Memorandum

Date:	August 30, 2011
To:	Gordon Sweet, Project Engineer, BKF Engineers Christophe Schneiter, Assistant Public Works Director, City Engineer, City of Santa Cruz Yvonne Hoffman, Environmental Manager, Caltrans District 5
Cc:	
From:	Shannon Hatcher, Air Quality Specialist, ICF International Debbie Loh, Project Manager, ICF International
Subject:	**Santa Cruz Route 1/Route 9 Intersection Improvement Project, Air Quality Technical Memorandum**

Background

The California Department of Transportation (Caltrans) is proposing to construct improvements to the intersection of Route 1 and Route 9/River Street (Route 1/9 intersection) in the City of Santa Cruz, California. Caltrans is the NEPA lead agency (under Caltrans assumption of responsibility pursuant to 23 U.S.C. 327) and CEQA lead agency for this project since Routes 1 and 9 are under Caltrans' jurisdiction.

An air quality technical memorandum was prepared for this project and reviewed by Caltrans District 5 in June 2007. Since that time, minor changes to the project have been proposed. The purpose of this memo is to incorporate Caltrans comments and to update the project description. The changes to the project primarily affect the southeast quadrant of the intersection and involve construction of an earthen embankment into the adjacent drainage culvert (known as the Arroyo de San Pedro Regaldo) to accommodate standard lane and shoulder width dimensions. This project change does not substantively affect the air quality analysis that was conducted for the original noise technical memo reviewed by Caltrans.

Project Description

Project Location

The proposed project is located at the intersection at Route 1/9 in the City of Santa Cruz, Santa Cruz County, California. Figure 1 shows the project location. The purposes of the project are to:

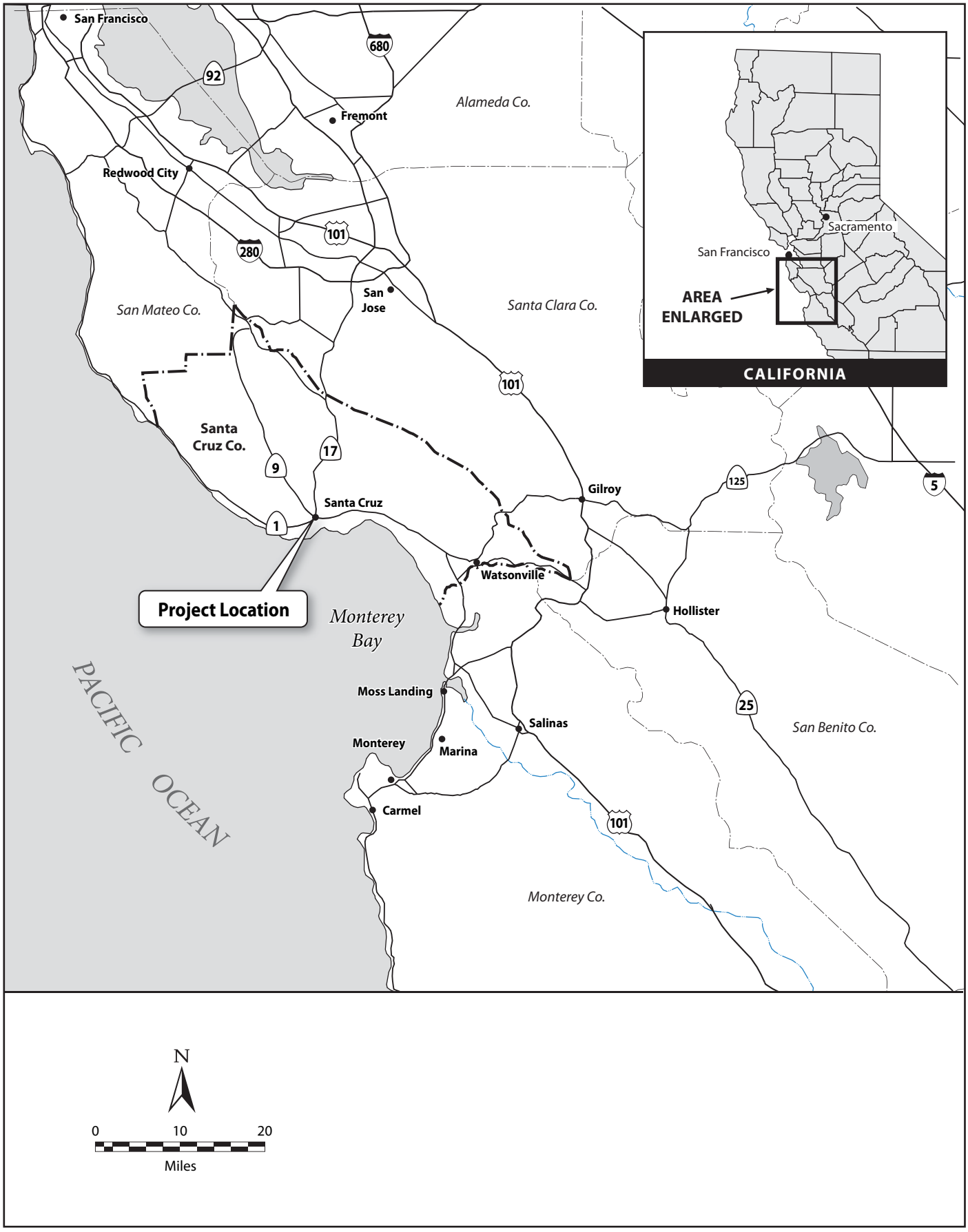


Figure 1
Regional and Project Location

- Alleviate congestion at the Route 1/9 intersection
- Accommodate existing and projected traffic volumes at the Route 1/ 9 intersection
- Improve safety

Proposed Improvements

The following improvements are proposed at the Route 1/9 intersection (listed below by segment). The project design plan is shown in Figure 2. Right-of-way acquisition and temporary construction easements that would be required for the project are identified in Figure 2 and Table 1.

Although both Route 1 and Route 9 are generally considered north-south thoroughfares, in the project area, Route 1 runs east-west orientation and Route 9 runs north-south. Thus, travel lanes on Route 1 are referred to as running in an "eastbound" or "westbound" direction, and travel lanes on Route 9 are referred to as running in a "northbound" or "southbound" direction.

