3.13 Air Quality

The following information is summarized from the air quality technical report prepared for the proposed action. This report is incorporated by reference and is available for public review at the Solano Transportation Authority's (STA's) and Caltrans' offices.

3.13.1 Regulatory Setting

The Clean Air Act as amended in 1990 is the federal law that governs air quality. Its counterpart in California is the California Clean Air Act of 1988. These laws set standards for the quantity of pollutants that can be in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). Standards have been established for six criteria pollutants that have been linked to potential health concerns; the criteria pollutants are: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), lead (Pb), and sulfur dioxide (SO_2).

Under the 1990 Clean Air Act Amendments, the U.S. Department of Transportation 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 Clean Air Act requirements. Conformity with the Clean Air Act 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.

Regional level conformity in California is concerned with how well the region is meeting the standards set for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and particulate matter (PM). California is in attainment for the other criteria pollutants. At the regional level, Regional Transportation Plans (RTP) are developed that include all of the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, an air quality model is run to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that attainment requirements of the Clean Air Act are met. If the conformity analysis is successful, the regional planning organization, such as the Metropolitan Transportation Commission (MTC) for the nine-county Bay Area, which includes Solano County, and the appropriate federal agencies, such as the Federal Highway Administration (FHWA), make the determination that the RTP is in conformity with the State Implementation Plan for achieving the goals of the Clean Air Act. 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 described in the RTP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

Conformity at the project-level also requires "hot spot" analysis if an area is "nonattainment" or "maintenance" for carbon monoxide (CO) and/or particulate matter. A region is a "nonattainment" area if one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas but have recently met the standard are called "maintenance" areas. "Hot spot" analysis is essentially the same, for technical purposes, as CO or

particulate matter analysis performed for NEPA purposes. Conformity does include some specific standards for projects that require a hot spot analysis. In general, projects must not cause the CO standard to be violated, and in "nonattainment" areas the project must not cause any increase in the number and severity of violations. If a known CO or particulate matter violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

A regional conformity analysis covering the San Francisco Bay Area Air Basin for ozone was carried out that includes this project and all reasonably foreseeable and financially constrained regionally significant projects for at least 20 years from the date that the analysis was started. The analysis used the latest planning assumptions, and the most recent emission models and appropriate analysis methods, as determined by Interagency Consultation concluding on February 23, 2005. Based on this analysis, the region will be in conformity with the SIP, including this project, based on the motor vehicles emissions budget contained in the 2001 1-Hour Ozone Attainment Plan for the ozone precursors conformity test and analysis procedures, as described in 40 CFR 93.109(l). The design concept and scope of the proposed project is consistent with the project design concept and scope used in the regional conformity analysis. Timely Implementation evaluation reviewed by Interagency Consultation on October 2, 2006.

The air quality management agencies of direct importance in the project corridor are the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (ARB), the Yolo Solano Air Quality Management District (YSAQMD), and the Bay Area Air Quality Management District (BAAQMD). YSAQMD has jurisdiction over air quality issues in all of Yolo County and northern and eastern Solano County. BAAQMD has jurisdiction over air quality issues in the counties surrounding San Francisco Bay and southwestern Solano County. The corridor straddles the two air districts, the northern portion being in the YSAQMD, the southern portion in the BAAQMD.

3.13.2 Affected Environment

3.13.2.1 Climate and Topography

Ambient air quality is affected by climatological conditions, topography, and types and amounts of pollutants emitted. The project spans an area from Fairfield to Vacaville. It is within both the San Francisco Bay Area Air Basin (SFBAAB) and Northern Sacramento Valley Air Basin (NSVAB). The average annual high temperatures in the corridor and vicinity range from the 50s °F in the winter and high 80s and 90s °F in summer. The annual precipitation averages about 25 inches. Winds in Fairfield range from 9 mph in winter to 17 mph in summer. It is less windy in Vacaville, with winds ranging from 4 mph in winter to 8 mph in summer.

The corridor lies just northeast of the Carquinez Strait and Suisun Bay. Prevailing winds are from the west, particularly during summer. During summer and fall, offshore high pressure, coupled with thermal low pressure in the Central Valley, caused by high inland temperatures, sets up a pressure pattern that draws marine air eastward through the Carquinez Strait. The wind is strongest in the afternoon because that is when the pressure gradient between the East Pacific high and the low pressure areas is greatest.

