State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: Yvonne Hoffmann
Associate Environmental Planner

Date: April 22, 2013

File: EA-05-0N7000
SB-101
PM-1.4/12.3

From: KEN J. ROMERO, P.E., Chief
Environmental Engineering Branch

Subject: South Coast 101 HOV Lanes Air Quality Addendum

Project Location and Description:

The project proposes High Occupancy Vehicle (HOV) Lanes between 0.22 miles south of Bailard Avenue overcrossing (PM 1.4) in the City of Carpinteria to Sycamore Creek (PM 12.3) in the City of Santa Barbara.

Air Quality Analysis:

The Air Quality Report (AQR) was completed in Nov 2010. At that time the analysis for PM10 and PM 2.5 was completed using the CT-EMFAC air quality modeling program. The results were summarized in Table 5, located on page 21 of the Air Quality Report. The analysis for "road dust" was not calculated in the report.

In response to several public comments, the Environmental Engineering Branch has analyzed and calculated the "road dust" associated with the "Build" and "No Build" alternatives. The analysis in this memorandum is provided as an addendum to the AQR.

Road Dust was calculated using EPA's empirical equation (AP-42) and the result was added only to PM10 emissions because it is not considered a significant contributor to PM2.5 emissions.

The results of the analysis are in the attached spread sheet.

Conclusion:

For the horizon year, the difference between the Build (Project) and No-Build in PM10 emissions is an increase of 73.89 pounds per day.

The difference between in the PM10 emissions between the horizon year Build Alternative and the existing condition is 625.49 pounds per day.

The increase in PM10 emissions on U.S. 101 within the project limits is due to a large percentage of vehicles diverting back from the local roads they typically travelled to avoid congestion on highway before the project. Conversely, the traffic on local streets within the project limits will see a decrease in local traffic once the project is completed, thereby reducing PM10 emissions and silt.

If you have any question, please contact Abdul Chafi, Transportation Engineer, at (559) 445-6418

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: YVONNE HOFFMANN
Associate Environmental Planner

Date: Jan 31, 2012

File: 05-0N700

From: KEN J. ROMERO, Chief
Environmental Engineering Branch

Subject: South Coast 101 HOV Project Addendum to AQR.

The purpose of this addendum is to respond to the Headquarter comments related to the Air Quality Report for South Coast 101 HOV Project.

Ambient Air Quality

Existing air quality conditions in the project area can be characterized in terms of the ambient air quality standards that the federal and state governments have established for various pollutants and monitoring data collected in the region. The following data was collected from Santa Barbara -700 East Canon Perdido Monitoring Station.

Summary of Ambient Air Quality Monitoring Data in Comparison to NAAQS

NAAQS/Monitoring Period	**Number of Days Exceeding NAAQS**		
Pollutant	**2008**	**2009**	**2010**
Ozone Max 1-hr/ 8-hr Concentrations (ppm)	0.076/0.064	0.091/0.077	0.075/0.061
Number of days Exceeding Standards 1-hr/8-hr	0/0	0/1	0/0
PM2.5 Max 24-hr Concentration (µg/m3)	44.2	25.3	12.1

Number of days exceeding Standard	1	0	0
National Annual Average	10.4	No Data	No Data
PM10 Max 24-hr Concentration (µg/m3)	No Data available	No Data available	No Data available
Number of days exceeding Standard	No Data	No Data	No Data
National Annual Average	No Data	No Data	No Data
CO Max 8-hr Concentrations (ppm)	1.69	1.57	1.07
Number of days exceeding 8-hrs standards	0	0	0
Source: CARB website			

Based on data obtained from the above mentioned station, the federal 8-hour standard has been exceeded one time in 2009 and the federal PM2.5 standard has been exceeded one time in 2008. Insufficient or no data available for PM10 federal standard and no exceedances for CO standard have been recorded.