Route 9 (north of the Route 1/9 intersection)

Northbound Route 9

- Add a second northbound lane and an 8-foot shoulder on northbound Route 9, from Route 1 to Fern Street, to receive vehicular and bicycle traffic from both the new left-turn lane on Route 1 and the converted shared left/through lane from northbound River Street.
- Add a 4-foot through bike lane, 12-foot right turn lane, and 4-foot shoulder on northbound Route 9, between Fern Street and Encinal Street, to accommodate bicycle through traffic, and vehicular traffic turning into the Tannery Arts Center.
- Replace channelizers with a 2-foot raised concrete median along Route 9 from Route 1 to Fern Street.

These improvements, all of which are standard lane and shoulder width dimensions, would require widening the existing roadway. Curb and gutter (at locations noted above) would be constructed along Route 9 from the Route 1/9 intersection to the south side of the Route 9/Encinal Street intersection.

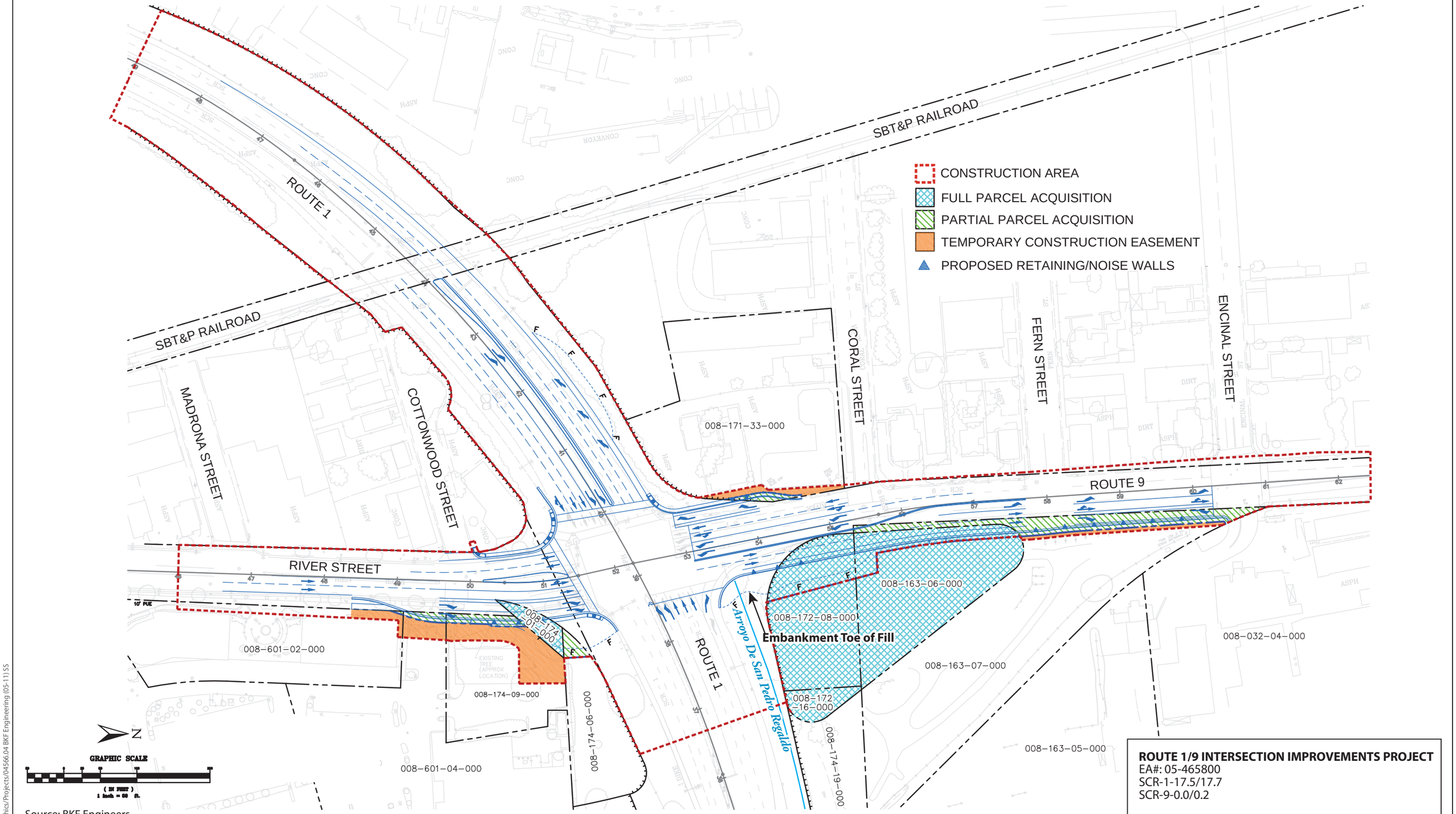
An earthen embankment would be constructed to support the roadway widening over the drainage culvert (known as Arroyo de San Pedro Regaldo) located at the northeast corner of the Route 1/9 intersection (see Figure 2). The embankment would have a 2:1 slope with the toe of the embankment extending approximately 20-40 feet beyond the existing roadway. The existing culvert would be extended approximately 10 feet. The existing concrete apron and cutoff wall that extend approximately 25 feet from the existing culvert would remain in place or reconstructed "in-kind". All construction activities would be conducted during the dry season. Dewatering would be accomplished by using small check dams and bypass pipes.