Sometimes, the pressure gradient reverses and flow from the east occurs. In summer and fall, this can cause elevated pollutant levels. Typically, for this to occur, high pressure is centered over the Great Basin or Pacific Northwest, setting up an east to west or northeast to southwest pressure gradient. These high-pressure periods have low wind speeds and shallow mixing depths, thereby allowing the localized emissions to build up. Furthermore, the air mass from the east is warmer, thereby increasing photochemical activity, and contains more pollutants than the usual cool, clean marine air from the west. During winter, easterly flow through the Carquinez Strait is more common. Between storms, with the high-pressure system no longer offshore, high pressure over inland areas causes easterly flow.

3.13.2.2 Pollutants of Concern

EPA has established NAAQS for several pollutants, including CO, NO_2, SO_2, ozone, inhalable particulate matter, and lead, for which ARB, YSAQMD, and BAAQMD have primary implementation responsibility. ARB, YSAQMD, and BAAQMD are also responsible for ensuring that California ambient air quality standards (CAAQS) are met. The current NAAQS and CAAQS are listed in Table 3.13-1, along with the attainment status for each of the air basins within Solano County. The attainment status is discussed below under "Attainment Status." Ozone, CO, and inhalable particulate matter are the pollutants of greatest concern for the project area. As discussed in the air quality report, there is no evidence to suggest that the project location would be routed in asbestos-containing rocks.[1]

Ozone

Ozone is a respiratory irritant that increases susceptibility to respiratory infections. It is also an oxidant that can cause substantial damage to vegetation and other materials. Ozone is not emitted directly into the air, but is formed by a photochemical reaction in the atmosphere. Ozone precursors—reactive organic gases (ROG) and oxides of nitrogen (NO_x)—react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer problem.

Ozone is considered a regional pollutant. Because photochemical reactions take time to occur, high ozone levels often occur downwind of the emission source. Because the predominant wind direction in the corridor and vicinity is from the west, Solano County is a receptor of regional pollutants such as ozone from the Bay Area. Therefore, ozone conditions in Solano County result from a combination of locally generated and transported emissions.

[1] PBS&J, Updated Air Quality Technical Report, Jepson Parkway Project, May 2008.

Table 3.13-1
Ambient Air Quality Standards Applicable in California and the Attainment Status of Solano County

			Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria		Attainment Status of Solano County	
Pollutant	**Symbol**	**Average Time**	**California**	**National**	**California**	**National**	**California**	**National**	**California**	**National**
Ozone	O_3	1 hour	0.09	–	180	–	If exceeded	–	SFBAAB and NSVAB: Nonattainment	No federal standard
		8 hours	0.07	0.08	137	–	If exceeded	If fourth highest 8-hour concentration in a year, averaged over 3 years, is exceeded at each monitor within an area	SFBAAB and NSVAB: Nonattainment	SFBAAB and NSVAB: Nonattainment
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year	SFBAAB and NSVAB: Attainment	SFBAAB: Attainment NSVAB: Unclassified/ Attainment
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year	SFBAAB and NSVAB: Attainment	SFBAAB: Attainment NSVAB: Unclassified/ Attainment
Nitrogen dioxide	NO_2	Annual average	0.03	0.053	56	100	If exceeded	If exceeded	SFBAAB and NSVAB: No designation	SFBAAB and NSVAB: Attainment
		1 hour	0.18	–	338	–	If exceeded	–	SFBAAB and NSVAB: Attainment	No federal standard
Sulfur dioxide	SO_2	Annual average	–	0.03	–	80	–	If exceeded	No state standard	SFBAAB and NSVAB: Attainment
		24 hours	0.04	0.14	105	365	If exceeded	If exceeded on more than 1 day per year	SFBAAB and NSVAB: Attainment	SFBAAB and NSVAB: Attainment

Table 3.13-1
Ambient Air Quality Standards Applicable in California and the Attainment Status of Solano County

Pollutant	Symbol	Average Time	Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria		Attainment Status of Solano County	
			California	National	California	National	California	National	California	National
		1 hour	0.25	–	655	–	–	–	SFBAAB and NSVAB: Attainment	No federal standard
Hydrogen sulfide	H_2S	1 hour	0.03	–	42	–	If equaled or exceeded	–	SFBAAB: Unclassified NSVAB: Attainment	No federal standard
Vinyl chloride	$C_2H_3C_l$	24 hours	0.010	–	26	–	If equaled or exceeded	–	SFBAAB No designation NSVAB: Attainment	No federal standard
Inhalable particulate matter	PM_{10}	Annual arithmetic mean	–	–	20	–	If exceeded	–	SFBAAB and NSVAB: Nonattainment	No federal standard
		24 hours	–	–	50	150	If exceeded	If average 1% over 3 years is exceeded	SFBAAB and NSVAB: Nonattainment	SFBAAB and NSVAB: Unclassified
	$PM_{2.5}$	Annual arithmetic mean	–	–	12	15	If exceeded	If exceeded	SFBAAB: Nonattainment NSVAB: No designation	SFBAAB and NSVAB: Attainment
		24 hours	–	–	–	35	–	If average 2% over 3 years is exceeded	No state standard	SFBAAB and NSVAB: Nonattainment
Sulfate particles	SO_4	24 hours	–	–	25	–	If equaled or exceeded	–	SFBAAB and NSVAB: Attainment	No federal standard

