Section 3.2 Air Quality and Climate Change

Introduction

This section discusses the environmental setting and effects of the alternatives analyzed in this Supplemental DEIS with regard to air quality and climate change. Specifically, this section discusses existing air quality conditions within the Capitol Expressway Corridor, describes applicable federal, state, and local regulations, and addresses potential adverse effects and mitigation measures.

This section is based on the September 2010 air quality technical study prepared by ICF International (ICF) (ICF International 2010). The study contains a comprehensive description of the methods and modeling data used in the analysis. A copy of the air quality technical study is available for review at VTA offices upon request.

Affected Environment

REGULATORY SETTING

Federal

The federal Clean Air Act (CAA), which was first introduced in 1963, enacted in 1970 and amended in 1977 and 1990, establishes the framework for modern air pollution control. The act directs the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) for six pollutants: ozone, carbon monoxide (CO), lead, nitrogen dioxide (NO_2), particulate matter (PM) less than 10 microns (PM10) and 2.5 microns (PM2.5), and sulfur dioxide (SO_2) (Table 3.2-1). Under the 1990 CAA, the U.S. Department of Transportation (DOT) cannot fund, authorize, or approve Federal actions to support programs or projects that are not first found to conform to State Implementation Plan (SIP) for achieving the goals of the CAA requirements. Conformity with the CAA takes place on two levels—first, at the regional level and second, at the project level. The proposed project must conform at both levels to be approved.

Table 3.2-1. Federal and State Ambient Air Quality Standards

Pollutant	Symbol	Average Time	Standard (parts per million) California	Standard (parts per million) National	Standard (micrograms per cubic meter) California	Standard (micrograms per cubic meter) National	Violation Criteria California	Violation Criteria National	Attainment Status of Santa Clara County California	Attainment Status of Santa Clara County National
Ozone[a]	O_3	1 hour	0.09	NA	180	NA	If exceeded	NA	Serious Nonattainment	NA
		8 hours	0.070	0.075	137	147	If exceeded	If fourth highest 8-hour concentration in a year, averaged over 3 years, is greater than the standard	Nonattainment	Marginal Nonattainment
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year	Attainment	Moderate Maintenance
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year	Attainment	Moderate Maintenance
(Lake Tahoe only)		8 hours	6	NA	7,000	NA	If equaled or exceeded	NA	NA	NA
Nitrogen dioxide	NO_2	Annual arithmetic mean	0.030	0.053	57	100	If exceeded	If exceeded on more than 1 day per year	Attainment	Attainment
		1 hour	0.18	0.100	339	190	If exceeded	3-year average of 98th percentile highest daily 1-hour value	Attainment	NA
Sulfur dioxide	SO_2	Annual arithmetic mean	NA	NA[b]	NA	80	NA	If exceeded	NA	NA
		24 hours	0.04	NA[b]	105	365	If exceeded	If exceeded on more than 1 day per year	Attainment	NA
		1 hour	0.25	0.075	655	NA	If exceeded	NA	Attainment	NA
Hydrogen sulfide	H_2S	1 hour	0.03	NA	42	NA	If equaled or exceeded	NA	Unclassified	NA
Vinyl chloride	C_2H_3Cl	24 hours	0.01	NA	26	NA	If equaled or exceeded	NA	NA	NA

			Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria		Attainment Status of Santa Clara County	
Pollutant	Symbol	Average Time	California	National	California	National	California	National	California	National
Inhalable particulate matter	PM10	Annual arithmetic mean	NA	NA	20	NA	If exceeded	NA	Nonattainment	NA
		24 hours	NA	NA	50	150	If exceeded	If exceeded on more than 1 day per year	Nonattainment	Attainment
	PM2.5	Annual arithmetic mean	NA	NA	12	15	If exceeded	If 3-year average of the weighted annual mean from single or multiple community-oriented monitors exceeds the standard	Nonattainment	Nonattainment
		24 hours	NA	NA	NA	35	NA	If less than 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard	NA	Nonattainment
Sulfate particles	SO_4	24 hours	NA	NA	25	NA	If equaled or exceeded	NA	Attainment	NA
Lead particles	Pb	Calendar quarter	NA	NA	NA	1.5	NA	If exceeded no more than 1 day per year	NA	NA
		30-day average	NA	NA	1.5	NA	If equaled or exceeded	NA	Attainment	NA
		Rolling 3-Month average	NA	NA	NA	0.15	NA	Averaged over a rolling 3-month period	NA	NA

Source: California Air Resources Board 2010a and 2010b; U.S. Environmental Protection Agency 2010a and 2010b.

Notes: National standards shown are the primary (public health) standards. All equivalent units are based upon a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
NA = not applicable or data unavailable.

[a] The U.S. Environmental Protection Agency recently replaced the 1-hour ozone standard with an 8-hour standard of 0.08 part per million. EPA issued a final rule that revoked the 1-hour standard on June 15, 2005. However, the California 1-hour ozone standard will remain in effect.

[b] The U.S. Environmental Protection Agency revoked the existing 24-hour and annual primary SO_2 standard on August 23, 2010.

