 2.1-1: Commute travel times	Travel times substantially greater than the proposed Plan due to the inclusion of fewer expansion projects and a more dispersed land use pattern. (LS)	Travel times expected to be less than significant. (LS)	**Travel times substantially less than the proposed Plan, especially for users of public transit. (LS)**	Same as proposed Plan. (LS)	Same as proposed Plan. (LS)
Impact 2.1-2: Non-commute travel times	Travel times slightly longer than the proposed Plan due to the inclusion of fewer expansion projects. (LS)	**Travel times expected to be less than significant. (LS)**	**Same as proposed Plan. (LS)**	Travel times slightly longer than the proposed Plan due to higher levels of population and job growth. (LS)	Travel times slightly longer than the proposed Plan due to greater utilization of public transit and higher levels of traffic congestion. (LS)
Impact 2.1-3: Per-capita congested vehicle miles traveled	Congestion substantially greater than the proposed Plan as a result of fewer road and transit expansion projects. (SU)	Congestion would increase substantially. (SU)	**Congestion substantially less than the proposed Plan, as a result of increased transit services focused on alleviating highly congested corridors. (SU)**	Highly congested conditions due to higher levels of population and job growth, albeit less congestion than the No Project alternative. (SU)	Slightly greater congestion compared to the proposed Plan, but less than No Project and Alternative 4 due to exclusion of all highway projects. (SU)
Impact 2.1-4: Per-capita vehicle miles traveled (VMT)	Significantly greater VMT per capita compared to all other alternatives due to more dispersed land use	**Decline in VMT per capita. (NI)**	Greater VMT per capita, particularly for non-commute trips, compared to the proposed Plan due to	Same as proposed Plan. (NI)	Slightly greater VMT per capita than the proposed Plan, but less than No Project and Alternative 3 due to

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
	development pattern. (NI)		greater levels of growth in transit-served locations in the suburbs. (NI)		additional growth in suburban locations with less-frequent transit services. (NI)
Impact 2.1-5: Transit capacity exceedance	Transit utilization slightly lower than the proposed Plan due to a more dispersed land use pattern. (NI)	**Transit utilization below transit capacity supplied by operators. (NI)**	Transit utilization below the proposed Plan due to improved transit service frequencies. (NI)	Same as proposed Plan. (NI)	Transit utilization slightly less than the proposed Plan, while slightly greater than the No Project and Alternative 3 due to greater transit service levels, combined with significantly greater ridership. (NI)
Air Quality					
Impact 2.2-1: Consistency with Air Quality Plans	**Inconsistent with the goals and objectives of the 2010 Clean Air Plan (CAP) as a result of the dispersed land use pattern and higher VMT. (SU)**	**Consistent with the goals and objectives of the 2010 CAP due to emphasis on focused growth and reducing VMT. (LS)**	**Same as proposed Plan. (LS)**	**Same as proposed Plan. (LS)**	**Same as proposed Plan. (LS)**
Impact 2.2-2: Construction-Related Emissions	Lower than proposed Plan due to fewer transportation investments. (SU)	Construction-related emissions would increase due to transportation and land use projects in the proposed Plan. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)	Highest emissions compared to all other alternatives due to increase in land use development to accommodate additional growth. (SU,	**Lower than proposed Plan as a result of fewer roadway projects. (SU, SB 375 Streamlining LS-M)**

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
				SB 375 Streamlining LS-M)	
Impact 2.2-3a: Criteria Pollutant Emissions (ROG, NO_x, CO, and $PM_{2.5}$)	Higher emissions for NOx, CO, and $PM_{2.5}$ due to dispersed land use pattern and absence of uncommitted transportation projects. Emissions of ROG slightly lower than the proposed Plan due to more VMT in the Express Lane Network corridors. (NI)	Decreased emissions of ROG, NOx, CO, and $PM_{2.5}$ due to stringent emission controls and focused growth. (NI)	All criteria emissions would be slightly lower than the proposed Plan due to the emphasis on locating higher density development around transit stations. (NI)	Highest emissions compared to all other alternatives. Greater congestion resulting from no additional roadway or transit capacity beyond what is funded in the proposed Plan to accommodate the higher amount of growth. (NI)	**Lowest emissions compared to all other alternatives due to emphasis on increased transit capacity. (NI)**
Impact 2.2-3b: Increased emissions of PM_{10}	Slightly higher PM_{10} emissions than the proposed Plan. (SU)	Increased PM_{10} emissions due to increased VMT from existing conditions. (SU)	Slightly lower PM_{10} emissions than the proposed Plan, but still higher than existing conditions. (SU)	Slightly higher PM_{10} emissions than the proposed Plan. (SU)	Slightly lower PM_{10} emissions than the proposed Plan, but still higher than existing conditions. (SU)
Impact 2.2-4: Regional toxic air contaminant emissions	Emissions higher than the proposed Plan due to fewer transportation investments and increased VMT. (NI)	Decreased emissions due to stringent emission controls and focused growth. (NI)	Lower emissions compared to proposed Plan due to higher densities around transit stations, which would reduce vehicle use and VMT. (NI)	Highest emissions compared to all other alternatives due to higher employment and population growth, more vehicles in use, and higher VMT. (NI)	**Lowest emissions compared to all other alternatives due to highest investments in transit capacity. (NI)**
Impact 2.2-5(a): Local pollutant analysis:	**Exposure of potentially fewer new sensitive receptors as**	There would be a net increase in sensitive receptors as a result of	Same as proposed Plan. (SU)	Same as proposed Plan (SU)	Same as proposed Plan. (SU)

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
sensitive receptors located in TPP areas where the increased cancer risk is above the threshold	**compared to all other alternatives due to the dispersed land use pattern. (SU)**	the focused land use pattern. (SU)			
Impact 2.2-5(b): Local pollutant analysis: sensitive receptors located in TPP corridors within set distances to mobile or stationary sources of TAC or $PM_{2.5}$ emissions	**Exposure of potentially fewer new sensitive receptors as compared to all other alternatives due to the dispersed land use pattern. (SU)**	There would be a net increase in sensitive receptors as a result of the focused land use pattern. (SU)	Same as proposed Plan. (SU)	Same as proposed Plan. (SU)	Same as proposed Plan. (SU)
Impact 2.2-5(c): Local pollutant analysis: consistency with CRRPs	Same as proposed Plan. (LS)	Where a proposed project is consistent with an adopted CRRP, the impact would be less than significant. (LS)	Same as proposed Plan. (LS)	Same as proposed Plan. (LS)	Same as proposed Plan. (LS)
Impact 2.2-7: Disproportionally impacted communities (CARE)	Same as proposed Plan. (SU)	TAC and/or PM2.5 exhaust emissions in CARE Communities would have a slightly larger increase or	Same as proposed Plan. (SU)	Slightly larger impact in CARE communities than the proposed Plan. (SU)	Same as proposed Plan. (SU)

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
		smaller decrease as compared to non-CARE Communities. (SU)			
Land Use, Housing, Agriculture, and Physical Development					
Impact 2.3-1: Residential or business disruption or displacement	Long-term land use effects similar to proposed Plan. Least potential transportation impacts at localized level compared to all other alternatives. (SU)	Potential long-term localized impacts in areas where substantial land use changes are identified. Potential transportation impacts at localized level. (SU, SB 375 Streamlining LS-M)	Long term land use effects similar to the proposed Plan. Potential transportation impacts at localized level would be slightly less compared to the proposed Plan and Alternative 4, but greater than the No Project and Alternatives 5. (SU, SB 375 Streamlining LS-M)	Long term land use effects greater than the proposed Plan as a result of the larger number of land use development projects. Potential transportation impacts at localized level would be the same as the proposed Plan and greater than remaining alternatives. (SU, SB 375 Streamlining LS-M)	Long term land use effects similar to the proposed Plan. Potential transportation impacts at localized level less compared to the proposed Plan and greater than the No Project alternative. (SU, SB 375 Streamlining LS-M)
Impact 2.3-2: Community alteration or separation	Land use impacts same as the proposed Plan. Least impacts from transportation projects compared to all other alternatives. (SU)	Potential community separation impacts from land use development due to variation in local land use controls and standards results. No long term impacts due to transportation projects. (SU, SB 375 Streamlining LS-M)	Land use impacts same as proposed Plan. Impacts due to transportation projects slightly less than the proposed Plan and Alternative 4, but greater than the No Project alternative and Alternative 5. (SU, SB	Land use impacts greater than proposed Plan due to larger number of land use development projects. Impacts due to transportation projects similar to proposed Plan, and greater than the remaining	Land use impacts same as proposed Plan. Impacts due to transportation projects less than proposed Plan and greater than the No Project alternative. (SU, SB 375 Streamlining LS-M)

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
			375 Streamlining LS-M)	alternatives. (SU, SB 375 Streamlining LS-M)	
Impact 2.3-3: Conflict with adopted land use plans	**Does not include a land use plan, so would not conflict with any local plans. (LS)**	Land use authority remains with relevant local jurisdictions and permitting agencies. (LS)	Same as the proposed Plan. (LS)	Same as the proposed Plan. (LS)	Same as the proposed Plan. (LS)
Impact 2.3-4: Conversion of agricultural land and open space to urbanized land	Greatest conversion of farmland compared to all alternatives. Conversion of 16,962 acres of total farmland, 5,2002 acres of important farmland, 4,666 acres of Williamson Act lands, and 1,910 acres of open space. (SU)	Conversion of 5,912 acres of total farmland, 2,179 acres of important farmland, 724 acres of Williamson Act lands, and 2,396 acres of open space. (SU)	Generally slightly more farmland conversion than under proposed Plan but slightly less open space conversion. Conversion of 6,617 acres of total farmland, 2,234 acres of important farmland, 1,615 acres of Williamson Act lands, and 1,849 acres of open space. (SU)	**Generally slightly less conversion than under the proposed Plan. Conversion of 5,338 acres of total farmland, 2,339 acres of important farmland, 1,615 acres of Williamson Act lands, and 1,443 acres of open space. (SU)**	Generally slightly more farmland conversion than under the proposed Plan but slightly less open space conversion. Conversion of 7,343 acres of total farmland, 2,539 acres of important farmland, 1,755 acres of Williamson Act lands, and 1,808 acres of open space. (SU)
Impact 2.3-5: Conversion of forest land to urbanized land	Conversion of 2,577 acres, the most compared to all other alternatives. (SU)	Conversion of 1,395 acres. (SU)	Conversion of 1,766 acres, slightly more than under the proposed Plan. (SU)	**Conversion of 270 acres, the fewest of all alternatives (SU)**	Conversion of 1,981 acres, slightly more than under the proposed Plan. (SU)
Energy					
Impact 2.4-1: Per capita energy consumption	Less per capita energy use than the proposed Plan, but more than	Decrease in per capita energy use compared to existing conditions. (LS)	Slightly higher per capita energy use compared to proposed	**Lowest per capita energy use of all the alternatives (3.3 less**	Less than the proposed Plan, but more than Alternative 4. (LS)

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
	Alternative 4. (LS)		Plan. (LS)	**than the proposed Plan). (LS)**	
Impact 2.4-2: Inconsistency with adopted plans or policies related to energy conservation	Conflicts with California energy policy as it would not promote compact, mixed used land uses. (SU)	**Consistent with California energy policy as it promotes compact land uses and transit use. (NI)**	**Same as proposed Plan. (NI)**	**Same as proposed Plan. (NI)**	**Same as proposed Plan. (NI)**
Climate Change and Greenhouse Gases					
Impact 2.5-1: Failure to reduce passenger vehicle or light duty truck emissions	Inconsistent with SB 375, as modeled CO2 emissions do not meet the SB 375 targeted reductions in 2020 or 2035. Reductions are less than all other alternatives. (SU)	**Consistent with SB 375, as modeled CO2 emissions meet the SB 375 targeted reductions for per capita car and light duty truck emissions. Proposed Plan would result in greater emission reductions than the SB 375 targets. (NI)**	Consistent with SB 375, as modeled CO2 emissions meet the SB 375 targeted. Reductions slightly less than under proposed Plan, and similar to reductions under Alternative 5. (NI)	Inconsistent with SB 375, as modeled CO2 emissions do not meet the SB 375 targeted reductions in 2035. Reductions are less than proposed Plan, Alternative 3, and Alternative 5. Reductions are greater than under No Project alternative. (SU)	**Consistent with SB 375, as modeled CO2 emissions meet the SB 375 targeted reductions. Reductions are the same as the proposed Plan, and similar to reductions under Alternative 3. (NI)**
Impact 2.5-2: Increase in GHG emissions	Forecast GHG emissions are expected to decline by 12 percent from 2010 to 2040. This is a lower reduction than under proposed Plan, Alternative 3, or Alternative 5, but	Forecast GHG emissions are expected to decline by 15 percent from 2010 to 2040. (NI)	Forecast GHG emissions are expected to decline by 16 percent from 2010 to 2040. This is a greater decline than under proposed Plan. (NI)	Forecast GHG emissions are expected to decline by 10 percent from 2010 to 2040. This is the lowest reduction of all alternatives. (NI)	**Forecast GHG emissions are expected to decline by 17 percent from 2010 to 2040. This is the greatest decline of all alternatives. (NI)**

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
	greater than under Alternative 4. (NI)				
Impact 2.5-3: Impede attainment of Executive Orders S-3-05 and B-16-2012	Same as proposed Plan. (LS)	Declining per capita car and light duty truck emissions and declining total land use and on-road emissions moves the Bay Area in the direction of achieving the executive order goals, and does not impede achievement of identified goals. (LS)	Same as proposed Plan. (LS)	Same as proposed Plan. (LS)	Same as proposed Plan. (LS)
Impact 2.5-4: Conflict with other plans, policies, or regulations for reducing GHGs	Fails to meet SB 375 targets and is found to be inconsistent with State goals and mandates, resulting in a significant impact. (SU)	**Consistent with other applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs, including local CAPs or GHG reduction plans or State goals and mandates, comparable with Alternatives 3 and 5. (NI)**	**Same as the proposed Plan. (NI)**	Fails to meet SB 375 targets and is found to be inconsistent with State goals and mandates, resulting in a significant impact. (SU)	**Same as the proposed Plan. (NI)**
Impact 2.5-5: Increase transportation	17 fewer transportation investments and projects in SLR zone	High level of investments in transportation projects	Transportation projects and related impacts comparable to	Transportation projects and related impacts comparable to	**Nine fewer transportation projects than**

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
investments in areas regularly affected by sea level rise (SLR) by midcentury	compared to the proposed Plan. Lowest potential for inclusion of SLR adaptation strategies. (SU)	and potential for transportation project-related impacts (32 projects within the SLR zone). High potential for inclusion of SLR adaptation strategies to mitigate impacts. (SU, SB 375 Streamlining LS-M)	proposed Plan (32 projects within the SLR zone). Same potential for inclusion of SLR adaptation strategies as proposed Plan. (SU, SB 375 Streamlining LS-M)	proposed Plan (32 projects within the SLR zone). Same potential for inclusion of SLR adaptation strategies as proposed Plan. (SU, SB 375 Streamlining LS-M)	**proposed Plan and less potential for transportation project-related impacts. Same potential for inclusion of SLR adaptation strategies as proposed Plan. (SU, SB 375 Streamlining LS-M)**
Impact 2.5-6: Increase the population in areas regularly affected by sea level rise by midcentury	Eight percent fewer residents in SLR inundation zone than proposed Plan. (SU)	Increase of 25,750 residents in SLR inundation zone. (SU)	One percent fewer residents in SLR inundation zone than proposed Plan. (SU)	Five percent fewer residents in SLR inundation zone than proposed Plan. (SU)	**Twelve percent fewer residents in SLR inundation zone compared to proposed Plan. (SU)**
Impact 2.5-7: Increase land use development in areas regularly affected by sea level rise by midcentury	Four percent less commercial and industrial land use development in SLR inundation zone than proposed Plan. Nine percent smaller increase in residential land use development within the SLR inundation zone	Increase in commercial and industrial land use development in SLR inundation zone (27,870 jobs). Large increase in residential land use development in SLR inundation zone (4,400 households). (SU)	Eleven percent less commercial and industrial land use development in SLR inundation zone than proposed Plan. Two percent more residential land use development in SLR zone than proposed Plan. (SU)	**22 percent less commercial and industrial land use development in SLR inundation zone compared to proposed Plan.** Three percent less residential land use development in SLR inundation zone than proposed Plan. (SU)	Twelve percent less commercial and industrial land use development in SLR inundation zone than proposed Plan. **Ten percent less residential land use development in SLR inundation zone compared to proposed Plan.** (SU)

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
	compared to Proposed Plan. (SU)				
Noise					
Impact 2.6-1: Temporary construction noise or vibration in excess of local standards	Fewer transportation projects results in lower extent of construction-related noise than proposed Plan. Expanded land use development areas results in construction-related noise affecting more people than proposed Plan. (SU)	**Temporary construction-related noise impacts from construction of transportation investment projects and land use development. (SU, SB 375 Streamlining LS-M)**	Fewer transportation projects results in lower extent of construction-related noise than the proposed Plan. Expanded land use development areas results in construction-related noise affecting more people than the proposed Plan. (SU, SB 375 Streamlining LS-M)	Same transportation project construction-related noise as the proposed Plan. Greater total growth results in construction-related noise affecting more people than the proposed Plan and all other alternatives. (SU, SB 375 Streamlining LS-M)	Fewer transportation projects results in lower extent of construction-related noise than the proposed Plan. Expanded land use development areas results in construction-related noise affecting more people than the proposed Plan. (SU, SB 375 Streamlining LS-M)
Impact 2.6-2: Highway noise levels that approach or exceed FHWA Noise Abatement Criteria	**4,319 roadway miles exposed to noise levels at or above 66 dBA, the lowest of all alternatives. (SU)**	4,770 roadway miles exposed to noise levels at or above 66 dBA. (SU, SB 375 Streamlining LS-M)	4,697 roadway miles exposed to noise levels at or above 66 dBA. (SU, SB 375 Streamlining LS-M)	4,905 roadway miles exposed to noise levels at or above 66 dBA, resulting in the most severe impacts of all the alternatives. (SU, SB 375 Streamlining LS-M)	4,535 roadway miles exposed to noise levels at or above 66 dBA, resulting in the least severe impacts of action alternatives. (SU, SB 375 Streamlining LS-M)
Impact 2.6-3: Transit noise exceeding FTA criteria	**Some transit extension projects included in the proposed Plan would not occur. Smaller increase in transit vibration compared to**	Transit extension projects would occur. Potential increase in transit vibration when transit lines are extended to new areas. (SU)	Funding transferred away from roadway improvements to transit agencies. Potential transit vibration increase compared to the proposed Plan due	Transit vibration would be the same as the proposed Plan because it would implement the same Preferred Transportation Investment Strategy.	Funding transferred away from roadway improvements to transit agencies. Potential transit vibration increase compared to the proposed Plan due

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
	all other Alternatives. (SU)		to extended service times or routes of service. (SU)	(SU)	to extended service times or routes of service. (SU)
Impact 2.6-4: Transit vibration exceeding FTA criteria	**Some transit extension projects included in the proposed Plan would not occur. Smaller increase in transit vibration compared to proposed Plan or other Alternatives. (SU)**	Transit extension projects would occur. Potential increase in transit vibration when transit lines are extended to new areas. (SU)	Funding transferred away from roadway improvements to transit agencies. Potential transit vibration increase compared to the proposed Plan due to extended service times or routes of service. (SU)	Transit vibration would be the same as the proposed Plan because it would implement the same Preferred Transportation Investment Strategy. (SU)	Funding transferred away from roadway improvements to transit agencies. Potential transit vibration increase compared to the proposed Plan due to extended service times or routes of service. (SU)
Impact 2.6-5: Excessive noise near airport planning areas	Same as proposed Plan. (LS)	Noise exposure to aircraft or airports could occur, particularly in PDAs close to existing airports. Regulatory framework will reduce noise exposure impacts resulting from incompatible land uses. (LS)	Same as proposed Plan. (LS)	Same as proposed Plan. (LS)	Same as proposed Plan. (LS)
Geology and Seismicity					
Impact 2.7-1: Risk from fault rupture	**Same as proposed Plan. (LS-M)**	**Possible risk mitigated by existing regulations. (LS-M)**	**Same as proposed Plan. (LS-M)**	Higher projected growth would increase population exposed to issue, although risk	**Same as proposed Plan. (LS-M)**

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
				mitigated by existing regulations. (LS-M)	
Impact 2.7-2: Risk from ground shaking	**Same as proposed Plan. (LS-M)**	**Possible risk mitigated by existing regulations. (LS-M)**	**Same as proposed Plan. (LS-M)**	Higher projected growth would increase population exposed to issue, although risk mitigated by existing regulations. (LS-M)	**Same as proposed Plan. (LS-M)**
Impact 2.7-3: Risk from ground failure, including liquefaction	**Same as proposed Plan. (LS-M)**	**Possible risk mitigated by building code requirements. (LS-M)**	**Same as proposed Plan. (LS-M)**	Higher projected growth would increase population exposed to issue, although risk mitigated by existing regulations. (LS-M)	**Same as proposed Plan. (LS-M)**
Impact 2.7-4: Landslide risk	**Same as proposed Plan. (LS-M)**	**Possible risk mitigated by building code requirements. (LS-M)**	**Same as proposed Plan. (LS-M)**	Higher projected growth would increase population exposed to issue, although risk mitigated by existing regulations. (LS-M)	**Same as proposed Plan. (LS-M)**
Impact 2.7-5: Soil erosion or loss of topsoil	**Same as proposed Plan. (LS-M)**	**Possible risk mitigated by building code requirements. (LS-M)**	**Same as proposed Plan. (LS-M)**	Higher projected growth would increase population exposed to issue, although risk mitigated by existing regulations. (LS-M)	**Same as proposed Plan. (LS-M)**
Impact 2.7-6: Development on	**Same as proposed Plan. (LS-M)**	**Possible risk mitigated by building code**	**Same as proposed Plan. (LS-M)**	Higher projected growth would increase population exposed to	**Same as proposed Plan. (LS-M)**

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Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
unstable soils		**requirements. (LS-M)**		issue, although risk mitigated by existing regulations. (LS-M)	
Water Resources					
Impact 2.8-1: Violation of water quality standards or waste or storm water discharge requirements	Slight increase in potential for adverse impacts on water quality associated with dispersed construction compared to proposed Plan, but mitigated through implementation of NPDES permit requirements. (LS-M)	**Construction and operation (drainage) related impacts mitigated through implementation of NPDES permit requirements. (LS-M)**	**Same as proposed Plan. (LS-M)**	Generally greater impacts related to higher growth and associated development compared to the proposed Plan, but mitigated through implementation of NPDES permit requirements. (LS-M)	**Same as proposed Plan. (LS-M)**
Impact 2.8-2: Interference with groundwater recharge	Increased impervious surface area due to dispersed development results in increased adverse impacts compared to proposed Plan, but mitigated by adherence to drainage control requirements on local and state level. (LS-M)	Increased impervious surface area as a result of new development; impacts mitigated by adherence to drainage control requirements on local and state level. (LS-M)	Similar land use impacts compared to proposed Plan but smaller increases in impervious surface area from transportation projects, but mitigated by adherence to drainage control requirements on local and state level. (LS-M)	Potentially greater increase in impervious surface tied to land use development compared to the proposed Plan but mitigated by adherence to drainage control requirements on local and state level. (LS-M)	**Similar land use impacts but smaller increases in impervious surface area from transportation projects compared to the proposed Plan, but mitigated by adherence to drainage control requirements on local and state level. (LS-M)**

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Impact 2.8-3: Increase in erosion that affects water quality	Same as proposed Plan. (LS-M)	Possible risk mitigated by existing regulations. (LS-M)	Same as proposed Plan. (LS-M)	Same as proposed Plan. (LS-M)	Same as proposed Plan. (LS-M)
Impact 2.8-4: Increase in non-point pollution of stormwater runoff from litter, airborne emissions, or vehicle discharge	Increased impervious surface area due to dispersed development results in increased adverse impacts compared to proposed Plan, but mitigated by adherence to drainage control requirements on local and state level. (LS-M)	Increased impervious surface area as a result of new development; impacts mitigated by adherence to drainage control requirements on local and state level. (LS-M)	Similar land use impacts compared to proposed Plan but smaller increases in impervious surface area from transportation projects, but mitigated by adherence to drainage control requirements on local and state level. (LS-M)	Potentially greater increase in impervious surface tied to land use development compared to the proposed Plan but mitigated by adherence to drainage control requirements on local and state level. (LS-M)	**Similar land use impacts but smaller increases in impervious surface area from transportation projects compared to the proposed Plan, but mitigated by adherence to drainage control requirements on local and state level. (LS-M)**
Impact 2.8-5: Increase in non-point pollution of stormwater runoff from construction sites	Increased impervious surface area due to dispersed development results in increased adverse impacts compared to proposed Plan, but mitigated by adherence to drainage control requirements on local and state level. (LS-M)	Increased impervious surface area as a result of new development; impacts mitigated by adherence to drainage control requirements on local and state level. (LS-M)	Similar land use impacts compared to proposed Plan but smaller increases in impervious surface area and stormwater pollution potential from transportation projects, but mitigated by adherence to drainage control requirements on	Potentially greater increase in impervious surface tied to land use development compared to the proposed Plan but mitigated by adherence to drainage control requirements on local and state level. (LS-M)	**Similar land use impacts but much smaller increases in impervious surface area and stormwater pollution potential from transportation projects compared to the proposed Plan, but mitigated by adherence to drainage**

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
			local and state level. (LS-M)		**control requirements on local and state level. (LS-M)**
Impact 2.8-6: Increase in runoff due to impervious surfaces, cut and fill slopes, alterations to drainage	Increased impervious surface area due to dispersed development results in increased adverse impacts compared to proposed Plan, but mitigated by adherence to drainage control requirements on local and state level. (LS-M)	Increased impervious surface area as a result of new development; impacts mitigated by adherence to drainage control requirements on local and state level. (LS-M)	Similar land use impacts compared to proposed Plan but smaller increases in impervious surface area and stormwater pollution potential from transportation projects, but mitigated by adherence to drainage control requirements on local and state level. (LS-M)	Potentially greater increase in impervious surface tied to land use development compared to the proposed Plan but mitigated by adherence to drainage control requirements on local and state level. (LS-M)	**Similar land use impacts but much smaller increases in impervious surface area and stormwater pollution potential from transportation projects compared to the proposed Plan, but mitigated by adherence to drainage control requirements on local and state level. (LS-M)**
Impact 2.8-7: Structures that would impede or redirect floodwaters	**Impacts would be the same for land use changes but reduced for transportation projects compared to proposed Plan. (LS-M)**	Impacts may occur with new development, depending on specific project locations. (LS-M)	Same as proposed Plan. (LS-M)	Impacts would increase for land use changes but be the same for transportation projects compared to the proposed Plan. (LS-M)	**Impacts would be the same for land use changes but reduced for transportation projects compared to proposed Plan. (LS-M)**
Impact 2.8-8: Exposure of people to risk from flooding, seiche, tsunami,	**Impacts would be the same for land use changes but reduced for transportation projects compared to**	Impacts may occur with new development, depending on project specific locations. (LS)	Same as proposed Plan. (LS)	Impacts would increase for land use changes but be the same for transportation projects compared to the	**Impacts would be the same for land use changes but reduced for transportation projects compared to**

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Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
mudflows	**proposed Plan. (LS)**			proposed Plan. (LS)	**proposed Plan. (LS)**
Biological Resources					
Impact 2.9-1a: Adverse effects on species identified as candidate, sensitive, or special-status	Greatest overall adverse effect relative to all alternatives. (SU)	May have substantial adverse effects. (SU)	Adverse effects comparable to proposed Plan. (SU)	Greater overall adverse effect on than proposed Plan. (SU)	**Least overall adverse effect relative to all alternatives. (SU)**
Impact 2.9-1b: Adverse effects on critical habitat	Greatest adverse effect relative to all alternatives. (SU)	May have adverse impacts. (SU)	Adverse effects comparable to proposed Plan. (SU)	Greater overall adverse effect compared to proposed Plan. (SU)	**Least overall adverse effect relative to all alternatives. (SU)**
Impact 2.9-1c: Adverse effects on non-listed special-status raptor and nesting bird species	Greatest adverse effect relative to all alternatives. (SU)	Construction activities could have adverse effects. (SU, SB 375 Streamlining LS-M)	Adverse effects comparable to proposed Plan. (SU, SB 375 Streamlining LS-M)	Greater overall adverse effect compared to proposed Plan. (SU, SB 375 Streamlining LS-M)	**Least overall adverse effect relative to all alternatives. (SU, SB 375 Streamlining LS-M)**
Impact 2.9-2: Adverse effect son riparian habitat, federally protected, or other sensitive natural communities	Greatest adverse effect relative to all alternatives. (SU)	May have adverse effects. (SU)	Adverse effects comparable to proposed Plan. (SU)	Greater overall adverse effect compared to proposed Plan. (SU)	**Least overall adverse effect relative to all alternatives. (SU)**

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Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Impact 2.9-3: Interference with the movement of fish or wildlife species or use of native wildlife nursery sites	Greatest overall impact from development relative to all alternatives. (SU)	May have substantial effects. (SU)	Interference comparable to proposed Plan. (SU)	Greater overall interference compared to Proposed Plan. (SU)	**Least overall adverse effect relative to all alternatives. (SU)**
Impact 2.9-4: Conflict with adopted local conservation policies	Greatest overall level of conflict relative to all alternatives. (LS-M)	May conflict compared to existing conditions. (LS-M)	Level of conflict comparable to proposed Plan. (LS-M)	Greater overall level of conflict compared to proposed Plan. (LS-M)	**Least potential for conflict relative to all alternatives. (LS-M)**
Visual Resources					
Impact 2.10-1: Block panoramic views or significant landscapes	Greater impacts from more dispersed pattern of land development, but fewer impacts from less transportation projects; generally comparable level of impacts to proposed Plan. (SU)	Possible impacts from infill development, but greater risk from development at urban fringe, as well as from transportation projects in rural areas. (SU, SB 375 Streamlining LS-M)	Same as proposed plan. (SU, SB 375 Streamlining LS-M)	Greater growth overall with more dispersed household growth is expected to result in more new development in suburban and undeveloped areas and more significant impacts compared to proposed Plan. (SU, SB 375 Streamlining LS-M)	**Same growth and comparable dispersion of development as proposed Plan, but less of an impact due to fewer transportation projects. (SU, SB 375 Streamlining LS-M)**
Impact 2.10-2: Alter appearance of scenic highways	Potential for greater land use impacts compared to proposed Plan due to more dispersed development,	Potential for impacts due to land use and transportation projects. (SU)	Same as proposed Plan. (SU)	Potential for greater land use impacts compared to proposed Plan due to greater population growth and	**Similar land use impacts compared to proposed Plan but fewer transportation impacts due to smaller**

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Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
	but the fewest transportation impacts of all alternatives. (SU)			more dispersed development, but the same transportation impacts. (SU)	**transportation network. (SU)**
Impact 2.10-3: Create significant contrasts with existing community	Same as proposed Plan. (SU)	Potential for localized impacts due to land use and transportation projects. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)
Impact 2.10-4: Add urban character to rural area or modern element to historic area	Potential for greater land use impacts compared to proposed Plan due to more dispersed development, but the fewest transportation impacts of all alternatives. (SU)	Potential for impacts due to land use and transportation projects. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)	Potential for greater land use impacts compared to proposed Plan due to greater population growth and more dispersed development, but the same transportation impacts. (SU, SB 375 Streamlining LS-M)	**Similar land use impacts compared to proposed Plan but fewer transportation impacts due to smaller transportation network. (SU, SB 375 Streamlining LS-M)**
Impact 2.10-5: Substantial sources of light and glare	More dispersed development results in greater impacts than proposed Plan. Fewer transportation projects results in fewer impacts than proposed Plan. (SU)	New substantial impacts from land development and transportation projects. (SU, SB 375 Streamlining LS-M)	Same as proposed plan. (SU, SB 375 Streamlining LS-M)	More dispersed development results in greater impacts than proposed Plan. Same impacts as the proposed Plan from transportation projects. (SU, SB 375 Streamlining LS-M)	Less than proposed Plan due to similar land use development and fewer transportation projects. (SU, SB 375 Streamlining LS-M)

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Impact 2.10-6: Cast shadows	**Less land use-related impacts compared to proposed Plan due to more dispersed/lower density development. Fewest transportation projects results in fewer impacts than proposed Plan. (SU)**	Potential for significant land use-related impacts, particularly in dense urban areas due to compact growth. Few transportation-related impacts expected. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)	Less land use-related impacts due to more dispersed/lower density development. Same transportation-related impacts as proposed Plan. (SU, SB 375 Streamlining LS-M)	Similar land use-related impacts but fewer transportation-related impacts compared to proposed Plan. (SU, SB 375 Streamlining LS-M)
Cultural Resources					
Impact 2.11-1: Disturb or destroy historical resources	Greater land use impact than proposed Plan due to more dispersed development but the least transportation-related impacts due to a smaller transportation network expansion. (SU)	**Potential impacts from physical damage, infill development that is visually incompatible with a designated historic district, or roadway improvements that substantially alter the character of a designated historic structure or district. (SU, SB 375 Streamlining LS-M)**	**Same as proposed Plan. (SU, SB 375 Streamlining LS-M)**	**Same as proposed Plan. (SU, SB 375 Streamlining LS-M)**	**Same as proposed Plan. (SU, SB 375 Streamlining LS-M)**

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Impact 2.11-2: Disturb or destroy archaeological resources	Potential for greater land use impacts compared to proposed Plan due to more dispersed development, but the fewest transportation impacts of all alternatives. (SU)	Potential for impacts due to land use and transportation projects. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)	Potential for greater land use impacts compared to proposed Plan due to greater population growth and more dispersed development, but the same transportation impacts. (SU, SB 375 Streamlining LS-M)	**Similar land use impacts compared to proposed Plan but fewer transportation impacts due to smaller transportation network. (SU, SB 375 Streamlining LS-M)**
Impact 2.11-3: Disturb or destroy paleontological and/or geological	Potential for greater land use impacts compared to proposed Plan due to more dispersed development, but the fewest transportation impacts of all alternatives. (SU)	Potential for impacts due to land use and transportation projects. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)	Potential for greater land use impacts compared to proposed Plan due to greater population growth and more dispersed development, but the same transportation impacts. (SU, SB 375 Streamlining LS-M)	**Similar land use impacts compared to proposed Plan but fewer transportation impacts due to smaller transportation network. (SU, SB 375 Streamlining LS-M)**
Impact 2.11-4: Disturb or destroy human remains	Potential for greater land use impacts compared to proposed Plan due to more dispersed development, but the fewest transportation impacts of all alternatives. (LS-M)	Potential for impacts due to land use and transportation projects. (LS-M)	Same as proposed Plan. (LS-M)	Potential for greater land use impacts compared to proposed Plan due to greater population growth and more dispersed development, but the same transportation impacts. (LS-M)	**Similar land use impacts compared to proposed Plan but fewer transportation impacts due to smaller transportation network. (LS-M)**

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Public Utilities					
Impact 2.12-1: Insufficient water supplies	**Same as proposed Plan. (SU)**	**May exacerbate water supply shortage during dry years and result in localized water supply impacts. (SU, SB 375 Streamlining LS-M)**	**Same as proposed Plan. (SU, SB 375 Streamlining LS-M)**	Greatest impact compared to all other alternatives due to larger population and employment. (SU, SB 375 Streamlining LS-M)	**Same as proposed Plan. (SU, SB 375 Streamlining LS-M)**
Impact 2.12-2: Inadequate wastewater treatment capacity	Localized impacts with likely inadequate capacity in Napa, San Francisco, Solano, and Sonoma counties. (SU)	Localized impacts, with likely inadequate capacity in San Francisco. (SU, SB 375 Streamlining LS-M)	Localized impacts, with likely inadequate capacity in San Francisco although to a greater degree than in proposed Plan. (SU, SB 375 Streamlining LS-M)	**Localized impacts only, with no exceedance of aggregate county treatment capacity. However, localized impacts may occur. (SU, SB 375 Streamlining LS-M)**	Localized impacts with likely inadequate capacity in San Francisco and San Mateo counties. (SU, SB 375 Streamlining LS-M)
Impact 2.12-3: New/expanded stormwater drainage facilities	Same as proposed Plan. (SU)	Increase in impervious surface would result in localized impacts. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)
Impact 2.12-4: New/expanded water and wastewater treatment facilities	Same as proposed Plan. (SU)	Increase in population would result in localized impacts. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)	Same as proposed Plan. (SU, SB 375 Streamlining LS-M)

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Impact 2.12-5: Exceed wastewater treatment requirements	Same as proposed Plan. (LS)	Not anticipated, as existing regulations would mitigate potential impacts. (LS)	Same as proposed Plan. (LS)	Same as proposed Plan. (LS)	Same as proposed Plan. (LS)
Impact 2.12-6: Insufficient landfill capacity	**Same as proposed Plan. (SU)**	**The expected closure of most of the region's landfills before 2040, the Plan's time horizon. (SU, SB 375 Streamlining LS-M)**	**Same as proposed Plan. (SU, SB 375 Streamlining LS-M)**	Greater impact due to larger population and job growth. (SU, SB 375 Streamlining LS-M)	**Same as proposed Plan. (SU, SB 375 Streamlining LS-M)**
Hazardous Materials					
Impact 2.13-1: Hazard through the routine transport, use, or disposal of hazardous materials	**Same as proposed Plan. (LS-M)**	**Projected growth would likely result in an overall increase. (LS-M)**	**Same as proposed Plan. (LS-M)**	Generally greater impacts compared to the proposed Plan due to larger population growth. (LS-M)	**Same as proposed Plan. (LS-M)**
Impact 2.13-2: Hazard through reasonably foreseeable upset and accident conditions	**Operationally the same as the proposed Plan though with the fewest transportation projects of all alternatives there would be a reduction during the construction phase.**	Possible risk mitigated by existing regulations. (LS-M)	Operationally the same as the proposed Plan though with fewer transportation projects there would be a reduction during the construction phase. Possible risk mitigated by existing regulations. (LS-M)	Greater accident and upset conditions compared to the proposed Plan due to higher growth and employment. Possible risk mitigated by existing regulations. (LS-M)	Operationally the same as the proposed Plan though with fewer transportation projects there would be a reduction during the construction phase. Possible risk mitigated by existing regulations. (LS-M)

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
	Possible risk mitigated by existing regulations. (LS-M)				
Impact 2.13-3: Hazardous emissions within one-quarter mile of a school	Greater potential than under proposed Plan due to wider dispersed area of new development. Possible risk mitigated by existing regulations. (LS-M)	**Potential depending on specific development location. Possible risk mitigated by existing regulations. (LS-M)**	**Same as proposed Plan. (LS-M)**	Greater potential than under proposed Plan due to greater amount of new development. Possible risk mitigated by existing regulations. (LS-M)	**Same as proposed Plan. (LS-M)**
Impact 2.13-4: Projects on a hazardous materials site	Greater potential than under proposed Plan for encountering historical releases of contamination with a wider dispersed area of new development. (SU)	**Potential depending on specific development location. (SU, SB 375 Streamlining LS-M)**	**Same as proposed Plan. (SU, SB 375 Streamlining LS-M)**	Greater potential than under proposed Plan for encountering historical releases of contamination with increased new development. (SU, SB 375 Streamlining LS-M)	**Same as proposed Plan. (SU, SB 375 Streamlining LS-M)**
Impact 2.13-5: Safety hazard from a public airport	Same as proposed Plan. (LS-M)	Possible risk mitigated by existing regulations. (LS-M)	Same as proposed Plan. (LS-M)	Same as proposed Plan. (LS-M)	Same as proposed Plan. (LS-M)
Impact 2.13-6: Safety hazard from a private airstrip	Same as proposed Plan. (LS-M)	Possible risk mitigated by existing regulations. (LS-M)	Same as proposed Plan. (LS-M)	Same as proposed Plan. (LS-M)	Same as proposed Plan. (LS-M)

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Impact 2.13-7: Interfere with an emergency response or evacuation plan	Greater impact than under proposed Plan due to lack of coordination strategy and fewer transportation projects to reduce congestion which could interfere with emergency response and evacuation. (SU)	**The proposed Plan is not expected to interfere with emergency response or evacuation plans. (LS)**	**Same as proposed Plan. (LS)**	Similar to proposed Plan, but higher growth could result in greater impacts on emergency response / evacuation. (SU)	Similar to proposed Plan, but fewer transportation projects to reduce congestion which could interfere with emergency response and evacuation. (SU)
Impact 2.13-8: Risk involving wildland fires	Same as proposed Plan. (LS-M)	Possible risk mitigated by existing regulations and existing fire response services. (LS-M)	Same as proposed Plan. (LS-M)	Same as proposed Plan. (LS-M)	Same as proposed Plan. (LS-M)
Public Services and Recreation					
Impact 2.14-1: Need for new or expanded facilities	More dispersed growth may result in a greater impact compared to proposed Plan. Impacts related to transportation may be greater than the proposed Plan. (SU)	**Population growth could require additional facilities, but compact land uses would help to minimize impact. (SU, SB 375 Streamlining LS-M)**	**Impacts would be similar to the proposed Plan. (SU, SB 375 Streamlining LS-M)**	Greater total population coupled with more dispersed growth may result in the greatest impact compared to all other alternatives. Transportation improvement effects would be potentially worse than the proposed Plan. (SU, SB 375 Streamlining LS-M)	**Impacts would be similar to the proposed Plan. (SU, SB 375 Streamlining LS-M)**

TABLE 3.1-56: SUMMARY OF ALTERNATIVES COMPARISON TO THE PROPOSED PLAN

Impact	*Alternative 1: No Project*	*Alternative 2: Proposed Plan*	*Alternative 3: Transit Priority Focus*	*Alternative 4: Enhanced Network of Communities*	*Alternative 5: Environment, Equity and Jobs*
Impact 2.14-2: Physical deterioration of recreational facilities	**Impacts would be similar to the proposed Plan. (SU)**	**The distribution of population growth may result in localized impacts. (SU, SB 375 Streamlining LS-M)**	**Impacts would be similar to the proposed Plan. (SU, SB 375 Streamlining LS-M)**	Higher total population growth would result in a greater impact than all other alternatives. (SU, SB 375 Streamlining LS-M)	**Impacts would be similar to the proposed Plan. (SU, SB 375 Streamlining LS-M)**

Note: Bold cells indicate the environmentally preferred alternative(s) for each impact.

Environmentally Superior Alternative

CEQA Guidelines require each EIR to identify the environmentally superior alternative among the alternatives analyzed. If the No Project alternative is identified as the environmentally superior alternative, then the EIR must identify another alternative from among the alternatives analyzed.

There are numerous tradeoffs in impacts associated with the various alternatives, as summarized below.

PLAN GOALS AND OBJECTIVES

The adopted goals of the proposed Plan are:

- Climate Protection
- Adequate Housing
- Healthy and Safe Communities
- Open Space and Agricultural Preservation
- Equitable Access
- Economic Vitality
- Transportation System Effectiveness

The proposed Plan objectives are reflected in the following performance targets that measure the region's progress towards meeting these goals and are consistent with the requirements of SB 375:

- Reduce per-capita CO_2 emissions from cars and light-duty trucks by 15%.
- House 100% of the region's projected 25-year growth by income level without displacing current low-income residents.

An alternative that performs substantially worse than the proposed Plan with respect to meeting the plan goals would not achieve even the basic objectives of the proposed Plan. The alternatives also would result in varying degrees of success at achieving the Plan Bay Area goals and objectives. While all alternatives are expected to house 100% of the region's housing, the No Project alternative and Alternative 4 are not expected to meet the CO_2 emissions targets for cars and light-duty trucks.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE DETERMINATION

Alternative 5 would result in the lowest level of environmental impacts, but only marginally lower, as compared to all alternatives (including the proposed Plan), and therefore is identified as the environmentally superior alternative. Alternative 3 results in similar impacts to the proposed Plan, and Alternative 4 and the No Project alternative have mixed environmental outcomes. Overall, variations in environmental impacts among alternatives are minor. This determination does not factor in other benefits of the Plan outside of environmental effects. More specifically:

- In **Transportation**, Alternative 3 has the least environmental impact as it features shorter commute travel times (three percent shorter than the proposed Plan) and a lesser amount of congested VMT (14 percent fewer VMT at LOS F as compared to the proposed Plan) and the least potential for transit vehicle crowding (30 percent utilization of public transit systems, the same as the No Project alternative, and three percent less than the proposed Plan). These results are due to shifting regional growth to the Transit Priority Project eligible areas, with the greatest emphasis on growth in the urban core close to high-frequency transit.

- In **Air Quality,** Alternative 5 has the least environmental impact as it results in the lowest criteria pollutant emissions (1.7 percent fewer criteria pollutant emissions as compared to the proposed Plan) as well as lowest TAC emissions of all of the alternatives (1.9 percent fewer TAC emissions as compared to the proposed Plan). This is a result of placing a greater emphasis than the other alternatives on aligning compact land use development with transit service and increasing transit capacity.
- In **Energy,** Alternative 4 would result in the lowest per capita energy use (3.3 percent less than the proposed Plan and 2.7 percent less than Alternative 5), and would therefore have the least environmental impact.
- In **Greenhouse Gas Emissions,** the proposed Plan and Alternative 5 perform equally in regard to meeting SB 375 emission reduction targets in 2035 (both achieving a 16.4 percent reduction, one percent better than Alternative 3, 1.6 percent better than Alternative 4, and 9.6 percent better than the No Project alternative). Alternative 5 performs slightly better in terms of total emissions reductions (achieving a 17 percent reduction from 2010 to 2040, one percent better than Alternative 3 and two percent better than the proposed Plan).
- In **Sea Level Rise**, the No Project alternative includes the fewest transportation projects exposed to midcentury sea level rise inundation (the No Project alternative includes 15 projects, Alternative 5 includes 21 projects, and the proposed Plan, Alternative 3, and Alternative 4 include 32 projects exposed to midcentury sea level rise inundation). Alternative 5 includes the fewest residents (12 percent less than the proposed Plan), and new residential development (10 percent less than under the proposed Plan) exposed to midcentury sea level rise inundation because it distributes growth to areas farther from the Bay.
- In **Land Use (conversion of agricultural and forest land),** Alternative 4 results in the fewest acres of important agricultural and open space land converted to urbanized use, as well as the fewest acres of forest and timberland converted to urbanized use.
- In **Noise** the No Project alternative has the fewest environmental impacts since it results in the lowest number of roadway miles exposed to noise levels at or above 66 dBA. It also includes the fewest transit extension projects, resulting in the smallest increase in transit noise and vibration compared to other alternatives.
- In **Biological Resources, Water Resources, Cultural Resources, and Visual Resources,** Alternative 5 combines compact development with low transportation infrastructure development, resulting in fewer physical impacts tied to these resources. It is noted that in terms of land use development-related impacts alone (excluding transportation projects), the proposed Plan is the most compact and would have the least impact on these resources.
- In **Geology, Public Utilities, Public Services, and Hazardous Materials,** Alternatives 1, 2 (proposed Plan), 3 and 5 are comparable and have fewer impacts than Alternative 4. Alternative 4 includes the most growth, thereby inherently exposing the most people to geologic and hazards risks, and resulting in the greatest impacts on existing public service, recreation, and utility

systems. One exception to this is in regard to wastewater treatment, where Alternative 4 has the least impact because of limited growth proposed in San Francisco, which has likely inadequate wastewater treatment capacity under all other alternatives.

- For **Historic Resources and Land Use (community disruption or displacement, alteration and separation)**, all alternatives perform similarly. Since all alternatives include growth in urbanized areas where historic resources are likely to exist, impacts on historic resources would be similar. For land use, impacts related to community disruption or displacement and alteration and separation would be highly localized and similar across the alternatives.

While Alternative 5 is the environmentally preferred alternative due to its overall GHG emissions reductions and estimated reduction in criteria and TAC emissions, the proposed Plan does include some benefits over Alternative 5. For instance, the proposed Plan results in the lowest VMT per capita, with one percent fewer daily VMT per capita than Alternative 5. Alternative 5 also exhibits congested VMT levels 18 percent higher in the AM peak, seven percent higher in the PM peak, and 11 percent higher over the course of a typical weekday as compared to the proposed Plan. Finally, the proposed Plan results in fewer acres of agricultural and open space conversion as compared to Alternative 5 (though more than Alternative 4), and the fewest acres of important farmland (excluding grazing land) of all alternatives.

Another important consideration is that the proposed Plan was developed through extensive coordination with local jurisdictions. Alternative 5 assumes residential growth at levels that some local jurisdictions may be unlikely to implement, since it includes growth in areas that local jurisdictions have not planned for or do not currently anticipate.

In addition, there are some important unanswered questions about the feasibility of Alternative 5 that the ABAG Board and the MTC Commissioners will address during deliberations on this EIR. Specifically, implementation of the VMT tax, which is a key component of Alternative 5, may prove to be infeasible because it would require legislative approval and, in light of Proposition 26 (the "Stop Hidden Taxes" initiative), may require approval by a two-thirds supermajority vote of the Legislature. While there is currently a large majority of Democrats in the Legislature, and authorizing legislation may therefore be easier to achieve at this time, the difficulty of predicting whether new legislation will actually be enacted may make Alternative 5 infeasible.

Policy makers will be required to judge the relative importance of the various issue areas in making their final decision.

3.2 CEQA Required Conclusions

This chapter summarizes the impacts of the proposed Plan in several subject areas specifically required by CEQA, including significant irreversible changes, significant unavoidable impacts, growth inducing impacts, cumulative impacts, and impacts found to be not significant. These subject areas are evaluated based on the analysis in *Part Two: Settings, Impacts, and Mitigation Measures*, of this EIR.

SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

Significant irreversible environmental changes are those irretrievable commitments that consign non-renewable resources to uses that future generations will probably be unable to reverse. Irretrievable commitments of non-renewable resources associated with the land development pattern and transportation improvements in the proposed Plan would include:

- Consumption of significant amounts of nonrenewable energy for construction, maintenance, and operation of new development or transportation improvements, even if energy use rates do not exceed existing use rates;
- Use of building materials, fossil fuels, and other resources for construction, maintenance, and operation of new development or transportation improvements;
- Conversion of some resource lands, such as agricultural land, habitat areas, and other undeveloped lands into urbanized land or transportation uses.
- Degradation of ambient air quality through the increase of harmful particulate matter caused by a cumulative increase in vehicle exhaust; and
- Emission of greenhouse gases that will contribute to global climate change.

SIGNIFICANT UNAVOIDABLE IMPACTS

Significant unavoidable impacts are those that cannot be mitigated to a level that is less than significant. Part Two of this EIR identifies the following significant unavoidable impacts when comparing the proposed Plan to existing conditions:

- Increase in per capita vehicle miles traveled at Level of Service F at AM peak hours, at PM peak hours, and for the day as a whole when compared to existing conditions.
- Substantial net increase in construction-related emissions.
- Increased emissions of PM_{10} over existing conditions.

- Net increase in sensitive receptors located in Transit Priority Project (TPP) corridors where TACs or fine particulate matter ($PM_{2.5}$) concentrations result in a cancer risk greater than 100/million or a concentration of $PM_{2.5}$ greater than 0.8 ug/m3.
- Localized net increase in sensitive receptors located in Transit Priority Project (TPP) corridors within set distances (Table 2.2-10) to mobile or stationary sources of TAC or $PM_{2.5}$ emissions.
- Localized larger increase or smaller decrease of TACs and or $PM_{2.5}$ emissions in disproportionally impacted communities compared to the remainder of the Bay Area communities.
- Residential or business disruption or displacement of substantial numbers of existing population and housing.
- Permanent alterations to an existing neighborhood or community by separating residences from community facilities and services, restricting access to commercial or residential areas, or eliminating community amenities.
- Convert substantial amounts of important agricultural lands and open space or lands under Williamson Act contract to non-agricultural use.
- Loss of forest land, conversion of forest land to non-forest use, or conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production.
- Net increase in transportation investments within areas regularly inundated by sea level rise by midcentury.
- Net increase in the number of people residing within areas regularly inundated by sea level rise by midcentury.
- Increase in land use development within areas regularly inundated by sea level rise by midcentury.
- Exposure of persons to or generation of temporary construction noise levels and/or groundborne vibration levels in excess of standards established by local jurisdictions or transportation agencies.
- Increased traffic volumes that could result in roadside noise levels that approach or exceed the FHWA Noise Abatement Criteria.
- Increased noise exposure from transit sources that exceed FTA exposure thresholds.
- Increased vibration exposure from transit sources that exceed FTA exposure thresholds.
- Substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.
- Substantial adverse impacts on designated critical habitat for federally listed plant and wildlife species.
- Adversely affect non-listed nesting raptor species considered special-status by CDFW under CDFW Code 3503.5 and non-listed nesting bird species considered special-status by the USFWS under the federal Migratory Bird Treaty Act, and by CDFW under CDFW Code 3503 and 3513.

- Substantial adverse effect on riparian habitat, federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.), or other sensitive natural communities identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service, through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites.
- Affect visual resources by blocking panoramic views or views of significant landscape features or landforms (mountains, oceans, rivers, or significant man-made structures) as seen from a transportation facility or from public viewing areas.
- Affect visual resources by substantially damaging scenic resources (such as trees, rock outcroppings, and historic buildings) that would alter the appearance of or from state- or county-designated or eligible scenic highways.
- Affect visual resources by creating significant contrasts with the scale, form, line, color, and/or overall visual character of the existing community.
- Affect visual resources by adding a visual element of urban character to an existing rural or open space area or adding a modern element to a historic area.
- Adversely affect visual resources by creating new substantial sources of light and glare.
- Cast a substantial shadow in such a way as to cause a public hazard or substantially degrade the existing visual/aesthetic character or quality of a public place for a sustained period of time.
- Cause a substantial adverse change in the significance of a historic resource such that the significance of the resource would be materially impaired.
- Cause a substantial adverse change in the significance of a unique archaeological resource.
- Destroy, directly or indirectly, a unique paleontological resource or site or unique geologic feature.
- Result in insufficient water supplies from existing entitlements and resources to serve expected development.
- Result in inadequate wastewater treatment capacity to serve new development.
- Require and result in the construction of new or expanded stormwater drainage facilities as a result of new development, which could cause significant environmental impacts.
- Require and result in the construction of new or expanded water and wastewater treatment facilities as a result of new development, which could cause significant environmental impacts.
- Result in insufficient landfill capacity to serve new development while complying with applicable regulations.
- Locate projects on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.

- Result in the need for expanded facilities, the construction of which causes significant environmental impacts, in order to maintain adequate schools, emergency services, police, fire, and park and recreation services.
- Result in increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

GROWTH-INDUCING IMPACTS

Growth-inducing impacts are ways in which the proposed Plan may remove obstacles to growth or foster economic or population growth directly or indirectly in the surrounding environment. New housing and commercial development contribute directly to growth by providing the necessary amenities for new residents. Transportation projects provide a more indirect but important contribution by making traveling within a region and between regions easier, cheaper, and/or more attractive.

This section analyzes the proposed Plan's potential to generate population and employment growth beyond levels currently anticipated in regional and local plans. It describes the projected population and employment growth for the Bay Area through the year 2040. It also discusses various population characteristics (e.g., age and income) and identifies trends in the balance of jobs and housing throughout the region.

The EIR must examine the potential growth-inducing impacts of the proposed Plan. More specifically, CEQA Guidelines require that the EIR "discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly" (CEQA Guidelines Section 15126.2(d)). This analysis must also consider the removal of obstacles to population growth, such as improvements in the regional transportation system. Examples of projects likely to have growth-inducing impacts include extensions or expansions of infrastructure systems beyond what is needed to serve project-specific demand, and development of new residential subdivisions or office complexes in areas that are currently only sparsely developed or are undeveloped. Infill development may lead to additional demand for housing and jobs but is considered to result in fewer growth inducing impacts because it builds on existing infrastructure.

The CEQA Guidelines are clear that while an analysis of growth-inducing effects is required, it should not be assumed that induced growth is necessarily significant or adverse.

Environmental Setting

Population and Employment: Growth Trends and Projections

The Bay Area's population increased by 13 percent (764,000) from 1990 to 2000 and only by 5.4 percent (367,000) between 2000 and 2010, reflecting national growth and economic downturn trends. Employment increased from 1990 to 2000 by 17 percent, reflecting the dot-com boom and general economic growth, while employment decreased by 9.8 percent between 2000 and 2010 as a result of the "dot-com bust" at the beginning of the decade and the severe national economic recession that started in 2007. Looking ahead to 2040, the horizon year for the proposed Plan, ABAG projects that the Bay Area's population will grow another 30 percent from the 2010 level (over 2.1 million more residents), and employment will increase by 33 percent (over 1.1 million additional jobs). This growth is summarized in

Table 3.2-1. Two major demographic changes shape these forecasts as they relate to household and job growth: the increase in the senior population and the increase in the Latino and Asian populations.[1]

TABLE 3.2-1: TOTAL PROJECTED GROWTH FOR THE BAY AREA, 1990-2040

	1990	*2000*	*2010*	*2040*	*Projected 2010 – 2040*		*Annual Growth Rates*		
					Growth	*Change*	*1990-2000*	*2000-2010*	*2010-2040*
Population	6,020,000	6,784,000	7,151,000	9,299,000	2,148,000	30%	1.2%	0.5%	0.9%
Households	2,246,000	2,466,000	2,608,000	3,308,000	700,000	27%	0.9%	0.6%	0.8%
Housing Units	2,365,000	2,552,000	2,786,000	3,446,000	660,000	24%	0.8%	0.9%	0.7%
Jobs	3,206,000	3,753,000	3,385,000	4,505,000	1,120,000	33%	1.6%	-1.0%	1.0%

Sources: Association of Bay Area Governments, Plan Bay Area Jobs-Housing Connection Strategy, revised May 16, 2012; California Department of Finance, E-8 *Historical Population and Housing Estimates for Cities, Counties and the State, 1990-2000*, August 2007; ABAG Projections 2000 and 2009 for historic jobs estimates.

During the past 40 years, the distribution of people has become more dispersed in the Bay Area as new urban centers have formed and cities on the edge of the region have gained population. As outlined in *Chapter 2.3: Land Use*, Santa Clara, Alameda, and San Francisco counties have the highest number of jobs, and Santa Clara, Alameda, and Contra Costa counties are the most populous.

Age

According to the U.S. Census 2010, the median age in the Bay Area counties is 44.5 in Marin, 39.9 in Sonoma, 39.7 in Napa, 39.3 in San Mateo, 38.5 in Contra Costa and San Francisco, 36.9 in Solano, 36.6 in Alameda, and 36.2 in Santa Clara.[2]

The population of the Bay Area is expected to increase across all age groups, but with the largest increase (137 percent) happening in the age bracket of 65 and over, and the smallest increase (1 percent) happening in the age bracket of 45 to 64 years, as shown in **Table 3.2-2**. This indicates a change in overall composition of Bay Area residents towards an aging population. Effects of the growing senior population are expected to include an increase in the amount of residential care facilities and a decline in the labor force.[3]

[1] Association of Bay Area Governments, Plan Bay Area Jobs-Housing Connection Strategy, revised May 16, 2012.

[2] U.S. Census, 2010.

[3] Association of Bay Area Governments, Plan Bay Area Jobs-Housing Connection Strategy, revised May 16, 2012.

TABLE 3.2-2: FORECASTED GROWTH BY AGE GROUP AS A PERCENT OF THE TOTAL (2010-2040)

Age Bracket	*Percent Growth in Population. 2010-2040*
0-24 years	25%
25-44 years	17%
45-64 years	1%
65 years and over	137%

Source: Association of Bay Area Governments, Plan Bay Area Jobs-Housing Connection Strategy, revised May 16, 2012; 2010 Census, California Department of Finance.

Income

Median incomes in the Bay Area range from a low of $59,055 in Sonoma County to a high of $85,002 in Santa Clara County, as shown in **Table 3.2-3**.

TABLE 3.2-3: 2010 MEDIAN INCOME IN THE BAY AREA BY COUNTY

County	*Median Household Income*
Alameda	$ 67,169
Contra Costa	$ 73,721
Marin	$ 83,967
Napa	$ 64,401
San Francisco	$ 71,745
San Mateo	$ 82,748
Santa Clara	$ 85,002
Solano	$ 63,384
Sonoma	$ 59,055

Source: U.S. Census, 2010.

Population growth is expected to be reflected in all income groups through 2040 with small changes in the distribution: higher shares for the very low and low-income households and lower shares for the moderate and above moderate-income households.

Car Ownership

Approximately 9.6 percent of Bay Area households did not own a vehicle as of 2010, down from 10 percent in 2000. As shown in **Table 3.2-4**, average car ownership per household has increased slightly from 1.91 to 2.03 from 2000 to 2010.[4] Changes in car ownership in the Bay Area over time would be tied to income, with high-income households more likely to own cars, but also to transit access and proximity

[4] Metropolitan Transportation Commission, Vehicle Ownership Forecasts for the San Francisco Bay Area 1990 – 2030, 2005.

to work and other daily destinations.[5] Somewhat lower car ownership may be expected in households residing in transit-oriented developments,[6] although this depends greatly on the quality and density of the transit network. Overall in the Bay Area, commuting patterns remained largely consistent between 2000 and 2010, with the private automobile providing transportation for 80 percent of workers.[7]

TABLE 3.2-4: AUTO OWNERSHIP PER HOUSEHOLD IN THE BAY AREA, 2000 AND 2010

County	*2000*	*2010*
Alameda	1.79	1.93
Contra Costa	2.02	2.14
Marin	2.03	2.16
Napa	1.98	2.11
San Francisco	1.21	1.30
San Mateo	2.05	2.19
Santa Clara	2.17	2.26
Solano	2.07	2.20
Sonoma	2.07	2.18
Bay Area	**1.91**	**2.03**

Source: MTC Report, Growth in Auto Ownership by Bay Area Counties, 1930-2010, http://www.mtc.ca.gov/maps_and_data/datamart/forecast/ao/tablea1.htm.

MTC's 2006 report, "*Transit-Oriented Development: New Places, New Choices in the San Francisco Bay Area*," supports the proposition that transit-oriented development can reduce the rate of car ownership. According to this report, almost 30 percent of households living within a half-mile of a rail or ferry station do not own cars. Households closer to transit also log fewer daily miles on the cars they do own (20 miles per day for households less than a half-mile from transit, versus 39 to 55 miles per day for households living more than one mile from transit). Furthermore, households close to transit report a higher share of daily work and non-work trips on foot or by bike than households farther from transit.

Jobs and Housing

Over the last 10 years, the supply of affordable housing in the Bay Area has not kept pace with job growth. Thus, new workers filling jobs must either pay high prices to own or rent housing near their places of employment or move further away and face correspondingly longer commutes. **Table 3.2-5** compares the number of employed residents with the number of jobs for each county and indicates which counties are exporters of workers and which counties are importers.

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5 Association of Bay Area Governments, Plan Bay Area Jobs-Housing Connection Strategy, revised May 16, 2012.

6 Association of Bay Area Governments, Bay Area Air Quality Management District, Bay Conservation and Development Commission, and Metropolitan Transportation Commission, Transit-Oriented Development in the San Francisco Bay Area: New Places, New Choices, 2006.

7 U.S. Census, 2000 and 2010.

Table 3.2-5 shows that in 2010, there were approximately 3.3 million employed residents and 3.4 million jobs in the Bay Area. Based on these numbers, there are more jobs than residents, therefore resulting in about 116,000 commuters from outside the Bay Area filling jobs within the nine-county region.

Growth-inducing potential can be affected at the local and regional level by changes in the jobs-housing balance as local communities update general plans and zoning and developers respond to perceived opportunities where there is an imbalance. A jobs-housing balance ratio compares the available housing and available jobs within a community, city or other geographically defined sub-region. Planning for a jobs-housing balance is based on the premise that the number of work trips by car, the overall number of vehicle trips, and the resultant vehicle miles traveled can be reduced when there are sufficient jobs available locally to balance the employment demands of the community.

TABLE 3.2-5: 2010 EMPLOYMENT BY COUNTY – NET IMPORTERS/EXPORTERS OF WORKERS AND JOBS/HOUSING BALANCE

County	*Employed Residents*	*Jobs*	*Difference (Jobs/Employed Residents)*	*Jobs/Employed Residents Ratio*	*Imports/Exports Workers*
Alameda	667,750	694,450	26,700	1.04	Imports
Contra Costa	442,300	344,920	-97,380	0.78	Exports
Marin	118,430	110,730	-7,700	0.93	Equal[1]
Napa	57,230	70,650	13,420	1.23	Imports
San Francisco	413,730	568,720	154,990	1.37	Imports
San Mateo	346,650	345,200	-1,450	1.00	Equal[1]
Santa Clara	822,740	926,260	103,520	1.13	Imports
Solano	174,370	132,350	-33,390	1.00	Exports
Sonoma	225,490	192,010	-33,480	0.85	Exports
Region	**3,268,700**	**3,385,290**	**116,590**	**1.04**	**Imports**

Note:

1. Defined as difference of 10,000 or less.

Source: Association of Bay Area Governments, Plan Bay Area Jobs-Housing Connection Strategy, revised May 16, 2012.

Planning for a jobs-housing balance builds on and integrates analyses of employment potential (existing and projected), housing demand (by income level and housing type), new housing production, and the relationship between employment opportunities and housing availability. Improving the jobs-housing balance so that the number of jobs is approximately the same as the number of employed residents—a ratio of 1:1—requires carefully planning for the location, intensity, and nature of jobs and housing in order to encourage a reduction in vehicle trips and miles traveled and a corresponding increase in the use of mass transit and alternative modes of transportation, such as carpools, bicycling, and walking. Market forces also play an important role in determining the size and location of growth, however, and may not always correspond with regional planning priorities and policies.

Table 3.2-5 shows the current and projected jobs-employed residents balance by county. In theory, a 1:1 ratio would indicate balance and improved opportunities for reduced commuting distances when the types of jobs match the skills of the local residents (although commuting is not reduced where there are mismatches between jobs and worker skills, and income and housing affordability). An imbalance, particularly where there are fewer jobs than employed residents and the ratio is less than 1.0, can result in growth inducement as local officials and developers take actions to add non-residential land uses and increase the job base. These actions, in turn, can create pressure for additional growth. Also, if there is an imbalance in jobs and housing within a particular city, other cities may seek to fill the gap, whether it be housing or jobs to meet market demand. This can result in pressure for creation of jobs or housing in distant communities, and create a demand for additional infrastructure and services growth.

Impact Analysis

Method of Analysis

This analysis evaluates growth implications related to new land use patterns and new/expanded transportation systems (i.e., where demand for housing growth may increase based on increased transportation access or growth in employment), including potential impacts on areas outside the San Francisco Bay Area. UrbanSim, the regional land use forecasting model, was used to develop land use scenarios for the Bay Area that reflect policy and market forces based on historic trends, as well as the impact of transportation improvements (i.e., reduced highway congestion or increased demand for housing near a new transit station). Regional growth forecasts for the model were derived from the *Jobs-Housing Connection Strategy* completed by ABAG (available on the project website at www.onebayarea.org).[8] Based on the projected levels of household and job growth in the region, UrbanSim analyzed the impact of specific policy inputs, such as zoning, fees, incentives, and growth boundaries, on the regional development pattern. Analysis was conducted using an economic framework, meaning that the economic feasibility of residential and commercial development was evaluated in order to allocate housing based on market demands and trends. This data ranged from housing choice preferences (single-family versus multi-family) to job classifications' geographical distributions (concentrated versus distributed). In order to appropriately consider the symbiotic relationship of transportation and land use, Travel Model One and UrbanSim were unified in an integrated model framework. This allowed for analysis of how transportation projects affect the surrounding land use pattern, as well as how changes to household and employment locations affect transportation demand. More on the modeling process can be found in *Chapter 2.1: Land Use.*

This analysis therefore does not assess the total projected growth assumption, but evaluates the locational differences in growth that could occur as a result of the implementation of the proposed Plan. In particular, the analysis considers the impacts (regional and inter-regional) of the balance of jobs and employed residents, the amount of forecasted urbanized land in the Bay Area, and the role of transportation investments in influencing development over time. In general, growth impacts of the proposed Plan are compared to existing conditions as of 2010; however, where appropriate, comparison is made to the No Project alternative in order to analyze growth inducing impacts assuming no new plan is adopted.

Growth-inducing Effects of Plan Bay Area

Over the next 30 years, with or without Plan Bay Area, the Bay Area population is anticipated to continue to grow, increasing by 30 percent. The proposed Plan is intended to help shape and accommodate this

[8] Association of Bay Area Governments, Plan Bay Area Jobs-Housing Connection Strategy, revised May 16, 2012.

growth in a manner that is more efficient, sustainable, and compact. The goal is to encourage land use patterns that provide a more diverse mix of uses and a diverse range of transportation options to residents. It would be inaccurate to describe the Plan as growth-inducing as it was designed to accommodate, rather than to encourage, projected regional growth in a sustainable manner consistent with the goals of SB 375. The proposed Plan includes a compact land use development strategy, departing from the business-as-usual development pattern through:

- Defining a land use strategy designed to balance the location of new development regionally, direct jobs toward population (and vice versa), and locate new development within the existing urbanized areas; and
- Linking transportation projects with land development goals, targeting the type and location of transportation investments to more efficiently make use of existing infrastructure, serve the regional population, and promote balanced, compact growth.

The proposed Plan provides a coordinated strategy for managing land use patterns and transportation investments to accommodate projected population growth. As the proposed Plan's transportation projects are tied to the proposed land use development pattern and the region's population projections, they are inherently designed to not promote growth in other locations in the region, or growth beyond projections. That is, the transportation projects in the proposed Plan are deliberately selected to complement a certain type of land development (balanced and compact) and discourage another type of development (imbalanced, sprawling, and on greenfields). Finally, the proposed Plan encourages localities to adopt land use policies and programs that promote focused growth rather than growth beyond targeted areas, such as urban growth boundaries and reduced parking requirements.

Land Use Projects

Regional Effects

Jobs to Employed Residents

Under the proposed Plan, the overall ratio of jobs to employed residents will remain stable at 1.04 at the regional level from 2010 to 2040. **Table 3.2-6** shows that the number of jobs (4.5 million in 2040) will outpace employed residents (4.35 million in 2040) by approximately 155,000. This job surplus is due in part to the historic inability of the Bay Area to provide affordable housing to meet demand. Generally speaking, there are people living outside the nine-county region that commute into the Bay Area to work. While improvements to specific transit stations or roadways may make parts of the Bay Area relatively more attractive places to live or work than they have been in the past, virtually all parts of the Bay Area are already in high demand, and the proposed Plan does not alleviate the existing challenges of restricted housing supply or escalating housing costs. This ratio of out-of-region workers remains constant with historic trends; therefore, as the overall number of jobs increases, the total number of in-commuting workers would be expected to increase proportionately.

At the county level, seven counties will see a slight increase in the ratio of jobs to employed residents, although in most cases the change is small. **Table 3.2-6** shows that all nine counties will maintain their existing status as net importers or exporters of workers from 2010 to 2040 under the proposed Plan. When comparing the jobs to employed residents balance in the proposed Plan to the 2040 No Project scenario (which assumes no changes to existing general plans), some variations are notable at the county level. Specifically, the distribution of jobs shifts under the proposed Plan with an increased concentration in Alameda, San Francisco, and Santa Clara Counties and a decreased concentration in Contra Costa, Solano, and Sonoma counties. Under the No Project Alternative, net import/export of workers changes for two counties: San Mateo would shift to importing workers, and Santa Clara would begin to export workers.

TABLE 3.2-6: 2010 & 2040 EMPLOYED RESIDENTS AND JOBS BY COUNTY AND NET IMPORTERS/EXPORTERS OF WORKERS

County	*Employed Residents*			*Jobs*			*Difference (Jobs – Employed Residents)*			*Jobs/ Employed Residents Ratio*			*Imports/Exports Workers*		
Year	*2010*	*2040 No Project*	*2040 Preferred Plan*	*2010*	*2040 No Project*	*2040 Preferred Plan*	*2010*	*2040 No Project*	*2040 Preferred Plan*	*2010*	*2040 No Project*	*2040 Preferred Plan*	*2010*	*2040 No Project*	*2040 Preferred Plan*
Alameda	667,748	891,298	891,295	694,447	921,759	947,613	26,699	30,461	56,318	1.04	1.03	1.06	Imports	Imports	Imports
Contra Costa	442,299	579,093	579,088	344,921	539,131	465,453	-97,377	-39,962	-113,635	0.78	0.93	0.80	Exports	Exports	Exports
Marin	118,433	136,478	136,476	110,733	126,343	129,118	-7,700	-10,135	-7,358	0.93	0.93	0.95	Equal[1]	Equal[1]	Equal[1]
Napa	57,233	69,372	69,370	70,651	106,519	89,573	13,418	37,147	20,203	1.23	1.54	1.29	Imports	Imports	Imports
San Francisco	413,729	559,751	559,753	568,724	711,917	760,227	154,994	152,166	200,474	1.37	1.27	1.36	Imports	Imports	Imports
San Mateo	346,654	446,427	446,423	345,200	506,139	445,487	-1,454	59,712	-936	1.00	1.13	1.00	Equal[1]	Imports	Equal[1]
Santa Clara	822,743	1,158,874	1,158,878	926,264	1,135,257	1,229,756	103,522	-23,617	70,878	1.13	0.98	1.06	Imports	Exports	Imports
Solano	174,367	223,933	223,935	132,346	190,133	180,159	-42,021	-33,800	-43,776	0.76	0.85	0.80	Exports	Exports	Exports
Sonoma	225,494	284,825	284,828	192,013	268,021	257,833	-33,481	-16,804	-26,995	0.85	0.94	0.91	Exports	Exports	Exports
Region	**3,268,700**	**4,350,051**	**4,350,045**	**3,385,300**	**4,505,218**	**4,505,218**	**116,600**	**155,167**	**155,173**	**1.04**	**1.04**	**1.04**	**Imports**	**Imports**	**Imports**

1. Defined as difference of 15,000 or less.

Source: Association of Bay Area Governments, Metropolitan Transportation Commission, Dyett & Bhatia, 2012.

Urbanized Land

Most of the local agencies in the Bay Area with land use jurisdiction over territory that lies along the urban/rural boundaries have adopted growth management plans, urban limit lines, urban reserve areas, community separators, conservation easements, parks, greenbelts, agricultural land preservation trusts, performance standards, and large lot rural and agricultural zoning to manage urban sprawl, irrespective of the presence or absence of interregional transportation facilities that connect urban centers (see research cited in *Chapter 2.3: Land Use*).

Through the FOCUS effort, which is a regional development and conservation strategy that promotes a more compact land use pattern for the Bay Area, regional agencies (MTC, ABAG, BCDC, and BAAQMD) are working together with local jurisdictions to create complete, livable communities in PDAs and preserve open space. Consistent with this effort, many jurisdictions have adopted incentive programs for infill development, particularly in transit corridors and around rail transit stations, some of which are supported by MTC's OneBayArea Grant (OBAG) program. By limiting sprawl, these policies reduce pressures for growth extending beyond the urbanized footprint.

The proposed Plan seeks to further focus growth in the urbanized footprint, with only 10,800 new acres of urbanized land in 2040, an increase of one percent over existing conditions. Anticipated urbanized land based on UrbanSim modeling is shown in **Table 3.2-7** by county. Urbanized land maintains a consistent ratio to overall land by county, within one percent throughout the region.

TABLE 3.2-7: URBANIZED LAND BY COUNTY

County	*Land Acres*	*2010 Urban Footprint[1]*	*2010 Percent Urban Footprint*	*Increase in Urban Footprint[2]*	*2040 Percent Urban Footprint*
Alameda	476,000	146,000	31%	1,900	31%
Contra Costa	481,000	152,000	32%	2,500	32%
Marin	336,000	42,000	13%	500	13%
Napa	505,000	24,000	5%	200	5%
San Francisco	30,000	24,000	80%	200	81%
San Mateo	290,000	73,000	25%	900	25%
Santa Clara	831,000	189,000	23%	1,000	23%
Solano	544,000	60,000	11%	1,800	11%
Sonoma	1,016,000	75,000	7%	1,500	8%
Total	**4,509,000**	**785,000**	**17%**	**10,500**	**18%**

1. Data for San Francisco is from 2008.
2. Future urbanized footprint is based on modeled future development of over eight people per acre and/or ten jobs per acre.

Note: Numbers may not sum due to independent rounding.

Source: MTC UrbanSim Data Rasters, 2012; Urban and Built Up Land, Farmland Mapping and Monitoring Program, Department of Conservation; 2010 Census TIGER/Line Shapefiles; Dyett & Bhatia, 2013.

Localized Effects

Under the proposed Plan, employment and housing opportunities will be increasingly focused within PDAs. Locales identified as PDAs are nominated by local jurisdictions and are typically already important employment centers in the region. For example, in the three counties containing the highest number of jobs—Alameda, San Francisco, and Santa Clara—PDAs currently account for 44, 83, and 49 percent of total countywide jobs, respectively (see **Table 3.2-8**). By 2040, the percentage of jobs located in PDAs is anticipated to rise in all counties and in the region as a whole. Furthermore, the rate of job growth between 2010 and 2040 will increase more quickly in PDAs (47 percent) than in the rest of the region (33 percent).

Similarly, the percentage of employed residents that reside in PDAs varies significantly by county, from a low of 2 percent in Napa to a high of 48 percent in San Francisco. Under the proposed Plan, the percentage of employed residents that reside in PDAs is anticipated to increase significantly. On a regional basis, the percentage will increase to 35 percent in 2040 from 24 percent in 2010 (see **Table 3.2-9**). The rate of growth between 2010 and 2040 will also increase much more quickly in PDAs (90 percent) than in the rest of the region (33 percent).

As they are currently, PDAs will remain net importers of workers over the time horizon of the proposed Plan, although the imbalance between jobs and employed residents in PDAs will be less substantial over time. Overall, PDAs will shift from 1.98 jobs for each employed resident to 1.53 jobs for each employed resident. This shift occurs as a result of efforts in PDAs to draw new housing into these areas.

TABLE 3.2-8: 2010 & 2040 JOB GROWTH IN COUNTIES AND PDA'S

Counties	*Jobs in County*	*Jobs in PDAs*	*% Jobs in PDAs*	*Jobs in County*	*Jobs in PDAs*	*% Jobs in PDAs*	*% Change County*	*% Change PDAs*
Year	*2010*			*2040 Proposed Plan*				
Alameda	694,447	307,735	**44.3**	947,613	484,587	**51.1**	**36.5**	**57.5**
Contra Costa	344,921	111,848	**32.4**	465,453	180,472	**38.8**	**34.9**	**61.4**
Marin	110,733	16,178	**14.6**	129,118	20,321	**15.7**	**16.6**	**25.6**
Napa	70,651	12,240	**17.3**	89,573	15,686	**17.5**	**26.8**	**28.2**
San Francisco	568,724	471,565	**82.9**	760,227	634,446	**83.5**	**33.7**	**34.5**
San Mateo	345,200	115,710	**33.5**	445,487	175,441	**39.4**	**29.1**	**51.6**
Santa Clara	926,264	449,181	**48.5**	1,229,756	663,986	**54.0**	**32.8**	**47.8**
Solano	132,346	25,326	**19.1**	180,159	41,325	**22.9**	**36.1**	**63.2**
Sonoma	192,013	64,830	**33.8**	257,833	95,998	**37.2**	**34.3**	**48.1**
Region	**3,385,300**	**1,574,613**	**46.5**	**4,505,218**	**2,312,262**	**51.3**	**33.1**	**46.8**

Source: Association of Bay Area Governments, Metropolitan Transportation Commission, Dyett & Bhatia, 2012.

TABLE 3.2-9: 2010 & 2040 EMPLOYED RESIDENT GROWTH IN COUNTIES AND PDA'S

Counties	*Employed Residents in County*	*Employed Residents in PDAs*	*% Employed Residents in PDAs*	*Employed Residents in County*	*Employed Residents in PDAs*	*% Employed Residents in PDAs*	*% Change County*	*% Change PDAs*
Year		*2010*			*2040*			
Alameda	667,748	201,941	**30.2**	891,295	349,013	**39.2**	**33.5**	**72.8**
Contra Costa	442,299	50,303	**11.4**	579,088	119,981	**20.7**	**30.9**	**138.5**
Marin	118,433	8,677	**7.3**	136,476	12,637	**9.3**	**15.2**	**45.6**
Napa	57,233	1,180	**2.1**	69,370	3,593	**5.2**	**21.2**	**204.5**
San Francisco	413,729	198,938	**48.1**	559,753	320,430	**57.2**	**35.3**	**61.1**
San Mateo	346,654	81,304	**23.5**	446,423	146,781	**32.9**	**28.8**	**80.5**
Santa Clara	822,743	205,790	**25.0**	1,158,878	455,003	**39.3**	**40.9**	**121.1**
Solano	174,367	7,880	**4.5**	223,935	31,565	**14.1**	**28.4**	**300.6**
Sonoma	225,494	39,290	**17.4**	284,828	71,811	**25.2**	**26.3**	**82.8**
Region	**3,268,700**	**795,302**	**24.3**	**4,350,045**	**1,510,815**	**34.7**	**33.1**	**90.0**

Source: Association of Bay Area Governments, Metropolitan Transportation Commission, Dyett & Bhatia, 2012.

Transportation Projects

Regional Effects

The quality of the regional transportation system serving the San Francisco Bay Area has a limited role in stimulating overall growth compared to factors related to land use policy. All things considered, it is unlikely that the transportation system operations, maintenance, improvements, and expansion contemplated in the proposed Plan will be of sufficient magnitude, compared to the in-place transportation system, to stimulate new growth beyond the 30 percent increase in population and 33 percent increase in jobs forecast for the region. This is due to several factors:

1. Historically, transportation investment in general, and increased transportation capacity in particular, lag behind the growth that occurs in the Bay Area. The proposed Plan adds 687 roadway lane miles (three percent increase); a significant component of this increase is the Regional Express Lanes Network on many of the region's most congested freeway corridors, and highway widening projects are responsible for the remainder of the freeway capacity increases. The Plan also adds 30,983,000 transit seat miles (27 percent increase). Both roadway and transit expansions occur at lower rates than the 30 percent increase in population and 33 percent increase in jobs. The situation is likely to continue with the limited fiscal resources for expansion of transportation system capacity.
2. Due to the maturity of development in the region and the existing transportation system and mode choices already available, incremental corridor improvements are expected to play a minimal role in attracting or inducing new development to the region as a whole. The regional health of the economy, the diversity of arts and cultural activities, the stature of the educational system, particularly the universities and their research programs, the strength of local, regional and international markets, and interregional transportation costs are all more important influences on interregional location decisions.
3. The rising cost of gasoline, coupled with a burgeoning concern for sustainable development and climate change, seem to be resulting in changes in local land use and investment decision-making geared toward fewer car trips, smaller cars, transit accessibility, infill development, and overall reduced environmental impacts of Bay Area lifestyles.

As indicated in Chapter 2.1 of this EIR, overall mobility in the region will be more constrained in 2040 than it was in 2010, even with implementation of the proposed Plan. There will be more peak period congestion and more total vehicle hours of delay. The increases in total regional travel activity, however, are not caused by the implementation of the proposed Plan. Since the levels of trip-making, VMT, vehicle hours of delay, and average delay per trip are higher for the No Project Alternative, it is clear that these impacts are due to projected regional growth in population, jobs, and workers, rather than the proposed Plan's land use and transportation infrastructure. However, auto modes (drive alone and carpool) are expected to experience small commute travel time reductions, while transit and bicycle modes are forecasted to be minimally impacted by slightly greater commute travel times. This result is primarily a result of mode shift. Still, increasing congestion overall could discourage new firms from locating in the Bay Area or cause some existing firms to consider relocating away from the region. Consequently, to the extent that the transportation network has any effect on regional growth, it is likely that insufficient transportation infrastructure may decrease, rather than increase, the projected rates of population and employment growth.

The proposed Plan would result in significant investments and improvements in the regional transportation system in support of planned growth. In theory, transportation improvements can remove impediments to growth by providing access and roadway capacity to new areas for development and, depending on location, creating roadway capacity that induces travel. In this case, however, the transportation network is made to fit to the land use plan. As established above, this transportation system investment is integrally linked to, and balanced with, the housing and employment needed to accommodate the projected population of the region. In other words, rather than eliminating obstacles to growth, the proposed Plan accommodates growth that is outside the regulatory control of MTC and ABAG.

Localized Effects

The proposed Plan provides for an increase in transit supply substantially larger than that of highway capacity (as noted above). In this respect, the proposed Plan has a city-centered focus and gives priority to transportation improvements that serve urbanized locations. In general, transportation improvements contained within the proposed Plan seek to support infill development or urban redevelopment, which could affect housing demand in these areas. For instance, in some areas, improved transit might be one factor facilitating urban infill development and improving the overall jobs-housing balance. While any decision to amend local general plans for higher density or a better jobs-housing balance remains a local decision, the proposed Plan seeks to support more population and/or employment growth in these areas with better transit access than is currently anticipated in the local general plans. As described above, improving the jobs-housing balance by drawing more housing into PDA areas is an alternative to urban sprawl and regional growth outside of urban areas, consistent with SB 375, and does not necessarily contribute to growth of the regional population as a whole.

Combined Effects

In conclusion, the proposed Plan is not likely to have an overall regional population or employment growth-inducing effect. Rather, provision of transportation infrastructure is expected to continue to lag behind regional population and employment growth during the term of the proposed Plan. Localized densification effects would accommodate, not stimulate regional growth projections. While the proposed Plan would continue to import employed residents, this is consistent with historic trends, and does not represent inducement of growth outside the region beyond that which is reasonably expected. Further, as described above, land use authority resides entirely with cities and counties at the local level, meaning that MTC and ABAG cannot approve new development; and the proposed Plan was designed to accommodate, rather than to encourage, regional growth in a sustainable manner consistent with the goals of SB 375.

Based on these observations about the nature of population and job growth in the Bay Area, the indirect transportation effects of the proposed Plan on long-term population and economic growth are expected to be minimal. Therefore, the overall effect of the proposed Plan on growth inducement is considered less than significant (LS). No mitigation is required.

CUMULATIVE IMPACTS

Section 15130 of the CEQA Guidelines requires that an EIR evaluate potential environmental impacts that are individually limited but cumulatively significant. CEQA defines cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines § 15355). "'Cumulatively considerable' means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (CEQA Guidelines § 15065(a)(3)). This means that cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Plan Bay Area, which includes region-wide transportation improvements and land use development patterns in the Bay Area to accommodate projected regional growth through 2040, is a cumulative plan by definition. As such, the environmental analysis included throughout this EIR is a cumulative analysis compliant with the requirements of CEQA and the CEQA Guidelines. All of the impacts addressed in *Part Two* are considered cumulative and therefore are not repeated here.

IMPACTS FOUND NOT TO BE SIGNIFICANT

This EIR focuses on potentially significant impacts. CEQA requires that an EIR provide a brief statement indicating why various possible significant impacts were determined to not be significant and were not discussed in detail. For the issue areas addressed in *Part Two*, all potential impacts are identified, regardless of their magnitude.

Mineral resources are the only issue area determined to not be significant and not addressed in this EIR. Plan Bay Area will not affect mineral resources, since no substantive mineral resources have been identified in areas where new development and/or transportation projects will occur.

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Part Four

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Appendix A: Notice of Preparation

Notice of Preparation

To: Interested Agencies, Organizations, and Individuals

Subject: **Notice of Preparation of a Draft Environmental Impact Report for Plan Bay Area**

Lead Agencies:
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The Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) are co-lead agencies for preparing a program-level Draft Environmental Impact Report (EIR) for the Plan Bay Area in accordance with the California Environmental Quality Act (CEQA).

This Notice of Preparation (NOP) is intended to seek comments with specific detail about the scope and content of the environmental information that will be evaluated in the EIR. Agencies who have statutory responsibilities in connection with the project to be evaluated should share their views. Such agencies will use the EIR prepared by MTC and ABAG when considering a permit or other approval of a discrete project from Plan Bay Area. Local jurisdictions and transportation agencies may also elect to use this program-level EIR for tiering in second-tiered EIRs covering land use projects or transportation plans, projects, or programs.

MTC and ABAG seek your input on the following questions:

- Are there potential environmental issues that MTC and ABAG should analyze that are not identified in Attachment A to this notice?
- Are there any alternatives that MTC and ABAG should evaluate that are not identified in Attachment A to this notice?
- What types of mitigation measures should be considered that would help avoid or minimize potential environmental impacts of the proposed Project and alternatives?
- What elements of this EIR would help your agency with CEQA exemptions and tiering?

Four regional scoping meetings will be held to solicit input on the scope of the Draft EIR:

Wednesday, June 20, 2012
6:00 p.m. to 8:00 p.m.
Joseph P. Bort MetroCenter
MTC Auditorium
101 Eighth Street
Oakland, CA 94607

Thursday, June 21, 2012
10:00 a.m. to Noon
Dr. Martin Luther King, Jr. Library
Room 255/257
150 East San Fernando Street
San Jose, CA 95112

Tuesday, June 26, 2012
10:00 a.m. to Noon
San Francisco Planning + Urban Research (SPUR)
Public Assembly Hall – 2nd Floor
654 Mission Street
San Francisco, CA 94105

Wednesday, June 27, 2012
1:30 p.m. to 3:30 p.m.
Embassy Suites Hotel
Novato/Larkspur Room
101 McInnis Parkway
San Rafael, CA

All interested agencies, organizations and individuals are welcome to participate in the scoping meetings. Oral and written comments will be accepted at the scoping meetings. Due to the time limits mandated by State law, your response must be sent at the earliest possible date but ***no later than 30 days*** after receipt of this notice. **Please send your response to Ashley Nguyen, EIR Project Manager by <u>July 11, 2012</u> through any of the following methods.** Remember to include a return address and the name of the contact person.

Mail	Fax	E-mail
Ashley Nguyen, EIR Project Manager Metropolitan Transportation Commission Joseph P. Bort MetroCenter 101 Eighth Street Oakland, CA 94607-4700	510.817.5848	eircomments@mtc.ca.gov

The project description, location and the potential environmental effects are contained in the attached materials. An Initial Study is not required and thus not prepared.

Project Title:	Environmental Impact Report for Plan Bay Area
Project Location:	San Francisco Bay Area Region, California (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties)
Attachment:	Attachment A: Project Description & Scope of Environmental Analysis
Date:	June 11, 2012

Steve Heminger
MTC Executive Director

Patricia M Jones

Pat Jones
ABAG Assistant Executive Director

ATTACHMENT A
PROJECT DESCRIPTION & SCOPE OF ENVIRONMENTAL ANALYSIS

NOTICE OF PREPARATION

The Notice of Preparation (NOP), along with this Attachment A, is being issued to interested agencies, organizations and individuals, to solicit comments that will assist in the preparation of the Draft Environmental Impact Report (EIR) for Plan Bay Area. As a result of the responses to the NOP and staff analysis, the project description and scope of the environmental analysis described herein will likely be revised and then further refined through the course of preparing the EIR.

BACKGROUND

The Metropolitan Transportation Commission (MTC) is the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area (which includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties). Created by the State Legislature in 1970, MTC functions as both the regional transportation planning agency (RTPA)—a state designation—and for federal purposes, as the region's metropolitan planning organization (MPO). As required by State legislation (Government Code Section 65080 et. seq.) and by federal regulation (Title 23 USC Section 134), MTC is responsible for preparing the Regional Transportation Plan (RTP) for the San Francisco Bay Area Region. An RTP is a long-range plan that identifies the strategies and investments to maintain, manage, and improve the region's transportation network.

In the past, MTC has undertaken the task of regional transportation planning somewhat separately from the regional population and employment projections and regional housing needs allocation processes conducted by the Association of Bay Area Governments (ABAG). ABAG is a joint powers agency formed in 1961 pursuant to California Government Code §§ 6500, *et seq.,* and is the council of governments (COG) for the San Francisco Bay Area. ABAG prepares demographic and economic forecasts, and prepares the state-mandated Regional Housing Needs Allocation for the Bay Area. Consistent with the requirements of the Sustainable Communities and Climate Protection Act of 2008 (SB 375), MTC and ABAG are jointly developing a Regional Transportation Plan and Sustainable Communities Strategy, known as Plan Bay Area. In addition, MTC and ABAG are jointly preparing and certifying the EIR for Plan Bay Area.

SENATE BILL (SB) 375

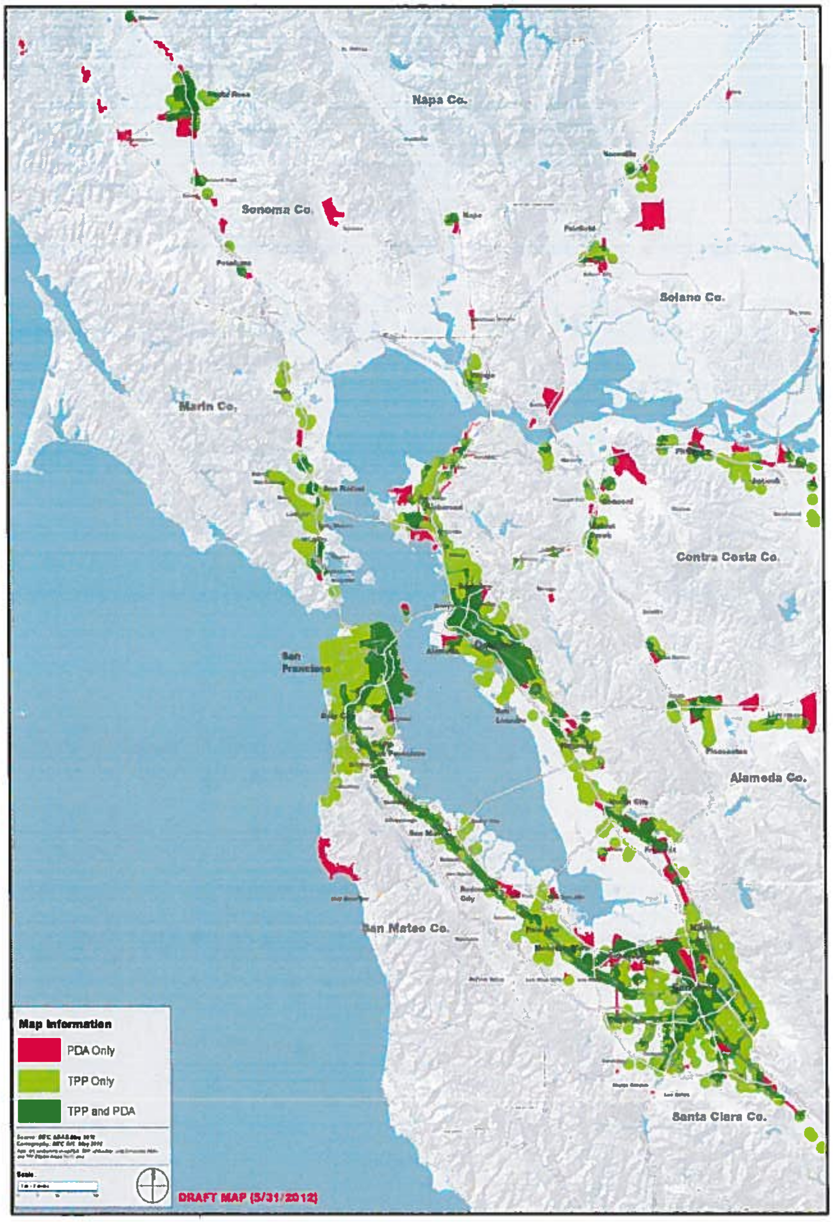
Senate Bill (SB) 375 went into effect in 2009 to help achieve the goal of reducing greenhouse gas (GHG) emissions to levels established by the California Air Resources Board and mandated under Assembly Bill (AB) 32. The Bay Area's per-capita GHG emission reduction targets are -7 percent in 2020 and -15 percent in 2035 from 2005 levels. The primary purpose of SB 375 is to integrate land-use and transportation planning to help lower GHG emissions and vehicle miles traveled through the development of a Sustainable Communities Strategy (SCS). If the SCS is unable to achieve the GHG emission reduction targets, an Alternative Planning Strategy (APS) must be developed to demonstrate how the targets could be achieved.

To help ensure its success, the SCS is developed in collaboration among many partners and stakeholders, including local jurisdictions, Congestion Management Agencies (CMAs), Caltrans, transit agencies, business and community organizations, and members of the public. Because SB 375 establishes new RTP land use elements, input from local jurisdictions with land use authority is essential to create a feasible and effective SCS.

While MTC, along with other regional agencies, prepares Regional Airport and Seaport plans, the projects in these advisory plans do not require MTC funding or approvals. As such, these plans are separate from the proposed Plan Bay Area and are subject to separate review processes. Therefore, this EIR does not analyze the environmental effects of these plans.

SB 375 CEQA STREAMLINING

SB 375 provides CEQA streamlining provisions for certain "residential/mixed use residential projects" and "transit priority projects" to encourage integrated land use and transportation planning. Below is a map of Transit Priority Project-eligible areas based on transit service compared to Priority Development Areas, which are locally-identified, infill development opportunity areas within existing communities.



To take advantage of these CEQA streamlining provisions, projects must pre-qualify based on two criteria:

1. A project must be consistent with the land use designation, density, building intensity, and applicable policies in an approved SCS or APS.
2. A project must be considered a Residential/Mixed Use Residential Project or a Transit Priority Project (TPP) (as defined in SB 375).

To qualify as a residential and mixed use project, at least 75% of the total building square footage of the project must consists of residential use.

To qualify as a TPP, a project must (1) contain at least 50 percent residential use, based on total building square footage, and if the project contains between 26 percent and 50 percent nonresidential uses, a floor area ratio of not less than 0.75; (2) provide a minimum net density of at least 20 dwelling units per acre; and (3) be within one-half mile of a major transit stop or high-quality transit corridor included in a regional transportation plan.

A project is considered to be within one-half mile of a major transit stop or high-quality transit corridor if all parcels within the project have no more than 25 percent of their area farther than one-half mile from the stop or corridor and if not more than 10 percent of the residential units or 100 units, whichever is less, in the project are farther than one-half mile from stop or corridor. A *major transit stop* is defined as a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods. A *high-quality transit corridor* is defined as a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

MTC and ABAG's role is to include the appropriate land use and transportation information in the Plan and EIR, including general land use designations, density, building intensities, and applicable policies, so that lead agencies/local jurisdictions can utilize SB 375 CEQA streamlining provisions for their projects and make their own consistency determinations with the Plan. In defining the alternatives, MTC and ABAG also intend to maximize opportunities to support residential/mixed use projects and TPPs so that lead agencies/local jurisdictions that wish to plan and implement a qualifying residential/mixed use project or TPP may take advantage of the SB 375 CEQA streamlining provisions.

During the EIR scoping process, MTC and ABAG are seeking input and comments on what elements of the Plan and EIR would be valuable to lead agencies/local jurisdictions for purposes of CEQA streamlining as called out in SB 375.

PLAN BAY AREA – THE PROPOSED PROJECT

Plan Bay Area is a joint effort led by MTC and ABAG and developed in partnership with the Bay Area's other two regional government agencies, the Bay Area Air Quality Management District (BAAQMD), and the Bay Conservation and Development Commission (BCDC). Plan Bay Area meets the requirements of SB 375 by developing an integrated RTP/SCS plan and strives to attain the per-capita GHG emission reduction targets of -7 percent by year 2020 and -15 percent by year 2035 from 2005 levels. Plan Bay Area, which covers the period through 2040, is the first Bay Area RTP that is subject to SB 375.

Plan Bay Area reinforces land use and transportation integration per SB 375 and presents a vision of what the Bay Area's land use patterns and transportation networks might look like in 2040. The vision for Plan Bay Area is guided by the three Es of sustainability: building a stronger economy, protecting the natural environment, and enhancing opportunities for Bay Area residents from all walks of life. Goals of Plan Bay Area include:

- Climate Protection
- Adequate Housing
- Healthy & Safe Communities
- Open Space & Agricultural Preservation
- Equitable Access
- Economic Vitality
- Transportation System Effectiveness

The Bay Area is projected to add over 2 million people, 1.1 million new jobs, and 660,000 new housing units between 2010 and 2040. To plan for this future growth, Plan Bay Area calls for focused housing and job growth around high-quality transit corridors, particularly within areas identified by local jurisdictions as Priority Development Areas (PDAs). This land use strategy enhances mobility and economic growth by linking housing/jobs with transit, thus offering a more efficient land use pattern around transit and a greater return on existing and planned transit investments than today's.

Plan Bay Area includes a financially constrained transportation investment plan as required by state and federal planning regulations. It includes transportation projects and programs that would be funded through existing and future revenues that are projected to be reasonably available to the region over the 28-year horizon of the plan. A total of $277 billion in revenues is available for the financially constrained Plan Bay Area. As such, the proposed Project and alternatives evaluated in the EIR must be financially constrained to the $277 billion envelope.

For more information about Plan Bay Area, visit: http://www.onebayarea.org/plan_bay_area/.
For more information about Plan Bay Area EIR, visit: http://www.onebayarea.org/EIR/.

SCOPE OF ENVIRONMENTAL ANALYSIS
The EIR for Plan Bay Area will be prepared in compliance with the California Environmental Quality Act (CEQA) of 1970, as amended. In general, the purpose of the EIR is to:

- Analyze the potential environmental effects of the adoption of the Plan;
- Inform decision-makers, other responsible agencies, and members of the public as to the range of these environmental impacts of the Plan;
- Recommend a set of measures to mitigate any significant adverse regional impacts; and
- Analyze a range of reasonable alternatives to the proposed Plan.