Table 1 Proposed Right-of-Way Acquisition and Temporary Construction Easements

APN No.	Property Owner	Land Use	Square Footage			
			Required for Road Right-of-Way	Excess on Full Property Acquisitions[1]	Temporary Construction Easement	Comments
Northwest Quadrant of SR 1/9 Intersection						
008-171-33-000	City of Santa Cruz	Homeless Services Center	741	0	1,751	
Northeast Quadrant of SR 1/9 Intersection						
008-163-06-000	Santee	Central Home Supply Business (landscaping and building supply)	30,709	24,879	0	Entire parcel is not needed for roadway right-of-way. A number of options will be evaluated during final design. Full acquisition of this parcel is assumed for this analysis.
008-172-16-000	Santee	Materials Storage for Central Home Supply	3,253	3,253	0	Parcel not needed for roadway right-of-way. However, full acquisition is assumed since the owner of this parcel also owns APN 008-163-06-000.
008-172-08-000	Santee	Residence at 744 River Street	23,013	15,850	0	
008-163-07-000	State of California	Undeveloped	8,579	0	1,397	
Southeast Quadrant of SR 1/9 Intersection						
008-174-01-000	City of Santa Cruz	Undeveloped	2,278	0	0	
008-174-06-000	City of Santa Cruz	Undeveloped	845	0	0	
008-174-09-000	Tedesco	Gateway Plaza Shopping Center	1,387	0	6,012	
008-601-02-000	SPG Associates	Gateway Plaza Shopping Center	47	0	988	
008-601-04-000	Gateway Plaza Associates	Gateway Plaza Shopping Center	650	0	1,499	

Shaded parcels indicate full acquisition is required.

[1] Square footage that is not directly needed for the proposed roadway right-of-way.



Source: BKF Engineers

ROUTE 1/9 INTERSECTION IMPROVEMENTS PROJECT
EA#: 05-465800
SCR-1-17.5/17.7
SCR-9-0.0/0.2

Graphics/Projects/04566.04 BKF Engineering (05-11)SS

Figure 2
Plan View

The road widening would result in the displacement of a private residence (744 River Street, Assessor's Parcel Number [APN] 008-172-08-000) on the east side of Route 9 located between the drainage culvert and the Central Home Supply (808 River Street, APN 008-163-06-000), a landscape and building supply business, both owned by the same property owner. The road widening would also result in loss of unofficial parking in front of Central Home Supply and would displace a portion of the Central Home Supply's showroom; the entire Central Home Supply parcel is not needed to accommodate the additional right-of-way needed for the project. Although full acquisition of APN 008-163-06-000 is not required to accommodate the proposed right-of-way, full acquisition of this parcel is assumed for the purposes of the environmental analysis conducted for this project as a worst-case assumption. Since full acquisition of the parcel that houses the Central Home Supply buildings may be required, full acquisition of APN 008-172-16-000, also owned by the property owner of APN 008-172-08-000 and 008-163-06-000, is also assumed. This parcel is used by Central Home Supply for materials storage.

Road widening may require construction of a retaining wall on the east side of Route 9 between Encinal Street and the Central Home Supply's driveway located south of Fern Street. The area along Central Home Supply is currently within Caltrans right-of-way and is being leased by Central Home Supply. The proposed improvements would also result in the removal of a number of street trees near the Route 9/Fern Street intersection.

Southbound Route 9

- Add a new shared through/left turn lane on southbound Route 9 to permit a triple left onto eastbound Route 1 and two through (receiving) lanes to southbound River Street.
- Add a 4-foot through bike lane to accommodate bicycle through traffic.

These improvements, all of which are standard lane and shoulder width dimensions, would require widening of the existing roadway and removal of the existing landscaping immediately adjacent to the Rebeles Family Shelter that is part of the City-owned Homeless Services Center (115 Coral Street) located at the corner of Route 9 and Coral Street. The Rebeles Family Shelter structure would not be directly affected, but the southeast corner of the structure would be moved closer to the travel lanes. The nearest lane is currently about 28 feet from the shelter and the new turn pocket would be about 19 feet from the shelter. Due to the standardization of the lane widths, the upstream lane that contributes to this right-turn pocket would actually be seven feet further away from the structure. The road widening may also require the reconstruction of a masonry block wall located at the corner immediately south of the Homeless Services Center and result in the removal of ornamental trees and shrubs adjacent to the masonry wall. Curb, gutter and sidewalk would be reconstructed from the Route 1/9 intersection to Coral Street. Road widening could also require the relocation of various road signs; an ornamental metal picket fence; electrical power poles; light poles along the sidewalk between Route 1 and Coral Street; an existing storm drain inlet; and an electrical box near the northwest quadrant of the Route 1/9 intersection.

River Street (south of the Route 1/9 intersection)

Northbound River Street

- Revise the left turn lane to provide a shared through/left turn lane, so two lanes turn onto westbound Route 1.

- Extend the queuing length for the two right turn lanes onto eastbound Route 1.

These improvements, all of which are standard lane and shoulder width dimensions, would require widening of the existing roadway. Curb, gutter, and sidewalk would be reconstructed from the Route 1/9 intersection to a point approximately 300 feet south of the intersection. Due to the elevation difference between the roadway and the existing grade immediately southeast of the intersection, a retaining wall may be necessary to minimize impacts to the adjacent properties. Where there is sufficient room to grade, the slope would be graded to a 2:1 (horizontal: vertical) maximum slope. The existing street frontage landscaping would be removed, and the sidewalk would be narrowed from eight feet to five feet. Road widening would also result in the removal of approximately five street trees; relocation of a utility joint trench located beneath the existing sidewalk including utility boxes, vaults, backflow preventers, roadside signs, and street lights; and reconstruction of the pedestrian and bicycle access to the Gateway Plaza shopping center. Road widening would also impact the driveway to the commercial office building located at 700/720 River Street which could require reconstruction of the driveway and the retaining wall (including hand railing) immediately adjacent to the commercial office, necessitate the removal of two redwood trees (including one of heritage size), and result in the loss of one to two onsite parking spaces along the driveway.

Additionally, the narrow concrete raised median in the middle of River Street, between Madrone Street and Cottonwood Street, would be removed and replaced with a double-yellow median stripe. The median surrounding the existing River Street gateway sign would be reconstructed to accommodate the new alignment, and the gateway sign would need to be removed and/or relocated.

Southbound River Street

- Realign the two lanes to receive traffic from the two through lanes on southbound Route 9.

These improvements all which are standard lane and shoulder width dimensions, would require widening of southbound River Street from the Route 1/9 intersection to the River Street/Cottonwood Street intersection. To accommodate curb, gutter, and sidewalk (including curb returns), the street frontage landscaping, including two street trees, would be removed, and the existing sidewalk would be narrowed from eight feet to five feet. The existing street light poles and other utility facilities would be relocated due to the widening.