At the regional level, EPA transportation conformity regulations requires that the project be included in a currently conforming regional transportation plan (RTP) and transportation improvement program (TIP) at the time of project approval. Using the projects included in the RTP, an air quality model is run to determine whether the implementation of those projects would conform to emission budgets or other tests showing that federal CAA attainment requirements are met. If the conformity analysis is successful, regional planning organizations, such as the Metropolitan Transportation Commission (MTC) for Santa Clara County, and the appropriate federal agencies such as the Federal Highway Administration (FHWA), make the determination that the RTP is in conformity with the SIP for achieving NAAQS goals. Otherwise, the projects in the RTP must be modified until conformity is attained. If the design and scope of the proposed transportation project are the same as those described in the RTP, the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

Conformity at the project level requires hot spot analysis if a region is designated nonattainment or maintenance for CO and/or PM. Hot spot analysis is essentially the same, for technical purposes, as CO or particulate matter analysis performed for NEPA purposes. In general, projects must not cause the CO standard to be violated, and in nonattainment regions the project must not cause any increase in the number and severity of violations. If known CO or PM violations are located in the project vicinity, the project must include measures to reduce or eliminate the existing violations as well.

State

Responsibility for achieving California's ambient air quality standards (CAAQS) (Table 3.2-1) is placed on the California Air Resources Board (ARB) and local air pollution control districts. State standards are achieved through district-level air quality management plans that are incorporated into the SIP, for which ARB is the lead agency.

The California Clean Air Act of 1988 (California CAA) substantially added to the authority and responsibilities of air districts. The California CAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures.

The California CAA focuses on attainment of the state ambient air quality standards and requires designation of attainment and nonattainment areas with respect to these standards. The act also requires that local and regional air districts expeditiously adopt and prepare an air quality attainment plan (Clean Air Plan) if the district violates state air quality standards for ozone, CO, SO_2, or NO_2. These plans are specifically designed to attain state standards and must be designed to achieve an annual 5 percent reduction in district-wide emissions of each nonattainment pollutant or its precursors. No locally prepared attainment plans are required for areas that violate the state PM10 standards; the ARB is responsible for developing plans and projects that achieve compliance with the state PM10 standards.

Local

At the local level, the BAAQMD is responsible for ensuring the NAAQS and CAAQS are met. Currently, the BAAQMD has established quantitative construction thresholds for the analysis of air quality impacts, and quantitative thresholds for the analysis of operational related criteria air pollutants and greenhouse gas (GHG) emissions. In addition, all projects are required to implement construction-related mitigation measures to control fugitive dust (Bay Area Air Quality Management District 2010).

In addition to administration of air quality regulations developed at the federal and state levels, the BAAQMD is also responsible for implementing local strategies for air quality improvement and recommending mitigation measures for new growth and development. The BAAQMD recently adopted the *2010 Clean Air Plan* to reduce pollutant emissions in the SFBAAB and improve regional air quality.

Climate Change Regulations

A variety of legislation has been enacted in California relating to climate change, much of which sets aggressive goals for GHG reductions within the state. The following key legislations are applicable to the proposed action:

- **Executive Order S-3-05** is designed to reduce California's greenhouse (GHG) emissions to: 1) 2000 levels by 2010, 2) 1990 levels by the year 2020 and 3) 80 percent below the 1990 levels by the year 2050.
- **Assembly Bill 32 (AB 32)**, the Global Warming Solutions Act of 2006, sets the same overall GHG emissions reduction goals as S-3-05 while further mandating that ARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team. Under AB32, the ARB is expected to adopt a regulation by July 31, 2010 requiring the state's load serving entities to meet a 33 percent renewable energy target by 2020.
- **The AB32 Scoping Plan** contains the main strategies California will use to reduce GHG from business-as-usual (BAU) emissions projected for 2020 back down to 1990 levels. As part of the scoping plan, the ARB is conducting rule making, culminating in rule adoption by January 1, 2011, for reducing GHG emissions to achieve the emissions cap by 2020.
- **Executive Order S-01-07 Low Carbon Fuel Standard**: Requires a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by the ARB.

- **Senate Bill 1368 (Perata)** prohibits any retail seller of electricity in California from entering into a long-term financial commitment for baseload generation if the GHG emissions are higher than those from a combined-cycle natural gas power plant.
- **Senate Bill 1078/107** obligates investor-owned utilities (IOUs), energy service providers (ESPs) and community choice aggregators (CCAs) to procure an additional 1 percent of retail sales per year from eligible renewable sources until 20 percent is reached, no later than 2010.
- **SB 375 (Steinberg), Statutes of 2008**: Requires regional transportation plans, developed by MPOs, to incorporate a "sustainable communities strategy" in their regional transportation plans that will achieve GHG emission reduction targets set by the ARB.

Within the past few years, federal action on climate change has also begun to take shape. On December 7, 2009, the EPA Administrator found that current and projected concentrations of CO_2, CH_4, N_2O, hydroflourocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) threaten the public health and welfare of current and future generations. Additionally, the Administrator found that combined emissions from motor vehicles contribute to the threat of climate change. The EPA recently reconfirmed that **"**climate science is credible, compelling, and growing stronger" by denying ten petitions challenging the Administrator's 2009 decision.

The Council on Environmental Quality (CEQ) also has issued a memorandum providing guidance on the consideration of the effects of climate change and GHG emissions under NEPA (Sutley 2010). The Draft Guidance suggests that the effects of projects directly emitting GHGs in excess of 25,000 metric tons (MT) annually be considered in a qualitative and quantitative manner in NEPA evaluations.