Specifically, the EIR for Plan Bay Area will be a program EIR, which is a first-tier CEQA document designed to consider broad, regional impacts of a program of actions (CEQA Guidelines §15168). Therefore, the EIR will focus on the entire set of projects and programs contained in the Plan, rather than on individual projects. This EIR will evaluate potentially significant environmental impacts, and cumulative impacts, and will include mitigation measures to offset potentially significant effects. In addition, this EIR will be the basis for subsequent tiered CEQA documents for project-specific or site-specific environmental reviews that will be conducted by implementing agencies as land use and transportation projects in the Plan are more clearly defined and more detailed studies prepared. Specific analysis of localized impacts in the vicinity of individual projects is not included in this program level EIR.

Under CEQA, key impact categories identified for analysis in this EIR include:

<u>Transportation</u>
- Potential decrease in the average number of jobs within 15, 30, or 45 minutes from home by auto or transit
- Potential increase in vehicle miles traveled (VMT) on facilities experiencing level of service F
- Potential increase in per-capita VMT

<u>Air Quality</u>
- Potential increase in short-term construction-related emissions
- Potential net increase of emissions of criteria pollutants and toxic air contaminants from on-road mobile sources

- Potential increase in health risks due to increased particulate matter and toxic air contaminants from mobile and stationary sources within high-quality transit corridors
- Potential conflict with an applicable air quality plan or violation of applicable air quality standard or substantial contribution to an existing or potential air quality violation

Land Use, Housing, Agriculture, and Physical Displacement

- Potential conversion of agricultural lands and open space to non-agricultural use
- Potential conflict with locally adopted land use plans, including general plans and zoning
- Potential disruption of residential or business uses or displacement of population and housing
- Potential alterations to the characteristics and qualities of an existing neighborhood or community by separating residences from community facilities and services

Energy

- Potential increase in the consumption of electricity, natural gas, gasoline, diesel, or other non-renewable energy types
- Potential inconsistency with adopted plans or policies related to energy conservation

Greenhouse Gases and Climate Change (including Sea Level Rise)

- Potential increase in net and per-capita CO_2 emissions from on-road mobile sources
- Potential vulnerability of land uses and transportation network to sea-level rise
- Potential conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases

Noise

- Potential exposure to construction, highway, transit noise levels or ground borne vibration in excess of established standards

Geology and Seismicity

- Potential increase in exposure of people or structures to the risk of property loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; and/or seismic-related ground failure
- Potential soil erosion or topsoil loss
- Potential location of projects on: a geologic unit or soil that is unstable or would become unstable as a result of the project; on expansive soils; or on weak, unconsolidated soils

Water Resources

- Potential violation of water quality standards or waste or storm water discharge requirements
- Potential interference with or reduced rates of groundwater recharge due to increased amount of impervious surfaces
- Potential erosion by altering the existing drainage patterns of a site

- Potential increase in non-point pollution of storm water runoff
- Potential increases in rates and amounts of runoff due to additional impervious surfaces
- Potential placement of structures within a 100-year flood hazard area which would impede or redirect flows
- Potential exposure of people to significant risk of loss, injury, or death involving flooding, seiche, tsunami, or mudflow

Biological Resources

- Potential adverse effect on sensitive or special-status species
- Potential adverse effect on riparian habitat, protected wetlands, or other sensitive natural community
- Potential interference with the movement of any native resident, migratory fish, or wildlife species
- Potential conflict with adopted local conservation policies

Visual Resources

- Potential adverse effect on scenic vistas
- Potential damage to scenic resources within a scenic highway,
- Potential degradation of existing visual character
- Potential creation of a new source of substantial light or glare

Cultural Resources

- Potential adverse change or damage to the significance of a historic resource, unique archaeological resource, and/or a unique paleontological resource/site
- Potential disruption of any human remains

Public Utilities

- Potential adverse effect on water supply, wastewater/storm water facilities, and solid waste

Growth-Inducing Impacts

- Potential direct or indirect substantial, unanticipated increases in population beyond those currently projected

Impact categories not specifically addressed in this EIR include hazardous materials, public services, recreation and mineral resources because no significant impacts of regional importance are expected to occur in these areas. These impact areas will be addressed in project-specific environmental documents.

PROPOSED PROJECT AND ALTERNATIVES TO BE ANALYZED IN THE EIR

The proposed Project and preliminary draft alternatives that may be evaluated in this EIR are described below. MTC will use the latest planning assumptions in the EIR analysis, as well as the same regional growth control totals of 1,120,000 new people, 2,147,000 new jobs, and 660,000 new housing units except for Alternative 4 (see Alternative 4 for details). It is important to note that more precise definitions of the alternatives, or new alternatives, will likely emerge as the EIR scoping and preparation process evolves.

Alternative 1 – No Project

CEQA requires the evaluation of a No Project alternative. The No Project alternative addresses the effect of not implementing Plan Bay Area as required by Section 15126.6(e) (2) of the CEQA Guidelines. It includes "what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (CEQA Section 15126.6(e) (2)). The No Project alternative allows decision-makers to compare the impacts of approving the proposed Project with the impacts of not approving the proposed Project.

For purposes of this EIR, the No Project alternative consists of two elements: (a) the existing 2010 land uses plus continuation of existing land use policy as defined in adopted general plans, zoning ordinances, etc. from all jurisdictions in the region and (b) the existing 2010 transportation network plus a set of highway, transit, local roadway, bicycle and pedestrian projects that have either already received funding or are scheduled for funding and have received environmental clearance by May 1, 2011.

Alternative 2 – Jobs-Housing Connection (Proposed Project)

The Jobs-Housing Connection alternative is the proposed Project, as approved by ABAG and MTC on May 17, 2012. This alternative lays out a land use pattern that is structured around four key elements: (1) over 200 locally selected Priority Development Areas (PDAs) that support job growth and accessibility as well as housing diversity and affordability, (2) the region's core transit network, (3) the Bay Area's network of open spaces and conservation land, including 100 Priority Conservation Areas (PCAs), and (4) a network of complete communities in which each community is supported by the appropriate services and amenities. To distribute future growth, regional growth factors were applied to address the changing economic, demographic and housing needs of the region.

- **Employment Distribution**: The approach for distributing new employment growth accounts for job growth by sector and is linked to transit infrastructure. Local planning and economic analysis regarding growing industries in the Bay Area informed focused growth in PDAs. Knowledge-sector jobs (such as information technology companies, legal or engineering firms, and biotechnology firms) are expected to grow based on current concentrations, specialization, and past growth as well as transit services and access. Population-based jobs (such as retail, stores, or restaurants) are expected to grow in a manner reflecting the distribution of future household growth. All other jobs (such as government, agriculture and manufacturing) are expected to grow according to the existing distribution of jobs in each of these sectors.
- **Housing Distribution**: The strategy for locating new housing begins with local plans at the county, city, and PDA levels. Housing growth in each place was then adjusted to ensure that regional goals were advanced based on five regional growth factors: (1) level of transit service, (2) vehicle-miles traveled per household, (3) employment by 2040, (4) low-wage workers commuting from outside each place, and (5) housing value.

More housing growth was directed to locations near transit, jobs, and high-quality services.

As a result, PDAs are proposed to absorb about 80 percent of new housing and 66 percent of new jobs on about five percent of the total regional land area. Regional centers in Oakland, San Francisco, and San Jose account for about 14 percent of new housing and 17 percent of job growth. Medium size cities also play an important role by adding a mix of new housing, employment, and services in strategic locations. About 99 percent of the region's open space and agricultural land are retained and North Bay counties take a very small share of growth. Napa and Marin counties account for about 1 percent of each of the total regional housing growth and Sonoma and Solano, 5 and 3 percent, respectively.

The transportation investment strategy for the Jobs-Housing Connection alternative is financially constrained (as required by federal and state planning regulations) to the $277 billion in federal, state, regional and local revenues forecasted to be reasonably available to the Bay Area over the next 28-years. Of the $277 billion in revenues, 88 percent of the revenue ($244 billion) is directed towards maintaining and operating the existing transit, roads and bridges, while the remaining 12 percent goes to transit and road expansions. Key new commitments funded with the $56 billion (out of $277 billion) in discretionary funds include:

- $700 million towards Climate Policy Initiatives (such as clean vehicles, smart driving, carsharing, vanpools, etc.)
- $24 billion towards maintaining existing pavement conditions for local streets and roads, highest-rated transit assets, and bridges, as well as fully funding operating needs for existing transit services
- $14 billion towards the OneBayArea Grant framework that rewards jurisdictions that produce housing near transit, support planning efforts for transit-oriented development in PDAs, and support Priority Conservation Areas (PCAs)
- $8 billion towards implementation of high-performing, cost-effective transportation projects, which includes the next generation of capital transit investments
- $3 billion towards the Regional Express Lanes Network, San Francisco Pricing Program, and MTC's Freeway Performance Initiative
- $500 million towards MTC's Transit Performance Initiative

Alternative 3 – Lower Concentrations of PDA Growth
This alternative creates alternative land use patterns to that proposed in the Jobs-Housing Connection by lowering concentrations of PDA growth. This alternative will examine land uses surrounding transit-rich or other transit services that were not proposed by local government through the PDA process. Land use policy levers such as upzoning, incentives, fees, and growth boundaries will be considered to allow us to test the effects of placing growth in these areas.

The Lower Concentrations of PDA Growth alternative builds from the No Project alternative, and uses the same transportation investment strategy as contained in Alternative 2. The upzoning policy will be applied in transit-rich areas. For all other areas, assumptions based on the adopted general plan and zoning policies will remain unchanged. This alternative also assumes tighter compliance of adopted urban growth boundaries (or similar urban service or limit lines) as defined by local jurisdictions as a means to further constrain greenfield development.

Alternative 4 – Eliminate Inter-Regional Commuting
This alternative assumes that all Bay Area jobs will be filled by Bay Area workers (thereby eliminating in-commuting from neighboring regions). This alternative will test different ways to accommodate this in-commute growth.

This alternative tests a modified transportation investment strategy, which is different from the approved transportation investment strategy reflected in Alternatives 2 and 3. The modification redirects about $6 billion in discretionary funding to increase transit service. The transit service to be implemented in this alternative is informed by Comprehensive Operations Analyses (COAs). These COAs were completed by major transit operators in San Francisco (i.e., Municipal Transit Authority) and Santa Clara County (i.e., Valley Transportation Authority), or conducted by MTC for the Inner East Bay (i.e., BART and AC Transit) as part of its Transit Sustainability Project. In addition, this alternative will not reflect the full implementation of the Regional Express Lanes network. It includes only projects that convert existing high-occupancy vehicle (HOV) lanes into high-occupancy toll (HOT) lanes.

Alternative 5 – Environment, Equity and Jobs
This alternative is proposed for evaluation in this EIR by various Bay Area equity stakeholders. This alternative seeks to carry out two objectives: (a) provide affordable housing in job-rich communities, and (b) maximize transit services by restoring transit service cuts made after 2005. Land use policies such as upzoning, incentives and fees will be applied in this alternative as a means to provide more affordable housing in high job accessibility areas. This alternative also assumes tighter compliance with adopted urban growth boundaries (or similar urban service or limit lines) as defined by local jurisdictions as a means to further constrain greenfield development.

This alternative tests a modified transportation investment strategy. This alternative redirects about $6 billion in discretionary funding towards restoring transit bus service to 2005 levels, and includes the latest 2010 rail network and transit capital expansion projects identified in the approved transit investment strategy from Alternative 2. The Regional Express Lanes Network contemplated in Alternative 4 will also be the same for this alternative.

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Appendix B: Scoping Comments Received

A full set of scoping comments can be found on the project website, onebayarea.org or a hard copy can be requested through the Metropolitan Transportation Commission Library.

Appendix C: Transportation Projects in Each EIR Alternative

Plan Bay Area Final List of Transporation Projects/Programs by County (As of July 27, 2012)										
RTP ID	County	Public Title	Total Project Cost	Committed Funds	Discretionary Funds	Alt 1: No Project	Alt 2: Jobs-Housing Connection	Alt 3: Transit Priority Focus	Alt 4: Enhanced Network of Communities	Alt 5: EEJ
21011	Bay Area Region/Multi-County	Transportation for Livable Communitites (TLC) Program - Priority Development Area (PDA) Planning Grants: provide planning funds to support transit-oriented development in PDAs	$ 100	$ -	$ 100	N	Y	Y	Y	Y
21012	Bay Area Region/Multi-County	Golden Gate Bridge Seismic Retrofit	$ 700	$ 700	$ -	Y	Y	Y	Y	Y
21013	Bay Area Region/Multi-County	State-Owned Toll Bridge Rehabilitation/Replacement/Retrofit	$ 1,620	$ 1,620	$ -	Y	Y	Y	Y	Y
21017	Bay Area Region/Multi-County	Small transit operators in Alameda, Contra Costa, Marin, Napa, Solano and Sonoma counties - transit operating and capital improvement program (including replacement, rehabilitation and minor enhancements for rolling stock, equipment, fixed facilities and other capital assets; does not include system expansion)	$ 8,470	$ 7,534	$ 935	N	Y	Y	Y	Y
21320	Bay Area Region/Multi-County	Golden Gate Bridge Moveable Median Barrier: installation of a moveable median barrier on the Golden Gate Bridge to provide a physical separation between opposing directions of traffic	$ 25	$ 25	$ -	Y	Y	Y	Y	Y
21342	Bay Area Region/Multi-County	Implement Transbay Transit Center/Caltrain Downtown Extension (Phase 1 - Transbay Transit Center)	$ 1,589	$ 1,589	$ -	Y	Y	Y	Y	Y
21627	Bay Area Region/Multi-County	Caltrain Service Frequency Improvements (6-Train Service during Peak Hours), Electrification (San Francisco to Tamien), and Communications-Based Overlay Signal System (CBOSS) and Positive Train Control System (PTC)	1718	$ 1,046	$ 672	N	Y	Y	Y	Y
22001	Bay Area Region/Multi-County	Implement Sonoma-Marin Area Rail Transit District (SMART) Commuter Rail and Multi-Use Pathway Project (Initial Operating Segment)	$ 360	$ 360	$ -	Y	Y	Y	Y	Y
22006	Bay Area Region/Multi-County	Improve ferry facilities/equipment including the Downtown Ferry Terminal and procuring additional spare ferry vessels	$ 193	$ 193	$ -	Y	Y	Y	Y	Y
22241	Bay Area Region/Multi-County	Fund Regional Measure 2 studies (Water Emergency Transportation Authority environmental studies, I-680/Pleasant Hill BART Connector Study)	$ 7	$ 7	$ -	Y	Y	Y	Y	Y
22243	Bay Area Region/Multi-County	Fund Regional Measure 2 Express Bus North improvements (includes park-and-ride lots and rolling stock)	$ 20	$ 20	$ -	Y	Y	Y	Y	Y
22244	Bay Area Region/Multi-County	Fund City CarShare	$ 5	$ 5	$ -	Y	Y	Y	Y	Y
22245	Bay Area Region/Multi-County	Fund Safe Routes to Transit	$ 30	$ 30	$ -	Y	Y	Y	Y	Y
22423	Bay Area Region/Multi-County	Lifeline Transportation Program: fund programs and services that address transportation gaps specific to low-income communities	809	$ -	$ 809	N	Y	Y	Y	Y
22425	Bay Area Region/Multi-County	Planning funds for the Metropolitan Transportation Commission, Association of Bay Area Governments, Bay Conservation and Development Commission, and nine county congestion management agencies	$ 100	$ -	$ 100	N	Y	Y	Y	Y
22481	Bay Area Region/Multi-County	Caltrain - transit operating and capital improvement program (including replacement, rehabilitation and minor enhancements for rolling stock, equipment, fixed facilities and other capital assets); station improvements (e.g., platforrms) are included	$ 7,667	$ 4,255	$ 1,120	N	Y	Y	Y	Y
22511	Bay Area Region/Multi-County	Provide ferry service between Berkeley/Albany and San Francisco	$ 312	$ 312	$ -	Y	Y	Y	Y	Y
22636	Bay Area Region/Multi-County	Implement BART transbay tube earthquake safety improvements (Phase 1)	$ 593	$ 593	$ -	Y	Y	Y	Y	Y
94089	Bay Area Region/Multi-County	Implement Presidio Parkway Project	$ 2,053	$ 2,053	$ -	Y	Y	Y	Y	Y

Plan Bay Area Final List of Transporation Projects/Programs by County (As of July 27, 2012)										
RTP ID	**County**	**Public Title**	**Total Project Cost**	**Committed Funds**	**Discretionary Funds**	**Alt 1: No Project**	**Alt 2: Jobs-Housing Connection**	**Alt 3: Transit Priority Focus**	**Alt 4: Enhanced Network of Communities**	**Alt 5: EEJ**
94152	Bay Area Region/Multi-County	Widen Route 12 (Jameson Canyon) from 2 lanes to 4 lanes from I-80 in Solano County to Route 29 in Napa County (Phase 1)	$ 140	$ 140	$ -	Y	Y	Y	Y	Y
94525	Bay Area Region/Multi-County	BART - transit operating and capital improvement program (including replacement, rehabilitation and minor enhancements, equipment, fixed facilities and other caital assets)	$ 43,516	$ 33,513	$ 4,457	N	Y	Y	Y	Y
94526	Bay Area Region/Multi-County	AC Transit - transit operating and capital improvement program (including replacement, rehabilitation and minor enhancements for rolling stock, equipment, fixed facilities and other capital assets; does not include system eqpansion)	$ 15,926	$ 14,000	$ 172	N	Y	Y	Y	Y
94527	Bay Area Region/Multi-County	Livermore Amador Valley Transit Authority (LAVTA) - transit operating and capital improvement program (including replacement, rehabilitation and minor enhancements for rolling stock, equipment, fixed facilities and other capital assets; does not include system expansion)	$ 885	$ 685	$ 161	N	Y	Y	Y	Y
94558	Bay Area Region/Multi-County	Central Contra Costa Transit Authority (CCCTA) - transit operating and capital improvement program (including replacement, rehabilitation and minor enhancements for rolling stock, equipment, fixed facilities and other capital assets; does not include system expansion)	$ 1,444	$ 1,401	$ -	Y	Y	Y	Y	Y
94572	Bay Area Region/Multi-County	Golden Gate Transit - transit operating and capital improvement program (including replacement, rehabilitation and minor enhancements for rolling stock, equipment, fixed facilities and other capital assets; does not include system expansion)	$ 4,240	$ 3,116	$ 681	N	Y	Y	Y	Y
94610	Bay Area Region/Multi-County	Valley Transportation Authority (VTA) - transit operating and capital improvement program (including replacement, rehabilitation and minor enhancements for rolling stock, equipment, fixed facilities and other capital assets; does not include system expansion)	$ 20,669	$ 20,669	$ -	Y	Y	Y	Y	Y
94636	Bay Area Region/Multi-County	San Francisco Municipal Transportation Agency (SFMTA) - transit operating and capital improvement program (including replacement, rehabilitation and minor enhancements for rolling stock, equipment, fixed facilities and other capital assets; does not include system expansion)	$ 48,997	$ 42,139	$ 2,190	N	Y	Y	Y	Y
94666	Bay Area Region/Multi-County	SamTrans - transit operating and capital improvement program (including replacement, rehabilitation and minor enhancements for rolling stock, equipment, fixed facilities and other capital assets; does not include system expansion)	$ 7,535	$ 6,125	$ 744	N	Y	Y	Y	Y
94683	Bay Area Region/Multi-County	SolTrans - transit operating and capital improvement program (including replacement, rehabilitation and minor enhancements for rolling stock, equipment, fixed facilities and other capital assets; does not include system expansion)	$ 594	$ 594	$ -	Y	Y	Y	Y	Y
230221	Bay Area Region/Multi-County	Implement I-80 Integrated Corridor Mobility (ICM) project operations and management	$ 70	$ 70	$ -	Y	Y	Y	Y	Y
230222	Bay Area Region/Multi-County	Implement San Pablo Avenue SMART Corridors operations and management	$ 11	$ 11	$ -	Y	Y	Y	Y	Y
230290	Bay Area Region/Multi-County	Implement Transbay Transit Center/Caltrain Downtown Extension (Phase 2 - Caltrain Downtown Extension)	$ 2,596	$ 639	$ 1,957	N	Y	Y	Y	Y
230336	Bay Area Region/Multi-County	Implement recommendations from MTC's Transit Connectivity Plan	$ 10	$ 10	$ -	Y	Y	Y	Y	Y

Plan Bay Area Final List of Transporation Projects/Programs by County (As of July 27, 2012)										
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230419	Bay Area Region/Multi-County	Freeway Performance Initiative (FPI): maximize performance and reliability using technology and limited expansions at essential locations on freeways and major arterials; includes Traffic Operations System (TOS) infrastructure, TOS maintenance and replacement, arterial coordination and management, and performance monitoring	$ 2,792	$ -	$ 2,792	N	Y	Y	Y	Y
230550	Bay Area Region/Multi-County	Climate Policy Initiatives: fund initiatives that reduce greenhouse has emissions from cars and light duty trucks	$ 700	$ -	$ 700	N	Y	Y	Y	Y
230581	Bay Area Region/Multi-County	San Francisco Ferry Berthing Improvements Program (Phase 1): improvements to existing ferry terminals and construction of new terminals to accommodate increases in ferry ridership	$ 33	$ 33	$ -	Y	Y	Y	Y	Y
230612	Bay Area Region/Multi-County	Conduct environmental and design studies related to implementing new ferry services in Antioch and Martinez	$ 2	$ 2	$ -	Y	Y	Y	Y	Y
230627	Bay Area Region/Multi-County	Implement upgrades to Route 12 (Jameson Canyon) between Napa and Solano Counties (includes grade realignment and full safety barrier)	$ 13	$ 13	$ -	Y	Y	Y	Y	Y
230712	Bay Area Region/Multi-County	Golden Gate Bridge Suicide Barrier - project development	$ 8	$ 8	$ -	Y	Y	Y	Y	Y
230716	Bay Area Region/Multi-County	Implement senior and disabled transportation projects, programs and services	$ 358	$ 219	$ 139	N	Y	Y	Y	Y
240019	Bay Area Region/Multi-County	Implement station improvements along the Caltrain corridor associated with planned transit-oriented development (includes parking, bus, shuttle and bicycle and pedestrian access improvements)	$ 220	$ 220	$ -	Y	Y	Y	Y	Y
240031	Bay Area Region/Multi-County	Implement system-wide access improvements at Caltrain stations associated with increased service (includes parking, bus, shuttle and bicycle and pedestrian access improvements)	$ 30	$ 30	$ -	Y	Y	Y	Y	Y
240048	Bay Area Region/Multi-County	Caltrain South Terminal Track Capacity Expansion, Phase II and III - project development	$ 16	$ 16	$ -	Y	Y	Y	Y	Y
240140	Bay Area Region/Multi-County	Implement Caltrain at-grade crossing improvements	$ 6	$ 6	$ -	Y	Y	Y	Y	Y
240731	Bay Area Region/Multi-County	Priority Conservation Area (PCA) Program: provides funding to preserve open space and conservation areas	$ 100	$ -	$ 100	N	Y	Y	Y	Y
240735	Bay Area Region/Multi-County	Transit Performance Initiative: fund supportive infrastructure to achieve performance improvements in major transit corridors	$ 500	$ -	$ 500	N	Y	Y	Y	Y
240736	Bay Area Region/Multi-County	Expand and enhance the SMART commuter rail system (Phase II) by constructing a one-station extension from San Rafael to Larkspur, constructing a one-station extension from North Santa Rosa to Windsor, implementing capacity improvements along the Initial Operating Segment (Sonoma County only), and completing the multi-use pathway from Larkspur to Cloverdale.	$ 209	$ -	$ 209	N	Y	Y	Y	Y
240727	Bay Area/Multi-Region	Implement transportation improvements serving the Golden Gate National Recreation Area	$ 225	$ 225	$ -	Y	Y	Y	Y	Y
22002	Bay Area Region/Multi-County	Extend High Occupancy Vehicle (HOV) lane on northbound I-880 from existing terminus at Bay Bridge approach to the Maritime on-ramp to provide HOV access from Maritime to Bay Bridge toll plaza	$ 29	$ 29	$ -	Y	Y	Y	Y	Y
22042	Bay Area Region/Multi-County	Widen I-680 northbound for express lanes from Route 237 to Route 84 (includes ramp metering and auxiliary lanes)	$ 210	$ 150	$ 60	N	Y	Y	Y	N
230088	Bay Area Region/Multi-County	Extend I-880 northbound express lanes from north of Hacienda Avenue to Hegenberger Road	$ 221	$ 201	$ 20	N	Y	Y	Y	N
230656	Bay Area Region/Multi-County	Convert I-80 HOV lanes to express lanes from Route 4 to Bay Bridge bypass lane in each direction	$ 53	$ 53	$ -	N	Y	Y	Y	N

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230657	Bay Area Region/Multi-County	Convert I-80 HOV lanes to express lanes from Carquinez Bridge to Route 4 in each direction	$ 9	$ 9	$ -	N	Y	Y	Y	N
230658	Bay Area Region/Multi-County	Widen I-80 in each direction for express lanes from Route 37 to Carquinez Bridge	$ 184	$ 184	$ -	N	Y	Y	Y	N
230659	Bay Area Region/Multi-County	Widen I-80 in each direction for express lanes from Red Top Road to Route 37	$ 160	$ 160	$ -	N	Y	Y	Y	N
230660	Bay Area Region/Multi-County	Convert I-80 HOV lanes to express lanes from Red Top Road to Air Base Parkway in each direction	$ 21	$ 21	$ -	N	Y	Y	Y	N
230666	Bay Area Region/Multi-County	Widen I-580 for eastbound and westbound express lanes from Greenville Road to San Joaquin County line	$ 391	$ 391	$ -	N	Y	N	Y	N
230668	Bay Area Region/Multi-County	Convert I-880 HOV lanes to express lanes between Hengenberger Road and Route 237 southbound, and Hacienda Drive to 237 northbound	$ 58	$ 58	$ -	N	Y	Y	Y	N
230672	Bay Area Region/Multi-County	Convert Route 92 westbound HOV lanes to express lanes from Hesperian Boulevard to San Mateo-Hayward Bridge toll plaza	$ 4	$ 4	$ -	N	Y	Y	Y	N
230673	Bay Area Region/Multi-County	Convert Route 84 westbound HOV lanes to express lanes from I-880 to Dumbarton Bridge toll plaza	$ 4	$ 4	$ -	N	Y	Y	Y	N
230684	Bay Area Region/Multi-County	Widen I-580/I-680 interchange in each direction for express lanes	$ 310	$ 310	$ -	N	Y	Y	Y	N
230685	Bay Area Region/Multi-County	Express Lanes on I-680: Widen I-680 northbound for express lane from Rudgear to North Main; Convert HOV lanes to express lanes between Benicia Bridge and Alcosta Boulevard in each direction	$ 24	$ 24	$ -	N	Y	Y	Y	N
230686	Bay Area Region/Multi-County	Widen I-680 in each direction for express lanes between Martinez Bridge to I-80	$ 335	$ 335	$ -	N	Y	Y	Y	N
230687	Bay Area Region/Multi-County	Widen I-680/I-80 interchange in each direction for express lanes	$ 140	$ 140	$ -	N	Y	Y	Y	N
240059	Bay Area Region/Multi-County	Widen I-680 northbound for express lane from Route 84 to Alcosta Boulevard	$ 161	$ 161	$ -	N	Y	Y	Y	N
240061	Bay Area Region/Multi-County	Widen I-680 southbound for express lane from Alcosta Boulevard to Route 84	$ 161	$ 161	$ -	N	Y	Y	Y	N
240581	Bay Area Region/Multi-County	Widen I-80 in each direction for express lanes from Air Base Parkway to I-505	$ 139	$ 139	$ -	N	Y	Y	Y	N
240583	Bay Area Region/Multi-County	Widen I-80 in each direction for express lanes from I-505 to Yolo County Line	$ 427	$ 427	$ -	N	Y	N	Y	N
240587	Bay Area Region/Multi-County	Widen I-680 northbound for express lanes from Marina Vista Avenue to North Main Street	$ 93	$ 93	$ -	N	Y	Y	Y	N
240588	Bay Area Region/Multi-County	Widen I-680 southbound for express lanes from Marina Vista Avenue to Livorna Road	$ 221	$ 221	$ -	N	Y	Y	Y	N
240732	Bay Area Region/Multi-County	Regional Express Lane Network Grant Funding	$ 600	$ -	$ 600	N	Y	Y	Y	N
240733	Bay Area Region/Multi-County	Regional Express Lane Network Reserve: net revenue from the Network will be held in reserve	$ 945	$ 945	$ -	N	Y	Y	Y	N
240734	Bay Area Region/Multi-County	Regional Express Lane Network Operations and Maintenance, Rehabilitation, and Financing Cost	$ 1,801	$ 1,801	$ -	N	Y	Y	Y	N
21093	Alameda	Implement Route 92/Clawiter Road/Whitesell Street interchange improvements and local intersection improvements	$ 28	$ 28	$ -	Y	Y	Y	Y	Y
21100	Alameda	Modify I-580/Vasco Road interchange, includes widening I-580 overcrossing to provide 8 lanes and bike lanes/shoulders, constructing auxiliary lanes on I-580 between Vasco and First Street, widening Vasco Road to 8 lanes between Northfront Road and Las Positas Road	$ 64	$ 55	$ 9	N	Y	Y	Y	N

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21103	Alameda	Construct grade separation structure on Central Avenue at Union Pacific Railroad crossing	$ 19	$ 1	$ 18	N	Y	Y	Y	Y
21114	Alameda	Construct grade separations on Washington Boulevard/Paseo Padre Parkway at the Union Pacific railroad tracks and proposed BART extension	$ 109	$ 109	$ -	Y	Y	Y	Y	Y
21116	Alameda	Widen I-580 for HOV and auxiliary lanes eastbound from Hacienda Road to Greenville Road and westbound from Greenville Road to Foothill Road	$ 226	$ 226	$ -	Y	Y	Y	Y	Y
21123	Alameda	Improve infrastructure at Union City Intermodal Station	$ 27	$ 20	$ 7	N	Y	Y	Y	Y
21126	Alameda	Construct Route 84 westbound HOV on-ramp from Newark Boulevard	$ 19	$ -	$ 19	N	Y	Y	Y	N
21131	Alameda	Build a BART Oakland Airport Connector between Coliseum BART station and Oakland International Airport	$ 484	$ 484	$ -	Y	Y	Y	Y	Y
21132	Alameda	Extend BART from Fremont to Warm Springs	$ 890	$ 890	$ -	Y	Y	Y	Y	Y
21144	Alameda	Reconfigure I-80/Gilman interchange, involves dual roundabout at interchange and bicycle/pedestrian improvements	$ 26	$ 1	$ 25	N	Y	Y	Y	N
21451	Alameda	Construct additional turn- and bus-loading lanes on Hesperian Boulevard and East 14th Street	$ 7	$ 7	$ -	Y	Y	Y	Y	Y
21472	Alameda	Improve I-680/Bernal Avenue interchange	$ 4	$ 4	$ -	Y	Y	Y	Y	Y
21473	Alameda	Construct a 4-lane arterial connecting Dublin Boulevard and North Canyons Parkway	$ 12	$ 12	$ -	Y	Y	Y	Y	Y
21475	Alameda	Reconstruct I-580/First Street interchange	$ 44	$ 38	$ 5	N	Y	Y	Y	N
21477	Alameda	Reconstruct I-580/Greenville road interchange	$ 54	$ 43	$ 11	N	Y	Y	Y	N
21484	Alameda	Widen Kato Road from Warren Avenue to Milmont Drive	$ 12	$ 0.2	$ 12	N	Y	Y	Y	N
21489	Alameda	Improve I-580/San Ramon Road/Foothill Road interchange, includes eliminating eastbound diagonal off-ramp and eastbound loop off-ramp and constructing new signalized intersection at off-ramp	$ 4	$ 3	$ 1	N	Y	Y	Y	N
22009	Alameda	Expand Capitol Corridor intercity rail service from Oakland to San Jose - project development	$ 58	$ 18	$ 40	N	Y	Y	Y	Y
22013	Alameda	Construct I-580 eastbound truck climbing lane at the Altamont Summit	$ 66	$ 66	$ -	Y	Y	Y	Y	Y
22062	Alameda	Construct Irvington BART Station in Fremont	$ 127	$ -	$ 127	N	Y	Y	Y	Y
22063	Alameda	Improve Route 238 corridor near Foothill Boulevard/I-580 by removing parking during peak periods and spot widening	$ 122	$ 122	$ -	Y	Y	Y	Y	Y
22082	Alameda	Implement Outer Harbor Intermodal Terminals project (includes 7th Street grade separation and roadway improvements)	$ 332	$ 166	$ 166	N	Y	Y	Y	Y
22100	Alameda	Replace overcrossing structure at I-880/Davis Street interchange and add additional travel lanes on Davis Street (includes ramp, intersection and signal improvements)	$ 11	$ 11	$ -	Y	Y	Y	Y	Y
22455	Alameda	Implement AC Transit East Bay Bus Rapid Transit (BRT)	$ 218	$ 179	$ 39	N	Y	Y	Y	Y
22509	Alameda	Provide ferry service between Alameda/Oakland and San Francisco, and between harbor Bay and San Francisco	$ 22	$ 22	$ -	Y	Y	Y	Y	Y
22664	Alameda	Convert the I-580 westbound HOV lane to an express lane from Greenville Road to San Ramon Road/Foothill Road	$ 17	$ 5	$ 12	N	Y	Y	Y	Y
22670	Alameda	Construct HOV lane for southbound I-880 from Hegenberger Road to Marina Boulevard (includes reconstructing bridges at Davis Street and Marina Boulevard)	$ 117	$ 117	$ -	Y	Y	Y	Y	Y
22760	Alameda	Construct Outer Harbor Intermodal Terminal (OHIT) on former Oakland Army Base at 7th Street/Maritime Street (includes expanded intermodal terminal for the Port, warehouses, and truck parking lot)	$ 326	$ 257	$ 70	N	Y	Y	Y	Y
22769	Alameda	Improve northbound I-880 interchange at 23rd and 29th Avenue, involves improving on- and off-ramp geometrics, modifying local streets, and landscaping/soundwalls	$ 109	$ 105	$ 4	N	Y	Y	Y	N

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22776	Alameda	Widen Route 84 from 2 lanes to 4 lanes from north of Pigeon Pass to Stanley Boulevard and from 2lanes to 6 lanes from Stanley Boulevard to Jack London Boulevard	$ 146	$ 135	$ 11	N	Y	Y	Y	N
22779	Alameda	Improve Route 262/I-880 interchange (Phase 2), which involves grade separation at Warren Avenue/Union Pacific Rail Road	$ 80	$ -	$ 80	N	Y	Y	Y	N
22780	Alameda	Implement AC Transit Grand-MacArthur Bus Rapid Transit (BRT)	$ 41	$ -	$ 41	N	Y	Y	Y	Y
22990	Alameda	Widen Route 262 from I-880 to Warm Springs Boulevard (includes reconstructing Route 262/I-880 and Route 262/Kato Road interchanges) and reconstruct Union Pacific Railroad underpasses	$ 62	$ 62	$ -	Y	Y	Y	Y	Y
94012	Alameda	Implement the Union City BART station transit-oriented development project, including construction of pedestrian grade separations under the BART and Union Pacific Railroad tracks and reconfiguring existing station to provide multimodal loop road (Phase 1)	$ 86	$ 86	$ -	Y	Y	Y	Y	Y
94506	Alameda	Construct an east-west connector between I-880 and Route 238/Mission Boulevard (includes improvements to roadways and intersections along Decoto Road, Fremont Boulevard, Paseo Padre Parkway, Alvarado-Niles Road and Route 238/Mission Boulevard)	$ 196	$ 110	$ 86	N	Y	Y	Y	N
98207	Alameda	Construct Bus Rapid Transit facility from Alameda Naval Station to 12th Street BART station, improve freeway weaving at I-880/I-980 interchange, construct new on-ramp at Market Street/6th Street and off-ramp at Martin Luther King Way/5th Street, improve operations at Posey and Webster Tubes, construct park and ride on Mariner Square Drive near Posey Tube entrance, add Intelligent Transportation Systems (ITS) elements on Webster Street, Ralph Appezatto Memorial Parkway, 6th Street, 5th Street, Broadway, Harrison Street, and 7th Street (Phase 1)	$ 83	$ 8	$ 75	N	Y	Y	Y	Y
230052	Alameda	Construct auxiliary lanes on I-880 near Winton Avenue in Hayward	$ 23	$ 23	$ -	Y	Y	Y	Y	Y
230054	Alameda	Construct auxiliary lanes on I-880 between Whipple Road and Industrial Parkway West	$ 10	$ 10	$ -	Y	Y	Y	Y	Y
230066	Alameda	Improve I-880/Marina Boulevard interchange (includes on-and off-ramp improvements, overcrossing modification and street improvements)	$ 34	$ 34	$ -	Y	Y	Y	Y	Y
230083	Alameda	Tri-Valley Transit Access: acquire right-of-way along I-580 from Hacienda Drive to the Greenville Road interchange to accommodate rail transit	$ 182	$ 182	$ -	Y	Y	Y	Y	Y
230091	Alameda	Install traffic monitoring systems, signal priority and coordination, ramp metering, and HOV bypass lanes in the I-880, I-238 and I-580 corridors	$ 47	$ 47	$ -	Y	Y	Y	Y	Y
230101	Alameda	Implement Union City Passenger Rail Station and Dumbarton Rail Segment G improvement; and Union City BART Phase 2/Passenger Rail Station	$ 231	$ 50	$ 181	N	Y	Y	Y	Y
230103	Alameda	Construct grade separation over Decoto Road in the Decoto neighborhood	$ 192	$ -	$ 192	N	Y	Y	Y	Y
230110	Alameda	Improvement Route 262 Mission Boulevard cross connector, includes widen Mission Boulevard to 3 lanes in each direction throughout I-680 interchange, extend westbound right turn lane from Warm Springs to Mohave, extend westbound left turn lanes at Warm Springs, rebuild northbound and southbound I-680 on and off ramps	$ 20	$ -	$ 20	N	Y	Y	Y	N
230114	Alameda	Widen Auto Mall Parkway from 4-lanes to 6-lanes between I-680 and I-880	$ 25	$ -	$ 25	N	Y	Y	Y	N
230132	Alameda	Improve I-580/Isabel/Route 84 interchange, includes providing 6-lanes over I-580 at Isabel/Route 84 interchange and 4-lanes over I-580 at Portola flyover	$ 31	$ 26	$ 5	N	Y	Y	Y	N

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230157	Alameda	Construct a 2-lane gap closure on Las Positas Road from Arroyo Vista to west of Vasco Road	$ 4	$ 4	$ -	Y	Y	Y	Y	Y
230170	Alameda	Improve 42nd Avenue and High Street, includes extending and aligning 42nd Avenue with Alameda Avenue to create road parallel to High Street, widening High Street between Oakport Street and Coliseum Way, realigning E. 8th Street near Alameda Avenue, and modifying traffic signals and other intersection improvements	$ 18	$ 6	$ 12	N	Y	Y	Y	N
230171	Alameda	Improve Route 24/Caldecott Tunnel including bicycle and transit access and soundwall improvements	$ 16	$ 16	$ -	Y	Y	Y	Y	Y
240003	Alameda	Construct I-80 bicycle-pedestrian bridge between 65th Street and Frontage Road	$ 23	$ 1	$ 22	N	Y	Y	Y	Y
240014	Alameda	Construct WETA operations and maintenance facility in Alameda	$ 38	$ 25	$ 13	N	Y	Y	Y	Y
240015	Alameda	Construct a new interchange at Route 92/Whitesell Street and extend Whitesell Street to Clawiter Road (includes new on-ramp from southbound Clawiter Road to Route 92 westbound on a bridge over the Route 92 westbound off ramp to Whitesell Street)	$ 78	$ 78	$ -	Y	Y	Y	Y	Y
240018	Alameda	Implement commuter service between Peninsula and East Bay (includes implementation of Phase 1 service as determined by on-going environmental work, railroad right-of-way acquisition, and environmental only for rail improvements)	$ 436	$ 314	$ 122	N	Y	Y	Y	Y
240024	Alameda	Implement Oakland Army Base infrastructure improvements (includes reconstructing Maritime Street, realigning Burma Road and Wake Avenue)	$ 215	$ 97	$ 118	N	Y	Y	Y	N
240025	Alameda	Reconstruct interchange at I-880/Industrial Parkway to provide a northbound off-ramp and a southbound HOV bypass lane on the southbound loop off-ramp (includes reconstruction of bridge over I-880)	$ 65	$ 65	$ -	Y	Y	Y	Y	Y
240037	Alameda	Reconstruct I-880/West Winton Avenue interchange, involves reconfiguring eastbound to southbound on ramp and new connection to Southland Mall Drive	$ 26	$ -	$ 26	N	Y	Y	Y	N
240038	Alameda	Widen Doughery Road from 4-lanes to 6-lanes between Sierra Lane and North City Limit	$ 19	$ 8	$ 11	N	Y	Y	Y	N
240047	Alameda	Reconstruct I-880/A Street interchange, includes widening of A Street from 5 lanes to 6 lanes underneath overpass, adding additional freeway lane in each direction, modifying intersection and signal	$ 64	$ -	$ 64	N	Y	Y	Y	N
240050	Alameda	Convert I-580 eastbound HOV lane to express lanes from Hacienda Road to Greenville Road	$ 20	$ 20	$ -	Y	Y	Y	Y	Y
240051	Alameda	Widen Union City Boulevard from 2-lanes to 3-lanes between Whipple Road and Industrial Parkway	$ 10	$ -	$ 10	N	Y	Y	Y	N
240052	Alameda	Improve I-880/Whipple Road interchange, includes northbound off-ramp, surface street improvements and realignment between Union City and Hayward city limits	$ 62	$ -	$ 62	N	Y	Y	Y	N
240055	Alameda	Construct underpass on Tennyson Road between Whitman Avenue and Huntwood Avenue	$ 14	$ -	$ 14	N	Y	Y	Y	N
240062	Alameda	Construct improvements for the Route 84/I-680 interchange, widen Route 84 from Pigeon Pass to I-680, and construct auxiliary lanes on I-680 between Andrade and Route 84	$ 277	$ -	$ 277	N	Y	Y	Y	N
240065	Alameda	Widen Route 92/Industrial Boulevard Interchange (includes striping improvements on Industrial Boulevard to accommodate the existing lane)	$ 9	$ 9	$ -	Y	Y	Y	Y	Y
240076	Alameda	Construct auxiliary lanes on I-580 eastbound between Isabel Avenue and North Livermore Avenue, and North Livermore Avenue and First Street (includes widening the Arroyo Las Positas Bridge at two locations and providing additional improvements to accommodate future express lanes)	$ 41	$ 41	$ -	Y	Y	Y	Y	Y

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240077	Alameda	Implement Rapid Bus Service from Alameda Point to Fruitvale BART station	$ 9	$ -	$ 9	N	Y	Y	Y	Y
240094	Alameda	Implement Crow Canyon Road Safety Improvements Project (includes roadway realignment, shoulder widening, retaining wall systems, and guardrail modifications along Crow Canyon Road between E. Castro Valley Blvd. and the Alameda / Contra Costa county line)	$ 24	$ 24	$ -	Y	Y	Y	Y	Y
240100	Alameda	Replace Park Street Bridge between Park Street in Alameda and 29th Avenue in Oakland	$ 70	$ -	$ 70	N	Y	Y	Y	Y
240101	Alameda	Replace Fruitvale Bridge between Tilden Way in Alameda and Fruitvale Avenue in Oakland (includes widening for travel lanes)	$ 142	$ -	$ 142	N	Y	Y	Y	Y
240139	Alameda	Widen the Stoneridge Drive overcrossing at I-680	$ 5	$ 1	$ 4	N	Y	Y	Y	N
240175	Alameda	Construct second bridge on Bernal Bridge for bicycle and pedestrian access	$ 5	$ 1	$ 4	N	Y	Y	Y	Y
240179	Alameda	Construct Downtown Berkeley Transit Center	$ 28	$ -	$ 28	N	Y	Y	Y	Y
240180	Alameda	Implement BART Metro/Bay Fair connection	$ 150	$ -	$ 150	N	Y	Y	Y	Y
240196	Alameda	Extend BART from the Dublin/Pleasanton Station to Livermore - project development (funds for study, construction reserve)	$ 617	$ 217	$ 400	N	Y	Y	Y	Y
240197	Alameda	Implement Berkeley Pedestrian Master Plan	$ 28	$ 28	$ -	Y	Y	Y	Y	Y
240200	Alameda	Extend Stoneridge Drive from Trevor Parkway to El Charro Road and construct six traffic signals	$ 17	$ 17	$ -	Y	Y	Y	Y	Y
240202	Alameda	Improve Route 13/Ashby Avenue corridor with traffic, bicycle, and pedestrian safety measures	$ 8	$ 2	$ 6	N	Y	Y	Y	N
240206	Alameda	Implement Berkeley Bicycle Plan	$ 18	$ 18	$ -	Y	Y	Y	Y	Y
240207	Alameda	Extend Bay Trail by 1.3 miles from West Frontage Road to Berkeley Marina	$ 32	$ -	$ 32	N	Y	Y	Y	Y
240208	Alameda	Improve highway-rail grade crossings at four crossings in Fremont	$ 3	$ -	$ 3	N	Y	Y	Y	Y
240226	Alameda	Construct access improvements to Berkeley Ferry Terminal	$ 109	$ -	$ 109	N	Y	Y	Y	Y
240227	Alameda	Extend Bay Trail in Oakland, inlcuding bicycle/pedestrian bridge over Lake Merritt Channel and bicycle/pedestrian access around Oakland Estuary	$ 116	$ 68	$ 48	N	Y	Y	Y	Y
240250	Alameda	Widen Dublin Boulevard from 4-lanes to 6-lanes between Sierra Court and Dublin Court	$ 4	$ 1	$ 4	N	Y	Y	Y	N
240254	Alameda	Widen Greenville Road from 2-lanes to 4-lanes between I-580 and Patterson Pass Road	$ 10	$ 5	$ 5	N	Y	Y	Y	N
240261	Alameda	Extend and widen Scarlett Drive from Dougherty Road to Dublin Boulevard and relocate Iron Horse Trail along Scarlett Drive in Dublin	$ 13	$ -	$ 13	N	Y	Y	Y	N
240263	Alameda	Modify Route 84/Peralta Boulevard (includes widening Peralta Boulevard from 1-lane to 2-lanes and a bike lane in each direction between Fremont Boulevard Mowry Avenue, and widening Mowry Avenue from 1-lane to 2-lanes and a bike lane in each direction between Thane Street and Mission Boulevard)	$ 45	$ -	$ 45	N	Y	Y	Y	N
240264	Alameda	Widen Fremont Boulevard to 6-lanes and 2-bike lanes from Grimmer Boulevard to I-880	$ 5	$ -	$ 5	N	Y	Y	Y	N
240272	Alameda	Widen Thornton Avenue from 2-lanes to 4-lanes between Gateway Boulevard and Hickory Street	$ 14	$ 1	$ 13	N	Y	Y	Y	N
240274	Alameda	Union Pacific Railroad (UPRR) Capital Access Fee to operate Altamont Commuter Express (ACE) trains	$ 3	$ 3	$ -	Y	Y	Y	Y	Y
240281	Alameda	Construct bicycle and pedestrian facilities from Fremont BART Station to Fremont Midown	$ 1	$ 1	$ -	Y	Y	Y	Y	Y
240295	Alameda	Install security cameras at the Alameda and San Joaquin County ACE stations	$ 3	$ 3	$ -	Y	Y	Y	Y	Y
240297	Alameda	Interoperable Communications Equipment for ACE	$ 0	$ 0	$ -	Y	Y	Y	Y	Y
240304	Alameda	Extend platforms at ACE Stations in Alameda County and San Joaquin County	$ 8	$ -	$ 8	N	Y	Y	Y	Y
240307	Alameda	Rehabilitate six ACE locomotives	$ 16	$ 16	$ -	Y	Y	Y	Y	Y
240310	Alameda	Minor repairs of ACE locomotives and rail cars	$ 9	$ 9	$ -	Y	Y	Y	Y	Y

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240311	Alameda	Preventive Maintenance for ACE locomotives and rail cars	$ 14	$ 14	$ -	Y	Y	Y	Y	Y
240318	Alameda	Reconstruct the Ashby Avenue interchange on I-80	$ 54	$ 1	$ 53	N	Y	Y	Y	N
240324	Alameda	Retrofit Miller Sweeney Bridge between Tilden Way and Fruitvale Avenue, includes bike lanes, median and sidewalks	$ 61	$ -	$ 61	N	Y	Y	Y	Y
240347	Alameda	Construct new segments and close existing gaps along Iron Horse Trail, East Bay Greenway, and Bay Trail	$ 243	$ 3	$ 240	N	Y	Y	Y	Y
240350	Alameda	Implement pedestrian safety improvements on Marin Avenue	$ 4	$ -	$ 4	N	Y	Y	Y	Y
240372	Alameda	Implement College Avenue/Broadway Corridor (Route 51) Improvements - Transit Priority Measures	$ 35	$ -	$ 35	N	Y	Y	Y	Y
240381	Alameda	Implement Alameda County's Bicycle and Pedestrian program (includes pedestrian infrastructure, support facilities, maintenance, and education/promotion programs)	$ 390	$ -	$ 390	N	Y	Y	Y	Y
240388	Alameda	Implement highway and freeway safety improvements (includes interchange improvements, ramp metering, and soundwalls)	$ 20	$ -	$ 20	N	Y	Y	Y	N
240389	Alameda	Implement Alameda County's Bridge Improvements Program	$ 30	$ -	$ 30	N	Y	Y	Y	N
240391	Alameda	Support TODs/PDAs through multi-modal improvements and CEQA mitigation	$ 270	$ -	$ 270	N	Y	Y	Y	Y
240392	Alameda	Implement promotion/outreach/education/planning studies about taking transit, biking, walking, and multi-modal access (includes Safe Routes to School program)	$ 30	$ -	$ 30	N	Y	Y	Y	Y
240393	Alameda	Implements Alameda County's Transportation Demand Management (TDM) and Parking Management program (includes Guaranteed Ride Home, Safe Routes to School, Safe Routes to Transit, Travel Choice, Travel Training, Walk/Bike Promotions, and parking cash out)	$ 270	$ -	$ 270	N	Y	Y	Y	Y
240394	Alameda	Implement Alameda County's Goods Movement Program (includes improvements for goods movement by truck and coordinated with rail and air)	$ 80	$ -	$ 80	N	Y	Y	Y	Y
240395	Alameda	Improve Priority Development Areas (PDAs) with non-transportation infrastructure (includes sewer and storm water upgrades)	$ 5	$ -	$ 5	N	Y	Y	Y	Y
240396	Alameda	Implement Alameda County's Environmental Mitigation Program	$ 10	$ -	$ 10	N	Y	Y	Y	Y
240397	Alameda	Implement Alameda County's Transportation Technology and Revenue Enhancement Program	$ 80	$ -	$ 80	N	Y	Y	Y	Y
240562	Alameda	Upgrade Clawiter Road/Route 92 interchange (includes new ramps and an over-crossing for the Whitesell Street extension and ramp intersection signalization)	$ 55	$ 55	$ -	Y	Y	Y	Y	Y
240683	Alameda	Expand Alamo Canal Trail from Dublin to Pleasanton	$ 3	$ 3	$ -	Y	Y	Y	Y	Y
240716	Alameda	Construct bicycle and pedestrian bridge on Tennyson Road from Nuestro Parquecito to South Hayward BART station	$ 2	$ -	$ 2	N	Y	Y	Y	Y
240717	Alameda	Rehabilitate Solano Avenue (includes resurfacing and beautification)	$ 3		$ 3	N	Y	Y	Y	Y
240718	Alameda	Implement streetscape improvements on San Pablo Avenue (includes medians and rain gardens)	$ 3	$ -	$ 3	N	Y	Y	Y	Y
240726	Alameda	Implement project development phases for transportation projects in Alameda County, includes wide-range of highway, arterial, transit, and bicycle/pedestrian improvements	$ 304	$ 39	$ 265	N	Y	Y	Y	Y
240382, 240383	Alameda	Implement Alameda County's Transit Enhancements, Expansion, Safety and Operations and Maintenance Program, including Paratransit	$ 1,069	$ -	$ 1,069	N	Y	Y	Y	Y
240387, 240386	Alameda	Local streets and roads improvements, operations, and maintenance	$ 1,550	$ -	$ 1,550	N	Y	Y	Y	Y

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21134	Contra Costa	Construct enhancements of the San Pablo Rapid service, including real-time passenger information, queue jump lanes, buses and on-board equipment, and passenger amenities	$ 19	$ 13	$ 6	N	Y	Y	Y	Y
21205	Contra Costa	Improve I-680/Route 4 interchange (includes connecting northbound I-680 to westbound State Route 4, connecting eastbound State Route 4 to southbound I-680, and widening SR4 between Morello and SR242)	$ 205	$ 33	$ 172	N	Y	Y	Y	N
21208	Contra Costa	Implement improvements to Richmond Parkway Transit Center	$ 50	$ 29	$ 20	N	Y	Y	Y	Y
21210	Contra Costa	Construct Capitol Corridor train station in Hercules	$ 19	$ 19	$ -	Y	Y	Y	Y	Y
21211	Contra Costa	Extend BART/East Contra Costa Rail (eBART) eastward from the Pittsburg/Bay Point BART station into eastern Contra Costa County	$ 493	$ 493	$ -	Y	Y	Y	Y	Y
21214	Contra Costa	Widen Wilbur Avenue over Burlington Northern Santa Fe Railroad from 2 lanes to 4 lanes	$ 16	$ 16	$ -	Y	Y	Y	Y	Y
21225	Contra Costa	Regional and local pedestrian and bicycle improvements, including overcrossing locations to be determined	$ 57	$ 57	$ 40	N	Y	Y	Y	Y
22122	Contra Costa	Provide ferry service from Richmond to San Francisco	$ 53	$ 1	$ 53	N	Y	Y	Y	Y
22350	Contra Costa	Improve I-680/Route 4 interchange Phases 4 and 5 (includes connecting soutbound I-680 to eastbound State Route 4, connecting westbound State Route 4 to northbound I-680, and constructing HOV flyover ramps from westbound State Route 4 to I-680 southbound from I-680 northbound to eastbound State Route 4)	$ 221	$ -	$ 221	N	Y	Y	Y	N
22351	Contra Costa	Construct an HOV lane on I-680 nortbound between North Main Street and Route 242 *(See Bay Area Region/Multi-County Project #240587)*	$ 48	$ -	$ -	Y	Y	Y	Y	Y
22352	Contra Costa	Construct new HOV-only on- and off-ramps at I-680/Norris Canyon Road	$ 102	$ 48	$ 54	N	Y	Y	Y	N
22353	Contra Costa	Construct an HOV lane on I-680 southbound between North Main Street and Livorna *(See Bay Area Region/Multi-County Project #240588)*	$ 102	$ 54	$ 20	N	Y	Y	Y	Y
22355	Contra Costa	Modify I-80/Central Avenue interchange, includes connecting Pierce Street to San Mateo Street and relocating traffic signal to San Mateo/Central Avenue intersection	$ 25	$ 21	$ 4	N	Y	Y	Y	N
22360	Contra Costa	Reconstruct I-80/San Pablo Dam Road interchange, includes relocating of westbound El Portal on-ramp to the full interchange northwards, providing access to McBryde Avenue through a new connector road from San Pablo Dam Road interchange, and replacing Riverside Avenue pedestrian overcrossing	$ 114	$ 30	$ 84	N	Y	Y	Y	N
22388	Contra Costa	Construct on- and off-ramp for State Route 242 at Clayton Road	$ 35	$ 6	$ 29	N	Y	Y	Y	N
22390	Contra Costa	Reonstruct State Route 4/Willow Pass Road ramps in Concord	$ 35	$ 26	$ 9	N	Y	Y	Y	N
22400	Contra Costa	Conduct environmental and design studies to create a new alignment for SR239 and develop corridor improvements from Brentwood to Tracy - project development	$ 30	$ 14	$ 16	N	Y	Y	Y	Y
22402	Contra Costa	Implement the San Ramon School Bus Program, and continue the Lamorinda School Bus Program	$ 261	$ 261	$ -	Y	Y	Y	Y	Y
22602	Contra Costa	Construct auxiliary lane on I-680 in both directions between Sycamore Valley Road in Danville to Crow Canyon Road in San Ramon	$ 34	$ 15	$ 20	N	Y	Y	Y	N
22604	Contra Costa	Improve safety and operations of Vasco Road from Brentwood to Alameda County line - Phase 2 (includes potential realignment)	$ 61	$ -	$ 61	N	Y	Y	Y	N
22607	Contra Costa	Widen and extend major streets, and improve interchanges in east Contra Costa County	$ 45	$ 45	$ -	Y	Y	Y	Y	Y
22609	Contra Costa	Widen and extend major streets, and improve interchanges in central Contra Costa County	$ 39	$ 39	$ -	Y	Y	Y	Y	Y
22610	Contra Costa	Widen and extend major streets, and improve interchanges in west Contra Costa County	$ 45	$ 45	$ -	Y	Y	Y	Y	Y

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22611	Contra Costa	Implement a low-income student bus pass program in west Contra Costa County	$ 32	$ 32	$ -	Y	Y	Y	Y	Y
22613	Contra Costa	Widen and extend major streets, and improve interchanges in southwest Contra Costa County (includes widening Camino Tassajara to 4 lanes between Danville and Windemere Parkway, and to 6 lanes from Windemere Parkway to Alameda County line)	$ 42	$ 42	$ -	Y	Y	Y	Y	Y
22614	Contra Costa	Construct Martinez Intermodal Station (Phase 3), which includes additional 425 spaces and auto/pedestrain bridge	$ 20	$ 4	$ 16	N	Y	Y	Y	Y
22637	Contra Costa	Construct BART crossover at Pleasant Hill BART station	$ 40	$ 40	$ -	Y	Y	Y	Y	Y
94046	Contra Costa	Improve interchanges and parallel arterials to Route 4	$ 32	$ 32	$ -	Y	Y	Y	Y	Y
94048	Contra Costa	Improve interchanges and parallel arterials to I-80	$ 23	$ 23	$ -	Y	Y	Y	Y	Y
94532	Contra Costa	Implement the Gateway Lamorinda Traffic Program (includes carpool lot in Lafayette, structural and safety improvements on Moraga Road, intersection realignments, turn lanes, pedestrian accommodation and signal coordination)	$ 5	$ 5	$ -	Y	Y	Y	Y	Y
98115	Contra Costa	Widen Ygnacio Valley/Kirker Pass Roads from 4 lanes to 6 lanes from Michigan Boulevard to Cowell Road	$ 15	$ 15	$ -	Y	Y	Y	Y	Y
98126	Contra Costa	Improve interchanges and arterials parallel to I-680 and Route 24	$ 32	$ 32	$ -	Y	Y	Y	Y	Y
98133	Contra Costa	Widen Pacheco Boulevard from 2 lanes to 4 lanes between Blum Road to Arthur Road	$ 58	$ 58	$ -	Y	Y	Y	Y	Y
98134	Contra Costa	Widen Dougherty Road to 6 lanes from Red Willow to Contra Costa County line	$ 72	$ 72	$ -	Y	Y	Y	Y	Y
98194	Contra Costa	Extend Commerce Avenue to Waterworld Parkway, including construction of vehicular bridge over Pine Creek, installation of trails and a pedestrian bridge connecting Willow Pass Road to Concord Avenue/Route 242 interchange	$ 8	$ 8	$ -	Y	Y	Y	Y	Y
98196	Contra Costa	Construct an eastbound auxiliary lane on Route 24 between Gateway Boulevard and Brookwood Road/Moraga Way	$ 7	$ -	$ 7	N	Y	Y	Y	N
98198	Contra Costa	Improve safety and operations on Vasco Road in Contra Costa and Alameda counties	$ 45	$ 11	$ 34	N	Y	Y	Y	N
98222	Contra Costa	Construct freeway-to-freeway direct connectors between Route 4 Bypass and Route 160	$ 53	$ 53	$ -	Y	Y	Y	Y	Y
98999	Contra Costa	Widen Route 4 from Somersville Road to Route 160 including improvements to interchanges	$ 442	$ 442	$ -	Y	Y	Y	Y	Y
230084	Contra Costa	Construct a railroad grade separation at the Richmond Waterfront on the Marina Bay Parkway	$ 39	$ 39	$ -	Y	Y	Y	Y	Y
230123	Contra Costa	Expand exist WestCAT maintenance facility to store addiitonal transit vehicles	$ 6	$ 1	$ 5	N	Y	Y	Y	Y
230127	Contra Costa	Construct new WestCat satellite maintenance/administration facility	$ 11	$ -	$ 11	N	Y	Y	Y	Y
230129	Contra Costa	Expand WestCAT service, including purchase of vehicles	$ 13	$ 13	$ -	Y	Y	Y	Y	Y
230131	Contra Costa	Provide expanded express bus service to Pinole and Hercules Ferry	$ 8	$ -	$ 8	N	Y	Y	Y	Y
230185	Contra Costa	Establish Express Bus Service and eBART support network	$ 24	$ -	$ 24	N	Y	Y	Y	Y
230196	Contra Costa	Transit Preferential Measures (TPM)s to improve bus speed and passenger safety, includes signal priority, passenger amenities, improved bus loading areas, and rider information	$ 19	$ 13	$ 6	N	Y	Y	Y	Y
230202	Contra Costa	Widen Route 4 Bypass from 2 to 4 Lanes from Laurel Road to Sand Creek Road	$ 20	$ 20	$ -	Y	Y	Y	Y	Y
230203	Contra Costa	Construct Route 4 Bypass interchange at Sand Creek Road	$ 35	$ 35	$ -	Y	Y	Y	Y	Y
230205	Contra Costa	Widen Route 4 Bypass from 2 to 4 lanes from Sand Creek Road to Balfour Road	$ 22	$ 22	$ -	Y	Y	Y	Y	Y
230206	Contra Costa	Construct Route 4 Bypass interchange at Balfour Road (Phase 1)	$ 46	$ 46	$ -	Y	Y	Y	Y	Y

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230212	Contra Costa	Improve Clayton Road/Treat Boulevard intersection and increase capacity (includes upgrading traffic signal and geometric improvements)	$ 3	$ 3	$ -	Y	Y	Y	Y	Y
230216	Contra Costa	Construct a two-lane bridge over Walnut Creek connecting Waterworld Parkway with Meridan Park Boulevard	$ 14	$ 8	$ 5	N	Y	Y	Y	N
230218	Contra Costa	Conduct planning, engineering, environmental studies, and construct transportation improvements at the El Cerrito Del Norte BART station's Transit Oriented Development (TOD) project	$ 30	$ -	$ 30	N	Y	Y	Y	Y
230232	Contra Costa	Improve State Route 4/Phillips Lane interchange to provide diamond configuration connecting Route 4 to an extension of Phillips Lane from Oakley Road	$ 50	$ 30	$ 20	N	Y	Y	Y	N
230233	Contra Costa	Extend James Donlon Boulevard to Kirker Pass Road by constructing a new 2-lane expressway	$ 54	$ 37	$ 17	N	Y	Y	Y	N
230236	Contra Costa	Widen Pittsburg-Antioch Highway from 2 lanes to 4 lanes	$ 15	$ 15	$ -	Y	Y	Y	Y	Y
230237	Contra Costa	Extend West Leland Road and construct a new 4-lane arterial road with raised median, bike lanes and sidewalks from San Marco Boulevard to Willow Pass Road	$ 16	$ 15	$ 2	N	Y	Y	Y	N
230238	Contra Costa	Widen California Avenue from 2 lanes to 4 lanes with 2 left-turn lanes	$ 13	$ 13	$ -	Y	Y	Y	Y	Y
230239	Contra Costa	Widen and improve Buskirk Avenue between Monument Boulevard and Hookston Road to provide 2 through lanes in each direction (includes road realignment, new traffic signals and bicycle/pedestrian streetscape improvements)	$ 11	$ 11	$ -	Y	Y	Y	Y	Y
230240	Contra Costa	Improve Contra Costa Boulevard from Boyd Road and 2nd Avenue, includes intersection geometry modificatins, new traffic signals, bike lane, sidewalks, bus shelters and landscaping	$ 13	$ 2	$ 11	N	Y	Y	Y	N
230247	Contra Costa	Widen Lone Tree Way to 6-lanes from O'Hara Avenue to Brentwood Boulevard	$ 16	$ 4	$ 12	N	Y	Y	Y	N
230249	Contra Costa	Construct grade sepration underpass at Lone Tree Way and Union Pacifc Railroad	$ 19	$ 4	$ 15	N	Y	Y	Y	Y
230250	Contra Costa	Widen Brentwood Boulevard from 2 lanes to 4 lanes between marsh Creek and Delta Road	$ 17	$ 17	$ -	Y	Y	Y	Y	Y
230253	Contra Costa	Rplace the old 2-lane Fitzuren Road with a new 4-lane divided arterial (includes shoulders, bicycle lanes, a park-and-ride lot and sidewalks)	$ 11	$ 11	$ -	Y	Y	Y	Y	Y
230274	Contra Costa	Widen Main Street to 6 lanes from Route 160 to Big Break Road	$ 13	$ 13	$ -	Y	Y	Y	Y	Y
230288	Contra Costa	Widen Empire Avenue from 2-lanes to 4-lanes between Lone Tree Way and Union Pacific Railroad right-of-way/Antioch city limits	$ 2	$ 2	$ -	Y	Y	Y	Y	Y
230289	Contra Costa	Create Main Street Downtown Bypass by constructing new roadway between Vintage Parkway and 2nd Street	$ 27	$ 12	$ 15	N	Y	Y	Y	N
230291	Contra Costa	Construct northbound truck climbing lane from Clearbrook Drive in Concord to crest of Kirker Pass Road, includes 12-foot dedicated truck climbing lane, bike lane and 8-foot paved shoulder	$ 10	$ 6	$ 4	N	Y	Y	Y	N
230293	Contra Costa	Provide transportation improvements on the east side of the Richmond BART station to accommodate redevelopment for a transit village	$ 11	$ 11	$ -	Y	Y	Y	Y	Y
230306	Contra Costa	Improve safety on Alhambra Avenue by adding second southbound lane from Walnut Avenue to south side of State Route 4, includes signal modifications	$ 3.0	$ 0.5	$ 2.6	N	Y	Y	Y	N
230307	Contra Costa	Widen Camino Tassajara Road from 2 lanes to 4 lanes from Windemere Parkway to County line, includes 8-foot paved shoulders and bike lanes in both directions	$ 15	$ 7	$ 8	N	Y	Y	Y	N
230308	Contra Costa	Realign and improve safety and operations on Alhambra Valley Road	$ 11	$ 7	$ 4	N	Y	Y	Y	N

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230309	Contra Costa	Provide rolling stock, infrastructure and information-technology for bus-rapit transit service in select corridors in Contra Costa County	$ 16	$ -	$ 16	N	Y	Y	Y	Y
230318	Contra Costa	Extend North Richmond truck route from Market Avenue to Parr Boulevard, involves two lanes, shoulders on both sides and sidewalk on west side	$ 20	$ -	$ 20	N	Y	Y	Y	N
230321	Contra Costa	Construct Hercules Intermodal Station (Phase 2, 3 and 4), includes improvements to railraod tracks, construction of a platform and pedestrian bridge to platform, building station structure and plaza, building Ferry Station building, extending John Muir Parkway to 2-lanes in each direction, providing trail connections and adding 226 surface parking spaces	$ 56	$ 11	$ 45	N	Y	Y	Y	Y
230397	Contra Costa	Improve infrastructure to support WestCat service area, includes park and ride lots, signal prioritization, queue jump lanes and freeway drop ramps	$ 17	$ -	$ 17	N	Y	Y	Y	Y
230505	Contra Costa	East Side Improvements at the Richmond Intermodal Station	$ 19	$ 19	$ -	Y	Y	Y	Y	Y
230535	Contra Costa	Realign Curves along Marsh Creek Road to improve safety and operations	$ 9	$ 9	$ -	Y	Y	Y	Y	Y
230538	Contra Costa	Widen Bailey Road lanes and shoulders	$ 6	$ 6	$ -	Y	Y	Y	Y	Y
230542	Contra Costa	Close a bicycle/pedestrian gap at San Pablo Avenue bridge in Pinole by upgrading the existing bridge or constructing a new dedicated bicycle/pedestrian bridge	$ 1	$ 1	$ -	Y	Y	Y	Y	Y
230596	Contra Costa	Construct a six bay transit hub on Pacheco Boulevard (includes park-and-ride spaces, landscaping, lighting and passenger amenities on Blum Road at the I-680/Route 4 interchange)	$ 4	$ 4	$ -	Y	Y	Y	Y	Y
230597	Contra Costa	Implement I-80 Integrated Corridor Mobility Project (includes the installation/upgrade of corridor management elements along the I-80 corridor (Phase 1) and along parallel and connecting arterials (Phase 2) to allow sharing of real-time traveler information among public agencies and the public)	$ 28	$ 28	$ -	Y	Y	Y	Y	Y
230613	Contra Costa	Provide ferry service between Hercules and San Francisco	$ 54	$ 4	$ 49	N	Y	Y	Y	Y
230693	Contra Costa	Maintain local streets and roads countywide	$ 644	$ -	$ 644	N	Y	Y	Y	Y
240074	Contra Costa	Improve BART Station capacity, including additional vertical circulation and faregates, platform widening, trainscreens and doors and pad area expansion (initial phase)	$ 127	$ -	$ 127	N	Y	Y	Y	Y
240167	Contra Costa	Widen Brentwood Boulevard from 2 lanes to 4 lanes from Lone Tree Way and the north city limit, includes bike lanes, median islands, curb gutter, sidewalk, street lights and landscaping	$ 12	$ 11	$ 1	N	Y	Y	Y	N
240333	Contra Costa	Replace CCCTA existing diesel trollery fleet with electric trolleys and necessary infrastructure	$ 0.4	$ -	$ 0.4	N	Y	Y	Y	Y
240355	Contra Costa	Add an eastbound mixed-flow lane on Route 4 from the lane drop 1,500 feet west of Port Chicago Highway to east of Willow Pass Road (west) on-ramp	$ 34	$ -	$ 34	N	Y	Y	Y	N
240364	Contra Costa	Implement paratransit programs	$ 227	$ 227	$ -	Y	Y	Y	Y	Y
240365	Contra Costa	Implement Transportation for Livable Communitites/streetscape projects	$ 146	$ 146	$ -	Y	Y	Y	Y	Y
240367	Contra Costa	Implement Contra Costa County's Safe Routes to Schools program	$ 45	$ 45	$ -	Y	Y	Y	Y	Y
240457	Contra Costa	Construct improvements at the Walnut Creek BART transit-oriented development, inlcudes additional parking station access, capacity, safety and operational improvements	$ 34	$ 24	$ 10	N	Y	Y	Y	Y
240459	Contra Costa	Construct bicycle/pedestrain overcrossings for Route 4 Bypass	$ 6	$ -	$ 6	N	Y	Y	Y	Y
240584	Contra Costa	Add a westbound mixed-flow lane from east of Willow Pass Road (West) to the lane-add west of Willow Pass Road (West)	$ 27	$ -	$ 27	N	Y	Y	Y	N
240624	Contra Costa	Implement I-80 Integrated Corridor Mobility (ICM) Project Operations and Management - Local Portion - Maintenance	$ 3	$ 3	$ -	Y	Y	Y	Y	Y

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240625	Contra Costa	Construct eBART station in the Route 4 median at Railroad Avenue	$ 16	$ 4	$ 12	N	Y	Y	Y	Y
240629	Contra Costa	Widen Bolinger Canyon Road from Alcosta to San Ramon Valley Boulevard	$ 11	$ 8	$ 3	N	Y	Y	Y	N
240637	Contra Costa	Enhance streetscape on 23rd Street in Richmond to encourage bicycle and pedestrian use	$ 15	$ -	$ 15	N	Y	Y	Y	Y
240640	Contra Costa	Make landside improvements for Richmond ferry service, inlcudes expanded parking	$ 21	$ 2	$ 19	N	Y	Y	Y	Y
240641	Contra Costa	Construct eastbound HOV lane on I-80 from Cummings Skyway to Carquinez Bridge *(See Bay Area Region/Multi-County Project #230657)*	$ 39	$ -	$ 30	N	Y	Y	Y	Y
240649	Contra Costa	Add 450 space parking structure to serve Hercules Rail Station and the Ferry Terminal	$ 35	$ -	$ 35	N	Y	Y	Y	Y
240656	Contra Costa	Widen bridge at Church Lane over San Pablo Creek	$ 1	$ -	$ 1	N	Y	Y	Y	N
240706	Contra Costa	Purchase rolling stock for enhanced AC Transit service	$ 5	$ -	$ 5	N	Y	Y	Y	Y
240707	Contra Costa	Implement Computer Aided Dispatch Upgrades for AC Transit	$ 4	$ -	$ 4	N	Y	Y	Y	Y
240708	Contra Costa	Close gaps and develop three major trails in Alameda County, includes Iron Horse, Bay Trail, and East Bay Greenway Project)	$ 2	$ -	$ 2	N	Y	Y	Y	Y
240725	Contra Costa	Rehabilitate transit vehicles	$ 43	$ -	$ 43	N	Y	Y	Y	Y
240738	Contra Costa	Martinez Rail Corridor Improvements	$ 36	$ 36	$ -	Y	Y	Y	Y	Y
21306	Marin	Improve interchange at U.S. 101/Lucas Valley Road - project development	$ 3	$ -	$ 3	N	Y	Y	Y	Y
21325	Marin	Improve U.S. 101 Greenbrae/Twin Cities Corridor (includes modifying access ramps, new bus stops, improving transit stops and facilities, and adding pedestrian/bicycle facilities)	$ 155	$ 49	$ 106	N	Y	Y	Y	N
98154	Marin	Implement Marin Sonoma Narrows Stage 1 (Marin County)	$ 222	$ 222	$ -	Y	Y	Y	Y	Y
98179	Marin	Improve U.S. 101/Tiburon Boulevard interchange - project development	$ 2	$ -	$ 2	N	Y	Y	Y	Y
230105	Marin	Replace Pacific Way Bridge	$ 8	$ 1	$ 7	N	Y	Y	Y	Y
230252	Marin	Improve local transit frequencies and service spans in Marin County	$ 5	$ -	$ 5	N	Y	Y	Y	Y
230422	Marin	Install traffic signal and modify roadway at the intersection of Anderson Drive/East Sir Francis Drake Boulevard	$ 6	$ -	$ 6	N	Y	Y	Y	N
230694	Marin	Local street and roads operations and maintenance	$ 204	$ 88	$ 116	N	Y	Y	Y	Y
240005	Marin	Implement local air quality and climate protection strategies countywide	$ 24	$ -	$ 24	N	Y	Y	Y	Y
240034	Marin	Construct Golden Gate Multi-modal transfer facility at Larkspur Ferry Terminal	$ 4	$ -	$ 4	N	Y	Y	Y	Y
240039	Marin	Widen Novato Boulevard between Diablo Avenue and Grant Avenue	$ 20	$ -	$ 20	N	Y	Y	Y	N
240041	Marin	Improve Downtown Novato Transit Facility	$ 4	$ -	$ 4	N	Y	Y	Y	Y
240043	Marin	Expand Marin Transit's Automated Vehicle Location (AVL) and real time system	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240044	Marin	Construct multi-modal transit hubs/green mobility hubs	$ 6	$ -	$ 6	N	Y	Y	Y	Y
240045	Marin	Enhance facilities for Muir Woods Shuttle and West Marin Stagecoach	$ 1.4	$ 0.1	$ 1.3	N	Y	Y	Y	Y
240078	Marin	Implement new technologies to manage transit systems	$ 2	$ -	$ 2	N	Y	Y	Y	Y
240456	Marin	Improve the intersection at Sir Francis Drake Boulevard/Red Hill Avenue/Center Boulevard (known as "The Hub") - project development	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240552	Marin	Construct multi-use pathway connecting Calpark tunnel and the Ferry Teriminal in Larkspur	$ 15	$ 14	$ 2	N	Y	Y	Y	Y
240644	Marin	Implement senior mobility program countywide (includes free transit passes for seniors, safe routes, subsidized rides and volunteer ride program)	$ 26	$ -	$ 26	N	Y	Y	Y	Y
240660	Marin	Improve local arterials parallel to U.S. 101 and I-580	$ 67	$ -	$ 67	N	Y	Y	Y	N
240662	Marin	Implementation of Station Area Plans in anticipation of SMART	$ 29	$ -	$ 29	N	Y	Y	Y	Y

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240678	Marin	Implement bicycle and pedestrian improvements countywide including Safe Routes to School elements	$ 123	$ 15	$ 108	N	Y	Y	Y	Y
240691	Marin	Marin Sonoma Narrows HOV Lane and corridor improvements	$ 119	$ -	$ 119	N	Y	Y	Y	N
240712	Marin	Implement regional planning policies	$ 22	$ -	$ 22	N	Y	Y	Y	Y
240713	Marin	Evaluate multi-modal options including trolley, Ross Valley to San Rafael	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240714	Marin	Improve Major Roads and related Infrastructure	$ 59	$ -	$ 59	N	Y	Y	Y	N
240715	Marin	Implement One Bay Area Grant Pilot Priority Conservation Area improvements	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240723	Marin	Transit operations and maintenance	$ 242	$ -	$ 242	N	Y	Y	Y	Y
240724	Marin	Transit Capital	$ 25	$ -	$ 25	N	Y	Y	Y	Y
240729	Marin	U.S. 101 Gap Closure - San Rafael	$ 31		$ 31	N	Y	Y	Y	N
22417	Napa	Implement Napa County's Safe Routes to School program	$ 6	$ -	$ 6	N	Y	Y	Y	Y
22744	Napa	Improve traffic signalization countywide	$ 3	$ -	$ 3	N	Y	Y	Y	N
22746	Napa	Construct round-a-bouts between California Blvd and Freeway Drive on First Street	$ 15	$ -	$ 15	N	Y	Y	Y	N
94073	Napa	Construct new southbound Route 221 to southbound Route 29 flyover, including auxiliary lane to Route 12/Route 29	$ 5	$ -	$ 5	N	Y	Y	Y	N
94075	Napa	Construct interchange at intersection of Route 12/Route 29/Airport Road	$ 6	$ 2	$ 4	N	Y	Y	Y	N
230378	Napa	Construct curb cuts and accessiblity improvements in St. Helena	$ 2	$ -	$ 2	N	Y	Y	Y	Y
230381	Napa	Improve signalization along Main Street from Sulpher Springs to Mills Lane in St. Helena	$ 1	$ -	$ 1	N	Y	Y	Y	N
230392	Napa	Extend Devlin Road from Airport Boulevard to Green Island Road	$ 12	$ -	$ 12	N	Y	Y	Y	N
230508	Napa	Construct corridor improvements in Yountville	$ 1	$ -	$ 1	N	Y	Y	Y	N
230510	Napa	Construct Madison Ave. bypass to Route 29 in Yountville	$ 1	$ -	$ 1	N	Y	Y	Y	N
230518	Napa	Improve intersection at Petrified Forest Road/Route 128	$ 3	$ -	$ 3	N	Y	Y	Y	N
230695	Napa	Rehabilitate local streets and roads countywide	$ 110	$ -	$ 110	N	Y	Y	Y	Y
240082	Napa	Reconfigure northbound Route 29 off-ramp at Lincoln Avenue	$ 3	$ -	$ 3	N	Y	Y	Y	N
240083	Napa	Construct a bicycle and pedestrian undercrossing along Napa Creek	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240085	Napa	Construct intersection improvements at Silverado Trail/Third Street/Coombsville Road/East Avenue	$ 5	$ -	$ 5	N	Y	Y	Y	N
240123	Napa	Rehabilitate Green Island Road	$ 5	$ -	$ 5	N	Y	Y	Y	Y
240136	Napa	Widen intersection at Napa Junction Road/Route 29	$ 3	$ -	$ 3	N	Y	Y	Y	N
240152	Napa	Implement lighted crosswalks at five intersections in St. Helena	$ 0.2	$ -	$ 0.2	N	Y	Y	Y	Y
240617	Napa	Create new road and transit configuration on Route 29 through American Canyon with connectivity to the Vallejo Ferry, including BRT, potential HOV, and other roadway innovations	$ 12	$ -	$ 12	N	Y	Y	Y	N
240057, 240120, 240122, 240138	Napa	Construct corridor improvements along Route 29	$ 26	$ -	$ 26	N	Y	Y	Y	N
240612, 230527	Napa	Build out countywide primary bicycle network	$ 20	$ -	$ 20	N	Y	Y	Y	Y
21510	San Francisco	Extend the Third Street light Rail line from north of King Street to Clay Street in Chinatown via a new Central Subway, including the purchase of light-rail vehicles	$ 1,578	$ 1,578	$ -	Y	Y	Y	Y	Y
21549	San Francisco	Implement Bayview Transportation Improvements	$ 37	$ 12	$ 26	N	Y	Y	Y	N
22415	San Francisco	Extend historic streetcar service from Fort Mason along Fisherman's Wharf to Caltrain Station	$ 69	$ 4	$ 64	N	Y	Y	Y	Y

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22512	San Francisco	Provide capital improvements to support ferry service between Treasure Island to San Francisco	$ 58	$ 58	$ -	Y	Y	Y	Y	Y	
98593	San Francisco	Implement Sfgo Integrated Transportation Management System	$ 102	$ 92	$ 10	N	Y	Y	Y	Y	
230161	San Francisco	Implement Bus Rapid Transit (BRT) on Van Ness Avenue from Mission Street to Lombard Street	$ 144	$ 22	$ 122	N	Y	Y	Y	Y	
230164	San Francisco	Implement Bus Rapid Transit (BRT) on Geary Boulevard from Van Ness Avenue to 33rd Avenue	$ 184	$ 38	$ 146	N	Y	Y	Y	Y	
230490	San Francisco	Re-build and widen Harney Way to 8-lanes	$ 24	$ 22	$ 2	N	Y	Y	Y	N	
230555	San Francisco	Reconstruct ramps on the east side of the San Francisco-Oakland Bay Bridge's Yerba Buena Island tunnel	$ 103	$ 103	$ -	Y	Y	Y	Y	Y	
240147	San Francisco	Implement Southeast Waterfront Transportation Improvements - Phase 1	$ 464	$ 449	$ 15	N	Y	Y	Y	Y	
240155	San Francisco	Implement Better Market Street - Transportation Elements	$ 206	$ 2	$ 205	N	Y	Y	Y	Y	
240158	San Francisco	Implement EN TRIPS Circulation & Streetscape Improvement Projects - Phase 1 Transportation Improvements without Transit Effectiveness Project Recommended	$ 70	$ -	$ 70	N	Y	Y	Y	Y	
240163	San Francisco	Implement Hunters Point Shipyard and Candlestick Point Local Roads Phase 1	$ 722	$ 698	$ 24	N	Y	Y	Y	N	
240171	San Francisco	Implement San Francisco's Transit Effectiveness Project (TEP)	$ 172	$ 18	$ 154	N	Y	Y	Y	Y	
240182	San Francisco	Implement BART Metro Program in San Francisco	$ 10	$ -	$ 10	N	Y	Y	Y	Y	
240259	San Francisco	Construct Mission Bay Loop	$ 8	$ 0.4	$ 7	N	Y	Y	Y	Y	
240309	San Francisco	Expand SFMTA transit fleet	$ 101	$ 1	$ 100	N	Y	Y	Y	Y	
240328	San Francisco	Implement Geneva Transit Preferential Streets (TPS) improvements on Geneva Avenue from Ocean Avenue to Prague (includes BRT on Geneva Avenue from Prague to U.S. 101 interchange)	$ 81	$ 7	$ 74	N	Y	Y	Y	Y	
240334	San Francisco	Construct Southern Intermodal Terminal and extend MUNI T-Line from Bayshore/Sunnydale to Caltrain Bayshore Station	$ 50	$ 21	$ 29	N	Y	Y	Y	Y	
240344	San Francisco	Expand Sfpark	$ 53	$ 24	$ 29	N	Y	Y	Y	Y	
240349	San Francisco	Widen I-280/Mariposa off-ramp	$ 7	$ 5	$ 2	N	Y	Y	Y	N	
240358	San Francisco	Implement Mission Bay New Roadway Network	$ 125	$ 94	$ 31	N	Y	Y	Y	N	
240370	San Francisco	Implement HOPE SF Street Grid Phase 1	$ 10	$ -	$ 10	N	Y	Y	Y	N	
240399	San Francisco	Implement Parkmerced Street Network (includes a new street network, traffic calming, pedestrian improvements, biking improvements, streetscape improvements, and transit/shuttle stops)	$ 48	$ 48	$ -	Y	Y	Y	Y	Y	
240400	San Francisco	Implement Treasure Island/Yerba Buena Island Street Network (includes a new street network, traffic calming, pedestrian improvements, biking improvements, streetscape improvements, and transit/shuttle stops)	$ 48	$ 48	$ -	Y	Y	Y	Y	Y	
240415	San Francisco	Establish new ferry terminal at Mission Bay 16th Street	$ 18	$ -	$ 18	N	Y	Y	Y	Y	
240471	San Francisco	Implement transit enhancements (including ADA compliance, directional signage, real-time arrival information, mobility and access improvements, passenger shelters, bus bulbs, informational kiosks, and other passenger amenities	$ 133	$ 88	$ 45	N	Y	Y	Y	Y	
240474	San Francisco	Implement San Francisco's Local Air Quality and Climate Protection strategies	$ 18	$ 13	$ 5	N	Y	Y	Y	Y	
240476	San Francisco	Plan for and expand parking management measures (includes demand based/variable pricing system for auto parking and parking cash out)	$ 6	$ 3	$ 3	N	Y	Y	Y	Y	

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240483	San Francisco	Enhance highways in San Francisco (includes signs and landscaping)	$ 1	$ -	$ 1	N	Y	Y	Y	N
240486	San Francisco	Expand bicycle and pedestrian facilities	$ 128	$ 113	$ 15	N	Y	Y	Y	Y
240487	San Francisco	Rehabilitate Fort Mason and Presidio Ferry Piers	$ 15	$ 15	$ -	Y	Y	Y	Y	Y
240488	San Francisco	Enhance bicycle and pedestrian facilities	$ 171	$ 156	$ 15	N	Y	Y	Y	Y
240490	San Francisco	Rehabilitate local roads (includes installation of signs, signals, transit lane markings, parking meters, resurfacing, and skid treatments)	$ 201	$ 75	$ 126	N	Y	Y	Y	Y
240493	San Francisco	Implement safety improvements on local roads	$ 410	$ 380	$ 30	N	Y	Y	Y	N
240523	San Francisco	Implement HOV Lanes on U.S. 101 in San Francisco - Planning, Preliminary Engineering, and Envrionmental	$ 2	$ -	$ 2	N	Y	Y	Y	Y
240525	San Francisco	Construct HOV Ramp on I-280 and 6th Street - Planning, Preliminary Engineering, and Envrionmental	$ 2	$ -	$ 2	N	Y	Y	Y	Y
240526	San Francisco	Transit Performance Initiative: Implement improvements to improve transit efficiency and performance at key intersections or choke points	$ 100	$ -	$ 100	N	Y	Y	Y	Y
240533	San Francisco	Rehabilitate bicycle and pedestrian facilities	$ 58	$ 53	$ 5	N	Y	Y	Y	Y
240534	San Francisco	Rehabilitate local bridges	$ 15	$ -	$ 15	N	Y	Y	Y	Y
240535	San Francisco	Maintain local streets and roads	$ 129	$ 129	$ -	Y	Y	Y	Y	Y
240536	San Francisco	Implement Transit Management Systems in San Francisco (includes fare management, transit GPS tracking systems)	$ 28	$ 13	$ 15	N	Y	Y	Y	Y
240537	San Francisco	Install transit safety and security improvements	$ 32	$ 27	$ 5	N	Y	Y	Y	Y
240541	San Francisco	Maintain transit operations	$ 110	$ 12	$ 98	N	Y	Y	Y	Y
240542	San Francisco	Manage freeways and expressways in San Francisco (includes non-ITS elements, performance monitoring, and corridor studies)	$ 3	$ -	$ 3	N	Y	Y	Y	Y
240543	San Francisco	Modify local road intersections (includes safety upgrades, signalization, and realignment)	$ 101	$ 70	$ 30	N	Y	Y	Y	N
240544	San Francisco	Implement San Francisco's Lifeline Transportation program	$ 19	$ 4	$ 15	N	Y	Y	Y	Y
240545	San Francisco	Extend light rail corridor into Parkmerced development project, add three new light rail stations and facilities, and add tail track and operator support facilities	$ 81	$ 81	$ -	Y	Y	Y	Y	Y
240546	San Francisco	Construct Treasure Island Bus Terminal Facility	$ 3	$ 3	$ -	Y	Y	Y	Y	Y
240551	San Francisco	Implement Road Diets for Bike Plan (includes conversion of traffic lanes for bicycle network improvements)	$ 2	$ -	$ 2	N	Y	Y	Y	Y
240557	San Francisco	Oakdale Caltrain Station - Planning, Preliminary Engineering, and Envrionmental	$ 13	$ 5	$ 8	N	Y	Y	Y	Y
240666	San Francisco	Conduct local planning studies and outreach	$ 14	$ 13	$ 2	N	Y	Y	Y	Y
240681	San Francisco	Implement Transportation Demand Management (TDM) measures	$ 30	$ 25	$ 5	N	Y	Y	Y	Y
240728	San Francisco	Implement San Francisco congestion pricing programs (includes Treasure Island Congestion Pricing and cordon pricing)	$ 147	$ 17	$ 130	N	Y	Y	Y	Y
240730	San Francisco	San Francisco Pricing Program: Mobility Improvements (includes transit-capital and maintenance improvements)	$ 2,500	$ 2,500	$ -	Y	Y	Y	Y	Y
21602	San Mateo	Reconstruct U.S. 101/Broadway interchange	$ 80	$ 47	$ 33	N	Y	Y	Y	N
21603	San Mateo	Improve U.S. 101/Woodside Road interchange	$ 73	$ 36	$ 36	N	Y	Y	Y	N
21604	San Mateo	Add northbound and southbound modified auxiliary lanes on U.S. 101 from Oyster Point to San Francisco County line	$ 77	$ 34	$ 43	N	Y	Y	Y	N
21606	San Mateo	Reconstruct U.S. 101/Willow Road interchange	$ 61	$ 34	$ 27	N	Y	Y	Y	N

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21607	San Mateo	Modify University Avenue overcrossing of U.S. 101 to improve operational efficiency and safety (includes widening of overcrossing, constructing new southbound off-ramp and auziliary lane, and adding bicycle lanes)	$ 3	$ 3	$ -	Y	Y	Y	Y	Y
21608	San Mateo	Construct auxiliary lanes (one in each direction) on U.S. 101 from Marsh Road to Embarcadero Road	$ 132	$ 132	$ -	Y	Y	Y	Y	Y
21609	San Mateo	Improve local access at I-280/I-380 from Sneath Lane and San Bruno Avenue to I-380	$ 5	$ 2	$ 2	N	Y	Y	Y	N
21612	San Mateo	Improve access to and from the west side of Dumbarton Bridge on Route 84 connecting to U.S. 101, includes flyovers, interchange improvements, and conversion of Willow Road between Route 84 and U.S. 101 to expressway	$ 64	$ 54	$ 10	N	Y	Y	Y	N
21613	San Mateo	Widen Route 92 between San Mateo-Hayward Bridge to I-280, includes uphill passing lane from U.S. 101 to I-280	$ 35	$ 19	$ 16	N	Y	Y	Y	N
21615	San Mateo	Modify and reconstruct I-280/Route 1 interchange in northbound and southbound directions, including braided ramps	$ 20	$ 10	$ 10	N	Y	Y	Y	N
21624	San Mateo	Implement incentive program to support transit-oriented development	$ 75	$ -	$ 75	N	Y	Y	Y	Y
21892	San Mateo	Widen Woodside Road from 4-lanes to 6-lanes from El Camino to Broadway, includes adding shoulders	$ 3	$ 2	$ 1	N	Y	Y	Y	N
21893	San Mateo	Widen Route 92 between Half Moon Bay city limits and Pilarcitos Creek alignment, includes widening of travel lanes and shoulders	$ 5	$ 3	$ 3	N	Y	Y	Y	N
22120	San Mateo	Provide ferry service from Redwood City to San Francisco	$ 61	$ 16	$ 45	N	Y	Y	Y	Y
22226	San Mateo	Create intermodal transit center at the Caltrain Bayshore Station, includes cross platform transfers with 3rd Street light-rail at Caltrain Bayshore station and bus rapid transit and bus connections	$ 2	$ -	$ 2	N	Y	Y	Y	Y
22227	San Mateo	Construct a 6-lane arterial from Geneva Avenue/Bayshore Boulevard intersection to U.S. 101/Candlestick Point interchange	$ 96	$ 76	$ 19	N	Y	Y	Y	N
22229	San Mateo	Reconstruct U.S. 101/Sierra Point Parkway interchange (includes extension of Lagoon Way to U.S. 101)	$ 16	$ 16	$ -	Y	Y	Y	Y	Y
22230	San Mateo	Add auxiliary lane in each direction on I-280 between Westborough and Hickey Boulevard	$ 14	$ 7	$ 7	N	Y	Y	Y	N
22232	San Mateo	Construct streetscape improvements on Mission Street (Route 82) from John Daly Boulevard to San Pedro Road	$ 8	$ 8	$ -	Y	Y	Y	Y	Y
22261	San Mateo	Replace San Pedro Creek Bridge on Route 1	$ 10	$ 7	$ 3	N	Y	Y	Y	Y
22268	San Mateo	Provide connecting shuttle service between Caltrain stations and major activity centers	$ 146	$ 68	$ 78	N	Y	Y	Y	Y
22271	San Mateo	Widen Skyline Boulevard (Route 35) to 4-lane roadway from I-280 to Sneath Lane	$ 4	$ 2	$ 2	N	Y	Y	Y	N
22274	San Mateo	Install an Intelligent Transportation System (ITS) and a Traffic Operation System countywide	$ 111	$ 66	$ 45	N	Y	Y	Y	Y
22279	San Mateo	Constrruct new itnerchange at U.S. 101/Produce Avenue	$ 162	$ 86	$ 75	N	Y	Y	Y	N
22282	San Mateo	Improve operations at U.S. 101 near Route 92	$ 221	$ 30	$ 192	N	Y	Y	Y	N
22726	San Mateo	Implement ferry service between South San Francisco and Alameda/Oakland	$ 225	$ 225	$ -	Y	Y	Y	Y	Y
22751	San Mateo	Improve safety on Route 1, including adding protected left and right turn lanes at Route 1, adding through lanes on Route 1 at signalized intersections, and constructing new pedestrian/bicycle path	$ 17	$ 9	$ 8	N	Y	Y	Y	N
22756	San Mateo	Reconstruct U.S. 101/Candlestick Point interchange to full all-directional interchange	$ 209	$ 169	$ 40	N	Y	Y	Y	N
94644	San Mateo	Construct a westbound slow vehicle lane on Route 92 between Route 35 and I-280	$ 21	$ 10	$ 10	N	Y	Y	Y	N
98204	San Mateo	Construct Route 1 (Calera Parkway) northbound and southbound lanes from Fassler Avenue to Westport Drive in Pacifica	$ 53	$ 27	$ 27	N	Y	Y	Y	N

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230417	San Mateo	Modify U.S. 101/Holly Street interchange (includes widening eastbound to northbound loop to 2 lanes and eliminating northbound to westbound loop)	$ 19	$ 19	$ -	Y	Y	Y	Y	Y
230428	San Mateo	Extend Blomquist Street over Redwood Creek to East Bayshore and Bair Island Road	$ 18	$ 18	$ -	Y	Y	Y	Y	Y
230430	San Mateo	Implement bicycle/pedestrian enhancements in San Mateo County	$ 121	$ 8	$ 113	N	Y	Y	Y	Y
230434	San Mateo	Implement local circulation improvements and traffic management programs countywide	$ 30	$ -	$ 30	N	Y	Y	Y	Y
230592	San Mateo	Improve streetscape and traffic calming along Bay Road, and construct new northern access connection between Demeter Street and University Avenue	$ 12	$ 12	$ -	Y	Y	Y	Y	Y
230697	San Mateo	Maintain local streets and roads countywide	$ 531	$ -	$ 531	N	Y	Y	Y	Y
230704	San Mateo	Make Route 92 operational improvements to Chess Drive on- and off-ramps	$ 2	$ 2	$ -	Y	Y	Y	Y	Y
240026	San Mateo	Add new rolling stock and infrastructure to support SamTrans bus rapid transit along El Camino Real from Palo Alto to Daly City	$ 160	$ 3	$ 157	N	Y	Y	Y	Y
240027	San Mateo	Implement supporting infrastructure and Automated Transit Signal Priority to support SamTrans express rapid bus service along El Camino Real from Palo Alto to Daly City	$ 1	$ 1	$ -	Y	Y	Y	Y	Y
240028	San Mateo	Make incremental increase in SamTrans paratransit service	$ 17	$ 3	$ 13	N	Y	Y	Y	Y
240060	San Mateo	Modify existing lanes on U.S. 101 from Whipple to County line to accommodate HOV/T lane	$ 117	$ 12	$ 105	N	Y	Y	Y	N
240064	San Mateo	Implement grade separations at select locations in San Mateo County	$ 355	$ 310	$ 45	N	Y	Y	Y	Y
240067	San Mateo	Widen overcrossing at Manor Drive over Route 1 to improve safety (includes installing traffic signals at both end of the overcrossing and new on-ramp for northbound Route 1 at Milagra Drive)	$ 19	$ 19	$ -	Y	Y	Y	Y	Y
240084	San Mateo	Implement San Mateo County's Safe Routes to Schools Program	$ 25	$ 8	$ 18	N	Y	Y	Y	Y
240086	San Mateo	Implement San Mateo County's Transportation for Livable Communities Program	$ 75	$ 15	$ 60	N	Y	Y	Y	Y
240087	San Mateo	Implement non-capacity Increasing local road Intersection modifications and channelization countywide	$ 15	$ -	$ 15	N	Y	Y	Y	N
240114	San Mateo	Implement operational and safety improvements on Route 1 between Half Moon Bay and Pacifica (includes acceleration lanes, deceleration lanes, turn lanes, bike lanes and enhanced crossings)	$ 21	$ 21	$ -	Y	Y	Y	Y	Y
240115	San Mateo	Extend California Drive north to the intersection of Victoria Avenue and El Camino Real in Millbrae	$ 2	$ 2	$ -	Y	Y	Y	Y	Y
240133	San Mateo	Widen Millbrae Avenue between Rollins Road and U.S. 101 southbound on-ramp and resurface intersection of Millbrae Avenue and Rollins Road	$ 1	$ 1	$ -	Y	Y	Y	Y	Y
240142	San Mateo	Implement intersection and signalization improvements at the Callan Boulevard/Serramonte Boulevard and Lake Merced Boulevard/Southgate Avenue intersections	$ 1	$ 1	$ -	Y	Y	Y	Y	Y
240143	San Mateo	Construct new multi-purpose pedestrian/bicycle overcrossing across U.S. 101, north of and adjacent to existing Millbrae Avenue Bridge across U.S. 101	$ 3	$ 3	$ -	Y	Y	Y	Y	Y
240160	San Mateo	Construct southbound on- and off-ramps to U.S. 101 at Peninsula Avenue to add on and off ramps from southbound U.S. 101	$ 6	$ 3	$ 3	N	Y	Y	Y	N
240161	San Mateo	Provide overcrossing at I-280/John Daly Boulevard	$ 1	$ 1	$ 1	N	Y	Y	Y	N
240169	San Mateo	Implement adaptive signal system between I-280 and Santa Cruz Avenue	$ 2	$ 2	$ -	Y	Y	Y	Y	Y
240174	San Mateo	Implement signal interconnect between signals on Willow Road from Middlefield Avenue to Bay Road	$ 2	$ 2	$ -	Y	Y	Y	Y	Y