Route 1 (west of Route 1/9 intersection)

Eastbound Route 1

- Add a left turn lane on eastbound Route 1 so that two lanes turn onto northbound Route 9.
- Remove the existing traffic signal mast arm and "pork chop" island between the right turn lane and through lane. A new signal mast arm will be installed at the curb return at the southwest corner of the intersection of Route 1/River Street, just south of the handicap ramps.
- Reconstruct the median, from the Route 1/9 intersection to the SCBT&P railroad tracks, to accommodate the additional left turn lane.
- Road widening would be minor and within the Caltrans right-of-way. The crosswalk would be restriped to align with the reconstructed median.

Westbound Route 1

- Minor widening and striping realignment of westbound Route 1 due to widening associated with the second left turn lane along eastbound Route 1.
- Road widening would be minor and within the Caltrans right-of-way. There would be no impacts to existing land uses or resources.

Route 1 (east of Route 1/9 intersection)

Eastbound Route 1

- Minor modification to the median nose to accommodate Route 1/9 intersection improvements, including receiving the triple left-turn movement from southbound Route 9.
- These improvements would not require road widening.

Westbound Route 1

There are no improvements proposed on westbound Route 1 east of the Route 1/9 intersection.

Regulatory Setting

Federal Requirements

The federal Clean Air Act (CAA), promulgated in 1970 and amended twice thereafter (including the 1990 amendments), establishes the framework for modern air pollution control. The act directs EPA to establish national ambient air quality standards (NAAQS) (Table 2) for six criteria pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead, and particulate

Table 2. Ambient Air Quality Standards Applicable in California and the Attainment Status of Santa Cruz County

Pollutant	Symbol	Average Time	Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria		Attainment Status of Santa Cruz County	
			California	National	California	National	California	National	California	National
Ozone*	O_3	1 hour	0.09	–	180	–	If exceeded	–	Moderate 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 exceeded at each monitor within an area	Nonattainment	Unclassified/attainment
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year	Unclassified	Unclassified/attainment
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year	Unclassified	Unclassified/attainment
(Lake Tahoe only)		8 hours	6	–	7,000	–	If equaled or exceeded	–	–	–
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	188	If exceeded	–	Attainment	Attainment
Sulfur dioxide	SO_2	24 hours	0.04	–	105	–	If exceeded	If exceeded on more than 1 day per year	Attainment	–
		1 hour	0.25	0.075	655	196	If exceeded	–	Attainment	Unclassified/attainment
		3 hour	–	0.5[a]	–	1,300[a]	If exceeded	–	–	–
Hydrogen sulfide	H_2S	1 hour	0.03	–	42	–	If equaled or exceeded	–	Unclassified	–
Vinyl chloride	C_2H_3Cl	24 hours	0.01	–	26	–	If equaled or exceeded	–	No designation	–
Inhalable particulate matter	PM10	Annual arithmetic mean	–	–	20	–	–	–	Nonattainment	–
		24 hours	–	–	50	150	If exceeded	If exceeded on more than 1 day per year	Nonattainment	Unclassified/attainment
	PM2.5	Annual arithmetic mean	–	–	12	15	–	If 3-year average from single or multiple community-oriented monitors is exceeded	Attainment	Unclassified/attainment
		24 hours	–	–	–	35	–	If 3-year average of 98th percentile at each population-oriented monitor within an area is exceeded	–	Unclassified/attainment
Sulfate particles	SO_4	24 hours	–	–	25	–	If equaled or exceeded	–	Attainment	–
Lead particles	Pb	Calendar quarter	–	–	–	1.5	–	If exceeded no more than 1 day per year	–	Unclassified/attainment
		30-day average	–	–	1.5	–	If equaled or exceeded	–	Attainment	–

Table 2. Continued

Pollutant	Symbol	Average Time	Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria		Attainment Status of Santa Cruz County	
			California	National	California	National	California	National	California	National
		Rolling 3-month average	–	–	–	0.15	If equaled or exceeded	Averaged over a rolling 3-month period	–	–

[a] Refers to a secondary standard only.

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

matter (PM), which consists of PM less than or equal to 10 microns (PM_{10}) and PM less than or equal to 2.5 microns ($PM_{2.5}$).

Regional Conformity—Ozone Precursors

Under the 1990 CAA Amendments, 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 the CAA requirements. The DOT and EPA developed guidance for determining conformity of transportation plans, programs, and projects in November 1993 in the Transportation Conformity Rule (40 CFR 51, 93). Projects must conform to the CAA on two levels: regional and project-level. On a regional level, transportation conformity is evaluated by identifying whether the proposed project is included in a conforming RTP because any project listed in an RTP must demonstrate conformity with the State Implementation Plan (SIP) that demonstrates how federal air quality standards will be achieved. RTPs, which are prepared by the local metropolitan planning organization (MPO), are developed to include all of the transportation projects planned for a region over a period of years (usually 20 years). Based on the projects included in the RTP, air quality modeling is conducted by the local MPO to determine whether emissions associated with implementation of those projects included in the RTP would exceed the allowable emission budgets from the SIP for ozone precursors, CO, and PM_{10}. If no violations would occur, the MPO and the appropriate federal agency determine that the RTP is in conformity with the SIP.

The Association of Monterey Bay Area Governments (AMBAG) is the responsible MPO in Santa Cruz County, and is responsible for the preparation of the RTP and associated demonstration of conformity with the SIP. The proposed project is included in the *Long Range Metropolitan Transportation Plan (MTP) for the Monterey Bay Area* (Monterey Bay Area Mobility 2035) and the FY 2010-11 to 2013-14 *Metropolitan Transportation Improvement Program* (MTIP) and associated conformity analysis prepared by AMBAG and adopted on September 23, 2010. The proposed project is included in the MTP and MTIP as MPO ID SC25 and CTIPS ID 201-0000-0416. Because the proposed project is listed in the MTIP, it is a conforming project for ozone precursors and in conformity with the SIP. Consequently, the proposed project is a conforming project and would not conflict with or obstruct implementation of an applicable air quality plan.

Localized "Hotspot" Conformity

Because PM_{10}, $PM_{2.5}$, and CO are localized pollutants, the determination of transportation conformity for these pollutants is assessed at the project-level by identifying whether the proposed project would generate elevated "hotspot" concentrations for these pollutants. For PM_{10} and $PM_{2.5}$, the determination of conformity can be quantitative or qualitative; for CO, the determination is quantitative.