EXISTING CONDITIONS

Environmental Setting

Ambient air quality is affected by climatological conditions, topography, and the types and amounts of pollutants emitted. The following discussion describes relevant characteristics of the air basin and offers an overview of conditions affecting pollutant ambient air pollutant concentrations.

Climate and Topography

The Bay Area climate is characterized by moderately wet winters and dry summers. Winter rains which occur in the months of December through March account for about 75 percent of the average annual rainfall. During rainy periods pollution levels are low.

The Santa Clara Valley has high potential to accumulate air pollutants. Stable air, high summer temperatures, and mountains surrounding the valley combine to promote ozone formation. The Santa Clara Valley has a high concentration of industrial air pollutant sources at its northern end. The valley's large population also generates the highest mobile source emissions from commuter trips of any subregion in the San Francisco Bay Area (Bay Area Air Quality Management District 2010).

In addition to these local sources of pollution, ozone precursors from Alameda, San Mateo, and San Francisco Counties are carried by prevailing winds to the Santa Clara Valley. Pollutants are generally channeled to the southeast. Further, on summer days with low-level inversions, ozone can be recirculated by southerly winds in the late evening and early morning and by the prevailing northwesterly winds in the afternoon. A similar recirculation pattern occurs in winter, affecting CO and PM10 levels in the air. This air movement throughout the valley significantly increases the impact of pollutants in this area (Bay Area Air Quality Management District 2010).

Smog is not emitted directly into the environment, but is formed by complex chemical reactions in the atmosphere between oxides of nitrogen and reactive organic compounds or reactive hydrocarbons, in the presence of sunlight. The inland valleys of the Bay Area and especially Santa Clara Valley are prone to high summer temperatures and abundant sunshine (smog-making conditions). Ozone formation is greatest on warm, windless, sunny days. Santa Clara Valley is thus prone to the formation of photochemical pollutants if the proper chemical ingredients are provided.

Existing Air Quality Conditions

Existing air quality conditions in the project area can be characterized in terms of the NAAQS and CAAQS by monitoring data collected in the region. The nearest air quality monitoring station in the vicinity of the project area is the Tully Road monitoring station, which is located approximately 3 miles from the project area. Air quality monitoring data from this station is summarized in Table 3.2-2. These data represent air quality monitoring data for the last three years (2007–2009) in which complete data is available.

Table 3.2-2. Ambient Air Quality Monitoring Data Measured at the Tully Road Monitoring Station

Pollutant Standards	2007	2008	2009
1-Hour Ozone			
Maximum 1-hour concentration (ppm)	0.083	0.118	0.088
Second-highest 1-hour concentration (ppm)	0.082	0.094	0.087
1-hour California designation value	0.090	0.010	0.09
1-hour expected peak day concentration	0.090	0.097	0.093
Number of days standard exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	0	1	0
8-Hour Ozone			
National maximum 8-hour concentration (ppm)	0.068	0.080	0.068

Pollutant Standards	2007	2008	2009
National second-highest 8-hour concentration (ppm)	0.067	0.078	0.066
State maximum 8-hour concentration (ppm)	0.068	0.080	0.069
State second-highest 8-hour concentration (ppm)	0.067	0.078	0.066
8-hour national designation value	0.061	0.065	0.062
8-hour California designation value	0.069	0.074	0.069
8-hour expected peak day concentration	0.070	0.074	0.072
Number of days standard exceeded[a]			
NAAQS 8-hour (>0.075 ppm)	0	2	0
CAAQS 8-hour (>0.070 ppm)	0	3	0
Carbon Monoxide (CO)			
National[b] maximum 8-hour concentration (ppm)	2.71	2.48	2.50
National[b] second-highest 8-hour concentration (ppm)	2.40	2.20	2.26
California[c] maximum 8-hour concentration (ppm)	2.71	2.48	2.50
California[c] second-highest 8-hour concentration (ppm)	2.40	2.20	2.26
Maximum 1-hour concentration (ppm)	3.50	3.30	-
Second-highest 1-hour concentration (ppm)	3.50	3.00	-
Number of days standard exceeded[a]			
NAAQS 8-hour (≥9 ppm)	0	0	0
CAAQS 8-hour (≥9.0 ppm)	0	0	0
NAAQS 1-hour (≥35 ppm)	0	0	0
CAAQS 1-hour (≥20 ppm)	0	0	0
Particulate Matter (PM10)[d]			
National[b] maximum 24-hour concentration (μg/m^3)	64.7	55.0	41.1
National[b] second-highest 24-hour concentration (μg/m^3)	60.8	40.3	40.6
State[c] maximum 24-hour concentration (μg/m^3)	69.1	57.3	43.3
State[c] second-highest 24-hour concentration (μg/m^3)	64.5	43.5	43.0
State annual average concentration (μg/m^3)[e]	21.9	23.4	20.3
Number of days standard exceeded[a]			
NAAQS 24-hour (>150 μg/m^3)[f]	0	0	0
CAAQS 24-hour (>50 μg/m^3)[f]	3	1	0
Particulate Matter (PM2.5)			
National[b] maximum 24-hour concentration (μg/m^3)	57.5	41.9	35.0
National[b] second-highest 24-hour concentration (μg/m^3)	51.7	39.8	34.7
State[c] maximum 24-hour concentration (μg/m^3)	57.5	41.9	35.0
State[c] second-highest 24-hour concentration (μg/m^3)	51.7	41.5	34.7
National annual designation value (μg/m^3)	11.1	11.0	10.8
National annual average concentration (μg/m^3)	10.7	11.5	10.1
State annual designation value (μg/m^3)	12	12	12
State annual average concentration (μg/m^3)[e]	11.0	11.5	10.1
Number of days standard exceeded[a]			
NAAQS 24-hour (>35 μg/m^3)	9	5	0