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240176	San Mateo	Widen Triton Drive between Foster City Boulevard and Pilgrim Drive	$ 2	$ 2	$ -	Y	Y	Y	Y	Y
240346	San Mateo	Implement Redwood City Street Car	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240511	San Mateo	Implement Transportation Environmental Enhancements countywide	$ 38	$ -	$ 38	N	Y	Y	Y	Y
240590	San Mateo	Implement a complete streets design for Mission Street/El Camino Real as part of Grand Boulevard Initiative	$ 75	$ 8	$ 68	N	Y	Y	Y	Y
21702	Santa Clara	Improve interchange at U.S. 101/Buena Vista Avenue	$ 32	$ -	$ 32	N	Y	Y	Y	N
21704	Santa Clara	Improve I-280 downtown access between 3rd Street and 7th Street	$ 31	$ -	$ 31	N	Y	Y	Y	N
21714	Santa Clara	Widen U.S. 101 from Monterey Street to Route 129 - project development	$ 7	$ -	$ 7	N	Y	Y	Y	Y
21722	Santa Clara	Improve interchange at U.S. 101 southbound Trimble Road/De la Cruz Boulevard/Central Expressway	$ 43	$ 19	$ 24	N	Y	Y	Y	N
21754	Santa Clara	Implement Valley Transportation Authority (VTA) soundwall program	$ 22	$ -	$ 22	N	Y	Y	Y	Y
21760	Santa Clara	Double-track segments of the Caltrain line between San Jose and Gilroy	$ 31	$ -	$ 31	N	Y	Y	Y	Y
21785	Santa Clara	Widen interchange at U.S. 101/Blossom Hill Road	$ 24	$ 10	$ 15	N	Y	Y	Y	N
21786	Santa Clara	Widen interchange at U.S. 101/Hellyer Avenue	$ 18	$ -	$ 18	N	Y	Y	Y	N
21787	Santa Clara	Expand the Palo Alto Caltrain Station and Bus Transit Center	$ 75	$ 75	$ -	Y	Y	Y	Y	Y
21790	Santa Clara	Provide Santa Clara Valley Transportation Authority's (VTA) share of funds for additional train sets, passenger facilities and service upgrades for the ACE service from San Joaquin and Alameda counties	$ 41	$ 41	$ -	Y	Y	Y	Y	Y
21922	Santa Clara	Implement Mineta San Jose International Airport APM connector	$ 753	$ 100	$ 653	N	Y	Y	Y	Y
22010	Santa Clara	Construct second exit lane on I-280 to Foothill Expressway	$ 2	$ -	$ 2	N	Y	Y	Y	N
22118	Santa Clara	Exten Hill Road from East Main Avenue to Peet Avenue	$ 9	$ -	$ 9	N	Y	Y	Y	N
22134	Santa Clara	Construct a lane on southbound U.S. 101 using the existing median from south of Story Road to Yerba Buena Road; modify the U.S. 101/Tully road interchange to a partial cloverleaf	$ 97	$ 97	$ -	Y	Y	Y	Y	Y
22156	Santa Clara	Improve connector ramp at Route 85 northbound to Route 237 eastbound (includes widening off-ramp from Route 85 to Route 237 eastbound, constructing auxiliary lane on Route 237 eastbound between Route 85 on-ramp to Middlefield Road; constructing off-ramp on Route 237 eastbound between Route 85 and Dana Street)	$ 31	$ -	$ 31	N	Y	Y	Y	N
22164	Santa Clara	Construct Route 237 westbound on-ramp from Middlefield Road to Route 237 westbound	$ 13	$ -	$ 13	N	Y	Y	Y	N
22175	Santa Clara	Widen Almaden Expressway from Coleman Avenue to Blossom Hill Road	$ 13	$ -	$ 13	N	Y	Y	Y	N
22179	Santa Clara	Widen Central Expressway from 4-lanes to 6-lanes between Lawrence Expressway and San Tomas Expressway	$ 16	$ -	$ 16	N	Y	Y	Y	N
22180	Santa Clara	Construct auxiliary lanes on Central Expressway between Lawrence Expressway and Mary Avenue	$ 20	$ -	$ 20	N	Y	Y	Y	N
22186	Santa Clara	Widen San Tomas Expressway to 8-lanes between Route 82 to Williams Road	$ 56	$ 50	$ 6	N	Y	Y	Y	N
22246	Santa Clara	Implement bicycle and pedestrian improvements on Blossom Hill Road	$ 3	$ 3	$ -	Y	Y	Y	Y	Y
22809	Santa Clara	Realign intersection at DeWitt Avenue/Sunnyside Avenue	$ 8	$ -	$ 8	N	Y	Y	Y	N
22811	Santa Clara	Improve railroad crossing at Church Avenue/Monterey Highway (includes adjusting grade)	$ 1	$ -	$ 1	N	Y	Y	Y	Y
22814	Santa Clara	Extend deceleration lane on Foothill Expressway	$ 1	$ -	$ 1	N	Y	Y	Y	N
22822	Santa Clara	Implement expressway traffic information and advisory systems (includes installation of electronic information changeable message signs, advisory radio, cable TV feeds and web page to provide real time traffic information)	$ 6	$ -	$ 6	N	Y	Y	Y	Y

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22829	Santa Clara	Improve intersection at Fitzgerald Avenue (includes construction of a left-turn lane to Fitzerald Avenue and bike lanes and sidewalks)	$ 1	$ -	$ 1	N	Y	Y	Y	N
22839	Santa Clara	Convert the HOV lane on Central Expressway between Sam Tomas and De La Cruz to a general purpose lane	$ 0	$ 0	$ -	Y	Y	Y	Y	Y
22843	Santa Clara	Widen Lawrence Expressway from Moorpark Avenue/Bollinger Road to south of Calvert Drive	$ 6	$ -	$ 6	N	Y	Y	Y	N
22845	Santa Clara	Construct auxiliary lane on southbound U.S. 101 from Ellis Street to eastbound Route 237	$ 4	$ -	$ 4	N	Y	Y	Y	N
22854	Santa Clara	Improve interchange at Oregon-Page Mill/I-280	$ 8	$ -	$ 8	N	Y	Y	Y	N
22873	Santa Clara	Improve circulation on Foothill Expressway and widen Loyola Bridge	$ 8	$ -	$ 8	N	Y	Y	Y	N
22878	Santa Clara	Realign Wildwood Avenue to connect with Lawrence Expressway (includes new traffic signal at Lawrence Expressway/Wildwood Avenue intersection)	$ 6	$ 1	$ 5	N	Y	Y	Y	N
22883	Santa Clara	Close median and right-in-and-out access on Lawrence Expressway at De Soto Avenue, Golden State Drive, Granada Avenue, Lillick Drive, Buckley Street, and St. Lawrence/Lawrence Station on-ramp	$ 2	$ -	$ 2	N	Y	Y	Y	N
22895	Santa Clara	Implement operational interchange improvements at San Tomas Expressway/Route 17	$ 3	$ -	$ 3	N	Y	Y	Y	N
22910	Santa Clara	Implement Intelligent Transportation System (ITS) facilities on the Santa Teresa Boulevard-Hale Avenue corridor between Day Road and Castro Valley Road	$ 6	$ -	$ 6	N	Y	Y	Y	Y
22932	Santa Clara	Add turn lane on Watsonville Road Center	$ 8	$ -	$ 8	N	Y	Y	Y	N
22944	Santa Clara	Widen I-880 for HOV lanes in both directions from Route 237 in Milpitas to U.S. 101 in San Jose	$ 101	$ 101	$ -	Y	Y	Y	Y	Y
22956	Santa Clara	Extend Capitol Expressway light rail to Eastridge Transit Center - Phase II	$ 294	$ -	$ 294	N	Y	Y	Y	Y
22965	Santa Clara	Improve interchange at U.S. 101/Mabury Road/Taylor Street	$ 63	$ 27	$ 35	N	Y	Y	Y	N
22979	Santa Clara	Improve interchange at U.S. 101/Zanker Road/Skyport Drive/Fourth Street	$ 113	$ 49	$ 64	N	Y	Y	Y	N
98119	Santa Clara	Extend ligh-rail transit from Winchester Station to Route 85 (Vasona Junction)	$ 179	$ 179	$ -	Y	Y	Y	Y	Y
230200	Santa Clara	Extend Autumn Parkway from Julian Street to San Carlos Street and implement improvements from St. John Street to Park Avenue	$ 40	$ 10	$ 29	N	Y	Y	Y	N
230201	Santa Clara	Widen Coleman Avenue from 4-lanes to 6-lanes between I-880 and Taylor Street	$ 15	$ 3	$ 12	N	Y	Y	Y	N
230210	Santa Clara	Rehabilitate San Tomas Expressway Box Culvert	$ 16	$ -	$ 16	N	Y	Y	Y	Y
230234	Santa Clara	Realign Marcella Avenue	$ 7	$ -	$ 7	N	Y	Y	Y	N
230235	Santa Clara	Extend Center Avenue to Marcella Avenue (includes constructing a bridge over Llagas Creek)	$ 3	$ -	$ 3	N	Y	Y	Y	N
230242	Santa Clara	Implement Capitol Expressway Traffic Operations System (TOS)	$ 6	$ -	$ 6	N	Y	Y	Y	Y
230246	Santa Clara	Improve intersection at Lawrence Expressway/Prospect Road (includes providing a second left turn lane from Prospect Road eastbound to Lawrence Expressway northbound and modify existing traffic signals)	$ 3	$ -	$ 3	N	Y	Y	Y	N
230251	Santa Clara	Implement Expressway TOS infrastructure improvements	$ 12	$ -	$ 12	N	Y	Y	Y	Y
230255	Santa Clara	Implement signal improvements on Santa Teresa Boulevard and San Martin Avenue	$ 1	$ -	$ 1	N	Y	Y	Y	N
230262	Santa Clara	Improve interchange at Montague Expressway/U.S. 101	$ 18	$ -	$ 18	N	Y	Y	Y	N
230265	Santa Clara	Improve grade intersection at Montague Expressway/Mission College Boulevard	$ 6	$ -	$ 6	N	Y	Y	Y	N
230266	Santa Clara	Implement traffic signal improvements on Santa Teresa Boulevard and Tilton Avenue	$ 1	$ -	$ 1	N	Y	Y	Y	N

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230267	Santa Clara	Widen Montague Expressway to 8-lanes for HOV lanes between Lick Mill and Trade Zone boulevards and on Guadalupe River Bridge and Penitencia Creek Road	$ 14	$ 14	$ -	Y	Y	Y	Y	Y
230269	Santa Clara	Construct a new interchange at Trimble Road and Montague Expressway	$ 37	$ 37	$ -	Y	Y	Y	Y	Y
230273	Santa Clara	Widen Montague Expressway between Trade Zone and I-680	$ 16	$ 4	$ 11	N	Y	Y	Y	N
230284	Santa Clara	Montague Expressway & McCarthy/O'Toole Interchange Improvements	$ 41	$ 41	$ -	Y	Y	Y	Y	Y
230286	Santa Clara	Implement bicycle and pedestrian improvements on Lawrence Expressway/Doyle Road	$ 1	$ -	$ 1	N	Y	Y	Y	Y
230292	Santa Clara	Implement Expressway and Cross Street signal coordiation	$ 6	$ -	$ 6	N	Y	Y	Y	N
230294	Santa Clara	Conduct environmental and design studies to widen and create new alignment for Route 152 (from Route 156 to U.S. 101)	$ 917	$ 917	$ -	Y	Y	Y	Y	Y
230332	Santa Clara	Construct grade separation at Rengstroff Avenue	$ 73	$ -	$ 73	N	Y	Y	Y	Y
230356	Santa Clara	Construct interchange at Lawrence Expressway and Arques Avenue	$ 52	$ 52	$ -	Y	Y	Y	Y	Y
230363	Santa Clara	Construct interchange at I-880 and Montague Expressway (includes improvements to Montague Expressway)	$ 14	$ 14	$ -	Y	Y	Y	Y	Y
230370	Santa Clara	Improve interchange at I-680/Montague Expressway	$ 27	$ -	$ 27	N	Y	Y	Y	N
230385	Santa Clara	Implement Palo Alto Street Smarts program	$ 5	$ -	$ 5	N	Y	Y	Y	Y
230407	Santa Clara	Widen off-ramp at southbound Route 17/Hamilton Avenue	$ 1	$ -	$ 1	N	Y	Y	Y	N
230410	Santa Clara	Construct auxiliary lane on southbound U.S. 101 from Great America Parkway to Lawrence Expressway	$ 3	$ -	$ 3	N	Y	Y	Y	N
230411	Santa Clara	Construct auxiliary lane on eastbound Route 237 from Mathilda Avenue to Fair Oaks Avenue	$ 7	$ -	$ 7	N	Y	Y	Y	N
230425	Santa Clara	Improve interchange at Route 87/Capitol Expressway/Narvaez Avenue	$ 13	$ 5	$ 8	N	Y	Y	Y	N
230445	Santa Clara	Implement capacity increasing improvements at the intersection of Great America Parkway/Mission College Boulevard	$ 8	$ -	$ 8	N	Y	Y	Y	N
230449	Santa Clara	Extend Charcot Avenue over I-880 as a new 2-lane roadway with bicycle and pedestrian improvements to connect to North San Jose employment center	$ 31	$ 31	$ -	Y	Y	Y	Y	Y
230452	Santa Clara	Implement couplet converstion projects in downtown San Jose (includes converting one-way couplets to two-way, reducing lanes, and adding bike lanes along 10th Street/11th Street, Almaden Avenue/Vine Street, and 2nd Street/3rd Street)	$ 28	$ 12	$ 16	N	Y	Y	Y	N
230456	Santa Clara	Widen Zanker Road from 4-lanes to 6-lanes	$ 61	$ 61	$ -	Y	Y	Y	Y	Y
230457	Santa Clara	Widen Oakland Road from 4-lanes to 6-lanes between U.S. 101 and Montague Expressway	$ 13	$ 5	$ 7	N	Y	Y	Y	N
230466	Santa Clara	Construct Caltrain grade separation at Branham Lane	$ 36	$ -	$ 36	N	Y	Y	Y	Y
230471	Santa Clara	Widen intersections and improve sidewalks throughout the city of Sunnyvale	$ 17	$ 17	$ -	Y	Y	Y	Y	Y
230492	Santa Clara	Improve interchange at U.S. 101/Old Oakland Road	$ 24	$ 10	$ 14	N	Y	Y	Y	N
230531	Santa Clara	Construct auxiliary lanes on U.S. 101 in Mountain View and Palo Alto, from Route 85 to Embarcadero Road	$ 106	$ 106	$ -	Y	Y	Y	Y	Y
230532	Santa Clara	Improve interchange at Route 237/North 1st Street	$ 2	$ 2	$ -	Y	Y	Y	Y	Y
230539	Santa Clara	Implement Sunnyvale Downtown Specific Plan Transportation Improvements (includes intersection and streetscape enhancements, bikeways, signal improvements, and roadway reconfiguration)	$ 15	$ -	$ 15	N	Y	Y	Y	N
230574	Santa Clara	Improve the Route 85/Cottle Road interchange	$ 6	$ 6	$ -	Y	Y	Y	Y	Y
230580	Santa Clara	Improve interchange at Route 237/El Camino Real/Grant Road	$ 5	$ -	$ 5	N	Y	Y	Y	N
230637	Santa Clara	Rehabilitate San Carlos Street Bridge	$ 11	$ -	$ 11	N	Y	Y	Y	Y

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230638	Santa Clara	Construct Caltrain grade separation at Skyway	$ 36	$ -	$ 36	N	Y	Y	Y	Y
230641	Santa Clara	Implement bicycle and pedestrian improvements in North San Jose	$ 36	$ 36	$ -	Y	Y	Y	Y	Y
230642	Santa Clara	Implement improvements on Bird Avenue pedestrian corridor	$ 4	$ -	$ 4	N	Y	Y	Y	Y
230643	Santa Clara	Implement improvements on Neiman Pedestrian Overcrossing	$ 10	$ -	$ 10	N	Y	Y	Y	Y
230644	Santa Clara	Implement miscellaneous intersection improvements in North San Jose	$ 33	$ 33	$ -	Y	Y	Y	Y	Y
230645	Santa Clara	Implement improvements to the North First Street Core Area grid	$ 71	$ 71	$ -	Y	Y	Y	Y	Y
240063	Santa Clara	Improve Caltrain terminal at San Jose Diridon Station	$ 206	$ 52	$ 155	N	Y	Y	Y	Y
240117	Santa Clara	Implement Rapid Transit improvements in the Santa Clara/Alum Rock route (includes dedicated guideways, signal prioritization, ticket vending machines, premium stations, real-time information, and specialized vehicles)	$ 147	$ 147	$ -	Y	Y	Y	Y	Y
240118	Santa Clara	Implement Stevens Creek Rapid Transit Project	$ 166	$ -	$ 166	N	Y	Y	Y	Y
240119	Santa Clara	Implement El Camino Rapid Transit Project	$ 234		$ 234	N	Y	Y	Y	Y
240159	Santa Clara	Implement King Road Rapid Transit Project	$ 62	$ 62	$ -	Y	Y	Y	Y	Y
240374	Santa Clara	Extend BART to Berryessa (includes environmental, preliminary engineering, property acquisition and construction phases)	$ 3,489	$ 3,489	$ -	Y	Y	Y	Y	Y
240375	Santa Clara	Extend BART from Berryessa to San Jose/Santa Clara (Phase 2)	$ 3,962	$ 1,355	$ 2,607	N	Y	Y	Y	Y
240376	Santa Clara	Implement improvements on Hacienda Avenue between Winchester Boulevard and San Tomas Aquino Road	$ 4	$ -	$ 4	N	Y	Y	Y	N
240377	Santa Clara	Widen McCllelan Road for bike lanes between Foothill Boulevard and Byrne Avenue	$ 3	$ -	$ 3	N	Y	Y	Y	N
240379	Santa Clara	Extend Buena Vista Avenue from Santa Teresa Boulevard to Monterey Road	$ 10	$ -	$ 10	N	Y	Y	Y	N
240385	Santa Clara	Construct 4-lane bridge across Uvas Creek to allow the extension of Tenth Street to Santa Teresa Boulevard (Glen Loma Development).	$ 16	$ -	$ 16	N	Y	Y	Y	N
240398	Santa Clara	Widen Los Gatos Boulevard from Camino Del Cerro to Samaritan Drive	$ 7	$ -	$ 7	N	Y	Y	Y	N
240403	Santa Clara	Widen Dixon Landing Road from 4-lanes to 6-lanes between North Milpitas Boulevard and I-880	$ 7	$ -	$ 7	N	Y	Y	Y	N
240404	Santa Clara	Widen Calaveras Boulevard overpass from 4-lanes to 6-lanes	$ 84	$ -	$ 84	N	Y	Y	Y	N
240405	Santa Clara	Improve intersection at Dixon Landing Road/Milpitas Boulevard	$ 4	$ -	$ 4	N	Y	Y	Y	N
240408	Santa Clara	Extend Butterfield Boulevard North (includes 4-lane arterial, bike lanes, sidewalks, lighting and signal modification)	$ 1	$ -	$ 1	N	Y	Y	Y	N
240411	Santa Clara	Implement improvements on Santa Teresa Boulevard between Main Avenue and DeWitt Avenue	$ 12	$ -	$ 12	N	Y	Y	Y	N
240412	Santa Clara	Extend Butterfield Boulevard South between Tennant Avenue and Watsonville Road (includes UPRR overpass structure, drainage channel, traffic signal upgrades, striping, median and landscaping, street lights, bike lanes and sidewalks)	$ 22	$ -	$ 22	N	Y	Y	Y	N
240414	Santa Clara	Improve intersection at Miramonte Avenue/Park Drive	$ 1	$ -	$ 1	N	Y	Y	Y	N
240419	Santa Clara	Upgrade Saratoga Signal System	$ 1	$ -	$ 1	N	Y	Y	Y	N
240425	Santa Clara	Widen intersection at El Camino Real/Lafayette Street	$ 1	$ -	$ 1	N	Y	Y	Y	N
240427	Santa Clara	Implement pedestrian safety improvements on Route 9	$ 2	$ -	$ 2	N	Y	Y	Y	Y
240428	Santa Clara	Implement Saratoga Signal Upgrade Project Phase II (includes providing traffic management system at Saratoga City Hall and communication equipment to all upgraded signals)	$ 1	$ -	$ 1	N	Y	Y	Y	N
240430	Santa Clara	Implement streetscale improvements on Prospect Road between Saratoga Avenue and Saratoga-Sunnyvale Road	$ 2	$ -	$ 2	N	Y	Y	Y	Y

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240434	Santa Clara	Implement sidewalk and pedestrian enhancements on Saratoga Avenue	$ 0.4	$ -	$ 0.4	N	Y	Y	Y	Y
240436	Santa Clara	Improve southbound U.S. 101 between San Antonio Road to Carleston Road/Rengstorff Avenue	$ 51	$ -	$ 51	N	Y	Y	Y	N
240439	Santa Clara	Convert Route 85 HOV lanes to express lanes between Route 87 and I-280	$ 187	$ 187	$ -	Y	Y	Y	Y	Y
240441	Santa Clara	Improve interchange at U.S. 101/Oregon Expressway/Embarcadero Road	$ 128	$ -	$ 128	N	Y	Y	Y	N
240443	Santa Clara	Extend Mary Avenue north across Route 237 (includes reconfiguring the Mathilda Avenue/U.S. 101 interchange, re-routing Moffett Park Drive and modifying the Route 237 eastbound/Mathilda Avenue northbound flyover)	$ 69	$ 32	$ 38	N	Y	Y	Y	N
240463	Santa Clara	Convert Route 237 HOV lanes to express lanes between North First Street and I-880	$ 17	$ 17	$ -	Y	Y	Y	Y	Y
240464	Santa Clara	Convert Route 87 HOV lanes to express lanes between Route 85 and U.S. 101	$ 36	$ 36	$ -	Y	Y	Y	Y	Y
240466	Santa Clara	Convert U.S. 101 HOV lanes to express lanes between Whipple Avenue and Cochrane Road	$ 480	$ 480	$ -	Y	Y	Y	Y	Y
240468	Santa Clara	Improve connector ramp at Route 237 westbound to Route 85 southbound (includes auxiliary lanes on Route 85 between El Camino Real and Route 87)	$ 94	$ -	$ 94	N	Y	Y	Y	N
240469	Santa Clara	Implement express lanes on Route 17 between I-280 and Route 85	$ 30	$ 30	$ -	Y	Y	Y	Y	Y
240470	Santa Clara	Install pedestrian countdown signals in Sunnyvale	$ 0.2	$ -	$ 0.2	N	Y	Y	Y	Y
240473	Santa Clara	Improve braided ramps on northbound I-280 between Foothill Expressway and Route 85	$ 103	$ -	$ 103	N	Y	Y	Y	N
240477	Santa Clara	Implement express lanes on Route 237 between Mathilda Avenue to Route 85	$ 84	$ 84	$ -	Y	Y	Y	Y	Y
240481	Santa Clara	Convert Route 237 HOV lanes to express lanes between North First Street to Mathilda Avenue	$ 21	$ 21	$ -	Y	Y	Y	Y	Y
240482	Santa Clara	Implement express lanes on I-680 from Calaveras Boulevard to Montague Expressway	$ 20	$ 20	$ -	Y	Y	Y	Y	Y
240484	Santa Clara	Implement express lanes on I-880 between the Alameda County Line and U.S. 101	$ 23	$ 23	$ -	Y	Y	Y	Y	Y
240485	Santa Clara	Implement express lanes on U.S. 101 between Cochrane Road and Masten Avenue	$ 110	$ 110	$ -	Y	Y	Y	Y	Y
240491	Santa Clara	Implement express lanes on U.S. 101 between Masten Avenue and 10th Street	$ 70	$ 70	$ -	Y	Y	Y	Y	Y
240492	Santa Clara	Implement express lanes on U.S. 101 between 10th Street and Route 25	$ 52	$ 52	$ -	Y	Y	Y	Y	Y
240494	Santa Clara	Implement System Operations and Management Program for Santa Clara County	$ 425	$ -	$ 425	N	Y	Y	Y	Y
240497	Santa Clara	Implement San Jose Midtown bicycle and pedestrian enhancements	$ 2	$ 1	$ 2	N	Y	Y	Y	Y
240498	Santa Clara	Widen Brokaw Bridge over Coyote Creek	$ 24	$ -	$ 24	N	Y	Y	Y	N
240506	Santa Clara	Implement El Camino Real Regional Corridor improvements from Palo Alto Medical Foundation to Churchill Avenue	$ 5	$ -	$ 5	N	Y	Y	Y	N
240507	Santa Clara	Improve Middlefield Road-Midtown Corridor (includes sidewalk enhancements, transit stop improvements, lighting improvements, and traffic signal improvements)	$ 2	$ -	$ 2	N	Y	Y	Y	N
240508	Santa Clara	Implement the Community Design and Transportation (CDT) Program in Santa Clara County (includes streetscape improvements, bicycle and pedestrian access improvements, place-making improvements, and roadway and transit facility improvements)	$ 566	$ -	$ 566	N	Y	Y	Y	Y
240509	Santa Clara	Develop projects and programs contained within VTA's Countywide Bicycle Plan, VTA's Bicycle Expenditure Program, and Local Bike Plans and programs.	$ 362	$ -	$ 362	N	Y	Y	Y	Y
240512	Santa Clara	Implement Guadelupe Express light rail improvements	$ 30	$ 30	$ -	Y	Y	Y	Y	Y
240513	Santa Clara	Implement express lanes on I-280 between Leland Avenue and Magdalena Avenue	$ 60	$ 60	$ -	Y	Y	Y	Y	Y
240514	Santa Clara	Implement express lanes on I-280 between US 101 and Leland Avenue	$ 25	$ 25	$ -	Y	Y	Y	Y	Y

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240515	Santa Clara	Implement express lanes on I-280 between southbound El Monte Road and Magdelena Avenue	$ 14	$ 14	$ -	Y	Y	Y	Y	Y
240516	Santa Clara	Implement express lanes on I-680 between Montague Expressway and US 101	$ 36	$ 36	$ -	Y	Y	Y	Y	Y
240517	Santa Clara	Implement express lanes on I-880 between U.S. 101 and I-280	$ 192	$ 192	$ -	Y	Y	Y	Y	Y
240518	Santa Clara	Implement Tasman Express Long T (includes double-tracking of a single-tracked light rail segment on the Mountain View line to facilitate the extra line of service)	$ 68	$ 68	$ -	Y	Y	Y	Y	Y
240519	Santa Clara	Implement North First Street light rail speed Improvements	$ 12	$ 12	$ -	Y	Y	Y	Y	Y
240532	Santa Clara	Improve interchanges on Route 152 at Frazier Lake Road, Bloomfield Road, Watsonville Road, and Ferguson Road	$ 10	$ -	$ 10	N	Y	Y	Y	N
240554	Santa Clara	Improve interchanges at Route 237/Mathilda Avenue and U.S. 101/Mathilda Avenue	$ 18	$ -	$ 18	N	Y	Y	Y	N
240570	Santa Clara	Widen offramp at Trimble Road on Route 87	$ 1	$ -	$ 1	N	Y	Y	Y	N
240591	Santa Clara	Implement Capitol Expressway Light Rail Extension - Phase I (includes sidewalk, landscape and street lights on both sides of the expressway from Capitol Avenue to Tully Road)	$ 53	$ 53	$ -	Y	Y	Y	Y	Y
240603	Santa Clara	Implement North San Jose Transit Improvements	$ 61	$ 61	$ -	Y	Y	Y	Y	Y
240611	Santa Clara	Improve interchange at Route 85/El Camino Real	$ 24	$ -	$ 24	N	Y	Y	Y	N
240636	Santa Clara	Construct 2-lane or 4-lane connection between Almaden Expressway and Winfield Boulevard (Chynoweth Ave. or Thornwood bridge will include construction of a new connector, bike lanes and sidewalks)	$ 17	$ -	$ 17	N	Y	Y	Y	N
240671	Santa Clara	Improve interchange at I-280/Senter Road	$ 52	$ -	$ 52	N	Y	Y	Y	N
240710	Santa Clara	Implement Lawrence Expressway/I-280 interchange project	$ 3	$ -	$ 3	N	Y	Y	Y	N
21341	Solano	Construct new Fairfield/Vacaville multimodal train station for Capitol Corridor intercity rail service (Phases 1, 2 and 3)	$ 49	$ 49	$ -	Y	Y	Y	Y	Y
22629	Solano	Construct new Vallejo Baylink Ferry Terminal (includes additional parking, upgrade of bus transfer facilities and pedestrian access improvements)	$ 76	$ 76	$ -	Y	Y	Y	Y	Y
22632	Solano	Widen American Canyon Road overpass at I-80	$ 12	$ 12	$ -	Y	Y	Y	Y	Y
22634	Solano	Construct an adjacent 200-space, at-grade parking lot at the Vacaville Intermodal Station (Phase 1)	$ 13	$ 13	$ -	Y	Y	Y	Y	Y
22794	Solano	Improve Curtola Transit Center, includes 420 space parking structure and transit plaza on existing park and ride lot, auto/carpool pick-up and circulation improvements	$ 18	$ 12	$ 6	N	Y	Y	Y	Y
22795	Solano	Improve Fairfield Transportation Center, includes 1,000 additional parking spaces	$ 34	$ 12	$ 22	N	Y	Y	Y	Y
22985	Solano	Implement transit hub in the Benicia Industrial Park	$ 1	$ 1	$ -	Y	Y	Y	Y	Y
94151	Solano	Construct 4-lane Jepson Parkway from Route 12 to Leisure Town Road at I-80	$ 191	$ 144	$ 47	N	Y	Y	Y	N
98212	Solano	Expand bicycle and pedestrian facilities	$ 5	$ -	$ 5	N	Y	Y	Y	Y
230313	Solano	Improve interchanges and widen roadways serving Solano County Fairgrounds, including Redwood Parkway	$ 96	$ 93	$ 3	N	Y	Y	Y	N
230322	Solano	Rebuild and relocate eastbound Cordelia Truck Scales Facility (inclues a new 4-lane bridge across Suisun Creek and new ramps at eastbound Route 12 and eastbound I-80)	$ 104	$ 104	$ -	Y	Y	Y	Y	Y
230326	Solano	Improve I-80/I-680/Route 12 Interchange (Phase 1), includes widen I-80 and I-680 and improve direct freeway to freeway connections	$ 578	$ 347	$ 231	N	Y	Y	Y	N

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230468	Solano	Provide auxiliary lanes on I-80 in eastbound and westbound directions from I-680 to Airbase Parkway, add eastbound mixed-flow lane from Route 12 East to Airbase Parkway, and remove I-80/auto Mall hook ramps and C-D slip ramp	$ 52	$ -	$ 52	N	Y	Y	Y	N
230558	Solano	Provide Lifeline transit service countywide	$ 50	$ -	$ 50	N	Y	Y	Y	Y
230590	Solano	Widen Railroad Avenue on Mare Island to 4-lanes from G Street to Route 37	$ 5	$ 5	$ -	Y	Y	Y	Y	Y
230635	Solano	Improve Vacaville Intermodal Station (Phase 2), inlcudes parking garage	$ 11	$ 2	$ 9	N	Y	Y	Y	Y
240210	Solano	Implement I-505/Vaca Valley Parkway interchange improvements (includes widening southbound off-ramp at Vaca Valley Parkway, widening Vaca Valley Parkway to provide protected left turn pockets, and signalization of the southbound ramp intersection)	$ 2	$ 2	$ -	Y	Y	Y	Y	Y
240213	Solano	Implement I-80/Lagoon Valley Road interchange improvements (includes widening existing overcrossing from 2 to 4 lanes, widening the westbound ramp and intersection, widening and realigning the eastbound ramps, and signalization of both eastbound and westbound ramp intersections)	$ 10	$ 10	$ -	Y	Y	Y	Y	Y
240313	Solano	Benicia Intermodal Facilities Project: Construct transit intermodal stations at Mliitary West and West 14th, and Military West and First Street	$ 3	$ 3	$ -	Y	Y	Y	Y	Y
240556	Solano	Enhance bicycle and pedestrian facilities	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240558	Solano	Rehabilitate bicycle and pedestrian facilities	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240559	Solano	Improve ADA access at existing intercity transit centers	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240572	Solano	Enhance transit information services (includes adding GPS devices and tracking hardware and software to all buses, and display media to bus stations)	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240573	Solano	Install security cameras and monitoring equipment at Solano transit stations	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240575	Solano	Rehabilitate major transit centers in Solano County	$ 2	$ -	$ 2	N	Y	Y	Y	Y
240576	Solano	Replace existing transit fleet	$ 10	$ -	$ 10	N	Y	Y	Y	Y
240578	Solano	Transit maintenance	$ 50	$ -	$ 50	N	Y	Y	Y	Y
240593	Solano	Implement safety improvements to state highways in Solano County	$ 1	$ -	$ 1	N	Y	Y	Y	N
240594	Solano	Implement enhancements on highways in Solano County (includes landscaping, soundwalls, gateways, multi-modal enhancements, and hardscaping)	$ -	$ -	$ -	Y	Y	Y	Y	Y
240595	Solano	Modify interchanges to improve operations, safety, multi-modal access, and improve signal timing	$ 1	$ -	$ 1	N	Y	Y	Y	N
240596	Solano	Conduct corridor studies of Solano highways and freeways and install non-ITS performance measures	$ 3	$ -	$ 3	N	Y	Y	Y	N
240599	Solano	Rehabilitate local bridges	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240600	Solano	Maintain local streets and roads	$ 3	$ -	$ 3	N	Y	Y	Y	Y
240601	Solano	Implement Solano County's local air quality and climate protection strategies	$ 3	$ -	$ 3	N	Y	Y	Y	Y
240602	Solano	Implement ridesharing measures (includes ridematching, vanpool services, and commute trip planning/consulting)	$ 14	$ -	$ 14	N	Y	Y	Y	Y
240604	Solano	Implement local parking management programs	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240605	Solano	Implement Solano County's Safe Routes to School program	$ 28	$ -	$ 28	N	Y	Y	Y	Y
240606	Solano	Implement Solano County's Safe Routes to Transit program	$ 7	$ -	$ 7	N	Y	Y	Y	Y

Plan Bay Area Final List of Transporation Projects/Programs by County (As of July 27, 2012)										
RTP ID	County	Public Title	Total Project Cost	Committed Funds	Discretionary Funds	Alt 1: No Project	Alt 2: Jobs-Housing Connection	Alt 3: Transit Priority Focus	Alt 4: Enhanced Network of Communities	Alt 5: EEJ
240608	Solano	Provide transit service to seniors and individuals with disabilities (separate from Lifeline)	$ 28	$ -	$ 28	N	Y	Y	Y	Y
240609	Solano	Rehabilitate transit guideways (includes docking facilities and channel maintenance for WETA ferries)	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240610	Solano	Local transportation planning and public outreach efforts	$ -	$ -	$ -	Y	Y	Y	Y	Y
240680	Solano	Local streets and roads maintenance	$ 50	$ -	$ 50	N	Y	Y	Y	Y
240719	Solano	Transit operations support	$ 1	$ -	$ 1	N	Y	Y	Y	Y
240720	Solano	Local Road Safety	$ 3	$ -	$ 3	N	Y	Y	Y	N
240721	Solano	Maintain state highways in Solano County	$ 5	$ -	$ 5	N	Y	Y	Y	Y
240722	Solano	Implement Solano County's regional air quality and climate protection strategies	$ 5	$ -	$ 5	N	Y	Y	Y	Y
240739	Solano	Dredge Channel to Port of Stockton	$ 18	$ 18	$ -	Y	Y	Y	Y	Y
21070	Sonoma	Realign Route 116 (Stage Gulch Road) along Champlin Creek to improve safety, adding shoulders to accommodate pedestrians and bicyclists	$ 12	$ 12	$ -	Y	Y	Y	Y	Y
21902	Sonoma	Widen U.S. 101 for HOV lanes from Pepper Road to Rohnert Park Expressway (Central Phase A)	$ 109	$ 109	$ -	Y	Y	Y	Y	Y
22190	Sonoma	Improve channelization and traffic signalization at Route 116/Route 121 intersection (includes Arnold Drive improvements)	$ 15	$ 5	$ 10	N	Y	Y	Y	N
22191	Sonoma	US 101 North Project - Phase B- Airport Boulevard interchange improvements and Airport Boulevard	$ 43	$ 43	$ -	Y	Y	Y	Y	Y
22195	Sonoma	Improve U.S. 101/Old Redwood Highway interchange (includes modifying/replacing existing 2-lane interchange to at least a 5-lane interchange and improving ramps)	$ 43	$ 43	$ -	Y	Y	Y	Y	Y
22197	Sonoma	Improve local circulation at various locations in Town of Penngrove (includes improvements to Main Street, Petaluma Hill Road, Adobe Road, Old Redwood Highway and U.S. 101/Railroad Avenue)	$ 40	$ 20	$ 20	N	Y	Y	Y	N
22204	Sonoma	Widen Fulton Road from 2-lanes to 4-lanes from Guerneville Road and Piner Road	$ 4	$ 1	$ 2	N	Y	Y	Y	N
22207	Sonoma	Extend Farmers Lane from Bellevue Avenue to Bennett Valley Road as a 3-lane or 4-lane arterial (includes a bicycle lane and sidewalk)	$ 58	$ 29	$ 29	N	Y	Y	Y	N
22438	Sonoma	Improve Bodega Highway west of Sebastopol (includes straightening curves near Occidental and adding turn pockets)	$ 2	$ 1	$ 1	N	Y	Y	Y	N
22490	Sonoma	Convert bridges in Sonoma County from 1-lane to 2-lane	$ 19	$ 1	$ 18	N	Y	Y	Y	N
22655	Sonoma	Widen U.S. 101 for HOV lanes (one in each direction) from Rohnert Park Expressway to Santa Rosa Avenue (includes interchange improvements and ramp metering)	$ 69	$ 69	$ -	Y	Y	Y	Y	Y
22656	Sonoma	Improve U.S. 101/East Washington Street interchange (includes new northbound on-ramp and improvements to southbound on-ramp)	$ 22	$ 22	$ -	Y	Y	Y	Y	Y
94691	Sonoma	Install traffic signal system on Route 121 and improve channelization at 8th Street	$ 3	$ 0	$ 3	N	Y	Y	Y	N
98147	Sonoma	Widen U.S. 101 in each direction with 1 HOV lane from Old Redwood Highway to the Marin/Sonoma County line	$ 220	$ 14	$ 206	N	Y	Y	Y	N
230341	Sonoma	Improve channelization and traffic signalization on Mirabel Road and Route 116	$ 5	$ 5	$ -	Y	Y	Y	Y	Y
230368	Sonoma	Construct Suburban Center intersection improvements at Route 12 (Farmers Lane) and 4th Street	$ 7	$ -	$ 7	N	Y	Y	Y	N
230700	Sonoma	Rehabilitate local roads countywide	$ 104	$ -	$ 104	N	Y	Y	Y	Y
240359	Sonoma	Widen Rohnert Park Expressway from 2-lanes to 4-lanes between Snyder Lane and Petaluma Hill Road (includes new bike lanes in both directions, curb and gutter, sidewalk, landscaped median, and traffic signal devices/improvements at Petaluma Hill Road)	$ 9	$ 9	$ -	Y	Y	Y	Y	Y

Plan Bay Area Final List of Transporation Projects/Programs by County (As of July 27, 2012)										
RTP ID	**County**	**Public Title**	**Total Project Cost**	**Committed Funds**	**Discretionary Funds**	**Alt 1: No Project**	**Alt 2: Jobs-Housing Connection**	**Alt 3: Transit Priority Focus**	**Alt 4: Enhanced Network of Communities**	**Alt 5: EEJ**
240360	Sonoma	Widen Snyder Lane from 2-lanes to 4-lanes between southside of "G" section and Southwest Boulevard	$ 5	$ 4	$ 1	N	Y	Y	Y	N
240366	Sonoma	Widen of Golf Course Drive West (formerly Wilfred Avenue) from 2-lanes to 4-lanes between the 1999 City Limits west of Redwood Drive to the Urban Growth Boundary (includes four travel lanes, a bike lane on both sides, sidewalks, landscaping, and traffic signals at Redwood Drive, Labath Avenue, and Dowdell Avenue)	$ 5	$ 5	$ -	Y	Y	Y	Y	Y
240524	Sonoma	Construct an interchange with bicycle and pedestrian enhancements at Route 12/Fulton Road	$ 70	$ 27	$ 43	N	Y	Y	Y	N
240529	Sonoma	Improve interchange at Hearn Avenue/U.S. 101	$ 46	$ 4	$ 42	N	Y	Y	Y	N
240547	Sonoma	Construct bicycle and pedestrian crossing at U.S. 101 and Copeland Creek	$ 6	$ -	$ 6	N	Y	Y	Y	Y
240561	Sonoma	Implement Sonoma County's Safe Routes to School program	$ 20	$ -	$ 20	N	Y	Y	Y	Y
240650	Sonoma	Enhance bus service frequencies in Sonoma County	$ 104	$ -	$ 104	N	Y	Y	Y	Y
240651	Sonoma	Implement bicycle and pedestrian improvements countywide	$ 118	$ 14	$ 104	N	Y	Y	Y	Y
240667	Sonoma	Implement Windsor River Road/Windsor Road/NWPRR Intersection improvements. Re-configure intersection and improve railroad, vehicle, pedestrian interface.	$ 9		$ 9	N	Y	Y	Y	N
240668	Sonoma	Widen Airport Boulevard from 2-lanes to 5-lanes between Ordiance Road and Aviation Boulevard	$ 36	$ 13	$ 23	N	Y	Y	Y	N
240672	Sonoma	Implement Marin Sonoma Narrows Stage 1 (Sonoma County)	$ 123	$ 123	$ -	Y	Y	Y	Y	Y
240709	Sonoma	Implement Sonoma County's Climate Initiatives program	$ 21	$ -	$ 21	N	Y	Y	Y	Y
240737	Sonoma	Conduct environmental studies and preliminary design for the proposed SMART commuter rail extension from Windsor to Cloverdale (Phase III)	$ 15	$ -	$ 15	N	Y	Y	Y	Y

Appendix D: Scoping Comments on Alternatives

Appendix D: Scoping Comments on Alternatives

This appendix documents the comments received on proposed alternative scenarios in response to the Notice of Preparation (NOP) for the EIR. The below tables summarize comments regarding definition of alternatives and information on why these suggestions were either included or not included for full evaluation in the EIR. General comments on methodology are not included.

GENERAL COMMENTS ON ALTERNATIVES

Topic	*Comments*	*Response*
Pricing	Alternatives should avoid the usage of pricing or other policy levers. Each alternative should include the use of policy measures such as pricing. (separate comments)	The alternatives may include land use or transportation policies that are feasible and achieve the project objectives. Alternatives include a variety of road pricing and policy incentive options for local jurisdictions, including using none at all.
Alternative Planning Strategy	Given potential infeasibility of meeting GHG targets, consider an Alternative Planning Strategy (APS). Alternatives 3, 4 and 5 should be assessed within the context of an Alternative Planning Strategy and MTC should evaluate the need to environmentally clear these alternatives.	An APS was not considered as the proposed Plan, as well as Alternatives 3 and 5 can achieve the state assigned GHG targets. Because multiple alternatives meet the GHG targets an APS was not considered at this time. Also, an APS must only be developed for the Plan selected and adopted by MTC and ABAG, not every alternative, and only if that final Plan cannot achieve the GHG targets.
Growth Forecasts	Include an Alternative with lower rate of employment and residential growth, based on an assumption that the Bay Area and regional economy do not see a significant economic recovery. Make clear that all Alternatives (except Alternative 4) will be analyzed using the same growth forecasts, and demographic and economic forecasts for Alternative 4 should be provided. Alternatives should plan for the housing level in the Eliminate Inter-Regional Commute alternative.	All alternatives are based on the same regional forecasts for population and job growth. The forecasts are considered static, and each alternative considers various distributions of the projected growth. The exception of Alternative 4 accommodates a higher population by assuming no regional in-commute from outside counties, but uses the same baseline population and job growth projections otherwise.

GENERAL COMMENTS ON ALTERNATIVES

Topic	*Comments*	*Response*
Preferred Transportation Investment Strategy	Concern that Alternatives 1, 4 and 5 do not include analysis using the Preferred Transportation Investment Strategy.	Alternative 1, the No Project alternative, by definition cannot use the Preferred Transportation Investment Scenario as it is restricted to projects already in progress. Alternative 4 uses the Preferred Transportation Investment Scenario with minor modifications to the Climate Program and road maintenance. Alternative 5 is based on the Preferred Transportation Investment Scenario, with modifications made as described later in this chapter.
Complete Streets	Complete Streets requirements and enforcement should be included and strengthened in all alternatives.	OneBayArea Grant (OBAG) funding is included in all alternatives, except the No Project alternative, and those funds include a complete streets requirement.
Free Youth Bus Pass	All alternatives (with the exception of "No Project") should include full regional funding for availability of a free bus pass for all middle and high school students, regardless of family income or school type.	This proposal has been incorporated into Alternative 5.
Travel Model	EIR analysis should rely on results of MTC's travel forecasting model, using fixed land use and demographic assumptions that apply in each alternative.	MTC's travel forecasting model was used, in conjunction with UrbanSim. The same land use and demographic assumptions were used in every alternative with minor variations. For example, Alternative 1 used different assumptions about urban growth boundaries and Alternative 4 assumes plans for no regional in-commuting, which results in the need to accommodate a higher population within the region. However, the basic types of land use and demographics (changes in age, income, household size, etc.) are fundamentally the same across all alternatives.

GENERAL COMMENTS ON ALTERNATIVES

Topic	*Comments*	*Response*
Legal Authority	Use a consistent approach regarding legal authority for the alternatives considered, specifically do not reject some alternatives as beyond legal authority, while proposing other alternatives that are also beyond legal authority. Ensure assumptions tested are consistent with local policies and can be implemented, and that adequate resources are identified. Only include reasonable and potentially feasible policies and mitigation measures. Do not include regional development fee policy lever =, which would require voter approval and is not within authority of either co-lead agency.	Feasibility and legal authority is identified consistently across alternatives. Definitions of feasibility are based on, and consistent with, the CEQA definitions. CEQA recognizes a distinction between "potential" feasibility (which is what the EIR is based on) and "actual" feasibility. CEQA also allows agencies to find that certain measures can and should be implemented, but are outside the agencies' jurisdiction (and the agency lacks legal authority to require). This distinction does not prevent discussion for the sake of public information.
CEQA Streamlining	Analysis should include a comparison of each alternative with and without CEQA streamlining.	CEQA streamlining opportunities are defined by State law (SB 375), not determined by MTC/ABAG, and therefore are considered part of the regulatory setting in the EIR analysis. Although Alternative 5 discourages CEQA streamlining, it is enabled by SB 375; Transit Priority Projects (TPP) are also defined by State law based project type and proximity to transit stops.
Mix and Match	Alternatives should be mixed-and matched.	This EIR discusses impacts in terms of land use and transportation plan components separately, as feasible, potentially allowing for a combined alternative for the final adopted plan. Upon review of this EIR, MTC and ABAG decision-makers may choose from among the different policy levers and eliminate some or add others to an alternative and still come up with an alternative that is within the range of impacts described in the EIR. However, if a combined alternative is selected, the Final EIR will need to confirm that the range of impacts from this combination of components has been fully addressed. The type and level of analysis that would be conducted will be determined by the changes under consideration.

COMMENTS ON ALTERNATIVE 1 IN NOP – NO PROJECT

Topic	*Comments*	*Response*
Role of PDAs	Concerns about how this varies from the "Preferred Scenario" if the PDAs have already been established, and in particular how the "No Project" could mean "No PDAs" if they are already established.	The No Project scenario is based on currently adopted general plans. If those general plans reflect a local government's desire to see growth in the PDAs then the PDAs are *de facto* in the No Project alternative. However, if PDAs have not been re-zoned to match their PDA designations, then the alternative does not assume they will be. The No Project alternative also does not include OBAG funding (which goes to PDAs), since this is not a committed funding source without implementation of the Plan.
RTP 2035	Alternative should be modified so that it is the implementation of the existing Regional Transportation Plan, Transportation 2035.	The transportation system in the No Project alternative consists of those projects that would go forward without another RTP or further environmental review. That would be the system in Transportation 2035, minus those projects that have not received funding, or have not received environmental clearance by May 1, 2011.
Scale of Development	Alternative should include limiting future development to either a few remaining developable lots and/or infill development within the current scale and character of the town [of Fairfax].	None of the alternatives assign specific land uses, designate future development at the parcel level, nor set the scale and character of future development. Such details are the responsibilities of local jurisdictions through their land use plans and zoning. The alternatives are determined by applying specific policy measures rather than by tweaking growth projections for individual cities. For the No Project alternative, the UrbanSim model forecasts how future growth will likely distribute based on existing general plan policies and associated development regulations, plus some additional capacity from the expansion of urban growth boundaries based on historical trends.

COMMENTS ON ALTERNATIVE 2 IN NOP – PROPOSED PLAN

Topic	*Comments*	*Response*
Exempt North Bay	Exempt the North Bay (Marin, Sonoma, Solano and Napa counties) from this scenario, due to its relatively small population and small base of jobs.	The North Bay is included in the proposed Plan and all alternatives, as the Plan must cover the entire nine-county region administered by MTC and ABAG.
Sub-Regional Approach Preferred	Scenario should be based on a concept of identifying transit commute sheds in a way that establishes commute thresholds for locating housing nodes and employment centers. Concern that scenario is not based upon a sub-regional approach for reductions of commute sheds and greenhouse gas reductions, therefore placing an inordinate burden on individual cities.	The MTC travel model incorporates travel and commute patterns and modes, and the UrbanSim model distributes growth based on market supply and demand. All alternatives, are designed to meet GHG reduction targets, as well as regional targets to manage congestion and travel time, among other goals.
Coordination with Preferred TIS	Concern that scenario is poorly coordinated with the Preferred Transportation Investment Strategy. Scenario should be tested with the preferred transportation investment strategy, both with and without the recommended climate policy incentives.	The land use scenario has been designed to support the transportation patterns and usage in the Preferred TIS in order to meet State and regionally-adopted targets.
TPPs vs. PDAs	Concern that scenario refers extensively to PDAs and makes little mention of TPP's.	Much of the land designated as PDAs is also within TPPs, and most of the TPP-eligible land in the region falls within a PDA. TPPs and their associated CEQA streamlining opportunities were created by SB 375 and are not defined by Plan Bay Area.
Road Pricing	Unrealistic to assume no change in bridge toll revenues, and MTC's revenue estimates already assume some revenue from new bridge tolls.	MTC modeling has indicated that the proposed set of land use and transportation policies and transportation projects is able to meet the State's mandated greenhouse gas reduction targets without additional tolls or road pricing.
Parking Minimums	Using a "Parking Status Quo" should be reevaluated, as it contradicts the PDA and focused growth approach.	Alternative 2 (proposed Plan) includes reduced parking minimums for new developments in TPP-eligible areas.

COMMENTS ON ALTERNATIVE 2 IN NOP – PROPOSED PLAN

Topic	*Comments*	*Response*
Responsiveness to Local Priorities	This scenario should include planning measures that reflect changes in the population in funding priorities; such as the elderly are less likely to need bike lanes and more likely to need well-planned convenient access to services.	All of the scenarios were based on evolving age, income, and household size demographics across the region. Plan Bay Area is regional in nature, with many transportation and all land use decisions to be made at the local level. MTC anticipates that localities will determine the detailed location of bike lanes, services, etc. The Plan does, however, include Safe Routes to Transit projects, Complete Streets policies, and policies to encourage more bike lane miles and better connectivity of the bike network across the region and within bikeable areas in order to increase the capacity of the existing transportation system at a low cost, and preserve mobility while reducing GHG emissions in accordance with State mandates.
Local Growth Policies	Concerns about the assumption that local growth policies (such as those accommodating growth consistent with past projections) will be reversed in response to this scenario.	Plan Bay Area cannot change local land use policy. (Government Code section 65080, subd. (b)(2)(K) explicitly states that the SCS shall not supersede the exercise of the land use authority of cities and counties within the region.) This alternative and others, however, do provide incentives for local agencies to rezone PDAs to accommodate infill development and to hold urban growth boundaries constant with today's boundaries. Localities can decide whether and how to accommodate such incentives.
West Oakland	Scenario is missing the land use component for West Oakland.	Much of West Oakland is within a PDA and has been modeled as such in this and every alternative.
Freeway Performance Initiative	Alternative should include a discussion on how the scenario would impact or incorporate the strategies in existing freeway corridor system management plans prepared under the Freeway Performance Initiative.	The Preferred Transportation Investment Strategy selected by MTC, and incorporated into this alternative, adopts and funds the recommendations of the Freeway Performance Initiative.

COMMENTS ON ALTERNATIVE 2 IN NOP – PROPOSED PLAN

Topic	*Comments*	*Response*
Economic and Political Feasibility	Consider feasibility of alternative from an economic and political standpoint.	This is an environmental impact report, which examines potential physical impacts on defined topic areas. This EIR is not required to, nor does it, consider economic and political feasibility. Such considerations are appropriately made in the agency's findings of fact required prior to agency approval of a plan. The UrbanSim model used to forecast future land development does, however, incorporate economic and political elements. In addition, CEQA recognizes a distinction between "potential" feasibility (which is what this EIR is based on) and "actual" feasibility. CEQA also allows agencies to find that certain measures can and should be implemented, but are outside the agencies' jurisdiction (and the agency lacks legal authority to require). This distinction does not prevent discussion for the sake of public information.

COMMENT ON ALTERNATIVE 3 IN NOP – LOWER CONCENTRATIONS OF PDA GROWTH

Topic	*Comments*	*Response*
Source of Funds	Concern that this alternative would require transfer of funds from certain program areas to invest in AC Transit and BART; the EIR should include an analysis on the impacts of these funds and the congestion levels resulting from lower funding levels for other programs.	Alternative 3 does shift funds from the Freeway Performance Initiative and OneBayArea grants, and slightly scales back the Regional Express Lane Network, in order to support additional investment in BART service in the core of the region and increased AC Transit bus service in the urban core. The traffic analysis of this EIR does evaluate congestion levels to the extent that the regional travel model can do so.

COMMENTS ON ALTERNATIVE 4 IN NOP – ELIMINATE INTER-REGIONAL COMMUTE

Topic	*Comments*	*Response*
Feasibility	Consider feasibility of alternative in relation to zeroing-out the in-commute.	The RTP/SCS cannot end in-commuting per se, but rather can set the stage for an improved jobs/housing balance. The results of the UrbanSim model show that the region has the capacity to accommodate housing for all of its employed residents.
Request for Additional Components	Analysis should include the testing of increased Levels of Service for SF Muni and support studying road pricing.	Impacts specific to one operator (such as SF Muni) cannot be studied as part of the regional analysis of this EIR; they need to be evaluated at the local level. Alternative 4 does include a higher peak period toll on the Bay Bridge and cordon pricing in San Francisco, which charges a fee to drive within a certain area of the San Francisco (specifically the downtown).
HOV/Express Lanes	Concern that alternative assumes a much higher residential growth rate than does the project, and therefore this alternative should include build-out of an HOV/ Express Lane network in the transportation investment package.	The preferred Transportation Investment Scenario, which includes a regional Express Lanes network and the Freeway Performance Initiative, is adopted under Alternative 4.
Accommodate All Housing Needs	"Enhanced Network of Communities" Alternative should accommodate 100% of the region's housing needs during the planning period.	Alternative 4 has been configured to accommodate this request.

COMMENTS ON ALTERNATIVE 5 IN NOP – ENVIRONMENT, EQUITY AND JOBS

Topic	*Comments*	*Response*
Location of Transportation Projects to Best Serve Low Income Population	Consider feasibility of alternative in relation to assuming low income populations do not need roadway and transit improvements in outlying areas and assuming that highway funds can be applied to transit projects.	Alternative 5 is configured to enhance transit service in both suburban and urban areas. This alternative does not shift committed highway funds to other projects, and it continues to fund road maintenance. It allocates uncommitted funds to expanded transit service rather than new road projects.
More Lower Income Housing in Suburban Cities	Alternative should modify the PDA-focused land-use map of the "Preferred Scenario" by shifting a portion of the lower-income housing from PDAs in the three large cities to suburban cities.	Additional areas for low income growth have been identified outside of the three major Bay Area cities in Alternative 5 by the stakeholder groups that defined the alternative.
Community Stabilization	Alternative should include community stabilization policies and incentives that protect against the indirect and direct displacement of existing low-income communities and communities of color from urban to exurban areas, and policies that incentivize affordable housing.	Alternative 5 includes a modified OneBayArea grant program focused on affordable housing and anti-displacement policies as pre-conditions for subsidies and incentives. However, the anti-displacement policies were not able to be represented in the model due to technical limitations; this does not affect the environmental conclusions.
Local Transit	Alternative should include high levels of local transit to support a robust local transit network.	The alternative seeks to strengthen public transit by significantly boosting service frequencies in suburban and urban areas.
SF Muni LOS	Analysis should include the testing of increased Levels of Service for Muni.	Impacts and analysis specific to one operator are beyond the scope of this regional EIR. Issues of a specific transit provider need to be evaluated at the local level; in the case of Muni, by the City of San Francisco. The advocates for Alternative 5 specifically included additional funding for transit operators other than SF Muni.
Shifting Funds to Transit	Test the impact of an alternative with transit service funded by shifting funds from Freeway Performance Initiatives, the OneBayArea Grant (OBAG) program, and Regional Express Lanes Network a	Most of these fund sources are not feasible to be used for transit due to fund source restrictions. However, Alternative 5 excludes all uncommitted road projects, other than maintenance projects, and does not include the Regional Express Lanes Network. The OBAG program is included as it is considered essential to incentivize infill development and affordable housing.
Unconstrained Land Use	Concern that this alternative presents an unconstrained land use scenario with a financially constrained transportation scenario.	Alternative 5 includes regional initiatives to support a strong urban growth boundary that does not expand future development beyond the current urbanized footprint. It also expands incentives to increase allowable density to

COMMENTS ON ALTERNATIVE 5 IN NOP – ENVIRONMENT, EQUITY AND JOBS

Topic	*Comments*	*Response*
		include jobs-rich, high-opportunity TPPs not currently identified as PDAs. In addition, it implements a vehicle miles traveled (VMT) tax of one cent per mile on all annual miles traveled within the region, exempting low income drivers, to fund the expanded investments in public transit and discourage residents from driving. Taken together, these policies are expected to encourage a constrained pattern of land use development.
Impact on Public Services	Unclear how this alternative includes additional affordable housing in locations with high-performing schools and local services when the EIR does not evaluate public services.	Alternative 5 considers additional affordable housing in high-opportunity areas with amenities such as good schools, parks, transit, etc. These areas are identified through several factors that act as proxies for areas of high opportunity, including median home values, low-income commuting statistics, and transit service levels. Communities with more expensive housing, greater low-income in-commuting, and more frequent transit are slated for encouragement of additional infill development in the analysis of Alternative 5. The impact of every alternative on public services and recreation is evaluated at a regional level in this EIR.

ALTERNATIVE LAND USE SUGGESTIONS

Topic	*Comments*	*Response*
Different Growth Scenarios	Consider alternative growth range scenarios, e.g., low, mid-range, and high growth rates and the impact of different scenarios. Include an alternative reflecting current regional growth trends or alternative including a realistic jobs scenario to test slower economic growth. Consider a 'no population growth' scenario.	Every alternative must demonstrate the ability to accommodate expected population and job growth through 2040, as estimated by ABAG (per SB 375). The alternatives do vary in how growth is distributed, however. Alternative 4 does accommodate a higher population than the other scenarios, but it is based on the same amount of population growth with no regional in-commute.
Inter-Regional Commuting	All alternatives should assume a common set of land use control totals, which assume some inter-regional commuting.	All the alternatives, but one, assume that the current rate of in-commuting will continue. Alternative 4 assumes no inter-regional commuting, with projected future population growth to be accommodated within the nine Bay Area counties.
Combine Alternatives 1 and 3	Include an alternative based on a combination of Alternatives 1 and 3, and including a more realistic employment and housing growth scenario.	It is unclear what a "more realistic" scenario would be, as ABAG believes the residential and employment projections to be realistic. It is also unclear what that combination would be like, although Alternative 2, the Preferred Plan, could be considered as such.
Align with Local Plans	Include an alternative reflecting current local general plans. A "local plans" alternative should be included. Include an alternative that is more closely aligned with local land use plans and policies.	Alternative 1, No Project, reflects current local plans. However, population and job growth will be consistent with the proposed Plan.
Variations in PDA Growth Distributions	Reconsider various growth allocations: Consider an alternative that promotes growth based on PDA ranking, given the vast differences among PDAs and the amount of transit that currently serves each PDA. Consider an alternative that places employment centers in Eastern Contra Costa and Solano Counties, thereby resulting in reduced vehicular miles traveled and carbon emissions.	Alternative 4 essentially achieves promoting growth based on PDA rankings. Employment centers in Eastern Contra Costa and Solano Counties are zoned for jobs, and therefore UrbanSim will place jobs in these areas if there is market support for Alternatives 1, 3 and 5. For Alternatives 2 and 4, the analysis assumes the housing and jobs distributions in PDAs from the Jobs Housing Connection and Current Regional Plans developed by ABAG, respectively. Areas outside of PDAs are evaluated using UrbanSim.
More Concentrated Growth	Consider an alternative based on more concentrated growth in a fewer amount of core areas, e.g., a less even distribution	Alternative 3 represents this scenario.

ALTERNATIVE LAND USE SUGGESTIONS

Topic	*Comments*	*Response*
Alternative	across all PDAs.	
Independent-Interdependent Cities Alternative	Network of strong independent and interdependent cities alternative.	None of the alternatives would prevent cities from being independent or interdependent.
Minimize Land Use Regulation	Analyze minimizing land use regulation.	There will not be any specific details proposed about minimizing land use regulations in the Plan itself, so the EIR will not address implementing this idea. By some measures, the No Project alternative which largely maintains the status quo would minimize land use regulations. By another measure, however, incentives to increase allowable densities and reduced parking requirements of Alternatives 2, 3, 4, and 5 could be seen as minimizing land use regulations, as those scenarios broaden rather than restrict what can be developed. Alternative 4 probably has the "least" land use regulation, as it increases allowable densities, reduces parking requirements, and does not restrict the expansion of urban growth boundaries.
Focus Development Around BART	Focus development around BART as a more effective way to reduce VMT.	Since most BART stations are designated as PDAs, future housing and job growth is focused around them in every alternative. However, accommodating the region's projected growth through 2040 will require development in more than just BART station areas as those are relatively finite areas in relation to the entire Bay Area.

ALTERNATIVE TRANSPORTATION SUGGESTIONS

Topic	*Comments*	*Response*
Automated Transit Networks	Include an alternative that includes the use of Automated Transit Networks.	An ATN is included in the Proposed Plan for San Jose International Airport. However, no other Automated Transit Network project proposals were submitted to MTC from an eligible sponsoring agency (transit operators, CMAs, etc.). Without eligible projects submitted, extensive use of ATNs was not included in the transportation networks.
Concerns About Funds Shifted to Transit	Concerns related to alternatives that eliminate funding for arterial operations/Freeway Performance Initiative in Alts 3 and 5 to increase transit funding.	Other ways to fund those alternatives are being analyzed by MTC/ ABAG and will be addressed in documents separate from the EIR.
New Rail System	Study 5-county BART/unified rail rapid transit with fewer transfers (details in letters) and effect of BART plan on long-distance automobile commutes and patronage gains. Include integrated BART/rail West Oakland station, HSR to West Oakland instead of San Francisco, Converting Caltrain to BART, A Port Costa/Benicia HSR tube, An SFO/OAK tube, and Replace “Regional Rail Plan” and “Blended Rail” with the above.	The regional transportation plan must be financially constrained and based on projects with relatively known budgets. MTC could consider such ideas in a future RTP should projects be developed to the appropriate level and submitted by project sponsors.
Telecommutes	Non-travel (e.g., telecommute) and Active Transportation improvements should be increased in each alternative to improve GHG.	All alternatives assume increases in telecommuting consistent with past trends. Active Transportation was analyzed as a GHG strategy. It was found to not be very effective, but the Plan does not allocate funding to active transportation projects to achieve other targets.
Gas Prices	Dramatically increase gas prices in order to reduce VMT.	MTC/ABAG does not have the authority to increase gas prices.
Safe Walking/ Cycling	Include an alternative that invests in safe cycling and walking options.	There is funding identified in the Plan for cycling and pedestrian projects and safe routes to school projects. This is also an eligible expense of OBAG funding.
No Lane Miles Added Alternative	An alternative that does not add any lane-miles to the highway system, especially for "Express Lane" purposes needs to be included in at least one alternative other than the "No Project" alternative.	Alternative 5 removes highway expansion projects.

ALTERNATIVE TRANSPORTATION SUGGESTIONS

Topic	*Comments*	*Response*
Active Transportation	All alternatives need to include well-funded improvements in Active Transportation.	All alternatives provide funding for active transportation.
HOV Lane Conversions	Several of the alternatives should include only HOV Lane conversions for Express Lanes.	Alternative 3 slightly scales back the Regional Express Lane Networks to only include conversions of existing HOV lanes and network gap closures by removing proposed express lanes at the fringe of the region. Alternative 5 does not contain any new express lanes.
San Francisco Transit Projects	Include an alternative that promotes direct transit connectivity in San Francisco, particularly along 19th Avenue, with funding mechanisms to ensure that the connections are made initially to reduce parking/traffic/transit impacts and reconsider current plans for Parkmerced.	These issues need to be evaluated at the local level, by the City of San Francisco. They are not within the scope of the regional analysis of the Plan Bay Area EIR.
Tolling at Urban Fringe	Include an alternative that uses tolling around the edges of the region.	Congestion Pricing for San Francisco and Treasure Island will be tested as part of the Preferred TIS. Alternative 4 accomplishes the objective of no-net in-commuting without implementing tolling at the regions borders
West Oakland Transportation	Include an alternative to the proposed Light Rail System (LRS) being planned for West Oakland in the West Oakland Specific Plan such as a Bus Rapid Transit system (West Oakland Environmental Indicators Project). Include an alternative that analyzes a comprehensive transportation connections and linkages plan for West Oakland.	These issues need to be evaluated at the local level, by the City of Oakland's West Oakland Specific Plan or other local assessment. They are not within the scope of the regional analysis of the Plan Bay Area EIR.
Undergrounding BART in West Oakland	Include an alternative that analyzes undergrounding BART through West Oakland.	Transportation projects are identified and proposed by various agencies; such a project was not submitted by BART to the MTC for consideration of inclusion in the RTP.
Advanced Transit Options	Include an alternative that considers advanced transit options.	The proposed Plan would continue to fund expansions of the transit network.

ALTERNATIVE TRANSPORTATION SUGGESTIONS

Topic	*Comments*	*Response*
No Taxpayer Money Alternative	Include an alternative that eliminates the use of taxpayer money for road improvements.	MTC/ABAG funding forecasts are based on funds that are reasonably expected to come to the region. Many tax revenues, such as state and federal taxes on gasoline, are specifically allocated for transportation and declining them here would simply shift those funds to another region. Finally, as roads are public rights-of-way, maintaining roadways require public funds.

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Appendix E: Air Quality Analysis Methodology

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Local Pollutant Methodology

To estimate and evaluate potential health risks due to increased toxic air contaminant (TAC) and fine particulate matter ($PM_{2.5}$) concentrations throughout the Transit Priority Project (TPP) areas[1], a geospatial analysis was designed and conducted using ArcGIS software and health risk data on stationary and mobile sources of TAC and/or $PM_{2.5}$ emissions. The health risk data was derived from the Bay Area Air Quality Management District (BAAQMD). Stationary sources of pollution in the Bay Area are required to obtain annual permits to operate from BAAQMD; accordingly, BAAQMD maintains a database which houses the geographic location of every permitted stationary source in the Bay Area and associated emissions information. In addition, BAAQMD estimated the health risks associated with exposure to mobile sources of TACs and/or $PM_{2.5}$ including major roadways, freeways, railroads and rail stations, and ferry terminals. This information is integrated into the geospatial analysis. Additional information on the methodology used by BAAQMD to estimate potential health risks from the various stationary and mobile sources of TAC's and/or $PM_{2.5}$ is detailed below.

The potential health risks due to increased TAC and/or $PM_{2.5}$ concentrations within the TPP areas are assessed cumulatively. The geospatial analysis was conducted using a 20 meter by 20 meter receptor grid. The maximum potential health risks for each cell in the receptor grid were estimated by summing all TAC's and or $PM_{2.5}$ concentrations from all sources, both mobile and stationary, which were present in any given cell. The final result from the geospatial analysis identifies areas where the cumulative cancer risk and $PM_{2.5}$ concentrations of the data sets exceed MTC's air quality significance thresholds for TACs and $PM_{2.5}$. Additional information on the geospatial analysis is detailed below.

STATIONARY SOURCES

BAAQMD developed a geographical database of estimated cancer risks and $PM_{2.5}$ concentrations for stationary sources permitted by BAAQMD in the year 2008. Using emissions data specific to each stationary source, BAAQMD calculated screening-level cancer risks (referred to as screening values) using health effect values adopted by the Office of Environmental Health Hazard Assessment

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[1] The geospatial analysis also included a 1,000 foot "area of influence" around the TPP areas. The area of influence is defined as the areas containing sources of TAC and/or PM2.5 that should be evaluated in relation to the TPP areas. Including the area of influence ensures that the geospatial analysis conducted to evaluate cumulative health risks takes into account sources of pollution *outside* of the TPP areas that may, however, impact the TPP areas themselves. In this document, the term "TPP areas" refers to both the TPP areas as defined by the Sustainable Communities Strategy for the Bay Area, as well as the 1,000 foot area of influence.

(OEHHA); health protective assumptions relating to the extent of an individual's exposure, including age sensitive factors; and a conservative modeling procedure to establish the extent to which a TAC is dispersed in the atmosphere after its release from the source. For permitted sources which emit $PM_{2.5}$, the screening-level health risk and $PM_{2.5}$ concentrations (referred to as screening values) are based on the same screening-level dispersion modeling procedure that was used to develop the trigger levels in BAAQMD's Regulation 2, Rule 5, Table 2-5-1, Toxic Air Contaminant Trigger Levels. For more specific information on the methodology used to estimate cancer risks and $PM_{2.5}$ concentrations from stationary sources, refer to BAAQMD's "Recommended Methods for Screening and Modeling Local Risks and Hazards" document[2]. The estimated health risk screening values represent cancer risks and concentrations near the fence-line of the plant. The database was initially created to provide jurisdictions and interested stakeholders with information on BAAQMD's stationary sources for land use planning and environmental review documents. The screening values are intentionally conservative and are based upon worst-case assumptions and are not intended to be used to assess the actual health risk for all land development projects, but rather are intended to be used at the screening level. The database can be downloaded from BAAQMD's website[3] and viewed in Google Earth (free) or ArcGIS.

For the purpose of the local pollutant analysis, BAAQMD staff updated and refined the database's stationary source data. Select screening values in the database were updated in 2012 with BAAQMD's most current emissions inventory data. Other refinements to the stationary source data include:

- Removing listings for facilities closed since 2008;
- Assessing and correcting the geographic location of stationary sources;
- General assumptions on estimated health risks for spray booth facilities; and
- Including decay factors for gas stations, diesel engines, and dry cleaners to reflect decreasing cancer risk and $PM_{2.5}$ values based on distance from the source.

For a select few stationary sources, BAAQMD staff conducted health risk assessments (HRSA) which include estimates of increased cancer risk derived from air dispersion modeling of the emissions at the facility as part of BAAQMD's permit requirements. These HRSA's conducted by BAAQMD staff represent the best available increased cancer risk values associated with the stationary source. When available, these site-specific cancer risks and $PM_{2.5}$ concentrations for stationary sources are included in both the database and in the local pollutant analysis.

Closed Stationary Sources: BAAQMD maintains permit records that are updated annually. Over time, some facilities close, or are transferred to a different plant number. BAAQMD staff reviewed BAAQMD permit records to identify any facilities that may have closed since 2008 located in the TPP areas. Any updates for closed, transferred, or changed plant numbers are reflected in the local pollutant analysis.

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2 Available at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en

3 Available at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx

Geographic Location of Stationary Sources: The geographic location of stationary sources in the database is based on information from BAAQMD permit records. The location is expressed in Universal Transverse Mercador (UTM) coordinates, and typically represents the coordinate location of each permitted source. However, the coordinates were collected over many years, and were sometimes recorded in different datums (a set of reference points on the Earth's surface against which position measurements are made). Due to the difference in datums used over several years, the geographic representation of the stationary source is inaccurate in some cases. To address this issue, BAAQMD staff geocoded (process of finding associated geographic coordinates, typically expressed in latitude and longitude, from other geographic data such as street addresses or zip codes) stationary source facility addresses using ArcGIS 10.1. The geocoded locations represent a facility's address and not the actual location of where a source, such as a boiler or exhaust vent, is located within the facility. Corrected locations of stationary sources are included in the local pollutant analysis. BAAQMD staff manually moved (using Google Earth) the location of permitted stationary sources which do not have a "true" address in BAAQMD permit files (for example: intersection of x road, y drive; or San Francisco International Airport) to the correct geographic location, and recorded the coordinates provided by Google Earth.

Spray Booths: Due to limited permit data on a number of facilities which operate spray booths, BAAQMD staff estimated cancer risk and $PM_{2.5}$ concentrations (for the facilities with limited data) based on health risk trends from existing permitted spray booths for which BAAQMD did have emissions and estimated health risk information from permits. BAAQMD staff assigned the most conservative (highest) health risk screening values to the spray booth facilities with limited permit data from the trends observed from all permitted spray booth facilities in the Bay Area. In general, spray booth facilities do not represent significant health risks to nearby sensitive receptors.

Decay Factors: Decay factors are included in the local pollutant analysis for gas stations, diesel engines, and dry cleaners to reflect the fact that cancer risks and $PM_{2.5}$ concentrations decrease with distance from a source. The further away a sensitive receptor is from a source, the less exposure they will experience. For all other source categories, it is conservatively assumed that the screening values remain constant from the fence line of the facility out to 1,000 feet in every direction. Decay factors were not developed for other types of facilities, because the majority of other permitted facilities (except gas stations, dry cleaners and diesel engines) contain a variety of different source types which makes it infeasible to provide a decay factor with the acceptable degree of accuracy because it would require too many generic assumptions. For example, hospitals (a common permitted facility) may contain diesel engines, boilers, chemical sterilization equipment, and more. Recycling and waste management facilities are common in the Bay Area as well, and include a variety of permitted source types such as material handling, incinerating, and more.

Diesel engines: To develop the decay factors for stationary back-up diesel engines, BAAQMD staff analyzed thousands of health risk values determined from over 150 air dispersion modeling runs. The modeling runs included assumptions for a worst-case stationary diesel engine exhaust configuration which addressed more than two dozen building dimensions for downwash considerations, and six different meteorological data sets. Modeling was conducted using AERMOD, an atmospheric dispersion model created by US EPA. The worst-case stationary diesel engine health risk values and the corresponding diesel engine decay factors for the worst case diesel engine health risk values were determined from the modeling data. The decay factors represent the decreased cancer risk and $PM_{2.5}$

concentrations (that BAAQMD staff would expect to see) from the fenceline of a facility out to 1,000 feet (in every direction).

To verify the accuracy of the decay factors, BAAQMD staff reviewed several BAAQMD permit applications and compared the residential cancer risk from the Health Risk Screening Assessment (HRSA) to the estimated health risks of the screening values adjusted to the closest resident (according to the HRA) using the decay factors. The results are detailed in **Table 1**. All of the values are shown with the age sensitivity factor (1.7) removed. In the majority of cases, the screening value results (adjusted with the decay factors) compared fairly well with the HRSA risks. In only three cases (15 percent of the sample), the cancer risks from the screening values (adjusted using the decay factors) were actually below the HRSA risk. However, in these three cases, the cancer risks from both the HRSA and the screening values were quite low (all less than nine chances in one million), and the estimates were fairly comparable. Overall, based on this assessment, BAAQMD staff feels that the screening values, when adjusted with the decay factors, are a conservative estimate in comparison to the actual HRA values.

TABLE 1: DECAY FACTOR ANALYSIS

Plant No	*Application No*	*Project Description*	*Plant Name*	*City*	*County*	*Distance from stack to receptor boundary*	*Stack height*	*Estimated Risk from Google Earth Using Multiplier*	*HRA Risk Resident (million)*
19245	18676	1 generator 250 bhp	New Enterprises Associates, Inc.	Menlo Park	San Mateo	800 ft	12 ft	2.32	1.28
19223	18614	1 generator 1482 bhp	Advent Software	San Francisco	San Francisco	310 ft	14.5 ft	6.7	4.49
19180	18462	3 generators sets with abatements - 2937 bhp	San Francisco PUC	San Francisco	San Francisco	260 ft	7.3 ft 26.5 ft 26.5 ft	3.56	2.5
19216	18596	1 generator - 99 bhp	City of Novato	Novato	Marin	246 ft	7 ft	5.83	3.6
19187	18514	1 generator - 130 bhp	Walnut Creek Endoscopy Center	Walnut Creek	Contra Costa	260 ft	9 ft	5.1	0.78
19181	18461	3 generators sets with 3 abatement - 2937 bhp	Comstock Data Center	Santa Clara	Santa Clara	200 ft	21 ft	7.63	3.3
19236	18645	1 generator - 385 bhp	Marin County	San Rafael	Marin	790 ft	8 ft	2.76	2.4
19232	18637	1 generator - 49 bhp	Verizon Wireless	Danville	Contra Costa	303 ft	8 ft	7.4	0.32
19096	18163	1 generator - 145 bhp	Marin County	Mill Valley	Marin	27 ft	8 ft	8.16	2.2
19143	18341	1 generator - 2220 bhp	Myers' Peninsula Ventures	South San Francisco	San Mateo	840 ft	11 ft	0.57	2.8
19156	18379	1 generator - 315 bhp	North Bay Regional Surgery Center	Novato	Marin	218 ft	8 ft	2.48	8.3

TABLE 1: DECAY FACTOR ANALYSIS

Plant No	*Application No*	*Project Description*	*Plant Name*	*City*	*County*	*Distance from stack to receptor boundary*	*Stack height*	*Estimated Risk from Google Earth Using Multiplier*	*HRA Risk Resident (million)*
19131	18308	1 generator - 916 bhp	City of Sebastopol	Sebastopol	Sonoma	780 ft	12 ft	2.89	0.48
19201	18540	1 generator - 157 bhp	BioSeek	South San Francisco	San Mateo	5000 ft	30 ft	0.16	0.17
19110	18227	1 generator - 399 bhp	Richmond Hall of Justice	Richmond	Contra Costa	504 ft	9 ft	1.02	2.3
19157	18380	1 generator - 364 bhp	List Labs	Campbell	Santa Clara	683 ft	10 ft	1.41	0.34
19164	18388	1 generator - 314 bhp	Kindred Hospital	San Leandro	Alameda	526 ft	14 ft	3.75	0.43
19170	18405	1 generator - 619 bhp	North Coast County Water District	San Bruno	San Mateo	100 ft	13 ft	10.96	3.1
19135	18319	1 generator - 157 bhp	Kasier Hospital	Napa	Napa	308 ft	7 ft	4.12	0.4
19136	18320	1 generator - 157 bhp	Kasier Hospital	Fairfield	Solano	1048 ft	7 ft	0.4	0.3

Source: BAAQMD, 2013

Table 2 lists the decay factors which were used in the geospatial analysis to calculate cancer risks and $PM_{2.5}$ concentrations out to 1,000 feet in every direction.

TABLE 2: DIESEL ENGINE DECAY FACTORS

Distance in meters	*Diesel Engine Distance Adjustment*
20	.90
25	.85
30	.73
35	.64
40	.58
50	.50
60	.41
70	.31
80	.28
90	.25
100	.22
110	.18
120	.16
130	.15
140	.14
150	.12
160	.10
180	.09
200	.08
220	.07
240	.06
260	.05
280	.04
300	.03
305	.02

Source: BAAQMD, 2013

Gas stations: Similar to diesel engines, BAAQMD staff created decay factors for gas stations based upon numerous modeling runs using meteorological data collected from five counties throughout the Bay Area. Emissions of benzene, ethylbenzene, hexane, xylene, and toluene were estimated based on actual throughput data when available. TAC emission factors used in the health risk calculations depended on the type of emission controls at the various facilities. Some health risk values were updated from a February 2011 survey conducted (except values that were lower or were at BAAQMD permit levels). A worst-case Chi/Q (predicted concentration based on an emission rate of one g/s) was used, which was derived from worst-case AERMOD modeling results based upon a number of factors, including: building dimensions around the meteorological towers which were used to collect/process the meteorological data; no complex terrain or flagpole receptors; over 4,000 receptor locations; assigned vent and volume parameters; and assigned emission ratios between vent and volumes. .

Table 3 lists the decay factors that were used in the geospatial analysis to calculate cancer risks and $PM_{2.5}$ concentrations out to 1,000 feet in every direction. The decay factor is only applied to cancer risks associated with gas stations; gas stations do not generate $PM_{2.5}$ emissions.

TABLE 3: GAS STATION DECAY FACTORS

Distance in meters	*Gas Station Distance Adjustment Multiplier*
20	1.0
25	.728
30	.559
35	.445
40	.365
45	.305
50	.260
55	.225
60	.197
65	.174
70	.155
75	.139
80	.126
85	.114
90	.104
95	.096
100	.088
110	.076
115	.071
120	.066
125	.062
130	.058
135	.055
140	.052
145	.049
150	.046
155	.044
160	.042
165	.040
170	.038
175	.036
180	.034
185	.033
190	.031
195	.030
200	.029

TABLE 3: GAS STATION DECAY FACTORS

Distance in meters	*Gas Station Distance Adjustment Multiplier*
205	.028
210	.027
215	.026
220	.025
225	.024
230	.023
235	.022
240	.022
245	.021
250	.020
255	.020
260	.019
265	.018
270	.018
275	.017
280	.017
285	.016
290	.016
295	.015
300	.015
305	.015

Source: BAAQMD, 2013

Dry Cleaners: The decay factor for dry cleaners differ from the decay factors applied to gas stations and diesel engines because the reduction in risks are not attributed to meteorological conditions diluting the source emissions, but on ARB's regulation requiring the gradual phase-out of perchloroethylene (perc) in dry cleaning facilities by January 1, 2023. The decay factor relies on adjustment to the age sensitivity factor that accounts for reduction in the exposure duration due to the compliance date of the regulation. The age sensitivity factors, which account for the increased susceptibility of infants and children to carcinogens, is a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age. A factor of three was applied for exposures that occur from two years through 15 years of age and a factor of one was applied for all subsequent years leading up to a 70 year exposure. Summing the age sensitivity factors for all 70 years of exposure produces a factor of 1.7 that is then multiplied by the non-adjusted cancer risk (also referred to as the screening value). Because the regulation prohibits the use of perc after January 1, 2023, the exposure duration is reduced to 13 years (rather than 70 years) and subsequent cumulative age sensitivity factor becomes 0.775 over 70 years. Consequently, the cancer risk for dry cleaners using perc was adjusted by multiplying the non-adjusted cancer risk (screening value) by (0.775/70). A decay multiplier (similar to the one used for diesel engine) was then applied to the new screening values to represent a decrease in cancer risk with distance up to 1,000 feet. $PM_{2.5}$ concentrations were not calculated because dry cleaners do not emit $PM_{2.5}$.

Mobile Source Data

BAAQMD provided estimated cancer risk and $PM_{2.5}$ concentration data for mobile sources located in and within 1,000 feet of TPP areas for use in the local pollutant analysis. Mobile sources include freeways, roadways with over 30,000 annual average daily trips (AADT), and railroads/rail stations.

Roadways: BAAQMD conducted air dispersion modeling to estimate cancer risks and $PM_{2.5}$ concentrations for roadways based on annual average daily traffic (AADT) for each of the nine Bay Area counties. The county specific tables provide estimated $PM_{2.5}$ concentrations and cancer risk values by distance from each roadway (categorized by AADT), up to 1,000 feet. Information (specific to each county) included in the air dispersion modeling includes AADT, percentage of heavy trucks and truck profiles, ARB emission factors (EMFAC 2007) and meteorological data from BAAQMD monitoring stations in each county. The estimated cancer risks and $PM_{2.5}$ concentrations were found to be minimal for roadways with less than 30,000 AADT; as such, BAAQMD staff only included the estimated cancer risks and $PM_{2.5}$ concentrations for roadways exceeding 30,000 AADT (within the TPP areas) in the local pollutant analysis.

Freeways: BAAQMD staff developed a freeway screening tool (available for download in Google Earth as well as ArcGIS) which maps each State freeway link in the Bay Area, where freeway links are defined by Caltrans mileposts. BAAQMD staff modeled cancer risks and $PM_{2.5}$ concentrations for each link using the CALINE3 model developed by the California Department of Transportation. The cancer risks and $PM_{2.5}$ concentrations were modeled at various distances (out to 1,000 feet) from the edge of the right of way (ROW) of each freeway link. Information specific to each county is incorporated in the modeling including: AADT, fleet mix and profiles, vehicle speeds from MTC's travel demand model, and meteorological data from BAAQMD monitoring stations. This information is available at elevations of six feet and 20 feet to represent sensitive receptors on the first and second floors of buildings respectively. For purposes of the local pollutant analysis, BAAQMD staff utilized the estimated health risk data at the six foot elevations only, as this is the most conservative scenario.

BAAQMD staff updated the original freeway screening tool using EMFAC2011, rather than EMFAC 2007, to estimate increased cancer risks and $PM_{2.5}$ concentrations. $PM_{2.5}$ emissions from exhaust, and tire and brake wear, as well as emissions from re-suspended road dust are included as part of the EMFAC2011 update. For additional information on the methodology used in the freeway modeling see BAAQMD's document entitled "*Recommended Methods for Screening and Modeling Local Risks and Hazards.*"

Railroads/Rail Stations: Similar to the methodology used for freeways, BAAQMD staff estimated cancer risk and $PM_{2.5}$ concentrations from railroads and rail stations using the CALINE3 model. Rail emissions were estimated for existing freight and passenger lines as well as proposed future lines in Marin County (i.e., SMART line) and eBART along Highway 4 in Contra Costa County. Emissions for freight corridors were estimated based on fuel consumption along specific lines provided by industry. Passenger rail emissions were weighted based on the rail activity, idling times, and speeds of individual trains. Freight and passenger emissions that run on parallel or share tracks were aggregated to estimate total emissions along rail corridors. Site-specific meteorological conditions for each rail link were then input into the model to estimate receptor-specific cancer risk and $PM_{2.5}$ concentrations. Cancer risk and $PM_{2.5}$ concentrations were estimated at various distances from the edge of the rail lines, up to 1000 feet, demonstrating reduced risks based on distance from the emissions source.

GIS Cumulative Analysis

BAAQMD staff conducted a geospatial analysis using GIS software to evaluate potential increased cancer risks and $PM_{2.5}$ concentrations due to TAC and $PM_{2.5}$ emissions from mobile and stationary sources in Transit Priority Project (TPP) areas[4]. The geospatial analysis was designed and executed in ArcGIS 10.1 using BAAQMD's estimated cancer risk and $PM_{2.5}$ concentration data on stationary and mobile sources of TACs and $PM_{2.5}$ (described above). BAAQMD contracted with ICF, Inc. (ICF) for assistance in designing and executing the geospatial analysis.

The geospatial analysis identifies areas where the cumulative cancer risk and $PM_{2.5}$ concentrations of the data sets exceed MTC's air quality significance thresholds for TACs and $PM_{2.5}$ using a spatial additive process. The spatial additive process involves three data sets: a regularized raster dataset representing the spatial extent of the TPP areas, to which all pollution values associated with the stationary and mobile sources are added; raster datasets representing the TAC/$PM_{2.5}$ plumes associated with each stationary source that were decayed to a specified distance (described in section above); and raster datasets representing TAC emissions and $PM_{2.5}$ concentrations generated by mobile sources, including freeways, major roadways (defined as roads with AADT counts exceeding 30,000), and railroads/rail stations.

DISTANCE RECOMMENDATION FROM SENSITIVE RECEPTORS SUMMARY

To help identify the appropriate distances that sensitive receptors should be protected from these stationary and mobile sources, MTC utilized work prepared by the California Air Resource's Board (ARB) 2005 *Air Quality and Land Use Handbook: A Community Health Perspective* (Handbook), and BAAQMD permit data. ARB developed the Handbook to bring attention to the potential health impacts associated with locating sensitive receptors in close proximity to air pollution sources. Using available health data, air quality modeling, and monitoring studies, the Handbook provides recommendations for how far sensitive land uses should be located away from some specific sources of air pollution. The ARB recommended distances are based primarily on data showing that air pollution exposure from TACs and $PM_{2.5}$ can be reduced as much as 80 percent when sensitive land uses are set back the recommended distance. The distance recommendations were based on existing health studies and data available at that time. ARB distance recommendations were only made when the relative exposure and health risk from a source could be reasonably characterized from the available data. For each source type, the Handbook summarizes the key health and distance related findings that helped form the distance recommendation for that source.

ARB recommends using local air pollution source data, where appropriate and if available, to better determine specific health risk near local TAC and $PM_{2.5}$ sources, especially for sources not included in ARB's Handbook, or to identify more appropriate distance recommendations than they provide in the Handbook.

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[4] The geospatial analysis also included a 1,000 foot "area of influence" around the TPP areas. The area of influence is defined as the areas containing sources of TAC and/or PM2.5 that should be evaluated in relation to the TPP areas. Including the area of influence ensures that the geospatial analysis conducted to evaluate cumulative health risks takes into account sources of pollution *outside* of the TPP areas that may, however, impact the TPP areas themselves. In this document, the term "TPP areas" refers to both the TPP areas as defined by the Sustainable Communities Strategy for the Bay Area, as well as the 1,000 foot area of influence.

For sources of TACs and $PM_{2.5}$ not included in ARB's Land Use Handbook or for sources where Air District data was more site specific than ARB's data, MTC worked with BAAQMD to develop distance recommendations for siting new sensitive land uses for use in this analysis. BAAQMD provided site specific stationary source permit data or existing studies to support the distance recommendations for diesel generators, refineries, sea ports, airports, railroads, rail stations, and ferry terminals.

The specific set distances recommended for avoiding locating sensitive land uses are listed below in Table 2.2-10. For detailed explanations of set distances recommended by ARB, see the 2005 Air Quality and Land Use Handbook: A Community Health Perspective. Recommended distances used for this analysis and how they are derived are described in detail below.

Diesel Generators

The ARB's Handbook does not contain a distance recommendation for diesel generators. There are over 3,000 diesel generators in the Bay Area, many of which may pose some increased cancer risk and $PM_{2.5}$ concentration to nearby sensitive receptors. Installations of new generators in the Bay Area are required to obtain and meet Air District permit requirements. Under Air District permitting requirements, new generators are required to install Toxic Best Available Control Technology (T-BACT) and demonstrate an increased cancer risk impact of less than 10 in a million to the closest sensitive receptor. However, many older existing generators operating in the Bay Area may not have T-BACT installed and generate much higher cancer risks than 10 in a million.

A 350 foot distance for siting new sensitive residents near existing diesel generators that have an estimated cancer risk of over 10 in a million is used for this analysis, based on MTC/ABAG consultation with the BAAQMD. The methodology used for developing this distance recommendation for diesel generators is consistent with ARB's methodology. ARB's set distance recommendations are based upon the distance at which risk would be reduced by 80 percent. BAAQMD analyzed their inventory of diesel generators in the stationary source screening tool and estimated the distance, using the diesel multiplier tool[5], where cancer risk tends to drops off by approximately 80 percent. Location of sensitive receptors within 350 feet of diesel generators may result in a potentially significant impact.

Railroad and Rail Stations

The ARB's Handbook does not contain distance recommendations for railroad lines or rail stations. Most of the passenger rail lines in the Bay Area are located within TPP areas and will likely attract new land use development with sensitive receptors as part of the proposed land use plan. Rail lines, including Caltrain, Amtrak, Capital Corridor, and the future SMART line in Marin County, generate diesel PM emissions, a known TAC and $PM_{2.5}$ source, from locomotive exhaust.

BAAQMD estimated cancer risk and $PM_{2.5}$ concentrations for railroads and rail stations within the Bay Area. Rail emissions were estimated along existing freight and passenger lines. Emissions along freight corridors were estimated based on fuel consumption; and passenger rail emissions were estimated based on the rail activity, idling times at stations, and speeds of individual trains. Freight and passenger emissions that run on parallel or shared tracks were aggregated to estimate total emissions along rail

[5] Available on BAAQMD's website, http://baaqmd-s/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx

corridors. The emissions and train activity data were combined with county-specific meteorological data for each rail link in the dispersion modeling to estimate cancer risk and $PM_{2.5}$ concentrations at various distances from the edge of the rail lines (up to 1,000 feet).

Based on BAAQMD's dispersion modeling, the maximum distance where the estimated cancer risk[6] dropped below the threshold occurs at approximately 200 feet. Therefore, this analysis uses a set distance of 200 feet from every railroad line and rail station. Location of sensitive receptors within 200 feet of railroad lines and rail stations may result in a potentially significant impact.

Ferry Terminals

The ARB Handbook does not contain distance recommendations for ferry terminals. The six ferry terminals in the Bay Area are located within TPP areas and could potentially include future new land use developments with sensitive receptors. Similar to rail stations, the primary TAC of concern at ferry terminals is diesel PM from ferry boat exhaust.

BAAQMD estimated cancer risk and $PM_{2.5}$ concentrations for each of the region's ferry terminals based on the number of ferry departures, assumed idling times at each ferry terminals, and modeling outputs from dispersion modeling conducted by BAAQMD for two ferry terminals in the City of San Francisco. The cancer risk and $PM_{2.5}$ concentrations were estimated at varying distances for each ferry terminal. The maximum distance where the estimated cancer risk[7] dropped below the cumulative threshold is at approximately 500 feet. Based on BAAQMD modeling, this analysis uses a set distance of 500 feet from every ferry terminal. Location of sensitive receptors within 500 feet of ferry terminals may result in a potentially significant impact.

Port of Oakland and UP Railyard

The ARB's Handbook recommends that lead agencies "avoid siting of new sensitive land uses immediately downwind of ports in the most heavily impacted zones." ARB does not contain more specific distance recommendation, rather the Handbook recommends consulting with the local air district or ARB on the status of any pending analyses of health risks associated with a specific port. It should be noted that ARB has prepared health risk assessments for several ports in the state, including the Port of Oakland, as part of a larger West Oakland Study.

In 2008, ARB completed a health risk assessment (HRA) for the West Oakland community. The study was designed to evaluate the potential public health risk to both residents of West Oakland and the broader Bay Area from exposure to diesel PM. The West Oakland HRA looked at emissions from the Port, railyard and the freeways individually and collectively. The report concluded that the "zone of impact" for potential risk levels above 100 in a million resulting from either the Port or the surrounding freeways encompass the entire West Oakland community (approximately 0.5 miles from Port property). The emissions from on-road heavy-duty trucks result in the largest contribution, over 71 percent, to the overall potential cancer risks levels in the West Oakland community.

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[6] The cancer risk threshold was triggered sooner than the PM2.5 threshold in the railroad modeling estimates.

[7] The cancer risk threshold was triggered sooner than the PM2.5 threshold in the ferry terminal modeling estimates.

ARB acknowledges, however, that the estimates for truck emissions in their HRA are uncertain, especially relative to the other categories of emissions studied, i.e. the Port and UP Railyard. Their uncertainty is due to limitations in the availability of data describing the magnitude and intensity of trucking operations in the West Oakland community. These data limitations may have led to an overestimate in the overall magnitude of truck-related emissions in the West Oakland community, and an underestimate of the fraction of total trucking emissions and risks attributable to trucks that service the Port of Oakland.

Based in part on the 2008 West Oakland HRA, and on Air District monitoring data that demonstrates TAC and $PM_{2.5}$ pollution levels are similar to background levels at approximately half mile from the Port and UP Railyard, this analysis uses a set distance of half a mile of the Port of Oakland and sensitive new land uses. Location of sensitive receptors within a half a mile of the Port of Oakland may result in a potentially significant impact.

Other Ports

For smaller ports in the region, including ports in Richmond, Redwood City, and Benicia, MTC recommends a set distance of 1,000 feet between these ports and sensitive land uses. These smaller ports have limited TAC and $PM_{2.5}$ emissions relative to the Port of Oakland. Cancer risk and $PM_{2.5}$ exposure from diesel truck activity associated with these ports are estimated to be significantly lower than found at the Port of Oakland. The Port of Richmond produces 6.3 tons per year of diesel PM, Benicia 5.0 tons per year, and Redwood City 10.2 tons per year[8] – compared to nearly 250 tons per year from the Port of Oakland. The small ports in the region, therefore, are not considered a substantial source of PM relative to the Port of Oakland. A distance of 1,000 feet is comparable to the distance ARB recommends for other large sources of PM, and the point at which, for most sources, pollution drops to background levels. Location of sensitive receptors within 1,000 feet of other ports may result in a potentially significant impact.

Refineries

In regards to refineries, ARB recommends that lead agencies "avoid siting new sensitive land uses immediately downwind of petroleum refineries." ARB also recommends that lead agencies consult with local air districts and other local agencies to determine an appropriate separation.

A petroleum refinery is a complex facility where crude oil is converted into petroleum products (primarily gasoline, diesel fuel, and jet fuel), which are then transported through a system of pipelines and storage tanks for final distribution by delivery truck to fueling facilities throughout the state. In California, most crude oil is delivered either by ship or via pipeline from oil production fields within the state. The crude oil then goes through numerous complex chemical and physical processes, which include distillation, catalytic cracking, reforming, and finishing. These refining processes have the potential to emit TACs and $PM_{2.5}$, and are subject to extensive controls by local air district regulations.

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[8] *SF Bay Area Seaports Air Emissions Inventory*, Bay Area Air Quality Management District, 2009: http://www.baaqmd.gov/Divisions/Planning-and-Research/Emission-Inventory/Small-Ports-Inventory.aspx

According to ARB and Air District staff, there is no current air quality modeling or monitoring data that provides a quantifiable basis for recommending a specific separation between refineries and new sensitive land uses. In the Bay Area, refineries were last analyzed for emissions and cancer risk in the 1990s, as part of ARB's Air Toxics "Hot Spots" Program, enacted by the state legislature in 1987. Since then, oil refining facilities in the Bay Area have changed substantially, thereby making the findings from the 1990's assessment obsolete. However, in view of the amount of, and potentially hazardous nature of, many of the pollutants released as part of the oil refining process, ARB suggest that the siting of new sensitive land uses immediately "downwind" of refineries should be avoided.

BAAQMD does not have current facility wide health risk assessments on which a set distance recommendation for Bay Area refineries and locating new sensitive land uses could be made. Therefore, this analysis considers a set distance of a half mile to be a precautionary distance where cancer risk would be expected to fall below 100 in a million and a $PM_{2.5}$ concentration of 0.8 ug/m3. Location of sensitive receptors within a half a mile of refineries may result in a potentially significant impact.

Airports

ARB's Land Use Hand book makes no mention of airports. However, airports are significant sources of air pollution. Airports generate numerous pollutants, including lead, 1,3-Butadiene, diesel PM, ultrafine PM (UFP), and $PM_{2.5}$, from a complex mix of mobile and stationary sources such as jet fuel, transport equipment, and power generation. Daily airport runway congestion especially contributes to local pollution levels that may compromise the health of residents living nearby and downwind from airports.

The South Coast Air Quality Management District prepared a *General Aviation Airport Air Monitoring Study* in August 2010[9], which studied the Van Nuys and Santa Monica Airports, and found that overall, the most significant airport-related impacts on air quality were observed for lead and for UFPs. However, diesel PM has been attributed as the leading driver for cancer risk[10] from airports, according to a Berkeley study that reviewed CEQA-prepared health risk assessments for Los Angeles (LAX), San Diego (SDIA) and the proposed El Toro (OCX) airport.

MTC/ABAG has not been able to identify any set distance recommendations from the limited studies surrounding air emissions from airports. Therefore, this analysis considers a set distance of a half mile to be a precautionary distance where cancer risk would be expected to fall below 100 in a million and a $PM_{2.5}$ concentration of 0.8 ug/m3. Location of sensitive receptors within a half a mile of airports may result in a potentially significant impact.

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[9] http://www.smgov.net/uploadedFiles/GA%20report_final%20(081710).pdf

[10] Vanderbilt, Pamela; Lowe, John *Health Risk Assessment of Air Toxics from Airports: The State of the Science & Strategies for the Future,* Airport Air Quality Symposium, February 28, 2002

Toxic Air Contaminant Mitigation Measures

The following section provides background information on air quality mitigation measures recommended in the DEIR to address localized impacts related to Toxic Air Contaminants (TACs), listed under Mitigation Measure 2.2(d).

Mitigation Measure Point 1: Install air filtration to reduce cancer risks and $PM_{2.5}$ exposure for residents and other sensitive populations in buildings that are in close proximity to freeways, major roadways, diesel generators, distribution centers, railyards, railroads, rail stations, and/or ferry terminals. Air filtration devices should be rated MERV-13 or higher. MERV-13 air filters are considered high efficiency filters able to remove 80 percent of fine particulate matter from indoor air.[11] MERV 13 air filters may reduce $PM_{2.5}$ concentrations from diesel PM from stationary and mobile sources by approximately 53 percent; and cancer risk by 42 percent. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system is required.

Air filtration protects residents and other sensitive receptors from exposure to pollutants by reducing the pollutant concentration in indoor air circulated from outdoor air. Air filtration places a control on a building's mechanical ventilation system that filters particles from the air. The effectiveness of a filter depends on its (1) efficiency to remove particles from passing air; (2) a ventilation system's air flow rate; and (3) the path the clean air follows after it leaves the filter. To ensure adequate health protection to sensitive receptors, a ventilation system should meet the following minimal design standards:

- A MERV-13, or higher, rating that represents a minimum of 90 percent efficiency to capture fine particulates;
- At least one air exchange(s) per hour of fresh outside filtered air;
- At least four air exchange(s) / hour recirculation; and
- At least 0.25 air exchange(s) per hour in unfiltered infiltration.[12]

The effectiveness of air filtration is highly variable and based upon a building's design and maintenance. For example, the presence of operable windows, the placement of the air intakes, operation and maintenance of the ventilation system, and proper sealings will impact the effectiveness of air filtration and thus residents' exposure to TACs and $PM_{2.5}$ from nearby sources of emissions. In addition, residential behavior such as unvented cooking and cigarette smoking (that affect indoor air quality) as well as the amount of time occupants spend outdoors versus indoors impact the effectiveness of air filtration. BAAQMD recommends that the homeowners/lease agreement and other property documents require cleaning, maintenance, and monitoring of the buildings for air flow leaks, assurance that new owners and tenants are provided information on the ventilation system, and that fees associated with

[11] EPA webpage on residential air cleaners, http://www.epa.gov/iaq/pubs/residair.html,

[12] DPH, *Assessment and Mitigation of Air Pollutant Health Effects from Intra-Urban Roadways: Guidance for Land Use Planning and Environmental Review*. May 2008. Original reference: Fisk WJ, Faulker D, Palonen J, Seppanen O. Performance and Costs of Particle Air Filtration Technologies Indoor Air 2002; 12(4):223-234.

owning or leasing a unit(s) in the building include funds for cleaning, maintenance, monitoring, and replacements of the filters, as needed.