Mobile Source Air Toxics (MSAT)

The South Coast HOV Lane project proposes to add capacity to the highway primarily by widening in the existing median of the highway. When the widening occurs in the median, the action would not move sources of air toxics (primarily diesel trucks) nearer to sensitive receptors, and should not increase the local burden of these pollutants. When outside widening is required, traffic would be moved approximately 12 feet closer to sensitive receptors located adjacent to the highway than the existing condition, which is not considered to be substantial change from present conditions.

FHWA has developed a tier approach for analyzing MSAT. Depending on the specific project circumstances, FHWA has identified three categories of analysis:

1. No analysis for projects with no potential for meaningful MSAT effects. This category is limited to projects that:

    a) Qualify as a categorical exclusion under 23 CFR 771.117(c);

    b) Are exempt under the Clean Air Act conformity rule under 40 CFR 93.126; or

    c) Have no meaningful impacts on traffic volumes or vehicle mix.

2. Qualitative analysis for projects with low potential MSAT effects. Projects that do not meet category (1) or (3) criteria should be included in this category.

3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Pollutant Emission Estimates

Pollutant	Existing 2009 (Tons/year)	2040 N0-Build (Tons/year)	2040 Build (Tons/year)	Difference Build versus No Build (Tons/year)
Diesel PM	0.00846	0.007	0.009	0.002
Formaldehyde	0.00825	0.003	0.004	0.001
Butadiene	0.00204	0.001	0.001	0.000
Benzene	0.0103	0.004	0.004	0.000
Acrolein	0.00001	0.000	0.000	0.000
Acetylaldehyde	0.00209	0.001	0.001	0.000

The project falls under category 1C FHWA Interim Guidance

Since the proposed would not significantly increase traffic on Route 101, and because design year traffic is less than 140,000 AADT (Truck percentages do vary from intersection to intersection throughout the corridor, but average approximately 6% between the post-mile limits), the project does not have potential meaningful mobile source air toxic effects in the project area.

Air Quality Study Report

South Coast 101 HOV Lanes

In Santa Barbara County between 0.22 miles south of the Bailard Avenue overcrossing in the City of Carpinteria and Sycamore Creek in the City of Santa Barbara

05-SB-101-PM 1.4/12.3

05-0N7000

Prepared by the

State of California Department of Transportation

November 2010

For individuals with sensory disabilities, this document is available in Braille, large print, on audiocassette, or computer disk. To obtain a copy in one of these alternate formats, please call or write to Caltrans, Attn: Valerie Levulett, Central Coast Technical Studies Branch, (805) 549-3193 Voice.

Air Quality Study Report

South Coast 101 HOV Lanes

In Santa Barbara County between 0.22 miles south of the Bailard Avenue overcrossing in the City of Carpinteria and Sycamore Creek in the City of Santa Barbara

05-SB-101-PM 1.4/12.3

05-0N7000

November 2010

Prepared By: _____ **Date:** November 19, 2010

Karl Mikel PE, Transportation Engineer

Phone Number: 805-549-4792
Office Name: Central Coast Technical Studies Branch
District/Region: District 5, Central Region

Approved By: _____ **Date:** November 19, 2010

Valerie Levulett, Senior Environmental Planner

Phone Number: 805-549-3669
Office Name: Central Coast Technical Studies Branch
District/Region: District 5, Central Region

The environmental review, certification and any other action required in accordance with applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 U.S.C. 327

Executive Summary

The air study provides a discussion of the proposed project, the physical setting of the project area, and the regulatory framework with respect to air quality. The report provides data on existing air quality, evaluates potential air quality impacts/benefits associated with the proposed project, and identifies mitigation measures recommended for potentially significant impacts.