Sources: California Air Resources Board 2009; U.S. Environmental Protection Agency 2009.

Notes:

CAAQS = California ambient air quality standards.

NAAQS = national ambient air quality standards.

– = insufficient data available to determine the value.

[a] An exceedance is not necessarily a violation.

[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[c] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, State statistics are based on California approved samplers.

[d] Measurements usually are collected every 6 days.

[e] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[f] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been truncated for presentation.

As shown in Table 3.2-2, the Tully Road monitoring station has experienced occasional violations of the state and federal ozone standard, the state PM10 standard, and the federal PM2.5 standard.

Carbon Monoxide

The build alternatives are located in a moderate (≤ 12.7 ppm) maintenance area with regards to the federal CO standard (Table 3.2-1) (U.S. Environmental Protection Agency 2010b). Consequently, the evaluation of transportation conformity for CO is required.

Particulate Matter

The proposed action is located in a nonattainment area for the federal PM2.5 standard (Table 3.2-1) (U.S. Environmental Protection Agency 2010b). Therefore, a determination must be made as to whether it is a Project of Air Quality Concern (POAQC). If the project is determined to be a POAQC, a PM hot-spot analysis would be required to analyze whether future localized pollutant concentrations associated with the project would cause or contribute to a violation of the PM2.5 NAAQS. For projects that are not considered POAQCs, a PM hot-spot analysis is not required. Rather, project sponsors must document that the requirements of the CAA and 40 CFR 93.116 are met without a hot-spot analysis, through an Interagency Consultation (IAC) process.

Mobile-Source Air Toxics

Applicable Mobile-Source Air Toxics Category Assessment

Average Daily Traffic (ADT) volumes, which can be used interchangeably with AADT, were provided by the project traffic engineers (Struecker pers. comm. [A] and [B]). Table 3.2-3 summarizes total ADT and truck volumes on Capitol Expressway for existing (2009), interim (2018), and design year (2035) conditions.

Based on the data presented in Table 3.2-3, traffic volumes along Capitol Expressway is not expected to exceed the FHWA's 140,000 ADT guideline for projects with lower potential mobile-source air toxics (MSATs) effects (Federal Highway Administration 2009). However, because Capitol Expressway is located within 500 feet of sensitive land-uses, the ARB considers the project to have the potential for higher MSAT effects (Brady pers. comm.; California Air Resources Board 2005). Consequently, a quantitative analysis of MSAT emissions was performed using the CT-EMFAC model and traffic data provided by the project traffic engineers.

Sensitive Receptors

The primary land use in the Capitol Expressway Corridor is residential. Single-family dwellings are located within 50 feet of Capitol Expressway, but are separated from traffic by soundwalls and/or frontage roads. There are numerous schools within one mile of the project area, the closest of which are the Ocala Middle School and the Ryan Thomas Elementary School, which are approximately 0.05 and 0.10 miles away from the project site, respectively. Various public uses are also found within the project area. The nearest public land uses include the Crossroad Calvary Chapel, Lake Cunningham Park, and the Raging Waters Theme Park.

Table 3.2-3 Existing (2009), Interim (2018), and Design Year (2035) ADT along Capitol Expressway

	Existing (2009)		2018 No Build		2018 Light Rail Alternative		2018 Light Rail Alternative, No Ocala Option		2035 No Build		2035 Light Rail Alternative		2035 Light Rail Alternative, No Ocala Option	
Segment	ADT	Truck Volumes[a]	ADT	Truck Volumes[a]	ADT	Truck Volumes[a]	ADT	Truck Volumes[a]	ADT	Truck Volumes[a]	ADT	Truck Volumes[a]	ADT	Truck Volumes[a]
North of Capitol Ave	66,030	3,302	75,990	3,800	68,440	3,422	67,810	3,391	94,830	4,742	87,260	4,363	86,630	4,332
Btwn Capitol Ave and Story Rd	66,640	3,332	78,220	3,911	69,080	3,454	68,410	3,421	100,110	5,006	90,970	4,549	90,290	4,515
Btwn Story Rd and Ocala Ave	67,970	3,399	80,280	4,014	70,650	3,533	70,680	3,534	103,540	5,177	93,900	4,695	93,940	4,697
Btwn Ocala Ave and Cunningham Ave	61,010	3,051	72,490	3,625	64,340	3,217	64,020	3,201	94,160	4,708	86,030	4,302	85,690	4,285
Btwn Cunningham Ave and Tully Rd	70,970	3,549	84,710	4,236	75,270	3,764	74,850	3,743	110,640	5,532	101,210	5,061	100,790	5,040
Btwn Tully Rd and Eastridge Loop	60,170	3,009	72,800	3,640	65,800	3,290	65,290	3,265	96,660	4,833	89,680	4,484	89,160	4,458
Btwn Eastridge Loop and Quimby Rd	56,080	2,804	68,060	3,403	61,740	3,087	61,220	3,061	90,690	4,535	84,380	4,219	83,870	4,194
Btwn Quimby and Nieman Blvd	65,000	3,250	76,960	3,848	75,530	3,777	74,970	3,749	99,560	4,978	95,240	4,762	94,620	4,731
South of Nieman Blvd	68,390	3,420	84,950	4,248	80,910	4,046	80,460	4,023	106,590	5,330	102,560	5,128	102,110	5,106