The Air Resources Board (ARB) recently studied the effectiveness of air filtration, along with other mitigation measures, as a strategy to reduce exposure to nearby traffic pollution.[13] The study finds that the use of air filtration tends to be relatively effective and represents a promising mitigation measure; however, additional research on the issue is needed. The study notes that air filtration could be especially effective in residences with consideration to California's requirement that new homes have mechanical ventilation systems installed. ARB is funding a project entitled, "Reducing In-Home Exposure to Air Pollution," that will measure the benefits of air filtration in reducing exposure to indoor and outdoor air pollutants.

Installation of MERV-13 filters in residential buildings represents a feasible option that is recommended by a number of entities. The City and County of San Francisco requires MERV-13 filters be installed in residential buildings located in air quality hot spots as defined by San Francisco's Health Code Article 38.[14] In addition, the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), recommends, in their green building guide, that a minimum of MERV-13 rated air filtration be required in building locations where the air quality is designated to be in non-attainment with the National Ambient Air Quality Standards for $PM_{2.5}$.[15] The United States Green Building Council (USGBS) requires that new construction be equipped with a MERV-13 or higher rated air filter in new construction for buildings and homes to receive air filtration green building credit points.[16]

Mitigation Measure Point 2: Phase residential developments located within the set distance of 500 feet from freeways until 2023, or as late as feasible. In 2008, ARB adopted a regulation that requires diesel trucks to retrofit or replace their engines so that by 2023, nearly all trucks would have a 2010 or newer model year engine. Therefore, starting in 2014, PM emissions from diesel trucks will decline by approximately 80 percent by 2023.

This measure allows proposed projects to avoid exposing sensitive receptors to high levels of diesel particulate matter from heavy duty trucks on freeways. As ARB's On-Road Heavy Duty Diesel Vehicles Regulation gets implemented, diesel particulate matter emissions will decrease over time, which will reduce cancer risk near freeways.

Mitigation Measure Point 3: Design buildings and sites to limit exposure from sources of TAC and/or $PM_{2.5}$ emissions. Design the site layout to locate sensitive receptors as far as possible from any freeways, roadways, diesel generators, distribution centers, and railroads/railyards. Locate operable windows,

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[13] "Status of Research on Potential Mitigation Concepts to Reduce Exposure to Nearby Traffic Pollution," ARB, August 2012.

[14] City and County of San Francisco 2011 Green Building Requirements Summary and Verification Form, http://sfdbi.org/Modules/ShowDocument.aspx?documentid=354

[15] ASHRAE Journal's Guide to Standard 189.1, Balancing Environmental Responsibility, Resource Efficiency and Occupant Comfort, June 2010.

[16] LEED 2009 for New Construction Rating System, http://new.usgbc.org/leed/rating-systems

balconies, and building air intakes as far away as is feasible from emission sources. If near a distribution center, residents shall not be located immediately adjacent to a loading dock or where trucks concentrate to deliver goods.

Building design can be an important factor in improving indoor air quality, especially when considering the location of the air intake for air ventilation. In general, $PM_{2.5}$ concentrations decrease with distance and with building height, therefore air intake locations should be located farthest away from emission sources as possible to provide the cleanest ventilation to building occupants.

Other minimal design features may further improve indoor air quality. For example, operable windows and balconies should be installed away from high volume roadways or other sources of air pollution. If emissions sources are located on the west of the building, these amenities should be installed on the east side of the building where the exposure concentrations are likely to be lower. Similarly, if mechanical ventilation is installed in a building, the project sponsor can consider installing inoperable windows along the side of the building downwind of the source. This strategy will reduce the possibility of higher polluted air from entering the building and also increases the efficiency and performance standard of the mechanical filter.

Mitigation Measure Point 4: Limit ground floor uses in residential or mixed-use buildings that are located within the set distance of 500 feet to a non-elevated highway or roadway. Sensitive receptors should be restricted from the ground floor and be limited to second floors and above.

Avoiding residential development on the ground floor of buildings is an effective strategy for reducing exposure to $PM_{2.5}$ and/or cancer risk from a highway, interstate or roadway. This strategy is often applied to infill development, where the ground floor is reserved for commercial and/or retail space and the second and subsequent levels are used for residents. Limiting ground floor residential development, as an exposure reduction strategy, is only effective when the adjacent roadway is not elevated. If the roadway is elevated at approximately the height of the second floor occupancy, then residents would be exposed to the same level of pollution as if they were at ground level.

For pollutants released at ground level, being on the second floor (or higher) of a building can reduce exposure to air pollution by as much as 50 percent within 10 feet of the roadway and by 15 percent within 100 feet. As part of its Freeway Screening Tool, BAAQMD staff modeled cancer risk and $PM_{2.5}$ concentrations at six feet (ground floor), 20 feet (second floor), and 30 feet (third floor) elevations. Future projects should apply the appropriate height concentrations to their project to reflect potential exposure reductions. The six- foot concentration data should be used when the freeway is elevated and at approximately the same height as where occupancy will occur.

Mitigation Measure Point 5: Plant trees and/or vegetation between sensitive receptors and pollution sources. Large, evergreen trees (those with foliage year-round) with long-life spans work best in trapping $PM_{2.5}$. In addition, trees with branches and leaves that have a sticky surface and trees with a fine, complex foliage structure that allow significant in-canopy airflow also perform well. Specific tree recommendations include: Pine (*Pinus nigra* var. *maritima*), Cypress (X *Cupressocyparis leylandii*), Hybrid popular (*Populus deltoids X trichocarpa*), and Redwoods *(Sequoia sempervirens*)

Planting certain trees can be an effective strategy for reducing exposure to air pollution. With certain trees, coarse and fine particulates become trapped and filtered by the leaves, stems, and twigs of the trees.

Trapped pollution particles are eventually washed to the ground by rainfall. Trees also lower the air temperature by providing shade over streets and parking lots, thereby reducing evaporative emissions from vehicles and energy consumed on air conditioning during summer months.

Research supports a reduction in particulate matter concentration ranging from 0.5 to 5 percent from planting trees near a source of $PM_{2.5}$. District staff recommends taking a 0.5 percent reduction from $PM_{2.5}$ concentration estimates when implementing this measure. If taking a larger reduction, the reasons for doing so should be supported and documented.

The effectiveness of $PM_{2.5}$ removal depends on the tree species planted. As mentioned, large, evergreen trees (those with foliage year-round) with long-life spans are best, and trees with branches and leaves that have a sticky surface are better at trapping particulate matter than those without. Trees with a fine, complex foliage structure that allows significant in-canopy airflow will also perform better at trapping particulate matter.

Specific tree recommendations include:

- Pine (Pinus nigra var. maritima),
- Cypress (X Cupressocyparis leylandii),
- Hybrid popular (Populus deltoids X trichocarpa),
- Redwoods (Sequoia sempervirens),

In addition to the type of tree, the placement of the trees, relative to major roadways, and how densely they are planted are important considerations in using trees as a strategy to reduce air pollution exposure. The $PM_{2.5}$ removal effectiveness of trees is greatest when the trees are planted closest to the edge of the roadway or stationary source, for this is where pollution concentrations are highest. Beyond 500 feet, concentrations begin to diminish considerably, thereby diminishing the need for or effectiveness of tree planting as a strategy. Ideally, trees should be planted within 500 feet from a roadway to be considered an effective strategy. In regards to density, trees should be planted so that they are grouped as close together as possible to ensure a rather dense collection of tree stands. The denser the trees, the more effective the foliage, trunks and canopies will be in collecting particulate matter.

Some trees emit various "biogenic volatile organic compounds" or BVOCs. BVOCs, such as isoprenes and monoterpenes, contribute to the formation of ozone. Only "low emitting" BVOC trees should be considered in a tree planting strategy. Oak trees, in particular, would not be recommended due their ability to emit large volumes of BVOCs. The amount of BVOCs that are emitted by a tree species should be determined before utilizing the species in a tree planting strategy.

Mitigation Measure Point 6: Plan sensitive receptors away from truck activity areas including loading docks and delivery areas. Requiring loading dock electrification and/or prohibiting all idling of heavy duty diesel trucks should be considered as appropriate.

Residences should not be located immediately adjacent to a loading dock on a neighboring parcel or a planned loading dock within a mixed use development. If loading docks are not used in the development but there will be areas where trucks concentrate to deliver goods, then a separation should be provided between the two uses. Requiring loading dock electrification and/or prohibiting all idling of heavy duty diesel trucks are complimentary measures that could be implemented to ensure adverse health impacts do not occur.

Mitigation Measure Point 7: If within the project site, replace or retrofit diesel generators that are not equipped with Best Available Control Technology to meet ARB's Tier 4 emission standards. New or retrofitted diesel generators may reduce $PM_{2.5}$ emissions by up to 90 percent.

This strategy reduces emissions by retrofitting or replacing generators to meet ARB's most stringent emission standards. This measure may be applied to generators used to provide electricity in construction sites and to back-up generators (also known as stationary, standby, or emergency generators) used to provide emergency power in buildings.

Generators replaced or retrofitted to meet ARB's Tier 4 emission standards can reduce $PM_{2.5}$ emissions, and therefore $PM_{2.5}$ concentrations and cancer risk, by up to 90 percent. Actual emission reductions and reductions in $PM_{2.5}$ concentrations and cancer risk depend on the number of, size, frequency and intensity-of-use of the generators.

Generators, specifically older ones, can have significant diesel particulate matter emissions. As part of its diesel risk reduction program, the California Air Resources Board adopted an air toxics control measure for or generators, in 2004. The measure requires that new generators, including back-up generators and generators used in construction, be certified to meet emission standards set by ARB and EPA (ARB and EPA have identical emission standards for generators). ARB/EPA emission standards apply to generators with more than 50 engine horse power and are set forth as Tiers 1 through 4, with Tier 4 engines being the cleanest. Generator engines certified at Tier 4 reduce PM emissions 85 to 90 percent over a non-tiered engine (whereas Tier 1 only reduces PM emissions by 25 percent). To achieve ARB's emission standards, older generators may be replaced with a new generator or retrofitted with control technologies such as diesel particulate filters. Engines meeting the Tier 4 standard began to be manufactured in 2008. By 2015, all new generator engines must meet Tier 4 emission standards.

To implement this measure, existing generators may be replaced, retrofitted, or otherwise upgraded to meet ARB Tier 4 emissions standards.

Mitigation Measure Point 8: If within the project site, reduce emissions from diesel trucks through the following measures:

- Install electrical hook-ups for diesel trucks at loading docks. The provision of electrical outlets at loading docks provide truck operators, whose trucks are equipped to utilize grid power, the ability to shut off their main engines while maintaining power refrigeration systems. Grocery stores, delivery centers, shopping malls, and other commercial land uses attract heavy-duty delivery trucks which may contain perishable items that must be kept refrigerated, or at a fixed temperature. While the frequency of heavy-duty trucks delivering goods in one place produces a high amount of air pollution in and of itself, the impact is exacerbated when truck operators must keep the main engine of the truck running while delivering refrigerated goods. The provision of electrical outlets at loading docks would give truck operators, whose trucks are equipped to utilize grid power, the ability to shut off their main engines while maintaining power to the refrigeration systems. Installing electrical outlets can lead to localized reductions in diesel emissions, thereby decreasing the potential for health risks to those that live and work in the area.

- Require trucks to use Transportation Refrigeration Units (TRU) that meet Tier 4 emission standards. TRUs are refrigeration systems powered by diesel internal combustion engines designed to refrigerate perishable products that are transported in various containers, including semi-trailers, truck vans, shipping containers, and rail cars. Although TRU engines are relatively small, ranging from nine to 36 horsepower, significant numbers of these engines congregate at distribution centers, truck stops, and other facilities, resulting in the potential for health risks to those that live and work nearby. The use of TRU's in lieu of running the main engine on delivery trucks, maintains refrigeration while minimizing diesel emissions. This measure may result in a 50 to 80 percent reduction in diesel particulate emissions at the project-level, relative to trucks without TRUs. Require truck-intensive projects to use advanced exhaust technology (e.g. hybrid) or alternative fuels.

  The use of hybrid and battery-electric vehicles or the use of clean fuels such as propane or natural gas has the potential to dramatically decrease $PM_{2.5}$ and TAC emissions in new development projects or land uses that include a fleet of heavy-duty trucks.. Requiring advanced drive trains or alternative fuels has the potential to decrease diesel emissions from heavy-duty trucks by 35 to 100 percent at the project-level.

  Truck manufacturers have begun offering diesel electric hybrids for all but the heaviest trucks; gasoline hybrids are available for lighter weight heavy-duty trucks. The availability of propane and natural gas powered trucks is somewhat limited in terms of weight class and usage, although there are some well-established markets for natural gas buses and garbage trucks. Trucks powered by battery or fuel cell hybrid electrics are currently limited to demonstration projects, but when commercialized will present the lowest emission option.

- Prohibit trucks from idling for more than two minutes as feasible. Clear signage to this effect shall be provided for truck drivers.

  Prohibiting trucks from idling for more than two minutes reduces emissions by limiting the amount of time that trucks operate while idling. This measure could apply to all types and sizes of trucks that spend extended periods of time idling when loading and unloading, staging, or when not in active use. Limiting truck idling times has the potential to decrease local diesel idling emissions from heavy-duty trucks by up to 60 percent at the project-level.

  An idling measure can be enforced by ARB, local air quality management districts and local police departments. BAAQMD has an active enforcement program to regulate ARB's five minute idling measure mostly at sea ports, rail yards and distribution yards within BAAQMD's designated CARE areas.

- Establish truck routes to avoid residential neighborhoods or other land uses serving sensitive populations. A truck route program, along with truck calming, parking and delivery restrictions, should be implemented to direct traffic activity at non-permitted sources of TAC and/or $PM_{2.5}$ emissions, as well as large construction projects. This strategy can reduce exposure from truck activity, but unlike the measures above, it does not directly reduce emissions of toxic air contaminants and particulate matter.

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Appendix F: Geology

TABLE F-1a: PDA and AP Zone Intersect

PDA Name	*Acres*
American Canyon: Highway 29 Corridor	116.0932
Benicia: Northern Gateway	55.9307
Concord: Downtown BART Station Planning	83.4764
Dublin: Downtown Specific Plan Area	81.79
Dublin: Transit Center	464.2016
East 14th Street and Mission Boulevard Mixed Use Corridor	103.5768
Fremont: City Center	156.5633
Fremont: Irvington District	115.0062
Hayward: Downtown	31.4487
Hayward: Mission Corridor	91.7819
Livermore: Vasco Road Station Planning Area	167.8286
Oakland: Transit Oriented Development Corridors	136.3583
Richmond: San Pablo Avenue Corridor	7.6216
San Pablo: San Pablo Avenue	24.6854

TABLE F-1b: Linear Projects in AP Zones

RTP_ID	*length*
21070	0.3154
21116	0.4293
21132	0.8637
21714	0.7321
22009	0.5273
22013	0.5325
22042	3.6084
22063	1.2696
22207	0.3788
22271	1.8395
22664	0.4133
230083	0.1831
230221	0.3403
230222	0.3766
230294	0.1905
230468	0.1892
230597	0.3317
230612	0.1402
230627	0.0567
230656	0.3309
230660	1.2405
230666	0.5436
230686	0.5873
240038	0.1428
240050	0.1890
240057X	0.8343
240059	0.7596
240061	0.7752
240062	0.9208
240123	0.1996
240196	0.1266
240202	0.7616
240254	0.5560
240263	0.2478
240617	0.8377
94152	0.3571
94644	0.3826

TABLE F-1c: Point Projects in AP Zones

RTP_ID
21114
21477
21489
22062
240208
240062

TABLE F-2a: PDAs in a Landslide Area

Name	*Planstatus*	*PTYPE*	*Acres*
Alameda County: Castro Valley BART	Potential	surficial deposits	264.8780
Alameda County: East 14th Street and Mission Boulevard	Planned	few landslides	49.0889
Alameda County: East 14th Street and Mission Boulevard	Planned	surficial deposits	760.9358
Alameda County: Hesperian Boulevard	Planned	surficial deposits	457.7099
Alameda County: Meekland Avenue Corridor	Planned	surficial deposits	171.4846
Alameda: Naval Air Station	Planned/Potential	surficial deposits	1011.5565
Alameda: Naval Air Station	Planned/Potential	water	40.5660
Alameda: Northern Waterfront	Potential	surficial deposits	319.2052
Alameda: Northern Waterfront	Potential	water	9.3380
Albany: San Pablo & Solano Mixed Use Neighborhood	Potential	few landslides	65.0759
Albany: San Pablo & Solano Mixed Use Neighborhood	Potential	surficial deposits	14.9340
American Canyon: Highway 29 Corridor	Potential	few landslides	38.6761
American Canyon: Highway 29 Corridor	Potential	mostly landslide	19.7312
American Canyon: Highway 29 Corridor	Potential	surficial deposits	315.9067
Antioch: Hillcrest eBART Station	Planned	few landslides	34.6442
Antioch: Hillcrest eBART Station	Planned	surficial deposits	347.0616
Antioch: Rivertown Waterfront	Potential	surficial deposits	457.3922
Antioch: Rivertown Waterfront	Potential	water	17.0637
Belmont: Villages of Belmont	Potential	few landslides	9.0613
Belmont: Villages of Belmont	Potential	surficial deposits	68.6695
Benicia: Downtown	Planned	few landslides	4.6362
Benicia: Downtown	Planned	surficial deposits	136.9918
Benicia: Downtown	Planned	water	17.1200
Berkeley: Adeline Street	Potential	few landslides	62.1440
Berkeley: Downtown	Planned	few landslides	155.1571
Berkeley: San Pablo Avenue	Planned	few landslides	9.3485
Berkeley: San Pablo Avenue	Planned	surficial deposits	96.5999
Berkeley: South Shattuck	Planned	few landslides	21.2083
Berkeley: Telegraph Avenue	Potential	few landslides	37.7643
Berkeley: University Avenue	Planned	few landslides	39.3373
Berkeley: University Avenue	Planned	surficial deposits	40.9983
Burlingame: Burlingame El Camino Real	Planned	few landslides	6.4473
Burlingame: Burlingame El Camino Real	Planned	surficial deposits	952.0270
Campbell: Central Redevelopment Area	Planned	surficial deposits	256.9043
City/County Association of Governments of San Mateo County: El Camino Real	Planned	few landslides	129.1343
City/County Association of Governments of San Mateo County: El Camino Real	Planned	mostly landslide	0.2416
City/County Association of Governments of San Mateo County: El Camino Real	Planned	surficial deposits	4407.8765
City/County Association of Governments of San Mateo County: El Camino Real	Planned	water	0.3966
City/County Association of Governments of San Mateo County: El Camino Real	Potential	few landslides	33.0045
City/County Association of Governments of San Mateo County: El Camino Real	Potential	surficial deposits	599.0246
Cloverdale: Downtown/SMART Transit Area	Planned	few landslides	23.7634
Cloverdale: Downtown/SMART Transit Area	Planned	mostly landslide	0.8966
Cloverdale: Downtown/SMART Transit Area	Planned	surficial deposits	473.0077
Cloverdale: Downtown/SMART Transit Area	Planned	water	6.1530
Concord: Community Reuse Area/Los Medanos	Potential	few landslides	5.2051
Concord: Community Reuse Area/Los Medanos	Potential	surficial deposits	2666.3813
Concord: Downtown	Potential	surficial deposits	480.0372
Concord: Downtown	Potential	water	6.4382
Contra Costa County: Contra Costa Centre	Planned	surficial deposits	100.1039
Contra Costa County: Downtown El Sobrante	Potential	few landslides	56.2308
Contra Costa County: Downtown El Sobrante	Potential	mostly landslide	9.4874
Contra Costa County: Downtown El Sobrante	Potential	surficial deposits	105.1055
Contra Costa County: Pittsburg/Bay Point BART Station	Planned	few landslides	49.5985
Contra Costa County: Pittsburg/Bay Point BART Station	Planned	surficial deposits	359.1039
Cotati: Downtown and Cotati Depot	Planned	few landslides	17.6624
Cotati: Downtown and Cotati Depot	Planned	surficial deposits	115.0312
Daly City: Bayshore	Potential	few landslides	119.6479
Daly City: Bayshore	Potential	surficial deposits	258.2458
Daly City: Mission Boulevard	Potential	few landslides	3.9935
Daly City: Mission Boulevard	Potential	surficial deposits	201.6702
Danville: Downtown	Potential	few landslides	79.1390

TABLE F-2a: PDAs in a Landslide Area

Name	*Planstatus*	*PTYPE*	*Acres*
Danville: Downtown	Potential	mostly landslide	1.7909
Danville: Downtown	Potential	surficial deposits	465.5606
Dixon: Downtown	Potential	surficial deposits	138.7018
Dublin: Downtown Specific Plan Area	Planned	surficial deposits	300.3625
Dublin: Town Center	Planned	few landslides	160.3992
Dublin: Town Center	Planned	surficial deposits	514.6229
Dublin: Town Center	Planned	water	0.8176
Dublin: Transit Center/Dublin Crossings	Planned	surficial deposits	279.5936
East Palo Alto: Ravenswood	Potential	surficial deposits	338.7257
East Palo Alto: Ravenswood	Potential	water	2.7173
El Cerrito: San Pablo Avenue Corridor	Planned	few landslides	205.2909
El Cerrito: San Pablo Avenue Corridor	Planned	surficial deposits	44.5337
Emeryville: Mixed-Use Core	Planned	surficial deposits	572.7317
Emeryville: Mixed-Use Core	Planned	water	11.2325
Fairfield: Downtown South (Jefferson Street)	Planned	surficial deposits	289.4518
Fairfield: Fairfield-Vacaville Train Station	Potential	few landslides	786.5803
Fairfield: Fairfield-Vacaville Train Station	Potential	surficial deposits	2132.1511
Fairfield: Fairfield-Vacaville Train Station	Potential	water	16.0383
Fairfield: North Texas Street Core	Potential	surficial deposits	180.4034
Fairfield: West Texas Street Gateway	Planned	surficial deposits	315.9313
Fremont: Centerville	Planned	surficial deposits	1707.7568
Fremont: Centerville	Planned	water	12.9906
Fremont: City Center	Planned	surficial deposits	1067.0295
Fremont: Irvington District	Planned	few landslides	0.1918
Fremont: Irvington District	Planned	surficial deposits	1387.8073
Fremont: Warm Springs		surficial deposits	1628.4609
Gilroy: Downtown	Planned	surficial deposits	254.0389
Hayward: Downtown	Planned	few landslides	40.3322
Hayward: Downtown	Planned	surficial deposits	263.6023
Hayward: Mission Boulevard Corridor	Potential	few landslides	19.4304
Hayward: Mission Boulevard Corridor	Potential	surficial deposits	250.3259
Hayward: South Hayward BART	Planned	few landslides	0.0540
Hayward: South Hayward BART	Planned	surficial deposits	236.3460
Hayward: The Cannery	Planned	surficial deposits	123.9228
Hercules: Central Hercules	Planned	few landslides	125.7242
Hercules: Central Hercules	Planned	mostly landslide	13.5692
Hercules: Central Hercules	Planned	surficial deposits	111.9997
Hercules: Central Hercules	Planned	water	0.6551
Hercules: Waterfront District	Planned	few landslides	75.7147
Hercules: Waterfront District	Planned	mostly landslide	0.4199
Hercules: Waterfront District	Planned	surficial deposits	163.9973
Hercules: Waterfront District	Planned	water	4.1559
Lafayette: Downtown	Planned	few landslides	120.6157
Lafayette: Downtown	Planned	mostly landslide	8.1898
Lafayette: Downtown	Planned	surficial deposits	174.7631
Livermore: Downtown	Planned	surficial deposits	252.2622
Livermore: East Side	Potential	few landslides	112.2446
Livermore: East Side	Potential	mostly landslide	27.8577
Livermore: East Side	Potential	surficial deposits	2187.9723
Livermore: Isabel Avenue/BART Station Planning Area	Potential	few landslides	725.2178
Livermore: Isabel Avenue/BART Station Planning Area	Potential	mostly landslide	42.7149
Livermore: Isabel Avenue/BART Station Planning Area	Potential	surficial deposits	363.1139
Marin County: Urbanized 101 Corridor	Potential	few landslides	818.8172
Marin County: Urbanized 101 Corridor	Potential	mostly landslide	273.9058
Marin County: Urbanized 101 Corridor	Potential	surficial deposits	522.8738
Marin County: Urbanized 101 Corridor	Potential	water	15.6061
Martinez: Downtown	Planned	few landslides	21.6469
Martinez: Downtown	Planned	surficial deposits	169.4773
Menlo Park: El Camino Real Corridor and Downtown	Planned	surficial deposits	156.8009
Millbrae: Transit Station Area	Planned	surficial deposits	119.0047
Milpitas: Transit Area	Planned	surficial deposits	409.3186

TABLE F-2a: PDAs in a Landslide Area

Name	*Planstatus*	*PTYPE*	*Acres*
Moraga: Moraga Center	Potential	few landslides	55.5580
Moraga: Moraga Center	Potential	mostly landslide	0.6107
Moraga: Moraga Center	Potential	surficial deposits	123.6116
Morgan Hill: Downtown	Planned	few landslides	4.9892
Morgan Hill: Downtown	Planned	surficial deposits	176.1219
Mountain View: Downtown	Planned	surficial deposits	692.1368
Mountain View: El Camino Real	Potential	surficial deposits	914.6027
Mountain View: North Bayshore	Potential	surficial deposits	804.2666
Mountain View: San Antonio	Potential	surficial deposits	431.2768
Mountain View: Whisman Station	Potential	surficial deposits	151.4982
Newark: Dumbarton Transit Oriented Development	Potential	surficial deposits	204.2170
Newark: Dumbarton Transit Oriented Development	Potential	water	0.6810
Newark: Old Town Mixed Use Area	Potential	surficial deposits	52.6661
Oakland: Coliseum BART Station Area	Planned	surficial deposits	1013.9774
Oakland: Downtown & Jack London Square	Planned	surficial deposits	770.0909
Oakland: Downtown & Jack London Square	Planned	water	32.9104
Oakland: Eastmont Town Center	Planned	few landslides	172.7549
Oakland: Eastmont Town Center	Planned	surficial deposits	404.7639
Oakland: Fruitvale and Dimond Areas	Planned	few landslides	222.2510
Oakland: Fruitvale and Dimond Areas	Planned	surficial deposits	1287.8654
Oakland: Fruitvale and Dimond Areas	Planned	water	0.0461
Oakland: MacArthur Transit Village	Planned	few landslides	135.4588
Oakland: MacArthur Transit Village	Planned	surficial deposits	800.0297
Oakland: Transit Oriented Development Corridors	Potential	few landslides	4058.2618
Oakland: Transit Oriented Development Corridors	Potential	surficial deposits	3738.5339
Oakland: Transit Oriented Development Corridors	Potential	water	251.9203
Oakland: West Oakland	Planned	surficial deposits	1630.2435
Oakley: Downtown	Potential	surficial deposits	145.9587
Oakley: Employment Area	Potential	surficial deposits	748.8559
Oakley: Employment Area	Potential	water	9.3554
Oakley: Potential Planning Area	Potential	surficial deposits	232.4632
Orinda: Downtown	Potential	few landslides	71.4176
Orinda: Downtown	Potential	mostly landslide	28.6888
Orinda: Downtown	Potential	surficial deposits	54.8636
Palo Alto: California Avenue	Planned	surficial deposits	119.6955
Petaluma: Central, Turning Basin/Lower Reach	Planned	few landslides	0.0100
Petaluma: Central, Turning Basin/Lower Reach	Planned	surficial deposits	408.5497
Petaluma: Central, Turning Basin/Lower Reach	Planned	water	46.8803
Pinole: Appian Way Corridor	Potential	few landslides	140.6308
Pinole: Old Town San Pablo Avenue	Potential	few landslides	139.4565
Pinole: Old Town San Pablo Avenue	Potential	mostly landslide	2.9193
Pinole: Old Town San Pablo Avenue	Potential	surficial deposits	98.0827
Pittsburg: Downtown	Planned	surficial deposits	432.2603
Pittsburg: Downtown	Planned	water	2.7503
Pittsburg: Railroad Avenue eBART Station	Planned	surficial deposits	1070.8750
Pleasant Hill: Buskirk Avenue Corridor	Potential	surficial deposits	319.9862
Pleasant Hill: Diablo Valley College	Potential	few landslides	24.5495
Pleasant Hill: Diablo Valley College	Potential	surficial deposits	33.4469
Pleasanton: Hacienda	Potential	surficial deposits	869.2118
Redwood City: Broadway/Veterans Boulevard Corridor	Planned	surficial deposits	445.3903
Redwood City: Broadway/Veterans Boulevard Corridor	Planned	water	2.8960
Redwood City: Downtown	Planned	surficial deposits	205.0753
Richmond (with Contra Costa County): North Richmond	Potential	surficial deposits	1100.9004
Richmond (with Contra Costa County): North Richmond	Potential	water	24.7369
Richmond: Central Richmond & 23rd Street Corridor	Planned	few landslides	0.2313
Richmond: Central Richmond & 23rd Street Corridor	Planned	surficial deposits	773.5240
Richmond: Central Richmond & 23rd Street Corridor	Potential	surficial deposits	50.9190
Richmond: South Richmond	Planned	few landslides	20.0094
Richmond: South Richmond	Planned	surficial deposits	1333.4493
Richmond: South Richmond	Planned	water	68.2337
Rohnert Park: Central Rohnert Park	Potential	surficial deposits	405.4094

TABLE F-2a: PDAs in a Landslide Area

Name	*Planstatus*	*PTYPE*	*Acres*
Rohnert Park: Sonoma Mountain Village	Planned	surficial deposits	177.5723
San Bruno: Transit Corridors	Planned	surficial deposits	667.8896
San Carlos: Railroad Corridor	Planned	few landslides	1.7447
San Carlos: Railroad Corridor	Planned	surficial deposits	67.4598
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Planned	few landslides	38.0572
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Planned	surficial deposits	330.7707
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Planned	water	4.4569
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Potential	few landslides	67.2519
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Potential	mostly landslide	4.0916
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Potential	surficial deposits	542.3508
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Potential	water	95.8483
San Francisco: 19th Avenue	Potential	few landslides	4.0434
San Francisco: 19th Avenue	Potential	surficial deposits	591.8024
San Francisco: 19th Avenue	Potential	water	1.1626
San Francisco: Balboa Park	Planned	few landslides	30.2661
San Francisco: Balboa Park	Planned	surficial deposits	184.9018
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Planned	few landslides	667.9316
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Planned	mostly landslide	42.0079
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Planned	surficial deposits	2111.5369
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Planned	water	63.8695
San Francisco: Downtown-Van Ness-Geary	Planned	few landslides	550.3034
San Francisco: Downtown-Van Ness-Geary	Planned	surficial deposits	2279.3314
San Francisco: Eastern Neighborhoods	Planned	few landslides	578.5470
San Francisco: Eastern Neighborhoods	Planned	surficial deposits	1622.1860
San Francisco: Eastern Neighborhoods	Planned	water	18.1432
San Francisco: Market & Octavia	Planned	few landslides	44.1432
San Francisco: Market & Octavia	Planned	surficial deposits	353.0235
San Francisco: Mission-San Jose Corridor	Planned	few landslides	336.4257
San Francisco: Mission-San Jose Corridor	Planned	mostly landslide	2.3267
San Francisco: Mission-San Jose Corridor	Planned	surficial deposits	1598.9965
San Francisco: Mission-San Jose Corridor	Planned	water	1.9354
San Francisco: Mission Bay	Planned	few landslides	0.0732
San Francisco: Mission Bay	Planned	surficial deposits	281.1074
San Francisco: Mission Bay	Planned	water	10.5864
San Francisco: Port of San Francisco	Planned	few landslides	5.8412
San Francisco: Port of San Francisco	Planned	surficial deposits	371.7831
San Francisco: Port of San Francisco	Planned	water	81.6501
San Francisco: Transbay Terminal	Planned	few landslides	1.5774
San Francisco: Transbay Terminal	Planned	surficial deposits	51.6084
San Francisco: Treasure Island	Planned	surficial deposits	343.7294
San Francisco: Treasure Island	Planned	water	11.5754
San Jose: Bascom TOD Corridor	Potential	surficial deposits	214.5626
San Jose: Bascom Urban Village	Potential	surficial deposits	117.5482
San Jose: Berryessa Station	Planned	surficial deposits	663.7019
San Jose: Blossom Hill/Snell Urban Village	Potential	surficial deposits	63.9221
San Jose: Camden Urban Village	Potential	surficial deposits	108.2956
San Jose: Capitol Corridor Urban Villages	Potential	surficial deposits	199.1591
San Jose: Capitol/Tully/King Urban Villages	Potential	few landslides	0.1144
San Jose: Capitol/Tully/King Urban Villages	Potential	surficial deposits	253.4481
San Jose: Communications Hill	Planned	few landslides	569.8212
San Jose: Communications Hill	Planned	mostly landslide	24.4909
San Jose: Communications Hill	Planned	surficial deposits	967.1329
San Jose: Cottle Transit Village (Hitachi)	Planned	surficial deposits	194.3019
San Jose: Cottle Transit Village (Hitachi)	Planned	water	1.5259
San Jose: Downtown "Frame"	Planned	surficial deposits	2445.4764
San Jose: East Santa Clara/Alum Rock Corridor	Planned	surficial deposits	859.9644
San Jose: Greater Downtown	Planned	surficial deposits	683.5377
San Jose: North San Jose	Planned	surficial deposits	4978.1668
San Jose: North San Jose	Planned	water	49.9176
San Jose: Oakridge/Almaden Plaza Urban Village	Potential	few landslides	0.1906
San Jose: Oakridge/Almaden Plaza Urban Village	Potential	surficial deposits	378.8244

TABLE F-2a: PDAs in a Landslide Area

Name	*Planstatus*	*PTYPE*	*Acres*
San Jose: Oakridge/Almaden Plaza Urban Village	Potential	water	1.1324
San Jose: Saratoga TOD Corridor	Potential	surficial deposits	158.5267
San Jose: Stevens Creek TOD Corridor	Potential	surficial deposits	258.8681
San Jose: West San Carlos and Southwest Expressway Corridors	Planned	surficial deposits	1296.3644
San Jose: Westgate/El Paseo Urban Village	Potential	surficial deposits	177.4358
San Jose: Winchester Boulevard TOD Corridor	Potential	surficial deposits	298.8694
San Leandro: Bay Fair BART Transit Village	Potential	surficial deposits	168.5753
San Leandro: Downtown Transit Oriented Development	Planned	surficial deposits	469.0007
San Leandro: East 14th Street	Planned	surficial deposits	194.7125
San Mateo: Downtown	Planned	surficial deposits	102.2408
San Mateo: El Camino Real	Planned	surficial deposits	140.3382
San Mateo: Rail Corridor	Planned	surficial deposits	497.7054
San Pablo: San Pablo Avenue & 23rd Street Corridors	Planned	few landslides	4.4747
San Pablo: San Pablo Avenue & 23rd Street Corridors	Planned	surficial deposits	279.8472
San Rafael: Civic Center/North Rafael Town Center	Planned	few landslides	151.1422
San Rafael: Civic Center/North Rafael Town Center	Planned	mostly landslide	8.2585
San Rafael: Civic Center/North Rafael Town Center	Planned	surficial deposits	337.7849
San Rafael: Civic Center/North Rafael Town Center	Planned	water	9.2760
San Rafael: Downtown	Planned	few landslides	31.0154
San Rafael: Downtown	Planned	mostly landslide	46.3536
San Rafael: Downtown	Planned	surficial deposits	419.7113
San Rafael: Downtown	Planned	water	5.4938
San Ramon: City Center	Planned	surficial deposits	455.6079
San Ramon: North Camino Ramon	Potential	few landslides	0.0306
San Ramon: North Camino Ramon	Potential	surficial deposits	302.3642
Santa Clara Valley Transportation Authority: City Cores, Corridors & Station Areas	Potential	few landslides	69.2110
Santa Clara Valley Transportation Authority: City Cores, Corridors & Station Areas	Potential	mostly landslide	9.9589
Santa Clara Valley Transportation Authority: City Cores, Corridors & Station Areas	Potential	surficial deposits	4991.8241
Santa Clara Valley Transportation Authority: City Cores, Corridors & Station Areas	Potential	water	14.8927
Santa Clara: El Camino Real Focus Area	Planned	surficial deposits	316.9240
Santa Clara: Santa Clara Station Focus Area	Planned	surficial deposits	255.5375
Santa Rosa: Downtown Station Area	Planned	surficial deposits	217.7767
Santa Rosa: Downtown Station Area	Planned/Potential	surficial deposits	415.4705
Santa Rosa: Mendocino Avenue/Santa Rosa Avenue Corridor	Planned/Potential	surficial deposits	12.7684
Santa Rosa: Mendocino Avenue/Santa Rosa Avenue Corridor	Potential	few landslides	138.2481
Santa Rosa: Mendocino Avenue/Santa Rosa Avenue Corridor	Potential	mostly landslide	45.8687
Santa Rosa: Mendocino Avenue/Santa Rosa Avenue Corridor	Potential	surficial deposits	1479.1653
Santa Rosa: North Santa Rosa Station	Potential	surficial deposits	988.9740
Santa Rosa: Roseland	Potential	surficial deposits	1381.6322
Santa Rosa: Sebastopol Road Corridor	Planned/Potential	surficial deposits	907.7261
Sebastopol: Core Area	Potential	few landslides	612.4306
Sebastopol: Core Area	Potential	surficial deposits	90.5905
South San Francisco: Downtown	Planned	few landslides	2.0180
South San Francisco: Downtown	Planned	mostly landslide	0.2201
South San Francisco: Downtown	Planned	surficial deposits	189.9587
Suisun City: Downtown & Waterfront	Planned	surficial deposits	371.4059
Suisun City: Downtown & Waterfront	Planned	water	18.8625
Sunnyvale: Downtown & Caltrain Station	Planned	surficial deposits	273.8765
Sunnyvale: East Sunnyvale	Potential	surficial deposits	459.5045
Sunnyvale: El Camino Real Corridor	Planned	surficial deposits	411.3907
Sunnyvale: Lawrence Station Transit Village	Potential	surficial deposits	356.4994
Sunnyvale: Tasman Crossing	Potential	surficial deposits	196.9121
Union City: Intermodal Station District	Planned	surficial deposits	141.9592
Union City: Intermodal Station District	Planned	water	1.0785
Vacaville: Allison Area	Planned	few landslides	35.3412
Vacaville: Allison Area	Planned	surficial deposits	174.7843
Vacaville: Downtown	Planned	few landslides	31.7868
Vacaville: Downtown	Planned	surficial deposits	135.7158
Vallejo: Waterfront & Downtown	Planned	few landslides	48.8973
Vallejo: Waterfront & Downtown	Planned	surficial deposits	131.5965
Vallejo: Waterfront & Downtown	Planned	water	31.6094

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
Alameda County Unincorporated: Castro Valley BART	surficial deposits	207.3377
Alameda County Unincorporated: Hesperian Corridor	surficial deposits	375.719
Alameda County Unincorporated: Meekland Corridor	surficial deposits	142.3724
Alameda: Naval Air Station	surficial deposits	1690.7656
Alameda: Naval Air Station	water	903.9126
Alameda: Northern Waterfront	surficial deposits	275.7157
Alameda: Northern Waterfront	water	12.6602
Albany: San Pablo Avenue & Solano Avenue	few landslides	40.1691
Albany: San Pablo Avenue & Solano Avenue	surficial deposits	5.7281
American Canyon: Highway 29 Corridor	few landslides	35.972
American Canyon: Highway 29 Corridor	mostly landslide	19.1338
American Canyon: Highway 29 Corridor	surficial deposits	244.0677
Antioch: Hillcrest eBART Station	few landslides	34.5926
Antioch: Hillcrest eBART Station	surficial deposits	342.799
Antioch: Rivertown Waterfront	surficial deposits	367.2501
Antioch: Rivertown Waterfront	water	16.0725
Belmont: Villages of Belmont	few landslides	6.7833
Belmont: Villages of Belmont	surficial deposits	46.1308
Benicia: Downtown	few landslides	3.5566
Benicia: Downtown	surficial deposits	98.5157
Benicia: Downtown	water	13.9751
Benicia: Northern Gateway	few landslides	438.0194
Benicia: Northern Gateway	surficial deposits	879.6836
Benicia: Northern Gateway	water	52.207
Berkeley: Adeline Street	few landslides	34.3389
Berkeley: Downtown	few landslides	112.0734
Berkeley: San Pablo Avenue	few landslides	5.3175
Berkeley: San Pablo Avenue	surficial deposits	67.0234
Berkeley: South Shattuck	few landslides	12.8726
Berkeley: Telegraph Avenue	few landslides	28.9904
Berkeley: University Avenue	few landslides	27.1542
Berkeley: University Avenue	surficial deposits	26.7908
Burlingame: Burlingame El Camino Real	few landslides	4.7587
Burlingame: Burlingame El Camino Real	surficial deposits	716.5084
Campbell: Central Redevelopment Area	surficial deposits	213.942
Campbell: VTA City Cores, Corridors & Station Areas	surficial deposits	251.8443
Cloverdale: Downtown/SMART Transit Area	few landslides	22.1469
Cloverdale: Downtown/SMART Transit Area	mostly landslide	0.8966
Cloverdale: Downtown/SMART Transit Area	surficial deposits	486.3156
Cloverdale: Downtown/SMART Transit Area	water	6.1485
Concord: Community Reuse Area	few landslides	22.0931
Concord: Community Reuse Area	surficial deposits	2806.2409
Concord: Downtown BART Station Planning	surficial deposits	372.0435
Concord: Downtown BART Station Planning	water	6.3644
Contra Costa County Unincorporated: Contra Costa Centre	surficial deposits	77.1498
Contra Costa County Unincorporated: Downtown El Sobrante	few landslides	47.6042
Contra Costa County Unincorporated: Downtown El Sobrante	mostly landslide	9.0175
Contra Costa County Unincorporated: Downtown El Sobrante	surficial deposits	90.7694
Contra Costa County Unincorporated: North Richmond	surficial deposits	969.7082
Contra Costa County Unincorporated: North Richmond	water	21.0743
Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	few landslides	5.727
Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	surficial deposits	236.2521
Cotati: Downtown and Cotati Depot	few landslides	17.1288
Cotati: Downtown and Cotati Depot	surficial deposits	109.7929
Cupertino: VTA City Cores, Corridors & Station Areas	surficial deposits	437.8663
Daly City: Bayshore	few landslides	2.5998

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
Daly City: Bayshore	surficial deposits	138.2157
Daly City: Mission Boulevard	few landslides	105.3038
Daly City: Mission Boulevard	surficial deposits	220.4531
Danville: Downtown Danville	few landslides	49.9056
Danville: Downtown Danville	mostly landslide	1.2997
Danville: Downtown Danville	surficial deposits	327.412
Dixon: Downtown Dixon	surficial deposits	103.4727
Dublin: Downtown Specific Plan Area	surficial deposits	252.2367
Dublin: Town Center	few landslides	136.0366
Dublin: Town Center	surficial deposits	434.6902
Dublin: Town Center	water	0.5924
Dublin: Transit Center	few landslides	586.3199
Dublin: Transit Center	mostly landslide	25.2856
Dublin: Transit Center	surficial deposits	655.4007
Dublin: Transit Center	water	1.2266
East 14th Street and Mission Boulevard Mixed Use Corridor	few landslides	33.6589
East 14th Street and Mission Boulevard Mixed Use Corridor	surficial deposits	604.8938
East Palo Alto: Ravenswood	surficial deposits	286.982
East Palo Alto: Ravenswood	water	2.7173
El Cerrito: San Pablo Avenue Corridor	few landslides	160.999
El Cerrito: San Pablo Avenue Corridor	surficial deposits	31.9324
Emeryville: Mixed-Use Core	surficial deposits	445.3574
Emeryville: Mixed-Use Core	water	0.0009
Fairfield: Downtown South (Jefferson Street)	surficial deposits	202.6815
Fairfield: Fairfield-Vacaville Train Station	few landslides	770.3275
Fairfield: Fairfield-Vacaville Train Station	surficial deposits	2049.6063
Fairfield: Fairfield-Vacaville Train Station	water	14.0732
Fairfield: North Texas Street Core	surficial deposits	157.5609
Fairfield: West Texas Street Gateway	surficial deposits	281.8782
Fremont: Centerville	surficial deposits	1366.2016
Fremont: Centerville	water	17.9004
Fremont: City Center	surficial deposits	887.8938
Fremont: Irvington District	surficial deposits	1104.1341
Fremont: South Fremont/Warm Springs	surficial deposits	1441.6464
Gilroy: Downtown	surficial deposits	194.2365
Gilroy: VTA City Cores, Corridors & Station Areas	few landslides	13.0607
Gilroy: VTA City Cores, Corridors & Station Areas	surficial deposits	225.2456
Hayward: Downtown	few landslides	35.9331
Hayward: Downtown	surficial deposits	192.5832
Hayward: Mission Corridor	few landslides	39.2939
Hayward: Mission Corridor	surficial deposits	197.1966
Hayward: South Hayward BART	few landslides	0.0546
Hayward: South Hayward BART	surficial deposits	197.1682
Hayward: The Cannery	surficial deposits	109.6996
Hercules: Central Hercules	few landslides	108.625
Hercules: Central Hercules	mostly landslide	6.6847
Hercules: Central Hercules	surficial deposits	55.6996
Hercules: Central Hercules	water	0.6551
Hercules: Waterfront District	few landslides	59.8852
Hercules: Waterfront District	mostly landslide	0.4206
Hercules: Waterfront District	surficial deposits	140.4182
Hercules: Waterfront District	water	4.1532
Lafayette: Downtown	few landslides	105.4894
Lafayette: Downtown	mostly landslide	6.7111
Lafayette: Downtown	surficial deposits	139.2113
Livermore: Downtown	surficial deposits	190.7063

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
Livermore: Isabel Avenue/BART Station Planning Area	few landslides	631.7265
Livermore: Isabel Avenue/BART Station Planning Area	mostly landslide	42.082
Livermore: Isabel Avenue/BART Station Planning Area	surficial deposits	274.9734
Livermore: Vasco Road Station Planning Area	few landslides	112.2446
Livermore: Vasco Road Station Planning Area	mostly landslide	27.8577
Livermore: Vasco Road Station Planning Area	surficial deposits	2035.8153
Los Altos: VTA City Cores, Corridors & Station Areas	surficial deposits	31.754
Los Gatos: VTA City Cores, Corridors & Station Areas	surficial deposits	104.7011
Marin County Unincorporated: Urbanized 101 Corridor	few landslides	750.3527
Marin County Unincorporated: Urbanized 101 Corridor	mostly landslide	211.3625
Marin County Unincorporated: Urbanized 101 Corridor	surficial deposits	390.4947
Marin County Unincorporated: Urbanized 101 Corridor	water	10.0557
Martinez: Downtown	few landslides	17.5766
Martinez: Downtown	surficial deposits	121.8216
Menlo Park: El Camino Real Corridor and Downtown	surficial deposits	118.8434
Millbrae: Transit Station Area	surficial deposits	66.5166
Milpitas: Transit Area	surficial deposits	368.6894
Milpitas: VTA City Cores, Corridors & Station Areas	surficial deposits	203.5422
Moraga: Moraga Center	few landslides	54.0784
Moraga: Moraga Center	mostly landslide	0.6097
Moraga: Moraga Center	surficial deposits	108.9455
Morgan Hill: Downtown	few landslides	3.6988
Morgan Hill: Downtown	surficial deposits	148.1112
Mountain View: Downtown	surficial deposits	498.9727
Mountain View: El Camino Real Corridor	surficial deposits	745.121
Mountain View: North Bayshore	surficial deposits	692.765
Mountain View: San Antonio Center	surficial deposits	344.2414
Mountain View: Whisman Station	surficial deposits	134.582
Napa: Downtown Napa	surficial deposits	123.4186
Napa: Soscol Gateway Corridor	few landslides	5.6552
Napa: Soscol Gateway Corridor	surficial deposits	309.9753
Napa: Soscol Gateway Corridor	water	30.6726
Newark: Dumbarton Transit Oriented Development	surficial deposits	210.5083
Newark: Dumbarton Transit Oriented Development	water	0.681
Newark: Old Town MIxed Use Area	surficial deposits	39.3943
Oakland: Coliseum BART Station Area	surficial deposits	809.5853
Oakland: Downtown & Jack London Square	surficial deposits	447.7306
Oakland: Downtown & Jack London Square	water	83.7631
Oakland: Eastmont Town Center	few landslides	127.9483
Oakland: Eastmont Town Center	surficial deposits	294.5475
Oakland: Fruitvale & Dimond Areas	few landslides	160.8918
Oakland: Fruitvale & Dimond Areas	surficial deposits	913.0645
Oakland: MacArthur Transit Village	few landslides	98.5587
Oakland: MacArthur Transit Village	surficial deposits	489.8073
Oakland: MacArthur Transit Village	water	0.0044
Oakland: Transit Oriented Development Corridors	few landslides	2836.438
Oakland: Transit Oriented Development Corridors	surficial deposits	2749.8912
Oakland: Transit Oriented Development Corridors	water	242.8465
Oakland: West Oakland	surficial deposits	1119.3491
Oakley: Downtown	surficial deposits	109.9182
Oakley: Employment Area	surficial deposits	763.2225
Oakley: Employment Area	water	48.9846
Oakley: Potential Planning Area	surficial deposits	200.6393
Orinda: Downtown	few landslides	48.7513
Orinda: Downtown	mostly landslide	12.4158
Orinda: Downtown	surficial deposits	38.9779

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
Palo Alto: California Avenue	surficial deposits	87.9248
Palo Alto: VTA City Cores, Corridors & Station Areas	surficial deposits	630.8588
Petaluma: Central, Turning Basin/Lower Reach	few landslides	0.0154
Petaluma: Central, Turning Basin/Lower Reach	surficial deposits	398.5897
Petaluma: Central, Turning Basin/Lower Reach	water	46.6059
Pinole: Appian Way Corridor	few landslides	119.0885
Pinole: Old Town & San Pablo Avenue	few landslides	110.8659
Pinole: Old Town & San Pablo Avenue	mostly landslide	1.9212
Pinole: Old Town & San Pablo Avenue	surficial deposits	77.5917
Pittsburg: Downtown	surficial deposits	340.2618
Pittsburg: Downtown	water	2.192
Pittsburg: Pittsburg/Bay Point BART Station	few landslides	34.8883
Pittsburg: Pittsburg/Bay Point BART Station	surficial deposits	32.0392
Pittsburg: Railroad Avenue eBART Station	surficial deposits	827.5783
Pleasant Hill: Buskirk Avenue Corridor	surficial deposits	227.1194
Pleasant Hill: Diablo Valley College	few landslides	22.97
Pleasant Hill: Diablo Valley College	surficial deposits	29.0615
Pleasanton: Hacienda	surficial deposits	785.8228
Redwood City: Downtown	surficial deposits	132.9414
Redwood City: Veterans Corridor	surficial deposits	310.4357
Redwood City: Veterans Corridor	water	2.2892
Richmond: Central Richmond & 23rd Street	few landslides	0.1962
Richmond: Central Richmond & 23rd Street	surficial deposits	585.0082
Richmond: San Pablo Avenue Corridor	few landslides	132.9729
Richmond: San Pablo Avenue Corridor	surficial deposits	26.4049
Richmond: South Richmond	few landslides	17.9853
Richmond: South Richmond	surficial deposits	1034.8108
Richmond: South Richmond	water	77.1878
Rohnert Park: Central Rohnert Park	surficial deposits	422.7984
Rohnert Park: Sonoma Mountain Village	surficial deposits	176.4365
San Bruno: Transit Corridors	surficial deposits	489.3605
San Francisco/San Mateo Bi-County Area (with City of Brisbane)	few landslides	31.3233
San Francisco/San Mateo Bi-County Area (with City of Brisbane)	surficial deposits	189.1108
San Francisco/San Mateo Bi-County Area (with City of Brisbane)	water	3.5714
San Francisco/San Mateo Bi-County Area (with San Francisco)	few landslides	65.1244
San Francisco/San Mateo Bi-County Area (with San Francisco)	mostly landslide	3.5823
San Francisco/San Mateo Bi-County Area (with San Francisco)	surficial deposits	551.0793
San Francisco/San Mateo Bi-County Area (with San Francisco)	water	90.0114
San Francisco: 19th Avenue	few landslides	2.4572
San Francisco: 19th Avenue	surficial deposits	440.6342
San Francisco: 19th Avenue	water	0.8985
San Francisco: Balboa Park	few landslides	27.9442
San Francisco: Balboa Park	surficial deposits	157.8758
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	few landslides	525.5566
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	mostly landslide	34.9862
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	surficial deposits	1625.9365
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	water	56.225
San Francisco: Downtown-Van Ness-Geary	few landslides	368.8833
San Francisco: Downtown-Van Ness-Geary	surficial deposits	1478.6165
San Francisco: Eastern Neighborhoods	few landslides	394.088
San Francisco: Eastern Neighborhoods	surficial deposits	1139.889
San Francisco: Eastern Neighborhoods	water	17.3923
San Francisco: Market & Octavia	few landslides	28.1992
San Francisco: Market & Octavia	surficial deposits	225.403
San Francisco: Mission-San Jose Corridor	few landslides	252.4485
San Francisco: Mission-San Jose Corridor	mostly landslide	2.3267

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
San Francisco: Mission-San Jose Corridor	surficial deposits	1087.1066
San Francisco: Mission-San Jose Corridor	water	1.5489
San Francisco: Mission Bay	few landslides	0.0732
San Francisco: Mission Bay	surficial deposits	239.2033
San Francisco: Mission Bay	water	8.6898
San Francisco: Port of San Francisco	few landslides	5.0433
San Francisco: Port of San Francisco	surficial deposits	306.2119
San Francisco: Port of San Francisco	water	71.7661
San Francisco: Transbay Terminal	few landslides	1.1859
San Francisco: Transbay Terminal	surficial deposits	37.6661
San Francisco: Treasure Island	surficial deposits	364.554
San Francisco: Treasure Island	water	14.4338
San Jose: Bascom TOD Corridor	surficial deposits	187.9109
San Jose: Bascom Urban Village	surficial deposits	89.2639
San Jose: Berryessa Station	surficial deposits	567.3111
San Jose: Blossom Hill/Snell Urban Village	surficial deposits	58.8778
San Jose: Camden Urban Village	surficial deposits	94.8237
San Jose: Capitol Corridor Urban Villages	surficial deposits	191.9756
San Jose: Capitol/Tully/King Urban Villages	few landslides	0.129
San Jose: Capitol/Tully/King Urban Villages	surficial deposits	235.0708
San Jose: Communications Hill	few landslides	524.6183
San Jose: Communications Hill	mostly landslide	21.316
San Jose: Communications Hill	surficial deposits	783.8508
San Jose: Cottle Transit Village	surficial deposits	269.1984
San Jose: Cottle Transit Village	water	1.5259
San Jose: Downtown "Frame"	surficial deposits	1773.2273
San Jose: East Santa Clara/Alum Rock Corridor	surficial deposits	645.7833
San Jose: Greater Downtown	surficial deposits	455.0212
San Jose: North San Jose	surficial deposits	4142.0045
San Jose: North San Jose	water	45.3495
San Jose: Oakridge/Almaden Plaza Urban Village	few landslides	0.204
San Jose: Oakridge/Almaden Plaza Urban Village	surficial deposits	319.755
San Jose: Oakridge/Almaden Plaza Urban Village	water	0.8285
San Jose: Saratoga TOD Corridor	surficial deposits	112.1978
San Jose: Stevens Creek TOD Corridor	surficial deposits	201.9819
San Jose: VTA City Cores, Corridors & Station Areas	few landslides	28.2372
San Jose: VTA City Cores, Corridors & Station Areas	mostly landslide	4.9085
San Jose: VTA City Cores, Corridors & Station Areas	surficial deposits	2890.528
San Jose: VTA City Cores, Corridors & Station Areas	water	10.5619
San Jose: West San Carlos and Southwest Expressway Corridors	surficial deposits	1022.6212
San Jose: Westgate/El Paseo Urban Village	surficial deposits	143.7582
San Jose: Winchester Boulevard TOD Corridor	surficial deposits	236.1171
San Leandro: Bay Fair BART Transit Village	surficial deposits	139.7647
San Leandro: Downtown Transit Oriented Development	surficial deposits	360.6913
San Leandro: East 14th Street	surficial deposits	156.2181
San Mateo: Downtown	surficial deposits	74.1352
San Mateo: El Camino	surficial deposits	94.9634
San Mateo: Rail Corridor	surficial deposits	366.2377
San Pablo: San Pablo Avenue	few landslides	4.343
San Pablo: San Pablo Avenue	surficial deposits	230.2595
San Rafael: Civic Center/North Rafael Town Center	few landslides	160.3665
San Rafael: Civic Center/North Rafael Town Center	mostly landslide	4.623
San Rafael: Civic Center/North Rafael Town Center	surficial deposits	265.6647
San Rafael: Civic Center/North Rafael Town Center	water	9.276
San Rafael: Downtown	few landslides	25.0533
San Rafael: Downtown	mostly landslide	31.3085

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
San Rafael: Downtown	surficial deposits	288.4989
San Rafael: Downtown	water	2.7392
San Ramon: City Center	surficial deposits	429.1979
San Ramon: North Camino Ramon	surficial deposits	257.8984
Santa Clara: El Camino Real Focus Area	surficial deposits	243.4483
Santa Clara: Santa Clara Station Focus Area	surficial deposits	204.643
Santa Clara: VTA City Cores, Corridors & Station Areas	surficial deposits	491.2698
Santa Clara: VTA City Cores, Corridors & Station Areas	water	1.6104
Santa Rosa: North Santa Rosa Station	surficial deposits	1000.3012
Santa Rosa: Roseland Area	surficial deposits	1374.2546
Santa Rosa: SUB-AREA: Downtown Station Area	surficial deposits	637.5127
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	few landslides	117.7684
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	mostly landslide	47.0341
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	surficial deposits	1515.333
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	water	0.3504
Santa Rosa: SUB-AREA: Sebastopol Road Corridor	surficial deposits	808.4179
Saratoga: VTA City Cores, Corridors & Station Areas	few landslides	6.0761
Saratoga: VTA City Cores, Corridors & Station Areas	surficial deposits	33.6371
Sebastopol: Nexus Area	few landslides	613.4599
Sebastopol: Nexus Area	surficial deposits	90.6033
South San Francisco: Downtown	few landslides	2.7143
South San Francisco: Downtown	surficial deposits	112.2331
SUB-AREA: CCAG/Colma	few landslides	0.2221
SUB-AREA: CCAG/Colma	surficial deposits	296.4085
SUB-AREA: CCAG/Colma	water	0.4799
SUB-AREA: CCAG/Daly City: Mission Boulevard	few landslides	25.4393
SUB-AREA: CCAG/Daly City: Mission Boulevard	surficial deposits	238.3507
SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	surficial deposits	217.0642
SUB-AREA: CCAG/Millbrae: Transit Station Area	surficial deposits	295.2922
SUB-AREA: CCAG/Redwood City: Downtown	surficial deposits	360.6763
SUB-AREA: CCAG/San Bruno: Transit Corridors	surficial deposits	195.7489
SUB-AREA: CCAG/San Carlos: Railroad Corridor	few landslides	72.1683
SUB-AREA: CCAG/San Carlos: Railroad Corridor	mostly landslide	0.1458
SUB-AREA: CCAG/San Carlos: Railroad Corridor	surficial deposits	412.2138
SUB-AREA: CCAG/San Mateo County	few landslides	2.7798
SUB-AREA: CCAG/San Mateo County	surficial deposits	44.56
SUB-AREA: CCAG/San Mateo County (North Fair Oaks)	surficial deposits	407.787
SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	surficial deposits	40.3805
SUB-AREA: CCAG/San Mateo: Downtown	few landslides	22.1255
SUB-AREA: CCAG/San Mateo: Downtown	surficial deposits	732.7435
SUB-AREA: CCAG/South San Francisco	few landslides	6.6465
SUB-AREA: CCAG/South San Francisco	surficial deposits	665.3958
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo Aver	few landslides	163.1918
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo Aver	mostly landslide	1.9524
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo Aver	surficial deposits	104.6068
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo Aver	water	0.197
Suisun City: Downtown & Waterfront	surficial deposits	278.6806
Suisun City: Downtown & Waterfront	water	15.1165
Sunnyvale: Downtown & Caltrain Station	surficial deposits	210.6259
Sunnyvale: East Sunnyvale ITR	surficial deposits	397.4709
Sunnyvale: El Camino Real Corridor	surficial deposits	1130.9425
Sunnyvale: Lawrence Station Transit Village	surficial deposits	306.7239
Sunnyvale: Tasman Station ITR	surficial deposits	161.4774
Sunnyvale: VTA City Cores, Corridors & Station Areas	surficial deposits	550.681
Sunnyvale: VTA City Cores, Corridors & Station Areas	water	0.1305
Union City: Intermodal Station District	surficial deposits	130.8425

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
Union City: Intermodal Station District	water	0.5342
Vacaville: Allison Area	few landslides	26.7807
Vacaville: Allison Area	surficial deposits	150.3395
Vacaville: Downtown	few landslides	27.3351
Vacaville: Downtown	surficial deposits	99.4988
Vallejo: Waterfront & Downtown	few landslides	31.7836
Vallejo: Waterfront & Downtown	surficial deposits	119.1749
Vallejo: Waterfront & Downtown	water	47.2205
VTA City Cores, Corridors & Station Areas	surficial deposits	32.7829
Walnut Creek: West Downtown	few landslides	38.654
Walnut Creek: West Downtown	surficial deposits	145.2325
Windsor: Redevelopment Area	few landslides	302.9921
Windsor: Redevelopment Area	surficial deposits	86.9127

TABLE F-3a: PDAs in a Liquefaction Zone

PDA Name	*Liquifaction Level*	*Acres*
Alameda County Unincorporated: Castro Valley BART	H	49.5875
Alameda County Unincorporated: Castro Valley BART	L	150.8726
Alameda County Unincorporated: Castro Valley BART	VL	6.8777
Alameda County Unincorporated: Hesperian Corridor	M	375.719
Alameda County Unincorporated: Meekland Corridor	M	142.3724
Alameda: Naval Air Station	M	36.5941
Alameda: Naval Air Station	VH	1730.1664
Alameda: Naval Air Station	W	827.9177
Alameda: Northern Waterfront	M	153.0536
Alameda: Northern Waterfront	VH	110.2318
Alameda: Northern Waterfront	W	25.0904
Albany: San Pablo Avenue & Solano Avenue	L	22.5599
Albany: San Pablo Avenue & Solano Avenue	M	23.3372
American Canyon: Highway 29 Corridor	L	274.764
American Canyon: Highway 29 Corridor	M	6.6497
American Canyon: Highway 29 Corridor	VH	0.3382
American Canyon: Highway 29 Corridor	VL	17.4216
Antioch: Hillcrest eBART Station	H	44.8983
Antioch: Hillcrest eBART Station	L	223.5686
Antioch: Hillcrest eBART Station	M	59.2763
Antioch: Hillcrest eBART Station	VH	11.3306
Antioch: Hillcrest eBART Station	VL	38.3179
Antioch: Rivertown Waterfront	H	24.4931
Antioch: Rivertown Waterfront	L	193.3917
Antioch: Rivertown Waterfront	M	103.6853
Antioch: Rivertown Waterfront	VH	45.257
Antioch: Rivertown Waterfront	W	16.4956
Belmont: Villages of Belmont	L	3.4347
Belmont: Villages of Belmont	M	45.2555
Belmont: Villages of Belmont	VH	0.6279
Belmont: Villages of Belmont	VL	3.5961
Benicia: Downtown	VH	31.1135
Benicia: Downtown	VL	81.4499
Benicia: Downtown	W	3.484
Benicia: Northern Gateway	H	101.2774
Benicia: Northern Gateway	L	241.7479
Benicia: Northern Gateway	VH	285.2739
Benicia: Northern Gateway	VL	741.6109
Berkeley: Adeline Street	L	34.3389
Berkeley: Downtown	L	112.0321
Berkeley: Downtown	M	0.0413
Berkeley: San Pablo Avenue	L	46.8914
Berkeley: San Pablo Avenue	M	25.4496
Berkeley: South Shattuck	L	12.8726
Berkeley: Telegraph Avenue	L	28.9904
Berkeley: University Avenue	L	25.2988
Berkeley: University Avenue	M	28.6462
Burlingame: Burlingame El Camino Real	H	126.4678
Burlingame: Burlingame El Camino Real	L	92.6071
Burlingame: Burlingame El Camino Real	M	216.5474
Burlingame: Burlingame El Camino Real	VH	26.6702
Burlingame: Burlingame El Camino Real	VL	258.9745
Campbell: Central Redevelopment Area	M	202.1585
Campbell: Central Redevelopment Area	VH	9.2912
Campbell: Central Redevelopment Area	W	2.4923
Campbell: VTA City Cores, Corridors & Station Areas	H	9.5004
Campbell: VTA City Cores, Corridors & Station Areas	L	49.5999
Campbell: VTA City Cores, Corridors & Station Areas	M	163.675
Campbell: VTA City Cores, Corridors & Station Areas	VH	18.9345
Campbell: VTA City Cores, Corridors & Station Areas	W	10.1344
Cloverdale: Downtown/SMART Transit Area	H	7.1301
Cloverdale: Downtown/SMART Transit Area	L	339.3158

TABLE F-3a: PDAs in a Liquefaction Zone

PDA Name	*Liquifaction Level*	*Acres*
Cloverdale: Downtown/SMART Transit Area	VH	122.756
Cloverdale: Downtown/SMART Transit Area	VL	32.9971
Cloverdale: Downtown/SMART Transit Area	W	13.3087
Concord: Community Reuse Area	H	270.0656
Concord: Community Reuse Area	L	1326.0515
Concord: Community Reuse Area	M	376.7508
Concord: Community Reuse Area	VH	30.8056
Concord: Community Reuse Area	VL	824.6606
Concord: Downtown BART Station Planning	H	44.4596
Concord: Downtown BART Station Planning	L	315.8103
Concord: Downtown BART Station Planning	VH	13.3722
Concord: Downtown BART Station Planning	VL	4.7659
Contra Costa County Unincorporated: Contra Costa Centre	H	35.3295
Contra Costa County Unincorporated: Contra Costa Centre	L	41.673
Contra Costa County Unincorporated: Contra Costa Centre	VH	0.1473
Contra Costa County Unincorporated: Downtown El Sobrante	M	86.6226
Contra Costa County Unincorporated: Downtown El Sobrante	VL	60.7686
Contra Costa County Unincorporated: North Richmond	H	199.9061
Contra Costa County Unincorporated: North Richmond	M	437.9326
Contra Costa County Unincorporated: North Richmond	VH	352.0217
Contra Costa County Unincorporated: North Richmond	W	0.9222
Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	L	172.4217
Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	M	53.7449
Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	VH	3.921
Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	VL	10.1509
Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	W	1.7406
Cotati: Downtown and Cotati Depot	H	29.5378
Cotati: Downtown and Cotati Depot	VL	97.3838
Cupertino: VTA City Cores, Corridors & Station Areas	L	341.4822
Cupertino: VTA City Cores, Corridors & Station Areas	M	94.1254
Cupertino: VTA City Cores, Corridors & Station Areas	VH	2.2588
Daly City: Bayshore	H	0.9266
Daly City: Bayshore	L	3.4693
Daly City: Bayshore	VL	136.4195
Daly City: Mission Boulevard	L	128.6681
Daly City: Mission Boulevard	VH	1.5359
Daly City: Mission Boulevard	VL	195.2838
Daly City: Mission Boulevard	W	0.269
Danville: Downtown Danville	H	92.1985
Danville: Downtown Danville	M	205.1056
Danville: Downtown Danville	VH	16.2
Danville: Downtown Danville	VL	65.1132
Dixon: Downtown Dixon	L	7.1525
Dixon: Downtown Dixon	M	96.3201
Dublin: Downtown Specific Plan Area	H	40.9046
Dublin: Downtown Specific Plan Area	L	44.4451
Dublin: Downtown Specific Plan Area	M	166.887
Dublin: Town Center	H	11.4459
Dublin: Town Center	L	159.2602
Dublin: Town Center	M	200.9825
Dublin: Town Center	VH	7.1737
Dublin: Town Center	VL	191.8076
Dublin: Town Center	W	0.6493
Dublin: Transit Center	H	28.0161
Dublin: Transit Center	L	331.7917
Dublin: Transit Center	M	286.0263
Dublin: Transit Center	VH	3.9331
Dublin: Transit Center	VL	615.8717
Dublin: Transit Center	W	2.5937
East 14th Street and Mission Boulevard Mixed Use Corridor	H	9.0488
East 14th Street and Mission Boulevard Mixed Use Corridor	L	200.3024
East 14th Street and Mission Boulevard Mixed Use Corridor	M	374.2776

TABLE F-3a: PDAs in a Liquefaction Zone

PDA Name	*Liquifaction Level*	*Acres*
East 14th Street and Mission Boulevard Mixed Use Corridor	VL	54.9239
East Palo Alto: Ravenswood	H	18.21
East Palo Alto: Ravenswood	L	14.3268
East Palo Alto: Ravenswood	M	241.1582
East Palo Alto: Ravenswood	VH	9.0808
East Palo Alto: Ravenswood	W	6.9235
El Cerrito: San Pablo Avenue Corridor	L	5.287
El Cerrito: San Pablo Avenue Corridor	M	180.3284
El Cerrito: San Pablo Avenue Corridor	VH	3.9452
El Cerrito: San Pablo Avenue Corridor	VL	3.3708
Emeryville: Mixed-Use Core	H	172.4008
Emeryville: Mixed-Use Core	L	31.3267
Emeryville: Mixed-Use Core	M	121.6166
Emeryville: Mixed-Use Core	VH	120.0141
Fairfield: Downtown South (Jefferson Street)	H	196.9487
Fairfield: Downtown South (Jefferson Street)	L	3.3506
Fairfield: Downtown South (Jefferson Street)	M	0.57
Fairfield: Downtown South (Jefferson Street)	VH	1.809
Fairfield: Downtown South (Jefferson Street)	W	0.0032
Fairfield: Fairfield-Vacaville Train Station	L	1493.0497
Fairfield: Fairfield-Vacaville Train Station	M	72.4235
Fairfield: Fairfield-Vacaville Train Station	VL	1248.8791
Fairfield: Fairfield-Vacaville Train Station	W	19.6546
Fairfield: North Texas Street Core	H	7.7405
Fairfield: North Texas Street Core	L	149.8204
Fairfield: West Texas Street Gateway	H	179.2274
Fairfield: West Texas Street Gateway	L	2.8909
Fairfield: West Texas Street Gateway	M	96.3287
Fairfield: West Texas Street Gateway	VH	3.4312
Fremont: Centerville	H	14.3813
Fremont: Centerville	L	139.1962
Fremont: Centerville	M	556.2753
Fremont: Centerville	VH	657.3677
Fremont: Centerville	W	16.8815
Fremont: City Center	H	26.9375
Fremont: City Center	L	326.4353
Fremont: City Center	M	527.1075
Fremont: City Center	W	7.4135
Fremont: Irvington District	H	100.3388
Fremont: Irvington District	L	982.6845
Fremont: Irvington District	VH	13.9397
Fremont: Irvington District	VL	7.1711
Fremont: South Fremont/Warm Springs	H	271.0753
Fremont: South Fremont/Warm Springs	L	1170.5711
Gilroy: Downtown	L	95.6399
Gilroy: Downtown	M	98.5966
Gilroy: VTA City Cores, Corridors & Station Areas	L	208.8952
Gilroy: VTA City Cores, Corridors & Station Areas	M	24.3626
Gilroy: VTA City Cores, Corridors & Station Areas	VL	5.0484
Hayward: Downtown	H	100.7116
Hayward: Downtown	L	0.7019
Hayward: Downtown	M	96.5674
Hayward: Downtown	VH	4.4214
Hayward: Downtown	VL	26.1141
Hayward: Mission Corridor	H	0.5994
Hayward: Mission Corridor	L	123.1192
Hayward: Mission Corridor	M	59.0251
Hayward: Mission Corridor	VL	53.7468
Hayward: South Hayward BART	H	83.1759
Hayward: South Hayward BART	L	108.5607
Hayward: South Hayward BART	VL	5.4861
Hayward: The Cannery	M	109.6996

TABLE F-3a: PDAs in a Liquefaction Zone

PDA Name	*Liquifaction Level*	*Acres*
Hercules: Central Hercules	H	50.9885
Hercules: Central Hercules	VL	120.676
Hercules: Waterfront District	H	111.4356
Hercules: Waterfront District	VH	12.0797
Hercules: Waterfront District	VL	81.3618
Lafayette: Downtown	L	26.8725
Lafayette: Downtown	M	142.794
Lafayette: Downtown	VL	81.7454
Livermore: Downtown	M	190.7063
Livermore: Isabel Avenue/BART Station Planning Area	H	45.7988
Livermore: Isabel Avenue/BART Station Planning Area	L	434.5413
Livermore: Isabel Avenue/BART Station Planning Area	M	153.6636
Livermore: Isabel Avenue/BART Station Planning Area	VH	76.9349
Livermore: Isabel Avenue/BART Station Planning Area	VL	237.8432
Livermore: Vasco Road Station Planning Area	H	6.5864
Livermore: Vasco Road Station Planning Area	L	1704.6452
Livermore: Vasco Road Station Planning Area	M	349.2233
Livermore: Vasco Road Station Planning Area	VH	12.2294
Livermore: Vasco Road Station Planning Area	VL	101.8879
Livermore: Vasco Road Station Planning Area	W	1.3454
Los Altos: VTA City Cores, Corridors & Station Areas	H	0.0015
Los Altos: VTA City Cores, Corridors & Station Areas	L	31.7525
Los Gatos: VTA City Cores, Corridors & Station Areas	H	2.9725
Los Gatos: VTA City Cores, Corridors & Station Areas	L	91.3108
Los Gatos: VTA City Cores, Corridors & Station Areas	M	8.9613
Los Gatos: VTA City Cores, Corridors & Station Areas	VH	1.4565
Marin County Unincorporated: Urbanized 101 Corridor	H	103.1895
Marin County Unincorporated: Urbanized 101 Corridor	L	34.5254
Marin County Unincorporated: Urbanized 101 Corridor	M	154.7479
Marin County Unincorporated: Urbanized 101 Corridor	VH	168.5677
Marin County Unincorporated: Urbanized 101 Corridor	VL	891.0133
Marin County Unincorporated: Urbanized 101 Corridor	W	10.2217
Martinez: Downtown	H	78.336
Martinez: Downtown	VH	31.4589
Martinez: Downtown	VL	29.6033
Menlo Park: El Camino Real Corridor and Downtown	M	118.3121
Menlo Park: El Camino Real Corridor and Downtown	VH	0.5313
Millbrae: Transit Station Area	H	12.6737
Millbrae: Transit Station Area	L	1.4621
Millbrae: Transit Station Area	VH	31.8963
Millbrae: Transit Station Area	VL	20.4844
Milpitas: Transit Area	H	31.3981
Milpitas: Transit Area	L	0.8038
Milpitas: Transit Area	M	336.4875
Milpitas: VTA City Cores, Corridors & Station Areas	H	121.3898
Milpitas: VTA City Cores, Corridors & Station Areas	L	0.458
Milpitas: VTA City Cores, Corridors & Station Areas	M	81.6943
Moraga: Moraga Center	H	99.485
Moraga: Moraga Center	M	1.8897
Moraga: Moraga Center	VL	62.2588
Morgan Hill: Downtown	L	139.7513
Morgan Hill: Downtown	M	10.201
Morgan Hill: Downtown	VL	1.8578
Mountain View: Downtown	H	1.4216
Mountain View: Downtown	L	0.7595
Mountain View: Downtown	M	489.4192
Mountain View: Downtown	VH	7.3724
Mountain View: El Camino Real Corridor	L	137.3173
Mountain View: El Camino Real Corridor	M	587.1114
Mountain View: El Camino Real Corridor	VH	20.6923
Mountain View: North Bayshore	H	662.2122
Mountain View: North Bayshore	L	8.4444

TABLE F-3a: PDAs in a Liquefaction Zone

PDA Name	*Liquifaction Level*	*Acres*
Mountain View: North Bayshore	VH	19.9044
Mountain View: North Bayshore	W	2.204
Mountain View: San Antonio Center	H	22.6157
Mountain View: San Antonio Center	L	136.8867
Mountain View: San Antonio Center	M	184.2306
Mountain View: San Antonio Center	VH	0.5084
Mountain View: Whisman Station	M	134.582
Napa: Downtown Napa	H	54.1971
Napa: Downtown Napa	L	12.523
Napa: Downtown Napa	VH	56.0693
Napa: Downtown Napa	W	0.6292
Napa: Soscol Gateway Corridor	H	111.2966
Napa: Soscol Gateway Corridor	L	5.8679
Napa: Soscol Gateway Corridor	VH	185.1058
Napa: Soscol Gateway Corridor	VL	24.6772
Napa: Soscol Gateway Corridor	W	19.3556
Newark: Dumbarton Transit Oriented Development	H	69.6168
Newark: Dumbarton Transit Oriented Development	L	132.1339
Newark: Dumbarton Transit Oriented Development	VL	7.0379
Newark: Dumbarton Transit Oriented Development	W	2.4006
Newark: Old Town MIxed Use Area	L	39.3943
Oakland: Coliseum BART Station Area	H	223.9592
Oakland: Coliseum BART Station Area	M	281.3264
Oakland: Coliseum BART Station Area	VH	304.2997
Oakland: Downtown & Jack London Square	L	38.9907
Oakland: Downtown & Jack London Square	M	333.4012
Oakland: Downtown & Jack London Square	VH	100.4548
Oakland: Downtown & Jack London Square	W	58.6471
Oakland: Eastmont Town Center	L	1.6821
Oakland: Eastmont Town Center	M	310.7232
Oakland: Eastmont Town Center	VL	110.0905
Oakland: Fruitvale & Dimond Areas	H	19.3975
Oakland: Fruitvale & Dimond Areas	L	237.5104
Oakland: Fruitvale & Dimond Areas	M	789.3387
Oakland: Fruitvale & Dimond Areas	VH	27.7098
Oakland: MacArthur Transit Village	L	67.7918
Oakland: MacArthur Transit Village	M	515.353
Oakland: MacArthur Transit Village	VL	5.2256
Oakland: Transit Oriented Development Corridors	H	305.2169
Oakland: Transit Oriented Development Corridors	L	2117.3223
Oakland: Transit Oriented Development Corridors	M	2302.1042
Oakland: Transit Oriented Development Corridors	VH	307.148
Oakland: Transit Oriented Development Corridors	VL	619.2934
Oakland: Transit Oriented Development Corridors	W	178.0908
Oakland: West Oakland	H	10.5387
Oakland: West Oakland	M	854.7182
Oakland: West Oakland	VH	254.0922
Oakley: Downtown	H	0.682
Oakley: Downtown	M	109.2363
Oakley: Employment Area	H	45.2353
Oakley: Employment Area	M	658.0904
Oakley: Employment Area	VH	65.2669
Oakley: Employment Area	W	43.6145
Oakley: Potential Planning Area	H	17.3788
Oakley: Potential Planning Area	M	182.8316
Oakley: Potential Planning Area	VH	0.4289
Orinda: Downtown	M	0.9868
Orinda: Downtown	VL	99.1582
Palo Alto: California Avenue	H	20.3703
Palo Alto: California Avenue	L	0.5418
Palo Alto: California Avenue	M	65.417
Palo Alto: California Avenue	VH	1.5957

TABLE F-3a: PDAs in a Liquefaction Zone

PDA Name	*Liquifaction Level*	*Acres*
Palo Alto: VTA City Cores, Corridors & Station Areas	H	8.6245
Palo Alto: VTA City Cores, Corridors & Station Areas	L	28.1621
Palo Alto: VTA City Cores, Corridors & Station Areas	M	589.6871
Palo Alto: VTA City Cores, Corridors & Station Areas	VH	4.3851
Petaluma: Central, Turning Basin/Lower Reach	H	141.3409
Petaluma: Central, Turning Basin/Lower Reach	M	4.9469
Petaluma: Central, Turning Basin/Lower Reach	VH	297.1788
Petaluma: Central, Turning Basin/Lower Reach	VL	1.7443
Pinole: Appian Way Corridor	VL	119.0885
Pinole: Old Town & San Pablo Avenue	H	0.2411
Pinole: Old Town & San Pablo Avenue	M	82.6905
Pinole: Old Town & San Pablo Avenue	VL	107.4472
Pittsburg: Downtown	L	195.6457
Pittsburg: Downtown	M	104.209
Pittsburg: Downtown	VH	28.2088
Pittsburg: Downtown	W	14.3903
Pittsburg: Pittsburg/Bay Point BART Station	L	25.6958
Pittsburg: Pittsburg/Bay Point BART Station	VH	2.0357
Pittsburg: Pittsburg/Bay Point BART Station	VL	39.1961
Pittsburg: Railroad Avenue eBART Station	L	628.5371
Pittsburg: Railroad Avenue eBART Station	M	191.7456
Pittsburg: Railroad Avenue eBART Station	VH	7.2955
Pleasant Hill: Buskirk Avenue Corridor	H	173.2451
Pleasant Hill: Buskirk Avenue Corridor	L	53.8743
Pleasant Hill: Diablo Valley College	H	35.9536
Pleasant Hill: Diablo Valley College	VH	6.311
Pleasant Hill: Diablo Valley College	VL	9.767
Pleasanton: Hacienda	H	494.4213
Pleasanton: Hacienda	L	23.9682
Pleasanton: Hacienda	M	267.4333
Redwood City: Downtown	H	104.8376
Redwood City: Downtown	L	3.655
Redwood City: Downtown	M	3.7399
Redwood City: Downtown	VH	20.0416
Redwood City: Downtown	W	0.6673
Redwood City: Veterans Corridor	H	164.909
Redwood City: Veterans Corridor	L	7.2612
Redwood City: Veterans Corridor	VH	136.1789
Redwood City: Veterans Corridor	W	4.3758
Richmond: Central Richmond & 23rd Street	H	46.4248
Richmond: Central Richmond & 23rd Street	M	538.7796
Richmond: San Pablo Avenue Corridor	L	0.0388
Richmond: San Pablo Avenue Corridor	M	44.9278
Richmond: San Pablo Avenue Corridor	VL	114.4112
Richmond: South Richmond	H	194.4458
Richmond: South Richmond	M	369.8293
Richmond: South Richmond	VH	516.4021
Richmond: South Richmond	VL	27.6397
Richmond: South Richmond	W	21.667
Rohnert Park: Central Rohnert Park	H	422.7984
Rohnert Park: Sonoma Mountain Village	H	115.4103
Rohnert Park: Sonoma Mountain Village	M	60.4504
Rohnert Park: Sonoma Mountain Village	VL	0.5758
San Bruno: Transit Corridors	H	36.6553
San Bruno: Transit Corridors	L	0.3811
San Bruno: Transit Corridors	VH	22.9428
San Bruno: Transit Corridors	VL	428.3679
San Bruno: Transit Corridors	W	1.0134
San Francisco/San Mateo Bi-County Area (with City of Brisbane)	L	15.09
San Francisco/San Mateo Bi-County Area (with City of Brisbane)	VH	18.6306
San Francisco/San Mateo Bi-County Area (with City of Brisbane)	VL	189.4063
San Francisco/San Mateo Bi-County Area (with City of Brisbane)	W	0.8786

TABLE F-3a: PDAs in a Liquefaction Zone

PDA Name	*Liquifaction Level*	*Acres*
San Francisco/San Mateo Bi-County Area (with San Francisco)	L	8.1502
San Francisco/San Mateo Bi-County Area (with San Francisco)	VH	543.9171
San Francisco/San Mateo Bi-County Area (with San Francisco)	VL	50.7457
San Francisco/San Mateo Bi-County Area (with San Francisco)	W	106.9845
San Francisco: 19th Avenue	L	44.3602
San Francisco: 19th Avenue	VL	399.6297
San Francisco: Balboa Park	L	3.496
San Francisco: Balboa Park	VL	182.3241
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	H	173.8571
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	L	100.2231
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	VH	1107.1853
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	VL	844.3397
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	W	17.099
San Francisco: Downtown-Van Ness-Geary	H	3.0323
San Francisco: Downtown-Van Ness-Geary	L	13.2271
San Francisco: Downtown-Van Ness-Geary	M	657.7603
San Francisco: Downtown-Van Ness-Geary	VH	632.401
San Francisco: Downtown-Van Ness-Geary	VL	541.079
San Francisco: Eastern Neighborhoods	L	3.5407
San Francisco: Eastern Neighborhoods	M	161.8784
San Francisco: Eastern Neighborhoods	VH	705.8949
San Francisco: Eastern Neighborhoods	VL	673.7215
San Francisco: Eastern Neighborhoods	W	6.3339
San Francisco: Market & Octavia	M	124.4476
San Francisco: Market & Octavia	VH	72.4153
San Francisco: Market & Octavia	VL	56.7393
San Francisco: Mission-San Jose Corridor	H	0.0054
San Francisco: Mission-San Jose Corridor	L	35.6081
San Francisco: Mission-San Jose Corridor	VH	28.1236
San Francisco: Mission-San Jose Corridor	VL	1276.5902
San Francisco: Mission-San Jose Corridor	W	3.1033
San Francisco: Mission Bay	M	9.4164
San Francisco: Mission Bay	VH	235.1533
San Francisco: Mission Bay	VL	3.3751
San Francisco: Mission Bay	W	0.0214
San Francisco: Port of San Francisco	M	0.1119
San Francisco: Port of San Francisco	VH	368.6771
San Francisco: Port of San Francisco	VL	0.0166
San Francisco: Port of San Francisco	W	14.2158
San Francisco: Transbay Terminal	VH	37.3801
San Francisco: Transbay Terminal	VL	1.472
San Francisco: Treasure Island	VH	378.9878
San Jose: Bascom TOD Corridor	M	187.9109
San Jose: Bascom Urban Village	L	61.1403
San Jose: Bascom Urban Village	M	27.7803
San Jose: Bascom Urban Village	VH	0.3433
San Jose: Berryessa Station	H	57.1923
San Jose: Berryessa Station	L	0.4128
San Jose: Berryessa Station	M	381.0517
San Jose: Berryessa Station	VH	128.6543
San Jose: Blossom Hill/Snell Urban Village	H	38.9018
San Jose: Blossom Hill/Snell Urban Village	M	19.976
San Jose: Camden Urban Village	L	94.8237
San Jose: Capitol Corridor Urban Villages	L	40.2468
San Jose: Capitol Corridor Urban Villages	M	149.4498
San Jose: Capitol Corridor Urban Villages	VH	2.279
San Jose: Capitol/Tully/King Urban Villages	H	93.1542
San Jose: Capitol/Tully/King Urban Villages	L	23.1766
San Jose: Capitol/Tully/King Urban Villages	M	118.869
San Jose: Communications Hill	H	361.7953
San Jose: Communications Hill	L	10.9509
San Jose: Communications Hill	M	393.0255

TABLE F-3a: PDAs in a Liquefaction Zone

PDA Name	*Liquifaction Level*	*Acres*
San Jose: Communications Hill	VL	563.098
San Jose: Communications Hill	W	0.9154
San Jose: Cottle Transit Village	M	270.7243
San Jose: Downtown "Frame"	H	93.2221
San Jose: Downtown "Frame"	L	7.556
San Jose: Downtown "Frame"	M	1639.4824
San Jose: Downtown "Frame"	VH	32.9669
San Jose: East Santa Clara/Alum Rock Corridor	H	262.8195
San Jose: East Santa Clara/Alum Rock Corridor	L	21.5549
San Jose: East Santa Clara/Alum Rock Corridor	M	343.3211
San Jose: East Santa Clara/Alum Rock Corridor	VH	18.0878
San Jose: Greater Downtown	M	444.4038
San Jose: Greater Downtown	VH	10.6174
San Jose: North San Jose	H	876.4051
San Jose: North San Jose	L	47.9405
San Jose: North San Jose	M	1119.8099
San Jose: North San Jose	VH	2127.5172
San Jose: North San Jose	W	15.6812
San Jose: Oakridge/Almaden Plaza Urban Village	L	1.9874
San Jose: Oakridge/Almaden Plaza Urban Village	M	244.9797
San Jose: Oakridge/Almaden Plaza Urban Village	VH	73.625
San Jose: Oakridge/Almaden Plaza Urban Village	VL	0.0006
San Jose: Oakridge/Almaden Plaza Urban Village	W	0.1949
San Jose: Saratoga TOD Corridor	M	112.1978
San Jose: Stevens Creek TOD Corridor	M	200.2793
San Jose: Stevens Creek TOD Corridor	VH	1.7026
San Jose: VTA City Cores, Corridors & Station Areas	H	785.7722
San Jose: VTA City Cores, Corridors & Station Areas	L	124.9944
San Jose: VTA City Cores, Corridors & Station Areas	M	1918.2035
San Jose: VTA City Cores, Corridors & Station Areas	VH	48.5817
San Jose: VTA City Cores, Corridors & Station Areas	VL	52.1213
San Jose: VTA City Cores, Corridors & Station Areas	W	4.5624
San Jose: West San Carlos and Southwest Expressway Corridors	H	20.0544
San Jose: West San Carlos and Southwest Expressway Corridors	M	987.4571
San Jose: West San Carlos and Southwest Expressway Corridors	VH	15.1097
San Jose: Westgate/El Paseo Urban Village	M	143.7582
San Jose: Winchester Boulevard TOD Corridor	M	236.1171
San Leandro: Bay Fair BART Transit Village	H	4.6636
San Leandro: Bay Fair BART Transit Village	M	135.1011
San Leandro: Downtown Transit Oriented Development	M	350.0488
San Leandro: Downtown Transit Oriented Development	VH	10.6425
San Leandro: East 14th Street	M	155.0431
San Leandro: East 14th Street	VH	1.175
San Mateo: Downtown	L	48.3652
San Mateo: Downtown	M	21.7118
San Mateo: Downtown	VH	4.0581
San Mateo: El Camino	L	16.999
San Mateo: El Camino	M	69.817
San Mateo: El Camino	VH	2.4084
San Mateo: El Camino	VL	5.739
San Mateo: Rail Corridor	L	33.9086
San Mateo: Rail Corridor	M	153.936
San Mateo: Rail Corridor	VH	178.3931
San Pablo: San Pablo Avenue	L	85.749
San Pablo: San Pablo Avenue	M	138.0263
San Pablo: San Pablo Avenue	VL	10.8272
San Rafael: Civic Center/North Rafael Town Center	H	137.3546
San Rafael: Civic Center/North Rafael Town Center	M	56.4973
San Rafael: Civic Center/North Rafael Town Center	VH	61.2931
San Rafael: Civic Center/North Rafael Town Center	VL	184.7853
San Rafael: Downtown	H	111.7001
San Rafael: Downtown	L	14.6674

TABLE F-3a: PDAs in a Liquefaction Zone

PDA Name	*Liquifaction Level*	*Acres*
San Rafael: Downtown	VH	159.7846
San Rafael: Downtown	VL	58.9297
San Rafael: Downtown	W	2.5182
San Ramon: City Center	H	142.4373
San Ramon: City Center	L	156.1283
San Ramon: City Center	M	130.6323
San Ramon: North Camino Ramon	H	56.0207
San Ramon: North Camino Ramon	M	201.5195
San Ramon: North Camino Ramon	VL	0.3582
Santa Clara: El Camino Real Focus Area	L	1.7716
Santa Clara: El Camino Real Focus Area	M	241.6767
Santa Clara: Santa Clara Station Focus Area	H	39.8024
Santa Clara: Santa Clara Station Focus Area	M	164.8406
Santa Clara: VTA City Cores, Corridors & Station Areas	H	174.7592
Santa Clara: VTA City Cores, Corridors & Station Areas	M	225.8984
Santa Clara: VTA City Cores, Corridors & Station Areas	VH	84.148
Santa Clara: VTA City Cores, Corridors & Station Areas	W	8.0746
Santa Rosa: North Santa Rosa Station	L	60.0141
Santa Rosa: North Santa Rosa Station	M	766.5404
Santa Rosa: North Santa Rosa Station	VL	173.7467
Santa Rosa: Roseland Area	M	830.0318
Santa Rosa: Roseland Area	VL	544.2229
Santa Rosa: SUB-AREA: Downtown Station Area	M	637.5127
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	L	106.0726
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	M	1155.6058
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	VL	418.8075
Santa Rosa: SUB-AREA: Sebastopol Road Corridor	M	587.4329
Santa Rosa: SUB-AREA: Sebastopol Road Corridor	VL	220.985
Saratoga: VTA City Cores, Corridors & Station Areas	L	17.6293
Saratoga: VTA City Cores, Corridors & Station Areas	M	22.0839
Sebastopol: Nexus Area	M	11.6106
Sebastopol: Nexus Area	VH	60.9231
Sebastopol: Nexus Area	VL	631.5295
South San Francisco: Downtown	H	4.3553
South San Francisco: Downtown	L	1.0796
South San Francisco: Downtown	VH	0.1496
South San Francisco: Downtown	VL	109.3629
SUB-AREA: CCAG/Colma	H	54.0212
SUB-AREA: CCAG/Colma	L	2.4011
SUB-AREA: CCAG/Colma	VL	238.4946
SUB-AREA: CCAG/Colma	W	2.1935
SUB-AREA: CCAG/Daly City: Mission Boulevard	H	4.7066
SUB-AREA: CCAG/Daly City: Mission Boulevard	L	1.7401
SUB-AREA: CCAG/Daly City: Mission Boulevard	VL	257.3433
SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	M	214.6246
SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	VH	2.4397
SUB-AREA: CCAG/Millbrae: Transit Station Area	H	55.1064
SUB-AREA: CCAG/Millbrae: Transit Station Area	L	7.0443
SUB-AREA: CCAG/Millbrae: Transit Station Area	VH	15.8425
SUB-AREA: CCAG/Millbrae: Transit Station Area	VL	217.299
SUB-AREA: CCAG/Redwood City: Downtown	H	40.6631
SUB-AREA: CCAG/Redwood City: Downtown	L	1.0424
SUB-AREA: CCAG/Redwood City: Downtown	M	312.7513
SUB-AREA: CCAG/Redwood City: Downtown	VH	6.2194
SUB-AREA: CCAG/San Bruno: Transit Corridors	H	14.7263
SUB-AREA: CCAG/San Bruno: Transit Corridors	L	8.3149
SUB-AREA: CCAG/San Bruno: Transit Corridors	VL	172.7077
SUB-AREA: CCAG/San Carlos: Railroad Corridor	L	41.6517
SUB-AREA: CCAG/San Carlos: Railroad Corridor	M	348.6012
SUB-AREA: CCAG/San Carlos: Railroad Corridor	VH	9.2497
SUB-AREA: CCAG/San Carlos: Railroad Corridor	VL	85.0253
SUB-AREA: CCAG/San Mateo County	H	0.1769

TABLE F-3a: PDAs in a Liquefaction Zone

PDA Name	*Liquifaction Level*	*Acres*
SUB-AREA: CCAG/San Mateo County	M	11.1925
SUB-AREA: CCAG/San Mateo County	VL	35.9704
SUB-AREA: CCAG/San Mateo County (North Fair Oaks)	H	252.1952
SUB-AREA: CCAG/San Mateo County (North Fair Oaks)	M	155.5919
SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	H	5.6693
SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	VL	34.7113
SUB-AREA: CCAG/San Mateo: Downtown	L	254.2918
SUB-AREA: CCAG/San Mateo: Downtown	M	303.1392
SUB-AREA: CCAG/San Mateo: Downtown	VH	40.048
SUB-AREA: CCAG/San Mateo: Downtown	VL	157.3899
SUB-AREA: CCAG/South San Francisco	H	171.9678
SUB-AREA: CCAG/South San Francisco	L	33.5674
SUB-AREA: CCAG/South San Francisco	VL	466.507
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo	H	62.605
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo	M	9.2703
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo	VH	6.3264
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo	VL	191.7463
Suisun City: Downtown & Waterfront	H	37.2484
Suisun City: Downtown & Waterfront	VH	247.7139
Suisun City: Downtown & Waterfront	W	8.8347
Sunnyvale: Downtown & Caltrain Station	M	210.6259
Sunnyvale: East Sunnyvale ITR	H	277.8362
Sunnyvale: East Sunnyvale ITR	M	119.6347
Sunnyvale: El Camino Real Corridor	L	473.5989
Sunnyvale: El Camino Real Corridor	M	657.3437
Sunnyvale: Lawrence Station Transit Village	H	19.7877
Sunnyvale: Lawrence Station Transit Village	L	2.2078
Sunnyvale: Lawrence Station Transit Village	M	284.7283
Sunnyvale: Tasman Station ITR	H	161.4774
Sunnyvale: VTA City Cores, Corridors & Station Areas	H	342.3113
Sunnyvale: VTA City Cores, Corridors & Station Areas	L	114.1188
Sunnyvale: VTA City Cores, Corridors & Station Areas	M	94.3814
Union City: Intermodal Station District	H	50.9429
Union City: Intermodal Station District	L	76.0885
Union City: Intermodal Station District	M	2.8081
Union City: Intermodal Station District	W	1.5373
Vacaville: Allison Area	L	2.3241
Vacaville: Allison Area	M	132.8361
Vacaville: Allison Area	VH	8.7417
Vacaville: Allison Area	VL	33.2184
Vacaville: Downtown	L	4.9058
Vacaville: Downtown	M	76.1055
Vacaville: Downtown	VH	3.5282
Vacaville: Downtown	VL	42.2944
Vallejo: Waterfront & Downtown	H	46.4378
Vallejo: Waterfront & Downtown	VH	85.0296
Vallejo: Waterfront & Downtown	VL	48.3805
Vallejo: Waterfront & Downtown	W	18.3311
VTA City Cores, Corridors & Station Areas	L	32.7829
Walnut Creek: West Downtown	VL	183.8865
Windsor: Redevelopment Area	H	119.1437
Windsor: Redevelopment Area	L	11.5157
Windsor: Redevelopment Area	M	0.8913
Windsor: Redevelopment Area	VH	7.4924
Windsor: Redevelopment Area	VL	250.8617

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
Alameda County Unincorporated: Castro Valley BART	surficial deposits	207.3377
Alameda County Unincorporated: Hesperian Corridor	surficial deposits	375.719
Alameda County Unincorporated: Meekland Corridor	surficial deposits	142.3724
Alameda: Naval Air Station	surficial deposits	1690.7656
Alameda: Naval Air Station	water	903.9126
Alameda: Northern Waterfront	surficial deposits	275.7157
Alameda: Northern Waterfront	water	12.6602
Albany: San Pablo Avenue & Solano Avenue	few landslides	40.1691
Albany: San Pablo Avenue & Solano Avenue	surficial deposits	5.7281
American Canyon: Highway 29 Corridor	few landslides	35.972
American Canyon: Highway 29 Corridor	mostly landslide	19.1338
American Canyon: Highway 29 Corridor	surficial deposits	244.0677
Antioch: Hillcrest eBART Station	few landslides	34.5926
Antioch: Hillcrest eBART Station	surficial deposits	342.799
Antioch: Rivertown Waterfront	surficial deposits	367.2501
Antioch: Rivertown Waterfront	water	16.0725
Belmont: Villages of Belmont	few landslides	6.7833
Belmont: Villages of Belmont	surficial deposits	46.1308
Benicia: Downtown	few landslides	3.5566
Benicia: Downtown	surficial deposits	98.5157
Benicia: Downtown	water	13.9751
Benicia: Northern Gateway	few landslides	438.0194
Benicia: Northern Gateway	surficial deposits	879.6836
Benicia: Northern Gateway	water	52.207
Berkeley: Adeline Street	few landslides	34.3389
Berkeley: Downtown	few landslides	112.0734
Berkeley: San Pablo Avenue	few landslides	5.3175
Berkeley: San Pablo Avenue	surficial deposits	67.0234
Berkeley: South Shattuck	few landslides	12.8726
Berkeley: Telegraph Avenue	few landslides	28.9904
Berkeley: University Avenue	few landslides	27.1542
Berkeley: University Avenue	surficial deposits	26.7908
Burlingame: Burlingame El Camino Real	few landslides	4.7587
Burlingame: Burlingame El Camino Real	surficial deposits	716.5084
Campbell: Central Redevelopment Area	surficial deposits	213.942
Campbell: VTA City Cores, Corridors & Station Areas	surficial deposits	251.8443
Cloverdale: Downtown/SMART Transit Area	few landslides	22.1469
Cloverdale: Downtown/SMART Transit Area	mostly landslide	0.8966
Cloverdale: Downtown/SMART Transit Area	surficial deposits	486.3156
Cloverdale: Downtown/SMART Transit Area	water	6.1485
Concord: Community Reuse Area	few landslides	22.0931
Concord: Community Reuse Area	surficial deposits	2806.2409
Concord: Downtown BART Station Planning	surficial deposits	372.0435
Concord: Downtown BART Station Planning	water	6.3644
Contra Costa County Unincorporated: Contra Costa Centre	surficial deposits	77.1498
Contra Costa County Unincorporated: Downtown El Sobrante	few landslides	47.6042
Contra Costa County Unincorporated: Downtown El Sobrante	mostly landslide	9.0175
Contra Costa County Unincorporated: Downtown El Sobrante	surficial deposits	90.7694
Contra Costa County Unincorporated: North Richmond	surficial deposits	969.7082
Contra Costa County Unincorporated: North Richmond	water	21.0743
Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	few landslides	5.727
Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	surficial deposits	236.2521
Cotati: Downtown and Cotati Depot	few landslides	17.1288
Cotati: Downtown and Cotati Depot	surficial deposits	109.7929
Cupertino: VTA City Cores, Corridors & Station Areas	surficial deposits	437.8663
Daly City: Bayshore	few landslides	2.5998