Mobile Source Air Toxics (MSATs)

The FHWA has issued interim guidance on how MSATs should be addressed in NEPA documents for highway projects. The FHWA has developed a tiered approach for analyzing MSATs in NEPA

documents. Depending on the specific project circumstances, FHWA has identified three levels of analysis:

- No analysis for exempt projects or projects with no potential for meaningful MSAT effects;
- Qualitative analysis for projects with low potential MSAT effects; or
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

State Requirements

Responsibility for achieving California ambient air quality standards (CAAQS) (Table 2), which are more stringent than NAAQS, is placed on the CARB and local air pollution control districts (in this case, the MBUAPCD). CAAQS are to be achieved through district-level air quality management plans that are incorporated into the state implementation plan. The California CAA requires local and regional air pollution control districts that are not attaining one or more of the CAAQS for ozone, CO, sulfur dioxide, or nitrogen dioxide to expeditiously adopt plans specifically designed to attain the standards. Each plan must be designed to achieve an annual 5% reduction in district-wide emissions of each non-attainment pollutant or its precursors.

Local Requirements

The MBUAPCD has adopted emission thresholds to determine the level of significance of a project's emissions. The air district has also adopted SIPs to prevent air quality impacts from ozone, as well as several rules and regulations to reduce emissions throughout the region. The proposed project may be subject to the following district rules. Failure to comply with any applicable district rule would be a violation subject to district enforcement action.

- **Rule 400, Visible Emissions:** Limits visible emissions from sources within the District.
- **Rule 403, Particulate Matter:** Restricts emissions of PM in excess of 0.15 grain per standard dry cubic foot of exhaust gas.
- **Rule 425, Use of Cutback Asphalt:** Limits the sale and use of liquid asphalt or emulsified asphalt product.
- **Rule 1010, Air Toxics Control Measure for Stationary Compression Ignition Engines:** Limits emissions of diesel PM (DPM) from stationary compression ignition engines.

Greenhouse Gases and Climate Change

Although there is currently no federal overarching law or policy related to climate change or the regulation of greenhouse gases (GHGs), recent activity suggests that regulation may be forthcoming. Foremost among recent developments have been the U.S. Supreme Court's decision in

Massachusetts v. EPA, the "Endangerment Finding," and the "Cause or Contribute Finding," which are described below. Despite these findings, the future of GHG regulations at the federal level is still uncertain. EPA regulation may be preempted by congressional action should a cap and trade bill be passed prior to adoption of EPA regulation.

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. Executive Order S-3-05 was passed in 2005 and orders state agencies to reduce GHG emissions to: (1) 2000 levels by 2010, (2) 1990 levels by 2020, and (3) 80% below 1990 levels by 2050. Assembly Bill 32 (AB 32) sets the same overall GHG emissions reduction goals as Executive Order S-3-05, while further mandating that ARB create a plan (that includes market mechanisms) and implement rules to achieve "real, quantifiable, cost-effective reductions" of GHGs. The State has also adopted CEQA guidelines for the evaluation of impacts to climate change and is in the processed of approving measures to enact a GHG Cap-and-Trade program.

Physical Setting

The project site is located in Santa Cruz County and within the North Central Coast Air Basin (NCCAB). The NCCAB comprises 5,159 square miles along the central coast and includes Monterey, Santa Cruz, and San Benito Counties. The northwest sector of the basin is dominated by the Santa Cruz Mountains. The Diablo Range marks the northeastern boundary and, together with the southern extent of the Santa Cruz Mountains, forms the Santa Clara Valley, which extends into the northeastern tip of the basin. Farther south, the Santa Clara Valley evolves into the San Benito Valley, which extends northwest–southeast and has the Gabilan Range as its western boundary. To the west of the Gabilan Range is the Salinas Valley, which extends from Salinas at the northwest end to King City at the southeast end. The western side of the Salinas Valley is formed by the Sierra de Salinas, which also form the eastern side of the smaller Carmel Valley; the coastal Santa Lucia Range defines the western side of the valley.

The semi-permanent high-pressure cell in the eastern Pacific is the basic controlling factor in the climate of the air basin. In the summer, the high-pressure cell is dominant and causes persistent west and northwest winds over the entire California coast. Air descends in the Pacific High forming a stable temperature inversion of hot air over a cool coastal layer of air. The onshore air currents pass over cool ocean waters to bring fog and relatively cool air into the coastal valleys. The warmer air aloft acts as a lid to inhibit vertical air movement.

The generally northwest–southeast orientation of the mountain ridges tends to restrict and channel the summer onshore air currents. Surface heating in the interior portion of the Salinas and San Benito Valleys creates a weak low pressure, which intensifies the onshore airflow during the afternoon and evening.

In the fall, the surface winds become weak, and the marine layer grows shallow, dissipating altogether on some days. The airflow is occasionally reversed in a weak offshore movement, and the relatively stationary air mass is held in place by the Pacific high-pressure cell, which allows pollutants to build up over a period of a few days. It is most often during this season that the north

or east winds develop to transport pollutants from either the San Francisco Bay area or the Central Valley into the NCCAB.

During the winter, the Pacific High migrates southward and has less influence on the air basin. Air frequently flows in a southeasterly direction out of the Salinas and San Benito Valleys, especially during night and morning hours. Northwest winds are nevertheless still dominant in winter, but easterly flow is more frequent. The general absence of deep, persistent inversions and the occasional storm systems usually result in good air quality for the basin as a whole in winter and early spring.

Attainment Status

Areas are classified as either attainment or nonattainment with respect to state and federal ambient air quality standards. These classifications are made by comparing actual monitored air pollutant concentrations to state and federal standards.

The EPA has classified Santa Cruz County as an unclassified/attainment area for the 1-hour ozone, CO, PM_{10}, and $PM_{2.5}$ standards. The CARB has classified Santa Cruz County as a moderate nonattainment area for the 8-hour ozone standard. For the CO standard, the CARB has classified Santa Cruz County as an unclassified area. The CARB has classified Santa Cruz County as a nonattainment area for the PM_{10} standard and an attainment area for the $PM_{2.5}$ standard. Santa Cruz County's attainment status for each of these pollutants relative to the NAAQS and CAAQS is summarized in Table 2.