Source: Struecker pers. comm [A]; Struecker pers. comm [B]

Notes:

[a] Truck volumes were assumed to represent 5 percent of total ADT.

Environmental Consequences

APPROACH AND METHODS

The Light Rail Alternative would generate construction- and operational-related emissions. See the Air Quality Technical Study for more detailed discussion of the methodology used to evaluate operational effects (ICF International 2010).

EFFECTS AND MITIGATION MEASURES

No-Build Alternative

Under the No-Build Alternative, it is anticipated that future emissions of criteria pollutants, MSATs, and CO will decrease relative to existing conditions due to improvements in engine technology and the phasing out of older, more polluting engines. However, GHG emissions from electricity and natural gas usage are expected to increase relative to existing conditions due to increased consumption. A comparison of the No-Build Alterative to existing conditions is provided in Tables 3.2-4 through 3.2-5 and Table 3.2-7.

Light Rail Alternative

Potential construction impacts related to air quality (temporary increases in ozone precursors [ROG and NOx] CO, and PM10 Emissions during grading) are discussed in Section 3.19 *Construction*.

Impact: Compliance With the Clean Air Act Transportation Conformity Requirements

The CAA requires states to submit a SIP for areas in nonattainment or maintenance with the NAAQS. The CAA amendments outline requirements for ensuring federal transportation plans, programs, and projects are consistent with (i.e., conform to) the SIP. Conformity to the SIP ensures transportation activities will not cause new air quality violations, worsen existing violations, or delay attainment with the NAAQS. RTPs are determined to conform to the SIP if the total emissions projected for the plan are within the emissions limit established by the SIP. Conformance to the CAA (i.e, "regional transportation conformity") is therefore determined by evaluating and documenting that the design and scope of the proposed transportation project are the same as those described in the RTP.

The proposed action (RTP #22956) is included in the MTC's Transportation 2035 Plan for the San Francisco Bay Area (Metropolitan Transportation Commission 2009a). The project (TIP ID# SCL050009) is also listed in the MTC's Transportation Improvement Program (Metropolitan Transportation Commission

2009b). Air quality modeling conducted by the MTC has shown that emissions associated with actions included in the RTP and TIP are within the allowable emission budgets for ozone precursors.

Because the Light Rail Alternative is included in the most recently adopted RTP and TIP and has not significantly changed in design concept and scope the project conforms to the SIP for the Bay Area and satisfies CAA requirements for transportation conformity. Therefore, regional transportation conformity has been met and no adverse effect is anticipated.

No adverse effects. No mitigation required.

Impact: Violations of PM2.5 CAAQS or NAAQS

On December 14, 2009, the Environmental Protection Agency (EPA) designated the nine-county San Francisco Bay Area as nonattainment for the national 24-hour $PM_{2.5}$ standards established in 2006. Beginning December 14, 2010, sponsors of certain projects that involve significant levels of diesel vehicle traffic are required to complete a $PM_{2.5}$ hot-spot analysis for project-level conformity determinations made by the Federal Highway Administration (FHWA) or Federal Transit Administration (FTA). In order to determine whether a $PM_{2.5}$ hot-spot analysis is required, the Metropolitan Transportation Commission (MTC) established interagency consultation procedures. The procedures involve submitting a project assessment form for $PM_{2.5}$ interagency consultation. The Air Quality Conformity Task Force, which includes staff from FHWA, FTA, and EPA, is responsible for reviewing the project assessment form and for making a recommendation as to whether a project is exempt, or if it is not exempt, whether it meets the definition of a project of air quality concern (POAQC) as identified in 40 CFR 93.123(b)(1):

- New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;
- Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and

- Projects in or affecting locations, areas, or categories of sites which are identified in the PM2.5 or PM10 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation

If the project is determined not to meet the definition of a POAQC, no hot-spot analysis for $PM_{2.5}$ is required. However, if the project is determined to meet the definition of a POAQC, then further consultation regarding the methods, assumptions, and results of the hot-spot analysis are required.

The proposed project submitted the project assessment form for $PM_{2.5}$ in November 2010, which was reviewed by the Air Quality Conformity Task Force at their meeting on December 8, 2010. This documentation demonstrated that the project would not significantly increase the number of diesel vehicles in the area. Concurrence that the project is not a POAQC and that no hot-spot analysis is required was received from the Air Quality Conformity Task Force on January 24, 2011. A copy of the email documentation confirming the project has undergone and completed the Interagency Consultation requirement for project-level conformity is included in Appendix F. Because the project is determined not to be a POAQC, no adverse effect from $PM_{2.5}$ emissions in anticipated.