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
Daly City: Bayshore	surficial deposits	138.2157
Daly City: Mission Boulevard	few landslides	105.3038
Daly City: Mission Boulevard	surficial deposits	220.4531
Danville: Downtown Danville	few landslides	49.9056
Danville: Downtown Danville	mostly landslide	1.2997
Danville: Downtown Danville	surficial deposits	327.412
Dixon: Downtown Dixon	surficial deposits	103.4727
Dublin: Downtown Specific Plan Area	surficial deposits	252.2367
Dublin: Town Center	few landslides	136.0366
Dublin: Town Center	surficial deposits	434.6902
Dublin: Town Center	water	0.5924
Dublin: Transit Center	few landslides	586.3199
Dublin: Transit Center	mostly landslide	25.2856
Dublin: Transit Center	surficial deposits	655.4007
Dublin: Transit Center	water	1.2266
East 14th Street and Mission Boulevard Mixed Use Corridor	few landslides	33.6589
East 14th Street and Mission Boulevard Mixed Use Corridor	surficial deposits	604.8938
East Palo Alto: Ravenswood	surficial deposits	286.982
East Palo Alto: Ravenswood	water	2.7173
El Cerrito: San Pablo Avenue Corridor	few landslides	160.999
El Cerrito: San Pablo Avenue Corridor	surficial deposits	31.9324
Emeryville: Mixed-Use Core	surficial deposits	445.3574
Emeryville: Mixed-Use Core	water	0.0009
Fairfield: Downtown South (Jefferson Street)	surficial deposits	202.6815
Fairfield: Fairfield-Vacaville Train Station	few landslides	770.3275
Fairfield: Fairfield-Vacaville Train Station	surficial deposits	2049.6063
Fairfield: Fairfield-Vacaville Train Station	water	14.0732
Fairfield: North Texas Street Core	surficial deposits	157.5609
Fairfield: West Texas Street Gateway	surficial deposits	281.8782
Fremont: Centerville	surficial deposits	1366.2016
Fremont: Centerville	water	17.9004
Fremont: City Center	surficial deposits	887.8938
Fremont: Irvington District	surficial deposits	1104.1341
Fremont: South Fremont/Warm Springs	surficial deposits	1441.6464
Gilroy: Downtown	surficial deposits	194.2365
Gilroy: VTA City Cores, Corridors & Station Areas	few landslides	13.0607
Gilroy: VTA City Cores, Corridors & Station Areas	surficial deposits	225.2456
Hayward: Downtown	few landslides	35.9331
Hayward: Downtown	surficial deposits	192.5832
Hayward: Mission Corridor	few landslides	39.2939
Hayward: Mission Corridor	surficial deposits	197.1966
Hayward: South Hayward BART	few landslides	0.0546
Hayward: South Hayward BART	surficial deposits	197.1682
Hayward: The Cannery	surficial deposits	109.6996
Hercules: Central Hercules	few landslides	108.625
Hercules: Central Hercules	mostly landslide	6.6847
Hercules: Central Hercules	surficial deposits	55.6996
Hercules: Central Hercules	water	0.6551
Hercules: Waterfront District	few landslides	59.8852
Hercules: Waterfront District	mostly landslide	0.4206
Hercules: Waterfront District	surficial deposits	140.4182
Hercules: Waterfront District	water	4.1532
Lafayette: Downtown	few landslides	105.4894
Lafayette: Downtown	mostly landslide	6.7111
Lafayette: Downtown	surficial deposits	139.2113
Livermore: Downtown	surficial deposits	190.7063

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
Livermore: Isabel Avenue/BART Station Planning Area	few landslides	631.7265
Livermore: Isabel Avenue/BART Station Planning Area	mostly landslide	42.082
Livermore: Isabel Avenue/BART Station Planning Area	surficial deposits	274.9734
Livermore: Vasco Road Station Planning Area	few landslides	112.2446
Livermore: Vasco Road Station Planning Area	mostly landslide	27.8577
Livermore: Vasco Road Station Planning Area	surficial deposits	2035.8153
Los Altos: VTA City Cores, Corridors & Station Areas	surficial deposits	31.754
Los Gatos: VTA City Cores, Corridors & Station Areas	surficial deposits	104.7011
Marin County Unincorporated: Urbanized 101 Corridor	few landslides	750.3527
Marin County Unincorporated: Urbanized 101 Corridor	mostly landslide	211.3625
Marin County Unincorporated: Urbanized 101 Corridor	surficial deposits	390.4947
Marin County Unincorporated: Urbanized 101 Corridor	water	10.0557
Martinez: Downtown	few landslides	17.5766
Martinez: Downtown	surficial deposits	121.8216
Menlo Park: El Camino Real Corridor and Downtown	surficial deposits	118.8434
Millbrae: Transit Station Area	surficial deposits	66.5166
Milpitas: Transit Area	surficial deposits	368.6894
Milpitas: VTA City Cores, Corridors & Station Areas	surficial deposits	203.5422
Moraga: Moraga Center	few landslides	54.0784
Moraga: Moraga Center	mostly landslide	0.6097
Moraga: Moraga Center	surficial deposits	108.9455
Morgan Hill: Downtown	few landslides	3.6988
Morgan Hill: Downtown	surficial deposits	148.1112
Mountain View: Downtown	surficial deposits	498.9727
Mountain View: El Camino Real Corridor	surficial deposits	745.121
Mountain View: North Bayshore	surficial deposits	692.765
Mountain View: San Antonio Center	surficial deposits	344.2414
Mountain View: Whisman Station	surficial deposits	134.582
Napa: Downtown Napa	surficial deposits	123.4186
Napa: Soscol Gateway Corridor	few landslides	5.6552
Napa: Soscol Gateway Corridor	surficial deposits	309.9753
Napa: Soscol Gateway Corridor	water	30.6726
Newark: Dumbarton Transit Oriented Development	surficial deposits	210.5083
Newark: Dumbarton Transit Oriented Development	water	0.681
Newark: Old Town MIxed Use Area	surficial deposits	39.3943
Oakland: Coliseum BART Station Area	surficial deposits	809.5853
Oakland: Downtown & Jack London Square	surficial deposits	447.7306
Oakland: Downtown & Jack London Square	water	83.7631
Oakland: Eastmont Town Center	few landslides	127.9483
Oakland: Eastmont Town Center	surficial deposits	294.5475
Oakland: Fruitvale & Dimond Areas	few landslides	160.8918
Oakland: Fruitvale & Dimond Areas	surficial deposits	913.0645
Oakland: MacArthur Transit Village	few landslides	98.5587
Oakland: MacArthur Transit Village	surficial deposits	489.8073
Oakland: MacArthur Transit Village	water	0.0044
Oakland: Transit Oriented Development Corridors	few landslides	2836.438
Oakland: Transit Oriented Development Corridors	surficial deposits	2749.8912
Oakland: Transit Oriented Development Corridors	water	242.8465
Oakland: West Oakland	surficial deposits	1119.3491
Oakley: Downtown	surficial deposits	109.9182
Oakley: Employment Area	surficial deposits	763.2225
Oakley: Employment Area	water	48.9846
Oakley: Potential Planning Area	surficial deposits	200.6393
Orinda: Downtown	few landslides	48.7513
Orinda: Downtown	mostly landslide	12.4158
Orinda: Downtown	surficial deposits	38.9779

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
Palo Alto: California Avenue	surficial deposits	87.9248
Palo Alto: VTA City Cores, Corridors & Station Areas	surficial deposits	630.8588
Petaluma: Central, Turning Basin/Lower Reach	few landslides	0.0154
Petaluma: Central, Turning Basin/Lower Reach	surficial deposits	398.5897
Petaluma: Central, Turning Basin/Lower Reach	water	46.6059
Pinole: Appian Way Corridor	few landslides	119.0885
Pinole: Old Town & San Pablo Avenue	few landslides	110.8659
Pinole: Old Town & San Pablo Avenue	mostly landslide	1.9212
Pinole: Old Town & San Pablo Avenue	surficial deposits	77.5917
Pittsburg: Downtown	surficial deposits	340.2618
Pittsburg: Downtown	water	2.192
Pittsburg: Pittsburg/Bay Point BART Station	few landslides	34.8883
Pittsburg: Pittsburg/Bay Point BART Station	surficial deposits	32.0392
Pittsburg: Railroad Avenue eBART Station	surficial deposits	827.5783
Pleasant Hill: Buskirk Avenue Corridor	surficial deposits	227.1194
Pleasant Hill: Diablo Valley College	few landslides	22.97
Pleasant Hill: Diablo Valley College	surficial deposits	29.0615
Pleasanton: Hacienda	surficial deposits	785.8228
Redwood City: Downtown	surficial deposits	132.9414
Redwood City: Veterans Corridor	surficial deposits	310.4357
Redwood City: Veterans Corridor	water	2.2892
Richmond: Central Richmond & 23rd Street	few landslides	0.1962
Richmond: Central Richmond & 23rd Street	surficial deposits	585.0082
Richmond: San Pablo Avenue Corridor	few landslides	132.9729
Richmond: San Pablo Avenue Corridor	surficial deposits	26.4049
Richmond: South Richmond	few landslides	17.9853
Richmond: South Richmond	surficial deposits	1034.8108
Richmond: South Richmond	water	77.1878
Rohnert Park: Central Rohnert Park	surficial deposits	422.7984
Rohnert Park: Sonoma Mountain Village	surficial deposits	176.4365
San Bruno: Transit Corridors	surficial deposits	489.3605
San Francisco/San Mateo Bi-County Area (with City of Brisbane)	few landslides	31.3233
San Francisco/San Mateo Bi-County Area (with City of Brisbane)	surficial deposits	189.1108
San Francisco/San Mateo Bi-County Area (with City of Brisbane)	water	3.5714
San Francisco/San Mateo Bi-County Area (with San Francisco)	few landslides	65.1244
San Francisco/San Mateo Bi-County Area (with San Francisco)	mostly landslide	3.5823
San Francisco/San Mateo Bi-County Area (with San Francisco)	surficial deposits	551.0793
San Francisco/San Mateo Bi-County Area (with San Francisco)	water	90.0114
San Francisco: 19th Avenue	few landslides	2.4572
San Francisco: 19th Avenue	surficial deposits	440.6342
San Francisco: 19th Avenue	water	0.8985
San Francisco: Balboa Park	few landslides	27.9442
San Francisco: Balboa Park	surficial deposits	157.8758
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	few landslides	525.5566
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	mostly landslide	34.9862
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	surficial deposits	1625.9365
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	water	56.225
San Francisco: Downtown-Van Ness-Geary	few landslides	368.8833
San Francisco: Downtown-Van Ness-Geary	surficial deposits	1478.6165
San Francisco: Eastern Neighborhoods	few landslides	394.088
San Francisco: Eastern Neighborhoods	surficial deposits	1139.889
San Francisco: Eastern Neighborhoods	water	17.3923
San Francisco: Market & Octavia	few landslides	28.1992
San Francisco: Market & Octavia	surficial deposits	225.403
San Francisco: Mission-San Jose Corridor	few landslides	252.4485
San Francisco: Mission-San Jose Corridor	mostly landslide	2.3267

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
San Francisco: Mission-San Jose Corridor	surficial deposits	1087.1066
San Francisco: Mission-San Jose Corridor	water	1.5489
San Francisco: Mission Bay	few landslides	0.0732
San Francisco: Mission Bay	surficial deposits	239.2033
San Francisco: Mission Bay	water	8.6898
San Francisco: Port of San Francisco	few landslides	5.0433
San Francisco: Port of San Francisco	surficial deposits	306.2119
San Francisco: Port of San Francisco	water	71.7661
San Francisco: Transbay Terminal	few landslides	1.1859
San Francisco: Transbay Terminal	surficial deposits	37.6661
San Francisco: Treasure Island	surficial deposits	364.554
San Francisco: Treasure Island	water	14.4338
San Jose: Bascom TOD Corridor	surficial deposits	187.9109
San Jose: Bascom Urban Village	surficial deposits	89.2639
San Jose: Berryessa Station	surficial deposits	567.3111
San Jose: Blossom Hill/Snell Urban Village	surficial deposits	58.8778
San Jose: Camden Urban Village	surficial deposits	94.8237
San Jose: Capitol Corridor Urban Villages	surficial deposits	191.9756
San Jose: Capitol/Tully/King Urban Villages	few landslides	0.129
San Jose: Capitol/Tully/King Urban Villages	surficial deposits	235.0708
San Jose: Communications Hill	few landslides	524.6183
San Jose: Communications Hill	mostly landslide	21.316
San Jose: Communications Hill	surficial deposits	783.8508
San Jose: Cottle Transit Village	surficial deposits	269.1984
San Jose: Cottle Transit Village	water	1.5259
San Jose: Downtown "Frame"	surficial deposits	1773.2273
San Jose: East Santa Clara/Alum Rock Corridor	surficial deposits	645.7833
San Jose: Greater Downtown	surficial deposits	455.0212
San Jose: North San Jose	surficial deposits	4142.0045
San Jose: North San Jose	water	45.3495
San Jose: Oakridge/Almaden Plaza Urban Village	few landslides	0.204
San Jose: Oakridge/Almaden Plaza Urban Village	surficial deposits	319.755
San Jose: Oakridge/Almaden Plaza Urban Village	water	0.8285
San Jose: Saratoga TOD Corridor	surficial deposits	112.1978
San Jose: Stevens Creek TOD Corridor	surficial deposits	201.9819
San Jose: VTA City Cores, Corridors & Station Areas	few landslides	28.2372
San Jose: VTA City Cores, Corridors & Station Areas	mostly landslide	4.9085
San Jose: VTA City Cores, Corridors & Station Areas	surficial deposits	2890.528
San Jose: VTA City Cores, Corridors & Station Areas	water	10.5619
San Jose: West San Carlos and Southwest Expressway Corridors	surficial deposits	1022.6212
San Jose: Westgate/El Paseo Urban Village	surficial deposits	143.7582
San Jose: Winchester Boulevard TOD Corridor	surficial deposits	236.1171
San Leandro: Bay Fair BART Transit Village	surficial deposits	139.7647
San Leandro: Downtown Transit Oriented Development	surficial deposits	360.6913
San Leandro: East 14th Street	surficial deposits	156.2181
San Mateo: Downtown	surficial deposits	74.1352
San Mateo: El Camino	surficial deposits	94.9634
San Mateo: Rail Corridor	surficial deposits	366.2377
San Pablo: San Pablo Avenue	few landslides	4.343
San Pablo: San Pablo Avenue	surficial deposits	230.2595
San Rafael: Civic Center/North Rafael Town Center	few landslides	160.3665
San Rafael: Civic Center/North Rafael Town Center	mostly landslide	4.623
San Rafael: Civic Center/North Rafael Town Center	surficial deposits	265.6647
San Rafael: Civic Center/North Rafael Town Center	water	9.276
San Rafael: Downtown	few landslides	25.0533
San Rafael: Downtown	mostly landslide	31.3085

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
San Rafael: Downtown	surficial deposits	288.4989
San Rafael: Downtown	water	2.7392
San Ramon: City Center	surficial deposits	429.1979
San Ramon: North Camino Ramon	surficial deposits	257.8984
Santa Clara: El Camino Real Focus Area	surficial deposits	243.4483
Santa Clara: Santa Clara Station Focus Area	surficial deposits	204.643
Santa Clara: VTA City Cores, Corridors & Station Areas	surficial deposits	491.2698
Santa Clara: VTA City Cores, Corridors & Station Areas	water	1.6104
Santa Rosa: North Santa Rosa Station	surficial deposits	1000.3012
Santa Rosa: Roseland Area	surficial deposits	1374.2546
Santa Rosa: SUB-AREA: Downtown Station Area	surficial deposits	637.5127
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	few landslides	117.7684
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	mostly landslide	47.0341
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	surficial deposits	1515.333
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	water	0.3504
Santa Rosa: SUB-AREA: Sebastopol Road Corridor	surficial deposits	808.4179
Saratoga: VTA City Cores, Corridors & Station Areas	few landslides	6.0761
Saratoga: VTA City Cores, Corridors & Station Areas	surficial deposits	33.6371
Sebastopol: Nexus Area	few landslides	613.4599
Sebastopol: Nexus Area	surficial deposits	90.6033
South San Francisco: Downtown	few landslides	2.7143
South San Francisco: Downtown	surficial deposits	112.2331
SUB-AREA: CCAG/Colma	few landslides	0.2221
SUB-AREA: CCAG/Colma	surficial deposits	296.4085
SUB-AREA: CCAG/Colma	water	0.4799
SUB-AREA: CCAG/Daly City: Mission Boulevard	few landslides	25.4393
SUB-AREA: CCAG/Daly City: Mission Boulevard	surficial deposits	238.3507
SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	surficial deposits	217.0642
SUB-AREA: CCAG/Millbrae: Transit Station Area	surficial deposits	295.2922
SUB-AREA: CCAG/Redwood City: Downtown	surficial deposits	360.6763
SUB-AREA: CCAG/San Bruno: Transit Corridors	surficial deposits	195.7489
SUB-AREA: CCAG/San Carlos: Railroad Corridor	few landslides	72.1683
SUB-AREA: CCAG/San Carlos: Railroad Corridor	mostly landslide	0.1458
SUB-AREA: CCAG/San Carlos: Railroad Corridor	surficial deposits	412.2138
SUB-AREA: CCAG/San Mateo County	few landslides	2.7798
SUB-AREA: CCAG/San Mateo County	surficial deposits	44.56
SUB-AREA: CCAG/San Mateo County (North Fair Oaks)	surficial deposits	407.787
SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	surficial deposits	40.3805
SUB-AREA: CCAG/San Mateo: Downtown	few landslides	22.1255
SUB-AREA: CCAG/San Mateo: Downtown	surficial deposits	732.7435
SUB-AREA: CCAG/South San Francisco	few landslides	6.6465
SUB-AREA: CCAG/South San Francisco	surficial deposits	665.3958
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo Aver	few landslides	163.1918
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo Aver	mostly landslide	1.9524
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo Aver	surficial deposits	104.6068
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo Aver	water	0.197
Suisun City: Downtown & Waterfront	surficial deposits	278.6806
Suisun City: Downtown & Waterfront	water	15.1165
Sunnyvale: Downtown & Caltrain Station	surficial deposits	210.6259
Sunnyvale: East Sunnyvale ITR	surficial deposits	397.4709
Sunnyvale: El Camino Real Corridor	surficial deposits	1130.9425
Sunnyvale: Lawrence Station Transit Village	surficial deposits	306.7239
Sunnyvale: Tasman Station ITR	surficial deposits	161.4774
Sunnyvale: VTA City Cores, Corridors & Station Areas	surficial deposits	550.681
Sunnyvale: VTA City Cores, Corridors & Station Areas	water	0.1305
Union City: Intermodal Station District	surficial deposits	130.8425

TABLE F-2a: PDAs in a Landslide Area

PDA Name	*Potential for Landslide*	*Acres*
Union City: Intermodal Station District	water	0.5342
Vacaville: Allison Area	few landslides	26.7807
Vacaville: Allison Area	surficial deposits	150.3395
Vacaville: Downtown	few landslides	27.3351
Vacaville: Downtown	surficial deposits	99.4988
Vallejo: Waterfront & Downtown	few landslides	31.7836
Vallejo: Waterfront & Downtown	surficial deposits	119.1749
Vallejo: Waterfront & Downtown	water	47.2205
VTA City Cores, Corridors & Station Areas	surficial deposits	32.7829
Walnut Creek: West Downtown	few landslides	38.654
Walnut Creek: West Downtown	surficial deposits	145.2325
Windsor: Redevelopment Area	few landslides	302.9921
Windsor: Redevelopment Area	surficial deposits	86.9127

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
21012	few landslides	0.5039
21012	mostly landslide	0.0191
21012	water	1.1973
21013	few landslides	1.0932
21013	surficial deposits	1.8744
21013	unmapped	1.2767
21013	water	17.1638
21070	few landslides	0.4310
21070	mostly landslide	1.1866
21070	surficial deposits	1.5270
21116	few landslides	1.7882
21116	mostly landslide	0.3004
21116	surficial deposits	11.0986
21131	surficial deposits	3.1226
21131	water	0.0036
21132	surficial deposits	4.5788
21132	water	0.1137
21211	surficial deposits	9.0415
21214	surficial deposits	0.3281
21320	few landslides	0.5385
21320	mostly landslide	0.1003
21320	water	1.1957
21325	mostly landslide	0.0224
21325	surficial deposits	1.0505
21325	water	0.1524
21473	few landslides	0.5017
21473	surficial deposits	1.1943
21484	surficial deposits	1.9825
21510	few landslides	0.1294
21510	surficial deposits	1.4234
21549	few landslides	2.3049
21549	surficial deposits	2.4147
21549	water	0.1065
21604	few landslides	0.2304
21604	mostly landslide	0.2852
21604	surficial deposits	2.7540
21608	surficial deposits	3.9673
21612	surficial deposits	0.9357
21613	few landslides	2.9114
21613	surficial deposits	4.0271
21613	water	0.1172
21627	few landslides	1.5907
21627	mostly landslide	0.5219
21627	surficial deposits	46.6259
21714	few landslides	1.3829

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
21714	mostly landslide	0.0183
21714	surficial deposits	3.5097
21714	unmapped	2.5958
21760	few landslides	0.0523
21760	surficial deposits	8.5106
21892	surficial deposits	0.8636
21893	few landslides	0.8866
21893	mostly landslide	0.6523
21893	surficial deposits	1.1648
21902	few landslides	3.4409
21902	surficial deposits	1.5921
21922	surficial deposits	1.7484
22001	few landslides	4.0253
22001	mostly landslide	1.0313
22001	surficial deposits	32.9857
22001	water	0.2785
22009	surficial deposits	43.7770
22009	water	0.5249
22010	surficial deposits	0.2171
22013	few landslides	2.2292
22013	mostly landslide	0.8998
22013	surficial deposits	0.4374
22042	few landslides	3.4878
22042	mostly landslide	0.0565
22042	surficial deposits	10.0786
22063	few landslides	0.3515
22063	surficial deposits	5.2283
22118	surficial deposits	0.3883
22120	surficial deposits	0.0270
22120	water	22.8749
22122	water	8.6361
22134	few landslides	0.1246
22134	surficial deposits	3.3891
22175	surficial deposits	1.1160
22179	surficial deposits	3.4290
22180	surficial deposits	2.7633
22186	surficial deposits	3.1309
22191	few landslides	0.3337
22191	surficial deposits	0.9897
22204	few landslides	0.9214
22204	surficial deposits	0.0773
22207	few landslides	1.6392
22207	mostly landslide	0.0887
22207	surficial deposits	0.4140
22227	few landslides	0.0539

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
22227	surficial deposits	0.7042
22230	few landslides	1.5524
22232	surficial deposits	2.1698
22271	few landslides	1.8291
22271	surficial deposits	0.0105
22351	surficial deposits	2.9605
22353	few landslides	0.9385
22353	surficial deposits	4.7939
22400	few landslides	1.8593
22400	surficial deposits	9.5368
22400	unmapped	5.5524
22400	water	0.1878
22415	few landslides	0.0502
22415	surficial deposits	4.3044
22415	water	0.0359
22455	surficial deposits	11.3479
22509	surficial deposits	0.1333
22509	water	15.1472
22511	surficial deposits	0.0390
22511	water	6.8941
22512	water	1.8523
22602	mostly landslide	0.4103
22602	surficial deposits	2.1538
22604	few landslides	4.6553
22604	mostly landslide	0.6432
22604	surficial deposits	4.4857
22604	water	0.1050
22636	surficial deposits	1.1389
22636	water	3.2376
22637	surficial deposits	0.6578
22655	surficial deposits	2.9792
22664	few landslides	1.8159
22664	mostly landslide	0.2914
22664	surficial deposits	11.0560
22670	surficial deposits	2.7412
22726	surficial deposits	0.0454
22726	water	13.3499
22776	few landslides	0.2056
22776	mostly landslide	0.0815
22776	surficial deposits	3.7694
22780	few landslides	5.4322
22780	surficial deposits	6.9671
22780	water	3.3377
22809	surficial deposits	0.2734
22839	surficial deposits	2.4389

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
22843	surficial deposits	0.7392
22845	surficial deposits	0.8580
22910	few landslides	0.3370
22910	surficial deposits	5.3898
22910	water	0.0199
22932	few landslides	0.5216
22932	mostly landslide	0.1644
22932	surficial deposits	5.5234
22944	surficial deposits	8.5968
22956	surficial deposits	2.4752
22990	surficial deposits	0.6013
230052	surficial deposits	0.7604
230054	surficial deposits	0.8118
230054	water	0.0343
230083	few landslides	1.8084
230083	mostly landslide	0.2671
230083	surficial deposits	8.4436
230088	surficial deposits	6.3142
230101	surficial deposits	6.3461
230101	water	0.4306
230103	surficial deposits	0.5277
230110	surficial deposits	0.7925
230114	surficial deposits	3.0711
230157	few landslides	0.0924
230157	surficial deposits	0.9682
230161	few landslides	0.1322
230161	surficial deposits	3.8485
230164	few landslides	0.6640
230164	surficial deposits	8.3817
230200	surficial deposits	0.8149
230201	surficial deposits	0.9430
230202	few landslides	0.9140
230202	surficial deposits	1.7268
230205	few landslides	0.5117
230205	surficial deposits	0.8239
230210	surficial deposits	3.5800
230216	surficial deposits	0.1178
230221	few landslides	8.4511
230221	mostly landslide	0.3035
230221	surficial deposits	12.0100
230221	water	0.3375
230222	few landslides	8.2677
230222	surficial deposits	9.8136
230232	few landslides	0.1726
230232	surficial deposits	0.3125

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
230233	few landslides	1.3573
230233	mostly landslide	0.2486
230233	surficial deposits	0.3160
230234	surficial deposits	0.3362
230235	surficial deposits	0.0891
230236	surficial deposits	1.8504
230237	few landslides	1.2185
230237	mostly landslide	0.2290
230237	surficial deposits	0.4618
230237	water	0.0439
230238	surficial deposits	0.6901
230239	surficial deposits	0.5313
230240	surficial deposits	2.6758
230247	surficial deposits	0.9798
230249	surficial deposits	0.2477
230250	surficial deposits	1.1948
230253	surficial deposits	0.3403
230267	surficial deposits	5.9740
230267	water	0.0603
230273	surficial deposits	3.2462
230274	surficial deposits	1.5778
230288	surficial deposits	0.6811
230289	surficial deposits	0.4797
230290	few landslides	0.1528
230290	surficial deposits	1.0709
230291	few landslides	0.6326
230291	mostly landslide	0.1140
230291	surficial deposits	0.3086
230294	few landslides	5.5451
230294	mostly landslide	1.3627
230294	surficial deposits	13.6027
230294	unmapped	4.8178
230306	few landslides	0.1066
230306	surficial deposits	0.1075
230307	surficial deposits	0.6575
230308	few landslides	3.7492
230308	mostly landslide	0.6976
230308	surficial deposits	4.3982
230313	few landslides	0.9594
230313	surficial deposits	0.6376
230313	water	0.1852
230318	surficial deposits	0.6243
230322	surficial deposits	2.3898
230332	surficial deposits	0.0697
230381	surficial deposits	0.4690

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
230392	surficial deposits	2.2530
230410	surficial deposits	1.1482
230411	surficial deposits	0.9505
230428	surficial deposits	0.3787
230428	water	0.0399
230449	surficial deposits	0.4095
230452	surficial deposits	9.8272
230456	surficial deposits	0.5042
230457	surficial deposits	2.9756
230466	surficial deposits	0.2093
230468	few landslides	0.0959
230468	surficial deposits	6.2363
230490	few landslides	0.1148
230490	surficial deposits	0.5756
230508	surficial deposits	3.1301
230510	surficial deposits	0.5743
230531	surficial deposits	4.0445
230535	few landslides	4.7358
230535	mostly landslide	1.9250
230535	surficial deposits	7.5273
230535	water	0.1628
230538	few landslides	2.1574
230538	mostly landslide	0.5156
230538	surficial deposits	2.0789
230542	few landslides	0.0636
230542	surficial deposits	0.0584
230590	surficial deposits	0.7571
230592	surficial deposits	0.7263
230597	few landslides	7.9471
230597	mostly landslide	0.3811
230597	surficial deposits	9.7456
230597	water	1.0249
230612	surficial deposits	0.0374
230612	water	50.9297
230613	surficial deposits	0.0339
230613	water	22.6959
230627	few landslides	2.2883
230627	mostly landslide	0.5236
230627	surficial deposits	2.9129
230642	surficial deposits	0.0980
230656	few landslides	5.6101
230656	mostly landslide	0.3450
230656	surficial deposits	8.6231
230656	water	0.8465
230657	few landslides	2.4887

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
230657	surficial deposits	0.8475
230658	few landslides	1.9391
230658	surficial deposits	8.8462
230658	water	0.0210
230659	few landslides	2.0545
230659	mostly landslide	2.8663
230659	surficial deposits	0.7777
230660	few landslides	0.3912
230660	mostly landslide	0.2456
230660	surficial deposits	14.9775
230666	few landslides	4.7242
230666	mostly landslide	1.8939
230666	surficial deposits	1.7729
230668	surficial deposits	26.9389
230668	water	0.1498
230672	surficial deposits	4.4980
230673	few landslides	0.1279
230673	surficial deposits	2.6757
230685	few landslides	5.6714
230685	mostly landslide	0.9931
230685	surficial deposits	18.0314
230686	few landslides	2.5551
230686	mostly landslide	1.2497
230686	surficial deposits	8.4007
230712	few landslides	0.2729
230712	water	1.1237
240003	surficial deposits	0.0650
240003	water	0.0113
240018	few landslides	3.6139
240018	mostly landslide	0.0148
240018	surficial deposits	28.1210
240018	water	1.4281
240026	few landslides	0.4972
240026	mostly landslide	0.1087
240026	surficial deposits	24.0957
240027	few landslides	0.7348
240027	mostly landslide	0.1286
240027	surficial deposits	25.1566
240038	few landslides	0.1045
240038	surficial deposits	1.5681
240039	surficial deposits	0.6608
240050	few landslides	1.8189
240050	mostly landslide	0.2762
240050	surficial deposits	8.4295
240051	surficial deposits	0.8204

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
240051	water	0.0279
240057X	few landslides	0.0606
240057X	mostly landslide	0.3686
240057X	surficial deposits	5.6946
240059	few landslides	1.8646
240059	mostly landslide	0.1865
240059	surficial deposits	8.2506
240060	few landslides	1.9597
240060	mostly landslide	0.5681
240060	surficial deposits	42.4469
240061	few landslides	1.5160
240061	mostly landslide	0.1842
240061	surficial deposits	8.5949
240062	few landslides	2.6501
240062	mostly landslide	0.0083
240062	surficial deposits	1.8801
240076	few landslides	0.6300
240076	mostly landslide	0.2745
240076	surficial deposits	2.7169
240077	surficial deposits	4.7261
240077	water	0.3156
240094	few landslides	1.6723
240094	mostly landslide	0.3382
240094	surficial deposits	4.8178
240114	few landslides	3.4647
240114	mostly landslide	1.1496
240114	surficial deposits	9.0973
240114	water	0.4284
240115	surficial deposits	0.2009
240117	surficial deposits	7.1028
240118	surficial deposits	9.6695
240119	surficial deposits	24.9539
240123	surficial deposits	1.0368
240133	surficial deposits	0.2353
240143	surficial deposits	0.3579
240147	few landslides	0.5078
240147	surficial deposits	2.3885
240147	water	0.1257
240155	surficial deposits	2.1980
240158	few landslides	0.3425
240158	surficial deposits	5.6379
240159	surficial deposits	7.6219
240167	surficial deposits	0.3877
240169	few landslides	1.2139
240169	surficial deposits	0.3841

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
240171	few landslides	2.8338
240171	surficial deposits	41.6519
240174	surficial deposits	1.1843
240176	surficial deposits	0.0751
240196	few landslides	1.1896
240196	surficial deposits	4.0484
240200	surficial deposits	0.4387
240202	few landslides	3.2060
240202	surficial deposits	0.6744
240207	surficial deposits	0.8090
240207	water	0.5577
240250	surficial deposits	0.2415
240254	surficial deposits	1.5723
240259	few landslides	0.0776
240259	surficial deposits	0.1244
240261	surficial deposits	0.4694
240263	surficial deposits	2.0024
240264	surficial deposits	5.8404
240272	surficial deposits	0.9492
240328	few landslides	0.5525
240328	surficial deposits	3.5784
240334	surficial deposits	0.6730
240350	few landslides	0.8791
240350	surficial deposits	0.0057
240355	few landslides	0.6508
240355	surficial deposits	1.4954
240358	few landslides	0.0974
240358	surficial deposits	2.2053
240359	surficial deposits	1.0154
240360	surficial deposits	1.7497
240366	surficial deposits	1.4009
240372	few landslides	3.2267
240372	surficial deposits	1.8853
240374	surficial deposits	10.0449
240375	surficial deposits	6.0605
240376	surficial deposits	0.8835
240377	surficial deposits	0.8086
240379	few landslides	0.1670
240379	surficial deposits	0.5061
240385	few landslides	0.1279
240385	surficial deposits	0.9795
240398	surficial deposits	0.3335
240403	surficial deposits	0.6569
240404	surficial deposits	0.5229
240408	surficial deposits	0.3321

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
240411	few landslides	0.2641
240411	surficial deposits	0.6078
240412	surficial deposits	0.8176
240427	few landslides	1.5125
240427	surficial deposits	2.9639
240430	surficial deposits	2.2138
240436	surficial deposits	0.7107
240439	surficial deposits	26.4987
240439	water	0.0313
240443	surficial deposits	0.5138
240463	surficial deposits	2.3571
240464	few landslides	0.4265
240464	surficial deposits	8.7660
240466	few landslides	1.0224
240466	surficial deposits	40.2066
240466	water	0.3225
240469	surficial deposits	4.5745
240477	surficial deposits	2.6281
240481	surficial deposits	3.7476
240481	water	0.1372
240482	surficial deposits	1.4767
240484	surficial deposits	6.7143
240485	surficial deposits	7.4751
240491	surficial deposits	4.1647
240492	surficial deposits	2.9206
240506	surficial deposits	0.7198
240507	surficial deposits	0.4232
240513	few landslides	1.9616
240513	surficial deposits	8.8714
240514	surficial deposits	4.6539
240515	few landslides	0.6122
240515	surficial deposits	0.3532
240516	surficial deposits	6.1091
240517	surficial deposits	4.0993
240518	surficial deposits	0.8813
240519	surficial deposits	5.4207
240523	few landslides	0.6031
240523	surficial deposits	2.4092
240545	surficial deposits	0.7115
240552	few landslides	0.0531
240552	mostly landslide	0.1531
240552	surficial deposits	0.1464
240581	few landslides	1.8342
240581	surficial deposits	7.0924
240583	surficial deposits	16.5708

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
240584	few landslides	0.6465
240584	surficial deposits	0.6947
240587	few landslides	2.0042
240587	surficial deposits	6.9913
240588	few landslides	2.8392
240588	surficial deposits	10.2263
240590	few landslides	0.7966
240590	mostly landslide	0.1286
240590	surficial deposits	24.5730
240591	surficial deposits	1.8431
240617	few landslides	0.6137
240617	mostly landslide	0.3555
240617	surficial deposits	14.2588
240617	water	0.3884
240629	surficial deposits	0.9980
240636	surficial deposits	0.5484
240637	surficial deposits	1.1166
240641	few landslides	0.6151
240668	few landslides	0.4642
240668	surficial deposits	0.7036
240671	surficial deposits	0.3003
240683	surficial deposits	0.1584
240691	few landslides	1.3105
240691	mostly landslide	1.3765
240691	surficial deposits	4.5332
240717	few landslides	1.8152
240717	surficial deposits	0.1295
240736	few landslides	8.0307
240736	mostly landslide	0.2449
240736	surficial deposits	23.3495
240737	few landslides	4.3362
240737	mostly landslide	0.1993
240737	surficial deposits	17.3994
94089	few landslides	0.9374
94089	surficial deposits	2.1543
94151	few landslides	0.2508
94151	surficial deposits	11.5277
94151	water	0.0362
94152	few landslides	2.2957
94152	mostly landslide	0.5236
94152	surficial deposits	3.1654
94506	surficial deposits	3.6006
94506	water	0.0410
94644	few landslides	2.4120
94644	mostly landslide	0.3546

TABLE F-2b: Linear Projects in a Landslide Area

RTP_ID	*PTYPE*	*Length*
94644	water	0.0172
98115	few landslides	1.5879
98115	surficial deposits	1.6989
98119	surficial deposits	1.6554
98133	few landslides	0.3950
98133	mostly landslide	0.6392
98133	surficial deposits	0.2210
98134	few landslides	0.8929
98134	mostly landslide	1.0052
98134	surficial deposits	2.2946
98147	few landslides	0.9271
98147	mostly landslide	3.1307
98147	surficial deposits	9.4829
98147	water	0.0665
98154	few landslides	0.7398
98154	mostly landslide	0.1044
98154	surficial deposits	2.2417
98154	water	0.0547
98194	surficial deposits	0.1240
98194	water	0.2010
98196	few landslides	0.7767
98196	mostly landslide	0.3333
98196	surficial deposits	0.0182
98204	few landslides	0.1359
98204	mostly landslide	0.0916
98204	surficial deposits	0.8412
98207	surficial deposits	4.7016
98207	water	0.3908
98999	few landslides	0.6581
98999	surficial deposits	3.7947

TABLE F-2c: Point Projects in a Landslide Area

RTP_ID	*PTYPE*
22190	surficial deposits
21786	surficial deposits
22355	surficial deposits
21451	surficial deposits
21472	surficial deposits
21210	surficial deposits
21787	surficial deposits
22246	surficial deposits
230269	surficial deposits
230284	surficial deposits
230356	surficial deposits
230363	surficial deposits
230532	surficial deposits
230574	surficial deposits
230341	few landslides
22656	surficial deposits
22195	surficial deposits
240313	surficial deposits
240313	surficial deposits
240213	surficial deposits
240025	surficial deposits
240065	surficial deposits
230206	surficial deposits
230212	surficial deposits
22632	few landslides
230505	surficial deposits
240142	few landslides
240142	surficial deposits
230704	surficial deposits
230417	surficial deposits
230596	surficial deposits
22226	surficial deposits
22795	surficial deposits
22002	surficial deposits
22156	surficial deposits
22100	surficial deposits
21609	surficial deposits
22261	surficial deposits
22164	surficial deposits
21126	surficial deposits
21208	few landslides
21607	surficial deposits
21306	surficial deposits
22873	surficial deposits
22811	surficial deposits
22829	surficial deposits
22854	few landslides
22878	surficial deposits
22985	surficial deposits
21103	surficial deposits
21144	surficial deposits
21702	surficial deposits
21722	surficial deposits

TABLE F-2c: Point Projects in a Landslide Area

RTP_ID	*PTYPE*
94012	surficial deposits
94073	few landslides
98222	few landslides
21123	surficial deposits
21114	surficial deposits
21114	surficial deposits
230105	few landslides
230170	surficial deposits
230132	surficial deposits
230262	surficial deposits
230255	surficial deposits
230422	few landslides
94691	surficial deposits
21475	surficial deposits
21477	surficial deposits
21489	surficial deposits
230368	surficial deposits
230445	surficial deposits
230407	surficial deposits
21785	surficial deposits
230218	few landslides
230266	few landslides
230580	surficial deposits
230518	surficial deposits
230492	surficial deposits
21214	surficial deposits
230425	surficial deposits
22006	surficial deposits
230635	surficial deposits
22350	surficial deposits
240180	surficial deposits
240557	surficial deposits
21341	surficial deposits
22282	surficial deposits
22229	mostly landslide
22794	surficial deposits
22279	surficial deposits
21606	surficial deposits
22756	few landslides
21615	few landslides
94075	surficial deposits
21602	surficial deposits
230326	surficial deposits
22629	water
230321	surficial deposits
240441	surficial deposits
240562	surficial deposits
240024	surficial deposits
240048	surficial deposits
240052	surficial deposits
240063	surficial deposits
240318	surficial deposits
21603	surficial deposits

TABLE F-2c: Point Projects in a Landslide Area

RTP_ID	*PTYPE*
240037	surficial deposits
240047	surficial deposits
240139	surficial deposits
240529	surficial deposits
240524	surficial deposits
240554	surficial deposits
240554	surficial deposits
240570	surficial deposits
240405	surficial deposits
240425	surficial deposits
240414	surficial deposits
240160	surficial deposits
240161	surficial deposits
240456	surficial deposits
240136	surficial deposits
240611	surficial deposits
240710	surficial deposits
240532	surficial deposits
240532	surficial deposits
240532	surficial deposits
240532	surficial deposits
240667	few landslides
21093	surficial deposits
240625	surficial deposits
240546	water
240547	surficial deposits
240179	few landslides
21341	surficial deposits
22062	surficial deposits
230370	surficial deposits
21342	surficial deposits
22634	surficial deposits
240498	surficial deposits
240415	surficial deposits
22979	surficial deposits
240226	water
22388	surficial deposits
22360	few landslides
22779	surficial deposits
230684	surficial deposits
22769	surficial deposits
22769	surficial deposits
230066	surficial deposits
240015	surficial deposits
240473	surficial deposits
240526	surficial deposits
240526	surficial deposits
240526	surficial deposits
240526	surficial deposits
240014	water
240055	surficial deposits
22614	surficial deposits
230123	few landslides

TABLE F-2c: Point Projects in a Landslide Area

RTP_ID	*PTYPE*
240656	surficial deposits
240041	surficial deposits
240525	surficial deposits
240210	surficial deposits
21205	surficial deposits
22352	surficial deposits
230203	surficial deposits
240640	surficial deposits
240649	surficial deposits
98179	few landslides
240034	surficial deposits
240082	surficial deposits
230555	surficial deposits
240067	surficial deposits
240067	surficial deposits
22895	surficial deposits
22965	surficial deposits
230265	surficial deposits
22814	surficial deposits
22883	surficial deposits
22883	surficial deposits
22883	surficial deposits
22883	surficial deposits
22883	surficial deposits
230638	surficial deposits
230687	surficial deposits
240295	surficial deposits
240295	surficial deposits
240304	surficial deposits
240085	surficial deposits
240349	surficial deposits
230246	surficial deposits
22990	surficial deposits
22990	surficial deposits
230110	surficial deposits
240175	surficial deposits
230293	surficial deposits
21704	surficial deposits
22746	surficial deposits
22746	surficial deposits
240208	surficial deposits
240457	surficial deposits
240487	water
240487	water
230286	surficial deposits
230322	surficial deposits
22082	surficial deposits
240716	surficial deposits
230232	few landslides
240468	surficial deposits
230581	surficial deposits
230581	surficial deposits
230581	water

TABLE F-2c: Point Projects in a Landslide Area

RTP_ID	*PTYPE*
230581	water
240295	surficial deposits
240295	surficial deposits
240304	surficial deposits
240304	surficial deposits
240304	surficial deposits
22990	surficial deposits
22746	surficial deposits
22746	surficial deposits
240208	surficial deposits
240208	surficial deposits
240208	surficial deposits
230637	surficial deposits
230581	surficial deposits
230581	surficial deposits
230581	water
22390	few landslides
240101	surficial deposits
240324	surficial deposits
21325	surficial deposits
22760	surficial deposits
240074	surficial deposits
240074	surficial deposits
240074	surficial deposits
240074	surficial deposits
240074	few landslides
240074	few landslides
21100	surficial deposits
240100	surficial deposits
230643	surficial deposits
240062	few landslides
240074	surficial deposits
240074	surficial deposits
240074	few landslides
240074	surficial deposits
240671	surficial deposits
98207	surficial deposits
98207	surficial deposits
230084	surficial deposits
230101	surficial deposits
240147	few landslides
240147	surficial deposits
98154	few landslides
240672	surficial deposits
240083	surficial deposits
240057X	surficial deposits

TABLE F-2d: Polygon Projects in a Landslide Area

RTP_ID	*PTYPE*	*Acres*
240163	few landslides	41.2441
240163	mostly landslide	16.4330
240163	surficial deposits	191.7598
240163	water	1.0300
240399	surficial deposits	136.1048
240400	few landslides	21.6526
240400	surficial deposits	417.4999
240400	water	40.4115
240728	few landslides	760.1307
240728	surficial deposits	4023.1619
240728	water	463.6885

TABLE F-3a: PDAs in a Liquefaction Zone

Name	*Risk*	*Acres*
Alameda County: Castro Valley BART	High	56.0079
Alameda County: East 14th Street and Mission Boulevard	High	11.1003
Antioch: Hillcrest eBART Station	High	45.6366
Antioch: Rivertown Waterfront	High	24.6906
Burlingame: Burlingame El Camino Real	High	172.2601
City/County Association of Governments of San Mateo County: El Camino Real	High	752.7796
City/County Association of Governments of San Mateo County: El Camino Real	High	7.0465
Cloverdale: Downtown/SMART Transit Area	High	5.4244
Concord: Community Reuse Area/Los Medanos	High	267.8380
Concord: Downtown	High	52.5683
Contra Costa County: Contra Costa Centre	High	42.3759
Cotati: Downtown and Cotati Depot	High	32.4877
Daly City: Mission Boulevard	High	0.8342
Danville: Downtown	High	124.9473
Dublin: Downtown Specific Plan Area	High	61.1127
Dublin: Town Center	High	12.3660
Dublin: Transit Center/Dublin Crossings	High	13.7161
East Palo Alto: Ravenswood	High	19.4435
Emeryville: Mixed-Use Core	High	208.8383
Fairfield: Downtown South (Jefferson Street)	High	278.3824
Fairfield: North Texas Street Core	High	7.8314
Fairfield: West Texas Street Gateway	High	193.4948
Fremont: Centerville	High	10.4481
Fremont: City Center	High	28.7651
Fremont: Irvington District	High	109.3506
Fremont: Warm Springs	High	299.4077
Hayward: Downtown	High	139.6413
Hayward: Mission Boulevard Corridor	High	1.1015
Hayward: South Hayward BART	High	94.7203
Hercules: Central Hercules	High	101.9394
Hercules: Waterfront District	High	132.4320
Livermore: East Side	High	6.5864
Livermore: Isabel Avenue/BART Station Planning Area	High	61.4522
Marin County: Urbanized 101 Corridor	High	152.7047
Martinez: Downtown	High	115.1323
Millbrae: Transit Station Area	High	13.8695
Milpitas: Transit Area	High	32.3612
Moraga: Moraga Center	High	110.8859
Mountain View: North Bayshore	High	767.6855
Mountain View: San Antonio	High	30.8164
Newark: Dumbarton Transit Oriented Development	High	59.4395
Oakland: Coliseum BART Station Area	High	265.9081
Oakland: Fruitvale and Dimond Areas	High	25.5732
Oakland: Transit Oriented Development Corridors	High	371.2472
Oakland: West Oakland	High	16.1503
Oakley: Downtown	High	1.7530
Oakley: Employment Area	High	8.9676
Oakley: Potential Planning Area	High	23.4113
Palo Alto: California Avenue	High	29.5280
Petaluma: Central, Turning Basin/Lower Reach	High	145.1230
Pinole: Old Town San Pablo Avenue	High	0.2900
Pleasant Hill: Buskirk Avenue Corridor	High	246.1191

TABLE F-3a: PDAs in a Liquefaction Zone

Name	*Risk*	*Acres*
Pleasant Hill: Diablo Valley College	High	40.9620
Pleasanton: Hacienda	High	562.7747
Redwood City: Broadway/Veterans Boulevard Corridor	High	207.6516
Redwood City: Downtown	High	164.4709
Richmond (with Contra Costa County): North Richmond	High	226.7594
Richmond: Central Richmond & 23rd Street Corridor	High	60.4824
Richmond: South Richmond	High	258.1413
Rohnert Park: Central Rohnert Park	High	405.4094
Rohnert Park: Sonoma Mountain Village	High	115.8013
San Bruno: Transit Corridors	High	44.1533
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	High	244.6921
San Francisco: Downtown-Van Ness-Geary	High	4.6225
San Francisco: Mission-San Jose Corridor	High	0.0054
San Jose: Berryessa Station	High	63.3855
San Jose: Blossom Hill/Snell Urban Village	High	42.3640
San Jose: Capitol/Tully/King Urban Villages	High	98.7893
San Jose: Communications Hill	High	445.4560
San Jose: Downtown "Frame"	High	127.0529
San Jose: East Santa Clara/Alum Rock Corridor	High	369.6799
San Jose: North San Jose	High	1017.0203
San Jose: West San Carlos and Southwest Expressway Corridors	High	16.5096
San Leandro: Bay Fair BART Transit Village	High	4.6636
San Rafael: Civic Center/North Rafael Town Center	High	186.6535
San Rafael: Downtown	High	174.4639
San Ramon: City Center	High	150.6562
San Ramon: North Camino Ramon	High	62.9459
Santa Clara Valley Transportation Authority: City Cores, Corridors & Station Areas	High	1104.6587
Santa Clara: Santa Clara Station Focus Area	High	46.9978
South San Francisco: Downtown	High	7.8951
Suisun City: Downtown & Waterfront	High	45.5843
Sunnyvale: East Sunnyvale	High	328.3440
Sunnyvale: Lawrence Station Transit Village	High	21.4058
Sunnyvale: Tasman Crossing	High	196.9121
Union City: Intermodal Station District	High	59.0694
Vallejo: Waterfront & Downtown	High	57.1226
West Contra Costa Transportation Advisory Committee: San Pablo Avenue Corridor	High	95.7422
Windsor: Redevelopment Area	High	121.3509
name	LIQ	acres
Alameda County: Castro Valley BART	Low	198.8759
Alameda County: East 14th Street and Mission Boulevard	Low	270.1263
Albany: San Pablo & Solano Mixed Use Neighborhood	Low	39.2636
American Canyon: Highway 29 Corridor	Low	346.8937
Antioch: Hillcrest eBART Station	Low	226.9152
Antioch: Rivertown Waterfront	Low	265.2550
Belmont: Villages of Belmont	Low	5.7347
Berkeley: Adeline Street	Low	62.1440
Berkeley: Downtown	Low	155.1109
Berkeley: San Pablo Avenue	Low	65.2064
Berkeley: South Shattuck	Low	21.2083
Berkeley: Telegraph Avenue	Low	37.7643
Berkeley: University Avenue	Low	38.3858
Burlingame: Burlingame El Camino Real	Low	124.6396

TABLE F-3a: PDAs in a Liquefaction Zone

Name	*Risk*	*Acres*
City/County Association of Governments of San Mateo County: El Camino Real	Low	473.4370
City/County Association of Governments of San Mateo County: El Camino Real	Low	2.1013
Cloverdale: Downtown/SMART Transit Area	Low	332.0315
Concord: Community Reuse Area/Los Medanos	Low	1185.9394
Concord: Downtown	Low	411.0699
Contra Costa County: Contra Costa Centre	Low	57.1683
Contra Costa County: Pittsburg/Bay Point BART Station	Low	279.7332
Daly City: Bayshore	Low	157.9087
Daly City: Mission Boulevard	Low	3.4385
Dixon: Downtown	Low	8.1942
Dublin: Downtown Specific Plan Area	Low	51.5519
Dublin: Town Center	Low	189.1647
Dublin: Transit Center/Dublin Crossings	Low	60.2258
East Palo Alto: Ravenswood	Low	14.7410
El Cerrito: San Pablo Avenue Corridor	Low	8.3910
Emeryville: Mixed-Use Core	Low	41.4826
Fairfield: Downtown South (Jefferson Street)	Low	7.4376
Fairfield: Fairfield-Vacaville Train Station	Low	1566.1611
Fairfield: North Texas Street Core	Low	172.5720
Fairfield: West Texas Street Gateway	Low	11.9475
Fremont: Centerville	Low	139.0615
Fremont: City Center	Low	398.0535
Fremont: Irvington District	Low	1240.4533
Fremont: Warm Springs	Low	1329.0533
Gilroy: Downtown	Low	131.1946
Hayward: Downtown	Low	3.6793
Hayward: Mission Boulevard Corridor	Low	159.7286
Hayward: South Hayward BART	Low	136.1465
Lafayette: Downtown	Low	34.2496
Livermore: East Side	Low	1819.3668
Livermore: Isabel Avenue/BART Station Planning Area	Low	523.3223
Marin County: Urbanized 101 Corridor	Low	44.1105
Millbrae: Transit Station Area	Low	4.3063
Milpitas: Transit Area	Low	0.8038
Morgan Hill: Downtown	Low	172.7514
Mountain View: Downtown	Low	0.9933
Mountain View: El Camino Real	Low	168.0754
Mountain View: North Bayshore	Low	8.4665
Mountain View: San Antonio	Low	161.3549
Newark: Dumbarton Transit Oriented Development	Low	138.4206
Newark: Old Town Mixed Use Area	Low	52.6661
Oakland: Downtown & Jack London Square	Low	60.4378
Oakland: Eastmont Town Center	Low	3.6789
Oakland: Fruitvale and Dimond Areas	Low	334.9042
Oakland: MacArthur Transit Village	Low	86.0232
Oakland: Transit Oriented Development Corridors	Low	3088.6510
Oakley: Downtown	Low	1.3174
Oakley: Potential Planning Area	Low	0.0004
Palo Alto: California Avenue	Low	0.6106
Pittsburg: Downtown	Low	246.4923
Pittsburg: Railroad Avenue eBART Station	Low	829.8242
Pleasant Hill: Buskirk Avenue Corridor	Low	73.8671

TABLE F-3a: PDAs in a Liquefaction Zone

Name	*Risk*	*Acres*
Pleasanton: Hacienda	Low	9.6477
Redwood City: Broadway/Veterans Boulevard Corridor	Low	32.9823
Redwood City: Downtown	Low	6.0013
San Bruno: Transit Corridors	Low	0.5478
San Carlos: Railroad Corridor	Low	6.3829
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Low	29.8682
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Low	9.7531
San Francisco: 19th Avenue	Low	43.6733
San Francisco: Balboa Park	Low	3.4960
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Low	148.8986
San Francisco: Downtown-Van Ness-Geary	Low	21.2570
San Francisco: Eastern Neighborhoods	Low	4.6918
San Francisco: Mission-San Jose Corridor	Low	51.6594
San Jose: Bascom Urban Village	Low	81.0178
San Jose: Berryessa Station	Low	1.4719
San Jose: Camden Urban Village	Low	108.2956
San Jose: Capitol Corridor Urban Villages	Low	46.1129
San Jose: Capitol/Tully/King Urban Villages	Low	25.4889
San Jose: Communications Hill	Low	11.1113
San Jose: Downtown "Frame"	Low	6.7307
San Jose: East Santa Clara/Alum Rock Corridor	Low	31.1190
San Jose: North San Jose	Low	159.3021
San Jose: Oakridge/Almaden Plaza Urban Village	Low	2.0746
San Mateo: Downtown	Low	71.2536
San Mateo: El Camino Real	Low	24.5651
San Mateo: Rail Corridor	Low	41.7787
San Pablo: San Pablo Avenue & 23rd Street Corridors	Low	98.9423
San Rafael: Downtown	Low	25.0180
San Ramon: City Center	Low	171.0648
Santa Clara Valley Transportation Authority: City Cores, Corridors & Station Areas	Low	899.8058
Santa Clara: El Camino Real Focus Area	Low	3.1592
Santa Rosa: Mendocino Avenue/Santa Rosa Avenue Corridor	Low	107.0254
Santa Rosa: North Santa Rosa Station	Low	61.3615
South San Francisco: Downtown	Low	2.1802
Sunnyvale: El Camino Real Corridor	Low	152.7131
Sunnyvale: Lawrence Station Transit Village	Low	2.3395
Union City: Intermodal Station District	Low	79.6196
Vacaville: Allison Area	Low	2.2403
Vacaville: Downtown	Low	6.1702
West Contra Costa Transportation Advisory Committee: San Pablo Avenue Corridor	Low	0.4564
Windsor: Redevelopment Area	Low	11.5157
Alameda County: East 14th Street and Mission Boulevard	Medium	456.7764
Alameda County: Hesperian Boulevard	Medium	457.7099
Alameda County: Meekland Avenue Corridor	Medium	171.4846
Alameda: Naval Air Station	Medium	37.7325
Alameda: Northern Waterfront	Medium	201.1461
Albany: San Pablo & Solano Mixed Use Neighborhood	Medium	40.7463
American Canyon: Highway 29 Corridor	Medium	8.8066
Antioch: Hillcrest eBART Station	Medium	59.3429
Antioch: Rivertown Waterfront	Medium	117.4516
Belmont: Villages of Belmont	Medium	65.8926
Berkeley: Downtown	Medium	0.0462

TABLE F-3a: PDAs in a Liquefaction Zone

Name	*Risk*	*Acres*
Berkeley: San Pablo Avenue	Medium	40.7420
Berkeley: University Avenue	Medium	41.9498
Burlingame: Burlingame El Camino Real	Medium	290.5522
Campbell: Central Redevelopment Area	Medium	246.2892
City/County Association of Governments of San Mateo County: El Camino Real	Medium	1452.8085
City/County Association of Governments of San Mateo County: El Camino Real	Medium	271.4138
Concord: Community Reuse Area/Los Medanos	Medium	413.7751
Contra Costa County: Downtown El Sobrante	Medium	106.4610
Contra Costa County: Pittsburg/Bay Point BART Station	Medium	62.2627
Danville: Downtown	Medium	302.2063
Dixon: Downtown	Medium	130.5076
Dublin: Downtown Specific Plan Area	Medium	187.6979
Dublin: Town Center	Medium	243.9529
Dublin: Transit Center/Dublin Crossings	Medium	200.7467
East Palo Alto: Ravenswood	Medium	292.5554
El Cerrito: San Pablo Avenue Corridor	Medium	231.6308
Emeryville: Mixed-Use Core	Medium	154.6236
Fairfield: Downtown South (Jefferson Street)	Medium	0.5332
Fairfield: Fairfield-Vacaville Train Station	Medium	80.0208
Fairfield: West Texas Street Gateway	Medium	106.2839
Fremont: Centerville	Medium	676.7502
Fremont: City Center	Medium	632.7973
Gilroy: Downtown	Medium	122.8444
Hayward: Downtown	Medium	125.8668
Hayward: Mission Boulevard Corridor	Medium	74.2280
Hayward: The Cannery	Medium	123.9228
Lafayette: Downtown	Medium	175.5098
Livermore: Downtown	Medium	252.2622
Livermore: East Side	Medium	384.1341
Livermore: Isabel Avenue/BART Station Planning Area	Medium	190.8187
Marin County: Urbanized 101 Corridor	Medium	200.5761
Menlo Park: El Camino Real Corridor and Downtown	Medium	155.6561
Milpitas: Transit Area	Medium	376.1536
Moraga: Moraga Center	Medium	1.8894
Morgan Hill: Downtown	Medium	5.5521
Mountain View: Downtown	Medium	681.0499
Mountain View: El Camino Real	Medium	727.8977
Mountain View: San Antonio	Medium	238.5987
Mountain View: Whisman Station	Medium	151.4982
Oakland: Coliseum BART Station Area	Medium	369.9776
Oakland: Downtown & Jack London Square	Medium	595.4065
Oakland: Eastmont Town Center	Medium	435.6893
Oakland: Fruitvale and Dimond Areas	Medium	1116.4117
Oakland: MacArthur Transit Village	Medium	844.1433
Oakland: Transit Oriented Development Corridors	Medium	3195.4964
Oakland: West Oakland	Medium	1291.4550
Oakley: Downtown	Medium	142.8882
Oakley: Employment Area	Medium	695.3695
Oakley: Potential Planning Area	Medium	208.1667
Orinda: Downtown	Medium	1.6779
Palo Alto: California Avenue	Medium	87.5430
Petaluma: Central, Turning Basin/Lower Reach	Medium	5.2918

TABLE F-3a: PDAs in a Liquefaction Zone

Name	*Risk*	*Acres*
Pinole: Old Town San Pablo Avenue	Medium	104.1886
Pittsburg: Downtown	Medium	130.8526
Pittsburg: Railroad Avenue eBART Station	Medium	233.1788
Pleasanton: Hacienda	Medium	296.7895
Redwood City: Broadway/Veterans Boulevard Corridor	Medium	0.0324
Redwood City: Downtown	Medium	6.8775
Richmond (with Contra Costa County): North Richmond	Medium	491.7773
Richmond: Central Richmond & 23rd Street Corridor	Medium	713.2729
Richmond: Central Richmond & 23rd Street Corridor	Medium	50.9190
Richmond: South Richmond	Medium	524.0294
Rohnert Park: Sonoma Mountain Village	Medium	61.1870
San Carlos: Railroad Corridor	Medium	49.5688
San Francisco: Downtown-Van Ness-Geary	Medium	1010.3573
San Francisco: Eastern Neighborhoods	Medium	244.9083
San Francisco: Market & Octavia	Medium	195.7490
San Francisco: Mission Bay	Medium	12.1011
San Francisco: Port of San Francisco	Medium	0.0491
San Jose: Bascom TOD Corridor	Medium	214.5626
San Jose: Bascom Urban Village	Medium	35.3646
San Jose: Berryessa Station	Medium	455.8120
San Jose: Blossom Hill/Snell Urban Village	Medium	21.5580
San Jose: Capitol Corridor Urban Villages	Medium	153.0462
San Jose: Capitol/Tully/King Urban Villages	Medium	129.2843
San Jose: Communications Hill	Medium	489.8957
San Jose: Cottle Transit Village (Hitachi)	Medium	195.8279
San Jose: Downtown "Frame"	Medium	2267.3377
San Jose: East Santa Clara/Alum Rock Corridor	Medium	439.4496
San Jose: Greater Downtown	Medium	664.7749
San Jose: North San Jose	Medium	1408.4974
San Jose: Oakridge/Almaden Plaza Urban Village	Medium	286.9712
San Jose: Saratoga TOD Corridor	Medium	158.5267
San Jose: Stevens Creek TOD Corridor	Medium	254.4606
San Jose: West San Carlos and Southwest Expressway Corridors	Medium	1263.7890
San Jose: Westgate/El Paseo Urban Village	Medium	177.4358
San Jose: Winchester Boulevard TOD Corridor	Medium	298.8694
San Leandro: Bay Fair BART Transit Village	Medium	163.9117
San Leandro: Downtown Transit Oriented Development	Medium	457.9896
San Leandro: East 14th Street	Medium	193.3655
San Mateo: Downtown	Medium	25.0452
San Mateo: El Camino Real	Medium	106.4930
San Mateo: Rail Corridor	Medium	181.3508
San Pablo: San Pablo Avenue & 23rd Street Corridors	Medium	174.1042
San Rafael: Civic Center/North Rafael Town Center	Medium	71.1271
San Ramon: City Center	Medium	133.8869
San Ramon: North Camino Ramon	Medium	237.5376
Santa Clara Valley Transportation Authority: City Cores, Corridors & Station Areas	Medium	2863.7652
Santa Clara: El Camino Real Focus Area	Medium	313.7648
Santa Clara: Santa Clara Station Focus Area	Medium	208.5397
Santa Rosa: Downtown Station Area	Medium	217.7767
Santa Rosa: Downtown Station Area	Medium	415.4705
Santa Rosa: Mendocino Avenue/Santa Rosa Avenue Corridor	Medium	12.7684
Santa Rosa: Mendocino Avenue/Santa Rosa Avenue Corridor	Medium	1119.4888

TABLE F-3a: PDAs in a Liquefaction Zone

Name	*Risk*	*Acres*
Santa Rosa: North Santa Rosa Station	Medium	757.3767
Santa Rosa: Roseland	Medium	830.7622
Santa Rosa: Sebastopol Road Corridor	Medium	659.1806
Sebastopol: Core Area	Medium	11.6106
Sunnyvale: Downtown & Caltrain Station	Medium	273.8765
Sunnyvale: East Sunnyvale	Medium	131.1605
Sunnyvale: El Camino Real Corridor	Medium	258.6777
Sunnyvale: Lawrence Station Transit Village	Medium	332.7541
Union City: Intermodal Station District	Medium	2.8113
Vacaville: Allison Area	Medium	158.6839
Vacaville: Downtown	Medium	106.3769
West Contra Costa Transportation Advisory Committee: San Pablo Avenue Corridor	Medium	21.1710
West Contra Costa Transportation Advisory Committee: San Pablo Avenue Corridor	Medium	70.8069
Windsor: Redevelopment Area	Medium	0.8913
Alameda: Naval Air Station	Very High	1010.5669
Alameda: Northern Waterfront	Very High	118.7709
American Canyon: Highway 29 Corridor	Very High	0.5622
Antioch: Hillcrest eBART Station	Very High	11.4948
Antioch: Rivertown Waterfront	Very High	49.5506
Belmont: Villages of Belmont	Very High	0.6279
Benicia: Downtown	Very High	46.8596
Burlingame: Burlingame El Camino Real	Very High	32.0725
Campbell: Central Redevelopment Area	Very High	7.8729
City/County Association of Governments of San Mateo County: El Camino Real	Very High	88.4269
City/County Association of Governments of San Mateo County: El Camino Real	Very High	3.4689
Cloverdale: Downtown/SMART Transit Area	Very High	123.2097
Concord: Community Reuse Area/Los Medanos	Very High	23.5031
Concord: Downtown	Very High	16.8906
Contra Costa County: Contra Costa Centre	Very High	0.3362
Contra Costa County: Pittsburg/Bay Point BART Station	Very High	7.9798
Daly City: Bayshore	Very High	1.2251
Danville: Downtown	Very High	21.2119
Dublin: Town Center	Very High	7.4835
East Palo Alto: Ravenswood	Very High	9.1875
El Cerrito: San Pablo Avenue Corridor	Very High	5.0385
Emeryville: Mixed-Use Core	Very High	179.0196
Fairfield: Downtown South (Jefferson Street)	Very High	3.0985
Fairfield: West Texas Street Gateway	Very High	4.2051
Fremont: Centerville	Very High	877.6062
Fremont: Irvington District	Very High	16.5261
Hayward: Downtown	Very High	4.5904
Hercules: Waterfront District	Very High	14.4513
Livermore: East Side	Very High	12.3445
Livermore: Isabel Avenue/BART Station Planning Area	Very High	112.2309
Marin County: Urbanized 101 Corridor	Very High	246.3912
Martinez: Downtown	Very High	36.7634
Menlo Park: El Camino Real Corridor and Downtown	Very High	1.1448
Millbrae: Transit Station Area	Very High	67.5427
Mountain View: Downtown	Very High	10.0936
Mountain View: El Camino Real	Very High	18.6296
Mountain View: North Bayshore	Very High	27.3770
Mountain View: San Antonio	Very High	0.5068

TABLE F-3a: PDAs in a Liquefaction Zone

Name	*Risk*	*Acres*
Oakland: Coliseum BART Station Area	Very High	378.0917
Oakland: Downtown & Jack London Square	Very High	140.8849
Oakland: Fruitvale and Dimond Areas	Very High	33.2735
Oakland: Transit Oriented Development Corridors	Very High	411.6133
Oakland: West Oakland	Very High	322.6382
Oakley: Employment Area	Very High	38.8640
Oakley: Potential Planning Area	Very High	0.8848
Palo Alto: California Avenue	Very High	2.0140
Petaluma: Central, Turning Basin/Lower Reach	Very High	303.3768
Pittsburg: Downtown	Very High	35.8010
Pittsburg: Railroad Avenue eBART Station	Very High	7.8720
Pleasant Hill: Diablo Valley College	Very High	6.9330
Redwood City: Broadway/Veterans Boulevard Corridor	Very High	202.5800
Redwood City: Downtown	Very High	26.8782
Richmond (with Contra Costa County): North Richmond	Very High	406.0689
Richmond: South Richmond	Very High	597.9449
San Bruno: Transit Corridors	Very High	29.2084
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Very High	25.3797
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Very High	537.3883
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Very High	1318.0559
San Francisco: Downtown-Van Ness-Geary	Very High	986.9003
San Francisco: Eastern Neighborhoods	Very High	959.1281
San Francisco: Market & Octavia	Very High	113.7560
San Francisco: Mission-San Jose Corridor	Very High	39.6357
San Francisco: Mission Bay	Very High	276.2201
San Francisco: Port of San Francisco	Very High	442.7064
San Francisco: Transbay Terminal	Very High	51.2670
San Francisco: Treasure Island	Very High	355.3048
San Jose: Bascom Urban Village	Very High	1.1658
San Jose: Berryessa Station	Very High	143.0325
San Jose: Downtown "Frame"	Very High	44.3551
San Jose: East Santa Clara/Alum Rock Corridor	Very High	19.7159
San Jose: Greater Downtown	Very High	18.7627
San Jose: North San Jose	Very High	2416.1847
San Jose: Oakridge/Almaden Plaza Urban Village	Very High	90.9353
San Jose: Stevens Creek TOD Corridor	Very High	4.4075
San Jose: West San Carlos and Southwest Expressway Corridors	Very High	16.0658
San Leandro: Downtown Transit Oriented Development	Very High	11.0111
San Leandro: East 14th Street	Very High	1.3469
San Mateo: Downtown	Very High	5.9420
San Mateo: El Camino Real	Very High	2.6460
San Mateo: Rail Corridor	Very High	274.5759
San Rafael: Civic Center/North Rafael Town Center	Very High	64.0149
San Rafael: Downtown	Very High	216.4267
Santa Clara Valley Transportation Authority: City Cores, Corridors & Station Areas	Very High	88.1644
Sebastopol: Core Area	Very High	60.9102
South San Francisco: Downtown	Very High	4.7724
Suisun City: Downtown & Waterfront	Very High	324.3286
Vacaville: Allison Area	Very High	10.3226
Vacaville: Downtown	Very High	4.3828
Vallejo: Waterfront & Downtown	Very High	88.8815
West Contra Costa Transportation Advisory Committee: San Pablo Avenue Corridor	Very High	22.3089

TABLE F-3a: PDAs in a Liquefaction Zone

Name	*Risk*	*Acres*
Windsor: Redevelopment Area	Very High	7.3884
Alameda County: Castro Valley BART	Very Low	9.9943
Alameda County: East 14th Street and Mission Boulevard	Very Low	72.0217
American Canyon: Highway 29 Corridor	Very Low	18.0514
Antioch: Hillcrest eBART Station	Very Low	38.3164
Belmont: Villages of Belmont	Very Low	5.4755
Benicia: Downtown	Very Low	110.3031
Burlingame: Burlingame El Camino Real	Very Low	338.9499
City/County Association of Governments of San Mateo County: El Camino Real	Very Low	1768.0034
City/County Association of Governments of San Mateo County: El Camino Real	Very Low	347.9985
Cloverdale: Downtown/SMART Transit Area	Very Low	33.9359
Concord: Community Reuse Area/Los Medanos	Very Low	780.5309
Concord: Downtown	Very Low	5.9466
Contra Costa County: Contra Costa Centre	Very Low	0.2235
Contra Costa County: Downtown El Sobrante	Very Low	64.3626
Contra Costa County: Pittsburg/Bay Point BART Station	Very Low	56.9857
Cotati: Downtown and Cotati Depot	Very Low	100.2059
Daly City: Bayshore	Very Low	218.4673
Daly City: Mission Boulevard	Very Low	201.3909
Danville: Downtown	Very Low	98.1251
Dublin: Town Center	Very Low	222.0089
Dublin: Transit Center/Dublin Crossings	Very Low	4.9050
El Cerrito: San Pablo Avenue Corridor	Very Low	4.7643
Fairfield: Fairfield-Vacaville Train Station	Very Low	1268.9332
Fremont: Irvington District	Very Low	21.6692
Hayward: Downtown	Very Low	30.1566
Hayward: Mission Boulevard Corridor	Very Low	34.6982
Hayward: South Hayward BART	Very Low	5.5332
Hercules: Central Hercules	Very Low	150.0087
Hercules: Waterfront District	Very Low	97.4046
Lafayette: Downtown	Very Low	93.8093
Livermore: East Side	Very Low	104.2973
Livermore: Isabel Avenue/BART Station Planning Area	Very Low	243.2225
Marin County: Urbanized 101 Corridor	Very Low	973.9745
Martinez: Downtown	Very Low	39.2285
Millbrae: Transit Station Area	Very Low	33.2863
Moraga: Moraga Center	Very Low	67.0050
Morgan Hill: Downtown	Very Low	2.8077
Newark: Dumbarton Transit Oriented Development	Very Low	7.0379
Oakland: Eastmont Town Center	Very Low	138.1506
Oakland: MacArthur Transit Village	Very Low	5.3219
Oakland: Transit Oriented Development Corridors	Very Low	806.0430
Orinda: Downtown	Very Low	153.2921
Petaluma: Central, Turning Basin/Lower Reach	Very Low	1.6484
Pinole: Appian Way Corridor	Very Low	140.6308
Pinole: Old Town San Pablo Avenue	Very Low	135.9799
Pleasant Hill: Diablo Valley College	Very Low	10.1014
Richmond: South Richmond	Very Low	31.4247
Rohnert Park: Sonoma Mountain Village	Very Low	0.5841
San Bruno: Transit Corridors	Very Low	593.0166
San Carlos: Railroad Corridor	Very Low	13.2528
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Very Low	316.7147

TABLE F-3a: PDAs in a Liquefaction Zone

Name	*Risk*	*Acres*
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Very Low	52.0135
San Francisco: 19th Avenue	Very Low	553.3352
San Francisco: Balboa Park	Very Low	211.6720
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Very Low	1151.3594
San Francisco: Downtown-Van Ness-Geary	Very Low	806.4976
San Francisco: Eastern Neighborhoods	Very Low	1001.5653
San Francisco: Market & Octavia	Very Low	87.6618
San Francisco: Mission-San Jose Corridor	Very Low	1845.2805
San Francisco: Mission Bay	Very Low	3.4230
San Francisco: Port of San Francisco	Very Low	0.0166
San Francisco: Transbay Terminal	Very Low	1.9188
San Jose: Communications Hill	Very Low	614.0666
San Mateo: El Camino Real	Very Low	6.6341
San Pablo: San Pablo Avenue & 23rd Street Corridors	Very Low	11.2754
San Rafael: Civic Center/North Rafael Town Center	Very Low	184.6661
San Rafael: Downtown	Very Low	81.6745
San Ramon: North Camino Ramon	Very Low	1.9112
Santa Clara Valley Transportation Authority: City Cores, Corridors & Station Areas	Very Low	115.1810
Santa Rosa: Mendocino Avenue/Santa Rosa Avenue Corridor	Very Low	436.7679
Santa Rosa: North Santa Rosa Station	Very Low	170.2358
Santa Rosa: Roseland	Very Low	550.8700
Santa Rosa: Sebastopol Road Corridor	Very Low	248.5455
Sebastopol: Core Area	Very Low	630.5003
South San Francisco: Downtown	Very Low	177.3490
Vacaville: Allison Area	Very Low	38.8786
Vacaville: Downtown	Very Low	50.5728
Vallejo: Waterfront & Downtown	Very Low	65.8221
Walnut Creek: West Downtown	Very Low	232.0689
West Contra Costa Transportation Advisory Committee: San Pablo Avenue Corridor	Very Low	281.0906
West Contra Costa Transportation Advisory Committee: San Pablo Avenue Corridor	Very Low	142.9740
Windsor: Redevelopment Area	Very Low	247.6964
Alameda: Naval Air Station	Water	3.8230
Alameda: Northern Waterfront	Water	8.6262
Antioch: Rivertown Waterfront	Water	17.5081
Benicia: Downtown	Water	1.5853
Campbell: Central Redevelopment Area	Water	2.7423
City/County Association of Governments of San Mateo County: El Camino Real	Water	2.1935
Cloverdale: Downtown/SMART Transit Area	Water	9.2191
Contra Costa County: Pittsburg/Bay Point BART Station	Water	1.7410
Daly City: Bayshore	Water	0.2926
Dublin: Town Center	Water	0.8637
East Palo Alto: Ravenswood	Water	5.5157
Fairfield: Fairfield-Vacaville Train Station	Water	19.6546
Fremont: Centerville	Water	16.8815
Fremont: City Center	Water	7.4135
Livermore: East Side	Water	1.3454
Marin County: Urbanized 101 Corridor	Water	13.4457
Mountain View: North Bayshore	Water	0.7376
Oakland: Downtown & Jack London Square	Water	6.2722
Oakland: Transit Oriented Development Corridors	Water	175.6651
Oakley: Employment Area	Water	15.0103
Pittsburg: Downtown	Water	21.8647

TABLE F-3a: PDAs in a Liquefaction Zone

Name	*Risk*	*Acres*
Redwood City: Broadway/Veterans Boulevard Corridor	Water	5.0400
Redwood City: Downtown	Water	0.8474
Richmond (with Contra Costa County): North Richmond	Water	1.0317
Richmond: South Richmond	Water	10.1522
San Bruno: Transit Corridors	Water	0.9635
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Water	1.3222
San Francisco & Brisbane: San Francisco/San Mateo Bi-County Area	Water	110.3878
San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Water	22.3399
San Francisco: Eastern Neighborhoods	Water	8.5827
San Francisco: Mission-San Jose Corridor	Water	3.1033
San Francisco: Mission Bay	Water	0.0227
San Francisco: Port of San Francisco	Water	16.5024
San Jose: Communications Hill	Water	0.9154
San Jose: North San Jose	Water	27.0799
San Jose: Oakridge/Almaden Plaza Urban Village	Water	0.1663
San Rafael: Downtown	Water	4.9910
Santa Clara Valley Transportation Authority: City Cores, Corridors & Station Areas	Water	14.3117
Suisun City: Downtown & Waterfront	Water	20.3555
Union City: Intermodal Station District	Water	1.5373
Vallejo: Waterfront & Downtown	Water	0.2769
West Contra Costa Transportation Advisory Committee: San Pablo Avenue Corridor	Water	0.0031

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
21012	Very Low	0.7502
21012	Water	0.9702
21013	High	0.3556
21013	NM	1.2740
21013	Very High	1.4164
21013	Very Low	1.3792
21013	Water	16.9828
21070	Medium	1.7897
21070	Very Low	1.3549
21116	High	3.1508
21116	Low	3.5740
21116	Medium	4.0870
21116	Very High	0.9422
21116	Very Low	1.4331
21131	High	0.1852
21131	Medium	0.0830
21131	Very High	2.8581
21132	High	2.6089
21132	Low	1.7858
21132	Medium	0.1677
21132	Water	0.1301
21211	Low	7.0365
21211	Medium	1.3672
21211	Very High	0.0835
21211	Very Low	0.5543
21214	Medium	0.3281
21320	Low	0.0516
21320	Very Low	0.8125
21320	Water	0.9703
21325	High	0.0716
21325	Very High	0.9988
21325	Very Low	0.0480
21325	Water	0.1070
21473	Low	1.5890
21473	Medium	0.0344
21473	Very High	0.0726
21484	High	0.7947
21484	Low	1.1878
21510	Low	0.0092
21510	Medium	0.3501
21510	Very High	0.9173
21510	Very Low	0.2763
21549	Very High	3.3366
21549	Very Low	1.4447
21549	Water	0.0450
21604	Low	0.2045
21604	Very High	2.5212
21604	Very Low	0.5438
21608	High	0.9024
21608	Low	0.1730
21608	Medium	2.8767
21608	Water	0.0152
21612	High	0.5159

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
21612	Low	0.2458
21612	Medium	0.1475
21612	Very High	0.0265
21613	High	0.0180
21613	Low	1.6518
21613	Medium	0.5951
21613	Very High	2.9217
21613	Very Low	1.7839
21613	Water	0.0852
21627	High	4.6492
21627	Low	9.2951
21627	Medium	21.6658
21627	Very High	6.4366
21627	Very Low	6.6917
21714	High	1.4402
21714	Low	0.9409
21714	Medium	2.3200
21714	NM	2.6188
21714	Very High	0.0721
21714	Very Low	0.1147
21760	Low	2.8133
21760	Medium	5.4299
21760	Very High	0.0185
21760	Very Low	0.3011
21892	High	0.5761
21892	Low	0.2665
21892	Medium	0.0210
21893	High	1.6674
21893	Medium	0.1944
21893	Very Low	0.8419
21902	High	0.7816
21902	Very Low	4.2514
21922	High	0.6334
21922	Low	0.0272
21922	Medium	0.5733
21922	Very High	0.5145
22001	High	23.3767
22001	Low	0.5602
22001	Medium	6.2334
22001	Very High	2.5427
22001	Very Low	5.6079
22009	High	14.9533
22009	Low	6.4793
22009	Medium	18.9337
22009	Very High	3.6848
22009	Water	0.2508
22010	High	0.0167
22010	Low	0.2004
22013	Low	1.1177
22013	Medium	0.0084
22013	Very Low	2.4404
22042	High	0.6951
22042	Low	6.1663

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
22042	Medium	2.3765
22042	Very High	0.1726
22042	Very Low	4.2125
22063	High	1.7957
22063	Low	2.6691
22063	Medium	0.7588
22063	Very High	0.0129
22063	Very Low	0.3433
22118	Low	0.3883
22120	Very High	0.0015
22120	Water	22.9004
22122	Water	8.6361
22134	High	0.4905
22134	Medium	2.9119
22134	Very Low	0.1112
22175	Medium	1.1160
22179	High	2.4456
22179	Low	0.0585
22179	Medium	0.8862
22179	Very High	0.0388
22180	Medium	2.7633
22186	Medium	2.4027
22186	Very High	0.7281
22191	High	0.5029
22191	Medium	0.6019
22191	Very Low	0.2186
22204	High	0.0803
22204	Very Low	0.9184
22207	Medium	0.3249
22207	Very Low	1.8169
22227	Low	0.0517
22227	Very High	0.6379
22227	Very Low	0.0685
22230	Low	0.0231
22230	Very Low	1.5292
22232	Very Low	2.1698
22271	Low	0.0459
22271	Very Low	1.7936
22351	High	1.2418
22351	Low	1.1321
22351	Very High	0.0837
22351	Very Low	0.5030
22353	High	0.4908
22353	Low	0.9892
22353	Medium	0.6212
22353	Very Low	3.6313
22400	High	1.7636
22400	Low	6.8102
22400	Medium	0.9748
22400	NM	3.8989
22400	Very High	0.0228
22400	Very Low	1.8999
22400	Water	0.0501

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
22415	Medium	0.2246
22415	Very High	4.0468
22415	Very Low	0.1192
22455	Low	2.3526
22455	Medium	8.3701
22455	Very High	0.6252
22509	Very High	0.0564
22509	Water	15.2241
22511	Very High	0.0241
22511	Water	6.9090
22512	Very High	0.0181
22512	Water	1.8341
22602	Medium	1.8798
22602	Very High	0.0816
22602	Very Low	0.6027
22604	Low	3.3795
22604	Medium	0.5992
22604	Very High	0.0880
22604	Very Low	5.8225
22636	Very High	1.2093
22636	Water	3.1672
22637	High	0.1799
22637	Low	0.4779
22655	High	2.8943
22655	Very Low	0.0849
22664	High	3.1418
22664	Low	3.5661
22664	Medium	4.0274
22664	Very High	0.9760
22664	Very Low	1.4520
22670	High	1.4023
22670	Medium	1.1800
22670	Very High	0.1589
22726	Very High	0.1519
22726	Water	13.2435
22776	High	0.9975
22776	Low	0.7957
22776	Medium	1.8633
22776	Very High	0.0402
22776	Very Low	0.3597
22780	Low	3.3020
22780	Medium	3.1592
22780	Very High	4.4463
22780	Very Low	1.5706
22780	Water	3.2588
22809	Medium	0.2734
22839	High	1.8460
22839	Medium	0.5929
22843	Medium	0.7392
22845	High	0.8580
22910	High	0.0240
22910	Low	3.3783
22910	Medium	1.2828

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
22910	Very High	0.1324
22910	Very Low	0.9291
22932	High	1.7741
22932	Low	3.5577
22932	Medium	0.3473
22932	Very High	0.0301
22932	Very Low	0.5001
22944	High	2.0556
22944	Low	2.6520
22944	Medium	2.5181
22944	Very High	1.3711
22956	High	1.0031
22956	Low	0.0187
22956	Medium	1.4534
22990	Low	0.6013
230052	Medium	0.7604
230054	High	0.8180
230054	Very High	0.0281
230083	High	2.1616
230083	Low	3.4627
230083	Medium	2.5371
230083	Very High	0.9862
230083	Very Low	1.3717
230088	High	3.0364
230088	Medium	3.1354
230088	Very High	0.1423
230101	High	0.7458
230101	Low	2.7142
230101	Medium	1.7667
230101	Very High	1.5498
230103	Low	0.5277
230110	Low	0.7925
230114	High	1.2143
230114	Low	1.8242
230114	Very High	0.0327
230157	Low	0.0178
230157	Medium	1.0428
230161	Medium	2.6948
230161	Very High	0.8560
230161	Very Low	0.4299
230164	Medium	7.0644
230164	Very High	1.3150
230164	Very Low	0.6663
230200	Medium	0.7745
230200	Very High	0.0404
230201	Medium	0.9430
230202	Low	0.0119
230202	Medium	1.6450
230202	Very High	0.0139
230202	Very Low	0.9700
230205	Medium	0.5904
230205	Very High	0.0115
230205	Very Low	0.7337

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
230210	Medium	2.7545
230210	Very High	0.8254
230216	High	0.0393
230216	Low	0.0785
230221	High	0.7766
230221	Low	0.7588
230221	Medium	4.2323
230221	Very High	6.8354
230221	Very Low	8.1837
230221	Water	0.3153
230222	High	0.4410
230222	Low	3.0036
230222	Medium	10.0398
230222	Very Low	4.5969
230232	High	0.0915
230232	Low	0.0175
230232	Medium	0.1751
230232	Very High	0.0110
230232	Very Low	0.1900
230233	Low	0.0986
230233	Very High	0.0182
230233	Very Low	1.8050
230234	Medium	0.3362
230235	Medium	0.0606
230235	Very High	0.0285
230236	Low	1.7578
230236	Medium	0.0926
230237	Low	0.2478
230237	Very Low	1.7054
230238	Low	0.0714
230238	Medium	0.6187
230239	High	0.5313
230240	High	2.6345
230240	Very High	0.0412
230247	High	0.0065
230247	Medium	0.9732
230249	Medium	0.2477
230250	High	0.1587
230250	Medium	1.0214
230250	Very High	0.0147
230253	Low	0.1253
230253	Medium	0.2149
230267	High	1.3523
230267	Low	0.0410
230267	Medium	1.3350
230267	Very High	3.3060
230273	High	0.1639
230273	Low	0.0275
230273	Medium	3.0547
230274	Medium	1.5778
230288	Medium	0.6811
230289	Medium	0.4797
230290	Medium	0.4252

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
230290	Very High	0.6588
230290	Very Low	0.1398
230291	Very Low	1.0551
230294	High	8.6994
230294	Low	0.2787
230294	Medium	4.0894
230294	NM	4.7245
230294	Very High	0.4154
230294	Very Low	7.0785
230294	Water	0.0422
230306	High	0.1621
230306	Very Low	0.0521
230307	High	0.1866
230307	Medium	0.2642
230307	Very Low	0.2067
230308	High	3.6066
230308	Low	1.9834
230308	Very Low	3.2550
230313	Low	0.5826
230313	Medium	0.3389
230313	Very Low	0.8607
230318	Medium	0.6243
230322	Medium	2.3674
230322	Very High	0.0224
230332	Medium	0.0697
230381	Medium	0.4690
230392	Low	1.7633
230392	Very High	0.0163
230392	Very Low	0.4734
230410	High	1.1316
230410	Low	0.0166
230411	High	0.9505
230428	High	0.0574
230428	Very High	0.3264
230428	Water	0.0348
230449	Medium	0.3194
230449	Very High	0.0901
230452	Medium	9.8272
230456	High	0.1666
230456	Very High	0.3377
230457	High	0.1653
230457	Medium	2.4643
230457	Very High	0.3460
230466	Medium	0.2093
230468	Low	1.7423
230468	Medium	4.0046
230468	Very High	0.0597
230468	Very Low	0.5257
230490	Very High	0.6169
230490	Very Low	0.0735
230508	High	0.8834
230508	Low	1.1750
230508	Medium	0.9198

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
230508	Very High	0.1518
230510	High	0.1181
230510	Low	0.2650
230510	Medium	0.1912
230531	High	2.5700
230531	Low	0.0622
230531	Medium	0.0520
230531	Very High	1.3603
230535	High	4.4303
230535	Low	0.2103
230535	Medium	2.0595
230535	Very High	0.1350
230535	Very Low	7.5158
230538	High	0.3338
230538	Low	1.2315
230538	Medium	0.0090
230538	Very High	0.0161
230538	Very Low	3.1616
230542	Very Low	0.1220
230590	Very High	0.7571
230592	Low	0.0508
230592	Medium	0.5659
230592	Very High	0.1096
230597	High	0.7695
230597	Low	0.7682
230597	Medium	4.4425
230597	Very High	5.5564
230597	Very Low	7.5621
230612	NM	0.3069
230612	Very High	0.0183
230612	Water	50.6419
230613	Very High	0.0075
230613	Water	22.7223
230627	Medium	2.8064
230627	Very High	0.0293
230627	Very Low	2.8892
230642	Medium	0.0980
230656	High	0.4578
230656	Low	0.2325
230656	Medium	4.3477
230656	Very High	4.9454
230656	Very Low	5.4413
230657	High	0.3157
230657	Low	0.5385
230657	Very High	0.1903
230657	Very Low	2.2916
230658	High	0.8213
230658	Low	1.4558
230658	Medium	1.7376
230658	Very High	0.7556
230658	Very Low	6.0361
230659	Low	0.5752
230659	Medium	1.2391

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
230659	Very Low	3.8842
230660	Low	5.3832
230660	Medium	8.4174
230660	Very High	0.1937
230660	Very Low	1.6200
230666	High	0.8562
230666	Low	1.2052
230666	Medium	0.0746
230666	Very Low	6.2550
230668	High	7.7253
230668	Low	6.9794
230668	Medium	8.5683
230668	Very High	3.8157
230672	High	1.1140
230672	Medium	3.1801
230672	Very High	0.2039
230673	High	1.2420
230673	Very High	1.4583
230673	Very Low	0.1033
230685	High	5.5640
230685	Low	1.8661
230685	Medium	6.1432
230685	Very High	0.4399
230685	Very Low	10.6828
230686	Low	5.5070
230686	Medium	1.6919
230686	Very High	1.0411
230686	Very Low	3.9655
230712	Very Low	0.4307
230712	Water	0.9659
240003	Very High	0.0763
240018	High	9.3174
240018	Low	6.6949
240018	Medium	7.8751
240018	Very High	4.5360
240018	Very Low	3.4774
240018	Water	1.2771
240026	High	3.4158
240026	Low	2.3489
240026	Medium	10.1335
240026	Very High	0.2240
240026	Very Low	8.5794
240027	High	3.5367
240027	Low	2.0014
240027	Medium	9.9244
240027	Very High	0.1422
240027	Very Low	10.4152
240038	High	0.1108
240038	Low	1.0173
240038	Medium	0.3577
240038	Very High	0.1867
240039	High	0.6608
240050	High	2.1611

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
240050	Low	3.4801
240050	Medium	2.5226
240050	Very High	0.9963
240050	Very Low	1.3645
240051	High	0.8255
240051	Water	0.0228
240057X	High	0.0262
240057X	Low	3.8862
240057X	Medium	0.0459
240057X	Very High	0.0263
240057X	Very Low	2.1393
240059	High	4.4581
240059	Low	0.0017
240059	Medium	2.5336
240059	Very High	0.9355
240059	Very Low	2.3728
240060	High	1.6587
240060	Low	5.4576
240060	Medium	0.0537
240060	Very High	31.0337
240060	Very Low	6.6573
240060	Water	0.1136
240061	High	4.6862
240061	Medium	2.4529
240061	Very High	0.9384
240061	Very Low	2.2176
240062	High	1.4317
240062	Low	0.3725
240062	Medium	0.6380
240062	Very High	0.1710
240062	Very Low	1.9253
240076	High	0.1574
240076	Low	0.6579
240076	Medium	0.6009
240076	Very High	0.9185
240076	Very Low	1.2866
240077	Medium	4.4831
240077	Very High	0.4859
240077	Water	0.0726
240094	High	0.9859
240094	Low	0.0547
240094	Medium	0.1575
240094	Very Low	5.6302
240114	High	0.4091
240114	Low	4.3984
240114	Medium	4.0028
240114	Very High	0.3424
240114	Very Low	4.9635
240114	Water	0.0239
240115	High	0.0494
240115	Low	0.0799
240115	Very Low	0.0716
240117	High	2.2312

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
240117	Low	0.4691
240117	Medium	4.3422
240117	Very High	0.0604
240118	Low	1.3014
240118	Medium	8.2533
240118	Very High	0.1148
240119	High	2.3861
240119	Low	3.7972
240119	Medium	18.5869
240119	Very High	0.1836
240123	Low	0.7378
240123	Very Low	0.2991
240133	Very High	0.2353
240143	Very High	0.3579
240147	Very High	2.7932
240147	Very Low	0.0881
240147	Water	0.1408
240155	Medium	0.7518
240155	Very High	1.3692
240155	Very Low	0.0770
240158	Medium	0.4221
240158	Very High	4.7392
240158	Very Low	0.8191
240159	High	1.6083
240159	Low	0.0199
240159	Medium	5.9337
240159	Very High	0.0600
240167	Medium	0.3877
240169	Low	0.2284
240169	Medium	0.0832
240169	Very Low	1.2864
240171	High	0.6794
240171	Low	1.5044
240171	Medium	15.1297
240171	Very High	9.6157
240171	Very Low	17.5565
240174	Low	0.1322
240174	Medium	1.0521
240176	Very High	0.0751
240196	High	1.9713
240196	Low	1.7561
240196	Medium	1.4005
240196	Very High	0.1101
240200	High	0.4137
240200	Low	0.0250
240202	Low	2.9211
240202	Very High	0.0418
240202	Very Low	0.9174
240207	Very High	1.3666
240250	Medium	0.2415
240254	Low	1.2858
240254	Very Low	0.2866
240259	Medium	0.0572

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
240259	Very High	0.1447
240261	Medium	0.4694
240263	Medium	2.0024
240264	Low	2.6042
240264	Medium	1.1691
240264	Very High	2.0671
240272	High	0.7640
240272	Medium	0.1852
240328	Low	1.1139
240328	Very High	1.1654
240328	Very Low	1.8516
240334	Low	0.1089
240334	Very High	0.3793
240334	Very Low	0.1847
240350	Low	0.3430
240350	Medium	0.5418
240355	Low	0.7787
240355	Medium	0.4535
240355	Very Low	0.9141
240358	Medium	0.1750
240358	Very High	1.9959
240358	Very Low	0.1317
240359	High	0.2743
240359	Medium	0.7411
240360	High	1.7497
240366	High	0.6869
240366	Very Low	0.7140
240372	Low	2.3123
240372	Medium	2.6634
240372	Very High	0.1364
240374	High	2.7411
240374	Low	2.8619
240374	Medium	4.3958
240374	Very High	0.0199
240374	Water	0.0261
240375	High	1.4875
240375	Low	0.0174
240375	Medium	4.4900
240375	Very High	0.0656
240376	Low	0.8468
240376	Medium	0.0367
240377	High	0.3189
240377	Low	0.4709
240377	Very High	0.0188
240379	Low	0.5294
240379	Very Low	0.1437
240385	High	0.0200
240385	Low	0.6213
240385	Medium	0.4244
240385	Very High	0.0372
240385	Very Low	0.0045
240398	Low	0.3335
240403	High	0.4222

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
240403	Low	0.2067
240403	Very High	0.0280
240404	High	0.5229
240408	Low	0.3223
240408	Medium	0.0098
240411	Low	0.6904
240411	Medium	0.0733
240411	Very Low	0.1083
240412	Low	0.8176
240427	High	0.3454
240427	Low	2.4091
240427	Medium	0.6783
240427	Very Low	1.0437
240430	Low	1.3154
240430	Medium	0.8544
240430	Very High	0.0440
240436	High	0.7107
240439	High	0.8287
240439	Low	21.0577
240439	Medium	3.7927
240439	Very High	0.5404
240439	Water	0.3105
240443	High	0.5138
240463	High	0.0715
240463	Low	1.7924
240463	Medium	0.0775
240463	Very High	0.4156
240464	High	0.9516
240464	Low	0.3547
240464	Medium	5.6064
240464	Very High	1.7602
240464	Very Low	0.5196
240466	High	15.5018
240466	Low	3.8672
240466	Medium	13.4539
240466	Very High	4.8094
240466	Very Low	3.7990
240466	Water	0.1202
240469	Low	0.0364
240469	Medium	3.0804
240469	Very High	1.4386
240469	Water	0.0191
240477	High	0.7727
240477	Medium	1.8554
240481	High	2.9215
240481	Low	0.2126
240481	Very High	0.5442
240481	Water	0.2066
240482	Medium	1.4767
240484	High	1.3574
240484	Low	2.0893
240484	Medium	1.6179
240484	Very High	1.6496

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
240485	High	0.9005
240485	Low	6.1665
240485	Medium	0.3582
240485	Very High	0.0500
240491	High	0.4934
240491	Low	0.5456
240491	Medium	3.1258
240492	High	0.5029
240492	Medium	2.3784
240492	Very High	0.0393
240506	Medium	0.7198
240507	High	0.4057
240507	Low	0.0175
240513	High	0.2204
240513	Low	3.1167
240513	Medium	4.8422
240513	Very High	0.1103
240513	Very Low	2.5433
240514	High	0.3163
240514	Medium	4.2828
240514	Very High	0.0548
240515	Very Low	0.9654
240516	High	0.9036
240516	Low	0.0557
240516	Medium	5.1315
240516	Very High	0.0183
240517	High	0.1775
240517	Low	0.8576
240517	Medium	2.8667
240517	Very High	0.1976
240518	High	0.0494
240518	Medium	0.8016
240518	Very High	0.0304
240519	High	1.8302
240519	Medium	3.5640
240519	Very High	0.0264
240523	High	0.7310
240523	Low	0.3368
240523	Very High	0.2314
240523	Very Low	1.7131
240545	Very Low	0.7115
240552	High	0.1643
240552	Very High	0.1780
240552	Very Low	0.0103
240581	High	0.2793
240581	Low	4.9118
240581	Medium	2.4788
240581	Very High	0.0452
240581	Very Low	1.2115
240583	High	0.0568
240583	Low	5.6485
240583	Medium	10.7530
240583	NM	0.0004

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
240583	Very High	0.1122
240584	Low	0.3147
240584	Medium	0.3328
240584	Very Low	0.6936
240587	High	4.5894
240587	Low	0.9430
240587	Medium	0.1591
240587	Very High	0.1780
240587	Very Low	3.1261
240588	High	4.7585
240588	Low	1.2638
240588	Medium	0.8190
240588	Very High	0.1715
240588	Very Low	6.0526
240590	High	3.5349
240590	Low	2.0016
240590	Medium	9.3302
240590	Very High	0.1417
240590	Very Low	10.4897
240591	High	0.9185
240591	Low	0.0187
240591	Medium	0.9059
240617	High	2.1068
240617	Low	5.3323
240617	Medium	0.3098
240617	Very High	1.6431
240617	Very Low	6.1754
240617	Water	0.0490
240629	High	0.2621
240629	Low	0.4685
240629	Medium	0.2674
240636	Medium	0.4668
240636	Very High	0.0530
240636	Water	0.0285
240637	Medium	1.1166
240641	Very Low	0.6151
240668	High	0.5029
240668	Medium	0.3158
240668	Very Low	0.3491
240671	High	0.1827
240671	Medium	0.0513
240671	Very High	0.0664
240683	High	0.1226
240683	Low	0.0357
240691	High	2.1745
240691	Low	2.5128
240691	Medium	0.2616
240691	Very Low	2.2712
240717	Low	1.4506
240717	Medium	0.3154
240717	Very Low	0.1788
240736	High	8.5507
240736	Low	5.2252