The California Department of Transportation (Caltrans) in cooperation with Santa Barbara County Association of Governments (SBCAG) proposes a High Occupancy Vehicle (HOV) Lane Project between 0.22 miles south of the Bailard Avenue overcrossing (PM 1.4) in the City of Carpinteria to Sycamore Creek (PM 12.3) in the City of Santa Barbara. Three build alternatives and a no-build alternative are proposed for this project. Each build alternative would add a single High Occupancy Vehicle (HOV) lane in both the northbound and southbound directions and reconstruct interchanges at Sheffield Drive and Cabrillo Boulevard.

The proposed widening would occur within the existing right-of-way; the new highway lanes would be added either to the inside or outside of the existing edge of travel way, or potentially a combination of inside and outside widening to preserve existing landscaping where possible. The purpose of the proposed new lanes is to relieve existing and projected future congestion on the highway in the project area. The current Annual Average Daily Traffic (AADT) in the project limits from post-mile 1.3 to 7.1 ranges between 66,000 and 74,000 and is forecasted to exceed 94,000 by 2035. The current AADT in the project limits from post-mile 7.1 to 12.3 averages approximately 105,000 and is forecasted to exceed 132,000 by 2035. Truck volume percentages vary between intersections within the corridor, which average approximately 6% percent throughout the project limits.

The existing capacity of Route 101 within the project limits, and throughout much of the Santa Barbara south coast, is severely congested during peak periods and weekends. During these times, the facility operates at Level of Service (LOS) F congested flow conditions for two to four hours daily in each direction (SBCAG *Congestion Management Program,* 2007). Without capacity improvements, LOS F conditions on Route 101 within the project limits are forecast to exceed nine hours a day in each direction by 2040 (Santa Barbara Council of Area Governments *101 in Motion* July 2006).

The forecasted rise in congestion and delay is a result of several factors, including increased long distance commuting from Ventura County, internal population growth, which is forecast to expand by ten percent by 2020 in Santa Barbara County (Santa Barbara Council of Area Governments *Regional Growth Forecast,* 2007), and interregional traffic growth, including goods movement. This project represents one component of a larger Route 101 corridor improvement strategy in northern Ventura County and southern Santa Barbara County.

The project is located in the South Central Coast Air Basin (Basin), which is in attainment of all National Ambient Air Quality Standards (NAAQS). The basin is considered non-attainment for State AAQS for ozone and particulate matter smaller than 10 microns (PM_{10}). The project would not substantially add to existing traffic volumes, but could potentially move traffic closer to sensitive receivers by up to one lane width (12 feet) depending on the alternative and/or alignment selected.

In Santa Barbara County, ozone and PM_{10} are the pollutants of main concern, since exceedances of state health-based standards for those are experienced there in most years. For this reason, the County has been designated as a non-attainment area for the State PM_{10} and ozone standards. In order for an air district to be in attainment, the State standards for any criteria pollutant must not be exceeded for three consecutive years.

The project would provide an operational air quality improvement over existing conditions by relieving congestion (gridlock conditions and low speed idling) and improving mobility. The proposed South Coast 101 HOV project is consistent with and included within the Santa Barbara Council of Area Government (SBCAG) approved 2008 Regional Transportation Plan (RTP). It is also included in the 2007 Metropolitan Transportation Plan (MTP) amended into the SBCAG approved 2009 Federal Transportation Improvement Program (FTIP)[1].

The design concept and scope of the proposed project is consistent with the project description in the 2008 RTP, the 2009 FTIP, and the assumptions in SBCAG's regional emissions analysis. These plans are deemed consistent with the applicable

[1] Projects in the FTIP are specifically identified in the SBCAG adopted Regional Transportation Plan (RTP) or are consistent with the RTP's goals, policies, and objectives. The RTP is a comprehensive, long-range transportation planning document. It is a 20-year plan of regional transportation needs, goals, and projects that guides public policy decisions regarding transportation expenditures and financing.

State Implementation Program (SIP) that is in the 2007 Clean Air Plan. Since the area is in attainment or unclassified for all NAAQS, a federal air quality conformity determination is not required.