No adverse effects. No mitigation required.

Impact: Generation of Significant Levels of MSAT Emissions

As shown in Table 3.2-3, traffic volumes along Capitol Expressway are not expected to exceed the FHWA's 140,000 ADT guideline for projects with lower potential MSAT effects. However, because Capitol Expressway is located within 500 feet of sensitive land-uses, California considers the project to have higher potential MSAT effects (Brady pers. comm.; California Air Resources Board 2005). Consequently, a quantitative analysis of MSAT emissions was performed using the CT-EMFAC model and traffic data provided by the project traffic engineers.

Table 3.2-4 presents modeled MSAT emissions for all project alternatives and analysis years. The differences in emissions between with- and without-project conditions represent emissions generated directly as a result of implementation of the proposed alternatives.

As shown in Table 3.2-4, implementation of the proposed action would result in no effect or decreased emissions compared to existing conditions. Some MSAT emissions would slightly increase, compared to the No-Build Alternative, under 2018 conditions due to a slight increase in VMT (see Table 3.2-7). However, these increases are less than 0.1 percent. Therefore, this impact is not considered adverse.

No adverse effects. No mitigation required.

Impact: Violations of Carbon Monoxide CAAQS or NAAQS

Existing (2009), interim (2018), and design-year (2035) project conditions were modeled to evaluate CO concentrations relative to the NAAQS and CAAQS (see Table 3.2-1). Emissions of CO concentrations were modeled at the following four intersections: Capitol Expressway/Capitol Avenue; Capitol Expressway/Story Road; Capitol Expressway/Ocala Avenue; and Capitol Expressway/Tully Road. These intersections were modeled because they were identified in the traffic analysis as having the greatest traffic volumes and worst LOS/delay (AECOM 2010). Table 3.2-5 summarizes the results of the CO modeling and indicates that concentrations are not expected to contribute to any new localized violations of the 1-hour or 8-hour ambient standards. Consequently, no adverse effect from CO is anticipated.

No adverse effects. No mitigation required.

Table 3.2-4. Summary of MSAT Emissions (tons per year)

	Tons per year					
Scenario	Diesel PM	Formaldehyde	Butadiene	Benzene	Acrolein	Acetaldehyde
Existing (2009)	38.378	27.572	5.993	31.905	1.364	9.075
2018 No-Build Alt	21.413	13.656	2.637	15.628	0.597	4.714
2018 LRT Alt	21.403	13.659	2.636	15.625	0.597	4.717
2018 LRT Alt (No Ocala Station Option)	21.496	13.703	2.647	15.686	0.599	4.730
2035 No-Build Alt	14.481	9.814	1.853	10.925	0.416	3.471
2035 LRT Alt	14.472	9.812	1.852	10.920	0.416	3.470
2035 LRT Alt (No Ocala Station Option)	14.473	9.808	1.852	10.917	0.416	3.468
Alternative Differences (Compared to the No-Build Alternative)						
2018 LRT Alt - 2018 No-Build Alt	-0.011	0.003	-0.001	-0.003	0.000	0.002
2018 LRT Alt (No Ocala Station Option) - 2018 No-Build Alt	0.082	0.047	0.010	0.058	0.002	0.016
2035 LRT Alt - 2035 No-Build Alt	-0.009	-0.002	-0.001	-0.005	0.000	0.000
2035 LRT Alt (No Ocala Station Option) - 2035 No-Build Alt	-0.009	-0.006	-0.001	-0.008	0.000	-0.002

Modeling completed by ICF International. Traffic data obtained from Struecker pers. comm. [A] and [B].

Table 3.2-5. Modeled CO Concentrations for Existing (2009), Interim (2018), and Design Year (2030) Conditions