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
240736	Medium	5.0420
240736	Very High	4.9474
240736	Very Low	7.8105
240736	Water	0.0495
240737	High	7.7175
240737	Low	4.1061
240737	Medium	2.4508
240737	Very High	3.5955
240737	Very Low	4.0153
240737	Water	0.0495
94089	Low	0.1123
94089	Medium	0.3408
94089	Very High	1.2111
94089	Very Low	1.4276
94151	Low	6.6247
94151	Medium	4.6651
94151	Very High	0.0268
94151	Very Low	0.4981
94152	Low	0.0145
94152	Medium	2.9465
94152	Very High	0.0293
94152	Very Low	2.9945
94506	High	0.6712
94506	Low	0.0501
94506	Medium	0.4386
94506	Very High	2.4373
94506	Water	0.0444
94644	Low	0.6048
94644	Very Low	2.1790
98115	Low	0.1019
98115	Very Low	3.1849
98119	Low	0.7118
98119	Medium	0.9436
98133	Medium	0.2534
98133	Very Low	1.0018
98134	High	1.3739
98134	Medium	0.3982
98134	Very High	0.2086
98134	Very Low	2.2119
98147	High	6.2574
98147	Low	0.1766
98147	Medium	2.2539
98147	Very Low	4.9194
98154	High	1.5398
98154	Medium	0.2401
98154	Very High	0.3701
98154	Very Low	0.9906
98194	High	0.2868
98194	Very High	0.0382
98196	Very Low	1.1282
98204	High	0.2758
98204	Low	0.5685
98204	Medium	0.0695

TABLE F-3b: Linear Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Length*
98204	Very Low	0.1550
98207	Medium	1.9922
98207	Very High	2.7149
98207	Water	0.3852
98999	Low	2.8463
98999	Medium	0.3552
98999	Very Low	1.2513

TABLE F-3c: Point Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*
22190	L
21786	H
22355	M
21451	M
21472	VH
21210	VH
21787	M
22246	M
230269	VH
230284	VH
230356	M
230363	M
230532	L
230574	M
230341	VL
22656	H
22195	VL
240313	VL
240313	VL
240213	L
240025	H
240065	M
230206	VL
230212	L
22632	VL
230505	M
240142	VL
240142	L
230704	VH
230417	VH
230596	VL
22226	VH
22795	M
22002	VH
22156	M
22100	M
21609	VL
22261	L
22164	M
21126	VH
21208	VL
21607	M
21306	VL
22873	M
22811	L
22829	L
22854	H
22878	H
22985	VH
21103	L
21144	VH
21702	M
21722	H

L: Low
M: Medium
H: High
VL: Very Low
VH: Very High

94012	L
94073	VL
98222	VL
21123	L
21114	H
21114	L
230105	H
230170	M
230132	L
230262	H
230255	L
230422	VL
94691	VL
21475	VL
21477	L
21489	M
230368	M
230445	H
230407	M
21785	M
230218	M
230266	L
230580	M
230518	M
230492	M
21214	M
230425	H
22006	VH
230635	L
22350	VL
240180	M
240557	L
21341	L
22282	VH
22229	VL
22794	VH
22279	VH
21606	M
22756	VL
21615	VL
94075	VL
21602	VH
230326	L
22629	VH
230321	VH
240441	H
240562	M
240024	VH
240048	M
240052	H
240063	M
240318	VH
21603	L
240037	M
240047	M
240139	H

240529	VL
240524	M
240554	H
240554	H
240570	H
240405	L
240425	M
240414	M
240160	L
240161	VL
240456	H
240136	L
240611	M
240710	M
240532	M
240532	M
240532	L
240532	H
240667	VL
21093	M
240625	L
240546	VH
240547	VL
240179	L
21341	L
22062	L
230370	M
21342	VH
22634	M
240498	H
240415	VH
22979	L
240226	VH
22388	H
22360	L
22779	L
230684	H
22769	M
22769	M
230066	H
240015	M
240473	H
240526	VH
240526	VH
240526	VL
240526	VL
240014	VH
240055	L
22614	VH
230123	VL
240656	M
240041	H
240525	VH
240210	L
21205	VL
22352	M

230203	M
240640	VH
240649	VH
98179	H
240034	VH
240082	L
230555	VL
240067	L
240067	L
22895	VH
22965	M
230265	H
22814	L
22883	M
22883	M
22883	M
22883	M
22883	M
230638	M
230687	L
240295	L
240295	M
240304	L
240085	H
240349	VH
230246	M
22990	L
22990	L
230110	L
240175	M
230293	M
21704	M
22746	H
22746	H
240208	M
240457	VL
240487	W
240487	W
230286	VH
230322	M
22082	VH
240716	L
230232	VL
240468	M
230581	VH
230581	VH
230581	VH
230581	W
240295	M
240295	L
240304	M
240304	L
240304	M
22990	L
22746	H
22746	H

240208	M
240208	M
240208	H
230637	M
230581	VH
230581	VH
230581	W
22390	VL
240101	W
240324	W
21325	H
22760	VH
240074	VL
240074	L
240074	VL
240074	M
240074	VL
240074	M
21100	M
240100	W
230643	M
240062	H
240074	L
240074	L
240074	M
240074	M
240671	VH
98207	M
98207	VH
230084	H
230101	L
240147	VH
240147	VH
98154	VL
240672	VL
240083	VH
240057X	L

TABLE F-3d: Polygon Projects in a Liquefaction Zone

RTP_ID	*Liquefaction Hazard*	*Acres*
240163	High	6.7507
240163	Low	6.0122
240163	Very High	184.5960
240163	Very Low	53.1080
240399	Low	13.3334
240399	Very Low	122.7714
240400	Very High	395.9835
240400	Very Low	82.6368
240400	Water	0.9436
240728	Low	17.5537
240728	Medium	1018.2873
240728	Very High	2781.7277
240728	Very Low	1032.9596
240728	Water	396.4529

Appendix G: Water Resources

TABLE G-1a: PDA Projects in a Flood Zone

PDA Name	*Acres*
Alameda County Unincorporated: Castro Valley BART	10.8322
Alameda County Unincorporated: Hesperian Corridor	7.263
Alameda: Naval Air Station	77.8576
Alameda: Northern Waterfront	21.4864
Albany: San Pablo Avenue & Solano Avenue	0.2962
American Canyon: Highway 29 Corridor	2.0735
Antioch: Hillcrest eBART Station	43.91
Antioch: Rivertown Waterfront	129.6347
Belmont: Villages of Belmont	1.543
Benicia: Downtown	6.2089
Benicia: Northern Gateway	198.3631
Berkeley: San Pablo Avenue	0.0013
Burlingame: Burlingame El Camino Real	53.9363
Campbell: Central Redevelopment Area	6.1883
Campbell: VTA City Cores, Corridors & Station Areas	3.5087
Cloverdale: Downtown/SMART Transit Area	185.904
Concord: Community Reuse Area	147.6725
Concord: Downtown BART Station Planning	1.9192
Contra Costa County Unincorporated: Contra Costa Centre	0.3182
Contra Costa County Unincorporated: Downtown El Sobrante	28.9023
Contra Costa County Unincorporated: North Richmond	65.3456
Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	1.8402
Cotati: Downtown and Cotati Depot	1.0651
Cupertino: VTA City Cores, Corridors & Station Areas	2.3646
Daly City: Mission Boulevard	1.7923
Danville: Downtown Danville	15.0306
Dublin: Downtown Specific Plan Area	46.1342
Dublin: Town Center	8.9427
Dublin: Transit Center	33.8319
East 14th Street and Mission Boulevard Mixed Use Corridor	25.5736
East Palo Alto: Ravenswood	141.8502
El Cerrito: San Pablo Avenue Corridor	7.4959
Fairfield: Downtown South (Jefferson Street)	17.0143
Fairfield: Fairfield-Vacaville Train Station	319.0479
Fairfield: North Texas Street Core	0.0832
Fairfield: West Texas Street Gateway	21.9499
Fremont: Centerville	25.1576
Fremont: City Center	12.1809
Fremont: Irvington District	48.5763
Fremont: South Fremont/Warm Springs	39.5707
Gilroy: Downtown	17.9594
Hayward: Downtown	6.8132
Hayward: Mission Corridor	1.1486
Hayward: South Hayward BART	24.1148
Hayward: The Cannery	0.3158

TABLE G-1a: PDA Projects in a Flood Zone

PDA Name	*Acres*
Hercules: Central Hercules	7.5265
Hercules: Waterfront District	40.3615
Lafayette: Downtown	24.5083
Livermore: Isabel Avenue/BART Station Planning Area	41.2422
Livermore: Vasco Road Station Planning Area	32.6882
Los Gatos: VTA City Cores, Corridors & Station Areas	3.2835
Marin County Unincorporated: Urbanized 101 Corridor	102.7517
Martinez: Downtown	45.3221
Menlo Park: El Camino Real Corridor and Downtown	0.2706
Millbrae: Transit Station Area	1.2409
Milpitas: Transit Area	230.181
Milpitas: VTA City Cores, Corridors & Station Areas	91.1609
Moraga: Moraga Center	8.3051
Morgan Hill: Downtown	74.4123
Mountain View: Downtown	5.1013
Mountain View: El Camino Real Corridor	24.0896
Mountain View: North Bayshore	407.6617
Mountain View: San Antonio Center	1.045
Napa: Downtown Napa	44.3994
Napa: Soscol Gateway Corridor	241.1815
Newark: Dumbarton Transit Oriented Development	78.1265
Oakland: Coliseum BART Station Area	13.3909
Oakland: Downtown & Jack London Square	57.7625
Oakland: Eastmont Town Center	0.5784
Oakland: Fruitvale & Dimond Areas	12.877
Oakland: MacArthur Transit Village	4.3642
Oakland: Transit Oriented Development Corridors	254.5582
Oakley: Downtown	4.5607
Oakley: Employment Area	163.7004
Oakley: Potential Planning Area	3.3433
Orinda: Downtown	14.4771
Palo Alto: California Avenue	0.7732
Palo Alto: VTA City Cores, Corridors & Station Areas	5.713
Petaluma: Central, Turning Basin/Lower Reach	140.0971
Pinole: Old Town & San Pablo Avenue	4.2494
Pittsburg: Downtown	62.2762
Pittsburg: Railroad Avenue eBART Station	29.0534
Pleasant Hill: Buskirk Avenue Corridor	16.657
Pleasant Hill: Diablo Valley College	16.8454
Pleasanton: Hacienda	43.922
Redwood City: Downtown	7.2342
Redwood City: Veterans Corridor	68.5142
San Bruno: Transit Corridors	3.9156
San Francisco/San Mateo Bi-County Area (with San Francisco)	124.7022
San Jose: Berryessa Station	256.5887

TABLE G-1a: PDA Projects in a Flood Zone

PDA Name	*Acres*
San Jose: Capitol Corridor Urban Villages	42.664
San Jose: Capitol/Tully/King Urban Villages	1.3062
San Jose: Communications Hill	104.5816
San Jose: Downtown "Frame"	207.1056
San Jose: East Santa Clara/Alum Rock Corridor	316.8724
San Jose: Greater Downtown	13.1892
San Jose: North San Jose	1120.8492
San Jose: Oakridge/Almaden Plaza Urban Village	0.0598
San Jose: Stevens Creek TOD Corridor	0.067
San Jose: VTA City Cores, Corridors & Station Areas	454.4993
San Jose: West San Carlos and Southwest Expressway Corridors	9.9179
San Leandro: Bay Fair BART Transit Village	22.0317
San Leandro: Downtown Transit Oriented Development	7.1823
San Leandro: East 14th Street	0.6246
San Mateo: Downtown	0.9977
San Mateo: El Camino	9.3993
San Mateo: Rail Corridor	180.0964
San Pablo: San Pablo Avenue	15.4444
San Rafael: Civic Center/North Rafael Town Center	29.1958
San Rafael: Downtown	157.6987
Santa Clara: El Camino Real Focus Area	37.8271
Santa Clara: Santa Clara Station Focus Area	12.9219
Santa Clara: VTA City Cores, Corridors & Station Areas	33.0195
Saratoga: VTA City Cores, Corridors & Station Areas	4.8252
Sebastopol: Nexus Area	120.7101
South San Francisco: Downtown	21.2736
SUB-AREA: CCAG/Colma	8.5135
SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	2.6133
SUB-AREA: CCAG/Millbrae: Transit Station Area	14.2909
SUB-AREA: CCAG/Redwood City: Downtown	0.7264
SUB-AREA: CCAG/San Carlos: Railroad Corridor	58.3841
SUB-AREA: CCAG/San Mateo County	0.1317
SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	0.4228
SUB-AREA: CCAG/San Mateo: Downtown	47.1095
SUB-AREA: CCAG/South San Francisco	64.4885
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo Aver	30.8505
Suisun City: Downtown & Waterfront	234.5068
Sunnyvale: Downtown & Caltrain Station	0.5824
Sunnyvale: East Sunnyvale ITR	30.1871
Sunnyvale: El Camino Real Corridor	12.2058
Sunnyvale: Lawrence Station Transit Village	46.5844
Sunnyvale: Tasman Station ITR	70.2043
Sunnyvale: VTA City Cores, Corridors & Station Areas	179.075
Union City: Intermodal Station District	2.505
Vacaville: Allison Area	24.2857

TABLE G-1a: PDA Projects in a Flood Zone

PDA Name	*Acres*
Vacaville: Downtown	3.9173
Vallejo: Waterfront & Downtown	27.0933
Walnut Creek: West Downtown	3.8842
Windsor: Redevelopment Area	22.0928

TABLE G-1b: Linear Projects in a Flood Zone

RTP_ID	*County*	*Corridor*	*Class*	*length*
21013	Bay Area Region/Multi-County	Region	Preservation	2.6509
21070	Sonoma	North Bay East-West	Enhancement	0.0347
21116	Alameda	Tri-Valley	Expansion	0.6965
21131	Alameda	Eastshore-South	Expansion	0.0441
21132	Alameda	Fremont-South Bay	Expansion	0.9026
21211	Contra Costa	Delta	Expansion	0.7612
21325	Marin	Golden Gate	System Management	0.9324
21484	Alameda	Fremont-South Bay	Expansion	0.8716
21608	San Mateo	Peninsula	System Management	2.0701
21612	San Mateo	Peninsula	System Management	0.4954
21613	San Mateo	Peninsula	Expansion	2.4326
21627	Bay Area Region/Multi-County	Peninsula	System Management	6.1932
21714	Santa Clara	Silicon Valley	Planning	2.9356
21760	Santa Clara	Silicon Valley	System Management	0.0662
21893	San Mateo	Peninsula	System Management	0.2139
21902	Sonoma	Golden Gate	Expansion	0.0127
21922	Santa Clara	Silicon Valley	Expansion	0.3922
22001	Bay Area Region/Multi-County	Golden Gate	Expansion	9.7321
22009	Alameda	Eastshore-North	Planning	9.5470
22042	Bay Area Region/Multi-County	Sunol Gateway	Expansion	0.3845
22120	San Mateo	Transbay San Mateo-Hayward and Dumbarton Bridges	Expansion	0.1487
22175	Santa Clara	Silicon Valley	Expansion	0.0615
22179	Santa Clara	Silicon Valley	Expansion	0.1097
22186	Santa Clara	Silicon Valley	Expansion	0.7006
22191	Sonoma	Golden Gate	Expansion	0.0669
22351	Contra Costa	Diablo	Expansion	0.0170
22400	Contra Costa	Delta	Planning	2.6532
22455	Alameda	Eastshore-North	System Management	0.2079
22509	Alameda	Transbay Bay Bridge	Expansion	2.3305
22604	Contra Costa	Delta	System Management	0.7464
22664	Alameda	Tri-Valley	System Management	0.6643
22670	Alameda	Eastshore-South	Expansion	0.0926
22726	San Mateo	Transbay Bay Bridge	Expansion	2.2884
22776	Alameda	Tri-Valley	Expansion	0.1709
22780	Alameda	Eastshore-North	System Management	0.3622
22839	Santa Clara	Silicon Valley	System Management	0.4216
22910	Santa Clara	Silicon Valley	System Management	0.0623
22932	Santa Clara	Silicon Valley	System Management	0.0974
22944	Santa Clara	Santa Clara County-wide	Expansion	0.1130
22956	Santa Clara	Silicon Valley	Expansion	1.6922
230054	Alameda	Eastshore-South	System Management	0.0592
230083	Alameda	Tri-Valley	Expansion	0.4961
230088	Bay Area Region/Multi-County	Eastshore-South	Expansion	0.1186
230101	Alameda	Fremont-South Bay	System Management	0.0607
230114	Alameda	Fremont-South Bay	Expansion	0.1077
230157	Alameda	Tri-Valley	Expansion	0.0168
230200	Santa Clara	Santa Clara County-wide	Expansion	0.0246
230202	Contra Costa	Delta	Expansion	0.0642
230210	Santa Clara	Silicon Valley	Preservation	1.1629
230216	Contra Costa	Diablo	Expansion	0.0519
230221	Bay Area Region/Multi-County	Eastshore-North	System Management	0.6193
230222	Bay Area Region/Multi-County	Eastshore-North	System Management	0.1548
230232	Contra Costa	Delta	Expansion	0.0336
230234	Santa Clara	Silicon Valley	System Management	0.1726
230235	Santa Clara	Silicon Valley	Expansion	0.0641
230236	Contra Costa	Delta	Expansion	0.1758
230240	Contra Costa	Diablo	System Management	0.6657
230250	Contra Costa	Delta	Expansion	0.0324
230253	Contra Costa	Delta	Expansion	0.2359
230267	Santa Clara	Silicon Valley	Expansion	0.8290
230273	Santa Clara	Silicon Valley	Expansion	1.6895
230294	Santa Clara	Santa Clara County-wide	Expansion	5.9318
230306	Contra Costa	Delta	Expansion	0.1629
230308	Contra Costa	Diablo	System Management	2.0769
230313	Solano	Solano County-wide	Expansion	0.5744
230318	Contra Costa	Eastshore-North	Expansion	0.0440
230322	Solano	Eastshore-North	Expansion	0.0103
230410	Santa Clara	Santa Clara County-wide	System Management	0.4016
230428	San Mateo	Peninsula	Expansion	0.4185
230452	Santa Clara	Santa Clara County-wide	System Management	0.7556
230457	Santa Clara	Santa Clara County-wide	Expansion	0.0485
230468	Solano	Eastshore-North	Expansion	0.2719
230508	Napa	Napa Valley	Operations and Maintenance	1.1214
230510	Napa	Napa Valley	Expansion	0.0392
230531	Santa Clara	Santa Clara County-wide	System Management	3.4280
230535	Contra Costa	Delta	System Management	2.8528

TABLE G-1b: Linear Projects in a Flood Zone

RTP_ID	*County*	*Corridor*	*Class*	*length*
230538	Contra Costa	Delta	System Management	0.2940
230590	Solano	North Bay East-West	Expansion	0.0996
230592	San Mateo	Peninsula	Enhancement	0.4175
230597	Contra Costa	Eastshore-North	System Management	0.1554
230612	Bay Area Region/Multi-County	Region	Planning	25.3744
230627	Bay Area Region/Multi-County	North Bay East-West	System Management	0.0661
230656	Bay Area Region/Multi-County	Eastshore-North	System Management	0.0876
230658	Bay Area Region/Multi-County	Eastshore-North	Expansion	0.4147
230660	Bay Area Region/Multi-County	Eastshore-North	System Management	0.6592
230668	Bay Area Region/Multi-County	Santa Clara County-wide	System Management	1.0882
230672	Bay Area Region/Multi-County	Transbay San Mateo-Hayward and Dumbarton Bridges	System Management	0.5113
230673	Bay Area Region/Multi-County	Transbay San Mateo-Hayward and Dumbarton Bridges	System Management	0.6973
230685	Bay Area Region/Multi-County	Diablo	System Management	0.7136
230686	Bay Area Region/Multi-County	Diablo	Expansion	0.6220
240018	Alameda	Transbay San Mateo-Hayward and Dumbarton Bridges	Expansion	9.9198
240026	San Mateo	Peninsula	Expansion	1.0351
240027	San Mateo	San Mateo County-wide	System Management	1.0627
240039	Marin	Marin County-wide	Expansion	0.6608
240050	Alameda	Tri-Valley	System Management	0.4641
240051	Alameda	Fremont-South Bay	Expansion	0.5707
240059	Bay Area Region/Multi-County	Sunol Gateway	Expansion	0.0577
240060	San Mateo	Peninsula	System Management	9.9956
240061	Bay Area Region/Multi-County	Sunol Gateway	Expansion	0.0651
240062	Alameda	Sunol Gateway	Expansion	0.3807
240076	Alameda	Tri-Valley	System Management	0.0409
240077	Alameda	Eastshore-South	Expansion	0.0745
240114	San Mateo	San Mateo County-wide	System Management	0.4325
240117	Santa Clara	Santa Clara County-wide	Expansion	3.1101
240118	Santa Clara	Silicon Valley	System Management	0.0472
240119	Santa Clara	Silicon Valley	System Management	4.0043
240159	Santa Clara	Silicon Valley	Enhancement	1.6644
240174	San Mateo	San Mateo County-wide	System Management	0.3815
240176	San Mateo	Transbay San Mateo-Hayward and Dumbarton Bridges	Expansion	0.0751
240196	Alameda	Tri-Valley	Planning	0.6241
240200	Alameda	Tri-Valley	Expansion	0.4387
240207	Alameda	Eastshore-North	Enhancement	0.0224
240272	Alameda	Fremont-South Bay	Expansion	0.9492
240355	Contra Costa	Delta	Expansion	0.1400
240359	Sonoma	Golden Gate	Expansion	0.4733
240360	Sonoma	Golden Gate	Expansion	0.2182
240374	Santa Clara	Silicon Valley	Expansion	2.2050
240375	Santa Clara	Silicon Valley	Expansion	1.1803
240377	Santa Clara	Silicon Valley	Enhancement	0.0958
240379	Santa Clara	Silicon Valley	Expansion	0.2800
240385	Santa Clara	Silicon Valley	Expansion	0.0419
240403	Santa Clara	Silicon Valley	Expansion	0.0626
240404	Santa Clara	Silicon Valley	Expansion	0.0675
240411	Santa Clara	Silicon Valley	System Management	0.0376
240412	Santa Clara	Silicon Valley	Expansion	0.1181
240427	Santa Clara	Silicon Valley	Enhancement	0.0127
240430	Santa Clara	Silicon Valley	Enhancement	0.0177
240436	Santa Clara	Silicon Valley	System Management	0.7107
240439	Santa Clara	Santa Clara County-wide	Expansion	0.7454
240463	Santa Clara	Santa Clara County-wide	System Management	1.0815
240464	Santa Clara	Santa Clara County-wide	System Management	1.9350
240466	Santa Clara	Santa Clara County-wide	Expansion	11.9613
240481	Santa Clara	Santa Clara County-wide	System Management	1.2159
240482	Santa Clara	Santa Clara County-wide	Expansion	0.2466
240484	Santa Clara	Santa Clara County-wide	System Management	0.3347
240485	Santa Clara	Santa Clara County-wide	Expansion	0.0224
240492	Santa Clara	Santa Clara County-wide	Expansion	1.8507
240507	Santa Clara	Silicon Valley	System Management	0.0127
240513	Santa Clara	Santa Clara County-wide	System Management	0.0573
240514	Santa Clara	Santa Clara County-wide	System Management	0.3782
240516	Santa Clara	Santa Clara County-wide	System Management	1.1873
240517	Santa Clara	Santa Clara County-wide	Expansion	0.1366
240518	Santa Clara	Santa Clara County-wide	Expansion	0.0239
240519	Santa Clara	Santa Clara County-wide	System Management	2.6150
240583	Bay Area Region/Multi-County	Eastshore-North	Expansion	1.4259
240584	Contra Costa	Delta	Expansion	0.0237
240587	Bay Area Region/Multi-County	Diablo	Expansion	0.7162
240588	Bay Area Region/Multi-County	Diablo	Expansion	0.3666
240590	San Mateo	Peninsula	System Management	1.0723
240591	Santa Clara	Silicon Valley	Enhancement	1.4289
240617	Napa	Napa Valley	Expansion	2.7123
240636	Santa Clara	Silicon Valley	Expansion	0.0572

TABLE G-1b: Linear Projects in a Flood Zone

RTP_ID	*County*	*Corridor*	*Class*	*length*
240668	Sonoma	Sonoma County-wide	Expansion	0.0669
240671	Santa Clara	Silicon Valley	Expansion	0.2496
240683	Alameda	Tri-Valley	Enhancement	0.1153
240691	Marin	Golden Gate	Expansion	0.0761
240736	Bay Area Region/Multi-County	Sonoma County-wide	Expansion	12.4490
240737	Sonoma	Sonoma County-wide	Planning	10.9487
94151	Solano	Eastshore-North	Expansion	0.3214
94152	Bay Area Region/Multi-County	North Bay East-West	Expansion	0.0661
94506	Alameda	Fremont-South Bay	Expansion	0.2276
98133	Contra Costa	Diablo	Expansion	0.4423
98134	Contra Costa	Diablo	Expansion	0.2777
98147	Sonoma	Golden Gate	Expansion	0.4816
98154	Marin	Golden Gate	Expansion	0.3833
98194	Contra Costa	Diablo	Expansion	0.0128
98196	Contra Costa	Diablo	System Management	0.0118
98204	San Mateo	Peninsula	Expansion	0.0045
98207	Alameda	Eastshore-South	Expansion	0.7815
98999	Contra Costa	Delta	Expansion	0.0160

TABLE G-1c: Project Projects in a Flood Zone

RTP_ID	*County*	*Corridor*	*Class*
230532	Santa Clara	Santa Clara County-wide	System Management
230704	San Mateo	Peninsula	Expansion
22261	San Mateo	Peninsula	Preservation
21722	Santa Clara	Silicon Valley	Expansion
230105	Marin	Marin County-wide	Preservation
94691	Sonoma	North Bay East-West	System Management
230445	Santa Clara	Santa Clara County-wide	Expansion
240441	Santa Clara	Silicon Valley	System Management
240570	Santa Clara	Santa Clara County-wide	Expansion
240414	Santa Clara	Silicon Valley	System Management
240532	Santa Clara	Santa Clara County-wide	Expansion
240532	Santa Clara	Santa Clara County-wide	Expansion
240547	Sonoma	Golden Gate	Enhancement
240498	Santa Clara	Silicon Valley	Expansion
240656	Contra Costa	Eastshore-North	Enhancement
240067	San Mateo	Peninsula	System Management
240175	Alameda	Tri-Valley	Enhancement
240101	Alameda	Alameda County-wide	Expansion
240324	Alameda	Alameda County-wide	Preservation
240100	Alameda	Alameda County-wide	Preservation
240671	Santa Clara	Silicon Valley	Expansion
98207	Alameda	Eastshore-South	Expansion
240083	Napa	Napa Valley	Enhancement

Appendix H: Biological Resources

Appendix H: Biological Resources Special-Status Species Table H-1

SPECIAL STATUS SPECIES LIST

TABLE H-1: FOCUSED LIST OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN OR NEAR PROPOSED PLAN BAY AREA PROJECTS

Common Name *Scientific Name*	*Listing Status USFWS/CDFG / CNPS*	*General Habitat*
SPECIES LISTED AS THREATENED OR ENDANGERED		
Invertebrates		
Conservancy fairy shrimp *Branchinecta conservatio*	FE/-- Critical Habitat	Endemic to grasslands of the northern two-thirds of the Central Valley; found in large turbid seasonal pools.
Longhorn fairy shrimp *Branchinecta longiantenna*	FE/-- Critical Habitat	Endemic to the eastern margin of the central coast mountains in seasonal grassland vernal pools; typically found in sandstone depressions or clear-to-turbid clay or grass bottomed pools.
Vernal pool fairy shrimp *Branchinecta lynchi*	FT/-- Critical Habitat	Grassland vernal pools.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE/--	Vernal pools and swales in the Sacramento Valley with clear to highly turbid water; pools commonly found in grass-bottomed swales of unplowed grasslands, also can be mud-bottomed and highly turbid.
San Bruno elfin butterfly *Callophrys mossii bayensis*	FE/--	Coastal scrub.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT/--	Dependent on elderberry bushes, which may occur individually or associated with riparian habitats.
Bay checkerspot butterfly *Euphydryas editha bayensis*	FT/-- Critical Habitat	Serpentine bunchgrass grassland.
Mission blue butterfly *Plebejus icarioides missionensis*	FE/--	Grasslands with *Lupinus albifrons, L. formosa*, and *L. varicolor.*

TABLE H-1: FOCUSED LIST OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN OR NEAR PROPOSED PLAN BAY AREA PROJECTS

Common Name *Scientific Name*	*Listing Status USFWS/CDFG / CNPS*	*General Habitat*
	SPECIES LISTED AS THREATENED OR ENDANGERED	
Callippe silverspot butterfly *Speyeria callippe callippe*	FE/--	Grasslands with *Viola pedunculata* as larval food plant.
Myrtle silverspot butterfly *Speyeria zerene myrtleae*	FE/--	Grasslands with *Viola pedunculata* as larval food plant.
California freshwater shrimp *Syncaris pacifica*	FE/CE	Large, slow-moving freshwater streams in Sonoma and Napa Counties.
Fish		
Tidewater goby *Eucyclogobius newberryi*	FE/CSC Critical Habitat	Shallow waters of bays and estuaries, critical habitat in Marin County.
Fish (cont.)		
Delta smelt *Hypomesus transpacificus*	FT/CT Critical Habitat	Brackish-water channels and sloughs of the Sacramento – San Joaquin Delta.
Coho salmon – central California ESU *Oncorhynchus kisutch*	FE/CE	Unblocked Bay Area and coastal rivers and streams; particularly cooler water streams in Marin, Sonoma, and Napa Counties, and the Sacramento – San Joaquin Delta.
Central California coast steelhead *Oncorhynchus mykiss irideus*	FT/-- Critical Habitat	Drainages of central California coastal rivers.
South Central California coast steelhead *Oncorhynchus mykiss irideus*	FT/--	Drainages of California coastal rivers between the San Francisco Bay Area and Los Angeles.
Central coast Chinook salmon *Oncorhynchus tshawytscha*	FT/CSC Critical Habitat	Drainages of central California coastal rivers.
Amphibians		
California tiger salamander *Ambystoma californiense*	FT/CT Critical Habitat	Wintering sites occur in grasslands occupied by burrowing mammals; breed in ponds, vernal pools, and slow-moving or receding streams.
California red-legged frog *Rana draytonii*	FT/CSC Critical Habitat	Breed in stock ponds, pools, and slow-moving streams with emergent vegetation; adjacent upland habitats are often used outside the breeding season.
Reptiles		

TABLE H-1: FOCUSED LIST OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN OR NEAR PROPOSED PLAN BAY AREA PROJECTS

Common Name *Scientific Name*	*Listing Status USFWS/CDFG / CNPS*	*General Habitat*
SPECIES LISTED AS THREATENED OR ENDANGERED		
Alameda whipsnake *Masticophis lateralis euryxanthus*	FT/CT Critical Habitat	Coastal scrub of the East Bay Hills broken by scattered grassy patches, on rocky hillsides, gullies, or canyons with stream courses.
Giant garter snake *Thamnophis gigas*	FT/CT	Typically found in Central Valley wetlands, this species requires permanent or semi permanent water and dense vegetation of freshwater marshes and permanent streams. May also use drainage canals and irrigation ditches that hold water through most of the year.
San Francisco garter snake *Thamnophis sirtalis tetrataenia*	FE/CE	Freshwater ponds and slow streams with emergent vegetation; nearby upland grasslands with small rodent burrows may also provide habitat for this species. Little is known about the seasonal movements of this species or its capacity for using upland areas.
Birds		
Marbled murrelet *Brachyramphus marmoratus*	FT/CE Critical Habitat	Nests in dense, old-growth forests along coast, critical habitat in Marin and Sonoma Counties.
Swainson's hawk *Buteo swainsoni*	--/CT	Nests in oaks or cottonwoods in or near riparian habitat. Forages in grasslands and agricultural fields.
Western snowy plover *Charadrius alexandrinus nivosus*	FT/CSC Critical Habitat	Nests and forages on sandy beaches on marine and estuarine shores; requires sandy, gravelly, or friable soils for nesting; may nest on salt pond levees or other suitable barren habitat.
American peregrine falcon *Falco peregrinus anatum*	--/CE	Forages in marshes and grasslands. Nesting habitat includes high, protected cliffs and ledges near water.
California black rail *Laterallus jamaicensis coturniculus*	--/CT, CDFG FP	Nests and forages in tidal emergent wetland with pickleweed.
California clapper rail *Rallus longirostris obsoletus*	FE/CE, CDFG FP	Nests and forages in emergent wetlands with pickleweed, cordgrass, and bulrush.
California least tern *Sterna antillarum browni*	FE/CE	Nests along the coast from San Francisco Bay south to northern Baja California; colonial breeder on bare or sparsely vegetated flat substrates including sand beaches, alkali flats, landfills, or paved areas.
Northern spotted owl *Strix occidentalis caurina*	FT/-- Critical Habitat	Nest in large trees in old-growth or mature forests.
Mammals		

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Common Name *Scientific Name*	*Listing Status USFWS/CDFG / CNPS*	*General Habitat*
SPECIES LISTED AS THREATENED OR ENDANGERED		
Salt marsh harvest mouse *Reithrodontomys raviventris*	FE/CE/CDFG fully protected	Saline emergent marshlands with dense pickleweed.
San Joaquin kit fox *Vulpes macrotis mutica*	FE/CT	Patchily distributed in the Diablo Range and south to Bakersfield in undeveloped grasslands and agricultural land.
Plants		
Sonoma alopecurus *Alopecurus aequalis* var. *franciscanum*	FE/--/1B.1	Freshwater marshes and swamps, riparian scrub, wetland.
Large-flowered fiddleneck *Amsinckia grandiflora*	FE/CE/1B.1	Valley grassland and foothill woodland, this species has been reported from Contra Costa County, Alameda, and Santa Clara Counties.
San Bruno Mtn. manzanita *Arctostaphylos imbricata*	--/CE/1B.1	Chaparral, coastal scrub.
Plants (cont.)		
Pacific manzanita *Arctostaphylos pacifica*	--/CE/1B.2	Chaparral, coastal scrub.
Pallid manzanita *Arctostaphylos pallida*	FT/CE/1B.1	Chaparral habitats in Alameda and Contra Costa Counties.
Sonoma sunshine *Blennosperma bakeri*	FE/SE/1B.1	Valley and foothill grassland, vernal pool, wetland.
Round-leaved filaree *California macrophylla*	--/--/1B.1	Cismontane woodland, valley and foothill grassland.
Tiburon Indian paintbrush *Castilleja affinis* ssp. *neglecta*	FE/CT/1B.2	Dry slopes in the Coast Ranges from San Mateo to Sonoma Counties.
Coyote ceanothus *Ceanothus ferrisae*	FE/--/1B.1	Dry serpentine slopes in foothill woodlands and chaparral habitats in the Santa Cruz Mountains.
Soft bird's beak *Chloropyron molle* ssp. *molle*	FE/CR/1B.2 Critical Habitat	Heavy clay soils of either coastal salt or brackish marshes of northern San Francisco Bay.
Robust spineflower *Chorizanthe robusta* var. *robusta*	FE/--/1B.1	Coastal scrub, coastal sand dunes, openings in oak woodlands with sandy or gravelly soil.
Crystal Springs fountain thistle *Cirsium fontinale* var. *fontinale*	FE/CE/1B.1	Grassland and openings in chaparral, in serpentinite seeps.
Suisun thistle *Cirsium hydrophilum* var. *hydrophilum*	FE/CE/1B.1	Brackish marshes around Suisun Bay.

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SPECIES LISTED AS THREATENED OR ENDANGERED		
Presidio clarkia *Clarkia franciscana*	FE/CE/1B.1	Coastal scrub, grassland (ultramafic).
Mt. Diablo bird's beak *Cordylanthus nidularius*	--/CR/1B.1	Serpentine slopes in chaparral habitats in Contra Costa County near Mt. Diablo.
Baker's larkspur *Delphinium bakeri*	FE/SE/1B.1 Critical Habitat	Coastal scrub, valley and foothill grassland.
Yellow larkspur *Delphinium luteum*	FE/CR/1B.1 Critical Habitat	Sea bluffs and northern coastal scrub.
Santa Clara Valley dudleya *Dudleya abramsii* ssp. *setchellii*	FE/--/1B.1	Ultramafic grasslands.
San Mateo woolly sunflower *Eriophyllum latilobum*	FE/CE/1B.1	Grassland, woodland slopes.
Plants (cont.)		
Contra Costa wallflower *Erysimum capitatum* ssp. *angustatum*	FE/CE/1B.1	Antioch Dunes along the San Joaquin River; Contra Costa County.
Marin western flax *Hesperolinon congestum*	FT/CT/1B.1	Grassland and openings in chaparral, often on serpentinite.
Contra Costa goldfields *Lasthenia conjugens*	FE/--/1B.1 Critical Habitat	Moist grasslands, vernal pools.
San Francisco lessingia *Lessingia germanorum*	FE/SE/1B.1	Coastal scrub.
Sebastapol meadowfoam *Limnanthes vinculans*	FE/SE/1B.1	Meadow and seep, valley and foothill grassland, vernal pool, wetland.
Few-flowered navarretia *Navarretia leucocephala* ssp. *pauciflora*	FE/ST/1B.1	Vernal pool, wetland.
Many-flowered navarretia *Navarretia leucocephala* ssp. *plieantha*	FE/SE/1B.2	Vernal pool, wetland.
White-rayed pentachaeta *Pentachaeta bellidiflora*	FE/CE/1B.1	Coastal scrub, grassland.
San Francisco popcorn flower *Plagiobothrys diffusus*	--/CE/1B.1	Grasslands with marine influence.
Metcalf Canyon jewel flower *Streptanthus albidus* ssp. *albidus*	FE/--/1B.1	Serpentine outcrops in chaparral habitats.

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Common Name *Scientific Name*	*Listing Status* *USFWS/CDFG* */ CNPS*	*General Habitat*
SPECIES LISTED AS THREATENED OR ENDANGERED		
Tiburon jewel-flower *Streptanthus niger*	FE/CE/1B.1	Serpentine slopes among coastal prairie habitat; Marin County.
Showy rancheria clover *Trifolium amoenum*	FE/--/1B.1	Coastal bluff scrub, ultramafic valley and foothill grassland.
Solano grass *Tuctoria mucronata*	FE/CE/1B.1	Vernal pools in valley grassland habitats; Solano County.
OTHER SPECIES OF SPECIAL CONCERN		
Invertebrates		
Monarch butterfly *Danaus plexippus*	--/*	Eucalyptus groves (winter sites).

TABLE H-1: FOCUSED LIST OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN OR NEAR PROPOSED PLAN BAY AREA PROJECTS

Common Name *Scientific Name*	*Listing Status* *USFWS/CDFG* */ CNPS*	*General Habitat*
	OTHER SPECIES OF SPECIAL CONCERN	
Fish		
Sacramento perch *Archoplites interruptus*	--/CSC	Slow-moving sloughs, streams, rivers, and lakes.
Russian river tule perch *Hysterocarpus traski pomo*	--/CSC	Endemic to streams of the Russian River watershed; prefer aquatic habitat with wood debris associated with riparian woodland.
Sacramento splittail *Pogonichthys macrolepidotus*	--/CSC	Large sloughs and dead-end sloughs of the Sacramento – San Joaquin Delta that are fed by freshwater streams. Juveniles and adults utilize shallow edgewater areas lined by emergent aquatic vegetation.
Amphibians		
Foothill yellow-legged frog *Rana boylii*	--/CSC	Streams with quiet pools absent of predatory fish.
Western spadefoot *Spea hammondii*	--/CSC	Floodplains and grassland pools.
Reptiles		
Silvery legless lizard *Anniella pulchra pulchra*	--/CSC	In areas with sandy or loose loamy soils, including beaches, chaparral, pine-oak woodland, or riparian stream terraces.
Western pond turtle *Emys marmorata*	--/CSC	Freshwater ponds and slow streams edged with sandy soils for laying eggs.
San Joaquin whipsnake *Masticophis flagellum ruddocki*	--/CSC	Prairie, scrublands, woodlands, farmlands, or grasslands with varying amounts of cover.
Reptiles		
California horned lizard *Phrynosoma blainvillii*	--/CSC	Patchy open areas with sandy soils and available ant food sources.
Birds		
Cooper's hawk *Accipiter cooperii*	CDFG 3503.5	Nests in riparian growths of deciduous trees and live oak woodlands.
Sharp-shinned hawk *Accipiter striatus*	CDFG 3503.5	Nests in riparian growths of deciduous trees and live oaks.
Tricolored blackbird *Agelaius tricolor*	--/CSC	Nests in freshwater marshes with dense stands of cattails or bulrushes, occasionally in willows, thistles, mustard, blackberry brambles, and dense shrubs and grains.

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Common Name *Scientific Name*	*Listing Status USFWS/CDFG / CNPS*	*General Habitat*
OTHER SPECIES OF SPECIAL CONCERN		
Birds (cont.)		
Short-eared owl *Asio flammeus*	--/3503.5	Nests in dry ground within salt and freshwater marshes; requires dense tule patches or tall grass.
Long-eared owl *Asio otis*	--/3503.5	Nests in riparian or oak woodlands near stream courses.
Golden eagle *Aquila chrysaetos*	--/CSC, CDFG FP	Nests in mountainous or hilly terrain and hunts over open grasslands habitats; common in Diablo Range.
Grasshopper sparrow *Ammodramus savannarum*	--/CSC	Nests and forages in dense, dry grasslands.
Great egret *Ardea alba*	--/*	Rookeries protected. Nest colonially in groves of trees. Rookery sites located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes.
Great blue heron *Ardea herodias*	--/*	Rookeries protected. Nests in trees along lakes and estuaries.
Burrowing owl *Athene cunicularia*	--/CSC	Nests and forages in low-growing grasslands that support burrowing mammals.
Great horned owl *Bubo virginianus*	--/3053.5	Present in a wide variety of habitats, including woodland, grassland, and some urban areas.
Red-tailed hawk *Buteo jamaicensis*	--/3503.5	Nests in large trees and man-made towers; present in almost any habitat in California.
Red-shouldered hawk *Buteo lineatus*	--/3503.5	Nests in eucalyptus trees and riparian woodland habitats.
Northern harrier *Circus cyaneus*	--/CSC	Nests in coastal freshwater and saltwater marshes, nest and forages in grasslands.
Yellow warbler *Dendroica petechia brewsteri*	--/CSC	Nests near wet habitats, particularly in willow and alder groves.
Northern harrier *Circus cyaneus*	--/3503.5	Nests in salt or freshwater wetlands, forages over wetlands, annual grasslands.
White-tailed kite *Elanus lecurus*	--/CDFG FP	Nests in large trees near annual grassland or wetlands; forages in a variety of habitats, including fresh and saltwater marshes, annual grasslands, orchards, and agricultural fields.
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	--/CSC	Breeds in moist salt marsh habitats with dense, low cover.
Yellow-breasted chat *Icteria virens*	--/CSC	Breeds in woodland edges and neglected pastures in thick willow habitats or shrubby wet meadows.

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	OTHER SPECIES OF SPECIAL CONCERN	
Birds (cont.)		
Loggerhead shrike *Lanius ludovicianus*	--/CSC	Scrub, open woodlands, and grasslands.
Suisun song sparrow *Melospiza melodia maxillaris*	--/CSC	Year-round inhabitant of saline emergent wetlands in Suisun Bay, northern San Francisco Bay, and San Pablo Bay.
Alameda song sparrow *Melospiza melodia pusillula*	--/CSC	Year-round inhabitant of saline emergent wetlands in the south San Francisco Bay.
San Pablo song sparrow *Melospiza melodia samuelis*	--/CSC	Year-round inhabitant of saline emergent wetlands of San Pablo Bay.
Black-crowned night heron *Nycticorax nycticorax*	--/*	Various wetland habitats, including salt, brackish, and freshwater marshes, swamps, streams, lakes, and agricultural fields. Nest in large trees, often with other herons or egrets.
Osprey *Pandion haliaetus*	--/3503.5	Nests near freshwater lakes and large streams on large snags.
Double-crested cormorant *Phalacrocorax auritus*	--/*	Nests along coast on isolated islands or in trees along lake margins.
Purple martin *Progne subis*	--/CSC	Natural nesting sites include old woodpecker holes, snags, and sometimes under bark.
Barn owl *Tyto alba*	--/3503.5	Forages over open grassland farmlands, or interspersed woodland; nests in tree cavities, nest boxes, or buildings.
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	--/CSC	Marsh and swamp, wetland.
Mammals		
Pallid bat *Antrozous pallidus*	--/CSC	Roosts in large-diameter trees.
Townsend's big-eared bat *Corynorhinus townsendii townsendii*	--/CSC	Inhabits oak and conifer woodlands, broad-leaved forests, arid grasslands, deserts, and high mountain meadows.
Greater western mastiff bat *Eumops perotis californicus*	--/CSC	Breeds in rugged, rocky canyons and forages in a variety of habitats.
Western red bat *Lasiurus blossevillii*	--/CSC	Roosts in tree or shrub foliage in riparian habitat, adjacent to open fields, or in orchards.
San Pablo vole *Microtus californicus sanpabloensis*	--/CSC	Brackish-water emergent wetlands; largely confined to a few locations in San Pablo.

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Common Name *Scientific Name*	*Listing Status USFWS/CDFG / CNPS*	*General Habitat*
OTHER SPECIES OF SPECIAL CONCERN		
Mammals (cont.)		
Big free-tailed bat *Nyctinomops macrotis*	--/CSC	Roosts in crevices.
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	--/CSC	Forests with moderate canopy cover and brushy understory.
Suisun shrew *Sorex ornatus sinuosus*	--/CSC	Restricted to natural tidal salt and brackish marshes.
Salt marsh wandering shrew *Sorex vagrans halicoetes*	--/CSC	Inhabits tidal salt marshes dense with pickleweed in the south San Francisco Bay.
American badger *Taxidea taxus*	--/CSC	A variety of open habitats with friable soils.
Plants		
Montara manzanita *Arctostaphylos montaraensis*	--/--/1B.2	Maritime chaparral, coastal scrub.
Marin manzanita *Arctostaphylos virgata*	--/--/1B.2	Brushy slopes at the edge of closed-cone pine forests in Marin County.
Alkali milk-vetch *Astragalus tener* var. *tener*	--/--/1B.2	Alkali playa, valley and foothill grassland, vernal pool, wetland.
Heartscale *Atriplex cordulata* var. *cordulata*	--/--/1B.2	Chenopod scrub, meadow and seep, valley and foothill grassland.
Brittlescale *Atriplex depressa*	--/--/1B.2	Alkali playa, chenopod scrub, meadow and seep, valley and foothill grassland, vernal pool, wetland.
San Joaquin spearscale *Atriplex joaquiniana*	--/--/1B.2	Chenopod scrub, meadow and seep, valley and foothill grassland.
Lesser saltscale *Atriplex minuscule*	--/--/1B.1	Alkali playa, chenopod scrub, valley and foothill grassland.
Vernal pool smallscale *Atriplex persistens*	--/--/1B.2	Vernal pool, wetland.
Big-scale balsamroot *Balsamorhiza macrolepis*	--/--/1B.2	Cismontane woodland, ultramafic valley and foothill grassland.
Big tarplant *Blepharizonia plumosa*	--/--/1B.1	Valley and foothill grassland.
Mt. Diablo fairy lantern *Calochortus pulchellus*	--/--/1B.2	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland.
Bristly sedge *Carex comosa*	--/--/2.1	Freshwater marsh and swamp, wetland.

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OTHER SPECIES OF SPECIAL CONCERN		
Plants (cont.)		
Congdon's tarplant *Centromadia parryi* ssp. *congdonii*	--/--/1B.2	Valley grassland.
Point Reyes bird's beak *Chloropyron maritimum* ssp. *palustre*	--/--/1B.2	Once common to north-central coastal salt marshes, this species is now restricted to only a few locations from Point Reyes to west Berkeley and south.
San Francisco Bay spineflower *Chorizanthe cuspidata* var. *cuspidata*	--/--/1B.2	Coastal bluff scrub, coastal dunes, coastal prairie, on sandy soils.
Woolly-headed spineflower *Chorizanthe cuspidata* var. *villosa*	--/--/1B.2	Sandy soil, dunes, and northern coastal strand from Santa Cruz to Sonoma Counties.
Santa Clara red ribbons *Clarkia concinna* ssp. *automixa*	--/--/4.3	Chaparral, cismontane woodland.
Hospital Canyon larkspur *Delphinium californicum* ssp. *interius*	--/--/1B.2	Moist areas of the inner Coast Ranges from Contra Costa to Santa Clara counties.
Recurved larkspur *Delphinium recurvatum*	--/--/1B.2	Alkali sink or valley and foothill grassland communities.
Western leatherwood *Dirca occidentalis*	--/--/1B.2	Broad-leaved upland forests, closed-cone coniferous forests, chaparral, cismontane woodland, north coast coniferous forests, riparian forests, riparian woodland; mesic sites.
Brandegee's eriastrum *Eriastrum brandegeae*	--/--/1B.2	Volcanic material in chaparral and foothill woodlands.
Tiburon buckwheat *Eriogonum luteolum* var. *caninum*	--/--/1B.2	Chaparral, cismontane woodland, coastal prairie, valley and foothill grassland.
Mt. Diablo buckwheat *Eriogonum truncatum*	--/--/1B.1	Chaparral, scrub, and grassland habitats of Alameda, Contra Costa, and Solano Counties.
Hoover's button celery *Eryngium aristulaum* var. *hooveri*	--/--/1B.1	Vernal pool, wetland.
Coast wallflower *Erysimum ammophilum*	--/--/1B.2	Sandy coastal habitats.
Diamond-petaled California poppy *Eschscholzia rhombipetala*	--/--/1B.1	Dry flats and brushy slopes below 3,500 feet in elevation.
Hillsborough chocolate lily *Fritillaria biflora* var. *ineziana*	--/--/1B.1	Cismontane woodland, grassland, on serpentinite.
Talus fritillary *Fritillaria falcata*	--/--/1B.2	Serpentine talus slopes in chaparral and foothill woodlands.

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Common Name *Scientific Name*	*Listing Status* *USFWS/CDFG* */ CNPS*	*General Habitat*
	OTHER SPECIES OF SPECIAL CONCERN	
Plants (cont.)		
Marin checker lily *Fritillaria lanceolata* var. *tristulis*	--/--/1B.1	Coastal grasslands of western Marin County.
Fragrant fritillary *Fritillaria liliacea*	--/--/1B.2	Coastal scrub, valley and foothill grassland, coastal prairie; on heavy clay soils, often on ultramafic soils.
Diablo helianthella *Helianthella castanea*	--/--/1B.2	Openings in chaparral and broad-leaved upland forest.
Brewer's western flax *Hesperolinon breweri*	--/--/1B.2	Grassy or brushy serpentine slopes within chaparral or foothill woodlands of the outer Coast Ranges; often partly shaded.
Drymaria-like western flax *Hesperolinon drymarioides*	--/--/1B.2	Dry slopes in foothill woodlands.
Carquinez goldenbush *Isocoma arguta*	--/--/1B.1	Slopes of the Carquinez Straits in Solano and Contra Costa Counties.
Delta tule pea *Lathyrus jepsonii* var. *jepsonii*	--/--/1B.2	Natural edges of sloughs and rivers in the Sacramento – San Joaquin Delta.
Legenere *Legenere limosa*	--/--/1B.1	Vernal pool, wetland.
Heckard's pepper grass *Lepidium latipes* var. *heckardii*	--/--/1B.1	Valley and foothill grassland, vernal pool, wetland.
Crystal Springs lessingia *Lessingia arachnoidea*	--/--/1B.2	Cismontane woodland, coastal scrub, grasslands, on serpentinite, often on roadcuts.
Smooth lessingia *Lessingia micradenia* var. *glabrata*	--/--/1B.2	Dry, open gravel slopes in serpentine or clay; from Santa Cruz Mountains.
Tamalpais lessingia *Lessingia micradenia* var. *micradenia*	--/--/1B.2	Chaparral and mixed evergreen forests on dry gravel or serpentine slopes; from Marin County.
Mason's lilaeopsis *Lilaeopsis masonii*	--/--/1B.1	Freshwater marsh and swamp, riparian scrub, wetland.
Coast lily *Lilium maritimum*	--/--/1B.1	Sandy soils, but also in brush and woods in coastal scrub and coastal coniferous habitats.
Delta mudwort *Limosella subulata*	--/--/2.1	Brackish and freshwater marsh and swamp, riparian scrub, wetland.
Showy madia *Madia radiata*	--/--/1B.1	Grassy slopes in valley grasslands and foothill woodlands of the inner Coast Ranges from Contra Costa to Kern Counties.
Arcuate bush-mallow *Malacothamnus arcuatus*	--/--/1B.2	Chaparral.

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OTHER SPECIES OF SPECIAL CONCERN		
Plants (cont.)		
Hall's bush mallow *Malacothamnus hallii*	--/--/1B.2	Ultramafic chaparral.
Baker's navarretia *Navarretia leucocephala* ssp. *bakeri*	--/--/1B.1	Vernal pools in valley grasslands and foothill woodlands.
Vernal pool navarretia *Navarretia prostrata*	--/--/1B.1	Coastal scrub, valley and foothill grassland, vernal pool, wetland.
Marin County navarretia *Navarretia rosulata*	--/--/1B.2	Serpentine soils; noted in Marin County.
North coast phacelia *Phacelia insularis* var. *continentis*	--/--/1B.2	Coastal strand and sand dunes in Marin and to Mendocino Counties.
Mt. Diablo phacelia *Phacelia phacelioides*	--/--/1B.2	Cismontane woodland, chaparral.
Hairless popcorn-flower *Plagiobothrys glaber*	--/--/1A	Largely confined to coastal salt marsh habitats along the south shore of San Francisco Bay, but also located in alkaline meadows in Santa Clara Valley and further south.
Hooked popcorn-flower *Plagiobothrys uncinatus*	--/--/1B.2	Canyon sides and chaparral habitats.
Rayless ragwort *Senecio aphanactis*	--/--/2.2	Dry, open places including chaparral and coastal sage scrub.
Marin checkerbloom *Sidalcea hickmanii* var. *viridis*	--/--/1B.3	Chaparral, usually on serpentinite.
San Francisco campion *Silene verecunda* var. *verecunda*	--/--/1B.2	Coastal bluff scrub, chaparral, coastal prairie, coastal scrub, grasslands with sandy soil.
Most beautiful jewel-flower *Streptanthus albidus* ssp. *peramoenus*	--/--/1B.2	Chaparral, cismontane woodland, ultramafic valley and foothill grassland
Tamalpais jewel-flower *Streptanthus batrachopus*	--/--/1B.3	Serpentine outcrops within chaparral; reported from Contra Costa and Marin Counties.
Slender-leaved pondweed *Stuckenia filiformis*	--/--/1B.2	Marsh and swamp, wetland.
Suisun marsh aster *Symphyotrichum lentum*	--/--/1B.2	Brackish water, freshwater marsh and swamp, wetland.
San Francisco owl's-clover *Triphysaria floribunda*	--/--/1B.2	Coastal prairie and grasslands, on serpentinite.

TABLE H-1: FOCUSED LIST OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN OR NEAR PROPOSED PLAN BAY AREA PROJECTS

Common Name *Scientific Name*	*Listing Status* *USFWS/CDFG* */ CNPS*	*General Habitat*
OTHER SPECIES OF SPECIAL CONCERN		
Plants (cont.)		
Napa bluecurls *Trichostema ruygtii*	--/--/1B.2	Chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland, vernal pool wetland.
Saline clover *Trifolium hydrophilum*	--/--/1B.2	Marsh and swamp, valley and foothill grassland, vernal pool, wetland.
Caper-fruited tropidocarpum Tropidocarpum capparideum	--/--/1B.1	Alkaline hills, grasslands.

FEDERAL: (U.S. Fish and Wildlife Service)

FE = Listed as Endangered (in danger of extinction) by the Federal Government.
FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by the Federal Government.
FP = Proposed for Listing as Endangered or Threatened.
FC = Candidate to become a *proposed* species.
FSC = former Federal Species of Concern. Species designated as such were listed by the Sacramento FWS office until 2006, when they stopped maintaining their list. These species are still considered to be at-risk species by other federal and state agencies, as well as various organizations with recognized expertise such as the Audubon Society.
MMPA = Marine Mammal Protection Act

STATE: (California Department of Fish and Game)

CE = Listed as Endangered by the State of California
CT = Listed as Threatened by the State of California
CDFG FP = Fully Protected by the State of California
CR = Listed as Rare by the State of California (plants only)
CSC = California Species of Special Concern
3503.5=Protection for nesting species of Falconiformes (hawks) and Strigiformes (owls)
*Special animal—listed on CDFG's Special Animals List

California Native Plant Society

List 1A=Plants presumed extinct in California
List 1B=Plants rare, Threatened, or Endangered in California and elsewhere
List 2= Plants rare, Threatened, or Endangered in California but more common elsewhere
List 3= Plants about which more information is needed
List 4= Plants of limited distribution

An extension reflecting the level of threat to each species is appended to each rarity category as follows:
- .1 – Seriously endangered in California
- .2 – Fairly endangered in California
- .3 – Not very endangered in California

Sources: CDFG, 2012; CNPS, 2012; Hickman et al., 1993; Zeiner and Laudenslayer, 1988-1990

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
Alameda	Alameda County Unincorporated: Meekland Corridor	alkali milk-vetch	11
Alameda	Alameda County Unincorporated: Meekland Corridor	pallid bat	19
Alameda	Alameda County Unincorporated: Meekland Corridor	Santa Cruz tarplant	142
Alameda	Alameda County Unincorporated: Meekland Corridor	western mastiff bat	
Alameda	Alameda: Naval Air Station	Alameda Island mole	
Alameda	Alameda: Naval Air Station	Alameda song sparrow	1575
Alameda	Alameda: Naval Air Station	California least tern	
Alameda	Alameda: Northern Waterfront	adobe sanicle	175
Alameda	Alameda: Northern Waterfront	Alameda Island mole	
Alameda	Alameda: Northern Waterfront	Alameda song sparrow	
Alameda	Alameda: Northern Waterfront	alkali milk-vetch	
Alameda	Alameda: Northern Waterfront	California tiger salamander	
Alameda	Alameda: Northern Waterfront	Kellogg's horkelia	
Alameda	Alameda: Northern Waterfront	robust spineflower	
Alameda	Alameda: Northern Waterfront	saline clover	
Alameda	Albany: San Pablo Avenue & Solano Avenue	Alameda song sparrow	0
Alameda	Albany: San Pablo Avenue & Solano Avenue	Bridges' coast range shoulderband	33
Alameda	Albany: San Pablo Avenue & Solano Avenue	monarch butterfly	1
Alameda	Albany: San Pablo Avenue & Solano Avenue	pallid bat	
Alameda	Albany: San Pablo Avenue & Solano Avenue	saline clover	7
Alameda	Berkeley: Adeline Street	big free-tailed bat	
Alameda	Berkeley: Adeline Street	pallid bat	12
Alameda	Berkeley: Downtown	big free-tailed bat	112
Alameda	Berkeley: Downtown	hoary bat	
Alameda	Berkeley: Downtown	pallid bat	
Alameda	Berkeley: Downtown	round-leaved filaree	
Alameda	Berkeley: San Pablo Avenue	monarch butterfly	0
Alameda	Berkeley: San Pablo Avenue	saline clover	43
Alameda	Berkeley: San Pablo Avenue	Santa Cruz tarplant	
Alameda	Berkeley: South Shattuck	big free-tailed bat	13
Alameda	Berkeley: South Shattuck	hoary bat	
Alameda	Berkeley: South Shattuck	pallid bat	
Alameda	Berkeley: South Shattuck	round-leaved filaree	
Alameda	Berkeley: Telegraph Avenue	big free-tailed bat	
Alameda	Berkeley: Telegraph Avenue	hoary bat	
Alameda	Berkeley: Telegraph Avenue	pallid bat	23
Alameda	Berkeley: Telegraph Avenue	round-leaved filaree	
Alameda	Berkeley: University Avenue	big free-tailed bat	
Alameda	Berkeley: University Avenue	hoary bat	
Alameda	Berkeley: University Avenue	pallid bat	
Alameda	Berkeley: University Avenue	round-leaved filaree	
Alameda	Berkeley: University Avenue	saline clover	40
Alameda	Dublin: Downtown Specific Plan Area	hairless popcornflower	53
Alameda	Dublin: Town Center	California red-legged frog	39
Alameda	Dublin: Town Center	California tiger salamander	7
Alameda	Dublin: Town Center	Congdon's tarplant	
Alameda	Dublin: Town Center	San Joaquin spearscale	110
Alameda	Dublin: Transit Center	American badger	
Alameda	Dublin: Transit Center	burrowing owl	
Alameda	Dublin: Transit Center	California linderiella	
Alameda	Dublin: Transit Center	California red-legged frog	9
Alameda	Dublin: Transit Center	Congdon's tarplant	
Alameda	Dublin: Transit Center	hairless popcornflower	673
Alameda	Dublin: Transit Center	western pond turtle	
Alameda	Dublin: Transit Center	white-tailed kite	
Alameda	East 14th Street and Mission Boulevard Mixed Use Corridor	Congdon's tarplant	67
Alameda	East 14th Street and Mission Boulevard Mixed Use Corridor	pallid bat	
Alameda	East 14th Street and Mission Boulevard Mixed Use Corridor	Santa Cruz tarplant	129
Alameda	East 14th Street and Mission Boulevard Mixed Use Corridor	western mastiff bat	
Alameda	East 14th Street and Mission Boulevard Mixed Use Corridor	woodland woollythreads	
Alameda	Emeryville: Mixed-Use Core	alkali milk-vetch	53
Alameda	Emeryville: Mixed-Use Core	Point Reyes bird's-beak	12
Alameda	Emeryville: Mixed-Use Core	Santa Cruz tarplant	317
Alameda	Fremont: Centerville	California black rail	
Alameda	Fremont: Centerville	great blue heron	
Alameda	Fremont: Centerville	hairless popcornflower	
Alameda	Fremont: Centerville	slender-leaved pondweed	329
Alameda	Fremont: Centerville	steelhead - central California coast DPS	71
Alameda	Fremont: City Center	slender-leaved pondweed	147
Alameda	Fremont: City Center	tricolored blackbird	0
Alameda	Fremont: Irvington District	burrowing owl	2
Alameda	Fremont: Irvington District	California tiger salamander	5
Alameda	Fremont: South Fremont/Warm Springs	burrowing owl	56
Alameda	Fremont: South Fremont/Warm Springs	tricolored blackbird	138
Alameda	Hayward: Downtown	pallid bat	229
Alameda	Hayward: Downtown	Santa Cruz tarplant	0
Alameda	Hayward: Downtown	western mastiff bat	
Alameda	Hayward: Mission Corridor	pallid bat	183
Alameda	Hayward: Mission Corridor	Santa Cruz tarplant	
Alameda	Hayward: Mission Corridor	western mastiff bat	
Alameda	Hayward: South Hayward BART	Diablo helianthella	0
Alameda	Hayward: South Hayward BART	most beautiful jewel-flower	0
Alameda	Hayward: The Cannery	alkali milk-vetch	29
Alameda	Hayward: The Cannery	hoary bat	
Alameda	Hayward: The Cannery	pallid bat	100

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
Alameda	Hayward: The Cannery	Santa Cruz tarplant	
Alameda	Hayward: The Cannery	western mastiff bat	
Alameda	Livermore: Downtown	California tiger salamander	25
Alameda	Livermore: Downtown	caper-fruited tropidocarpum	191
Alameda	Livermore: Downtown	foothill yellow-legged frog	
Alameda	Livermore: Downtown	hairless popcornflower	
Alameda	Livermore: Isabel Avenue/BART Station Planning Area	California red-legged frog	4
Alameda	Livermore: Isabel Avenue/BART Station Planning Area	California tiger salamander	
Alameda	Livermore: Isabel Avenue/BART Station Planning Area	caper-fruited tropidocarpum	620
Alameda	Livermore: Isabel Avenue/BART Station Planning Area	foothill yellow-legged frog	341
Alameda	Livermore: Vasco Road Station Planning Area	alkali milk-vetch	664
Alameda	Livermore: Vasco Road Station Planning Area	brittlescale	
Alameda	Livermore: Vasco Road Station Planning Area	burrowing owl	38
Alameda	Livermore: Vasco Road Station Planning Area	California red-legged frog	122
Alameda	Livermore: Vasco Road Station Planning Area	California tiger salamander	
Alameda	Livermore: Vasco Road Station Planning Area	caper-fruited tropidocarpum	2176
Alameda	Livermore: Vasco Road Station Planning Area	Cooper's hawk	
Alameda	Livermore: Vasco Road Station Planning Area	ferruginous hawk	
Alameda	Livermore: Vasco Road Station Planning Area	Livermore tarplant	
Alameda	Livermore: Vasco Road Station Planning Area	loggerhead shrike	
Alameda	Livermore: Vasco Road Station Planning Area	stinkbells	
Alameda	Livermore: Vasco Road Station Planning Area	tricolored blackbird	
Alameda	Livermore: Vasco Road Station Planning Area	western pond turtle	67
Alameda	Livermore: Vasco Road Station Planning Area	western spadefoot	
Alameda	Livermore: Vasco Road Station Planning Area	white-tailed kite	
Alameda	Newark: Dumbarton Transit Oriented Development	alkali milk-vetch	
Alameda	Newark: Dumbarton Transit Oriented Development	burrowing owl	125
Alameda	Newark: Dumbarton Transit Oriented Development	Congdon's tarplant	0
Alameda	Newark: Dumbarton Transit Oriented Development	Contra Costa goldfields	
Alameda	Newark: Dumbarton Transit Oriented Development	saline clover	
Alameda	Newark: Dumbarton Transit Oriented Development	San Joaquin spearscale	
Alameda	Newark: Old Town MIxed Use Area	alkali milk-vetch	39
Alameda	Newark: Old Town MIxed Use Area	burrowing owl	39
Alameda	Newark: Old Town MIxed Use Area	Contra Costa goldfields	
Alameda	Newark: Old Town MIxed Use Area	San Joaquin spearscale	
Alameda	Newark: Old Town MIxed Use Area	western snowy plover	2
Alameda	Oakland: Coliseum BART Station Area	Point Reyes bird's-beak	15
Alameda	Oakland: Coliseum BART Station Area	woodland woollythreads	
Alameda	Oakland: Downtown & Jack London Square	bent-flowered fiddleneck	
Alameda	Oakland: Downtown & Jack London Square	Choris' popcornflower	
Alameda	Oakland: Downtown & Jack London Square	hoary bat	236
Alameda	Oakland: Downtown & Jack London Square	Kellogg's horkelia	
Alameda	Oakland: Downtown & Jack London Square	round-leaved filaree	
Alameda	Oakland: Downtown & Jack London Square	San Francisco Bay spineflower	
Alameda	Oakland: Downtown & Jack London Square	San Joaquin spearscale	
Alameda	Oakland: Eastmont Town Center	Alameda song sparrow	83
Alameda	Oakland: Eastmont Town Center	Bay checkerspot butterfly	
Alameda	Oakland: Eastmont Town Center	fragrant fritillary	
Alameda	Oakland: Eastmont Town Center	woodland woollythreads	
Alameda	Oakland: Fruitvale & Dimond Areas	adobe sanicle	
Alameda	Oakland: Fruitvale & Dimond Areas	Alameda Island mole	
Alameda	Oakland: Fruitvale & Dimond Areas	Alameda song sparrow	
Alameda	Oakland: Fruitvale & Dimond Areas	alkali milk-vetch	
Alameda	Oakland: Fruitvale & Dimond Areas	California tiger salamander	
Alameda	Oakland: Fruitvale & Dimond Areas	fragrant fritillary	21
Alameda	Oakland: Fruitvale & Dimond Areas	Kellogg's horkelia	
Alameda	Oakland: Fruitvale & Dimond Areas	Point Reyes bird's-beak	0
Alameda	Oakland: Fruitvale & Dimond Areas	robust spineflower	
Alameda	Oakland: Fruitvale & Dimond Areas	saline clover	
Alameda	Oakland: Fruitvale & Dimond Areas	woodland woollythreads	
Alameda	Oakland: MacArthur Transit Village	bent-flowered fiddleneck	20
Alameda	Oakland: MacArthur Transit Village	Choris' popcornflower	20
Alameda	Oakland: MacArthur Transit Village	hoary bat	
Alameda	Oakland: MacArthur Transit Village	Kellogg's horkelia	
Alameda	Oakland: MacArthur Transit Village	round-leaved filaree	
Alameda	Oakland: MacArthur Transit Village	San Francisco Bay spineflower	
Alameda	Oakland: MacArthur Transit Village	San Joaquin spearscale	
Alameda	Oakland: Transit Oriented Development Corridors	adobe sanicle	
Alameda	Oakland: Transit Oriented Development Corridors	Alameda Island mole	
Alameda	Oakland: Transit Oriented Development Corridors	Alameda song sparrow	744
Alameda	Oakland: Transit Oriented Development Corridors	alkali milk-vetch	
Alameda	Oakland: Transit Oriented Development Corridors	Bay checkerspot butterfly	184
Alameda	Oakland: Transit Oriented Development Corridors	bent-flowered fiddleneck	
Alameda	Oakland: Transit Oriented Development Corridors	California clapper rail	
Alameda	Oakland: Transit Oriented Development Corridors	California tiger salamander	111
Alameda	Oakland: Transit Oriented Development Corridors	Choris' popcornflower	
Alameda	Oakland: Transit Oriented Development Corridors	Cooper's hawk	
Alameda	Oakland: Transit Oriented Development Corridors	Diablo helianthella	
Alameda	Oakland: Transit Oriented Development Corridors	fragrant fritillary	
Alameda	Oakland: Transit Oriented Development Corridors	hoary bat	9
Alameda	Oakland: Transit Oriented Development Corridors	Kellogg's horkelia	
Alameda	Oakland: Transit Oriented Development Corridors	mimic tryonia (=California brackishwater snail)	
Alameda	Oakland: Transit Oriented Development Corridors	Point Reyes bird's-beak	
Alameda	Oakland: Transit Oriented Development Corridors	robust spineflower	
Alameda	Oakland: Transit Oriented Development Corridors	round-leaved filaree	

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
Alameda	Oakland: Transit Oriented Development Corridors	saline clover	
Alameda	Oakland: Transit Oriented Development Corridors	San Francisco Bay spineflower	
Alameda	Oakland: Transit Oriented Development Corridors	San Joaquin spearscale	
Alameda	Oakland: Transit Oriented Development Corridors	Santa Clara red ribbons	
Alameda	Oakland: Transit Oriented Development Corridors	silver-haired bat	
Alameda	Oakland: Transit Oriented Development Corridors	tidewater goby	163
Alameda	Oakland: Transit Oriented Development Corridors	woodland woollythreads	
Alameda	Oakland: West Oakland	bent-flowered fiddleneck	
Alameda	Oakland: West Oakland	Choris' popcornflower	
Alameda	Oakland: West Oakland	hoary bat	984
Alameda	Oakland: West Oakland	Kellogg's horkelia	
Alameda	Oakland: West Oakland	round-leaved filaree	
Alameda	Oakland: West Oakland	saline clover	
Alameda	Oakland: West Oakland	San Francisco Bay spineflower	
Alameda	Oakland: West Oakland	San Joaquin spearscale	
Alameda	Oakland: West Oakland	Santa Cruz tarplant	
Alameda	Pleasanton: Hacienda	burrowing owl	54
Alameda	Pleasanton: Hacienda	hairless popcornflower	
Alameda	San Leandro: Bay Fair BART Transit Village	Congdon's tarplant	13
Alameda	San Leandro: Bay Fair BART Transit Village	woodland woollythreads	
Alameda	San Leandro: Downtown Transit Oriented Development	Alameda song sparrow	83
Alameda	San Leandro: Downtown Transit Oriented Development	woodland woollythreads	
Alameda	San Leandro: East 14th Street	Alameda song sparrow	
Alameda	San Leandro: East 14th Street	Congdon's tarplant	45
Alameda	San Leandro: East 14th Street	woodland woollythreads	
		Alameda County Potential Effect	**12201**
		Alameda County Urban Land (2008)	**146075**
		Total Alameda County Land	**525338**

County	*PDA*	*Species impacted*	*Acres*
Contra Costa	Antioch: Hillcrest eBART Station	big tarplant	
Contra Costa	Antioch: Hillcrest eBART Station	burrowing owl	
Contra Costa	Antioch: Hillcrest eBART Station	California tiger salamander	17
Contra Costa	Antioch: Hillcrest eBART Station	Contra Costa goldfields	
Contra Costa	Antioch: Hillcrest eBART Station	diamond-petaled California poppy	
Contra Costa	Antioch: Hillcrest eBART Station	Hoover's cryptantha	
Contra Costa	Antioch: Hillcrest eBART Station	Hurd's metapogon robberfly	
Contra Costa	Antioch: Hillcrest eBART Station	Mt. Diablo buckwheat	
Contra Costa	Antioch: Hillcrest eBART Station	round-leaved filaree	
Contra Costa	Antioch: Hillcrest eBART Station	silvery legless lizard	236
Contra Costa	Antioch: Hillcrest eBART Station	Swainson's hawk	15
Contra Costa	Antioch: Hillcrest eBART Station	western red bat	
Contra Costa	Antioch: Rivertown Waterfront	Antioch andrenid bee	0
Contra Costa	Antioch: Rivertown Waterfront	Antioch Dunes anthicid beetle	0
Contra Costa	Antioch: Rivertown Waterfront	Antioch Dunes buckwheat	1
Contra Costa	Antioch: Rivertown Waterfront	Antioch Dunes evening-primrose	1
Contra Costa	Antioch: Rivertown Waterfront	Antioch Dunes halcitid bee	8
Contra Costa	Antioch: Rivertown Waterfront	Antioch efferian robberfly	0
Contra Costa	Antioch: Rivertown Waterfront	Antioch multilid wasp	0
Contra Costa	Antioch: Rivertown Waterfront	Antioch specid wasp	0
Contra Costa	Antioch: Rivertown Waterfront	big tarplant	144
Contra Costa	Antioch: Rivertown Waterfront	California tiger salamander	144
Contra Costa	Antioch: Rivertown Waterfront	Contra Costa goldfields	
Contra Costa	Antioch: Rivertown Waterfront	diamond-petaled California poppy	
Contra Costa	Antioch: Rivertown Waterfront	Hoover's cryptantha	
Contra Costa	Antioch: Rivertown Waterfront	Hurd's metapogon robberfly	12
Contra Costa	Antioch: Rivertown Waterfront	Mason's lilaeopsis	
Contra Costa	Antioch: Rivertown Waterfront	Middlekauff's shieldback katydid	0
Contra Costa	Antioch: Rivertown Waterfront	Mt. Diablo buckwheat	
Contra Costa	Antioch: Rivertown Waterfront	redheaded sphecid wasp	8
Contra Costa	Antioch: Rivertown Waterfront	round-leaved filaree	
Contra Costa	Antioch: Rivertown Waterfront	salt-marsh harvest mouse	7
Contra Costa	Antioch: Rivertown Waterfront	silvery legless lizard	
Contra Costa	Antioch: Rivertown Waterfront	Stabilized Interior Dunes	0
Contra Costa	Antioch: Rivertown Waterfront	Suisun Marsh aster	12
Contra Costa	Antioch: Rivertown Waterfront	western red bat	
Contra Costa	Concord: Community Reuse Area	California tiger salamander	14
Contra Costa	Concord: Community Reuse Area	Contra Costa goldfields	
Contra Costa	Concord: Community Reuse Area	golden eagle	8
Contra Costa	Concord: Community Reuse Area	hoary bat	
Contra Costa	Concord: Community Reuse Area	San Joaquin spearscale	
Contra Costa	Concord: Downtown BART Station Planning	California tiger salamander	369
Contra Costa	Concord: Downtown BART Station Planning	Contra Costa goldfields	
Contra Costa	Concord: Downtown BART Station Planning	hoary bat	
Contra Costa	Concord: Downtown BART Station Planning	San Joaquin spearscale	
Contra Costa	Contra Costa County Unincorporated: Contra Costa Centre	California tiger salamander	
Contra Costa	Contra Costa County Unincorporated: Contra Costa Centre	Congdon's tarplant	74
Contra Costa	Contra Costa County Unincorporated: Downtown El Sobrante	San Pablo song sparrow	128
Contra Costa	Contra Costa County Unincorporated: North Richmond	California black rail	0
Contra Costa	Contra Costa County Unincorporated: North Richmond	California clapper rail	
Contra Costa	Contra Costa County Unincorporated: North Richmond	Northern Coastal Salt Marsh	
Contra Costa	Contra Costa County Unincorporated: North Richmond	northern harrier	
Contra Costa	Contra Costa County Unincorporated: North Richmond	salt-marsh harvest mouse	
Contra Costa	Contra Costa County Unincorporated: North Richmond	salt-marsh wandering shrew	
Contra Costa	Contra Costa County Unincorporated: North Richmond	San Pablo song sparrow	123

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
Contra Costa	Contra Costa County Unincorporated: North Richmond	San Pablo vole	
Contra Costa	Contra Costa County Unincorporated: North Richmond	short-eared owl	
Contra Costa	Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	Suisun song sparrow	4
Contra Costa	Danville: Downtown Danville	Antioch efferian robberfly	
Contra Costa	Danville: Downtown Danville	California tiger salamander	3
Contra Costa	Danville: Downtown Danville	pallid bat	
Contra Costa	Danville: Downtown Danville	San Joaquin spearscale	324
Contra Costa	El Cerrito: San Pablo Avenue Corridor	Alameda song sparrow	0
Contra Costa	El Cerrito: San Pablo Avenue Corridor	alkali milk-vetch	
Contra Costa	El Cerrito: San Pablo Avenue Corridor	Bridges' coast range shoulderband	
Contra Costa	El Cerrito: San Pablo Avenue Corridor	California seablite	
Contra Costa	El Cerrito: San Pablo Avenue Corridor	fragrant fritillary	
Contra Costa	El Cerrito: San Pablo Avenue Corridor	hoary bat	127
Contra Costa	El Cerrito: San Pablo Avenue Corridor	pallid bat	
Contra Costa	El Cerrito: San Pablo Avenue Corridor	saline clover	99
Contra Costa	Hercules: Central Hercules	California red-legged frog	23
Contra Costa	Hercules: Central Hercules	Carquinez goldenbush	8
Contra Costa	Hercules: Waterfront District	California black rail	0
Contra Costa	Hercules: Waterfront District	Northern Coastal Salt Marsh	0
Contra Costa	Lafayette: Downtown	pallid bat	213
Contra Costa	Martinez: Downtown	big free-tailed bat	139
Contra Costa	Martinez: Downtown	Bolander's water-hemlock	
Contra Costa	Martinez: Downtown	Carquinez goldenbush	
Contra Costa	Martinez: Downtown	Northern Coastal Salt Marsh	
Contra Costa	Martinez: Downtown	soft bird's-beak	95
Contra Costa	Martinez: Downtown	Suisun song sparrow	
Contra Costa	Moraga: Moraga Center	round-leaved filaree	
Contra Costa	Moraga: Moraga Center	woodland woollythreads	164
Contra Costa	Oakley: Downtown	Antioch andrenid bee	110
Contra Costa	Oakley: Downtown	Bolander's water-hemlock	
Contra Costa	Oakley: Downtown	curved-foot hygrotus diving beetle	110
Contra Costa	Oakley: Downtown	Suisun Marsh aster	
Contra Costa	Oakley: Employment Area	Mason's lilaeopsis	9
Contra Costa	Oakley: Employment Area	silvery legless lizard	25
Contra Costa	Oakley: Employment Area	Suisun Marsh aster	
Contra Costa	Oakley: Potential Planning Area	Swainson's hawk	3
Contra Costa	Orinda: Downtown	American badger	100
Contra Costa	Orinda: Downtown	Berkeley kangaroo rat	
Contra Costa	Orinda: Downtown	pallid bat	
Contra Costa	Pinole: Appian Way Corridor	pallid bat	
Contra Costa	Pinole: Appian Way Corridor	San Pablo song sparrow	
Contra Costa	Pinole: Appian Way Corridor	Santa Cruz tarplant	26
Contra Costa	Pinole: Appian Way Corridor	yellow-headed blackbird	74
Contra Costa	Pinole: Old Town & San Pablo Avenue	pallid bat	132
Contra Costa	Pinole: Old Town & San Pablo Avenue	San Pablo song sparrow	
Contra Costa	Pinole: Old Town & San Pablo Avenue	yellow-headed blackbird	
Contra Costa	Pittsburg: Downtown	big tarplant	260
Contra Costa	Pittsburg: Downtown	Delta tule pea	2
Contra Costa	Pittsburg: Downtown	Mason's lilaeopsis	
Contra Costa	Pittsburg: Downtown	Suisun Marsh aster	
Contra Costa	Pittsburg: Downtown	Suisun song sparrow	260
Contra Costa	Pittsburg: Railroad Avenue eBART Station	big tarplant	682
Contra Costa	Pittsburg: Railroad Avenue eBART Station	Suisun song sparrow	
Contra Costa	Pleasant Hill: Buskirk Avenue Corridor	Congdon's tarplant	227
Contra Costa	Pleasant Hill: Buskirk Avenue Corridor	hoary bat	
Contra Costa	Pleasant Hill: Diablo Valley College	California tiger salamander	33
Contra Costa	Richmond: San Pablo Avenue Corridor	alkali milk-vetch	7
Contra Costa	Richmond: San Pablo Avenue Corridor	California seablite	
Contra Costa	Richmond: San Pablo Avenue Corridor	fragrant fritillary	7
Contra Costa	Richmond: San Pablo Avenue Corridor	hoary bat	13
Contra Costa	Richmond: San Pablo Avenue Corridor	pallid bat	
Contra Costa	Richmond: San Pablo Avenue Corridor	saline clover	
Contra Costa	Richmond: San Pablo Avenue Corridor	San Pablo song sparrow	33
Contra Costa	Richmond: South Richmond	Alameda song sparrow	67
Contra Costa	Richmond: South Richmond	alkali milk-vetch	421
Contra Costa	Richmond: South Richmond	burrowing owl	5
Contra Costa	Richmond: South Richmond	California clapper rail	
Contra Costa	Richmond: South Richmond	California seablite	232
Contra Costa	Richmond: South Richmond	fragrant fritillary	
Contra Costa	Richmond: South Richmond	hoary bat	
Contra Costa	Richmond: South Richmond	monarch butterfly	
Contra Costa	Richmond: South Richmond	Northern Coastal Salt Marsh	
Contra Costa	Richmond: South Richmond	pallid bat	
Contra Costa	Richmond: South Richmond	saline clover	
Contra Costa	San Pablo: San Pablo Avenue	San Pablo song sparrow	135
Contra Costa	San Ramon: City Center	burrowing owl	5
Contra Costa	SUB-AREA: West Contra Costa Transportation Advisory Committee: San I	Carquinez goldenbush	101
Contra Costa	SUB-AREA: West Contra Costa Transportation Advisory Committee: San I	pallid bat	
Contra Costa	SUB-AREA: West Contra Costa Transportation Advisory Committee: San I	San Pablo song sparrow	27
Contra Costa	SUB-AREA: West Contra Costa Transportation Advisory Committee: San I	yellow-headed blackbird	9
Contra Costa	Walnut Creek: West Downtown	big tarplant	133
Contra Costa	Walnut Creek: West Downtown	California tiger salamander	133
Contra Costa	Walnut Creek: West Downtown	Contra Costa goldfields	
Contra Costa	Walnut Creek: West Downtown	pallid bat	
		Contra Costa County Potential Effect	**5904**

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
		Contra Costa County Urban Land (2008)	**151336**
		Total Contra Costa County Land	**514020**

County	*PDA*	*Species impacted*	*Acres*
Marin	Marin County Unincorporated: Urbanized 101 Corridor	California black rail	
Marin	Marin County Unincorporated: Urbanized 101 Corridor	California clapper rail	106
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Coastal Brackish Marsh	
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Coastal Terrace Prairie	0
Marin	Marin County Unincorporated: Urbanized 101 Corridor	great blue heron	26
Marin	Marin County Unincorporated: Urbanized 101 Corridor	hairless popcornflower	
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Marin western flax	
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Mt. Tamalpais manzanita	344
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Northern Coastal Salt Marsh	0
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Opler's longhorn moth	0
Marin	Marin County Unincorporated: Urbanized 101 Corridor	pallid bat	10
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Point Reyes bird's-beak	0
Marin	Marin County Unincorporated: Urbanized 101 Corridor	salt-marsh harvest mouse	
Marin	Marin County Unincorporated: Urbanized 101 Corridor	San Pablo song sparrow	231
Marin	Marin County Unincorporated: Urbanized 101 Corridor	white-rayed pentachaeta	558
Marin	San Rafael: Civic Center/North Rafael Town Center	California clapper rail	13
Marin	San Rafael: Civic Center/North Rafael Town Center	Mt. Tamalpais manzanita	440
Marin	San Rafael: Downtown	Marin western flax	176
Marin	San Rafael: Downtown	pallid bat	
Marin	San Rafael: Downtown	white-rayed pentachaeta	
		Marin County Potential Effect	**1903**
		Marin County Urban Land (2008)	**146075**
		Total Marin County Land	**525338**

County	*PDA*	*Species impacted*	*Acres*
Napa	American Canyon: Highway 29 Corridor	showy rancheria clover	32
Napa	American Canyon: Highway 29 Corridor	western pond turtle	3
Napa	Napa: Downtown Napa	American badger	123
Napa	Napa: Downtown Napa	An isopod	
Napa	Napa: Downtown Napa	Mason's lilaeopsis	22
Napa	Napa: Downtown Napa	pallid bat	123
Napa	Napa: Downtown Napa	showy rancheria clover	
Napa	Napa: Soscol Gateway Corridor	American badger	270
Napa	Napa: Soscol Gateway Corridor	An isopod	
Napa	Napa: Soscol Gateway Corridor	Delta tule pea	
Napa	Napa: Soscol Gateway Corridor	Mason's lilaeopsis	32
Napa	Napa: Soscol Gateway Corridor	pallid bat	
Napa	Napa: Soscol Gateway Corridor	saltmarsh common yellowthroat	
Napa	Napa: Soscol Gateway Corridor	showy rancheria clover	270
Napa	Napa: Soscol Gateway Corridor	western pond turtle	
		Napa County Potential Effect	**876**
		Napa County Urban Land (2008)	**146075**
		Total Napa County Land	**525338**

County	*PDA*	*Species impacted*	*Acres*
San Francisco	San Francisco/San Mateo Bi-County Area (with City of Brisbane)	beach layia	224
San Francisco	San Francisco/San Mateo Bi-County Area (with City of Brisbane)	bristly sedge	
San Francisco	San Francisco/San Mateo Bi-County Area (with City of Brisbane)	Diablo helianthella	18
San Francisco	San Francisco/San Mateo Bi-County Area (with City of Brisbane)	Mission blue butterfly	77
San Francisco	San Francisco/San Mateo Bi-County Area (with City of Brisbane)	rose leptosiphon	224
San Francisco	San Francisco/San Mateo Bi-County Area (with City of Brisbane)	San Francisco Bay Area leaf-cutter bee	
San Francisco	San Francisco/San Mateo Bi-County Area (with City of Brisbane)	San Francisco collinsia	
San Francisco	San Francisco/San Mateo Bi-County Area (with City of Brisbane)	sandy beach tiger beetle	
San Francisco	San Francisco/San Mateo Bi-County Area (with City of Brisbane)	white seaside tarplant	
San Francisco	San Francisco: 19th Avenue	bank swallow	22
San Francisco	San Francisco: 19th Avenue	beach layia	444
San Francisco	San Francisco: 19th Avenue	blue coast gilia	
San Francisco	San Francisco: 19th Avenue	bristly sedge	
San Francisco	San Francisco: 19th Avenue	California black rail	68
San Francisco	San Francisco: 19th Avenue	California red-legged frog	68
San Francisco	San Francisco: 19th Avenue	compact cobwebby thistle	
San Francisco	San Francisco: 19th Avenue	Franciscan thistle	
San Francisco	San Francisco: 19th Avenue	hoary bat	74
San Francisco	San Francisco: 19th Avenue	Kellogg's horkelia	
San Francisco	San Francisco: 19th Avenue	Opler's longhorn moth	
San Francisco	San Francisco: 19th Avenue	robust spineflower	
San Francisco	San Francisco: 19th Avenue	rose leptosiphon	
San Francisco	San Francisco: 19th Avenue	San Francisco Bay Area leaf-cutter bee	
San Francisco	San Francisco: 19th Avenue	San Francisco Bay spineflower	
San Francisco	San Francisco: 19th Avenue	San Francisco lessingia	68
San Francisco	San Francisco: 19th Avenue	San Francisco owl's-clover	
San Francisco	San Francisco: 19th Avenue	sandy beach tiger beetle	
San Francisco	San Francisco: 19th Avenue	tidewater goby	68
San Francisco	San Francisco: 19th Avenue	Tomales isopod	
San Francisco	San Francisco: 19th Avenue	white seaside tarplant	
San Francisco	San Francisco: Balboa Park	beach layia	186
San Francisco	San Francisco: Balboa Park	bristly sedge	
San Francisco	San Francisco: Balboa Park	robust spineflower	
San Francisco	San Francisco: Balboa Park	rose leptosiphon	186
San Francisco	San Francisco: Balboa Park	San Francisco Bay Area leaf-cutter bee	
San Francisco	San Francisco: Balboa Park	San Francisco Bay spineflower	173

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
Santa Clara	San Jose: North San Jose	Alameda song sparrow	
Santa Clara	San Jose: North San Jose	burrowing owl	
Santa Clara	San Jose: North San Jose	California tiger salamander	2864
Santa Clara	San Jose: North San Jose	Congdon's tarplant	673
Santa Clara	San Jose: North San Jose	great blue heron	5
Santa Clara	San Jose: North San Jose	Hall's bush-mallow	5
Santa Clara	San Jose: North San Jose	Hoover's button-celery	257
Santa Clara	San Jose: North San Jose	robust spineflower	
Santa Clara	San Jose: North San Jose	western pond turtle	
Santa Clara	San Jose: Oakridge/Almaden Plaza Urban Village	Congdon's tarplant	321
Santa Clara	San Jose: Saratoga TOD Corridor	California tiger salamander	35
Santa Clara	San Jose: Saratoga TOD Corridor	robust spineflower	
Santa Clara	San Jose: Stevens Creek TOD Corridor	California tiger salamander	126
Santa Clara	San Jose: Stevens Creek TOD Corridor	Congdon's tarplant	
Santa Clara	San Jose: Stevens Creek TOD Corridor	robust spineflower	
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	arcuate bush-mallow	9
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	burrowing owl	6
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	California tiger salamander	
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Congdon's tarplant	2158
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Contra Costa goldfields	
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	hairless popcornflower	
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	hoary bat	23
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Metcalf Canyon jewel-flower	6
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	pallid bat	264
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	robust spineflower	
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	saline clover	2
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	San Francisco collinsia	177
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Santa Clara Valley dudleya	8
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	smooth lessingia	3
Santa Clara	San Jose: West San Carlos and Southwest Expressway Corridors	California tiger salamander	1023
Santa Clara	San Jose: West San Carlos and Southwest Expressway Corridors	Congdon's tarplant	
Santa Clara	San Jose: West San Carlos and Southwest Expressway Corridors	Cooper's hawk	36
Santa Clara	San Jose: West San Carlos and Southwest Expressway Corridors	hoary bat	114
Santa Clara	San Jose: West San Carlos and Southwest Expressway Corridors	pallid bat	4
Santa Clara	San Jose: West San Carlos and Southwest Expressway Corridors	robust spineflower	
Santa Clara	San Jose: West San Carlos and Southwest Expressway Corridors	saline clover	4
Santa Clara	San Jose: Winchester Boulevard TOD Corridor	California tiger salamander	236
Santa Clara	San Jose: Winchester Boulevard TOD Corridor	Congdon's tarplant	
Santa Clara	San Jose: Winchester Boulevard TOD Corridor	robust spineflower	
Santa Clara	Santa Clara: El Camino Real Focus Area	arcuate bush-mallow	86
Santa Clara	Santa Clara: El Camino Real Focus Area	California tiger salamander	144
Santa Clara	Santa Clara: El Camino Real Focus Area	hairless popcornflower	
Santa Clara	Santa Clara: El Camino Real Focus Area	hoary bat	86
Santa Clara	Santa Clara: El Camino Real Focus Area	robust spineflower	
Santa Clara	Santa Clara: Santa Clara Station Focus Area	arcuate bush-mallow	193
Santa Clara	Santa Clara: Santa Clara Station Focus Area	California tiger salamander	205
Santa Clara	Santa Clara: Santa Clara Station Focus Area	Congdon's tarplant	
Santa Clara	Santa Clara: Santa Clara Station Focus Area	hairless popcornflower	
Santa Clara	Santa Clara: Santa Clara Station Focus Area	hoary bat	193
Santa Clara	Santa Clara: Santa Clara Station Focus Area	robust spineflower	
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	Alameda song sparrow	75
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	burrowing owl	42
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	California tiger salamander	112
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	Congdon's tarplant	
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	Hoover's button-celery	125
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	robust spineflower	
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	salt-marsh wandering shrew	54
Santa Clara	Saratoga: VTA City Cores, Corridors & Station Areas	Indian Valley bush-mallow	40
Santa Clara	Saratoga: VTA City Cores, Corridors & Station Areas	Loma Prieta hoita	
Santa Clara	Saratoga: VTA City Cores, Corridors & Station Areas	woodland woollythreads	
Santa Clara	Sunnyvale: El Camino Real Corridor	burrowing owl	66
Santa Clara	Sunnyvale: Tasman Station ITR	salt-marsh wandering shrew	13
Santa Clara	Sunnyvale: VTA City Cores, Corridors & Station Areas	salt-marsh wandering shrew	238
Santa Clara	VTA City Cores, Corridors & Station Areas	woodland woollythreads	33
		Santa Clara County Potential Effect	**21631**
		Santa Clara County Urban Land (2008)	**188883**
		Total Santa Clara County Land	**835229**

County	*PDA*	*Species impacted*	*Acres*
Solano	Benicia: Downtown	big tarplant	116
Solano	Benicia: Downtown	Bolander's water-hemlock	
Solano	Benicia: Downtown	Carquinez goldenbush	
Solano	Benicia: Downtown	Mason's lilaeopsis	2
Solano	Benicia: Downtown	Suisun song sparrow	
Solano	Benicia: Northern Gateway	California clapper rail	
Solano	Benicia: Northern Gateway	Carquinez goldenbush	1365
Solano	Benicia: Northern Gateway	Coastal Brackish Marsh	
Solano	Benicia: Northern Gateway	saline clover	89
Solano	Benicia: Northern Gateway	salt-marsh harvest mouse	74
Solano	Benicia: Northern Gateway	Suisun Marsh aster	
Solano	Benicia: Northern Gateway	Suisun song sparrow	
Solano	Dixon: Downtown Dixon	adobe-lily	103
Solano	Dixon: Downtown Dixon	burrowing owl	
Solano	Fairfield: Downtown South (Jefferson Street)	hoary bat	62
Solano	Fairfield: Downtown South (Jefferson Street)	legenere	80

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
San Francisco	San Francisco: Balboa Park	sandy beach tiger beetle	
San Francisco	San Francisco: Balboa Park	white seaside tarplant	
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	adobe sanicle	303
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	alkali milk-vetch	
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	beach layia	2156
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	bristly sedge	
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Diablo helianthella	1322
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	fragrant fritillary	
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	hoary bat	13
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Mission blue butterfly	150
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	rose leptosiphon	
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	San Francisco Bay Area leaf-cutter bee	
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	San Francisco collinsia	
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	San Francisco owl's-clover	
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	sandy beach tiger beetle	
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	white seaside tarplant	
San Francisco	San Francisco: Downtown-Van Ness-Geary	beach layia	1847
San Francisco	San Francisco: Downtown-Van Ness-Geary	bristly sedge	
San Francisco	San Francisco: Downtown-Van Ness-Geary	California black rail	889
San Francisco	San Francisco: Downtown-Van Ness-Geary	Franciscan manzanita	
San Francisco	San Francisco: Downtown-Van Ness-Geary	Marin western flax	
San Francisco	San Francisco: Downtown-Van Ness-Geary	monarch butterfly	3
San Francisco	San Francisco: Downtown-Van Ness-Geary	Presidio manzanita	6
San Francisco	San Francisco: Downtown-Van Ness-Geary	rose leptosiphon	
San Francisco	San Francisco: Downtown-Van Ness-Geary	San Francisco Bay Area leaf-cutter bee	
San Francisco	San Francisco: Downtown-Van Ness-Geary	San Francisco Bay spineflower	
San Francisco	San Francisco: Downtown-Van Ness-Geary	San Francisco lessingia	0
San Francisco	San Francisco: Downtown-Van Ness-Geary	sandy beach tiger beetle	
San Francisco	San Francisco: Downtown-Van Ness-Geary	white seaside tarplant	
San Francisco	San Francisco: Eastern Neighborhoods	adobe sanicle	876
San Francisco	San Francisco: Eastern Neighborhoods	alkali milk-vetch	
San Francisco	San Francisco: Eastern Neighborhoods	beach layia	1551
San Francisco	San Francisco: Eastern Neighborhoods	bristly sedge	
San Francisco	San Francisco: Eastern Neighborhoods	fragrant fritillary	
San Francisco	San Francisco: Eastern Neighborhoods	rose leptosiphon	
San Francisco	San Francisco: Eastern Neighborhoods	San Francisco Bay Area leaf-cutter bee	
San Francisco	San Francisco: Eastern Neighborhoods	San Francisco owl's-clover	
San Francisco	San Francisco: Eastern Neighborhoods	sandy beach tiger beetle	
San Francisco	San Francisco: Eastern Neighborhoods	white seaside tarplant	
San Francisco	San Francisco: Market & Octavia	beach layia	254
San Francisco	San Francisco: Market & Octavia	bristly sedge	
San Francisco	San Francisco: Market & Octavia	Presidio manzanita	41
San Francisco	San Francisco: Market & Octavia	rose leptosiphon	254
San Francisco	San Francisco: Market & Octavia	San Francisco Bay Area leaf-cutter bee	
San Francisco	San Francisco: Market & Octavia	sandy beach tiger beetle	
San Francisco	San Francisco: Market & Octavia	white seaside tarplant	
San Francisco	San Francisco: Mission Bay	adobe sanicle	91
San Francisco	San Francisco: Mission Bay	alkali milk-vetch	
San Francisco	San Francisco: Mission Bay	beach layia	248
San Francisco	San Francisco: Mission Bay	bristly sedge	
San Francisco	San Francisco: Mission Bay	fragrant fritillary	
San Francisco	San Francisco: Mission Bay	rose leptosiphon	248
San Francisco	San Francisco: Mission Bay	San Francisco Bay Area leaf-cutter bee	
San Francisco	San Francisco: Mission Bay	San Francisco owl's-clover	
San Francisco	San Francisco: Mission Bay	sandy beach tiger beetle	
San Francisco	San Francisco: Mission Bay	white seaside tarplant	
San Francisco	San Francisco: Mission-San Jose Corridor	beach layia	1343
San Francisco	San Francisco: Mission-San Jose Corridor	bristly sedge	
San Francisco	San Francisco: Mission-San Jose Corridor	coastal triquetrella	0
San Francisco	San Francisco: Mission-San Jose Corridor	fragrant fritillary	0
San Francisco	San Francisco: Mission-San Jose Corridor	hoary bat	106
San Francisco	San Francisco: Mission-San Jose Corridor	robust spineflower	
San Francisco	San Francisco: Mission-San Jose Corridor	rose leptosiphon	
San Francisco	San Francisco: Mission-San Jose Corridor	San Francisco Bay Area leaf-cutter bee	1343
San Francisco	San Francisco: Mission-San Jose Corridor	San Francisco Bay spineflower	
San Francisco	San Francisco: Mission-San Jose Corridor	San Francisco collinsia	
San Francisco	San Francisco: Mission-San Jose Corridor	San Francisco gumplant	0
San Francisco	San Francisco: Mission-San Jose Corridor	San Francisco owl's-clover	0
San Francisco	San Francisco: Mission-San Jose Corridor	sandy beach tiger beetle	
San Francisco	San Francisco: Mission-San Jose Corridor	white seaside tarplant	
San Francisco	San Francisco: Port of San Francisco	adobe sanicle	22
San Francisco	San Francisco: Port of San Francisco	alkali milk-vetch	22
San Francisco	San Francisco: Port of San Francisco	beach layia	383
San Francisco	San Francisco: Port of San Francisco	bristly sedge	
San Francisco	San Francisco: Port of San Francisco	California black rail	62
San Francisco	San Francisco: Port of San Francisco	California clapper rail	
San Francisco	San Francisco: Port of San Francisco	California seablite	
San Francisco	San Francisco: Port of San Francisco	rose leptosiphon	383
San Francisco	San Francisco: Port of San Francisco	San Francisco Bay Area leaf-cutter bee	
San Francisco	San Francisco: Port of San Francisco	San Francisco owl's-clover	
San Francisco	San Francisco: Port of San Francisco	sandy beach tiger beetle	
San Francisco	San Francisco: Port of San Francisco	white seaside tarplant	
San Francisco	San Francisco: Transbay Terminal	beach layia	39
San Francisco	San Francisco: Transbay Terminal	bristly sedge	
San Francisco	San Francisco: Transbay Terminal	rose leptosiphon	

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
San Francisco	San Francisco: Transbay Terminal	San Francisco Bay Area leaf-cutter bee	
San Francisco	San Francisco: Transbay Terminal	sandy beach tiger beetle	
San Francisco	San Francisco: Transbay Terminal	white seaside tarplant	
		San Francisco County Potential Effect	**15857**
		San Francisco County Urban Land (2008)	**146075**
		Total San Francisco County Land	**525338**