Monitoring Data

The existing air quality conditions in the project area can be characterized by air quality monitoring data collected in the region. Monitoring data for the last 3 years (2007 to 2009) are presented in Table 3. Table 3 summarizes monitoring data for the pollutants of concern in the NCCAB. The closest air quality monitoring station is located at 2544 Soquel Avenue in Santa Cruz.

Sensitive Receptors

The MBUAPCD generally defines a sensitive receptor as a location where human populations, especially children, seniors, and sick persons, are located where there is reasonable expectation of continuous human exposure according to the averaging period for the AAQS (e.g., 24-hour, 8-hour, 1-hour). Sensitive receptors typically include residences, hospitals, and schools. Sensitive receptors in the vicinity of the project site include a single-family residence located in the northeast quadrant of the intersection (744 River Street) but this residence will be removed as part of the proposed project. The northwest quadrant contains the Homeless Services Center Complex including the Rebele Family Shelter at the corner of SR 9/Coral Street that contains emergency housing for the homeless.

Table 3. Ambient Air Quality Monitoring Data Measured at the Santa Cruz Soquel Avenue Monitoring Station

	Year		
Pollutant Standards	**2008**	**2009**	**2010**
1-Hour Ozone			
Maximum 1-hour concentration (ppm)	0.086	0.073	0.077
1-hour California designation value	0.07	0.07	0.07
1-hour expected peak day concentration	0.073	0.073	0.074
Number of days standard exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	0	0	0
8-Hour Ozone			
National maximum 8-hour concentration (ppm)	0.066	0.061	0.059
National second-highest 8-hour concentration (ppm)	0.059	0.060	0.054
State maximum 8-hour concentration (ppm)	0.066	0.061	0.059
State second-highest 8-hour concentration (ppm)	0.059	0.061	0.055
8-hour national designation value	0.054	0.055	0.056
8-hour California designation value	0.060	0.061	0.061
8-hour expected peak day concentration	0.061	0.062	0.062
Number of days standard exceeded[a]			
NAAQS 8-hour (>0.075 ppm)	0	0	0
CAAQS 8-hour (>0.070 ppm)	0	0	0
Carbon Monoxide			
National maximum 8-hour concentration (ppm)[b]	-	-	-
National second-highest 8-hour concentration (ppm) [b]	-	-	-
California maximum 8-hour concentration (ppm)[c]	-	-	-
California second-highest 8-hour concentration (ppm)[c]	-	-	-
Maximum 1-hour concentration (ppm)	-	-	-
Second-highest 1-hour concentration (ppm)	-	-	-
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
PM10[d]			
National[b] maximum 24-hour concentration ($\mu g/m^3$)[b]	44.0	35.0	31.0
National[b] second-highest 24-hour concentration ($\mu g/m^3$)[b]	35.0	35.0	30.0
California maximum 24-hour concentration ($\mu g/m^3$)[c]	45.0	36.0	31.0
California second-highest 24-hour concentration ($\mu g/m^3$)[c]	35.0	36.0	31.0
California annual average concentration ($\mu g/m^3$)[e]	18.8	16.4	14.6
Number of days standard exceeded[a]			
NAAQS 24-hour (>150 $\mu g/m^3$)[f]	0	0	0
CAAQS 24-hour (>50 $\mu g/m^3$)[f]	0	0	0
PM2.5			
National maximum 24-hour concentration ($\mu g/m^3$)[b]	14.9	24.5	32.8
National second-highest 24-hour concentration ($\mu g/m^3$)[b]	12.5	12.0	15.7
California maximum 24-hour concentration ($\mu g/m^3$)[c]	14.9	24.5	-
California second-highest 24-hour concentration ($\mu g/m^3$)[c]	12.5	12.0	-
National annual designation value ($\mu g/m^3$)	6.7	6.3	6.3
National annual average concentration ($\mu g/m^3$)	6.7	5.6	6.5
California annual designation value ($\mu g/m^3$)	7	7	-
California annual average concentration ($\mu g/m^3$) [e]	6.8	5.7	-
Number of days standard exceeded[a]			
NAAQS 24-hour (>35 $\mu g/m^3$)[f]	0	0	0

Table 3. Ambient Air Quality Monitoring Data Measured at the Santa Cruz Soquel Avenue Monitoring Station

Pollutant Standards	Year 2008	2009	2010

CAAQS = California ambient air quality standards.
NAAQS = national ambient air quality standards.
ppm = parts per million.
$\mu g/m^3$ = micrograms per cubic meter.
– = insufficient data available to determine the value.
An exceedance is not necessarily a violation.
National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.
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.
Usually, measurements are collected every 6 days.
State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
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.
Sources: California Air Resources Board 2011

Impacts

Thresholds

The MBUAPCD has established significance thresholds within its *CEQA Air Quality Guidelines* (2008) to determine whether project-related air quality impacts need mitigation. Based on consultation with MBUAPCD staff (Brennan pers. comm.) and the MBUAPCD's CEQA air quality guidelines, Table 4 summarizes applicable thresholds that are used in the analysis of significant air quality impacts.

Table 4. Monterey Bay Unified Air Pollution Control District Thresholds of Significance

Pollutant	Construction	Operation[1]
Reactive Organic Gases (ROG)	NA[2]	137 pounds per day
NO_x	NA[2]	137 pounds per day
CO	NA	550 pounds per day
PM_{10}	82 pounds per day	82 pounds per day
$PM_{2.5}$	NA	NA
SO_x	NA	150 pounds per day
Toxic Air Containments (TAC)	Cancer incidence >1 in 100,000 population	Cancer incidence >1 in 100,000 population

Notes:

Projects that emit other criteria pollutant emissions would have a significant impact if emissions would cause or substantially contribute to the violation of the NAAQS or CAAQS. Criteria pollutant emissions could also have a significant impact if they would alter air movement, moisture, temperature, climate, or create objectionable odors in substantial concentrations.

[1] The MBUAPCD does not have significance thresholds for construction-related ozone precursors from typical construction equipment because they are accommodated in the emission inventories of State- and federally required air plans and would not have a significant impact on the attainment and maintenance of ozone AAQS.