Table 3.13-1
Ambient Air Quality Standards Applicable in California and the Attainment Status of Solano County

			Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria		Attainment Status of Solano County	
Pollutant	**Symbol**	**Average Time**	**California**	**National**	**California**	**National**	**California**	**National**	**California**	**National**
Lead particles	Pb	Calendar quarter	–	–	–	1.5	–	If exceeded no more than 1 day per year	No state standard	SFBAAB and NSVAB: Attainment
		30 days	–	–	1.5	–	If equaled or exceeded	–	SFBAAB and NSVAB: Attainment	No federal standard

Source: ARB, "Area Designations for State and National Ambient Air Quality Standards."

Notes: All standards are based on measurements at 25°C and 1 atmosphere pressure; National standards shown are the primary (health effects) standards; – = not applicable; SFBAAB = San Francisco Bay Area Air Basin; NSVAB = Northern Sacramento Valley Air Basin.

Carbon Monoxide

CO is a public health concern because it combines readily with hemoglobin and reduces the amount of oxygen transported in the bloodstream. CO can cause health problems such as fatigue, headache, confusion, dizziness, and even death. Motor vehicles are the dominant source of CO emissions in most areas. High CO levels develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

Inhalable Particulate Matter

Particulates can damage human health and retard plant growth. Health concerns associated with suspended particulate matter focus on those particles small enough to reach the lungs when inhaled. Particulates also reduce visibility and corrode materials. The NAAQS and CAAQS for particulate matter applies to two classes of particulates—particulate matter less than or equal to 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$, respectively). PM_{10} sources in Solano County comprise both rural and urban sources, including agricultural burning, tilling of agricultural fields, industrial emissions, dust suspended by vehicle traffic, and secondary aerosols formed by reactions in the atmosphere.

Nitrogen Dioxide

NO_2 is a reddish brown gas that is a by-product of fuel combustion, mostly from motor vehicle and industrial sources. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as the active coloring agent in a brown cloud on high pollution days, especially when both NO_2 and high ozone levels are present.

Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA is the lead federal agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17229; March 29, 2001). This rule was issued

under the authority in Section 202 of the Clean Air Act. In its rule, EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64 percent increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel PM emissions by 87 percent.

As a result, EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The agency is preparing another rule under authority of CAA Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary six MSATs.

This EIS includes a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable us to predict the project-specific health impacts of the emission changes associated with the alternatives under the proposed project. Due to these limitations, the discussion is included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information.

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

Monitoring Data

The stations closest to the corridor that monitor ozone and PM_{10} are located in Vacaville, Fairfield, and Napa. The closest station that measures CO and NO_x is in Davis. No stations monitoring $PM_{2.5}$ are near or representative of the project area. Monitoring data from these stations for 2004 to 2006 is summarized in Table 3.13-2. During the monitoring period, Vacaville experienced occasional violations of the State ozone standard.

The CCAA requires local and regional air pollution control districts that are not attaining the CAAQS for ozone, CO, SO_2, or NO_2 to expeditiously adopt plans specifically designed to attain these standards. Each plan must be designed to achieve an annual five percent reduction in district-wide emissions of each nonattainment pollutant or its precursors. ARB is responsible for developing plans and projects that achieve compliance with the State PM_{10} standards.