Intersection	Receptor[a]	Existing (2009)		Interim (2018) No Build		Interim (2018) Light Rail Alternative		Interim (2018) No Ocala Option		Design (2035) No Build		Design (2035) Light Rail Alternative		Design (2035) No Ocala Option	
		1-hour CO[b,c]	8-hour CO[b,d]	1-hour CO[b,c]	8-hour CO[b,d]	1-hour CO[b,c]	8-hour CO[b,d]	1-hour CO[b,c]	8-hour CO[b,d]	1-hour CO[b,c]	8-hour CO[b,d]	1-hour CO[b,c]	8-hour CO[b,d]	1-hour CO[b,c]	8-hour CO[b,d]
Capitol Expy/ Excalibur Dr	1	5.7	3.8	4.6	3.2	4.5	3.1	4.5	3.1	4.1	2.9	4.1	2.9	4.1	2.9
	2	6.1	4.1	4.8	3.3	4.6	3.2	4.6	3.2	4.2	2.9	4.2	2.9	4.2	2.9
	3	6.0	4.0	4.7	3.2	4.6	3.2	4.6	3.2	4.2	2.9	4.1	2.9	4.1	2.9
	4	5.8	3.9	4.6	3.2	4.5	3.1	4.5	3.1	4.2	2.9	4.1	2.9	4.1	2.9
Capitol Expy/ Story Rd	5	6.2	4.1	4.8	3.3	4.7	3.2	4.7	3.2	4.2	2.9	4.2	2.9	4.2	2.9
	6	6.1	4.1	4.8	3.3	4.6	3.2	4.6	3.2	4.2	2.9	4.2	2.9	4.2	2.9
	7	6.4	4.2	4.9	3.3	4.7	3.2	4.7	3.2	4.3	3.0	4.2	2.9	4.2	2.9
	8	6.2	4.1	4.8	3.3	4.7	3.2	4.7	3.2	4.2	2.9	4.2	2.9	4.2	2.9
Capitol Expy/ Ocala Ave	9	5.7	3.8	4.6	3.2	4.5	3.1	4.5	3.1	4.1	2.9	4.1	2.9	4.1	2.9
	10	5.8	3.9	4.6	3.2	4.6	3.2	4.6	3.2	4.2	2.9	4.1	2.9	4.1	2.9
	11	5.8	3.9	4.6	3.2	4.6	3.2	4.5	3.1	4.2	2.9	4.1	2.9	4.1	2.9
	12	5.7	3.8	4.6	3.2	4.5	3.1	4.5	3.1	4.1	2.9	4.1	2.9	4.1	2.9
Capitol Expy/ Tully Rd	13	5.9	3.9	4.7	3.2	4.6	3.2	4.6	3.2	4.2	2.9	4.2	2.9	4.2	2.9
	14	5.7	3.8	4.6	3.2	4.6	3.2	4.5	3.1	4.2	2.9	4.1	2.9	4.1	2.9
	15	6.0	4.0	4.8	3.3	4.7	3.2	4.7	3.2	4.2	2.9	4.2	2.9	4.2	2.9
	16	5.9	3.9	4.7	3.2	4.6	3.2	4.6	3.2	4.2	2.9	4.2	2.9	4.2	2.9

Modeling completed by ICF International. Traffic data obtained from AECOM 2010.

Notes:

[a] Receptors 1 through 12 are located 100 feet from the center of each intersection diagonal, 71 feet from the roadway centerline, and at the boundary of the mixing zone.

[b] Background concentrations of 3.63 ppm and 2.56 ppm were added to the modeling 1-hour and 8-hour results, respectively.

[c] The federal and state 1-hour standards are 35 and 20 ppm, respectively.

[d] The federal and state 8-hour standards are 9 and 9.0 ppm, respectively.

Impact: Generation of Significant Operation-Related Emissions of Ozone Precursors, Carbon Monoxide, and Particulate Matter

Long-term air quality impacts are those associated with motor vehicles operating on the roadway network, predominantly those operating in the project vicinity. Emissions of ROG, NO_X, CO, PM10, PM2.5, and CO_2 for existing (2009), interim (2018), and design-year (2035) conditions were evaluated using Caltrans' CT-EMFAC model. Table 3.2-6 summarizes the modeled yearly emissions. The differences in emissions between with- and without-project conditions represent emissions generated directly as a result of implementation of the proposed alternatives. Vehicular emission rates, in general, are anticipated to lessen in future years due to continuing improvements in engine technology and the retirement of older, higher-emitting vehicles.

As shown in Table 3.2-6, implementation of the proposed action would decrease emissions of all criteria air pollutants relative to the No-Build Alternative under design year conditions. These decreases are attributable to the removal of single-occupant-vehicle trips as result of expanded light rail service. Emissions would slightly increase under interim year conditions with implementation of the No Ocala Option. However, any increases in emissions would be well below the BAAQMD threshold of significance. There would be no adverse effect.

No adverse effects. No mitigation required.

Impact: Generation of Significant Greenhouse Gas Emissions

GHG emissions tend to accumulate in the atmosphere because of their relatively long lifespan. As a result, their affect on the atmosphere is mostly independent of the point of emission; GHG contaminant emissions are more appropriately evaluated on a regional, state, or even national scale than on an individual project level. Therefore, project-level GHGs are not considered to be an adverse effect. Please refer to the cumulative-effects section for a discussion of GHG emissions and their affects on global climate change.

No adverse effects. No mitigation required.

<u>Proposed Options</u>

The above discussion is inclusive of the Light Rail Alternative options.

Table 3.2-6. Summary of Operational Emissions (tons per year)

		Tons per year					
Scenario	Yearly VMT	ROG	NO_X	CO	PM10	PM2.5	CO_2[a]
Existing (2009)	4,979,022,323	1,358.673	3,346.816	19,812.154	107.774	99.251	2,034,302
2018 No-Build Alt	5,951,319,160	729.819	1,712.577	10,463.740	108.985	102.048	2,411,058
2018 LRT Alt	5,945,624,430	729.706	1,711.269	10,453.132	108.959	102.007	2,409,477
2018 LRT Alt (No Ocala Station Option)	5,973,747,315	732.536	1,718.690	10,502.828	109.436	102.454	2,420,262
2035 No-Build Alt	7,787,880,313	478.809	844.419	6,598.427	137.037	126.254	3,140,495
2035 LRT Alt	7,782,185,571	478.603	843.879	6,592.756	136.965	126.185	3,138,448
2035 LRT Alt (No Ocala Station Option)	7,784,216,654	478.413	843.963	6,593.605	136.924	126.150	3,138,402
Alternative Differences (Compared to the No-Build Alternative)							
2018 LRT Alt - 2018 No-Build Alt	-5,694,730	-0.114	-1.308	-10.608	-0.026	-0.041	-1,580.809
2018 LRT Alt (No Ocala Station Option) - 2018 No-Build Alt	22,428,155	2.716	6.114	39.087	0.450	0.406	9,203.884
2035 LRT Alt - 2035 No-Build Alt	-5,694,742	-0.206	-0.540	-5.671	-0.071	-0.069	-2,047
2035 LRT Alt (No Ocala Station Option) - 2035 No-Build Alt	-3,663,659	-0.396	-0.456	-4.822	-0.113	-0.104	-2,093
BAAQMD Threshold	-	*10*	*10*	-	*15*	*10*	-