[2] Based on the construction threshold of 82 pounds per day of PM_{10}, the MBUAPCD has identified levels of construction activity that could result in a significant impact. For construction activities with minimal earthmoving, the MBUAPCD has identified construction sites that disturb more than 8.1 acres per day as having the potential to exceed the District's 82 pounds per day threshold. For construction activities involving grading, excavation, and other earthmoving activities, the MBUAPCD has identified construction sites that disturb more than 2.2 acres per day as having the potential to exceed the District's 82 pounds per day threshold.

Source: Monterey Bay Unified Air Pollution Control District 2008.

Analysis Methods

The proposed project would result in both construction and operational emissions. Construction emissions were evaluated using the Road Construction Emissions Model (Version 6.3). The road construction model is a public-domain spreadsheet model formatted as a series of individual worksheets. The model enables users to estimate emissions using a minimum amount of project-specific information. The model estimates emissions for load hauling (on-road heavy-duty vehicle trips), worker commute trips, construction site fugitive PM_{10} dust, and off-road construction vehicles.

The effects of CO, PM_{10}, $PM_{2.5}$, and ozone precursors were evaluated through the conformity process. CO emissions were evaluated qualitatively using Caltrans' *Transportation Project-Level CO Protocol* (*Protocol*) (Garza et al. 1997). PM_{10} and $PM_{2.5}$ were evaluated using the EPA's December 2010, *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas* (U.S. Environmental Protection Agency 2010b). Ozone precursors were evaluated qualitatively by determining if the proposed project is included in a conforming RTP.

The primary operational emissions associated with the project would be CO, PM_{10}, and ozone precursors (ROG and NO_x) emitted as vehicle exhaust. These emissions were evaluated qualitatively based on information provided by the project traffic engineer, Hexagon Transportation Consultants.

Impact AQ-1: Construction Emissions in Excess of Monterey Bay Unified Air Pollution Control District Standards. Implementation of the proposed project would result in the construction of a widened intersection and construction of an embankment to accommodate the widened roadways. Temporary construction emissions would result from grubbing/land clearing, grading/excavation, drainage/utilities/subgrade, and paving activities and construction worker commuting patterns. Pollutant emissions would vary daily, depending on the level of activity, specific operations, and prevailing weather. It is anticipated that construction activities would begin in 2013 and occur over a 9-month period.

The Road Construction Emissions Model (Version 6.3) was used to estimate construction-related ozone precursors (ROG and NOx), CO, and PM10 emissions from construction activities. It was assumed that construction activities would occur for 8 hours per day over the construction period. The total project length was assumed to be approximately 0.4 mile. It was assumed that an area of approximately one acre would be disturbed and no more than 0.25 acre would be disturbed daily. It was also assumed that a total of 4,200 cubic yards of soil would be imported and exported, and that approximately 58 cubic yards would be moved daily (Manalo pers. comm.). Construction activities were divided into separate phases and analyzed separately. The results of modeling for construction activities are summarized in Table 5.

Table 5. Construction Emission Estimates (pounds per day)

				PM_{10}			$PM_{2.5}$			
	ROG	CO	NOx	Total	Exhaust	Dust	Total	Exhaust	Dust	CO_2[a]
Grubbing/Land Clearing	3.3	14.2	28.1	3.6	1.1	2.5	1.6	1.0	0.5	26
Grading/Excavation	3.9	20.6	31.7	4.0	1.5	2.5	1.9	1.4	0.5	129
Drainage/ Utilities/Sub-Grade	3.2	14.0	25.5	3.8	1.3	2.5	1.7	1.2	0.5	84
Paving	1.9	7.9	11.4	1.0	1.0	-	0.9	0.9	-	14

Note: Emissions calculations based on Road Construction Emissions Model (Version 6.3).

[a] Emissions presented in metric tons per phase.

Table 5 indicates construction activities would not exceed the MBUAPCD's standard of 82 pounds per day of PM_{10}. Construction activities are subject to Caltrans Standard Specifications, Section 14-9.01, "Air Pollution Control" and Section 14.02, "Dust Control." Implementation of Minimization Measure AQ-1 will further reduce any dust emissions generated by the project.

Impact AQ-2: Generation of Operation-Related Emissions of Ozone Precursors, Carbon Monoxide, and Particulate Matter in Excess of Monterey Bay Unified Air Pollution Control District Standards. Based on information provided by the project traffic engineer, Hexagon Transportation Consultants, the proposed project would not increase traffic volumes on Route 1/9 (van den Hout pers. comm.). Implementation of the proposed project would result in improved traffic operations that would decrease congestion and increase traffic speeds. In general, as traffic speed increases from the lowest speeds (0–45 miles per hour [mph]), vehicle emissions tend to decrease with the lowest emissions occurring around 45 mph. The highest pollutant emission rates occur at stop and go speeds (0-25 mph) and speeds greater than 65 mph. Given this relationship between speed and emissions and because operational traffic speeds on roadways in the vicinity of the proposed project area would improve, emissions would likely decrease relative to the no-project condition. Consequently, the implementation of the proposed project would not generate emissions of ozone precursors, carbon monoxide, and particulate matter in excess of MBUAPCD standards.

Impact AQ-3: Construction-Related Diesel Health Risk. Construction activities are anticipated to involve the operation of diesel-powered equipment for various activities. In October 2000, the CARB identified diesel exhaust as a toxic air contaminant (TAC). Cancer health risks associated with exposures to diesel exhaust are typically associated with chronic exposure, in which a 70-year exposure period is often assumed. Although excess cancer can result from exposure periods of less than 70 years, acute exposure (i.e., exposure periods of 2 to 3 years) to diesel exhaust are typically not anticipated to result in an increased health risk because acute exposure typically does not result in the exposure concentrations necessary to result in a health risk. MBUAPCD staff has indicated that construction activities that occur for less than one year will generally not result in any adverse health impacts. As previously discussed, construction activities are anticipated to occur for a period of nine months. Because construction activities are less than one year in duration, it is anticipated that no adverse health effects would occur with regards to diesel particulate matter.