Table 3.13-2
Ambient Air Quality Monitoring Data from Area Monitoring Stations

Pollutant Standards	2004	2005	2006
Ozone (O_3) (ppm)			
Maximum 1-Hour Concentration	0.096	0.090	0.106
Days Standard Exceeded			
CAAQS (1 Hour) > 0.09	1	0	3
Maximum 8-Hour Concentration	0.077	0.073	0.087
Days Standard Exceeded			
NAAQS (8-Hour) > 0.08	0	0	1
Carbon Monoxide (CO) (ppm)			
Maximum 8-Hour Concentration	0.98	0.69	0.56
Days Standard Exceeded			
NAAQS (8 Hours) ≥ 9.0	0	0	0
CAAQS (8 Hours) ≥ 9.0	0	0	0
Nitrogen Dioxide (NO_2) (ppm)			
Maximum 1-Hour Concentration	0.057	0.043	0.045
Days Standard Exceeded			
CAAQS (1 Hour) ≥ 0.18	0	0	0
Annual Average Concentration	0.009	0.009	0.009
Particulate Matter (PM_{10}) ($\mu g/m^3$)			
Maximum 24-Hour Concentration	44.0	33.0	22.0
Second-Highest 24-Hour Concentration	40.0	32.0	21.0
Average Arithmetic Mean Concentration	18.2	16.1	8.2
Days Standard Exceeded			
NAAQS (24 Hours) > 150	0	0	0
CAAQS (24 Hours) > 50[a]	0	0	0

Sources: ARB 2007; EPA 2007.

Notes: Ozone measurements were taken from the Fairfield Chadbourne Road station.

PM_{10} measurements were taken from the Vacaville Merchant Street station.

CO and NO_2 measurements were taken from the Vallejo Tuolumne Street station in Davis. These two pollutants are not monitored in Vacaville or Fairfield.

Measurements expressed as ppm (parts per million) or $\mu g/m^3$ (micrograms per cubic meter) as indicated.

a. Recorded every 6 days.

Attainment Status

If a pollutant concentration is lower than the respective State or federal standard, the area is classified as being in attainment of that standard. If a pollutant exceeds the standard in the manner prescribed by the appropriate federal or State regulatory agency, the area is considered a nonattainment area. If data are insufficient to determine whether a pollutant is violating the standard, the area is designated as unclassified; this occurs in nonurbanized areas where levels of the pollutant are not a concern. Table 3.13-1 summarizes the attainment status of Solano County for each pollutant within each of the air basins within the County (SFBAAB and NSVAB). The project area is currently designated as

"nonattainment" for the federal ozone and $PM_{2.5}$ standards and for the State ozone, PM_{10}, and $PM_{2.5}$ standards. The BAAQMD is considered a "maintenance" attainment area for CO, which indicates that the area was once designated as a non-attainment area for that pollutant, but is now designated as an attainment area in light of improved conditions. Except for West Sacramento, the YSAQMD is in attainment for this pollutant. Since the project area is in nonattainment for federal ozone and $PM_{2.5}$ standards, and is a CO maintenance area, the project is subject to general conformity regulations.

3.13.3 Impacts (including Permanent, Temporary, Direct, Indirect, and Cumulative)

3.13.3.1 Methodology

Construction

Construction activity is a source of dust and exhaust emissions that can have substantial temporary impacts on local air quality. These emissions would result from earthmoving, use of heavy equipment, as land clearing, ground excavation, cut-and-fill operations, and construction of roadways. Daily emissions can vary substantially, depending on the level of activity, specific operations, and prevailing weather. A major portion of dust emissions for the project would likely be caused by construction traffic on temporary construction roads. The primary emissions of concern from construction activities are PM_{10} and ozone precursors from diesel-fueled equipment.

YSAQMD and BAAQMD have construction emissions standards. However, federal conformity regulations (40 CFR 93.123 (c)(5)) only require analysis of construction impacts for construction activities that will last for more than five years. The proposed project's construction activities are expected to last less than five years; therefore the project impacts are considered temporary. To the extent possible, measures will be implemented to reduce construction emissions (see Section 3.13.4).

Operation

The primary operational emissions associated with the project are CO, PM_{10}, and ozone precursors emitted as vehicle exhaust. The effects of CO emissions were evaluated through CO dispersion modeling. The effects of PM_{10} and ozone precursors were evaluated through the conformity process.

Carbon Monoxide Dispersion Modeling

Predicting the ambient air quality impacts of pollutant emissions requires an assessment of the transport, dispersion, chemical transformation, and removal processes that affect pollutant emissions after their release from a source. Gaussian dispersion models are frequently used for such analyses. The term "Gaussian dispersion" refers to a general type of mathematical equation used to describe the horizontal and vertical distribution of pollutants downwind from an emission source.

Future ambient CO concentrations from traffic emissions were evaluated using CALINE4 (Benson 1989), a Gaussian dispersion model specifically designed to evaluate air quality impacts of roadway projects. Each roadway segment analyzed in the model is treated as a sequence of "links." CALINE4

uses worst-case meteorological data to predict a concentration that would never be exceeded, thereby producing a conservative estimate of a project's potential impacts.