The information contained in this document may be used to support environmental documentation that will be prepared for the project in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Caltrans is the state lead agency for CEQA compliance. The Federal Highway Administration (FHWA), with Caltrans serving as its representative, is the federal lead agency for NEPA compliance.

The proposed project is not expected to have a significant adverse impact on long-term air quality. The project is an operational improvement that would help improve traffic circulation, reduce peak hour congestion, reduce out of direction / diverted travel on local streets, and reduce low speed and idling emissions. These are all transportation control measures listed in the SBCAPCD Clean Air Plan. It is anticipated that these improvements would increase average speeds on the route and would have a beneficial impact on air quality by relieving most of the congestion and low speed emissions on the through lanes of the highway. Two pollutants of concern, carbon monoxide (CO) and reactive organic gas (ROG) decrease with increasing speeds.

Construction related air emissions are considered to be equivalent for the various project alternatives due to the similar size, scope, and nature of the proposed project features. As such, projected short-term construction related emissions are only evaluated as a single build alternative for the maximum footprint anticipated. Design measures that focus on enhancing alternative transportation are qualitatively discussed. Mitigation / minimization measures are identified for transportation and construction related emissions.

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1. Purpose of Air Quality Study Report

This report documents the anticipated air quality effects of the proposed project. Since this document is intended to satisfy the requirements of both the California Environmental Quality Act and the National Environmental Policy Act, it addresses both state and federal air quality standards.

2. Project Location, Description, and Alternatives

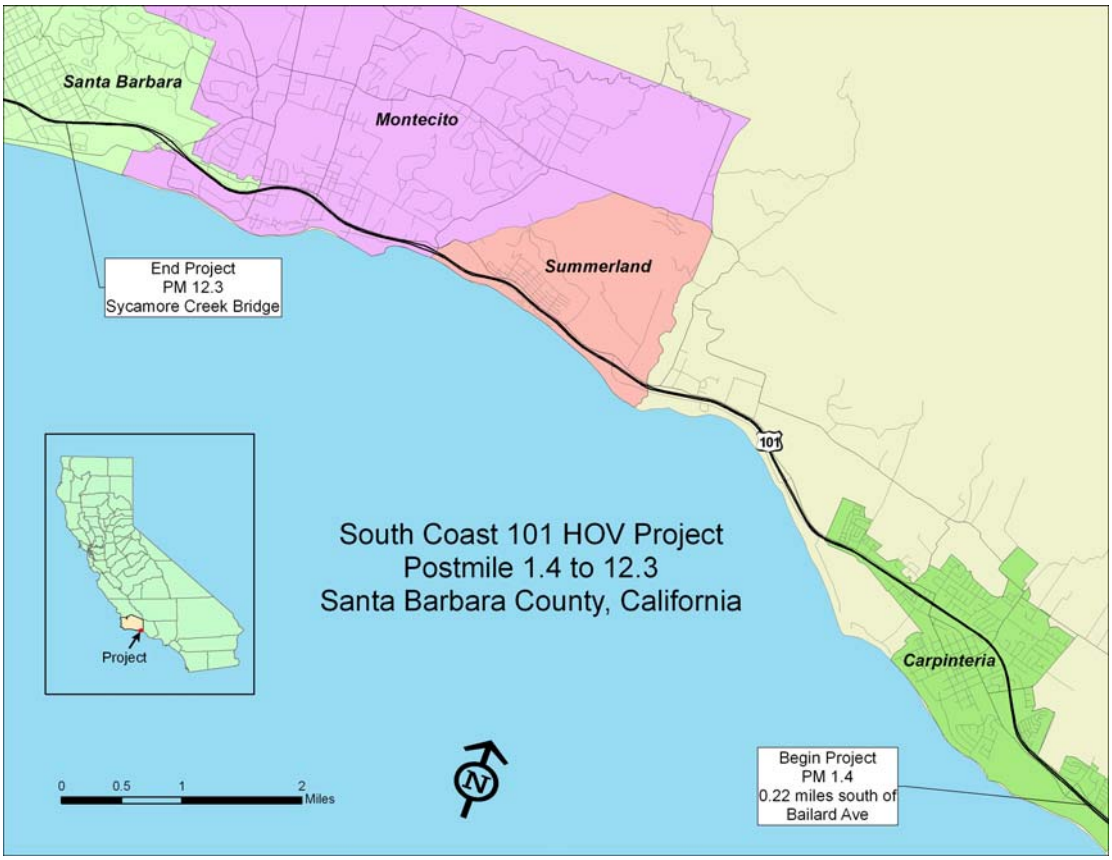
The California Department of Transportation (Caltrans) in cooperation with Santa Barbara County Association of Governments (SBCAG) proposes a High Occupancy Vehicle (HOV) Lane Project between 0.22 miles south of the Bailard Avenue overcrossing (PM 1.4) in the City of Carpinteria to Sycamore Creek (PM 12.3) in the City of Santa Barbara. Three build alternatives and a no-build alternative are proposed for this project. Each build alternative would add a single High Occupancy Vehicle (HOV) lane in both the northbound and southbound directions and reconstruct interchanges at Sheffield Drive and Cabrillo Boulevard.