Impact AQ-4: Regional Transportation Conformity—Ozone Precursors. The proposed project is included in the Monterey Bay Area Mobility 2035 and the FY 2010-11 to 2013-14 MTIP. Air quality modeling has been conducted that shows that emissions associated with the MTIP are within the allowable emission budgets for ozone precursors. Therefore, the proposed project is considered a conforming transportation project for this regional pollutant.

Impact AQ-5: Localized/Project-Level Transportation Conformity—Carbon Monoxide Emissions. Because Santa Cruz County was designated an attainment area for CO and continued attainment has been verified, the *Protocol* indicates that the user proceeds to level 7 in Figure 3 of the *Protocol*. Three conditions must be satisfied for question 1 of the level 7 analysis:

1. Project does not significantly increase cold start percentage (less than 2%);
2. Project does not significantly increase traffic volumes (less than 5%); and
3. Project improves traffic flow.

A qualitative screening is performed to check each of these conditions. If all three conditions are satisfied, then the project does not require additional air quality analysis.

For condition 1, the proposed project would not result in an increase in nearby retail activity or visitation to tourist attractions. Therefore, it would not significantly increase vehicles operating in cold-start mode. For condition 2, the proposed project would not increase traffic volumes on Route 1/9 in excess of 5% (van den Hout pers. comm.); it therefore satisfies this condition. For condition 3, the proposed project would improve traffic flow by increasing speeds and alleviating congestion. Because the proposed project satisfies the three conditions above, the *Protocol* indicates that the project is deemed satisfactory and would not result in a CO violation. No further analysis is needed.

Impact AQ-6: Localized/Project-Level Transportation Conformity—PM_{10} and $PM_{2.5}$ Hot spots. The proposed project is not subject to PM_{10} and $PM_{2.5}$ hot spot conformity analyses because it is located within areas that are in attainment for the PM_{10} and $PM_{2.5}$ standards. Consequently, hot spots are not anticipated to occur that would result in violations of the PM_{10} and $PM_{2.5}$ standards. No further analysis is needed.

Impact AQ-7: Generation of Significant Levels of MSAT Emissions. Air toxics analysis is a continuing area of research. Currently, limited tools and techniques are available for assessing project-specific health impacts from MSATs because there are no established criteria for determining when MSAT emissions should be considered a significant issue in a NEPA context.

To comply with Council on Environmental Quality regulations (40 CFR 1502.22[b]) regarding incomplete or unavailable information, Appendix A contains a discussion of the emerging field of air toxics analysis. Specifically, how current scientific techniques, tools, and data are not sufficient to accurately estimate human health impacts resulting from transportation projects in a way that would be useful to decision makers. In compliance with 40 CFR 150.22(b), Appendix A contains a summary of current studies regarding the health impacts of MSATs.

The proposed project would result in minor widening of Route 1 (west of Route 9) and both sides of Route 9 (River Street) and alleviate congestion at the intersection of Route 1/9. The road widening

and intersection improvements would fall under the FHWA's Low Potential MSAT Effects category (Federal Highway Administration 2009). Because the proposed project would not create new capacity or add significant capacity, the proposed project is not considered a project with higher potential MSAT effects. Thus, a qualitative rather than a quantitative analysis of MSAT emissions is required (Federal Highway Administration 2009).

The amount of MSAT emitted would be proportional to the vehicle miles travelled (VMT) assuming that other variables, such as fleet mix, are the same for each alternative. The proposed project is not expected to divert traffic from other roadways, cause a change in trip distribution patterns, increase traffic volumes or VMT over no project conditions (van den Hout pers. comm.). Also, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent between 1999 and 2050. 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.

Impact AQ-8: Greenhouse Gas Contaminant Emissions. Currently, the EPA, CARB, and MBUAPCD have not established any thresholds or guidance to evaluate impacts associated with GHG emissions. As previously noted, GHG contaminant emissions tend to accumulate in the atmosphere because of their relatively long lifespan. As a result, their impact 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.

Emissions from construction are a result of fuel combustion from heavy-duty equipment (Table 5). These emissions are emitted only during construction and are therefore considered short-term. GHG emissions from vehicle operations would likely decrease, relative to the no project condition, due to improvements in operational traffic speeds on roadways in the vicinity of the proposed project area. Consequently, it is anticipated that implementation of the proposed project would lower emissions of GHGs, relative to no project conditions.

Minimization Measures

Minimization Measure AQ-1: Implement California Department of Transportation Standard Specification Section 14

The project applicant will follow Caltrans' Standard Specification Section 14-9.01, "Air Pollution Control" and Section 14.02, "Dust Control." The following measures will be performed:

- 14-9.01 Air Pollution Control:
    - Comply with air pollution control rules, regulations, ordinances, and statutes that apply to work performed under the Contract, including air pollution control rules, regulations, ordinances, and statutes provided in Government Code § 11017 (Pub Cont Code 10231).
    - Do not burn material to be disposed of.

- 14-9.02 Dust Control:
  - Prevent and alleviate dust by applying water, dust palliative, or both under Section 14-9.01.
  - Apply water under Section 17, "Watering."
  - Apply dust palliative under Section 18,"Dust Palliative."
  - If ordered, apply water, dust palliative, or both to control dust caused by public traffic. This work will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

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Appendix A
Compliance with 40 CFR 1502.22

This text is taken from the Federal Highway Administration's (FHWA) *Interim Guidance Update on Air Toxic Analysis in NEPA Documents,* Appendix C (Federal Highway Administration 2009).

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in mobile source air toxin (MSAT) emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the federal Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, <https://www.epa.gov/iris/>). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's *Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents*. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, <http://pubs.healtheffects.org/view.php?id=282>) or in the future as vehicle emissions substantially decrease (HEI, <http://pubs.healtheffects.org/view.php?id=306>).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts—each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California Environmental Protection Agency's (Cal-EPA's) Emfac2007 model,

and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (h<ttp://www.epa.gov/scram001/dispersion_alt.htm#hyroad>), which documents poor model performance at ten sites across the country—three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (<http://pubs.healtheffects.org/view.php?id=282>). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (<http://www.epa.gov/risk/basicinformation.htm#g>) and the HEI (<http://pubs.healtheffects.org/getfile.php?u=395>) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the federal Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response.