Traffic volumes and operating conditions used in the modeling were obtained from the traffic analysis prepared for this project (PBS&J 2007). Conditions for 2010 and 2030 under Alternatives A to E were modeled using CALINE4. In general, only PM peak traffic was modeled because the level of service (LOS) and delays would be worse in the PM peak than in the AM peak. At the intersection of Peabody and Cement Hill Roads, however, both peaks were modeled to obtain the highest concentration because the LOS would be worse in the AM peak at that location. Based on LOS and peak hourly volumes, the intersections with the potential for causing the highest CO concentrations are the intersections of Canon Road and Vanden Road, Peabody Road and Cement Hill Road, Peabody Road and Elmira Road, and Depot Street and Elmira Road. CO concentrations were estimated at four receptors located 0 feet away from the edge of the roadway, at each intersection.

A background concentration of 6 parts per million (ppm) was added to the modeled 1-hour values to account for sources of ambient CO not included in the modeling (BAAQMD 1999). Eight-hour modeled values were calculated from the 1-hour values using a persistence factor of 0.7. A background concentration of 4.2 ppm was added to the modeled 8-hour values. One-hour background concentration data were taken from isopleths of ambient CO concentrations from the BAAQMD CEQA guidelines. One-hour CO monitored data in Solano County are not available from ARB. Actual 1- and 8-hour background concentrations in future years would likely be lower than those used in the CO modeling analysis because the trend in CO emissions and concentrations is decreasing because of continuing improvements in engine technology and the retirement of older, higher-emitting vehicles from the vehicle fleet.

Transportation Conformity

Transportation conformity requires that no federal money be used to fund a transportation project unless it can be clearly demonstrated that the project would not cause or contribute to violations of the NAAQS. Typically, conformity is assessed by evaluating whether a project is included in a conforming RTP and TIP. In addition, a local pollutant impact analysis is usually required.

The project is located in an area designated as nonattainment for the federal ozone standards. Because ozone and its precursors are considered regional pollutants, the project must be evaluated under the transportation conformity requirements. An affirmative regional conformity determination must be made before the project can proceed.

The regional transportation conformity regulations require, in addition to the regional conformity determination, that CO, PM_{10}, and $PM_{2.5}$ hotspots be evaluated for projects in federal nonattainment and maintenance areas. The project is in a CO maintenance area; therefore, CO modeling was conducted to evaluate potential CO hotspots. The project is also in a federal $PM_{2.5}$ nonattainment area. However, the proposed project is not considered a project of air quality concern for $PM_{2.5}$ (POAQC) because it does not meet the definition of a POAQC as defined in EPA's Transportation Conformity Guidance. PM hot-spot analysis is not required. The project has undergone Interagency Consultation

(IAC). IAC participants concurred that the project is not a POAQC. Public Notice of the conformity determination was provided on February 4, 2011 through notifications published in the Fairfield and Vacaville newspapers. No comments were received on the determination during the 15-day public comment period, which ended on February 22, 2011. Subsequent to the close of the comment period, FHWA concurred with the conformity determination (see Appendix K).

Summary of Air Quality Impacts

Table 3.13-3 summarizes the potential for each alternative to result in air quality impacts. As shown, each of the alternatives, including Alternative A, would not result in a violation of the CO standards for any intersections within the corridor. Construction of the build alternatives would result in construction-related emissions of ROG, NO_x, and PM_{10}. The project, including the associated alternatives, was included in a Regional Conformity Plan. There would be no impact from mobile source air toxics. Demolition under the build alternatives would potentially result in the release of asbestos-containing materials, which would be covered by existing regulations.

Impact AQ-1: Would the Alternatives Result in Violations of Carbon Monoxide NAAQS?

Alternative A. Traffic conditions for the year 2010 without the project were modeled to evaluate CO concentrations relative to the CAAQS. Modeled CO concentrations for the intersections of Canon Road and Vanden Road, Peabody Road and Cement Hill Road, Peabody Road and Elmira Road, and Depot Street and Elmira Road are shown in Table 3.13-4. Concentrations for these intersections are shown because the impacts at these locations would be higher than at any other project-affected intersections. Based on the data contained in Table 3.13-4, modeled CO concentrations under Alternative A are below the CAAQS. There would be no violations of the CO standards under Alternative A.

Alternative B. Based on the data contained in Table 3.13-4, modeled CO concentrations under Alternative B are below the CAAQS. There would be no violations of the CO standards under Alternative B.

Alternative C. Based on the data contained in Table 3.13-4, modeled CO concentrations under Alternative C are below the CAAQS. There would be no violations of the CO standards under Alternative C.