The proposed widening would occur within the existing right-of-way, the new highway lanes would be added either to the inside or outside of the existing edge of travel way, or potentially a combination of inside and outside widening to preserve median landscaping where possible. The purpose of the proposed new lanes is to relieve existing and projected future congestion on the highway in the project area (Figure 1).

The current Annual Average Daily Traffic (AADT) in the project limits from post-mile 1.3 to 7.1 ranges between 66,000 and 74,000 and is forecasted to exceed 94,000 by 2035. The current Annual Average Daily Traffic (AADT) in the project limits from post-mile 7.1 to 12.3 averages approximately 105,000 and is forecasted to exceed 132,000 by 2035. Truck volume percentages vary between intersections within the corridor, which average approximately 6% percent throughout the project limits.

The existing capacity of Route 101 within the project limits, and throughout much of the Santa Barbara south coast, is congested during peak periods and weekends. During these times, the facility operates at Level of Service (LOS) F congested flow conditions for two to four hours daily in each direction (SBCAG *Congestion Management Program,* 2007).

Figure 1: Project Location/Vicinity Map



Without capacity improvements, LOS F conditions on Route101within the project limits are forecast to exceed nine hours a day in each direction by 2040 (SBCAG's 101 in Motion July 2006). The forecasted rise in congestion and delay is a result of several factors, including increased long distance commuting from Ventura County, internal population growth, which is forecast to expand by ten percent by 2020 in Santa Barbara County (SBCAG *Regional Growth Forecast,* 2007), and interregional traffic growth, including goods movement. This project represents one component of a larger Route 101 corridor improvement strategy in northern Ventura County and southern Santa Barbara County.

Alternatives

The California Department of Transportation (Caltrans) in cooperation with Santa Barbara County Association of Governments (SBCAG) proposes a High Occupancy Vehicle (HOV) Lane Project between 0.22 miles south of the Bailard Avenue overcrossing (PM 1.4) in the City of Carpinteria to Sycamore Creek (PM 12.3) in the

City of Santa Barbara. Three build alternatives and a no-build alternative are proposed for this project. Each build alternative would add a single High Occupancy Vehicle (HOV) lane in both the northbound and southbound directions and reconstruct interchanges at Sheffield Drive and Cabrillo Boulevard.

Three build alternatives -- Alternatives 1, 2 and 3 -- and a No-Build Alternative are proposed for this project. Alternatives 1, 2 and 3 would add a single HOV lane in both the northbound and southbound directions and reconstruct interchanges at Sheffield Drive and Cabrillo Boulevard. All build alternatives provide add an additional lane in each direction to provide for a part time High Occupancy Vehicle (HOV) facility within the project limits. Alternative 1 proposes to balance competing resource interests such as scenic views, wetlands, and median/outside landscaping. Alternative 2 proposes to maximize landscaping in the median, and recognizes that some identified scenic resources may be partially blocked and some wetland areas impacted. Alternative 3 proposes to construct all new paved lanes within the existing available median and maximizes the retention of outside planting.