County	*PDA*	*Species impacted*	*Acres*
San Mateo	Belmont: Villages of Belmont	Alameda song sparrow	53
San Mateo	Belmont: Villages of Belmont	Davidson's bush-mallow	
San Mateo	Belmont: Villages of Belmont	pallid bat	
San Mateo	Belmont: Villages of Belmont	Santa Cruz kangaroo rat	
San Mateo	Burlingame: Burlingame El Camino Real	California clapper rail	236
San Mateo	Burlingame: Burlingame El Camino Real	fragrant fritillary	24
San Mateo	Burlingame: Burlingame El Camino Real	Franciscan onion	456
San Mateo	Burlingame: Burlingame El Camino Real	Hillsborough chocolate lily	
San Mateo	Burlingame: Burlingame El Camino Real	hoary bat	24
San Mateo	Burlingame: Burlingame El Camino Real	pallid bat	211
San Mateo	Daly City: Bayshore	beach layia	133
San Mateo	Daly City: Bayshore	bristly sedge	
San Mateo	Daly City: Bayshore	hoary bat	99
San Mateo	Daly City: Bayshore	Kellogg's horkelia	32
San Mateo	Daly City: Bayshore	robust spineflower	86
San Mateo	Daly City: Bayshore	rose leptosiphon	133
San Mateo	Daly City: Bayshore	San Francisco Bay Area leaf-cutter bee	
San Mateo	Daly City: Bayshore	San Francisco Bay spineflower	53
San Mateo	Daly City: Bayshore	sandy beach tiger beetle	
San Mateo	Daly City: Bayshore	showy rancheria clover	32
San Mateo	Daly City: Bayshore	white seaside tarplant	
San Mateo	Daly City: Mission Boulevard	beach layia	326
San Mateo	Daly City: Mission Boulevard	bristly sedge	
San Mateo	Daly City: Mission Boulevard	callippe silverspot butterfly	54
San Mateo	Daly City: Mission Boulevard	Mission blue butterfly	42
San Mateo	Daly City: Mission Boulevard	rose leptosiphon	326
San Mateo	Daly City: Mission Boulevard	San Francisco Bay Area leaf-cutter bee	
San Mateo	Daly City: Mission Boulevard	San Francisco collinsia	
San Mateo	Daly City: Mission Boulevard	San Francisco gumplant	1
San Mateo	Daly City: Mission Boulevard	San Francisco owl's-clover	
San Mateo	Daly City: Mission Boulevard	sandy beach tiger beetle	
San Mateo	Daly City: Mission Boulevard	short-leaved evax	1
San Mateo	Daly City: Mission Boulevard	Stage's dufourine bee	94
San Mateo	Daly City: Mission Boulevard	white seaside tarplant	
San Mateo	East Palo Alto: Ravenswood	Alameda song sparrow	
San Mateo	East Palo Alto: Ravenswood	California black rail	
San Mateo	East Palo Alto: Ravenswood	California clapper rail	
San Mateo	East Palo Alto: Ravenswood	Congdon's tarplant	
San Mateo	East Palo Alto: Ravenswood	Northern Coastal Salt Marsh	
San Mateo	East Palo Alto: Ravenswood	Point Reyes bird's-beak	
San Mateo	East Palo Alto: Ravenswood	salt-marsh harvest mouse	10
San Mateo	East Palo Alto: Ravenswood	saltmarsh common yellowthroat	
San Mateo	Menlo Park: El Camino Real Corridor and Downtown	Alameda song sparrow	115
San Mateo	Menlo Park: El Camino Real Corridor and Downtown	American badger	
San Mateo	Menlo Park: El Camino Real Corridor and Downtown	California tiger salamander	16
San Mateo	Menlo Park: El Camino Real Corridor and Downtown	hoary bat	
San Mateo	Menlo Park: El Camino Real Corridor and Downtown	lost thistle	
San Mateo	Menlo Park: El Camino Real Corridor and Downtown	Santa Cruz kangaroo rat	
San Mateo	Menlo Park: El Camino Real Corridor and Downtown	slender-leaved pondweed	16
San Mateo	Menlo Park: El Camino Real Corridor and Downtown	western pond turtle	
San Mateo	Millbrae: Transit Station Area	pallid bat	67
San Mateo	Redwood City: Downtown	hoary bat	133
San Mateo	Redwood City: Downtown	Santa Cruz kangaroo rat	
San Mateo	Redwood City: Veterans Corridor	hoary bat	
San Mateo	Redwood City: Veterans Corridor	Santa Cruz kangaroo rat	313
San Mateo	Redwood City: Veterans Corridor	western snowy plover	81
San Mateo	San Bruno: Transit Corridors	Alameda song sparrow	348
San Mateo	San Bruno: Transit Corridors	California red-legged frog	9
San Mateo	San Bruno: Transit Corridors	hoary bat	446
San Mateo	San Bruno: Transit Corridors	San Francisco forktail damselfly	
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	beach layia	470
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	bristly sedge	
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	rose leptosiphon	
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	San Francisco Bay Area leaf-cutter bee	
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	San Francisco collinsia	41
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	San Francisco forktail damselfly	268
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	sandy beach tiger beetle	
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	white seaside tarplant	
San Mateo	San Mateo: Downtown	Alameda song sparrow	74
San Mateo	San Mateo: Downtown	Franciscan onion	
San Mateo	San Mateo: Downtown	hoary bat	
San Mateo	San Mateo: Downtown	Myrtle's silverspot	74
San Mateo	San Mateo: Downtown	Ricksecker's water scavenger beetle	74
San Mateo	San Mateo: El Camino	Alameda song sparrow	3
San Mateo	San Mateo: El Camino	Davidson's bush-mallow	3
San Mateo	San Mateo: El Camino	pallid bat	3
San Mateo	San Mateo: El Camino	Santa Cruz kangaroo rat	42

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
San Mateo	San Mateo: Rail Corridor	Alameda song sparrow	54
San Mateo	San Mateo: Rail Corridor	Franciscan onion	54
San Mateo	San Mateo: Rail Corridor	hoary bat	54
San Mateo	San Mateo: Rail Corridor	Myrtle's silverspot	
San Mateo	San Mateo: Rail Corridor	Ricksecker's water scavenger beetle	54
San Mateo	San Mateo: Rail Corridor	Santa Cruz kangaroo rat	1
San Mateo	South San Francisco: Downtown	Alameda song sparrow	74
San Mateo	South San Francisco: Downtown	bent-flowered fiddleneck	68
San Mateo	SUB-AREA: CCAG/Colma	beach layia	39
San Mateo	SUB-AREA: CCAG/Colma	bristly sedge	
San Mateo	SUB-AREA: CCAG/Colma	Kellogg's horkelia	296
San Mateo	SUB-AREA: CCAG/Colma	robust spineflower	
San Mateo	SUB-AREA: CCAG/Colma	rose leptosiphon	
San Mateo	SUB-AREA: CCAG/Colma	San Francisco Bay Area leaf-cutter bee	
San Mateo	SUB-AREA: CCAG/Colma	sandy beach tiger beetle	
San Mateo	SUB-AREA: CCAG/Colma	showy rancheria clover	
San Mateo	SUB-AREA: CCAG/Colma	white seaside tarplant	48
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	beach layia	264
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	bristly sedge	
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	hoary bat	239
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	Kellogg's horkelia	
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	robust spineflower	
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	rose leptosiphon	
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	San Francisco Bay Area leaf-cutter bee	
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	San Francisco Bay spineflower	71
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	San Francisco collinsia	0
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	San Francisco gumplant	
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	sandy beach tiger beetle	
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	showy rancheria clover	25
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	Stage's dufourine bee	6
San Mateo	SUB-AREA: CCAG/Daly City: Mission Boulevard	white seaside tarplant	
San Mateo	SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	Alameda song sparrow	204
San Mateo	SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	American badger	
San Mateo	SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	California tiger salamander	74
San Mateo	SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	hoary bat	
San Mateo	SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	lost thistle	
San Mateo	SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	Santa Cruz kangaroo rat	217
San Mateo	SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	slender-leaved pondweed	
San Mateo	SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	western pond turtle	
San Mateo	SUB-AREA: CCAG/Millbrae: Transit Station Area	California red-legged frog	3
San Mateo	SUB-AREA: CCAG/Millbrae: Transit Station Area	pallid bat	222
San Mateo	SUB-AREA: CCAG/Redwood City: Downtown	hoary bat	263
San Mateo	SUB-AREA: CCAG/Redwood City: Downtown	Santa Cruz kangaroo rat	361
San Mateo	SUB-AREA: CCAG/San Bruno: Transit Corridors	Alameda song sparrow	6
San Mateo	SUB-AREA: CCAG/San Bruno: Transit Corridors	hoary bat	142
San Mateo	SUB-AREA: CCAG/San Carlos: Railroad Corridor	Alameda song sparrow	120
San Mateo	SUB-AREA: CCAG/San Carlos: Railroad Corridor	Davidson's bush-mallow	120
San Mateo	SUB-AREA: CCAG/San Carlos: Railroad Corridor	pallid bat	
San Mateo	SUB-AREA: CCAG/San Carlos: Railroad Corridor	Santa Cruz kangaroo rat	485
San Mateo	SUB-AREA: CCAG/San Mateo County	Alameda song sparrow	47
San Mateo	SUB-AREA: CCAG/San Mateo County	Davidson's bush-mallow	15
San Mateo	SUB-AREA: CCAG/San Mateo County	hoary bat	2
San Mateo	SUB-AREA: CCAG/San Mateo County	pallid bat	15
San Mateo	SUB-AREA: CCAG/San Mateo County	Santa Cruz kangaroo rat	
San Mateo	SUB-AREA: CCAG/San Mateo County	white seaside tarplant	1
San Mateo	SUB-AREA: CCAG/San Mateo County (North Fair Oaks)	hoary bat	25
San Mateo	SUB-AREA: CCAG/San Mateo County (North Fair Oaks)	Santa Cruz kangaroo rat	408
San Mateo	SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	beach layia	40
San Mateo	SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	bristly sedge	
San Mateo	SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	Kellogg's horkelia	
San Mateo	SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	robust spineflower	
San Mateo	SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	rose leptosiphon	40
San Mateo	SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	San Francisco Bay Area leaf-cutter bee	
San Mateo	SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	sandy beach tiger beetle	
San Mateo	SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	showy rancheria clover	
San Mateo	SUB-AREA: CCAG/San Mateo County (Unincorporated Colma)	white seaside tarplant	
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown	Alameda song sparrow	417
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown	Davidson's bush-mallow	
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown	Franciscan onion	398
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown	hoary bat	
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown	Myrtle's silverspot	
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown	pallid bat	19
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown	Ricksecker's water scavenger beetle	
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown	Santa Cruz kangaroo rat	149
San Mateo	SUB-AREA: CCAG/South San Francisco	Alameda song sparrow	
San Mateo	SUB-AREA: CCAG/South San Francisco	hoary bat	27
San Mateo	SUB-AREA: CCAG/South San Francisco	Kellogg's horkelia	
San Mateo	SUB-AREA: CCAG/South San Francisco	robust spineflower	90
San Mateo	SUB-AREA: CCAG/South San Francisco	showy rancheria clover	
San Mateo	SUB-AREA: CCAG/South San Francisco	white seaside tarplant	464
		San Mateo County Potential Effect	**10746**
		San Mateo County Urban Land (2008)	**71872**
		Total San Mateo County Land	**353450**

County	*PDA*	*Species impacted*	*Acres*

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
Santa Clara	Campbell: Central Redevelopment Area	California tiger salamander	208
Santa Clara	Campbell: Central Redevelopment Area	Congdon's tarplant	
Santa Clara	Campbell: Central Redevelopment Area	robust spineflower	
Santa Clara	Campbell: VTA City Cores, Corridors & Station Areas	California tiger salamander	80
Santa Clara	Campbell: VTA City Cores, Corridors & Station Areas	Congdon's tarplant	
Santa Clara	Campbell: VTA City Cores, Corridors & Station Areas	hoary bat	0
Santa Clara	Campbell: VTA City Cores, Corridors & Station Areas	robust spineflower	
Santa Clara	Gilroy: Downtown	hoary bat	179
Santa Clara	Gilroy: Downtown	Loma Prieta hoita	
Santa Clara	Gilroy: Downtown	pallid bat	
Santa Clara	Gilroy: VTA City Cores, Corridors & Station Areas	hoary bat	133
Santa Clara	Gilroy: VTA City Cores, Corridors & Station Areas	Loma Prieta hoita	
Santa Clara	Gilroy: VTA City Cores, Corridors & Station Areas	pallid bat	
Santa Clara	Los Altos: VTA City Cores, Corridors & Station Areas	hoary bat	0
Santa Clara	Los Altos: VTA City Cores, Corridors & Station Areas	pallid bat	0
Santa Clara	Los Gatos: VTA City Cores, Corridors & Station Areas	hairless popcornflower	38
Santa Clara	Los Gatos: VTA City Cores, Corridors & Station Areas	hoary bat	54
Santa Clara	Los Gatos: VTA City Cores, Corridors & Station Areas	robust spineflower	
Santa Clara	Milpitas: Transit Area	alkali milk-vetch	0
Santa Clara	Milpitas: Transit Area	burrowing owl	0
Santa Clara	Milpitas: Transit Area	California tiger salamander	117
Santa Clara	Milpitas: Transit Area	robust spineflower	
Santa Clara	Milpitas: VTA City Cores, Corridors & Station Areas	alkali milk-vetch	77
Santa Clara	Milpitas: VTA City Cores, Corridors & Station Areas	burrowing owl	
Santa Clara	Mountain View: Downtown	hoary bat	83
Santa Clara	Mountain View: Downtown	pallid bat	
Santa Clara	Mountain View: El Camino Real Corridor	hoary bat	372
Santa Clara	Mountain View: El Camino Real Corridor	pallid bat	
Santa Clara	Mountain View: North Bayshore	alkali milk-vetch	63
Santa Clara	Mountain View: North Bayshore	burrowing owl	
Santa Clara	Mountain View: North Bayshore	Hoover's button-celery	63
Santa Clara	Palo Alto: California Avenue	Alameda song sparrow	86
Santa Clara	Palo Alto: California Avenue	California tiger salamander	88
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	Alameda song sparrow	211
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	American badger	
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	California tiger salamander	512
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	Franciscan onion	6
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	hoary bat	224
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	lost thistle	335
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	pallid bat	90
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	San Francisco collinsia	
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	Santa Cruz kangaroo rat	197
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	slender-leaved pondweed	
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	western pond turtle	0
Santa Clara	San Jose: Bascom TOD Corridor	California tiger salamander	188
Santa Clara	San Jose: Bascom TOD Corridor	Congdon's tarplant	
Santa Clara	San Jose: Bascom TOD Corridor	robust spineflower	
Santa Clara	San Jose: Bascom Urban Village	California tiger salamander	
Santa Clara	San Jose: Bascom Urban Village	Congdon's tarplant	44
Santa Clara	San Jose: Bascom Urban Village	robust spineflower	
Santa Clara	San Jose: Berryessa Station	California tiger salamander	567
Santa Clara	San Jose: Berryessa Station	Congdon's tarplant	
Santa Clara	San Jose: Berryessa Station	robust spineflower	
Santa Clara	San Jose: Blossom Hill/Snell Urban Village	Congdon's tarplant	52
Santa Clara	San Jose: Camden Urban Village	Congdon's tarplant	
Santa Clara	San Jose: Capitol Corridor Urban Villages	California tiger salamander	192
Santa Clara	San Jose: Capitol Corridor Urban Villages	Congdon's tarplant	
Santa Clara	San Jose: Capitol Corridor Urban Villages	robust spineflower	
Santa Clara	San Jose: Capitol/Tully/King Urban Villages	burrowing owl	39
Santa Clara	San Jose: Capitol/Tully/King Urban Villages	California tiger salamander	233
Santa Clara	San Jose: Capitol/Tully/King Urban Villages	Congdon's tarplant	
Santa Clara	San Jose: Capitol/Tully/King Urban Villages	robust spineflower	
Santa Clara	San Jose: Communications Hill	burrowing owl	9
Santa Clara	San Jose: Communications Hill	California tiger salamander	
Santa Clara	San Jose: Communications Hill	Congdon's tarplant	1330
Santa Clara	San Jose: Communications Hill	Hall's bush-mallow	
Santa Clara	San Jose: Communications Hill	Metcalf Canyon jewel-flower	5
Santa Clara	San Jose: Communications Hill	robust spineflower	
Santa Clara	San Jose: Communications Hill	Santa Clara Valley dudleya	20
Santa Clara	San Jose: Downtown "Frame"	California tiger salamander	1773
Santa Clara	San Jose: Downtown "Frame"	Congdon's tarplant	
Santa Clara	San Jose: Downtown "Frame"	hoary bat	649
Santa Clara	San Jose: Downtown "Frame"	pallid bat	840
Santa Clara	San Jose: Downtown "Frame"	robust spineflower	
Santa Clara	San Jose: Downtown "Frame"	saline clover	
Santa Clara	San Jose: East Santa Clara/Alum Rock Corridor	California tiger salamander	646
Santa Clara	San Jose: East Santa Clara/Alum Rock Corridor	Congdon's tarplant	
Santa Clara	San Jose: East Santa Clara/Alum Rock Corridor	hairless popcornflower	56
Santa Clara	San Jose: East Santa Clara/Alum Rock Corridor	robust spineflower	
Santa Clara	San Jose: Greater Downtown	California tiger salamander	455
Santa Clara	San Jose: Greater Downtown	Congdon's tarplant	
Santa Clara	San Jose: Greater Downtown	hoary bat	391
Santa Clara	San Jose: Greater Downtown	pallid bat	431
Santa Clara	San Jose: Greater Downtown	robust spineflower	
Santa Clara	San Jose: Greater Downtown	saline clover	431

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
Solano	Fairfield: Downtown South (Jefferson Street)	monarch butterfly	73
Solano	Fairfield: Downtown South (Jefferson Street)	Mt. Diablo buckwheat	62
Solano	Fairfield: Downtown South (Jefferson Street)	Northern Claypan Vernal Pool	109
Solano	Fairfield: Downtown South (Jefferson Street)	salt-marsh harvest mouse	8
Solano	Fairfield: Downtown South (Jefferson Street)	slender-leaved pondweed	
Solano	Fairfield: Downtown South (Jefferson Street)	Suisun shrew	109
Solano	Fairfield: Fairfield-Vacaville Train Station	alkali milk-vetch	1099
Solano	Fairfield: Fairfield-Vacaville Train Station	Baker's navarretia	
Solano	Fairfield: Fairfield-Vacaville Train Station	burrowing owl	4
Solano	Fairfield: Fairfield-Vacaville Train Station	California tiger salamander	
Solano	Fairfield: Fairfield-Vacaville Train Station	Carquinez goldenbush	
Solano	Fairfield: Fairfield-Vacaville Train Station	Contra Costa goldfields	110
Solano	Fairfield: Fairfield-Vacaville Train Station	dwarf downingia	
Solano	Fairfield: Fairfield-Vacaville Train Station	San Joaquin spearscale	
Solano	Fairfield: Fairfield-Vacaville Train Station	showy rancheria clover	
Solano	Fairfield: Fairfield-Vacaville Train Station	Swainson's hawk	4
Solano	Fairfield: Fairfield-Vacaville Train Station	vernal pool fairy shrimp	
Solano	Fairfield: North Texas Street Core	legenere	85
Solano	Fairfield: North Texas Street Core	pappose tarplant	131
Solano	Fairfield: West Texas Street Gateway	monarch butterfly	282
Solano	Fairfield: West Texas Street Gateway	Northern Claypan Vernal Pool	193
Solano	Fairfield: West Texas Street Gateway	Suisun shrew	
Solano	Suisun City: Downtown & Waterfront	California linderiella	11
Solano	Suisun City: Downtown & Waterfront	Coastal Brackish Marsh	0
Solano	Suisun City: Downtown & Waterfront	Delta tule pea	
Solano	Suisun City: Downtown & Waterfront	hoary bat	270
Solano	Suisun City: Downtown & Waterfront	legenere	85
Solano	Suisun City: Downtown & Waterfront	Mason's lilaeopsis	25
Solano	Suisun City: Downtown & Waterfront	Mt. Diablo buckwheat	
Solano	Suisun City: Downtown & Waterfront	Northern Claypan Vernal Pool	
Solano	Suisun City: Downtown & Waterfront	salt-marsh harvest mouse	2
Solano	Suisun City: Downtown & Waterfront	Suisun Marsh aster	
Solano	Suisun City: Downtown & Waterfront	Suisun shrew	149
Solano	Vacaville: Allison Area	Baker's navarretia	
Solano	Vacaville: Allison Area	showy rancheria clover	7
Solano	Vacaville: Allison Area	vernal pool tadpole shrimp	
Solano	Vacaville: Downtown	Baker's navarretia	127
Solano	Vacaville: Downtown	showy rancheria clover	
Solano	Vallejo: Waterfront & Downtown	Carquinez goldenbush	
Solano	Vallejo: Waterfront & Downtown	fragrant fritillary	155
Solano	Vallejo: Waterfront & Downtown	Northern Coastal Salt Marsh	
Solano	Vallejo: Waterfront & Downtown	osprey	0
Solano	Vallejo: Waterfront & Downtown	soft bird's-beak	148
		Solano County Potential Effect	**5143**
		Solano County Urban Land (2008)	**59157**
		Total Solano County Land	**582371**

County	*PDA*	*Species impacted*	*Acres*
Sonoma	Cotati: Downtown and Cotati Depot	California tiger salamander	17
Sonoma	Cotati: Downtown and Cotati Depot	white seaside tarplant	10
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	alkali milk-vetch	426
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	Franciscan onion	
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	Petaluma popcornflower	
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	Point Reyes checkerbloom	
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	round-leaved filaree	
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	Sacramento splittail	1
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	San Pablo song sparrow	294
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	Sonoma spineflower	426
Sonoma	Rohnert Park: Sonoma Mountain Village	California tiger salamander	5
Sonoma	Santa Rosa: North Santa Rosa Station	bent-flowered fiddleneck	5
Sonoma	Santa Rosa: North Santa Rosa Station	Jepson's leptosiphon	181
Sonoma	Santa Rosa: Roseland Area	California linderiella	
Sonoma	Santa Rosa: Roseland Area	California tiger salamander	57
Sonoma	Santa Rosa: Roseland Area	Jepson's leptosiphon	17
Sonoma	Santa Rosa: Roseland Area	saline clover	63
Sonoma	Santa Rosa: Roseland Area	white-tailed kite	5
Sonoma	Santa Rosa: SUB-AREA: Downtown Station Area	bent-flowered fiddleneck	351
Sonoma	Santa Rosa: SUB-AREA: Downtown Station Area	Jepson's leptosiphon	622
Sonoma	Santa Rosa: SUB-AREA: Downtown Station Area	western pond turtle	7
Sonoma	Santa Rosa: SUB-AREA: Downtown Station Area	white sedge	501
Sonoma	Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	bent-flowered fiddleneck	266
Sonoma	Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	Jepson's leptosiphon	352
Sonoma	Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	showy rancheria clover	36
Sonoma	Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	Sonoma canescent manzanita	21
Sonoma	Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	western pond turtle	2
Sonoma	Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	white sedge	73
Sonoma	Santa Rosa: SUB-AREA: Sebastopol Road Corridor	Baker's navarretia	
Sonoma	Santa Rosa: SUB-AREA: Sebastopol Road Corridor	California tiger salamander	56
Sonoma	Santa Rosa: SUB-AREA: Sebastopol Road Corridor	Jepson's leptosiphon	113
Sonoma	Santa Rosa: SUB-AREA: Sebastopol Road Corridor	saline clover	223
Sonoma	Santa Rosa: SUB-AREA: Sebastopol Road Corridor	Sebastopol meadowfoam	
Sonoma	Santa Rosa: SUB-AREA: Sebastopol Road Corridor	showy rancheria clover	
Sonoma	Santa Rosa: SUB-AREA: Sebastopol Road Corridor	white seaside tarplant	2
Sonoma	Santa Rosa: SUB-AREA: Sebastopol Road Corridor	white sedge	95
Sonoma	Sebastopol: Nexus Area	Baker's goldfields	645

TABLE H-1A: PDAs That May Impact Impact Special-Status Species

County	*PDA*	*Species impacted*	*Acres*
Sonoma	Sebastopol: Nexus Area	Burke's goldfields	1
Sonoma	Sebastopol: Nexus Area	oval-leaved viburnum	
Sonoma	Sebastopol: Nexus Area	Peruvian dodder	8
Sonoma	Sebastopol: Nexus Area	Sonoma spineflower	
Sonoma	Sebastopol: Nexus Area	swamp harebell	18
Sonoma	Sebastopol: Nexus Area	thin-lobed horkelia	
Sonoma	Sebastopol: Nexus Area	western pond turtle	1
Sonoma	Windsor: Redevelopment Area	California linderiella	15
Sonoma	Windsor: Redevelopment Area	narrow-anthered brodiaea	
		Sonoma County Potential Effect	**4917**
		Sonoma County Urban Land (2008)	**74742**
		Total Sonoma County Land	**1026085**

Urban Land and Total Land for all counties except San Francisco from California Department of Conservation, Farmland Mapping and Monitoring Program, "2006-2008 California Farmland Conversion Report." Available on the internet at: http://www.conservation.ca.gov/dlrp/fmmp/pubs/2006-2008/Pages/FMMP_2006-2008_FCR.aspx

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Alameda	21116	alkali milk-vetch	0.8456
Alameda	21116	California red-legged frog	0.8456
Alameda	21116	California tiger salamander	1.1839
Alameda	21116	caper-fruited tropidocarpum	0.7870
Alameda	21116	foothill yellow-legged frog	0.8456
Alameda	21116	hairless popcornflower	0.8456
Alameda	21116	San Joaquin spearscale	0.8456
Alameda	21116	western pond turtle	0.8456
Alameda	21131	Alameda song sparrow	0.1382
Alameda	21131	California seablite	0.1344
Alameda	21131	mimic tryonia (=California brackishwater snail)	1.1961
Alameda	21131	salt-marsh wandering shrew	1.1961
Alameda	21131	western snowy plover	2.6192
Alameda	21131	woodland woollythreads	0.0708
Alameda	21132	burrowing owl	0.0898
Alameda	21132	California tiger salamander	10.3763
Alameda	21132	tricolored blackbird	0.3660
Alameda	21473	California red-legged frog	0.0886
Alameda	21473	California tiger salamander	0.0825
Alameda	21473	Congdon's tarplant	1.1961
Alameda	21473	prostrate vernal pool navarretia	0.0191
Alameda	21484	tricolored blackbird	0.0751
Alameda	22009	Alameda song sparrow	0.0400
Alameda	22009	alkali milk-vetch	1.1961
Alameda	22009	arcuate bush-mallow	0.0667
Alameda	22009	burrowing owl	1.1961
Alameda	22009	California clapper rail	1.1901
Alameda	22009	California seablite	0.0886
Alameda	22009	California tiger salamander	0.4591
Alameda	22009	Congdon's tarplant	1.1961
Alameda	22009	Contra Costa goldfields	3.1446
Alameda	22009	hairless popcornflower	0.0568
Alameda	22009	Hall's bush-mallow	1.9857
Alameda	22009	hoary bat	0.0580
Alameda	22009	Hoover's button-celery	0.1560
Alameda	22009	mimic tryonia (=California brackishwater snail)	6.1355
Alameda	22009	most beautiful jewel-flower	3.9867
Alameda	22009	Northern Coastal Salt Marsh	2.1594
Alameda	22009	pallid bat	0.5498
Alameda	22009	Point Reyes bird's-beak	0.0863
Alameda	22009	prostrate vernal pool navarretia	1.2483
Alameda	22009	robust spineflower	0.8801
Alameda	22009	saline clover	1.2019
Alameda	22009	salt-marsh harvest mouse	0.5817
Alameda	22009	saltmarsh common yellowthroat	0.8801
Alameda	22009	San Joaquin spearscale	1.4171
Alameda	22009	Santa Cruz tarplant	0.1709
Alameda	22009	slender-leaved pondweed	0.0916
Alameda	22009	steelhead - central California coast DPS	0.8223
Alameda	22009	western mastiff bat	5.5766
Alameda	22009	western snowy plover	1.8641
Alameda	22009	woodland woollythreads	1.8641
Alameda	22013	caper-fruited tropidocarpum	1.8641

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Alameda	22013	curved-foot hygrotus diving beetle	1.8641
Alameda	22063	pallid bat	1.8641
Alameda	22063	western mastiff bat	1.8641
Alameda	22455	Alameda song sparrow	1.8641
Alameda	22455	bent-flowered fiddleneck	1.8448
Alameda	22455	Choris' popcornflower	1.8641
Alameda	22455	hoary bat	0.1489
Alameda	22455	Kellogg's horkelia	0.0919
Alameda	22455	round-leaved filaree	0.0919
Alameda	22455	San Francisco Bay spineflower	0.0919
Alameda	22455	San Joaquin spearscale	0.0919
Alameda	22455	woodland woollythreads	0.0919
Alameda	22509	Alameda song sparrow	0.3281
Alameda	22509	beach layia	0.0919
Alameda	22509	bristly sedge	0.1489
Alameda	22509	double-crested cormorant	0.0919
Alameda	22509	rose leptosiphon	0.0523
Alameda	22509	San Francisco Bay Area leaf-cutter bee	0.2407
Alameda	22509	sandy beach tiger beetle	0.0919
Alameda	22509	white seaside tarplant	0.9237
Alameda	22664	alkali milk-vetch	0.9237
Alameda	22664	California red-legged frog	1.2617
Alameda	22664	California tiger salamander	0.8230
Alameda	22664	caper-fruited tropidocarpum	0.9237
Alameda	22664	foothill yellow-legged frog	0.9237
Alameda	22664	hairless popcornflower	0.9237
Alameda	22664	San Joaquin spearscale	0.9237
Alameda	22664	western pond turtle	0.7344
Alameda	22670	woodland woollythreads	0.0041
Alameda	22776	California tiger salamander	0.0144
Alameda	22776	caper-fruited tropidocarpum	0.6984
Alameda	22776	foothill yellow-legged frog	0.4423
Alameda	22776	tricolored blackbird	0.6008
Alameda	22780	Bay checkerspot butterfly	1.5528
Alameda	22780	beach layia	1.5528
Alameda	22780	bent-flowered fiddleneck	0.5177
Alameda	22780	blue coast gilia	1.5528
Alameda	22780	bristly sedge	1.5528
Alameda	22780	Choris' popcornflower	1.5528
Alameda	22780	Cooper's hawk	1.5528
Alameda	22780	Diablo helianthella	1.7982
Alameda	22780	double-crested cormorant	1.7982
Alameda	22780	fragrant fritillary	4.8262
Alameda	22780	hoary bat	4.8262
Alameda	22780	Kellogg's horkelia	1.0114
Alameda	22780	rose leptosiphon	0.8437
Alameda	22780	round-leaved filaree	4.8262
Alameda	22780	saline clover	4.8262
Alameda	22780	saltmarsh common yellowthroat	1.7982
Alameda	22780	San Francisco Bay Area leaf-cutter bee	4.8262
Alameda	22780	San Francisco Bay spineflower	4.8262
Alameda	22780	San Joaquin spearscale	0.9198
Alameda	22780	sandy beach tiger beetle	0.0782

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Alameda	22780	Santa Clara red ribbons	0.9198
Alameda	22780	white seaside tarplant	0.9198
Alameda	22780	woodland woollythreads	0.9198
Alameda	22990	tricolored blackbird	0.9198
Alameda	230052	hoary bat	0.0581
Alameda	230083	alkali milk-vetch	0.9198
Alameda	230083	California red-legged frog	0.0638
Alameda	230083	California tiger salamander	1.8950
Alameda	230083	caper-fruited tropidocarpum	0.8037
Alameda	230083	foothill yellow-legged frog	1.9029
Alameda	230083	hairless popcornflower	0.4533
Alameda	230083	San Joaquin spearscale	0.3389
Alameda	230083	western pond turtle	0.0894
Alameda	230101	slender-leaved pondweed	0.3389
Alameda	230101	steelhead - central California coast DPS	1.1860
Alameda	230110	tricolored blackbird	1.0987
Alameda	230157	alkali milk-vetch	0.3389
Alameda	230157	California red-legged frog	2.1026
Alameda	230157	caper-fruited tropidocarpum	10.0230
Alameda	230157	foothill yellow-legged frog	2.1026
Alameda	230157	hairless popcornflower	1.9865
Alameda	240003	Alameda song sparrow	1.6531
Alameda	240003	Point Reyes bird's-beak	6.2540
Alameda	240003	Santa Cruz tarplant	6.2540
Alameda	240018	Alameda song sparrow	1.6147
Alameda	240018	alkali milk-vetch	0.3328
Alameda	240018	American badger	10.1131
Alameda	240018	burrowing owl	4.5723
Alameda	240018	California least tern	1.9900
Alameda	240018	California red-legged frog	1.6332
Alameda	240018	California tiger salamander	1.1039
Alameda	240018	Congdon's tarplant	3.9231
Alameda	240018	Contra Costa goldfields	1.6531
Alameda	240018	Franciscan onion	12.0952
Alameda	240018	hoary bat	1.8482
Alameda	240018	lost thistle	2.0034
Alameda	240018	monarch butterfly	5.7149
Alameda	240018	Northern Coastal Salt Marsh	2.0034
Alameda	240018	pallid bat	6.7734
Alameda	240018	saline clover	6.2540
Alameda	240018	salt-marsh wandering shrew	1.2899
Alameda	240018	San Francisco collinsia	6.2540
Alameda	240018	San Joaquin spearscale	0.4623
Alameda	240018	Santa Cruz kangaroo rat	0.8392
Alameda	240018	slender-leaved pondweed	2.1026
Alameda	240018	steelhead - central California coast DPS	6.2540
Alameda	240018	western snowy plover	10.2799
Alameda	240018	white-tailed kite	1.8482
Alameda	240038	hairless popcornflower	0.0324
Alameda	240050	alkali milk-vetch	6.2540
Alameda	240050	California red-legged frog	0.1659
Alameda	240050	California tiger salamander	1.9523
Alameda	240050	caper-fruited tropidocarpum	0.1049

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Alameda	240050	foothill yellow-legged frog	0.0824
Alameda	240050	hairless popcornflower	0.8812
Alameda	240050	San Joaquin spearscale	0.9522
Alameda	240050	western pond turtle	1.9473
Alameda	240051	Northern Coastal Salt Marsh	0.8636
Alameda	240051	saltmarsh common yellowthroat	0.8636
Alameda	240062	California tiger salamander	0.1169
Alameda	240062	steelhead - central California coast DPS	0.1002
Alameda	240062	tricolored blackbird	0.0991
Alameda	240076	California red-legged frog	0.0838
Alameda	240076	caper-fruited tropidocarpum	0.4500
Alameda	240076	foothill yellow-legged frog	0.6467
Alameda	240076	hairless popcornflower	1.7484
Alameda	240076	western pond turtle	1.7484
Alameda	240077	adobe sanicle	0.4500
Alameda	240077	Alameda Island mole	0.4500
Alameda	240077	Alameda song sparrow	1.7484
Alameda	240077	alkali milk-vetch	1.6962
Alameda	240077	California tiger salamander	0.9047
Alameda	240077	Kellogg's horkelia	0.1646
Alameda	240077	robust spineflower	0.2564
Alameda	240077	saline clover	0.0479
Alameda	240094	California red-legged frog	1.3520
Alameda	240196	California tiger salamander	0.2017
Alameda	240196	caper-fruited tropidocarpum	1.4165
Alameda	240196	foothill yellow-legged frog	1.6962
Alameda	240196	San Joaquin spearscale	1.6938
Alameda	240202	pallid bat	1.8083
Alameda	240202	Santa Cruz tarplant	0.5649
Alameda	240207	Alameda song sparrow	1.4165
Alameda	240207	Point Reyes bird's-beak	10.8630
Alameda	240207	saline clover	1.1111
Alameda	240250	hairless popcornflower	0.0121
Alameda	240254	brittlescale	0.5649
Alameda	240254	California tiger salamander	1.6962
Alameda	240254	caper-fruited tropidocarpum	1.6962
Alameda	240254	Livermore tarplant	1.6962
Alameda	240261	burrowing owl	0.0956
Alameda	240261	hairless popcornflower	1.7415
Alameda	240263	slender-leaved pondweed	0.3251
Alameda	240272	alkali milk-vetch	7.4471
Alameda	240272	burrowing owl	0.3440
Alameda	240272	California clapper rail	1.6962
Alameda	240272	Contra Costa goldfields	0.1132
Alameda	240272	salt-marsh harvest mouse	0.0505
Alameda	240272	salt-marsh wandering shrew	2.0232
Alameda	240272	San Joaquin spearscale	0.9433
Alameda	240350	Bridges' coast range shoulderband	2.9447
Alameda	240350	saline clover	3.1642
Alameda	240372	bent-flowered fiddleneck	1.3541
Alameda	240372	Choris' popcornflower	2.4178
Alameda	240372	hoary bat	0.0959
Alameda	240372	Kellogg's horkelia	1.0511

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Alameda	240372	pallid bat	5.5648
Alameda	240372	round-leaved filaree	2.8586
Alameda	240372	San Francisco Bay spineflower	0.9077
Alameda	240372	San Joaquin spearscale	1.3541
Alameda	240683	hairless popcornflower	0.0750
Alameda	240717	Bridges' coast range shoulderband	3.1038
Alameda	94506	steelhead - central California coast DPS	3.5120
Alameda	98207	Alameda song sparrow	1.5595
Alameda	98207	bent-flowered fiddleneck	1.4683
Alameda	98207	Choris' popcornflower	0.6114
Alameda	98207	hoary bat	1.8522
Alameda	98207	Kellogg's horkelia	1.5595
Alameda	98207	round-leaved filaree	0.3451
Alameda	98207	San Francisco Bay spineflower	5.2320
Alameda	98207	San Joaquin spearscale	2.4912
		Total Alameda County	**384.2924**
Bay Area Region/Mu	21012	beach layia	0.9258
Bay Area Region/Mu	21012	bristly sedge	0.5679
Bay Area Region/Mu	21012	marsh sandwort	0.9077
Bay Area Region/Mu	21012	Mission blue butterfly	0.8211
Bay Area Region/Mu	21012	rose leptosiphon	2.9009
Bay Area Region/Mu	21012	San Francisco Bay Area leaf-cutter bee	0.1544
Bay Area Region/Mu	21012	sandy beach tiger beetle	0.9205
Bay Area Region/Mu	21012	white seaside tarplant	0.3559
Bay Area Region/Mu	21013	Alameda song sparrow	5.7396
Bay Area Region/Mu	21013	arcuate bush-mallow	3.5665
Bay Area Region/Mu	21013	beach layia	0.1206
Bay Area Region/Mu	21013	bristly sedge	0.0874
Bay Area Region/Mu	21013	Carquinez goldenbush	0.0996
Bay Area Region/Mu	21013	Coastal Brackish Marsh	1.8774
Bay Area Region/Mu	21013	Delta tule pea	2.6682
Bay Area Region/Mu	21013	double-crested cormorant	2.6682
Bay Area Region/Mu	21013	giant garter snake	3.1006
Bay Area Region/Mu	21013	Mason's lilaeopsis	3.1006
Bay Area Region/Mu	21013	Northern Coastal Salt Marsh	0.4801
Bay Area Region/Mu	21013	rose leptosiphon	0.2276
Bay Area Region/Mu	21013	saline clover	0.4801
Bay Area Region/Mu	21013	salt-marsh harvest mouse	0.8131
Bay Area Region/Mu	21013	salt-marsh wandering shrew	3.1006
Bay Area Region/Mu	21013	San Francisco Bay Area leaf-cutter bee	3.1006
Bay Area Region/Mu	21013	San Pablo song sparrow	3.1006
Bay Area Region/Mu	21013	sandy beach tiger beetle	2.3211
Bay Area Region/Mu	21013	soft bird's-beak	0.4801
Bay Area Region/Mu	21013	Suisun Marsh aster	0.4801
Bay Area Region/Mu	21013	western snowy plover	3.1006
Bay Area Region/Mu	21013	white seaside tarplant	0.9381
Bay Area Region/Mu	21320	beach layia	0.9381
Bay Area Region/Mu	21320	bristly sedge	0.9381
Bay Area Region/Mu	21320	marsh sandwort	0.9381
Bay Area Region/Mu	21320	Mission blue butterfly	0.9381
Bay Area Region/Mu	21320	rose leptosiphon	0.9381
Bay Area Region/Mu	21320	San Francisco Bay Area leaf-cutter bee	3.0710
Bay Area Region/Mu	21320	sandy beach tiger beetle	3.5137

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Bay Area Region/Mu	21320	white seaside tarplant	0.9567
Bay Area Region/Mu	21627	adobe sanicle	3.0710
Bay Area Region/Mu	21627	Alameda song sparrow	0.1450
Bay Area Region/Mu	21627	alkali milk-vetch	1.0456
Bay Area Region/Mu	21627	American badger	0.3607
Bay Area Region/Mu	21627	arcuate bush-mallow	0.3607
Bay Area Region/Mu	21627	beach layia	3.1309
Bay Area Region/Mu	21627	bristly sedge	3.1309
Bay Area Region/Mu	21627	California clapper rail	0.3417
Bay Area Region/Mu	21627	California red-legged frog	0.1072
Bay Area Region/Mu	21627	California tiger salamander	0.6306
Bay Area Region/Mu	21627	Congdon's tarplant	1.0442
Bay Area Region/Mu	21627	Davidson's bush-mallow	0.7581
Bay Area Region/Mu	21627	Diablo helianthella	0.7581
Bay Area Region/Mu	21627	fragrant fritillary	0.7581
Bay Area Region/Mu	21627	Franciscan onion	0.7581
Bay Area Region/Mu	21627	hairless popcornflower	0.1458
Bay Area Region/Mu	21627	hoary bat	0.0858
Bay Area Region/Mu	21627	lost thistle	0.7581
Bay Area Region/Mu	21627	Myrtle's silverspot	0.7581
Bay Area Region/Mu	21627	pallid bat	0.0451
Bay Area Region/Mu	21627	Ricksecker's water scavenger beetle	0.0451
Bay Area Region/Mu	21627	robust spineflower	0.0451
Bay Area Region/Mu	21627	rose leptosiphon	1.3806
Bay Area Region/Mu	21627	saline clover	2.1698
Bay Area Region/Mu	21627	San Francisco Bay Area leaf-cutter bee	2.1698
Bay Area Region/Mu	21627	San Francisco collinsia	2.1061
Bay Area Region/Mu	21627	San Francisco forktail damselfly	0.0054
Bay Area Region/Mu	21627	San Francisco owl's-clover	0.4093
Bay Area Region/Mu	21627	sandy beach tiger beetle	2.1698
Bay Area Region/Mu	21627	Santa Cruz kangaroo rat	2.1698
Bay Area Region/Mu	21627	slender-leaved pondweed	0.4040
Bay Area Region/Mu	21627	Stage's dufourine bee	2.1698
Bay Area Region/Mu	21627	white seaside tarplant	0.0054
Bay Area Region/Mu	22001	alkali milk-vetch	2.1698
Bay Area Region/Mu	22001	American badger	0.1621
Bay Area Region/Mu	22001	bent-flowered fiddleneck	0.1825
Bay Area Region/Mu	22001	burrowing owl	0.3737
Bay Area Region/Mu	22001	California black rail	0.4137
Bay Area Region/Mu	22001	California clapper rail	0.9878
Bay Area Region/Mu	22001	California tiger salamander	1.9819
Bay Area Region/Mu	22001	Coastal Brackish Marsh	0.4137
Bay Area Region/Mu	22001	Franciscan onion	0.4137
Bay Area Region/Mu	22001	Jepson's leptosiphon	1.7571
Bay Area Region/Mu	22001	Marin knotweed	2.2892
Bay Area Region/Mu	22001	Marin western flax	0.6859
Bay Area Region/Mu	22001	mimic tryonia (=California brackishwater snail)	1.7571
Bay Area Region/Mu	22001	Mt. Tamalpais manzanita	1.7571
Bay Area Region/Mu	22001	Napa false indigo	0.2968
Bay Area Region/Mu	22001	Northern Coastal Salt Marsh	2.0873
Bay Area Region/Mu	22001	pallid bat	0.0609
Bay Area Region/Mu	22001	Petaluma popcornflower	0.0959
Bay Area Region/Mu	22001	Point Reyes checkerbloom	1.4279

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Bay Area Region/Mu	22001	round-leaved filaree	4.2095
Bay Area Region/Mu	22001	Sacramento splittail	0.0518
Bay Area Region/Mu	22001	salt-marsh harvest mouse	9.2282
Bay Area Region/Mu	22001	saltmarsh common yellowthroat	0.3374
Bay Area Region/Mu	22001	San Pablo song sparrow	0.1099
Bay Area Region/Mu	22001	soft bird's-beak	2.0014
Bay Area Region/Mu	22001	Sonoma spineflower	0.3648
Bay Area Region/Mu	22001	tidewater goby	1.0868
Bay Area Region/Mu	22001	western pond turtle	0.0363
Bay Area Region/Mu	22001	white seaside tarplant	0.1259
Bay Area Region/Mu	22001	white sedge	0.3411
Bay Area Region/Mu	22042	California tiger salamander	4.3906
Bay Area Region/Mu	22042	steelhead - central California coast DPS	4.3906
Bay Area Region/Mu	22042	tricolored blackbird	2.2475
Bay Area Region/Mu	22511	beach layia	0.0645
Bay Area Region/Mu	22511	bristly sedge	4.3906
Bay Area Region/Mu	22511	rose leptosiphon	4.3906
Bay Area Region/Mu	22511	San Francisco Bay Area leaf-cutter bee	4.3906
Bay Area Region/Mu	22511	sandy beach tiger beetle	4.3906
Bay Area Region/Mu	22511	white seaside tarplant	1.8988
Bay Area Region/Mu	22636	beach layia	0.7658
Bay Area Region/Mu	22636	bristly sedge	0.7658
Bay Area Region/Mu	22636	double-crested cormorant	0.7658
Bay Area Region/Mu	22636	rose leptosiphon	0.7658
Bay Area Region/Mu	22636	San Francisco Bay Area leaf-cutter bee	0.7658
Bay Area Region/Mu	22636	sandy beach tiger beetle	0.7658
Bay Area Region/Mu	22636	white seaside tarplant	0.7658
Bay Area Region/Mu	230088	woodland woollythreads	5.3628
Bay Area Region/Mu	230221	Alameda song sparrow	1.7632
Bay Area Region/Mu	230221	alkali milk-vetch	2.3429
Bay Area Region/Mu	230221	California seablite	2.3429
Bay Area Region/Mu	230221	Carquinez goldenbush	0.2037
Bay Area Region/Mu	230221	fragrant fritillary	2.3429
Bay Area Region/Mu	230221	hoary bat	2.3429
Bay Area Region/Mu	230221	monarch butterfly	2.3429
Bay Area Region/Mu	230221	pallid bat	2.3429
Bay Area Region/Mu	230221	Point Reyes bird's-beak	0.9866
Bay Area Region/Mu	230221	saline clover	0.9866
Bay Area Region/Mu	230221	San Pablo song sparrow	0.9866
Bay Area Region/Mu	230221	Santa Cruz tarplant	0.9866
Bay Area Region/Mu	230221	yellow-headed blackbird	0.9866
Bay Area Region/Mu	230222	alkali milk-vetch	0.9866
Bay Area Region/Mu	230222	bent-flowered fiddleneck	0.8228
Bay Area Region/Mu	230222	Bridges' coast range shoulderband	0.8228
Bay Area Region/Mu	230222	California seablite	0.8228
Bay Area Region/Mu	230222	Choris' popcornflower	0.8228
Bay Area Region/Mu	230222	fragrant fritillary	0.8228
Bay Area Region/Mu	230222	hoary bat	0.8228
Bay Area Region/Mu	230222	Kellogg's horkelia	0.1284
Bay Area Region/Mu	230222	monarch butterfly	0.1284
Bay Area Region/Mu	230222	pallid bat	0.1284
Bay Area Region/Mu	230222	round-leaved filaree	0.2531
Bay Area Region/Mu	230222	saline clover	1.9470

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Bay Area Region/Mu	230222	San Francisco Bay spineflower	0.0619
Bay Area Region/Mu	230222	San Joaquin spearscale	2.0384
Bay Area Region/Mu	230222	San Pablo song sparrow	3.2254
Bay Area Region/Mu	230222	Santa Cruz tarplant	8.2505
Bay Area Region/Mu	230222	yellow-headed blackbird	0.1599
Bay Area Region/Mu	230290	beach layia	1.9822
Bay Area Region/Mu	230290	bristly sedge	0.2907
Bay Area Region/Mu	230290	rose leptosiphon	0.0843
Bay Area Region/Mu	230290	San Francisco Bay Area leaf-cutter bee	0.1376
Bay Area Region/Mu	230290	sandy beach tiger beetle	0.9134
Bay Area Region/Mu	230290	white seaside tarplant	0.9134
Bay Area Region/Mu	230612	beach layia	0.1713
Bay Area Region/Mu	230612	big tarplant	0.9134
Bay Area Region/Mu	230612	Bolander's water-hemlock	0.9134
Bay Area Region/Mu	230612	bristly sedge	0.9134
Bay Area Region/Mu	230612	Carquinez goldenbush	0.9134
Bay Area Region/Mu	230612	Delta smelt	0.6578
Bay Area Region/Mu	230612	double-crested cormorant	0.6105
Bay Area Region/Mu	230612	rose leptosiphon	0.0483
Bay Area Region/Mu	230612	San Francisco Bay Area leaf-cutter bee	1.9867
Bay Area Region/Mu	230612	San Pablo song sparrow	0.0828
Bay Area Region/Mu	230612	sandy beach tiger beetle	0.1563
Bay Area Region/Mu	230612	soft bird's-beak	6.1185
Bay Area Region/Mu	230612	white seaside tarplant	3.9784
Bay Area Region/Mu	230656	Alameda song sparrow	2.1591
Bay Area Region/Mu	230656	alkali milk-vetch	0.5477
Bay Area Region/Mu	230656	California seablite	0.0890
Bay Area Region/Mu	230656	fragrant fritillary	2.2176
Bay Area Region/Mu	230656	hoary bat	1.6176
Bay Area Region/Mu	230656	monarch butterfly	0.4080
Bay Area Region/Mu	230656	pallid bat	0.4080
Bay Area Region/Mu	230656	Point Reyes bird's-beak	1.6403
Bay Area Region/Mu	230656	saline clover	0.1362
Bay Area Region/Mu	230656	San Pablo song sparrow	2.3294
Bay Area Region/Mu	230656	Santa Cruz tarplant	0.3536
Bay Area Region/Mu	230656	yellow-headed blackbird	0.1701
Bay Area Region/Mu	230657	Carquinez goldenbush	1.9158
Bay Area Region/Mu	230657	San Pablo song sparrow	2.0524
Bay Area Region/Mu	230658	Carquinez goldenbush	0.0146
Bay Area Region/Mu	230658	Suisun shrew	1.9158
Bay Area Region/Mu	230659	California red-legged frog	2.0524
Bay Area Region/Mu	230659	Suisun shrew	0.0943
Bay Area Region/Mu	230660	monarch butterfly	0.4747
Bay Area Region/Mu	230660	pappose tarplant	3.4879
Bay Area Region/Mu	230660	Suisun shrew	2.1538
Bay Area Region/Mu	230660	Suisun song sparrow	2.0524
Bay Area Region/Mu	230666	burrowing owl	2.0524
Bay Area Region/Mu	230666	California red-legged frog	1.9158
Bay Area Region/Mu	230666	caper-fruited tropidocarpum	2.0524
Bay Area Region/Mu	230666	curved-foot hygrotus diving beetle	0.3837
Bay Area Region/Mu	230666	diamond-petaled California poppy	0.0897
Bay Area Region/Mu	230666	round-leaved filaree	1.9158
Bay Area Region/Mu	230666	San Joaquin kit fox	2.0524

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Bay Area Region/Mu	230668	alkali milk-vetch	2.0524
Bay Area Region/Mu	230668	California tiger salamander	1.9158
Bay Area Region/Mu	230668	hairless popcornflower	0.3323
Bay Area Region/Mu	230668	hoary bat	1.9158
Bay Area Region/Mu	230668	pallid bat	3.4318
Bay Area Region/Mu	230668	salt-marsh harvest mouse	0.0822
Bay Area Region/Mu	230668	steelhead - central California coast DPS	2.4389
Bay Area Region/Mu	230668	tricolored blackbird	2.4389
Bay Area Region/Mu	230668	woodland woollythreads	0.2643
Bay Area Region/Mu	230672	Alameda song sparrow	1.2922
Bay Area Region/Mu	230672	alkali milk-vetch	0.2475
Bay Area Region/Mu	230672	California clapper rail	0.7915
Bay Area Region/Mu	230672	double-crested cormorant	6.1484
Bay Area Region/Mu	230672	hairless popcornflower	1.9623
Bay Area Region/Mu	230672	hoary bat	6.1484
Bay Area Region/Mu	230672	pallid bat	2.4752
Bay Area Region/Mu	230673	monarch butterfly	2.4752
Bay Area Region/Mu	230673	white-tailed kite	0.3541
Bay Area Region/Mu	230685	Antioch efferian robberfly	2.4752
Bay Area Region/Mu	230685	big tarplant	0.5004
Bay Area Region/Mu	230685	California tiger salamander	0.2300
Bay Area Region/Mu	230685	Carquinez goldenbush	1.9863
Bay Area Region/Mu	230685	Congdon's tarplant	0.0270
Bay Area Region/Mu	230685	Contra Costa goldfields	0.1447
Bay Area Region/Mu	230685	pallid bat	6.0978
Bay Area Region/Mu	230685	San Joaquin spearscale	4.0127
Bay Area Region/Mu	230685	soft bird's-beak	0.9368
Bay Area Region/Mu	230685	Suisun song sparrow	0.5360
Bay Area Region/Mu	230685	tricolored blackbird	0.0927
Bay Area Region/Mu	230686	Carquinez goldenbush	2.2479
Bay Area Region/Mu	230686	Coastal Brackish Marsh	2.7944
Bay Area Region/Mu	230686	pappose tarplant	0.1376
Bay Area Region/Mu	230686	saline clover	0.5020
Bay Area Region/Mu	230686	salt-marsh harvest mouse	0.1633
Bay Area Region/Mu	230686	Suisun Marsh aster	0.0986
Bay Area Region/Mu	230686	Suisun shrew	1.0606
Bay Area Region/Mu	230686	Suisun song sparrow	0.7183
Bay Area Region/Mu	230712	beach layia	0.8431
Bay Area Region/Mu	230712	bristly sedge	3.9807
Bay Area Region/Mu	230712	marsh sandwort	3.9807
Bay Area Region/Mu	230712	Mission blue butterfly	2.3179
Bay Area Region/Mu	230712	rose leptosiphon	3.9807
Bay Area Region/Mu	230712	San Francisco Bay Area leaf-cutter bee	3.9807
Bay Area Region/Mu	230712	sandy beach tiger beetle	3.9807
Bay Area Region/Mu	230712	white seaside tarplant	3.9807
Bay Area Region/Mu	240059	chaparral harebell	9.0457
Bay Area Region/Mu	240059	hairless popcornflower	0.4720
Bay Area Region/Mu	240059	tricolored blackbird	9.0457
Bay Area Region/Mu	240061	chaparral harebell	1.6705
Bay Area Region/Mu	240061	hairless popcornflower	0.4720
Bay Area Region/Mu	240061	tricolored blackbird	0.0472
Bay Area Region/Mu	240581	Baker's navarretia	0.4720
Bay Area Region/Mu	240581	pappose tarplant	9.0457

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Bay Area Region/Mu	240581	saline clover	0.4720
Bay Area Region/Mu	240581	showy rancheria clover	9.0457
Bay Area Region/Mu	240583	burrowing owl	2.7532
Bay Area Region/Mu	240583	Swainson's hawk	0.0472
Bay Area Region/Mu	240583	vernal pool fairy shrimp	9.0457
Bay Area Region/Mu	240587	big tarplant	9.0457
Bay Area Region/Mu	240587	California tiger salamander	0.8149
Bay Area Region/Mu	240587	Carquinez goldenbush	0.8149
Bay Area Region/Mu	240587	Congdon's tarplant	0.7903
Bay Area Region/Mu	240587	Contra Costa goldfields	0.7667
Bay Area Region/Mu	240587	pallid bat	0.8149
Bay Area Region/Mu	240587	soft bird's-beak	0.7667
Bay Area Region/Mu	240587	Suisun song sparrow	0.9430
Bay Area Region/Mu	240587	tricolored blackbird	0.9430
Bay Area Region/Mu	240588	big tarplant	0.1982
Bay Area Region/Mu	240588	California tiger salamander	0.9430
Bay Area Region/Mu	240588	Carquinez goldenbush	0.1982
Bay Area Region/Mu	240588	Congdon's tarplant	0.4540
Bay Area Region/Mu	240588	Contra Costa goldfields	3.5800
Bay Area Region/Mu	240588	pallid bat	3.5800
Bay Area Region/Mu	240588	Suisun song sparrow	2.3886
Bay Area Region/Mu	240588	tricolored blackbird	1.9004
Bay Area Region/Mu	240736	Burke's goldfields	1.7403
Bay Area Region/Mu	240736	California linderiella	3.5169
Bay Area Region/Mu	240736	dwarf downingia	1.9004
Bay Area Region/Mu	240736	Marin western flax	1.8743
Bay Area Region/Mu	240736	marsh microseris	0.2852
Bay Area Region/Mu	240736	narrow-anthered brodiaea	2.6542
Bay Area Region/Mu	240736	Navarro roach	2.5913
Bay Area Region/Mu	240736	pallid bat	3.7306
Bay Area Region/Mu	240736	Sonoma sunshine	3.9349
Bay Area Region/Mu	240736	western pond turtle	1.9899
Bay Area Region/Mu	240736	white-rayed pentachaeta	1.0297
Bay Area Region/Mu	240736	white seaside tarplant	1.7775
Bay Area Region/Mu	94089	beach layia	1.4026
Bay Area Region/Mu	94089	blue coast gilia	0.6264
Bay Area Region/Mu	94089	bristly sedge	0.8523
Bay Area Region/Mu	94089	dark-eyed gilia	1.4026
Bay Area Region/Mu	94089	Franciscan manzanita	1.5368
Bay Area Region/Mu	94089	marsh microseris	3.3750
Bay Area Region/Mu	94089	marsh sandwort	1.4026
Bay Area Region/Mu	94089	Presidio clarkia	0.0884
Bay Area Region/Mu	94089	Presidio manzanita	3.9966
Bay Area Region/Mu	94089	rose leptosiphon	1.4026
Bay Area Region/Mu	94089	round-headed Chinese-houses	3.4604
Bay Area Region/Mu	94089	San Francisco Bay Area leaf-cutter bee	1.4026
Bay Area Region/Mu	94089	San Francisco gumplant	1.4026
Bay Area Region/Mu	94089	sandy beach tiger beetle	4.2491
Bay Area Region/Mu	94089	white seaside tarplant	1.2980
		Total Bay Area Region/Multi-County	**501.1827**
Contra Costa	21211	big tarplant	2.1020
Contra Costa	21211	California tiger salamander	0.0179
Contra Costa	21211	Contra Costa goldfields	0.4804

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Contra Costa	21211	diamond-petaled California poppy	1.7214
Contra Costa	21211	Hoover's cryptantha	0.4370
Contra Costa	21211	Mt. Diablo buckwheat	0.4370
Contra Costa	21211	round-leaved filaree	0.5313
Contra Costa	21211	silvery legless lizard	0.5149
Contra Costa	21211	Suisun song sparrow	0.7727
Contra Costa	21211	western red bat	0.2325
Contra Costa	21214	Antioch Dunes halcitid bee	0.2325
Contra Costa	21214	big tarplant	0.2325
Contra Costa	21214	California tiger salamander	0.2325
Contra Costa	21214	Contra Costa goldfields	0.2325
Contra Costa	21214	diamond-petaled California poppy	0.2325
Contra Costa	21214	Hoover's cryptantha	0.2325
Contra Costa	21214	Hurd's metapogon robberfly	0.2325
Contra Costa	21214	Mt. Diablo buckwheat	0.2325
Contra Costa	21214	redheaded sphecid wasp	6.0343
Contra Costa	21214	round-leaved filaree	0.5524
Contra Costa	21214	San Joaquin dune beetle	6.0343
Contra Costa	21214	silvery legless lizard	0.9148
Contra Costa	21214	western red bat	0.9148
Contra Costa	22122	beach layia	0.0832
Contra Costa	22122	bristly sedge	0.4797
Contra Costa	22122	rose leptosiphon	0.2612
Contra Costa	22122	San Francisco Bay Area leaf-cutter bee	0.4797
Contra Costa	22122	sandy beach tiger beetle	0.4797
Contra Costa	22122	white seaside tarplant	1.2237
Contra Costa	22351	big tarplant	1.2237
Contra Costa	22351	California tiger salamander	1.2237
Contra Costa	22351	Congdon's tarplant	1.2237
Contra Costa	22351	Contra Costa goldfields	1.2237
Contra Costa	22351	pallid bat	1.2237
Contra Costa	22353	big tarplant	0.6390
Contra Costa	22353	California tiger salamander	0.3658
Contra Costa	22353	Congdon's tarplant	0.1924
Contra Costa	22353	Contra Costa goldfields	1.7349
Contra Costa	22353	pallid bat	0.3651
Contra Costa	22400	Alkali Meadow	0.5694
Contra Costa	22400	big tarplant	0.7088
Contra Costa	22400	burrowing owl	0.0154
Contra Costa	22400	California red-legged frog	0.6575
Contra Costa	22400	California tiger salamander	0.0617
Contra Costa	22400	caper-fruited tropidocarpum	0.4171
Contra Costa	22400	curved-foot hygrotus diving beetle	1.7822
Contra Costa	22400	diamond-petaled California poppy	0.3428
Contra Costa	22400	Northern Claypan Vernal Pool	0.4118
Contra Costa	22400	recurved larkspur	0.4118
Contra Costa	22400	San Joaquin kit fox	0.6246
Contra Costa	22400	San Joaquin pocket mouse	0.4185
Contra Costa	22400	San Joaquin spearscale	0.4185
Contra Costa	22400	Swainson's hawk	0.4185
Contra Costa	22400	tricolored blackbird	0.4095
Contra Costa	22400	Valley Sink Scrub	0.4095
Contra Costa	22602	Antioch efferian robberfly	9.8272

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Contra Costa	22602	pallid bat	9.8272
Contra Costa	22602	San Joaquin spearscale	3.7148
Contra Costa	22604	American badger	4.4265
Contra Costa	22604	big tarplant	9.8272
Contra Costa	22604	brittlescale	4.4265
Contra Costa	22604	California red-legged frog	2.9756
Contra Costa	22604	California tiger salamander	1.3108
Contra Costa	22604	diamond-petaled California poppy	2.9756
Contra Costa	22604	golden eagle	0.2093
Contra Costa	22604	San Joaquin kit fox	0.2093
Contra Costa	22604	San Joaquin spearscale	1.5687
Contra Costa	22604	stinkbells	1.1836
Contra Costa	22604	tricolored blackbird	0.9807
Contra Costa	22637	California tiger salamander	0.9807
Contra Costa	22637	Congdon's tarplant	0.6904
Contra Costa	230205	burrowing owl	0.6904
Contra Costa	230232	burrowing owl	0.0774
Contra Costa	230232	silvery legless lizard	0.2788
Contra Costa	230236	big tarplant	0.6904
Contra Costa	230238	big tarplant	0.6904
Contra Costa	230238	Suisun song sparrow	0.6904
Contra Costa	230239	Congdon's tarplant	0.6904
Contra Costa	230240	California tiger salamander	1.8282
Contra Costa	230240	Congdon's tarplant	1.8282
Contra Costa	230253	big tarplant	0.4813
Contra Costa	230253	California tiger salamander	0.9760
Contra Costa	230253	Contra Costa goldfields	1.1797
Contra Costa	230253	diamond-petaled California poppy	3.0437
Contra Costa	230253	Hoover's cryptantha	3.8520
Contra Costa	230253	Mt. Diablo buckwheat	2.2504
Contra Costa	230253	round-leaved filaree	1.8849
Contra Costa	230253	silvery legless lizard	0.7299
Contra Costa	230253	western red bat	2.0799
Contra Costa	230274	silvery legless lizard	3.1839
Contra Costa	230289	Antioch andrenid bee	5.9974
Contra Costa	230289	Bolander's water-hemlock	0.6612
Contra Costa	230289	curved-foot hygrotus diving beetle	0.0778
Contra Costa	230289	Suisun Marsh aster	0.0469
Contra Costa	230307	California horned lark	0.0071
Contra Costa	230307	white-tailed kite	0.0071
Contra Costa	230308	Diablo helianthella	0.0071
Contra Costa	230318	San Pablo song sparrow	0.4198
Contra Costa	230535	big tarplant	0.0500
Contra Costa	230535	Brewer's western flax	0.0500
Contra Costa	230535	California red-legged frog	0.0958
Contra Costa	230535	California tiger salamander	0.1130
Contra Costa	230535	Mt. Diablo buckwheat	0.0504
Contra Costa	230535	Mt. Diablo fairy-lantern	0.0500
Contra Costa	230535	Mt. Diablo manzanita	2.9180
Contra Costa	230535	round-leaved filaree	1.9085
Contra Costa	230535	San Joaquin kit fox	1.7559
Contra Costa	230535	slender silver moss	2.6717
Contra Costa	230535	western pond turtle	1.9085

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Contra Costa	230538	burrowing owl	1.8640
Contra Costa	230538	California tiger salamander	0.2488
Contra Costa	230542	pallid bat	2.6616
Contra Costa	230542	San Pablo song sparrow	2.9494
Contra Costa	230542	yellow-headed blackbird	3.7271
Contra Costa	230597	Alameda song sparrow	3.7540
Contra Costa	230597	alkali milk-vetch	1.9892
Contra Costa	230597	California seablite	1.0564
Contra Costa	230597	Carquinez goldenbush	1.0183
Contra Costa	230597	fragrant fritillary	0.7240
Contra Costa	230597	hoary bat	0.7240
Contra Costa	230597	monarch butterfly	1.0183
Contra Costa	230597	pallid bat	11.2547
Contra Costa	230597	Point Reyes bird's-beak	0.2244
Contra Costa	230597	saline clover	0.1055
Contra Costa	230597	San Pablo song sparrow	1.0183
Contra Costa	230597	Santa Cruz tarplant	1.0183
Contra Costa	230597	yellow-headed blackbird	0.5801
Contra Costa	230613	beach layia	1.0183
Contra Costa	230613	bristly sedge	1.8616
Contra Costa	230613	rose leptosiphon	1.0183
Contra Costa	230613	San Francisco Bay Area leaf-cutter bee	1.0314
Contra Costa	230613	sandy beach tiger beetle	1.0314
Contra Costa	230613	white seaside tarplant	1.0314
Contra Costa	240641	Carquinez goldenbush	1.0314
Contra Costa	240641	San Pablo song sparrow	1.0314
Contra Costa	98115	Antioch Dunes evening-primrose	1.0314
Contra Costa	98133	Bridges' coast range shoulderband	0.0980
Contra Costa	98133	California tiger salamander	0.0980
Contra Costa	98133	Congdon's tarplant	0.0980
Contra Costa	98134	Congdon's tarplant	0.0980
Contra Costa	98196	American badger	2.6019
Contra Costa	98196	Berkeley kangaroo rat	1.9048
Contra Costa	98196	pallid bat	1.7499
Contra Costa	98999	big tarplant	1.9048
Contra Costa	98999	burrowing owl	1.8688
Contra Costa	98999	California tiger salamander	0.2668
Contra Costa	98999	Contra Costa goldfields	2.6606
Contra Costa	98999	diamond-petaled California poppy	2.6664
Contra Costa	98999	Hoover's cryptantha	3.7288
Contra Costa	98999	Mt. Diablo buckwheat	2.6505
Contra Costa	98999	round-leaved filaree	1.9918
Contra Costa	98999	silvery legless lizard	1.0470
Contra Costa	98999	western red bat	2.7402
		Contra Costa County	**219.3121**
Marin	21325	marsh microseris	1.1615
Marin	240039	Mt. Tamalpais manzanita	7.0905
Marin	240039	San Pablo song sparrow	2.6573
Marin	240691	American badger	0.3762
Marin	240691	Marin knotweed	0.6281
Marin	240691	Mt. Tamalpais manzanita	3.1308
Marin	240691	Napa false indigo	3.4419
Marin	240691	San Pablo song sparrow	3.0151

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Marin	240691	tidewater goby	3.0151
Marin	98154	Mt. Tamalpais manzanita	0.3203
Marin	98154	San Pablo song sparrow	0.0796
Marin	98154	tidewater goby	4.7003
Marin	98154	white seaside tarplant	0.1078
		Total Marin County	**29.7245**
Napa	230381	Clara Hunt's milk-vetch	0.0309
Napa	230381	Greene's narrow-leaved daisy	0.6991
Napa	230392	ferruginous hawk	0.2000
Napa	240057X	dwarf downingia	0.9967
Napa	240057X	ferruginous hawk	0.5214
Napa	240057X	showy rancheria clover	1.6915
Napa	240057X	Swainson's hawk	1.9800
Napa	240617	American badger	1.7097
Napa	240617	An isopod	0.1122
Napa	240617	California clapper rail	0.1629
Napa	240617	dwarf downingia	0.7404
Napa	240617	ferruginous hawk	2.0975
Napa	240617	fragrant fritillary	0.5825
Napa	240617	legenere	2.0358
Napa	240617	Mason's lilaeopsis	0.3602
Napa	240617	Northern Coastal Salt Marsh	0.1269
Napa	240617	pallid bat	2.0358
Napa	240617	salt-marsh harvest mouse	0.3887
Napa	240617	saltmarsh common yellowthroat	1.7468
Napa	240617	San Pablo song sparrow	0.2157
Napa	240617	showy rancheria clover	0.5261
Napa	240617	soft bird's-beak	2.1458
Napa	240617	Swainson's hawk	1.7549
Napa	240617	western pond turtle	4.1682
		Total Napa County	**27.0297**
San Francisco	21510	beach layia	0.7287
San Francisco	21510	bristly sedge	3.0702
San Francisco	21510	California black rail	1.7549
San Francisco	21510	rose leptosiphon	5.0414
San Francisco	21510	San Francisco Bay Area leaf-cutter bee	2.1458
San Francisco	21510	sandy beach tiger beetle	0.1427
San Francisco	21510	white seaside tarplant	0.3383
San Francisco	21549	adobe sanicle	0.1873
San Francisco	21549	alkali milk-vetch	3.3395
San Francisco	21549	beach layia	0.3950
San Francisco	21549	bristly sedge	1.1776
San Francisco	21549	Diablo helianthella	11.7839
San Francisco	21549	fragrant fritillary	0.0590
San Francisco	21549	rose leptosiphon	0.0944
San Francisco	21549	San Francisco Bay Area leaf-cutter bee	1.1434
San Francisco	21549	San Francisco owl's-clover	3.3051
San Francisco	21549	sandy beach tiger beetle	0.7112
San Francisco	21549	white seaside tarplant	0.7112
San Francisco	22415	beach layia	1.0477
San Francisco	22415	bristly sedge	0.5972
San Francisco	22415	California black rail	0.7112
San Francisco	22415	monarch butterfly	0.7112

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
San Francisco	22415	rose leptosiphon	0.7112
San Francisco	22415	San Francisco Bay Area leaf-cutter bee	0.7112
San Francisco	22415	sandy beach tiger beetle	0.0676
San Francisco	22415	white seaside tarplant	0.0676
San Francisco	22512	beach layia	0.0763
San Francisco	22512	bristly sedge	1.8196
San Francisco	22512	rose leptosiphon	2.2322
San Francisco	22512	San Francisco Bay Area leaf-cutter bee	1.2096
San Francisco	22512	sandy beach tiger beetle	2.5059
San Francisco	22512	white seaside tarplant	0.1866
San Francisco	230161	beach layia	0.4413
San Francisco	230161	bristly sedge	4.8524
San Francisco	230161	California black rail	1.8931
San Francisco	230161	rose leptosiphon	2.2322
San Francisco	230161	San Francisco Bay Area leaf-cutter bee	2.2082
San Francisco	230161	sandy beach tiger beetle	3.7435
San Francisco	230161	white seaside tarplant	2.5923
San Francisco	230164	beach layia	0.2433
San Francisco	230164	blue coast gilia	0.0823
San Francisco	230164	bristly sedge	1.1440
San Francisco	230164	California black rail	0.1084
San Francisco	230164	dark-eyed gilia	0.3137
San Francisco	230164	Kellogg's horkelia	1.1440
San Francisco	230164	marsh microseris	2.2322
San Francisco	230164	rose leptosiphon	8.3546
San Francisco	230164	round-headed Chinese-houses	3.8731
San Francisco	230164	San Francisco Bay Area leaf-cutter bee	0.1316
San Francisco	230164	San Francisco Bay spineflower	1.5372
San Francisco	230164	San Francisco gumplant	0.5423
San Francisco	230164	sandy beach tiger beetle	8.5340
San Francisco	230164	white seaside tarplant	1.9908
San Francisco	230490	beach layia	0.5375
San Francisco	230490	bristly sedge	0.5375
San Francisco	230490	California clapper rail	1.0084
San Francisco	230490	Mission blue butterfly	1.2813
San Francisco	230490	rose leptosiphon	1.9958
San Francisco	230490	San Francisco Bay Area leaf-cutter bee	3.9505
San Francisco	230490	sandy beach tiger beetle	8.2188
San Francisco	230490	white seaside tarplant	2.0438
San Francisco	240147	beach layia	1.2813
San Francisco	240147	bristly sedge	1.9518
San Francisco	240147	Diablo helianthella	4.5698
San Francisco	240147	Mission blue butterfly	1.9518
San Francisco	240147	rose leptosiphon	2.0438
San Francisco	240147	San Francisco Bay Area leaf-cutter bee	0.5375
San Francisco	240147	sandy beach tiger beetle	0.5375
San Francisco	240147	white seaside tarplant	0.5717
San Francisco	240155	beach layia	0.5375
San Francisco	240155	bristly sedge	10.3207
San Francisco	240155	Presidio manzanita	2.0438
San Francisco	240155	rose leptosiphon	1.2813
San Francisco	240155	San Francisco Bay Area leaf-cutter bee	0.0929
San Francisco	240155	sandy beach tiger beetle	2.3877

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
San Francisco	240155	white seaside tarplant	8.5825
San Francisco	240158	adobe sanicle	2.1062
San Francisco	240158	alkali milk-vetch	2.0619
San Francisco	240158	beach layia	2.0619
San Francisco	240158	bristly sedge	1.0018
San Francisco	240158	rose leptosiphon	1.0582
San Francisco	240158	San Francisco Bay Area leaf-cutter bee	1.9933
San Francisco	240158	San Francisco owl's-clover	3.9498
San Francisco	240158	sandy beach tiger beetle	9.5050
San Francisco	240158	white seaside tarplant	2.0473
San Francisco	240171	adobe sanicle	1.0582
San Francisco	240171	alkali milk-vetch	1.9511
San Francisco	240171	American badger	4.2323
San Francisco	240171	bank swallow	1.9511
San Francisco	240171	beach layia	2.7086
San Francisco	240171	blue coast gilia	2.0619
San Francisco	240171	bristly sedge	2.0619
San Francisco	240171	bumblebee scarab beetle	0.6613
San Francisco	240171	California black rail	0.2394
San Francisco	240171	Choris' popcornflower	2.0619
San Francisco	240171	dark-eyed gilia	10.1011
San Francisco	240171	Diablo helianthella	2.0473
San Francisco	240171	Franciscan manzanita	1.0582
San Francisco	240171	hoary bat	0.0997
San Francisco	240171	marsh microseris	3.9268
San Francisco	240171	Mission blue butterfly	1.4074
San Francisco	240171	Presidio manzanita	0.6608
San Francisco	240171	robust spineflower	0.6608
San Francisco	240171	rose leptosiphon	1.9866
San Francisco	240171	round-headed Chinese-houses	0.0335
San Francisco	240171	San Francisco Bay Area leaf-cutter bee	0.1453
San Francisco	240171	San Francisco Bay spineflower	6.1065
San Francisco	240171	San Francisco collinsia	4.0087
San Francisco	240171	San Francisco lessingia	0.9335
San Francisco	240171	San Francisco owl's-clover	0.5350
San Francisco	240171	San Francisco popcornflower	0.0925
San Francisco	240171	sandy beach tiger beetle	0.0661
San Francisco	240171	short-leaved evax	0.0654
San Francisco	240171	white seaside tarplant	0.3729
San Francisco	240259	adobe sanicle	0.3334
San Francisco	240259	alkali milk-vetch	0.2051
San Francisco	240259	beach layia	0.0787
San Francisco	240259	bristly sedge	0.3826
San Francisco	240259	rose leptosiphon	0.8460
San Francisco	240259	San Francisco Bay Area leaf-cutter bee	0.5685
San Francisco	240259	San Francisco owl's-clover	0.8998
San Francisco	240259	sandy beach tiger beetle	11.0422
San Francisco	240259	white seaside tarplant	0.8998
San Francisco	240328	beach layia	7.8913
San Francisco	240328	bristly sedge	1.2764
San Francisco	240328	Mission blue butterfly	7.8913
San Francisco	240328	robust spineflower	4.0600
San Francisco	240328	rose leptosiphon	0.3759

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
San Francisco	240328	San Francisco Bay Area leaf-cutter bee	3.3687
San Francisco	240328	San Francisco Bay spineflower	2.3527
San Francisco	240328	San Francisco collinsia	0.0622
San Francisco	240328	San Francisco forktail damselfly	6.1561
San Francisco	240328	sandy beach tiger beetle	6.1511
San Francisco	240328	short-leaved evax	0.9976
San Francisco	240328	white seaside tarplant	2.9152
San Francisco	240334	beach layia	6.9097
San Francisco	240334	bristly sedge	2.9152
San Francisco	240334	rose leptosiphon	7.8913
San Francisco	240334	San Francisco Bay Area leaf-cutter bee	0.6336
San Francisco	240334	San Francisco collinsia	7.8913
San Francisco	240334	sandy beach tiger beetle	0.0799
San Francisco	240334	white seaside tarplant	2.9409
San Francisco	240358	adobe sanicle	7.8913
San Francisco	240358	alkali milk-vetch	8.8640
San Francisco	240358	beach layia	0.1302
San Francisco	240358	bristly sedge	1.5900
San Francisco	240358	fragrant fritillary	7.8913
San Francisco	240358	rose leptosiphon	0.4330
San Francisco	240358	San Francisco Bay Area leaf-cutter bee	0.7944
San Francisco	240358	San Francisco owl's-clover	0.5746
San Francisco	240358	sandy beach tiger beetle	0.4331
San Francisco	240358	white seaside tarplant	0.0997
San Francisco	240523	adobe sanicle	1.7728
San Francisco	240523	alkali milk-vetch	0.0335
San Francisco	240523	beach layia	3.6214
San Francisco	240523	bristly sedge	3.6214
San Francisco	240523	Diablo helianthella	0.7328
San Francisco	240523	fragrant fritillary	0.0923
San Francisco	240523	Mission blue butterfly	1.8964
San Francisco	240523	rose leptosiphon	1.9720
San Francisco	240523	San Francisco Bay Area leaf-cutter bee	2.3345
San Francisco	240523	San Francisco owl's-clover	1.8964
San Francisco	240523	sandy beach tiger beetle	1.8964
San Francisco	240523	white seaside tarplant	1.8964
San Francisco	240545	beach layia	1.8964
San Francisco	240545	bristly sedge	1.8964
San Francisco	240545	compact cobwebby thistle	0.0671
San Francisco	240545	robust spineflower	2.0998
San Francisco	240545	rose leptosiphon	0.5938
San Francisco	240545	San Francisco Bay Area leaf-cutter bee	0.2971
San Francisco	240545	San Francisco Bay spineflower	1.9749
San Francisco	240545	sandy beach tiger beetle	2.4867
San Francisco	240545	white seaside tarplant	0.7453
		Total San Francisco County	**384.8675**
San Mateo	21604	beach layia	0.2984
San Mateo	21604	bent-flowered fiddleneck	0.2019
San Mateo	21604	bristly sedge	2.0998
San Mateo	21604	rose leptosiphon	1.0534
San Mateo	21604	San Francisco Bay Area leaf-cutter bee	1.2805
San Mateo	21604	sandy beach tiger beetle	0.5938
San Mateo	21604	Stage's dufourine bee	1.9749

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
San Mateo	21604	white seaside tarplant	2.1466
San Mateo	21608	Point Reyes bird's-beak	0.2573
San Mateo	21608	Santa Cruz kangaroo rat	0.2009
San Mateo	21612	Santa Cruz kangaroo rat	7.1028
San Mateo	21613	arcuate bush-mallow	7.1028
San Mateo	21613	Bay checkerspot butterfly	0.3492
San Mateo	21613	coastal marsh milk-vetch	0.9575
San Mateo	21613	double-crested cormorant	1.5320
San Mateo	21613	Franciscan onion	7.1028
San Mateo	21613	Hall's bush-mallow	1.5320
San Mateo	21613	San Francisco Bay spineflower	6.1500
San Mateo	21613	western leatherwood	4.6064
San Mateo	21892	hoary bat	2.2563
San Mateo	21892	Santa Cruz kangaroo rat	1.7071
San Mateo	21893	California red-legged frog	6.1500
San Mateo	21893	San Francisco dusky-footed woodrat	1.7071
San Mateo	22120	beach layia	0.3483
San Mateo	22120	bristly sedge	0.3483
San Mateo	22120	California least tern	2.4560
San Mateo	22120	double-crested cormorant	15.1779
San Mateo	22120	northern harrier	9.8944
San Mateo	22120	Point Reyes bird's-beak	0.3475
San Mateo	22120	rose leptosiphon	0.0915
San Mateo	22120	San Francisco Bay Area leaf-cutter bee	2.4560
San Mateo	22120	sandy beach tiger beetle	6.7149
San Mateo	22120	Santa Cruz kangaroo rat	1.0962
San Mateo	22120	short-eared owl	4.9387
San Mateo	22120	western snowy plover	12.2752
San Mateo	22120	white seaside tarplant	2.0127
San Mateo	22227	beach layia	1.1598
San Mateo	22227	bristly sedge	1.3030
San Mateo	22227	rose leptosiphon	1.0962
San Mateo	22227	San Francisco Bay Area leaf-cutter bee	0.2353
San Mateo	22227	San Francisco collinsia	0.3579
San Mateo	22227	San Francisco forktail damselfly	3.0220
San Mateo	22227	sandy beach tiger beetle	3.0220
San Mateo	22227	white seaside tarplant	1.9304
San Mateo	22230	Kellogg's horkelia	0.2792
San Mateo	22230	robust spineflower	3.0220
San Mateo	22230	showy rancheria clover	3.0220
San Mateo	22230	white seaside tarplant	3.0220
San Mateo	22232	beach layia	3.0220
San Mateo	22232	bristly sedge	2.1980
San Mateo	22232	hoary bat	2.1980
San Mateo	22232	Kellogg's horkelia	0.0333
San Mateo	22232	robust spineflower	2.1980
San Mateo	22232	rose leptosiphon	2.1980
San Mateo	22232	San Francisco Bay Area leaf-cutter bee	2.1980
San Mateo	22232	San Francisco Bay spineflower	2.1980
San Mateo	22232	sandy beach tiger beetle	1.2863
San Mateo	22232	showy rancheria clover	1.2863
San Mateo	22232	white seaside tarplant	5.9804
San Mateo	22271	California red-legged frog	5.9804

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
San Mateo	22271	fringed myotis	5.9804
San Mateo	22271	white-rayed pentachaeta	5.9804
San Mateo	22726	Alameda song sparrow	1.2863
San Mateo	22726	California clapper rail	5.9804
San Mateo	22726	San Francisco owl's-clover	5.9804
San Mateo	230428	hoary bat	1.1466
San Mateo	230428	Santa Cruz kangaroo rat	7.6219
San Mateo	230428	western snowy plover	7.6219
San Mateo	230592	Alameda song sparrow	1.1466
San Mateo	230592	California black rail	2.3393
San Mateo	230592	California clapper rail	2.0123
San Mateo	230592	Northern Coastal Salt Marsh	7.6219
San Mateo	230592	Point Reyes bird's-beak	2.0123
San Mateo	230592	saltmarsh common yellowthroat	0.3745
San Mateo	240026	Alameda song sparrow	0.7820
San Mateo	240026	American badger	1.5979
San Mateo	240026	beach layia	0.7820
San Mateo	240026	bristly sedge	1.1211
San Mateo	240026	California clapper rail	1.1211
San Mateo	240026	California tiger salamander	3.5011
San Mateo	240026	Davidson's bush-mallow	0.0330
San Mateo	240026	Franciscan onion	44.4857
San Mateo	240026	hoary bat	0.3790
San Mateo	240026	Kellogg's horkelia	44.4857
San Mateo	240026	lost thistle	0.0330
San Mateo	240026	Myrtle's silverspot	2.1710
San Mateo	240026	pallid bat	3.5011
San Mateo	240026	Ricksecker's water scavenger beetle	0.3790
San Mateo	240026	robust spineflower	0.9810
San Mateo	240026	rose leptosiphon	0.1571
San Mateo	240026	San Francisco Bay Area leaf-cutter bee	4.6890
San Mateo	240026	San Francisco collinsia	0.3790
San Mateo	240026	sandy beach tiger beetle	1.3169
San Mateo	240026	Santa Cruz kangaroo rat	0.6884
San Mateo	240026	showy rancheria clover	3.3396
San Mateo	240026	slender-leaved pondweed	44.4857
San Mateo	240026	western pond turtle	0.3790
San Mateo	240026	white seaside tarplant	44.4857
San Mateo	240027	Alameda song sparrow	6.9297
San Mateo	240027	American badger	1.3525
San Mateo	240027	beach layia	0.3543
San Mateo	240027	bristly sedge	1.1211
San Mateo	240027	California clapper rail	0.0809
San Mateo	240027	California tiger salamander	44.4857
San Mateo	240027	Davidson's bush-mallow	1.3169
San Mateo	240027	Franciscan onion	44.4857
San Mateo	240027	hoary bat	0.2793
San Mateo	240027	Kellogg's horkelia	0.2793
San Mateo	240027	lost thistle	0.5047
San Mateo	240027	Myrtle's silverspot	0.2793
San Mateo	240027	pallid bat	0.5047
San Mateo	240027	Ricksecker's water scavenger beetle	1.1843
San Mateo	240027	robust spineflower	0.5047

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
San Mateo	240027	rose leptosiphon	0.0751
San Mateo	240027	San Francisco Bay Area leaf-cutter bee	0.1565
San Mateo	240027	San Francisco Bay spineflower	0.2829
San Mateo	240027	San Francisco collinsia	0.4693
San Mateo	240027	sandy beach tiger beetle	0.5517
San Mateo	240027	Santa Cruz kangaroo rat	0.7499
San Mateo	240027	showy rancheria clover	0.7281
San Mateo	240027	slender-leaved pondweed	0.1885
San Mateo	240027	western pond turtle	0.1885
San Mateo	240027	white seaside tarplant	0.3697
San Mateo	240060	adobe sanicle	0.2415
San Mateo	240060	Alameda song sparrow	0.0973
San Mateo	240060	alkali milk-vetch	0.1825
San Mateo	240060	beach layia	1.5723
San Mateo	240060	bent-flowered fiddleneck	0.1861
San Mateo	240060	bristly sedge	0.2020
San Mateo	240060	California clapper rail	0.2020
San Mateo	240060	California red-legged frog	0.2020
San Mateo	240060	Davidson's bush-mallow	0.2020
San Mateo	240060	Diablo helianthella	0.2020
San Mateo	240060	fragrant fritillary	0.2020
San Mateo	240060	Franciscan onion	0.2020
San Mateo	240060	hoary bat	0.2020
San Mateo	240060	Mission blue butterfly	0.2020
San Mateo	240060	Myrtle's silverspot	0.0804
San Mateo	240060	pallid bat	0.4694
San Mateo	240060	Ricksecker's water scavenger beetle	1.6628
San Mateo	240060	rose leptosiphon	0.4443
San Mateo	240060	salt-marsh harvest mouse	0.6928
San Mateo	240060	San Francisco Bay Area leaf-cutter bee	0.1098
San Mateo	240060	San Francisco forktail damselfly	0.4443
San Mateo	240060	San Francisco owl's-clover	0.1098
San Mateo	240060	sandy beach tiger beetle	0.1098
San Mateo	240060	Santa Cruz kangaroo rat	0.4443
San Mateo	240060	Stage's dufourine bee	4.1309
San Mateo	240060	western snowy plover	4.1309
San Mateo	240060	white seaside tarplant	0.5742
San Mateo	240114	big free-tailed bat	0.8325
San Mateo	240114	bumblebee scarab beetle	4.1309
San Mateo	240114	California red-legged frog	4.1309
San Mateo	240114	coast yellow leptosiphon	0.8325
San Mateo	240114	Franciscan thistle	1.2204
San Mateo	240114	Hickman's cinquefoil	0.1122
San Mateo	240114	hoary bat	4.1309
San Mateo	240114	monarch butterfly	0.5742
San Mateo	240114	Myrtle's silverspot	4.1309
San Mateo	240114	rose leptosiphon	0.6730
San Mateo	240114	saltmarsh common yellowthroat	0.6730
San Mateo	240114	San Francisco Bay spineflower	0.6730
San Mateo	240114	San Francisco collinsia	0.6730
San Mateo	240114	San Francisco gumplant	0.2270
San Mateo	240114	steelhead - central California coast DPS	0.6730
San Mateo	240115	pallid bat	0.6730

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
San Mateo	240133	pallid bat	0.8848
San Mateo	240143	pallid bat	0.3239
San Mateo	240169	American badger	0.8469
San Mateo	240169	Hoover's button-celery	0.8469
San Mateo	240169	Santa Cruz kangaroo rat	2.3027
San Mateo	240169	western leatherwood	2.3027
San Mateo	240174	Alameda song sparrow	0.1419
San Mateo	240174	American badger	2.3027
San Mateo	240174	California tiger salamander	2.3027
San Mateo	240174	hoary bat	0.8469
San Mateo	240174	lost thistle	2.3027
San Mateo	240174	Santa Cruz kangaroo rat	2.3027
San Mateo	240174	slender-leaved pondweed	0.0383
San Mateo	240176	arcuate bush-mallow	0.2876
San Mateo	240590	Alameda song sparrow	1.0824
San Mateo	240590	American badger	1.0824
San Mateo	240590	beach layia	1.8581
San Mateo	240590	bristly sedge	1.0824
San Mateo	240590	California clapper rail	0.6112
San Mateo	240590	California tiger salamander	1.8581
San Mateo	240590	Davidson's bush-mallow	1.0824
San Mateo	240590	Franciscan onion	1.0824
San Mateo	240590	hoary bat	1.9532
San Mateo	240590	Kellogg's horkelia	3.2968
San Mateo	240590	lost thistle	1.6530
San Mateo	240590	Myrtle's silverspot	3.2968
San Mateo	240590	pallid bat	0.6384
San Mateo	240590	Ricksecker's water scavenger beetle	0.0936
San Mateo	240590	robust spineflower	6.0605
San Mateo	240590	rose leptosiphon	6.0605
San Mateo	240590	San Francisco Bay Area leaf-cutter bee	0.0936
San Mateo	240590	San Francisco Bay spineflower	1.4187
San Mateo	240590	sandy beach tiger beetle	2.7045
San Mateo	240590	Santa Cruz kangaroo rat	6.0605
San Mateo	240590	showy rancheria clover	2.7045
San Mateo	240590	slender-leaved pondweed	0.3147
San Mateo	240590	western pond turtle	0.3147
San Mateo	240590	white seaside tarplant	0.3147
San Mateo	94644	Bay checkerspot butterfly	0.3335
San Mateo	94644	coastal marsh milk-vetch	0.0177
San Mateo	94644	Crystal Springs lessingia	0.5229
San Mateo	94644	fountain thistle	0.3321
San Mateo	94644	Franciscan onion	1.1336
San Mateo	94644	Marin western flax	1.4691
San Mateo	94644	San Francisco Bay spineflower	1.4691
San Mateo	94644	San Mateo thorn-mint	1.1336
San Mateo	94644	Serpentine Bunchgrass	1.4691
San Mateo	94644	western leatherwood	0.1661
San Mateo	94644	white-rayed pentachaeta	0.1661
San Mateo	98204	big free-tailed bat	5.0392
San Mateo	98204	bumblebee scarab beetle	2.8130
San Mateo	98204	hoary bat	0.2243
San Mateo	98204	Myrtle's silverspot	0.2183

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
San Mateo	98204	saltmarsh common yellowthroat	8.1671
San Mateo	98204	San Francisco Bay spineflower	8.6844
		Total San Mateo County	**678.5447**
Santa Clara	21714	American badger	0.3441
Santa Clara	21714	bank swallow	2.0157
Santa Clara	21714	Pinnacles optioservus riffle beetle	1.9401
Santa Clara	21714	saline clover	8.1671
Santa Clara	21760	California tiger salamander	1.9401
Santa Clara	21760	pallid bat	1.8282
Santa Clara	21760	woodland woollythreads	0.3971
Santa Clara	21922	arcuate bush-mallow	11.2600
Santa Clara	21922	burrowing owl	10.6413
Santa Clara	21922	California tiger salamander	1.9844
Santa Clara	21922	Congdon's tarplant	1.3162
Santa Clara	21922	hairless popcornflower	1.8282
Santa Clara	21922	hoary bat	1.9415
Santa Clara	21922	robust spineflower	0.5383
Santa Clara	22134	California tiger salamander	10.4741
Santa Clara	22134	Congdon's tarplant	1.5357
Santa Clara	22134	hairless popcornflower	4.8491
Santa Clara	22134	robust spineflower	0.0365
Santa Clara	22134	round-leaved filaree	0.0755
Santa Clara	22175	Congdon's tarplant	0.6125
Santa Clara	22179	California tiger salamander	2.7892
Santa Clara	22179	robust spineflower	2.6163
Santa Clara	22186	California tiger salamander	0.3228
Santa Clara	22186	robust spineflower	2.7892
Santa Clara	22809	California tiger salamander	0.7154
Santa Clara	22839	California tiger salamander	0.9716
Santa Clara	22839	robust spineflower	1.9853
Santa Clara	22910	western pond turtle	1.6040
Santa Clara	22932	Bay checkerspot butterfly	3.0932
Santa Clara	22932	California tiger salamander	1.0019
Santa Clara	22944	alkali milk-vetch	3.0932
Santa Clara	22944	California tiger salamander	0.0845
Santa Clara	22944	Congdon's tarplant	1.8026
Santa Clara	22944	robust spineflower	1.4915
Santa Clara	22956	California tiger salamander	1.4915
Santa Clara	22956	Congdon's tarplant	1.4915
Santa Clara	22956	Contra Costa goldfields	0.0830
Santa Clara	22956	robust spineflower	0.0830
Santa Clara	230200	California tiger salamander	0.0830
Santa Clara	230200	Congdon's tarplant	0.7198
Santa Clara	230200	hoary bat	0.7198
Santa Clara	230200	pallid bat	0.6873
Santa Clara	230200	robust spineflower	0.7198
Santa Clara	230200	saline clover	0.7198
Santa Clara	230201	California tiger salamander	0.7198
Santa Clara	230201	Congdon's tarplant	0.6873
Santa Clara	230201	pallid bat	0.4232
Santa Clara	230201	robust spineflower	2.8529
Santa Clara	230201	saline clover	1.4167
Santa Clara	230210	California tiger salamander	2.8529

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Santa Clara	230210	robust spineflower	4.6539
Santa Clara	230267	California tiger salamander	4.6539
Santa Clara	230267	Hoover's button-celery	0.9208
Santa Clara	230267	robust spineflower	2.0332
Santa Clara	230273	California tiger salamander	4.6539
Santa Clara	230273	robust spineflower	5.7787
Santa Clara	230294	arcuate bush-mallow	3.9903
Santa Clara	230294	California red-legged frog	0.9074
Santa Clara	230294	California tiger salamander	5.7787
Santa Clara	230294	Hall's bush-mallow	4.0993
Santa Clara	230294	pallid bat	4.0993
Santa Clara	230294	saline clover	0.2841
Santa Clara	230294	Sycamore Alluvial Woodland	4.0993
Santa Clara	230294	western pond turtle	0.1046
Santa Clara	230449	California tiger salamander	4.7387
Santa Clara	230449	robust spineflower	2.4909
Santa Clara	230452	California tiger salamander	0.3443
Santa Clara	230452	Congdon's tarplant	0.9431
Santa Clara	230452	hoary bat	4.7387
Santa Clara	230452	pallid bat	0.9431
Santa Clara	230452	robust spineflower	0.4460
Santa Clara	230452	saline clover	0.4460
Santa Clara	230457	California tiger salamander	3.0123
Santa Clara	230457	Congdon's tarplant	3.0123
Santa Clara	230457	robust spineflower	1.1566
Santa Clara	230466	Congdon's tarplant	0.0276
Santa Clara	230466	San Francisco collinsia	0.4840
Santa Clara	230531	alkali milk-vetch	3.0123
Santa Clara	230531	Hoover's button-celery	3.0123
Santa Clara	230531	Point Reyes bird's-beak	0.4460
Santa Clara	230642	California tiger salamander	3.0123
Santa Clara	230642	Congdon's tarplant	3.0123
Santa Clara	230642	hoary bat	0.7115
Santa Clara	230642	robust spineflower	0.7115
Santa Clara	240117	California tiger salamander	0.4146
Santa Clara	240117	Congdon's tarplant	0.3952
Santa Clara	240117	Contra Costa goldfields	0.7115
Santa Clara	240117	hoary bat	0.7115
Santa Clara	240117	pallid bat	0.3952
Santa Clara	240117	robust spineflower	0.7115
Santa Clara	240117	saline clover	0.7115
Santa Clara	240118	California tiger salamander	1.9225
Santa Clara	240118	Congdon's tarplant	1.2904
Santa Clara	240118	hoary bat	0.5268
Santa Clara	240118	pallid bat	1.9225
Santa Clara	240118	robust spineflower	0.2776
Santa Clara	240118	saline clover	0.3115
Santa Clara	240119	Alameda song sparrow	1.2381
Santa Clara	240119	American badger	0.4790
Santa Clara	240119	arcuate bush-mallow	2.8933
Santa Clara	240119	California tiger salamander	0.7271
Santa Clara	240119	Congdon's tarplant	3.0575
Santa Clara	240119	Contra Costa goldfields	0.4790

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Santa Clara	240119	Franciscan onion	0.4790
Santa Clara	240119	hairless popcornflower	0.1394
Santa Clara	240119	hoary bat	0.3447
Santa Clara	240119	lost thistle	0.1837
Santa Clara	240119	pallid bat	1.7573
Santa Clara	240119	robust spineflower	4.1572
Santa Clara	240119	saline clover	0.4015
Santa Clara	240119	San Francisco collinsia	3.0818
Santa Clara	240119	Santa Cruz kangaroo rat	1.7573
Santa Clara	240119	slender-leaved pondweed	1.7573
Santa Clara	240159	arcuate bush-mallow	0.2488
Santa Clara	240159	California tiger salamander	0.2161
Santa Clara	240159	Congdon's tarplant	7.9873
Santa Clara	240159	hairless popcornflower	1.5121
Santa Clara	240159	hoary bat	2.1324
Santa Clara	240159	pallid bat	2.1324
Santa Clara	240159	robust spineflower	1.0018
Santa Clara	240159	saline clover	0.4640
Santa Clara	240374	alkali milk-vetch	1.9951
Santa Clara	240374	California tiger salamander	3.9498
Santa Clara	240374	Congdon's tarplant	8.9811
Santa Clara	240374	robust spineflower	2.0477
Santa Clara	240374	tricolored blackbird	0.4640
Santa Clara	240375	arcuate bush-mallow	1.9511
Santa Clara	240375	California tiger salamander	3.9950
Santa Clara	240375	Congdon's tarplant	1.9511
Santa Clara	240375	hairless popcornflower	2.7791
Santa Clara	240375	hoary bat	2.1324
Santa Clara	240375	pallid bat	2.1324
Santa Clara	240375	robust spineflower	0.7313
Santa Clara	240375	saline clover	2.1324
Santa Clara	240385	hoary bat	9.5088
Santa Clara	240385	Loma Prieta hoita	2.0477
Santa Clara	240385	pallid bat	0.4640
Santa Clara	240398	hoary bat	0.1002
Santa Clara	240403	salt-marsh harvest mouse	3.9970
Santa Clara	240404	alkali milk-vetch	1.8431
Santa Clara	240408	California tiger salamander	1.8431
Santa Clara	240427	hairless popcornflower	0.3541
Santa Clara	240427	Indian Valley bush-mallow	1.8431
Santa Clara	240427	Loma Prieta hoita	1.6978
Santa Clara	240427	robust spineflower	1.6978
Santa Clara	240427	woodland woollythreads	0.0761
Santa Clara	240436	alkali milk-vetch	0.3722
Santa Clara	240436	Hoover's button-celery	0.2052
Santa Clara	240439	Congdon's tarplant	0.7056
Santa Clara	240439	hoary bat	0.2493
Santa Clara	240463	Alameda song sparrow	0.1530
Santa Clara	240463	alkali milk-vetch	0.8323
Santa Clara	240464	California tiger salamander	1.6978
Santa Clara	240464	Congdon's tarplant	0.0994
Santa Clara	240464	Hall's bush-mallow	0.2035
Santa Clara	240464	hoary bat	0.1471