Alternative D. Based on the data contained in Table 3.13-4, modeled CO concentrations under Alternative D are below the CAAQS. There would be no violations of the CO standards under Alternative D.

Alternative E. Based on the data contained in Table 3.13-4, modeled CO concentrations under Alternative E are below the CAAQS. There would be no violations of the CO standards under Alternative E.

Table 3.13-3
Summary of Air Quality Impacts

Impact	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Violations of Carbon Monoxide NAAQS	No violations of CO standards	No violations of CO standards	No violations of CO standards	No violations of CO standards	No violations of CO standards
Increase ROG, NO_x, and PM_{10} Construction-Related Emissions	No Impact	Increased construction-related emissions	Increased construction-related emissions	Increased construction-related emissions	Increased construction-related emissions
Regional Conformity	No Impact	Included in a Regional Conformity Plan	Included in a Regional Conformity Plan	Included in a Regional Conformity Plan	Included in a Regional Conformity Plan
Mobile Source Air Toxics	No impact	No impact	No impact	No impact	No impact
Naturally Occurring Asbestos/Structural Asbestos	No impact	Demolition of potential asbestos containing materials would be covered by existing regulations	Demolition of potential asbestos containing materials would be covered by existing regulations	Demolition of potential asbestos containing materials would be covered by existing regulations	Demolition of potential asbestos containing materials would be covered by existing regulations

Table 3.13-4
Modeled Carbon Monoxide Concentrations at the Intersection Location of Maximum Impact for Alternatives A to E

Intersection	Alternative (ppm) (Project Start Year 2010)									
	A		B		C		D		E	
	1 Hour	8 Hours	1 Hour	8 Hours	1 Hour	8 Hours	1 Hour	8 Hours	1 Hour	8 Hours
Canon Road/ Vanden Road	6.0	4.2	6.4	4.5	6.4	4.5	6.4	4.5	6.0	4.2
Peabody Road/Cement Hill Road	7.7	5.4	8.0	5.6	8.8	6.2	8.0	5.6	7.7	5.4
Peabody Road/Elmira Road	8.6	6.0	7.8	5.5	8.2	5.7	8.8	6.2	8.8	6.2
Depot Street/ Elmira Road	7.8	5.5	7.7	5.4	7.7	5.4	7.7	5.4	7.8	5.5
*State Ambient Standards**	*20.0*	*9.0*	*20.0*	*9.0*	*20.0*	*9.0*	*20.0*	*9.0*	*20.0*	*9.0*

Note: Background concentrations of 4.7 and 1.7 ppm were added to the modeling 1- and 8-hour results, respectively.

* The federal 1- and 8-hour standards are 9 and 35 ppm, respectively.

Impact AQ-2: Would the Alternatives Increase ROG, NO_x, and PM_{10} Construction-Related Emissions?

Alternative A. Because the project would not be constructed under Alternative A, there would be no air quality impacts from construction activities.

Alternative B, C, D, and E. Construction of the project would occur over a period of approximately four years. Federal conformity regulations (40 CFR 93.123 (c) (5)) require analysis of construction impacts for construction activities that will last for more than five years.

During construction, short-term degradation of air quality may occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and other activities related to construction. Emissions from construction equipment also are anticipated and would include carbon monoxide (CO), nitrogen oxides (NOx), volatile organic compounds (VOCs), directly-emitted particulate matter (PM_{10} and $PM_{2.5}$), and toxic air contaminants such as diesel exhaust particulate matter. Ozone is a regional pollutant that is derived from NOx and VOCs in the presence of sunlight and heat.

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. Construction-related effects on air quality from most highway projects would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate PM_{10}, $PM_{2.5}$, and small amounts of CO, SO_2, NOx, and VOCs. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Caltrans' Standard Specifications (Section 10) pertaining to dust minimization requirements requires use of water or dust palliative compounds and will reduce potential fugitive dust emissions during construction.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NOx, VOCs and some soot particulate (PM_{10} and $PM_{2.5}$) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Impact AQ-3: Would the Alternatives Meet Regional Conformity?

Alternative A. Under Alternative A, roadway improvements for constructing the parkway would not be made; therefore, there would be no regional conformity conflicts.