Modeling completed by ICF International. Traffic data obtained from Struecker pers. comm. [A] and [B]. [a] Presented in metric tons. See following discussion for evaluation of significance.

CUMULATIVE EFFECTS

No-Build Alternative

The No-Build Alternative would not contribute to cumulative impacts on air quality or climate change.

Light Rail Alternative

Potential construction impacts related to air quality (including GHG emissions as a result of construction) are discussed in Section 3.18 *Construction*.

Criteria Air Pollutants

As discussed above, neither the Light Rail Alternative nor the No Ocala Station Option is expected to exceed the BAAQMD thresholds or result in local effects on air quality. Implementation of Mitigation Measure AQ-1 will also reduce fugitive dust emissions from construction. It is assumed that all projects in the Bay Area will be subject to the BAAQMD-recommended basic control measures. Moreover, the BAAQMD has adopted EPA-approved SIPs to prevent cumulative impacts and improve regional air quality. Therefore, the proposed action, in combination with other reasonably foreseeable projects, will not contribute to adverse cumulative air quality impacts.

Impact: Generation of Greenhouse Gas Emissions as a Result of Operations

As shown in Table 3.2-6, implementation of the Light Rail Alternative would remove a substantial number of single-occupancy-vehicles within the transportation network, resulting in a decrease in GHG emissions. Consequently, GHG emissions from project operations would only result from increased electricity and natural gas usage. Emissions from these sources were calculated using data presented in Chapter 4-7 and emission factors obtained from PG&E and California Climate Action Registry (California Climate Action Registry 2009; Pacific Gas & Electric 2007).

Table 3.2-7 presents a summary of emissions from electricity and natural usage, respectively. Please refer to the air quality study report for additional information on quantification methods (ICF International 2010).

Table 3.2-7. Summary of GHG Emissions from Electricity Usage (metric tons CO_2e[a] per year)[b]

Scenario	Electricity	Natural Gas
Existing	11,407	852
2018 No-Build Alt	29,753	2,223
2018 LRT Alt	31,176	2,329
2018 LRT Alt (No Ocala Station Option)	31,099	2,324
2035 No-Build Alt	39,465	2,949
2035 LRT Alt	41,354	3,090
2035 LRT Alt (No Ocala Station Option)	41,211	3,082
Alternative Difference (Compared to the No-Build Alternative)		
2018 LRT Alt - No-Build Alt	1,424	106
2018 LRT Alt (No Ocala Station Option) - No-Build Alt	1,347	101
2035 LRT Alt - 2035 No-Build Alt	1,888	141
2035 LRT Alt (No Ocala Station Option) - 2035 No-Build Alt	1,746	133

Modeling completed by ICF International. Emission factors obtained from California Climate Action Registry 2009 and Pacific Gas & Electric 2007

Refer to ICF International 2010 for additional information.

Notes:

[a] Refers to carbon dioxide equivalents--represents total emissions of carbon dioxide, methane, nitrous oxide, and sulfur-hexafluoride, accounting for the global warming potential of each gas. Please see ICF International 2010 for additional detail.

[b] Based on usage assumptions summarized in Chapter 4-7.

Based on information in Table 3.2-7, implementation of the proposed action would result in an increase in GHG emissions from electricity and natural gas consumption relative to the No-Build Alterative. However, these increases would be offset by the GHG reductions achieved by the removal of single-occupancy-vehicles. As shown in Table 3.2-8, implementation of the Light Rail Alternative and No Ocala Option under design year conditions would result in net reductions of GHG emissions. Likewise, implementation of the Light Rail Alternative under interim year conditions would result in net GHG reductions. This is considered to be an air quality benefit.

Table 3.2-8. Total GHG Emissions Generated by Project Operations, Relative to the No-Build Alternative (metric tons CO_2e per year)

Scenario	Electricity	Natural Gas	Traffic	Net Change
2018 LRT Alt - No-Build Alt	+1,424	+106	-1,581	-51
2018 LRT Alt (No Ocala Option) - No-Build Alt	+1,347	+101	+9,204	+10,652
2035 LRT Alt - No-Build Alt	+1,888	+141	-2,047	-18
2035 LRT Alt (No Ocala Option) - No-Build Alt	+1,746	+133	-2,093	-214

Because the No Ocala Option will result in a slight increase in VMT under interim year conditions, implementation of this alternative would result in a 10,652 increase in GHG emissions. However, these emissions are not in excess of the CEQ reference point. Consequently, there would be no adverse effect.

No adverse effects. No mitigation required.

Proposed Options

The above discussion is inclusive of the Light Rail Alternative options.