TABLE H-1B: Transportation Projects (linear features) That May Impact Special-Status Speci

County	*RTP_ID*	*Species impacted*	*Length (mi)*
Santa Clara	240464	pallid bat	1.9013
Santa Clara	240464	robust spineflower	1.8799
Santa Clara	240464	saline clover	0.0770
Santa Clara	240466	alkali milk-vetch	0.0871
Santa Clara	240466	burrowing owl	0.5484
Santa Clara	240466	California tiger salamander	0.6151
Santa Clara	240466	Congdon's tarplant	0.6151
Santa Clara	240466	hairless popcornflower	0.3003
Santa Clara	240466	hoary bat	0.3003
Santa Clara	240466	Hoover's button-celery	0.3003
Santa Clara	240466	pallid bat	0.1584
Santa Clara	240466	Point Reyes bird's-beak	0.5270
Santa Clara	240466	robust spineflower	1.5499
Santa Clara	240466	round-leaved filaree	2.2636
Santa Clara	240466	Santa Cruz kangaroo rat	1.7149
Santa Clara	240466	smooth lessingia	1.8748
Santa Clara	240466	western pond turtle	0.1060
Santa Clara	240466	western snowy plover	1.5220
Santa Clara	240469	California tiger salamander	0.2131
Santa Clara	240469	Congdon's tarplant	0.0924
Santa Clara	240469	hoary bat	0.0732
Santa Clara	240469	robust spineflower	1.2426
Santa Clara	240481	Alameda song sparrow	0.3269
Santa Clara	240481	burrowing owl	2.1587
Santa Clara	240481	salt-marsh wandering shrew	0.1130
Santa Clara	240484	alkali milk-vetch	2.1781
Santa Clara	240484	California tiger salamander	0.1891
Santa Clara	240484	Congdon's tarplant	0.2312
Santa Clara	240484	robust spineflower	0.1719
Santa Clara	240484	salt-marsh harvest mouse	1.9806
Santa Clara	240485	woodland woollythreads	0.0405
Santa Clara	240491	hoary bat	0.0642
Santa Clara	240491	Loma Prieta hoita	0.3277
Santa Clara	240491	pallid bat	1.1379
Santa Clara	240492	hoary bat	0.1132
Santa Clara	240492	Loma Prieta hoita	0.9275
Santa Clara	240492	pallid bat	0.1580
Santa Clara	240506	California tiger salamander	3.0917
Santa Clara	240506	hoary bat	3.0026
Santa Clara	240506	lost thistle	3.0917
Santa Clara	240506	pallid bat	3.0026
Santa Clara	240506	San Francisco collinsia	0.1915
Santa Clara	240506	Santa Cruz kangaroo rat	3.0026
Santa Clara	240506	slender-leaved pondweed	1.5036
Santa Clara	240507	Alameda song sparrow	0.6134
Santa Clara	240513	California tiger salamander	0.7064
Santa Clara	240513	Congdon's tarplant	3.0917
Santa Clara	240513	robust spineflower	3.0026
Santa Clara	240514	California tiger salamander	3.0917
Santa Clara	240514	Congdon's tarplant	0.7119
Santa Clara	240514	hairless popcornflower	3.0917
Santa Clara	240514	hoary bat	3.0917
Santa Clara	240514	robust spineflower	2.7264

TABLE H-1C: Transportation Projects (point features) That May Impact Special-Status Spec

County	*RTP_ID*	*Species Impacted*
Alameda	21100	alkali milk-vetch
Alameda	21100	caper-fruited tropidocarpum
Alameda	21103	alkali milk-vetch
Alameda	21103	burrowing owl
Alameda	21103	Contra Costa goldfields
Alameda	21103	San Joaquin spearscale
Alameda	21144	saline clover
Alameda	21451	Congdon's tarplant
Alameda	21475	caper-fruited tropidocarpum
Alameda	21475	foothill yellow-legged frog
Alameda	21475	hairless popcornflower
Alameda	21477	caper-fruited tropidocarpum
Alameda	22100	woodland woollythreads
Alameda	22769	adobe sanicle
Alameda	22769	Alameda Island mole
Alameda	22769	Alameda song sparrow
Alameda	22769	alkali milk-vetch
Alameda	22769	California tiger salamander
Alameda	22769	Kellogg's horkelia
Alameda	22769	robust spineflower
Alameda	22769	saline clover
Alameda	22779	tricolored blackbird
Alameda	22990	tricolored blackbird
Alameda	230110	tricolored blackbird
Alameda	230132	caper-fruited tropidocarpum
Alameda	230132	foothill yellow-legged frog
Alameda	240037	hoary bat
Alameda	240062	tricolored blackbird
Alameda	240065	alkali milk-vetch
Alameda	240065	hairless popcornflower
Alameda	240065	pallid bat
Alameda	240100	adobe sanicle
Alameda	240100	Alameda Island mole
Alameda	240100	Alameda song sparrow
Alameda	240100	alkali milk-vetch
Alameda	240100	California tiger salamander
Alameda	240100	Kellogg's horkelia
Alameda	240100	robust spineflower
Alameda	240100	saline clover
Alameda	240101	adobe sanicle
Alameda	240101	Alameda Island mole
Alameda	240101	Alameda song sparrow
Alameda	240101	alkali milk-vetch
Alameda	240101	California tiger salamander
Alameda	240101	Kellogg's horkelia
Alameda	240101	robust spineflower
Alameda	240101	saline clover
Alameda	240179	big free-tailed bat
Alameda	240179	hoary bat
Alameda	240179	pallid bat
Alameda	240179	round-leaved filaree
Alameda	240208	most beautiful jewel-flower
Alameda	240208	slender-leaved pondweed

TABLE H-1C: Transportation Projects (point features) That May Impact Special-Status Spec

County	*RTP_ID*	*Species Impacted*
Alameda	240295	alkali milk-vetch
Alameda	240295	California red-legged frog
Alameda	240295	caper-fruited tropidocarpum
Alameda	240295	foothill yellow-legged frog
Alameda	240295	slender-leaved pondweed
Alameda	240304	alkali milk-vetch
Alameda	240304	California red-legged frog
Alameda	240304	caper-fruited tropidocarpum
Alameda	240304	foothill yellow-legged frog
Alameda	240304	slender-leaved pondweed
Alameda	240318	Santa Cruz tarplant
Alameda	240324	adobe sanicle
Alameda	240324	Alameda Island mole
Alameda	240324	Alameda song sparrow
Alameda	240324	alkali milk-vetch
Alameda	240324	California tiger salamander
Alameda	240324	Kellogg's horkelia
Alameda	240324	robust spineflower
Alameda	240324	saline clover
Alameda	98207	bent-flowered fiddleneck
Alameda	98207	Choris' popcornflower
Alameda	98207	hoary bat
Alameda	98207	Kellogg's horkelia
Alameda	98207	round-leaved filaree
Alameda	98207	San Francisco Bay spineflower
Alameda	98207	San Joaquin spearscale
	Total Alameda	
Bay Area Region/Multi-	21342	beach layia
Bay Area Region/Multi-	21342	bristly sedge
Bay Area Region/Multi-	21342	rose leptosiphon
Bay Area Region/Multi-	21342	San Francisco Bay Area leaf-cutter bee
Bay Area Region/Multi-	21342	sandy beach tiger beetle
Bay Area Region/Multi-	21342	white seaside tarplant
Bay Area Region/Multi-	22006	beach layia
Bay Area Region/Multi-	22006	bristly sedge
Bay Area Region/Multi-	22006	rose leptosiphon
Bay Area Region/Multi-	22006	San Francisco Bay Area leaf-cutter bee
Bay Area Region/Multi-	22006	sandy beach tiger beetle
Bay Area Region/Multi-	22006	white seaside tarplant
Bay Area Region/Multi-	230581	beach layia
Bay Area Region/Multi-	230581	bristly sedge
Bay Area Region/Multi-	230581	California black rail
Bay Area Region/Multi-	230581	marsh sandwort
Bay Area Region/Multi-	230581	rose leptosiphon
Bay Area Region/Multi-	230581	San Francisco Bay Area leaf-cutter bee
Bay Area Region/Multi-	230581	sandy beach tiger beetle
Bay Area Region/Multi-	230581	white seaside tarplant
Bay Area Region/Multi-	230684	hairless popcornflower
Bay Area Region/Multi-	230687	pappose tarplant
Bay Area Region/Multi-	230687	Suisun shrew
Bay Area Region/Multi-	230687	Suisun song sparrow
Bay Area Region/Multi-	240048	California tiger salamander
Bay Area Region/Multi-	240048	Congdon's tarplant

TABLE H-1C: Transportation Projects (point features) That May Impact Special-Status Spec

County	*RTP_ID*	*Species Impacted*
Bay Area Region/Multi-	240048	hoary bat
Bay Area Region/Multi-	240048	pallid bat
Bay Area Region/Multi-	240048	robust spineflower
Bay Area Region/Multi-	240048	saline clover
Contra Costa	21205	California tiger salamander
Contra Costa	21205	Congdon's tarplant
Contra Costa	21214	Hurd's metapogon robberfly
Contra Costa	22350	California tiger salamander
Contra Costa	22350	Congdon's tarplant
Contra Costa	22355	California seablite
Contra Costa	22355	hoary bat
Contra Costa	22355	pallid bat
Contra Costa	22614	big free-tailed bat
Contra Costa	22614	Bolander's water-hemlock
Contra Costa	22614	Carquinez goldenbush
Contra Costa	22614	soft bird's-beak
Contra Costa	22614	Suisun song sparrow
Contra Costa	230123	pallid bat
Contra Costa	230123	San Pablo song sparrow
Contra Costa	230123	yellow-headed blackbird
Contra Costa	230218	alkali milk-vetch
Contra Costa	230218	fragrant fritillary
Contra Costa	230218	hoary bat
Contra Costa	230218	saline clover
Contra Costa	230232	burrowing owl
Contra Costa	230596	California tiger salamander
Contra Costa	230596	Congdon's tarplant
Contra Costa	240074	alkali milk-vetch
Contra Costa	240074	American badger
Contra Costa	240074	Berkeley kangaroo rat
Contra Costa	240074	big tarplant
Contra Costa	240074	California tiger salamander
Contra Costa	240074	Congdon's tarplant
Contra Costa	240074	Contra Costa goldfields
Contra Costa	240074	fragrant fritillary
Contra Costa	240074	hoary bat
Contra Costa	240074	pallid bat
Contra Costa	240074	saline clover
Contra Costa	240074	San Joaquin spearscale
Contra Costa	240457	big tarplant
Contra Costa	240457	California tiger salamander
Contra Costa	240457	Contra Costa goldfields
Contra Costa	240457	pallid bat
Contra Costa	240625	big tarplant
Contra Costa	240625	Suisun song sparrow
Contra Costa	240656	San Pablo song sparrow
Marin	21306	Mt. Tamalpais manzanita
Marin	21306	San Pablo song sparrow
Marin	21325	marsh microseris
Marin	230105	California red-legged frog
Marin	230105	coho salmon - central California coast ESU
Marin	230105	monarch butterfly
Marin	240041	Mt. Tamalpais manzanita

TABLE H-1C: Transportation Projects (point features) That May Impact Special-Status Spec

County	*RTP_ID*	*Species Impacted*
Marin	240041	San Pablo song sparrow
Marin	240456	Napa false indigo
Marin	98154	Marin knotweed
Marin	98154	Napa false indigo
Napa	22746	American badger
Napa	22746	An isopod
Napa	22746	pallid bat
Napa	22746	showy rancheria clover
Napa	240083	American badger
Napa	240083	An isopod
Napa	240083	pallid bat
Napa	240083	showy rancheria clover
Napa	240085	American badger
Napa	240085	An isopod
Napa	240085	pallid bat
Napa	240085	showy rancheria clover
San Francisco	230555	double-crested cormorant
San Francisco	240147	beach layia
San Francisco	240147	bristly sedge
San Francisco	240147	Diablo helianthella
San Francisco	240147	rose leptosiphon
San Francisco	240147	San Francisco Bay Area leaf-cutter bee
San Francisco	240147	sandy beach tiger beetle
San Francisco	240147	white seaside tarplant
San Francisco	240349	adobe sanicle
San Francisco	240349	alkali milk-vetch
San Francisco	240349	beach layia
San Francisco	240349	bristly sedge
San Francisco	240349	fragrant fritillary
San Francisco	240349	rose leptosiphon
San Francisco	240349	San Francisco Bay Area leaf-cutter bee
San Francisco	240349	San Francisco owl's-clover
San Francisco	240349	sandy beach tiger beetle
San Francisco	240349	white seaside tarplant
San Francisco	240415	beach layia
San Francisco	240415	bristly sedge
San Francisco	240415	rose leptosiphon
San Francisco	240415	San Francisco Bay Area leaf-cutter bee
San Francisco	240415	sandy beach tiger beetle
San Francisco	240415	white seaside tarplant
San Francisco	240487	beach layia
San Francisco	240487	bristly sedge
San Francisco	240487	California black rail
San Francisco	240487	marsh sandwort
San Francisco	240487	rose leptosiphon
San Francisco	240487	San Francisco Bay Area leaf-cutter bee
San Francisco	240487	sandy beach tiger beetle
San Francisco	240487	white seaside tarplant
San Francisco	240525	beach layia
San Francisco	240525	bristly sedge
San Francisco	240525	rose leptosiphon
San Francisco	240525	San Francisco Bay Area leaf-cutter bee
San Francisco	240525	sandy beach tiger beetle

TABLE H-1C: Transportation Projects (point features) That May Impact Special-Status Spec

County	*RTP_ID*	*Species Impacted*
San Francisco	240525	white seaside tarplant
San Francisco	240526	beach layia
San Francisco	240526	bristly sedge
San Francisco	240526	rose leptosiphon
San Francisco	240526	San Francisco Bay Area leaf-cutter bee
San Francisco	240526	sandy beach tiger beetle
San Francisco	240526	white seaside tarplant
San Francisco	240557	beach layia
San Francisco	240557	bristly sedge
San Francisco	240557	Diablo helianthella
San Francisco	240557	rose leptosiphon
San Francisco	240557	San Francisco Bay Area leaf-cutter bee
San Francisco	240557	sandy beach tiger beetle
San Francisco	240557	white seaside tarplant
San Mateo	21602	California clapper rail
San Mateo	21602	Franciscan onion
San Mateo	21603	hoary bat
San Mateo	21603	Santa Cruz kangaroo rat
San Mateo	21606	Santa Cruz kangaroo rat
San Mateo	21609	hoary bat
San Mateo	21615	Kellogg's horkelia
San Mateo	21615	robust spineflower
San Mateo	21615	showy rancheria clover
San Mateo	22226	beach layia
San Mateo	22226	bristly sedge
San Mateo	22226	rose leptosiphon
San Mateo	22226	San Francisco Bay Area leaf-cutter bee
San Mateo	22226	sandy beach tiger beetle
San Mateo	22226	white seaside tarplant
San Mateo	22229	Stage's dufourine bee
San Mateo	22261	California red-legged frog
San Mateo	22261	coast yellow leptosiphon
San Mateo	22261	Franciscan thistle
San Mateo	22261	San Francisco collinsia
San Mateo	22261	steelhead - central California coast DPS
San Mateo	22279	Alameda song sparrow
San Mateo	22756	beach layia
San Mateo	22756	bristly sedge
San Mateo	22756	rose leptosiphon
San Mateo	22756	San Francisco Bay Area leaf-cutter bee
San Mateo	22756	sandy beach tiger beetle
San Mateo	22756	white seaside tarplant
San Mateo	230417	Santa Cruz kangaroo rat
San Mateo	230704	arcuate bush-mallow
San Mateo	240142	beach layia
San Mateo	240142	bristly sedge
San Mateo	240142	rose leptosiphon
San Mateo	240142	San Francisco Bay Area leaf-cutter bee
San Mateo	240142	sandy beach tiger beetle
San Mateo	240142	white seaside tarplant
San Mateo	240161	beach layia
San Mateo	240161	bristly sedge
San Mateo	240161	hoary bat

TABLE H-1C: Transportation Projects (point features) That May Impact Special-Status Spec

County	*RTP_ID*	*Species Impacted*
San Mateo	240161	rose leptosiphon
San Mateo	240161	San Francisco Bay Area leaf-cutter bee
San Mateo	240161	sandy beach tiger beetle
San Mateo	240161	white seaside tarplant
Santa Clara	21704	California tiger salamander
Santa Clara	21704	Congdon's tarplant
Santa Clara	21704	hoary bat
Santa Clara	21704	robust spineflower
Santa Clara	21722	California tiger salamander
Santa Clara	21722	robust spineflower
Santa Clara	21786	Congdon's tarplant
Santa Clara	21786	round-leaved filaree
Santa Clara	21787	Alameda song sparrow
Santa Clara	21787	American badger
Santa Clara	21787	California tiger salamander
Santa Clara	21787	hoary bat
Santa Clara	21787	lost thistle
Santa Clara	21787	Santa Cruz kangaroo rat
Santa Clara	21787	slender-leaved pondweed
Santa Clara	22854	Franciscan onion
Santa Clara	22965	California tiger salamander
Santa Clara	22965	Congdon's tarplant
Santa Clara	22965	robust spineflower
Santa Clara	22979	California tiger salamander
Santa Clara	22979	Congdon's tarplant
Santa Clara	22979	robust spineflower
Santa Clara	230255	woodland woollythreads
Santa Clara	230265	Hoover's button-celery
Santa Clara	230266	California tiger salamander
Santa Clara	230269	California tiger salamander
Santa Clara	230269	robust spineflower
Santa Clara	230284	California tiger salamander
Santa Clara	230284	robust spineflower
Santa Clara	230363	California tiger salamander
Santa Clara	230363	robust spineflower
Santa Clara	230407	California tiger salamander
Santa Clara	230407	Congdon's tarplant
Santa Clara	230407	robust spineflower
Santa Clara	230425	California tiger salamander
Santa Clara	230425	Congdon's tarplant
Santa Clara	230425	robust spineflower
Santa Clara	230492	California tiger salamander
Santa Clara	230492	Congdon's tarplant
Santa Clara	230492	robust spineflower
Santa Clara	230532	Alameda song sparrow
Santa Clara	230637	California tiger salamander
Santa Clara	230637	Congdon's tarplant
Santa Clara	230637	hoary bat
Santa Clara	230637	robust spineflower
Santa Clara	230638	Congdon's tarplant
Santa Clara	230638	San Francisco collinsia
Santa Clara	230643	California tiger salamander
Santa Clara	230643	Congdon's tarplant

TABLE H-1C: Transportation Projects (point features) That May Impact Special-Status Spec

County	*RTP_ID*	*Species Impacted*
Santa Clara	230643	robust spineflower
Santa Clara	240063	California tiger salamander
Santa Clara	240063	Congdon's tarplant
Santa Clara	240063	hoary bat
Santa Clara	240063	pallid bat
Santa Clara	240063	robust spineflower
Santa Clara	240063	saline clover
Santa Clara	240414	hoary bat
Santa Clara	240414	pallid bat
Santa Clara	240425	arcuate bush-mallow
Santa Clara	240425	California tiger salamander
Santa Clara	240425	hairless popcornflower
Santa Clara	240425	hoary bat
Santa Clara	240425	robust spineflower
Santa Clara	240441	Point Reyes bird's-beak
Santa Clara	240498	California tiger salamander
Santa Clara	240498	robust spineflower
Santa Clara	240532	hoary bat
Santa Clara	240570	California tiger salamander
Santa Clara	240570	robust spineflower
Santa Clara	240671	California tiger salamander
Santa Clara	240671	Congdon's tarplant
Santa Clara	240671	robust spineflower
Solano	21341	alkali milk-vetch
Solano	21341	Baker's navarretia
Solano	21341	Carquinez goldenbush
Solano	21341	dwarf downingia
Solano	21341	San Joaquin spearscale
Solano	21341	showy rancheria clover
Solano	22629	fragrant fritillary
Solano	22629	soft bird's-beak
Solano	22794	Carquinez goldenbush
Solano	22795	monarch butterfly
Solano	22985	Carquinez goldenbush
Solano	230326	pappose tarplant
Solano	230326	Suisun shrew
Solano	230326	Suisun song sparrow
Solano	230635	alkali milk-vetch
Solano	230635	Baker's navarretia
Solano	230635	Carquinez goldenbush
Solano	230635	dwarf downingia
Solano	230635	San Joaquin spearscale
Solano	230635	showy rancheria clover
Solano	240313	big tarplant
Solano	240313	Bolander's water-hemlock
Solano	240313	Carquinez goldenbush
Solano	240313	Congdon's tarplant
Sonoma	22190	bank swallow
Sonoma	230341	hoary bat
Sonoma	230341	pallid bat
Sonoma	230368	Sonoma canescent manzanita
Sonoma	230368	white sedge
Sonoma	240524	saline clover

TABLE H-1D: Transportation Projects (polygon features) That May Impact Special-Status Species

County	*RTP_ID*	*Species impacted*	*Acres*
San Francisco	240163	beach layia	233.8148
San Francisco	240163	bristly sedge	233.8148
San Francisco	240163	Diablo helianthella	159.0415
San Francisco	240163	hoary bat	4.3711
San Francisco	240163	Mission blue butterfly	33.8268
San Francisco	240163	rose leptosiphon	233.8148
San Francisco	240163	San Francisco Bay Area leaf-cutter bee	233.8148
San Francisco	240163	sandy beach tiger beetle	233.8148
San Francisco	240163	white seaside tarplant	233.8148
San Francisco	240399	bank swallow	25.3574
San Francisco	240399	beach layia	136.1048
San Francisco	240399	blue coast gilia	57.0082
San Francisco	240399	bristly sedge	136.1048
San Francisco	240399	California black rail	57.0082
San Francisco	240399	California red-legged frog	57.0082
San Francisco	240399	compact cobwebby thistle	75.1514
San Francisco	240399	Franciscan thistle	57.0082
San Francisco	240399	hoary bat	7.5522
San Francisco	240399	Kellogg's horkelia	57.0082
San Francisco	240399	Opler's longhorn moth	57.0082
San Francisco	240399	robust spineflower	32.8363
San Francisco	240399	rose leptosiphon	136.1048
San Francisco	240399	San Francisco Bay Area leaf-cutter bee	136.1048
San Francisco	240399	San Francisco Bay spineflower	32.8399
San Francisco	240399	San Francisco gumplant	6.4647
San Francisco	240399	San Francisco lessingia	57.0082
San Francisco	240399	San Francisco owl's-clover	57.0082
San Francisco	240399	sandy beach tiger beetle	136.1048
San Francisco	240399	tidewater goby	57.0082
San Francisco	240399	white seaside tarplant	136.1048
San Francisco	240400	blue coast gilia	1.7433
San Francisco	240400	double-crested cormorant	15.9016
San Francisco	240728	adobe sanicle	497.5994
San Francisco	240728	alkali milk-vetch	497.5994
San Francisco	240728	beach layia	4857.7222
San Francisco	240728	bristly sedge	4857.7222
San Francisco	240728	California black rail	1739.0001
San Francisco	240728	fragrant fritillary	166.9091
San Francisco	240728	monarch butterfly	9.8858
San Francisco	240728	Presidio manzanita	25.6503
San Francisco	240728	rose leptosiphon	4857.7222
San Francisco	240728	San Francisco Bay Area leaf-cutter bee	4857.7222
San Francisco	240728	San Francisco owl's-clover	497.5994
San Francisco	240728	sandy beach tiger beetle	4857.7222
San Francisco	240728	white seaside tarplant	4857.7222

TABLE H-2A: PDAs That May Impact Critical Habitat for Federal-listed Species

County	PDA	Species	Acres
Alameda	Livermore: Isabel Avenue/BART Station Planning Area	CALIFORNIA RED-LEGGED FROG	0.0715
		Total Alameda County	**0.0715**
Contra Costa	Antioch: Hillcrest eBART Station	DELTA SMELT	377.3916
Contra Costa	Antioch: Rivertown Waterfront	ANTIOCH DUNES EVEING PRIMROSE	9.385
Contra Costa	Antioch: Rivertown Waterfront	CONTRA COSTA WALLFLOWER	9.385
Contra Costa	Antioch: Rivertown Waterfront	DELTA SMELT	383.3226
Contra Costa	Contra Costa County Unincorporated: Pittsburg/Bay Point BART Station	DELTA SMELT	26.2722
Contra Costa	Oakley: Downtown	DELTA SMELT	109.9182
Contra Costa	Oakley: Employment Area	DELTA SMELT	812.2071
Contra Costa	Oakley: Potential Planning Area	DELTA SMELT	200.6393
Contra Costa	Pittsburg: Downtown	DELTA SMELT	342.4538
Contra Costa	Pittsburg: Pittsburg/Bay Point BART Station	DELTA SMELT	0.0447
Contra Costa	Pittsburg: Railroad Avenue eBART Station	DELTA SMELT	827.5783
		Total Contra Costa County	**3098.598**
Santa Clara	San Jose: Communications Hill	BAY CHECKERSPOT BUTTERFLY	377.2594
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	BAY CHECKERSPOT BUTTERFLY	19.8543
		Total Santa Clara County	**397.1137**
Solano	Benicia: Downtown	DELTA SMELT	3.7654
Solano	Fairfield: Fairfield-Vacaville Train Station	CONTRA COSTA GOLDFIELDS	487.2116
Solano	Fairfield: Fairfield-Vacaville Train Station	VERNAL POOL FAIRY SHRIMP	487.2116
Solano	Fairfield: Fairfield-Vacaville Train Station	VERNAL POOL TADPOLE SHRIMP	487.2116
Solano	Suisun City: Downtown & Waterfront	DELTA SMELT	6.0268
Solano	Suisun City: Downtown & Waterfront	SUISUN THISTLE	0.0221
		Total Solano County	**1471.449**
Sonoma	Cotati: Downtown and Cotati Depot	CALIFORNIA TIGER SALAMANDER	48.6674
Sonoma	Rohnert Park: Central Rohnert Park	CALIFORNIA TIGER SALAMANDER	0.4663
Sonoma	Rohnert Park: Sonoma Mountain Village	CALIFORNIA TIGER SALAMANDER	77.9707
Sonoma	Santa Rosa: Roseland Area	CALIFORNIA TIGER SALAMANDER	1323.693
Sonoma	Santa Rosa: SUB-AREA: Downtown Station Area	CALIFORNIA TIGER SALAMANDER	0.0091
Sonoma	Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	CALIFORNIA TIGER SALAMANDER	112.2753
Sonoma	Santa Rosa: SUB-AREA: Sebastopol Road Corridor	CALIFORNIA TIGER SALAMANDER	751.6031
		Total Sonoma County	**2314.685**

TABLE H-2B: Transportation Projects That May Impact Critical Habitat for Federal-Listed Species

County	*RTP_ID*	*CH Species*	*Length (mi)*
Alameda	21473	CALIFORNIA RED-LEGGED FROG	0.1271
		Total Alameda County	**0.1271**
Contra Costa	230308	ALAMEDA WHIPSNAKE	5.9516
Contra Costa	230535	ALAMEDA WHIPSNAKE	0.0212
Contra Costa	230307	CALIFORNIA RED-LEGGED FROG	0.6575
Contra Costa	230308	CALIFORNIA RED-LEGGED FROG	4.1313
Contra Costa	22400	CONTRA COSTA GOLDFIELDS	0.6821
Contra Costa	22604	CONTRA COSTA GOLDFIELDS	1.4357
Contra Costa	21211	DELTA SMELT	8.5436
Contra Costa	21214	DELTA SMELT	0.3281
Contra Costa	22400	DELTA SMELT	7.8998
Contra Costa	230205	DELTA SMELT	1.2247
Contra Costa	230232	DELTA SMELT	0.4851
Contra Costa	230233	DELTA SMELT	0.3791
Contra Costa	230236	DELTA SMELT	1.8504
Contra Costa	230238	DELTA SMELT	0.6901
Contra Costa	230247	DELTA SMELT	0.9798
Contra Costa	230249	DELTA SMELT	0.2477
Contra Costa	230250	DELTA SMELT	1.1948
Contra Costa	230253	DELTA SMELT	0.3403
Contra Costa	230274	DELTA SMELT	1.5778
Contra Costa	230288	DELTA SMELT	0.6811
Contra Costa	230289	DELTA SMELT	0.4797
Contra Costa	230535	DELTA SMELT	0.3209
Contra Costa	240167	DELTA SMELT	0.3877
Contra Costa	98999	DELTA SMELT	4.4528
Contra Costa	22400	VERNAL POOL FAIRY SHRIMP	1.6340
Contra Costa	22604	VERNAL POOL FAIRY SHRIMP	2.7014
Contra Costa	230202	DELTA SMELT	1.7745
		Total Contra Costa County	**51.0528**
Napa	240617	CONTRA COSTA GOLDFIELDS	0.6867
		Total Napa County	**0.6867**
Regional	230666	CALIFORNIA RED-LEGGED FROG	0.0811
Regional	22001	CALIFORNIA TIGER SALAMANDER	5.4937
Regional	240736	CALIFORNIA TIGER SALAMANDER	2.2437
Regional	21013	DELTA SMELT	1.5584
		Total Regional	**9.3769**
San Mateo	21893	CALIFORNIA RED-LEGGED FROG	1.9217
San Mateo	240114	CALIFORNIA RED-LEGGED FROG	3.2437
San Mateo	94644	CALIFORNIA RED-LEGGED FROG	2.1774
		Total San Mateo County	**7.3428**
Santa Clara	230294	CALIFORNIA RED-LEGGED FROG	13.2996
		Total Santa Clara County	**13.2996**
Solano	94151	CONTRA COSTA GOLDFIELDS	2.0348
Solano	94151	VERNAL POOL FAIRY SHRIMP	2.0348
Solano	94151	VERNAL POOL TADPOLE SHRIMP	2.0348
		Total Sonoma County	**6.1044**
Sonoma	21902	CALIFORNIA TIGER SALAMANDER	3.9447
Sonoma	22655	CALIFORNIA TIGER SALAMANDER	0.1233
Sonoma	240366	CALIFORNIA TIGER SALAMANDER	1.4009
		Total Sonoma County	**5.4689**

TABLE H-2C: Transportation Projects That May Impact Critical Habitat for Federal-Listed Species

County	*RTP_ID*	*CH Species*
Contra Costa	230206	DELTA SMELT
Contra Costa	98222	DELTA SMELT
Contra Costa	21214	DELTA SMELT
Contra Costa	240625	DELTA SMELT
Contra Costa	230203	DELTA SMELT
Contra Costa	230232	DELTA SMELT
Sonoma	22195	CALIFORNIA TIGER SALAMANDER

TABLE H-3A: PDAs That May Impact Salmonid Critical Habitat

County	*PDA*	*ESU*	*Stream*	*Stream Length (mi)*
Napa	Napa: Downtown Napa	CCC steelhead	Napa Creek	0.2158
Napa	Napa: Downtown Napa	CCC steelhead	Napa River	0.0044
Napa	Napa: Soscol Gateway Corridor	CCC steelhead	Napa River	0.2318
Napa	Napa: Soscol Gateway Corridor	CCC steelhead	Tulucay Creek	0.1583
			Total Napa County	**0.6103**
San Mateo	Menlo Park: El Camino Real Corridor and Downtown	CCC steelhead	San Francisquito Creek	0.0337
San Mateo	SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtown	CCC steelhead	San Francisquito Creek	0.2444
			Total San Mateo County	**0.2781**
Santa Clara	Mountain View: Downtown	CCC steelhead	Stevens Creek	0.6436
Santa Clara	Mountain View: El Camino Real Corridor	CCC steelhead	Stevens Creek	0.6998
Santa Clara	Mountain View: North Bayshore	CCC steelhead	Stevens Creek	0.1876
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	CCC steelhead	San Francisquito Creek	0.0037
Santa Clara	San Jose: Berryessa Station	CCC steelhead	Coyote Creek (Santa Clara)	0.9209
Santa Clara	San Jose: Berryessa Station	CCC steelhead	Upper Penitencia Creek	0.9395
Santa Clara	San Jose: Capitol Corridor Urban Villages	CCC steelhead	Upper Penitencia Creek	0.101
Santa Clara	San Jose: East Santa Clara/Alum Rock Corridor	CCC steelhead	Coyote Creek (Santa Clara)	0.7988
Santa Clara	San Jose: North San Jose	CCC steelhead	Coyote Creek (Santa Clara)	2.551
Santa Clara	San Jose: North San Jose	CCC steelhead	Guadulpe River	1.6598
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	CCC steelhead	Coyote Creek (Santa Clara)	0.29
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	CCC steelhead	Guadulpe River	0.2936
			Total Santa Clara County	**9.0893**
Sonoma	Cloverdale: Downtown/SMART Transit Area	CC Chinook	Mainstem in Alexander Vall	0.3457
Sonoma	Cloverdale: Downtown/SMART Transit Area	CCC steelhead	Mainstem Alexander Valley	0.3457
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	CCC steelhead	Petaluma River	1.8427
Sonoma	Windsor: Redevelopment Area	CCC steelhead	Middle reach of Windsor Cr	0.4942
			Total Sonoma County	**3.0283**

TABLE H-3B: TIP LINEAR PROJECT

County	*RTP_ID*	*ESU*	*Stream*
Alameda	22009	CCC steelhead	Coyote Creek (Santa Clara)
Alameda	22009	CCC steelhead	Guadulpe River
Alameda	22509	CCC steelhead	San Francisco Bay, South
Alameda	22780	CCC steelhead	San Francisco Bay, South
Alameda	240018	CCC steelhead	San Francisco Bay, South
Alameda	240018	CCC steelhead	San Francisquito Creek
Total Projects Alameda County			**3**
Bay Area Region/Multi-County	21012	CCC steelhead	Suisun Bay
Bay Area Region/Multi-County	21012	Central Valley Steelhead	
Bay Area Region/Multi-County	21013	CCC steelhead	Carquinez Straits
Bay Area Region/Multi-County	21013	CCC steelhead	San Francisco Bay, Central
Bay Area Region/Multi-County	21013	CCC steelhead	San Francisco Bay, South
Bay Area Region/Multi-County	21013	Central Valley Steelhead	
Bay Area Region/Multi-County	21320	CCC steelhead	Suisun Bay
Bay Area Region/Multi-County	21320	Central Valley Steelhead	
Bay Area Region/Multi-County	21627	CCC steelhead	San Francisquito Creek
Bay Area Region/Multi-County	21627	CCC steelhead	Stevens Creek
Bay Area Region/Multi-County	22001	CCC steelhead	Petaluma River
Bay Area Region/Multi-County	22001	CCC steelhead	San Antonio Creek
Bay Area Region/Multi-County	22001	CCC steelhead	Willow Brook
Bay Area Region/Multi-County	22511	CCC steelhead	San Francisco Bay, South
Bay Area Region/Multi-County	22636	CCC steelhead	San Francisco Bay, South
Bay Area Region/Multi-County	230612	CCC steelhead	Carquinez Straits
Bay Area Region/Multi-County	230612	CCC steelhead	San Francisco Bay, Central
Bay Area Region/Multi-County	230612	CCC steelhead	San Francisco Bay, South
Bay Area Region/Multi-County	230612	CCC steelhead	San Pablo Bay
Bay Area Region/Multi-County	230612	CCC steelhead	Suisun Bay
Bay Area Region/Multi-County	230612	Central Valley Steelhead	
Bay Area Region/Multi-County	230712	CCC steelhead	Suisun Bay
Bay Area Region/Multi-County	230712	Central Valley Steelhead	
Bay Area Region/Multi-County	240736	CC Chinook	Middle Reach of Mainstem
Bay Area Region/Multi-County	240736	CCC steelhead	Foss Creek
Bay Area Region/Multi-County	240736	CCC steelhead	Lower Pruit Creek
Bay Area Region/Multi-County	240736	CCC steelhead	Mainstem near Healdsburg
Bay Area Region/Multi-County	240736	CCC steelhead	Mark West Creek
Bay Area Region/Multi-County	240736	CCC steelhead	Middle reach of Windsor Creek
Bay Area Region/Multi-County	240736	CCC steelhead	Pool Creek
Total Projects Bay Area/Multi County			**9**
Contra Costa	22122	CCC steelhead	San Francisco Bay, South
Contra Costa	230613	CCC steelhead	Carquinez Straits
Contra Costa	230613	CCC steelhead	Suisun Bay
Contra Costa	230613	Central Valley Steelhead	
Total Projects Contra Costa County			**2**
Marin	21325	CCC steelhead	Corte Madera Creek
Napa	230508	CCC steelhead	Dry Creek
Napa	240057X	CCC steelhead	Suscol Creek
Napa	240617	CCC steelhead	Napa Creek
Napa	240617	CCC steelhead	Napa River
Napa	240617	CCC steelhead	Suscol Creek
Napa	240617	CCC steelhead	Tulucay Creek
Total Projects Napa County			**4**
San Mateo	21608	CCC steelhead	San Francisquito Creek
San Mateo	21893	CCC steelhead	Apanolio Cr
San Mateo	21893	CCC steelhead	Pilarcitos Creek
San Mateo	22120	CCC steelhead	San Francisco Bay, South
San Mateo	22726	CCC steelhead	San Francisco Bay, South
San Mateo	240026	CCC steelhead	San Francisquito Creek
San Mateo	240027	CCC steelhead	San Francisquito Creek
San Mateo	240114	CCC steelhead	Denniston Creek

TABLE H-3B: TIP LINEAR PROJECT

County	*RTP_ID*	*ESU*	*Stream*	
San Mateo	240114	CCC steelhead	Frenchmans Creek	
San Mateo	240114	CCC steelhead	San Pedro Creek	
San Mateo	240590	CCC steelhead	San Francisquito Creek	
Total Projects San Mateo County				**7**
Santa Clara	21714	SCCC steelhead	Pajaro River	
Santa Clara	21714	SCCC steelhead	Tar Creek	
Santa Clara	21714	SCCC steelhead	Uvas Creek	
Santa Clara	21760	SCCC steelhead	Llagas Creek	
Santa Clara	21922	CCC steelhead	Guadulpe River	
Santa Clara	22910	SCCC steelhead	Uvas Creek	
Santa Clara	22932	SCCC steelhead	Llagas Cr	
Santa Clara	22932	SCCC steelhead	Uvas Creek	
Santa Clara	22944	CCC steelhead	Coyote Creek (Santa Clara)	
Santa Clara	230235	SCCC steelhead	Llagas Creek	
Santa Clara	230267	CCC steelhead	Coyote Creek (Santa Clara)	
Santa Clara	230267	CCC steelhead	Guadulpe River	
Santa Clara	230294	SCCC steelhead	Carnadero Creek	
Santa Clara	230294	SCCC steelhead	Cedar Creek	
Santa Clara	230294	SCCC steelhead	Pacheco Creek	
Santa Clara	230294	SCCC steelhead	Uvas Creek	
Santa Clara	230457	CCC steelhead	Coyote Creek (Santa Clara)	
Santa Clara	240117	CCC steelhead	Coyote Creek (Santa Clara)	
Santa Clara	240119	CCC steelhead	Coyote Creek (Santa Clara)	
Santa Clara	240119	CCC steelhead	Stevens Creek	
Santa Clara	240159	CCC steelhead	Coyote Creek (Santa Clara)	
Santa Clara	240374	CCC steelhead	Upper Penitencia Creek	
Santa Clara	240375	CCC steelhead	Coyote Creek (Santa Clara)	
Santa Clara	240377	CCC steelhead	Stevens Creek	
Santa Clara	240385	SCCC steelhead	Uvas Creek	
Santa Clara	240463	CCC steelhead	Coyote Creek (Santa Clara)	
Santa Clara	240466	CCC steelhead	Coyote Creek (Santa Clara)	
Santa Clara	240466	CCC steelhead	Guadulpe River	
Santa Clara	240466	CCC steelhead	San Francisquito Creek	
Santa Clara	240466	CCC steelhead	Stevens Creek	
Santa Clara	240481	CCC steelhead	Guadulpe River	
Santa Clara	240484	CCC steelhead	Coyote Creek (Santa Clara)	
Santa Clara	240485	SCCC steelhead	Llagas Creek	
Santa Clara	240492	SCCC steelhead	Uvas Creek	
Santa Clara	240513	CCC steelhead	Stevens Creek	
Santa Clara	240514	CCC steelhead	Coyote Creek (Santa Clara)	
Santa Clara	240516	CCC steelhead	Upper Penitencia Creek	
Santa Clara	240517	CCC steelhead	Guadulpe River	
Santa Clara	240518	CCC steelhead	Stevens Creek	
Santa Clara	240671	CCC steelhead	Coyote Creek (Santa Clara)	
Total ProjectsSanta Clara County				**29**
Sonoma	240737	CC Chinook	Middle Reach of Mainstem	
Sonoma	240737	CCC steelhead	Foss Creek	
Sonoma	240737	CCC steelhead	Mainstem near Healdsburg	
Sonoma	98147	CCC steelhead	Lynch Creek	
Sonoma	98147	CCC steelhead	Petaluma River	
Total Projects Sonoma County				**2**

TABLE H-4A: PDAs That May Impact Wetlands

County	*PDA*	*Wetland Type*	*Acres*	
Alameda	Alameda: Naval Air Station	Estuarine and Marine Deepwater	845.4709	1
Alameda	Alameda: Naval Air Station	Estuarine and Marine Wetland	8.7624	
Alameda	Alameda: Naval Air Station	Freshwater Emergent Wetland	29.0014	
Alameda	Alameda: Naval Air Station	Freshwater Pond	2.469	
Alameda	Alameda: Northern Waterfront	Estuarine and Marine Deepwater	20.1403	1
Alameda	Dublin: Town Center	Freshwater Pond	0.5898	1
Alameda	Dublin: Transit Center	Freshwater Emergent Wetland	1.2165	1
Alameda	Dublin: Transit Center	Freshwater Forested/Shrub Wetland	0.6726	
Alameda	Dublin: Transit Center	Freshwater Pond	1.9987	
Alameda	Emeryville: Mixed-Use Core	Estuarine and Marine Wetland	0.3094	1
Alameda	Fremont: Centerville	Freshwater Emergent Wetland	18.1372	1
Alameda	Fremont: Centerville	Freshwater Pond	19.8557	
Alameda	Fremont: City Center	Freshwater Emergent Wetland	2.3093	1
Alameda	Fremont: City Center	Freshwater Forested/Shrub Wetland	5.5533	
Alameda	Fremont: City Center	Freshwater Pond	2.0433	
Alameda	Fremont: Irvington District	Freshwater Emergent Wetland	0.3941	
Alameda	Fremont: Irvington District	Freshwater Forested/Shrub Wetland	0.0701	1
Alameda	Fremont: Irvington District	Freshwater Pond	0.0387	
Alameda	Fremont: South Fremont/Warm Springs	Freshwater Emergent Wetland	14.622	1
Alameda	Fremont: South Fremont/Warm Springs	Freshwater Pond	0.2664	
Alameda	Livermore: Isabel Avenue/BART Station Planning Area	Freshwater Emergent Wetland	5.8496	1
Alameda	Livermore: Vasco Road Station Planning Area	Freshwater Emergent Wetland	1.9668	1
Alameda	Livermore: Vasco Road Station Planning Area	Other	0.332	
Alameda	Newark: Dumbarton Transit Oriented Development	Estuarine and Marine Deepwater	1.1334	1
Alameda	Newark: Dumbarton Transit Oriented Development	Estuarine and Marine Wetland	0.3402	
Alameda	Newark: Dumbarton Transit Oriented Development	Freshwater Emergent Wetland	36.3665	
Alameda	Newark: Dumbarton Transit Oriented Development	Freshwater Pond	3.5145	
Alameda	Newark: Dumbarton Transit Oriented Development	Lake	4.9691	
Alameda	Newark: Dumbarton Transit Oriented Development	Other	5.0643	
Alameda	Oakland: Coliseum BART Station Area	Estuarine and Marine Wetland	9.0975	1
Alameda	Oakland: Downtown & Jack London Square	Estuarine and Marine Deepwater	54.8929	1
Alameda	Oakland: Transit Oriented Development Corridors	Estuarine and Marine Deepwater	45.8795	1
Alameda	Oakland: Transit Oriented Development Corridors	Estuarine and Marine Wetland	4.3622	
Alameda	Oakland: Transit Oriented Development Corridors	Freshwater Emergent Wetland	28.025	
Alameda	Oakland: Transit Oriented Development Corridors	Freshwater Forested/Shrub Wetland	2.6363	
Alameda	Oakland: Transit Oriented Development Corridors	Freshwater Pond	6.8821	
Alameda	Oakland: Transit Oriented Development Corridors	Lake	142.075	
Alameda	Oakland: West Oakland	Freshwater Emergent Wetland	0.5743	1
Alameda	Pleasanton: Hacienda	Other	2.9384	1
Alameda	San Leandro: Bay Fair BART Transit Village	Freshwater Pond	0.1092	1
Alameda	San Leandro: Downtown Transit Oriented Development	Freshwater Forested/Shrub Wetland	7.2038	1
Alameda	San Leandro: East 14th Street	Freshwater Forested/Shrub Wetland	0.5178	1
		Total Alameda County	**1338.652**	
Contra Costa	Antioch: Hillcrest eBART Station	Freshwater Emergent Wetland	1.7332	1
Contra Costa	Antioch: Hillcrest eBART Station	Freshwater Pond	1.1603	
Contra Costa	Antioch: Rivertown Waterfront	Freshwater Emergent Wetland	19.0493	1
Contra Costa	Antioch: Rivertown Waterfront	Freshwater Forested/Shrub Wetland	7.7776	
Contra Costa	Antioch: Rivertown Waterfront	Freshwater Pond	2.7991	
Contra Costa	Antioch: Rivertown Waterfront	Lake	1.4771	
Contra Costa	Antioch: Rivertown Waterfront	Other	1.5956	
Contra Costa	Antioch: Rivertown Waterfront	Riverine	17.6942	
Contra Costa	Concord: Community Reuse Area	Freshwater Forested/Shrub Wetland	0.5708	1
Contra Costa	Concord: Community Reuse Area	Freshwater Pond	5.1158	
Contra Costa	Concord: Downtown BART Station Planning	Freshwater Pond	7.5464	1
Contra Costa	Contra Costa County Unincorporated: North Richmond	Estuarine and Marine Wetland	18.0004	
Contra Costa	Contra Costa County Unincorporated: North Richmond	Freshwater Pond	49.7911	1
Contra Costa	Contra Costa County Unincorporated: North Richmond	Lake	0.0014	
Contra Costa	Contra Costa County Unincorporated: North Richmond	Other	0.1141	
Contra Costa	Contra Costa County Unincorporated: Pittsburg/Bay Point BART Stat	Freshwater Emergent Wetland	1.7485	1
Contra Costa	Danville: Downtown Danville	Freshwater Forested/Shrub Wetland	9.4165	1
Contra Costa	Hercules: Central Hercules	Freshwater Emergent Wetland	1.0677	1
Contra Costa	Hercules: Central Hercules	Freshwater Forested/Shrub Wetland	0.5639	
Contra Costa	Hercules: Central Hercules	Freshwater Pond	0.8106	
Contra Costa	Hercules: Waterfront District	Freshwater Emergent Wetland	0.9821	1
Contra Costa	Hercules: Waterfront District	Freshwater Forested/Shrub Wetland	0.6001	
Contra Costa	Hercules: Waterfront District	Freshwater Pond	3.3578	
Contra Costa	Martinez: Downtown	Estuarine and Marine Wetland	0.527	1
Contra Costa	Moraga: Moraga Center	Freshwater Forested/Shrub Wetland	12.6387	1
Contra Costa	Oakley: Downtown	Freshwater Emergent Wetland	0.021	1
Contra Costa	Oakley: Downtown	Freshwater Pond	0.1793	
Contra Costa	Oakley: Employment Area	Freshwater Emergent Wetland	54.2464	1
Contra Costa	Oakley: Employment Area	Freshwater Forested/Shrub Wetland	7.7655	
Contra Costa	Oakley: Employment Area	Freshwater Pond	4.5554	
Contra Costa	Oakley: Employment Area	Riverine	33.2872	
Contra Costa	Oakley: Potential Planning Area	Freshwater Emergent Wetland	0.7506	1
Contra Costa	Pittsburg: Downtown	Estuarine and Marine Deepwater	16.7759	1
Contra Costa	Pittsburg: Downtown	Freshwater Pond	12.6946	
Contra Costa	Richmond: South Richmond	Estuarine and Marine Deepwater	12.7286	1
Contra Costa	Richmond: South Richmond	Estuarine and Marine Wetland	52.6161	
Contra Costa	Richmond: South Richmond	Freshwater Pond	6.0991	
Contra Costa	San Ramon: City Center	Freshwater Pond	8.0101	1

TABLE H-4A: PDAs That May Impact Wetlands

County	*PDA*	*Wetland Type*	*Acres*	
Contra Costa	SUB-AREA: West Contra Costa Transportation Advisory Committee: !	Freshwater Forested/Shrub Wetland	0.1096	1
		Total Conta Costa County	**375.9787**	
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Estuarine and Marine Wetland	45.7754	1
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Freshwater Emergent Wetland	3.9849	
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Freshwater Forested/Shrub Wetland	4.7533	
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Freshwater Pond	2.5916	
Marin	San Rafael: Civic Center/North Rafael Town Center	Estuarine and Marine Wetland	4.6135	1
Marin	San Rafael: Civic Center/North Rafael Town Center	Freshwater Emergent Wetland	0.3335	
Marin	San Rafael: Civic Center/North Rafael Town Center	Freshwater Pond	10.0992	
Marin	San Rafael: Downtown	Estuarine and Marine Deepwater	3.0099	1
		Total Marin County	**75.1613**	
Napa	Napa: Downtown Napa	Riverine	0.4324	1
Napa	Napa: Soscol Gateway Corridor	Freshwater Emergent Wetland	13.5783	1
Napa	Napa: Soscol Gateway Corridor	Riverine	2.3058	
		Total Napa County	**16.3165**	
San Francisco	San Francisco/San Mateo Bi-County Area (with City of Brisbane)	Estuarine and Marine Wetland	1.6802	1
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Estuarine and Marine Deepwater	8.4426	1
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Estuarine and Marine Wetland	1.5268	
San Francisco	San Francisco: Bayview/Hunters Point Shipyard/Candlestick Point	Other	0.1094	
San Francisco	San Francisco: Downtown-Van Ness-Geary	Estuarine and Marine Deepwater	0.0444	1
San Francisco	San Francisco: Eastern Neighborhoods	Estuarine and Marine Deepwater	5.406	1
San Francisco	San Francisco: Eastern Neighborhoods	Estuarine and Marine Wetland	0.8193	
San Francisco	San Francisco: Mission Bay	Estuarine and Marine Deepwater	3.8552	1
San Francisco	San Francisco: Port of San Francisco	Estuarine and Marine Deepwater	64.6194	1
San Francisco	San Francisco: Port of San Francisco	Estuarine and Marine Wetland	1.7246	
		Total San Francisco County	**88.2279**	
San Mateo	Daly City: Mission Boulevard	Freshwater Forested/Shrub Wetland	0.66	1
San Mateo	Daly City: Mission Boulevard	Freshwater Pond	0.0893	
San Mateo	East Palo Alto: Ravenswood	Estuarine and Marine Deepwater	0.0487	1
San Mateo	East Palo Alto: Ravenswood	Estuarine and Marine Wetland	27.9677	
San Mateo	East Palo Alto: Ravenswood	Freshwater Emergent Wetland	2.3556	
San Mateo	East Palo Alto: Ravenswood	Lake	2.5536	
San Mateo	Redwood City: Veterans Corridor	Estuarine and Marine Deepwater	2.9961	1
San Mateo	Redwood City: Veterans Corridor	Estuarine and Marine Wetland	2.5359	
San Mateo	San Bruno: Transit Corridors	Freshwater Emergent Wetland	0.1564	1
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	Estuarine and Marine Deepwater	101.4467	1
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	Estuarine and Marine Wetland	10.7435	
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	Freshwater Emergent Wetland	5.8463	
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)	Freshwater Pond	0.7107	
San Mateo	San Mateo: Rail Corridor	Freshwater Pond	0.6353	1
San Mateo	SUB-AREA: CCAG/Colma	Freshwater Pond	2.3069	1
San Mateo	SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Downtov	Freshwater Pond	0.3632	1
San Mateo	SUB-AREA: CCAG/Millbrae: Transit Station Area	Freshwater Emergent Wetland	1.9417	1
San Mateo	SUB-AREA: CCAG/Redwood City: Downtown	Freshwater Emergent Wetland	3.6178	1
San Mateo	SUB-AREA: CCAG/San Carlos: Railroad Corridor	Estuarine and Marine Wetland	0.0255	1
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown	Freshwater Pond	0.5314	1
		Total San Mateo County	**167.5323**	
Santa Clara	Campbell: VTA City Cores, Corridors & Station Areas	Freshwater Pond	0.5289	1
Santa Clara	Campbell: VTA City Cores, Corridors & Station Areas	Other	4.8219	
Santa Clara	Cupertino: VTA City Cores, Corridors & Station Areas	Freshwater Pond	1.4856	1
Santa Clara	Los Gatos: VTA City Cores, Corridors & Station Areas	Freshwater Forested/Shrub Wetland	1.0323	
Santa Clara	Los Gatos: VTA City Cores, Corridors & Station Areas	Freshwater Pond	0.0067	
Santa Clara	Los Gatos: VTA City Cores, Corridors & Station Areas	Riverine	0.0669	
Santa Clara	Morgan Hill: Downtown	Freshwater Emergent Wetland	0.1633	1
Santa Clara	Morgan Hill: Downtown	Riverine	0.2932	
Santa Clara	Mountain View: Downtown	Freshwater Pond	0.1805	1
Santa Clara	Mountain View: El Camino Real Corridor	Freshwater Pond	0.6203	1
Santa Clara	Mountain View: North Bayshore	Estuarine and Marine Deepwater	0.3728	1
Santa Clara	Mountain View: North Bayshore	Freshwater Emergent Wetland	2.8614	
Santa Clara	Mountain View: North Bayshore	Freshwater Pond	0.2908	
Santa Clara	Mountain View: North Bayshore	Other	7.804	
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	Freshwater Pond	0.1469	1
Santa Clara	San Jose: Berryessa Station	Freshwater Forested/Shrub Wetland	13.4713	1
Santa Clara	San Jose: Cottle Transit Village	Freshwater Pond	1.8632	1
Santa Clara	San Jose: Downtown "Frame"	Freshwater Forested/Shrub Wetland	0.9365	1
Santa Clara	San Jose: East Santa Clara/Alum Rock Corridor	Freshwater Forested/Shrub Wetland	18.0495	1
Santa Clara	San Jose: North San Jose	Estuarine and Marine Deepwater	9.0709	1
Santa Clara	San Jose: North San Jose	Estuarine and Marine Wetland	7.5203	
Santa Clara	San Jose: North San Jose	Freshwater Emergent Wetland	30.7598	
Santa Clara	San Jose: North San Jose	Freshwater Forested/Shrub Wetland	85.8384	
Santa Clara	San Jose: North San Jose	Freshwater Pond	4.1082	
Santa Clara	San Jose: North San Jose	Other	9.9539	
Santa Clara	San Jose: Oakridge/Almaden Plaza Urban Village	Freshwater Pond	0.0339	1
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Freshwater Emergent Wetland	2.0867	1
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Freshwater Forested/Shrub Wetland	6.4472	
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Lake	4.7034	
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Riverine	3.678	
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	Estuarine and Marine Deepwater	3.5909	
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	Estuarine and Marine Wetland	3.7007	1
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	Freshwater Pond	1.4591	
Santa Clara	Sunnyvale: East Sunnyvale ITR	Freshwater Emergent Wetland	1.4682	1

TABLE H-4A: PDAs That May Impact Wetlands

County	*PDA*	*Wetland Type*	*Acres*	
Santa Clara	Sunnyvale: East Sunnyvale ITR	Freshwater Pond	1.2966	
Santa Clara	Sunnyvale: East Sunnyvale ITR	Other	10.5236	
Santa Clara	Sunnyvale: El Camino Real Corridor	Freshwater Pond	4.0923	1
Santa Clara	Sunnyvale: VTA City Cores, Corridors & Station Areas	Estuarine and Marine Wetland	0.1013	1
Santa Clara	Sunnyvale: VTA City Cores, Corridors & Station Areas	Freshwater Emergent Wetland	2.5192	
		Total Santa Clara County	**247.9486**	
Solano	Benicia: Downtown	Estuarine and Marine Wetland	3.0683	1
Solano	Benicia: Northern Gateway	Estuarine and Marine Wetland	23.5016	1
Solano	Benicia: Northern Gateway	Freshwater Emergent Wetland	61.3953	
Solano	Benicia: Northern Gateway	Freshwater Forested/Shrub Wetland	0.6476	
Solano	Benicia: Northern Gateway	Freshwater Pond	13.5363	
Solano	Benicia: Northern Gateway	Other	2.417	
Solano	Fairfield: Downtown South (Jefferson Street)	Freshwater Emergent Wetland	17.3668	1
Solano	Fairfield: Fairfield-Vacaville Train Station	Freshwater Emergent Wetland	5.0102	1
Solano	Fairfield: Fairfield-Vacaville Train Station	Freshwater Pond	3.812	
Solano	Fairfield: North Texas Street Core	Freshwater Pond	0.1197	1
Solano	Suisun City: Downtown & Waterfront	Estuarine and Marine Deepwater	9.0809	1
Solano	Suisun City: Downtown & Waterfront	Estuarine and Marine Wetland	7.1492	
Solano	Suisun City: Downtown & Waterfront	Freshwater Emergent Wetland	4.5236	
Solano	Vallejo: Waterfront & Downtown	Estuarine and Marine Deepwater	21.3592	1
Solano	Vallejo: Waterfront & Downtown	Estuarine and Marine Wetland	0.2819	
Solano	Vallejo: Waterfront & Downtown	Freshwater Emergent Wetland	9.1828	
		Total Solano County	**182.4524**	
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	Estuarine and Marine Deepwater	51.3975	1
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	Freshwater Pond	0.8756	
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	Riverine	3.9	
Sonoma	Rohnert Park: Sonoma Mountain Village	Freshwater Pond	0.3719	1
		Total Sonoma County	**56.545**	88

TABLE H-4B: TIP LINEAR PROJECTS THAT MAY IMPACT WETLANDS

County	*RTP_ID*	*Wetland Type*	*Road Length (mi)*
Alameda	21131	Estuarine and Marine Deepwater	0.02
Alameda	22009	Estuarine and Marine Deepwater	0.14
Alameda	22509	Estuarine and Marine Deepwater	15.22
Alameda	22780	Estuarine and Marine Deepwater	3.34
Alameda	240018	Estuarine and Marine Deepwater	0.53
Alameda	240077	Estuarine and Marine Deepwater	0.06
Alameda	240207	Estuarine and Marine Deepwater	0.14
Alameda	98207	Estuarine and Marine Deepwater	0.41
Alameda	22009	Estuarine and Marine Wetland	1.95
Alameda	22509	Estuarine and Marine Wetland	0.04
Alameda	22780	Estuarine and Marine Wetland	0.09
Alameda	230054	Estuarine and Marine Wetland	0.03
Alameda	230101	Estuarine and Marine Wetland	0.00
Alameda	240018	Estuarine and Marine Wetland	0.78
Alameda	240051	Estuarine and Marine Wetland	0.03
Alameda	21132	Freshwater Emergent Wetland	0.08
Alameda	22009	Freshwater Emergent Wetland	1.95
Alameda	240018	Freshwater Emergent Wetland	0.12
Alameda	240272	Freshwater Emergent Wetland	0.13
Alameda	94506	Freshwater Emergent Wetland	0.04
Alameda	21132	Freshwater Forested/Shrub Wetland	0.17
Alameda	22455	Freshwater Forested/Shrub Wetland	0.01
Alameda	21132	Lake	0.09
Alameda	22009	Lake	0.06
Alameda	240018	Lake	2.06
Alameda	240018	Other	0.65
Alameda	240272	Other	0.13
Alameda	22776	Riverine	0.01
		Total Alameda County	28.27
Bay Area Region/Multi-County	21012	Estuarine and Marine Deepwater	0.99
Bay Area Region/Multi-County	21013	Estuarine and Marine Deepwater	10.56
Bay Area Region/Multi-County	21320	Estuarine and Marine Deepwater	0.99
Bay Area Region/Multi-County	22001	Estuarine and Marine Deepwater	0.02
Bay Area Region/Multi-County	22511	Estuarine and Marine Deepwater	6.89
Bay Area Region/Multi-County	22636	Estuarine and Marine Deepwater	3.16
Bay Area Region/Multi-County	230221	Estuarine and Marine Deepwater	0.33
Bay Area Region/Multi-County	230612	Estuarine and Marine Deepwater	49.56
Bay Area Region/Multi-County	230658	Estuarine and Marine Deepwater	0.01
Bay Area Region/Multi-County	230712	Estuarine and Marine Deepwater	0.98
Bay Area Region/Multi-County	21013	Estuarine and Marine Wetland	6.34
Bay Area Region/Multi-County	22001	Estuarine and Marine Wetland	1.69
Bay Area Region/Multi-County	22511	Estuarine and Marine Wetland	0.03
Bay Area Region/Multi-County	230668	Estuarine and Marine Wetland	0.03
Bay Area Region/Multi-County	230685	Estuarine and Marine Wetland	0.04
Bay Area Region/Multi-County	240587	Estuarine and Marine Wetland	0.04
Bay Area Region/Multi-County	240588	Estuarine and Marine Wetland	0.04
Bay Area Region/Multi-County	22001	Freshwater Emergent Wetland	2.12
Bay Area Region/Multi-County	230668	Freshwater Emergent Wetland	0.05
Bay Area Region/Multi-County	240587	Freshwater Emergent Wetland	0.06
Bay Area Region/Multi-County	22001	Freshwater Forested/Shrub Wetland	0.11
Bay Area Region/Multi-County	22001	Freshwater Pond	0.09
Bay Area Region/Multi-County	21013	Lake	0.22

TABLE H-4B: TIP LINEAR PROJECTS THAT MAY IMPACT WETLANDS

County	*RTP_ID*	*Wetland Type*	*Road Length (mi)*
Bay Area Region/Multi-County	21013	Other	0.81
Bay Area Region/Multi-County	22001	Other	1.27
Bay Area Region/Multi-County	230673	Other	0.15
Bay Area Region/Multi-County	21013	Riverine	0.68
Bay Area Region/Multi-County	22001	Riverine	0.03
Bay Area Region/Multi-County	230612	Riverine	1.37
Bay Area Region/Multi-County	240583	Riverine	0.01
		Total Bay Area/Multi County	**88.70**
Contra Costa	22122	Estuarine and Marine Deepwater	8.64
Contra Costa	230613	Estuarine and Marine Deepwater	22.42
Contra Costa	230613	Estuarine and Marine Wetland	0.31
Contra Costa	22400	Freshwater Emergent Wetland	0.01
Contra Costa	22604	Freshwater Emergent Wetland	0.01
Contra Costa	230216	Freshwater Emergent Wetland	0.06
Contra Costa	98194	Freshwater Emergent Wetland	0.02
Contra Costa	22400	Riverine	0.05
		Total Contra Costa County	**31.52**
Marin	21325	Estuarine and Marine Deepwater	0.09
Marin	240552	Estuarine and Marine Wetland	0.03
		Total Marin County	**0.12**
Napa	240617	Estuarine and Marine Wetland	0.50
Napa	240617	Freshwater Emergent Wetland	0.09
Napa	240617	Riverine	0.02
		Total Napa County	**0.61**
San Francisco	21549	Estuarine and Marine Deepwater	0.06
San Francisco	22512	Estuarine and Marine Deepwater	1.85
San Francisco	240147	Estuarine and Marine Wetland	0.14
		Total San Francisco County	**2.05**
San Mateo	21613	Estuarine and Marine Deepwater	0.06
San Mateo	22120	Estuarine and Marine Deepwater	21.18
San Mateo	22726	Estuarine and Marine Deepwater	13.40
San Mateo	230428	Estuarine and Marine Deepwater	0.03
San Mateo	22120	Estuarine and Marine Wetland	1.72
San Mateo	230592	Estuarine and Marine Wetland	0.07
San Mateo	240060	Estuarine and Marine Wetland	0.07
San Mateo	240114	Freshwater Emergent Wetland	0.02
San Mateo	240114	Freshwater Forested/Shrub Wetland	0.03
San Mateo	21613	Lake	0.02
		Total San Mateo County	**36.60**
Santa Clara	240466	Estuarine and Marine Deepwater	0.02
Santa Clara	240481	Estuarine and Marine Deepwater	0.03
Santa Clara	240481	Estuarine and Marine Wetland	0.05
Santa Clara	230294	Freshwater Emergent Wetland	0.02
Santa Clara	240439	Freshwater Emergent Wetland	0.13
Santa Clara	240466	Freshwater Emergent Wetland	0.00
Santa Clara	240481	Freshwater Emergent Wetland	0.41
Santa Clara	22932	Freshwater Forested/Shrub Wetland	0.01
Santa Clara	22944	Freshwater Forested/Shrub Wetland	0.10
Santa Clara	230267	Freshwater Forested/Shrub Wetland	0.13
Santa Clara	230294	Freshwater Forested/Shrub Wetland	0.30
Santa Clara	230457	Freshwater Forested/Shrub Wetland	0.03
Santa Clara	240117	Freshwater Forested/Shrub Wetland	0.04

TABLE H-4C: TIP POINT PROJECTS THAT MAY IMPACT WETLANDS			
County	*RTP_ID*	*Wetland Type*	
Alameda	240226	Estuarine and Marine Wetland	
Alameda	240175	Freshwater Emergent Wetland	
Alameda	240101	Estuarine and Marine Deepwater	
Alameda	240324	Estuarine and Marine Deepwater	
Alameda	240100	Estuarine and Marine Deepwater	
Total Projects Alameda County			**5**
Bay Area Region/Multi-County	22006	Estuarine and Marine Deepwater	
Bay Area Region/Multi-County	230581	Estuarine and Marine Deepwater	
Bay Area Region/Multi-County	230581	Estuarine and Marine Deepwater	
Bay Area Region/Multi-County	230581	Estuarine and Marine Deepwater	
Bay Area Region/Multi-County	230581	Estuarine and Marine Deepwater	
Total Projects Multi County			**2**
San Francisco	240487	Estuarine and Marine Deepwater	
San Francisco	240487	Estuarine and Marine Deepwater	
Total Projects Alameda County			**1**
Santa Clara	240498	Freshwater Forested/Shrub Wetland	
Santa Clara	240671	Freshwater Forested/Shrub Wetland	
Total Projects Alameda County			**2**

TABLE H-4D: TIP POLYGON PROJECT

County	*RTP_ID*	*Wetland Type*	*Acres*
San Francisco	240400	Estuarine and Marine Deepwater	1.54
San Francisco	240728	Estuarine and Marine Deepwater	540.83
San Francisco	240728	Estuarine and Marine Wetland	3.29
		Total	**545.66**

TABLE H-5A: PDAs That May Impact Other Waters of the U.S.

County	*PDA*	*Stream name*	*Length (mi)*
Alameda	Alameda County Unincorporated: Castro Valley BART		0.6315
Alameda	Alameda County Unincorporated: Hesperian Corridor	San Lorenzo Creek	0.2636
Alameda	Albany: San Pablo Avenue & Solano Avenue	Codornices Creek	0.0366
Alameda	Dublin: Downtown Specific Plan Area		0.6342
Alameda	Dublin: Town Center		1.8231
Alameda	Dublin: Town Center	Tassajara Creek	0.4829
Alameda	Dublin: Transit Center		2.4971
Alameda	East 14th Street and Mission Boulevard Mixed Use Corridor		0.3041
Alameda	East 14th Street and Mission Boulevard Mixed Use Corridor	San Lorenzo Creek	1.0685
Alameda	Fremont: Centerville		0.9671
Alameda	Fremont: Centerville	Coyote Hills Slough	0.6028
Alameda	Fremont: City Center		0.6437
Alameda	Fremont: Irvington District		2.8814
Alameda	Fremont: South Fremont/Warm Springs		0.5776
Alameda	Fremont: South Fremont/Warm Springs	Agua Caliente Creek	1.0265
Alameda	Fremont: South Fremont/Warm Springs	Agua Fria Creek	0.4818
Alameda	Fremont: South Fremont/Warm Springs	Aliso, Cañada Del	0.3454
Alameda	Fremont: South Fremont/Warm Springs	Scott Creek	0.4226
Alameda	Fremont: South Fremont/Warm Springs	Toroges Creek	0.3533
Alameda	Hayward: Downtown		0.3426
Alameda	Hayward: Downtown	San Lorenzo Creek	0.5413
Alameda	Hayward: Mission Corridor		0.0764
Alameda	Hayward: Mission Corridor	Ward Creek	0.7119
Alameda	Hayward: South Hayward BART		0.0861
Alameda	Livermore: Isabel Avenue/BART Station Planning Area		2.6634
Alameda	Livermore: Isabel Avenue/BART Station Planning Area	Positas, Arroyo Las	1.5748
Alameda	Livermore: Vasco Road Station Planning Area		2.4225
Alameda	Livermore: Vasco Road Station Planning Area	Seco, Arroyo	1.5098
Alameda	Newark: Dumbarton Transit Oriented Development		1.4676
Alameda	Oakland: Coliseum BART Station Area		0.8103
Alameda	Oakland: Coliseum BART Station Area	Lion Creek	0.5766
Alameda	Oakland: Coliseum BART Station Area	Viejo, Arroyo	0.8752
Alameda	Oakland: Eastmont Town Center	Viejo, Arroyo	0.0215
Alameda	Oakland: Fruitvale & Dimond Areas		0.2219
Alameda	Oakland: Fruitvale & Dimond Areas	Peralta Creek	0.0444
Alameda	Oakland: Fruitvale & Dimond Areas	Sausal Creek	1.0701
Alameda	Oakland: Transit Oriented Development Corridors		2.1924
Alameda	Oakland: Transit Oriented Development Corridors	Claremont Creek	0.0009
Alameda	Oakland: Transit Oriented Development Corridors	Glen Echo Creek	0.7335
Alameda	Oakland: Transit Oriented Development Corridors	Peralta Creek	0.7682
Alameda	Oakland: Transit Oriented Development Corridors	San Leandro Creek	0.0358
Alameda	Oakland: Transit Oriented Development Corridors	Sausal Creek	0.5306
Alameda	Oakland: Transit Oriented Development Corridors	Viejo, Arroyo	0.6772
Alameda	Pleasanton: Hacienda		2.2721
Alameda	Pleasanton: Hacienda	Arroyo Mocho	0.6029
Alameda	Pleasanton: Hacienda	Tassajara Creek	1.1226
Alameda	San Leandro: Bay Fair BART Transit Village		0.7712
Alameda	San Leandro: Downtown Transit Oriented Development	San Leandro Creek	0.9973
Alameda	San Leandro: East 14th Street	San Leandro Creek	0.0733
Alameda	Union City: Intermodal Station District		0.3889
		Total Alameda County	**42.2271**
Contra Costa	Antioch: Hillcrest eBART Station		1.649
Contra Costa	Antioch: Rivertown Waterfront		1.2991
Contra Costa	Concord: Community Reuse Area		4.0363
Contra Costa	Concord: Community Reuse Area	Clayton Canal	0.4007
Contra Costa	Concord: Community Reuse Area	Mount Diablo Creek	5.1609
Contra Costa	Concord: Downtown BART Station Planning	Pine Creek	0.0716
Contra Costa	Contra Costa County Unincorporated: Contra Costa Centre	Walnut Creek	0.0158
Contra Costa	Contra Costa County Unincorporated: Downtown El Sobrante		1.0415

TABLE H-5A: PDAs That May Impact Other Waters of the U.S.

County	*PDA*	*Stream name*	*Length (mi)*
Contra Costa	Contra Costa County Unincorporated: Downtown El Sobrante	San Pablo Creek	0.3873
Contra Costa	Contra Costa County Unincorporated: North Richmond		0.4866
Contra Costa	Contra Costa County Unincorporated: North Richmond	San Pablo Creek	1.3634
Contra Costa	Contra Costa County Unincorporated: North Richmond	Wildcat Creek	1.1906
Contra Costa	Contra Costa County Unincorporated: Pittsburg/Bay Point BART		1.9065
Contra Costa	Danville: Downtown Danville		0.1145
Contra Costa	Danville: Downtown Danville	Green Valley Creek	0.2124
Contra Costa	Danville: Downtown Danville	San Ramon Creek	0.9826
Contra Costa	El Cerrito: San Pablo Avenue Corridor	Cerrito Creek	0.1825
Contra Costa	Hercules: Central Hercules		0.6698
Contra Costa	Hercules: Central Hercules	Refugio Creek	0.2904
Contra Costa	Hercules: Waterfront District		0.7374
Contra Costa	Hercules: Waterfront District	Refugio Creek	0.8564
Contra Costa	Lafayette: Downtown		1.1431
Contra Costa	Lafayette: Downtown	Lafayette Creek	0.9223
Contra Costa	Lafayette: Downtown	Las Trampas Creek	0.0627
Contra Costa	Martinez: Downtown	Hambre, Arroyo del	0.6293
Contra Costa	Moraga: Moraga Center		0.9561
Contra Costa	Oakley: Potential Planning Area	Marsh Creek	0.0462
Contra Costa	Orinda: Downtown		0.2495
Contra Costa	Orinda: Downtown	San Pablo Creek	0.4931
Contra Costa	Pinole: Old Town & San Pablo Avenue	Pinole Creek	0.5543
Contra Costa	Pittsburg: Pittsburg/Bay Point BART Station		0.4857
Contra Costa	Pittsburg: Railroad Avenue eBART Station		1.6072
Contra Costa	Pittsburg: Railroad Avenue eBART Station	Kirker Creek	0.6401
Contra Costa	Pleasant Hill: Buskirk Avenue Corridor		0.6714
Contra Costa	Pleasant Hill: Buskirk Avenue Corridor	Walnut Creek	0.0415
Contra Costa	Pleasant Hill: Diablo Valley College	Grayson Creek	0.2831
Contra Costa	Richmond: South Richmond		1.2155
Contra Costa	San Pablo: San Pablo Avenue		0.0049
Contra Costa	San Pablo: San Pablo Avenue	San Pablo Creek	0.214
Contra Costa	San Pablo: San Pablo Avenue	Wildcat Creek	0.5874
Contra Costa	San Ramon: City Center		0.2552
Contra Costa	San Ramon: City Center	South San Ramon Creek	0.6423
Contra Costa	SUB-AREA: West Contra Costa Transportation Advisory Committ		0.0736
Contra Costa	SUB-AREA: West Contra Costa Transportation Advisory Committ	Garrity Creek	0.018
Contra Costa	SUB-AREA: West Contra Costa Transportation Advisory Committ	Rodeo Creek	0.2679
		Total Contra Costa County	**35.1197**
Marin	Marin County Unincorporated: Urbanized 101 Corridor		0.7413
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Coyote Creek	0.2946
Marin	Marin County Unincorporated: Urbanized 101 Corridor	Miller Creek	0.4552
Marin	San Rafael: Civic Center/North Rafael Town Center		0.984
Marin	San Rafael: Civic Center/North Rafael Town Center	South Fork Gallinas Creek	0.1233
Marin	San Rafael: Downtown		0.548
Marin	San Rafael: Downtown	San Rafael Creek	0.6164
		Total Marin County	**3.7628**
Napa	American Canyon: Highway 29 Corridor	American Canyon Creek	0.0266
Napa	American Canyon: Highway 29 Corridor	North Slough	0.0127
Napa	Napa: Downtown Napa		0.0165
Napa	Napa: Downtown Napa	Napa Creek	0.1817
Napa	Napa: Downtown Napa	Napa River	0.0027
Napa	Napa: Soscol Gateway Corridor		0.074
Napa	Napa: Soscol Gateway Corridor	Napa River	0.0177
Napa	Napa: Soscol Gateway Corridor	Tulucay Creek	0.1119
		Total Napa County	**0.4438**
San Mateo	Belmont: Villages of Belmont	Belmont Creek	0.1291
San Mateo	Burlingame: Burlingame El Camino Real		0.1112
San Mateo	Burlingame: Burlingame El Camino Real	Easton Creek	0.4932
San Mateo	Burlingame: Burlingame El Camino Real	Mills Creek	0.4842

TABLE H-5A: PDAs That May Impact Other Waters of the U.S.

County	*PDA*	*Stream name*	*Length (mi)*
San Mateo	Burlingame: Burlingame El Camino Real	Sanchez Creek	0.4587
San Mateo	East Palo Alto: Ravenswood		0.364
San Mateo	East Palo Alto: Ravenswood	San Francisco Bay	0.0003
San Mateo	Millbrae: Transit Station Area		0.3822
San Mateo	Redwood City: Downtown		0.4651
San Mateo	Redwood City: Downtown	Ojo De Agua, Arroyo	0.3984
San Mateo	Redwood City: Veterans Corridor		0.3555
San Mateo	San Bruno: Transit Corridors		0.7195
San Mateo	San Francisco/San Mateo Bi-County Area (with San Francisco)		0.5292
San Mateo	San Mateo: Downtown	San Mateo Creek	0.3157
San Mateo	San Mateo: El Camino		0.0316
San Mateo	San Mateo: El Camino	Laurel Creek	0.1555
San Mateo	San Mateo: Rail Corridor		0.3496
San Mateo	SUB-AREA: CCAG/Colma	Colma Creek	0.2558
San Mateo	SUB-AREA: CCAG/Menlo Park: El Camino Real Corridor and Dow	San Francisquito Creek	0.2058
San Mateo	SUB-AREA: CCAG/Millbrae: Transit Station Area		0.3923
San Mateo	SUB-AREA: CCAG/Redwood City: Downtown		0.3911
San Mateo	SUB-AREA: CCAG/Redwood City: Downtown	Cordilleras Creek	0.3049
San Mateo	SUB-AREA: CCAG/Redwood City: Downtown	Ojo De Agua, Arroyo	0.1831
San Mateo	SUB-AREA: CCAG/San Bruno: Transit Corridors		0.1833
San Mateo	SUB-AREA: CCAG/San Carlos: Railroad Corridor		0.2416
San Mateo	SUB-AREA: CCAG/San Carlos: Railroad Corridor	Belmont Creek	0.1523
San Mateo	SUB-AREA: CCAG/San Carlos: Railroad Corridor	Cordilleras Creek	0.21
San Mateo	SUB-AREA: CCAG/San Carlos: Railroad Corridor	Pulgas Creek	0.582
San Mateo	SUB-AREA: CCAG/San Mateo County	Belmont Creek	0.0361
San Mateo	SUB-AREA: CCAG/San Mateo County (North Fair Oaks)		0.9459
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown		0.1684
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown	Laurel Creek	0.2907
San Mateo	SUB-AREA: CCAG/San Mateo: Downtown	San Mateo Creek	0.2136
San Mateo	SUB-AREA: CCAG/South San Francisco		0.1933
San Mateo	SUB-AREA: CCAG/South San Francisco	Colma Creek	1.5858
		Total San Mateo County	**12.279**
Santa Clara	Campbell: Central Redevelopment Area	Gatos Creek, Los	0.208
Santa Clara	Campbell: VTA City Cores, Corridors & Station Areas		0.4806
Santa Clara	Campbell: VTA City Cores, Corridors & Station Areas	Gatos Creek, Los	0.2334
Santa Clara	Cupertino: VTA City Cores, Corridors & Station Areas	Calabazas Creek	0.1947
Santa Clara	Gilroy: Downtown		0.0409
Santa Clara	Gilroy: Downtown	Miller Slough	0.3877
Santa Clara	Gilroy: VTA City Cores, Corridors & Station Areas	Miller Slough	0.2791
Santa Clara	Los Gatos: VTA City Cores, Corridors & Station Areas	Gatos Creek, Los	0.1024
Santa Clara	Milpitas: Transit Area	Penitencia Creek	0.2212
Santa Clara	Milpitas: VTA City Cores, Corridors & Station Areas		0.4635
Santa Clara	Milpitas: VTA City Cores, Corridors & Station Areas	Coches, Arroyo De Los	0.1138
Santa Clara	Morgan Hill: Downtown		0.4958
Santa Clara	Mountain View: Downtown		0.3816
Santa Clara	Mountain View: Downtown	Stevens Creek	0.6597
Santa Clara	Mountain View: El Camino Real Corridor		0.1508
Santa Clara	Mountain View: El Camino Real Corridor	Permanente Creek	0.7289
Santa Clara	Mountain View: El Camino Real Corridor	Stevens Creek	0.5931
Santa Clara	Mountain View: North Bayshore	Mountain View Slough	0.0214
Santa Clara	Mountain View: North Bayshore	Permanente Creek	0.4088
Santa Clara	Mountain View: North Bayshore	Stevens Creek	0.1837
Santa Clara	Mountain View: San Antonio Center		0.6433
Santa Clara	Palo Alto: California Avenue	Matadero Creek	0.1702
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	Adobe Creek	0.0896
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	Barron Creek	0.1868
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	Matadero Creek	0.2404
Santa Clara	Palo Alto: VTA City Cores, Corridors & Station Areas	San Francisquito Creek	0.0405
Santa Clara	San Jose: Berryessa Station	Coyote Creek	0.9223

TABLE H-5A: PDAs That May Impact Other Waters of the U.S.

County	*PDA*	*Stream name*	*Length (mi)*
Santa Clara	San Jose: Berryessa Station	Upper Penitencia Creek	0.9645
Santa Clara	San Jose: Capitol Corridor Urban Villages	Upper Penitencia Creek	0.1956
Santa Clara	San Jose: Communications Hill	Canoas Creek	0.953
Santa Clara	San Jose: Downtown "Frame"	Gatos Creek, Los	0.1182
Santa Clara	San Jose: Downtown "Frame"	Guadalupe River	1.2093
Santa Clara	San Jose: East Santa Clara/Alum Rock Corridor		0.3092
Santa Clara	San Jose: East Santa Clara/Alum Rock Corridor	Coyote Creek	0.7416
Santa Clara	San Jose: East Santa Clara/Alum Rock Corridor	Silver Creek	0.1873
Santa Clara	San Jose: Greater Downtown	Gatos Creek, Los	0.4802
Santa Clara	San Jose: Greater Downtown	Guadalupe River	0.3921
Santa Clara	San Jose: North San Jose		1.5507
Santa Clara	San Jose: North San Jose	Coyote Creek	2.6116
Santa Clara	San Jose: North San Jose	Guadalupe River	2.4313
Santa Clara	San Jose: Stevens Creek TOD Corridor	San Tomas Aquinas Creek	0.1415
Santa Clara	San Jose: Stevens Creek TOD Corridor	Saratoga Creek	0.0674
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas		1.9516
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Canoas Creek	0.2874
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Coyote Creek	0.2994
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Guadalupe River	0.3745
Santa Clara	San Jose: VTA City Cores, Corridors & Station Areas	Silver Creek	0.3264
Santa Clara	San Jose: West San Carlos and Southwest Expressway Corridors	Gatos Creek, Los	0.7345
Santa Clara	Santa Clara: El Camino Real Focus Area	Calabazas Creek	0.1183
Santa Clara	Santa Clara: El Camino Real Focus Area	San Tomas Aquinas Creek	0.0671
Santa Clara	Santa Clara: El Camino Real Focus Area	Saratoga Creek	0.0543
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas		0.0634
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	Guadalupe River	0.2822
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	San Tomas Aquinas Creek	0.1182
Santa Clara	Santa Clara: VTA City Cores, Corridors & Station Areas	Saratoga Creek	0.169
Santa Clara	Saratoga: VTA City Cores, Corridors & Station Areas	Saratoga Creek	0.2081
Santa Clara	Sunnyvale: Lawrence Station Transit Village	Calabazas Creek	0.2303
Santa Clara	Sunnyvale: Tasman Station ITR		0.7248
Santa Clara	Sunnyvale: VTA City Cores, Corridors & Station Areas		0.1203
Santa Clara	Sunnyvale: VTA City Cores, Corridors & Station Areas	Calabazas Creek	0.2233
		Total Santa Clara County	**27.3488**
Solano	Benicia: Northern Gateway		2.4123
Solano	Benicia: Northern Gateway	Goodyear Slough	0.9332
Solano	Benicia: Northern Gateway	Sulphur Springs Creek	1.7805
Solano	Fairfield: Downtown South (Jefferson Street)		0.5613
Solano	Fairfield: Fairfield-Vacaville Train Station		5.5889
Solano	Fairfield: Fairfield-Vacaville Train Station	Union Creek	3.4077
Solano	Fairfield: North Texas Street Core		0.0203
Solano	Fairfield: West Texas Street Gateway		0.0292
Solano	Fairfield: West Texas Street Gateway	Ledgewood Creek	0.2605
Solano	Suisun City: Downtown & Waterfront		0.0923
Solano	Suisun City: Downtown & Waterfront	Laurel Creek	0.4161
Solano	Suisun City: Downtown & Waterfront	Suisun Slough	0.0174
Solano	Vacaville: Allison Area	Ulatis Creek	0.7191
Solano	Vacaville: Downtown	Ulatis Creek	0.4017
		Total Solano County	**16.6405**
Sonoma	Cloverdale: Downtown/SMART Transit Area		1.0363
Sonoma	Cloverdale: Downtown/SMART Transit Area	Porterfield Creek	0.0469
Sonoma	Cloverdale: Downtown/SMART Transit Area	Russian River	0.3487
Sonoma	Cotati: Downtown and Cotati Depot	Laguna de Santa Rosa	0.1495
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	McNear Channel	0.7032
Sonoma	Petaluma: Central, Turning Basin/Lower Reach	Petaluma River	1.8392
Sonoma	Rohnert Park: Central Rohnert Park		0.8229
Sonoma	Rohnert Park: Central Rohnert Park	Copeland Creek	0.7203
Sonoma	Rohnert Park: Central Rohnert Park	Hinebaugh Creek	0.5721
Sonoma	Santa Rosa: North Santa Rosa Station		1.8425

TABLE H-5A: PDAs That May Impact Other Waters of the U.S.

County	*PDA*	*Stream name*	*Length (mi)*
Sonoma	Santa Rosa: Roseland Area		1.3656
Sonoma	Santa Rosa: Roseland Area	Colgan Creek Flood Control Channel	2.0632
Sonoma	Santa Rosa: SUB-AREA: Downtown Station Area	Matanzas Creek	0.0804
Sonoma	Santa Rosa: SUB-AREA: Downtown Station Area	Santa Rosa Creek	1.2103
Sonoma	Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue		1.1207
Sonoma	Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue	Colgan Creek Flood Control Channel	0.5085
Sonoma	Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue	Matanzas Creek	0.1405
Sonoma	Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue	Santa Rosa Creek	0.0282
Sonoma	Santa Rosa: SUB-AREA: Sebastopol Road Corridor		0.1138
Sonoma	Sebastopol: Nexus Area	Laguna de Santa Rosa	0.4139
Sonoma	Windsor: Redevelopment Area		1.0935
Sonoma	Windsor: Redevelopment Area	Windsor Creek	0.5056
		Total Sonoma County	**16.7258**

TABLE H-5B: LINEAR TIP PROJECTS THAT MAY IMPACT OTHER WATERS OF THE U.S.

County	*RTP_ID*	
Alameda	21116	
Alameda	21131	
Alameda	21132	
Alameda	21473	
Alameda	21484	
Alameda	22009	
Alameda	22013	
Alameda	22063	
Alameda	22455	
Alameda	22455	
Alameda	22509	
Alameda	22664	
Alameda	22670	
Alameda	22776	
Alameda	22780	
Alameda	230052	
Alameda	230054	
Alameda	230083	
Alameda	230101	
Alameda	230114	
Alameda	230157	
Alameda	240018	
Alameda	240050	
Alameda	240051	
Alameda	240062	
Alameda	240076	
Alameda	240094	
Alameda	240196	
Alameda	240200	
Alameda	240202	
Alameda	240264	
Alameda	240272	
Alameda	240683	
Alameda	94506	
Alameda	94506	
Alameda	94506	
Alameda	98207	
Total Projects Alameda County		**34**
Bay Area Region/Multi-County	21012	
Bay Area Region/Multi-County	21013	
Bay Area Region/Multi-County	21013	
Bay Area Region/Multi-County	21013	
Bay Area Region/Multi-County	21013	
Bay Area Region/Multi-County	21013	
Bay Area Region/Multi-County	21013	
Bay Area Region/Multi-County	21013	
Bay Area Region/Multi-County	21320	
Bay Area Region/Multi-County	21627	
Bay Area Region/Multi-County	22001	
Bay Area Region/Multi-County	22042	
Bay Area Region/Multi-County	22511	
Bay Area Region/Multi-County	22636	
Bay Area Region/Multi-County	230088	

TABLE H-5B: LINEAR TIP PROJECTS THAT MAY IMPACT OTHER WATERS OF THE U.S.

County	*RTP_ID*	
Bay Area Region/Multi-County	230221	
Bay Area Region/Multi-County	230222	
Bay Area Region/Multi-County	230612	
Bay Area Region/Multi-County	230627	
Bay Area Region/Multi-County	230656	
Bay Area Region/Multi-County	230657	
Bay Area Region/Multi-County	230658	
Bay Area Region/Multi-County	230659	
Bay Area Region/Multi-County	230660	
Bay Area Region/Multi-County	230666	
Bay Area Region/Multi-County	230668	
Bay Area Region/Multi-County	230673	
Bay Area Region/Multi-County	230685	
Bay Area Region/Multi-County	230686	
Bay Area Region/Multi-County	230712	
Bay Area Region/Multi-County	240059	
Bay Area Region/Multi-County	240061	
Bay Area Region/Multi-County	240581	
Bay Area Region/Multi-County	240583	
Bay Area Region/Multi-County	240587	
Bay Area Region/Multi-County	240588	
Bay Area Region/Multi-County	240736	
Bay Area Region/Multi-County	240736	
Bay Area Region/Multi-County	94152	
Total Projects Multi-County		**32**
Contra Costa	21211	
Contra Costa	22351	
Contra Costa	22353	
Contra Costa	22400	
Contra Costa	22602	
Contra Costa	22604	
Contra Costa	230202	
Contra Costa	230205	
Contra Costa	230216	
Contra Costa	230232	
Contra Costa	230233	
Contra Costa	230236	
Contra Costa	230237	
Contra Costa	230238	
Contra Costa	230250	
Contra Costa	230308	
Contra Costa	230318	
Contra Costa	230535	
Contra Costa	230538	
Contra Costa	230597	
Contra Costa	230613	
Contra Costa	240355	
Contra Costa	240584	
Contra Costa	240629	
Contra Costa	98115	
Contra Costa	98133	
Contra Costa	98134	
Contra Costa	98194	

TABLE H-5B: LINEAR TIP PROJECTS THAT MAY IMPACT OTHER WATERS OF THE U.S.

County	*RTP_ID*	
Contra Costa	98196	
Contra Costa	98999	
Total Projects Contra Costa County		**30**
Marin	21325	
Marin	240691	
Marin	98154	
Total Projects Marin County		**3**
Napa	230392	
Napa	230508	
Napa	230510	
Napa	240057X	
Napa	240617	
Total Projects Napa County		**5**
San Francisco	21549	
San Francisco	240147	
Total Projects San Francisco County		**2**
San Mateo	21604	
San Mateo	21608	
San Mateo	21612	
San Mateo	21613	
San Mateo	21893	
San Mateo	22120	
San Mateo	22271	
San Mateo	22726	
San Mateo	230428	
San Mateo	240026	
San Mateo	240027	
San Mateo	240060	
San Mateo	240060	
San Mateo	240114	
San Mateo	240169	
San Mateo	240590	
San Mateo	94644	
San Mateo	98204	
Total San Mateo County		**17**
Santa Clara	21714	
Santa Clara	21760	
Santa Clara	21922	
Santa Clara	22175	
Santa Clara	22179	
Santa Clara	22186	
Santa Clara	22809	
Santa Clara	22910	
Santa Clara	22932	
Santa Clara	22944	
Santa Clara	22944	
Santa Clara	22956	
Santa Clara	230200	
Santa Clara	230210	
Santa Clara	230235	
Santa Clara	230267	
Santa Clara	230267	
Santa Clara	230273	

TABLE H-5B: LINEAR TIP PROJECTS THAT MAY IMPACT OTHER WATERS OF THE U.S.

County	*RTP_ID*	
Santa Clara	230294	
Santa Clara	230410	
Santa Clara	230449	
Santa Clara	230457	
Santa Clara	230531	
Santa Clara	240117	
Santa Clara	240118	
Santa Clara	240119	
Santa Clara	240159	
Santa Clara	240374	
Santa Clara	240375	
Santa Clara	240377	
Santa Clara	240379	
Santa Clara	240385	
Santa Clara	240404	
Santa Clara	240427	
Santa Clara	240430	
Santa Clara	240439	
Santa Clara	240439	
Santa Clara	240463	
Santa Clara	240464	
Santa Clara	240466	
Santa Clara	240469	
Santa Clara	240477	
Santa Clara	240481	
Santa Clara	240482	
Santa Clara	240484	
Santa Clara	240485	
Santa Clara	240491	
Santa Clara	240492	
Santa Clara	240507	
Santa Clara	240513	
Santa Clara	240514	
Santa Clara	240515	
Santa Clara	240516	
Santa Clara	240517	
Santa Clara	240518	
Santa Clara	240591	
Santa Clara	240636	
Santa Clara	240671	
Santa Clara	98119	
Total Projects Santa Clara County		**56**
Solano	230313	
Solano	230313	
Solano	230313	
Solano	230322	
Solano	230322	
Solano	230468	
Solano	94151	
Total Projects Solano County		**4**
Sonoma	21070	
Sonoma	21902	
Sonoma	22204	

TABLE H-5B: LINEAR TIP PROJECTS THAT MAY IMPACT OTHER WATERS OF THE U.S.

County	*RTP_ID*	
Sonoma	22207	
Sonoma	22655	
Sonoma	22655	
Sonoma	240360	
Sonoma	240366	
Sonoma	240737	
Sonoma	98147	
Sonoma	98147	
Total Projects Sonoma County		**9**

TABLE H-6A: Comparison of Transportation Impacts on Biological Resources by Alternative

County	Alternative 1	Plan Bay Area	Alternative 3	Alternative 4	Alternative 5
*Special-status Species**					
Alameda	90.45	314.38	314.38	314.38	295.94
Bay Area Region/Multi-County	218.06	520.80	512.83	520.80	364.00
Contra Costa	110.26	180.20	180.20	180.20	153.42
Marin	5.58	15.67	15.67	15.67	5.58
Napa	0.00	13.53	13.53	13.53	0.00
San Francisco	20.25	624.63	624.63	624.63	567.42
San Mateo	118.64	410.01	410.01	410.01	269.32
Santa Clara	310.84	534.46	534.46	534.46	456.35
Solano	0.42	21.02	21.02	21.02	0.42
Sonoma	3.76	15.98	15.98	15.98	6.53
Regional Total	**878.26**	**2650.67**	**2642.71**	**2650.67**	**2118.97**
*Critical Habitat**					
Alameda	0.13	0.13	0.13	0.13	0.13
Bay Area Region/Multi-County	31.94	34.27	34.18	34.27	34.18
Contra Costa	23.00	51.05	51.05	51.05	33.46
Marin	0.00	0.00	0.00	0.00	0.00
Napa	0.00	0.69	0.69	0.69	0.00
San Francisco	0.00	0.00	0.00	0.00	0.00
San Mateo	3.24	7.34	7.34	7.34	3.24
Santa Clara	15.31	15.31	15.31	15.31	15.31
Solano	0.00	6.10	6.10	6.10	0.00
Sonoma	5.47	5.47	5.47	5.47	5.47
Regional Total	**79.09**	**120.36**	**120.28**	**120.36**	**91.80**
*Salmonid Critical Habitat***					
Alameda	1	6	6	6	6
Bay Area Region/Multi-County	21	30	30	30	30
Contra Costa	0	4	4	4	4
Marin	0	1	1	1	0
Napa	0	5	5	5	0
San Francisco	0	0	0	0	0
San Mateo	6	11	11	11	9
Santa Clara	24	40	40	40	33
Solano	0	0	0	0	0
Sonoma	0	5	5	5	3
Regional Total	**52**	**102**	**102**	**102**	**85**
*Wetlands**					
Alameda	15.65	28.27	28.27	28.27	27.94
Bay Area Region/Multi-County	88.26	88.70	88.69	88.70	88.26
Contra Costa	0.02	31.52	31.52	31.52	31.45
Marin	0.00	0.12	0.12	0.12	0.03
Napa	0.00	0.61	0.61	0.61	0.00
San Francisco	1.85	2.05	2.05	2.05	1.99
San Mateo	13.55	36.60	36.60	36.60	36.45
Santa Clara	2.09	2.53	2.53	2.53	2.20
Solano	0.00	0.00	0.00	0.00	0.00
Sonoma	0.02	0.10	0.10	0.10	0.02
Regional Total	**121.45**	**190.49**	**190.48**	**190.49**	**188.33**
*Other Waters***					
Alameda	37	91	91	91	74
Bay Area Region/Multi-County	42	165	158	165	78
Contra Costa	33	62	62	62	41
Marin	2	5	5	5	2
Napa	0	16	16	16	0
San Francisco	0	0	0	0	0
San Mateo	23	66	66	66	45
Santa Clara	95	161	161	161	137
Solano	2	12	12	12	2
Sonoma	8	28	28	28	18
Regional Total	**242**	**606**	**599**	**606**	**397**

* Linear miles that transportation projects intersect resource polygons

**Number of transportation projects that intersect streams and rivers

Appendix I: Hazards

TABLE I-1a: PDAs in a Fire Hazard Zone

PDA Name	*Hazard Class*	*Acres*
Concord: Community Reuse Area	High	0.0012
Concord: Community Reuse Area	Moderate	0.0552
Daly City: Mission Boulevard	High	2.1675
Livermore: Isabel Avenue/BART Station Planning Area	High	7.9292
Livermore: Isabel Avenue/BART Station Planning Area	Moderate	29.9468
Livermore: Vasco Road Station Planning Area	High	0.217
Livermore: Vasco Road Station Planning Area	Moderate	13.942
Marin County Unincorporated: Urbanized 101 Corridor	High	4.3194
Marin County Unincorporated: Urbanized 101 Corridor	Moderate	73.1112
Marin County Unincorporated: Urbanized 101 Corridor	Very High	276.1215
San Jose: VTA City Cores, Corridors & Station Areas	High	1.8303
Santa Rosa: SUB-AREA: Mendocino Avenue/Santa Rosa Avenue Corridor	Moderate	50.4707
SUB-AREA: West Contra Costa Transportation Advisory Committee: San Pablo Avenue Corr*	Very High	17.4061

TABLE I-1b: Linear Projects in a Fire Hazard Zone

RTP_ID	*HAZ_CLASS*	*length*
21013	Moderate	0.0405
21070	High	2.0226
21070	Moderate	0.8490
21116	High	0.0375
21473	Moderate	1.6344
21613	High	0.3864
21714	High	0.1061
21893	Moderate	1.0110
21893	Very High	1.6927
21902	Moderate	2.8434
22001	Moderate	3.5592
22013	High	3.3742
22013	Moderate	0.1923
22042	High	1.3140
22042	Moderate	0.6984
22207	Moderate	0.7387
22271	High	0.2954
22271	Moderate	0.2056
22400	Moderate	3.5379
22604	High	2.4712
22604	Moderate	7.4180
22664	High	0.0225
22776	Very High	0.0150
22809	Very High	0.2734
22910	High	0.1455
22910	Moderate	0.3104
22932	High	0.4918
22932	Moderate	3.8061
22932	Very High	1.6313
230221	High	1.2998
230221	Moderate	0.8239
230233	High	1.8678
230291	High	0.5821
230294	High	6.6557
230294	Moderate	9.6990
230307	High	0.1863
230307	Moderate	0.4712
230308	High	8.5454
230510	Moderate	0.0827
230535	High	8.6792
230535	Moderate	4.8456
230535	Very High	0.1059
230538	High	0.9869
230538	Moderate	0.6377
230597	High	1.1460

TABLE I-1b: Linear Projects in a Fire Hazard Zone

RTP_ID	*HAZ_CLASS*	*length*
230597	Moderate	0.8351
230627	High	3.4232
230627	Moderate	2.0617
230657	High	1.2212
230657	Moderate	0.8286
230659	High	2.7049
230660	High	0.0299
230666	High	4.3044
230666	Moderate	4.0866
240050	High	0.0064
240059	High	2.7785
240059	Moderate	0.6927
240061	High	2.7589
240061	Moderate	0.7136
240062	Moderate	3.2006
240094	High	5.4215
240094	Moderate	0.1412
240114	High	0.4952
240114	Moderate	1.1331
240114	Very High	3.0017
240169	High	0.2862
240254	High	0.0661
240254	Moderate	0.6696
240355	High	0.5155
240355	Moderate	0.2050
240466	High	0.4288
240581	High	1.2872
240584	High	0.4549
240584	Moderate	0.2666
240617	Moderate	0.2143
240641	High	0.6151
240691	Moderate	4.6729
240736	Moderate	0.8263
240737	Moderate	0.8264
94152	High	3.7328
94152	Moderate	2.0524
94644	Moderate	2.7838
98134	Moderate	2.1430
98147	Moderate	6.0937

TABLE I-1c: Point Projects in a Fire Hazard Zone

RTP_ID	*HAZ_CLASS*
21477	High
240532	Moderate
22390	High
240062	Moderate
98154	Moderate
240672	Moderate

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