Alternatives B, C, D, and E. Regional conformity is based on whether a project would cause or contribute to violations of the NAAQS. Regional conformation also requires a project-level hot spot analysis for projects that are within a federal nonattainment or maintenance area. The corridor is in a non-attainment area for federal ozone standards. Ozone is a regional pollutant. Ozone precursors are converted into ozone by photochemical reactions some distance downwind, over several hours. It is therefore unlikely for most transportation projects to create a localized ozone "hot spot." Increases in traffic would contribute to the regional ozone precursor emissions, and analysis of such emissions and their impact is normally done for regional planning. The project is also in a federal $PM_{2.5}$ nonattainment area. However, the proposed project is not considered a project of air quality concern for $PM_{2.5}$ (POAQC) because it does not meet the definition of a POAQC as defined in EPA's Transportation Conformity Guidance. Therefore, a PM hot-spot analysis is not required.

If a project is part of a Regional Transportation Plan, which has been shown to contribute to annual emission reductions, then the project would not reduce a region's ability to reach attainment. Air quality conformity analysis were conducted for the current Regional Transportation Plan for the Bay Area (the Transportation 2035 Plan), and for the 2011 TIP using the latest planning assumptions. The conformity determination was made under the motor vehicles emissions budget contained in the 2001 1-Hour Ozone Attainment Plan for the ozone precursors.

The project is fully funded and is in the 2035 RTP which was found to conform by the MTC on April 22, 2009. The project is also included in the MTC financially constrained 2011 TIP, page 366 and 367. The MTC TIP was found to conform by FHWA and FTA on December 14, 2010. The design concept and scope of the project is consistent with the project description in the 2035 RTP, 2011 TIP, and the assumptions in the MTC's regional emissions analysis. The project is listed in the 2035 RTP and 2011 TIP with the following project descriptions:

- "RTP ID Solano 94151 – Construct 4-lane Jepson Parkway from Route 12 to Leisure Town Road."
- "TIP ID SOL110003 – Jepson Parkway segment: Vanden Road project from Peabody Road to Leisure Town Road."
- "TIP ID SOL110004 – Jepson Parkway segment: Walters Road Extension – Peabody Widening."
- "TIP ID SOL110005 – Jepson Parkway segment: Leisure Town Road from Vanden Road to Alamo Road"
- "TIP ID SOL110006 – Jepson Parkway segment: Leisure Town Road from Alamo Road to Orange Road"

While this project would not implement a Transportation Control Measure (TCM)[2] identified in the SIP and RTP, it would not interfere with implementation of any TCMs. The build alternatives therefore meet the regional tests for conformity with the SIP.

Impact AQ-4: Would the Alternatives Result in an Increase in Mobile Source Air Toxics?

Alternative A. The FHWA's MSAT guidance considers projects like the proposed project to have low potential MSAT effects because it is intended to improve roadway operations without adding substantial new capacity and without creating a facility that is likely to increase emissions. For the purposes of this analysis, the roadway alignment for Alternative A has been separated into segments, where each segment has an associated traffic volume. From the traffic study, the segment with the highest Average Annual Daily Traffic (AADT) would be on Airbase Parkway, in the section between Walters Road and Peabody Road, with an AADT of 42,300 under Alternative A (the No Build Alternative). The amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. VMT are determined based on the AADT of each segment within the project corridor and the length of each segment.

Alternative B, C, D, and E. According to the traffic study for the proposed project, the segment within the project boundaries with the highest traffic volumes under the No Build Alternative would be on Airbase Parkway, in the section between Walters Road and Peabody Road. This segment would have a maximum AADT of 42,300 under Alternative A in 2030. While this roadway segment would have the highest background volumes, only Alternatives C and E would be located along this roadway segment. Under Alternative B and D, the project would not be located in this area, and would therefore have higher traffic volumes in other segments of the corridor. The maximum AADTs under each alternative in year 2030 are shown in Table 3.13-5. As shown in the table, the maximum AADT under Alternative B would be similar to the No Build Alternative, and Alternatives C, D, and E would result in an increase in AADTs higher than the No Build Alternative for each of the identified roadway segments.

According to the traffic study, the proposed project would be expected to result in similar truck percentage of total vehicles for all alternatives in 2030. The VMT estimated for each of the build alternatives is slightly higher than that for the Alternative A, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network (see Table 3.13-5). This increase in VMT would lead to higher MSAT emissions for the each of the build alternatives along the corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due a reduction in congestion. According to EPA's MOBILE6 emissions model, emissions of all of the priority MSATs, except for diesel particulate matter, decrease as speed increases. The extent to which these speed-related emissions decreases would offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

[2] Transportation Control Measures are regional measures used to reduce emissions. They are a broad array of strategies and can range from specific traffic control measures to the incorporation of carpool programs.

Table 3.13-5
Projected Average Annual Daily Traffic and Vehicle Miles Traveled Year 2030

Alternative	Maximum Average Annual Daily Traffic[1]	Vehicle Miles Traveled (1,000 miles)[2]	Percent Increase in Vehicle Miles Traveled over No Build Conditions
Alternative A	42,300	462.9	–
Alternative B	35,600	533.1	15%
Alternative C	53,000	519.2	12%
Alternative D	41,100	500.1	8%
Alternative E	48,100	542.7	17%

Notes:
1. Based on the segment within the corridor with the highest 24-hour volume.
2. Based on average annual daily traffic and length of the segments within the corridor.

Regardless of the alternative chosen, emissions would likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the build alternatives would have the effect of moving some traffic closer to nearby homes and businesses; therefore, under each build alternative there may be localized areas where ambient concentrations of MSATs could be higher under certain build alternatives than Alternative A. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built along Walters Road, under all alternatives, along Leisure Town Road, under Alternatives B, C, and D, and along Peabody Road under Alternative E. However, as discussed above, the magnitude and the duration of these potential increases compared to the Alternative A cannot be accurately quantified due to the inherent deficiencies of current models. In sum, when a roadway is widened and, as a result, moves closer to receptors, the localized level of MSAT emissions for the build alternative could be higher relative to the Alternative A, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSATs would be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, would over time cause substantial reductions that, in almost all cases, would cause region-wide MSAT levels to be substantially lower than today.

Impact AQ-5: Would the Alternatives Result in the Release of Naturally Occurring Asbestos (NOA) or Structural Asbestos?

Alternative A. Under Alternative A, roadway improvements for constructing the parkway would not be made; therefore, there would be no potential for the release of naturally occurring asbestos or structural asbestos.

Alternatives B, C, D, and E. As discussed in the air quality report, there is no evidence to suggest that the project location would be routed in asbestos-containing rocks. Therefore, the potential for naturally occurring asbestos is low. Under each of the build alternatives, the project would require relocation of underground utilities, potential relocation of buildings, and bridge improvements. These structures have the potential to include asbestos-containing materials (ACMs). Should the project geologist encounter asbestos or ACMs during construction, handling and disposal of these materials would be subject to existing regulations.

Impact AQ-6: Would the Alternatives Result in Cumulative Air Quality Effects?

Construction activities associated with the project would generate emissions of ROG, NO_x, and PM_{10}. The emissions generated would contribute to the already degraded cumulative air quality conditions in Solano County. Implementation of Mitigation Measures AQ-1 and AQ-2 would reduce the project's contribution to the cumulative impact.

Traffic conditions for the years 2010 and 2030 without the project were modeled to evaluate CO concentrations relative to the CAAQS. Modeled concentrations for the year 2010 are higher than those for the year 2030, although peak-hour traffic volumes are higher in the year 2030. This is due to the decrease in EMFAC2007 emission factors for carbon monoxide from the year 2010 to the year 2030. Based on the data contained in Table 3.13-4 above, modeled CO concentrations under all alternatives are below the CAAQS. Therefore, there would be no violations of the CO standards under cumulative years 2010 and 2030 conditions.

3.13.4 Avoidance, Minimization, and/or Mitigation Measures

Mitigation Measure AQ-1: Implement Construction Mitigation Measures to Reduce Construction Equipment Exhaust Emissions.

To the extent possible, STA or the appropriate local agency may require construction contractors to reduce construction-related emissions by implementing the following:

- restricting unnecessary vehicle idling to 5 minutes;
- requiring use of late model engines;
- requiring use of low-emission diesel products;
- requiring use of alternative fuels;
- requiring use of engine retrofit technology;

- requiring use of after-treatment products; and/or
- implementing other options as they become available.

Mitigation Measure AQ-2: Implement Construction Mitigation Measures to Reduce Construction Emissions, as Required by the BAAQMD. As discussed, BAAQMD requires implementation of control measures to reduce a project's construction impacts. Therefore, the following measures will be implemented to the extent possible as part of the project:

- Water exposed surfaces twice daily;
- Cover all trucks hauling soil, sand, and other loose materials or maintain at least 2 feet of freeboard;
- Pave, apply water three times daily, or apply nontoxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites;
- Sweep daily with water sweepers all paved access roads, parking areas, and staging areas at construction sites;
- Sweep streets daily with water sweepers if visible soil material is carried onto adjacent public streets;
- Hydroseed or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more);
- Enclose, cover, water twice daily, or apply nontoxic soil binders to exposed stockpiles (dirt, sand, etc.);
- Limit traffic speeds on unpaved roads to 15 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways; and/or
- Replace vegetation in disturbed areas as quickly as possible.

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