Common Design Features of the Build Alternatives

Alternatives 1, 2 and 3 would include the following:

Basic Common Design Features

- Add an additional lane in each direction on Route 101 to provide for a part time, continuous access High Occupancy Vehicle (HOV) facility within the project limits.
- Replace bridge structures at: Arroyo Paredon (Parida), Toro Canyon, Romero (Picay), Oak, and San Ysidro Creeks.
- Widen bridge structures at Franklin and Santa Monica creeks.
- Widen traffic undercrossing structures at South Padaro Lane and Evans Avenue.
- Reconstruct the northbound off ramp and on ramp at Salinas Street.
- Convert the existing northbound auxiliary lane to a through lane between the northbound on ramp at Cabrillo Boulevard and Salinas Street off ramp.
- Construct a southbound auxiliary lane between the Sheffield Drive on ramp and the Evans Avenue off ramp.
- Reconstruct the interchanges at Sheffield Drive and Cabrillo Boulevard.
- Consideration, as design options, seven mutually exclusive Cabrillo Boulevard. interchange configurations (F, H, I, J, L, M, and Q). Interchange configurations under consideration include:

F) SB 1/2 DIAMOND -Close both median off ramps at Cabrillo Blvd.; improve the northbound Hermosillo Drive off ramp and the northbound Cabrillo Blvd. on ramp. Construct new on and off ramps to intersect at Cabrillo Blvd., northbound and southbound, immediately adjacent and to the right of the freeway lane.

H) TIGHT DIAMOND- Close all existing off ramps, including the Los Patos Way and Hermosillo Drive ramps. Construct new on and off ramps to intersect at Cabrillo Blvd., northbound and southbound, immediately adjacent and to the right of the freeway lanes.

I) EXISTING MAINLINES / IMPROVE LOS PATOS - Close both median off ramps at Cabrillo Blvd.; improve the northbound Hermosillo Drive off ramp, the southbound Los Patos Way off ramp, and the northbound Cabrillo Blvd. on ramp.

J) EXISTING MAINLINES / IMPROVE LOS PATOS - Identical to Configuration "I" with the addition of a southbound Los Patos Way on ramp.

L) NB 1/2 DIAMOND / IMPROVE LOS PATOS -Close northbound and southbound median off ramps at Cabrillo Blvd. and close the northbound Hermosillo Drive off ramp; add a southbound Cabrillo Blvd. off ramp; improve the southbound Los Patos Way off ramp and the northbound Cabrillo Blvd. on ramps.

M) NB 1/2 DIAMOND / IMPROVE LOS PATOS -Identical to Configuration "L" with the addition of a southbound Los Patos Way onramp.

Q) HALF SINGLE POINT -Close the Los Patos southbound off ramp, the northbound and southbound median off ramps at Cabrillo Blvd, and the northbound on ramp at Cabrillo; construct a new Cabrillo Blvd southbound right side off ramp that will undercross three southbound freeway lanes and a new northbound right side on ramp that will undercross three northbound freeway lanes - both will join at the existing median ramp intersections at Cabrilllo Blvd.; also improve the northbound Hermosillo Drive off ramp.

Additional Common Design Features

- Construct retaining walls at two locations: On the southbound outside shoulder at the right of way line along the southbound off ramp at Sheffield Drive (430 feet in length) and on the outside shoulder of the proposed southbound auxiliary lane from Sheffield Drive to Evans Avenue (1550 feet in length).
- Provide median landscaping in the first 0.2 mile at the southern limits of the project, and the last 0.5 mile of the project.
- Install replacement planting.
- Construct sound walls for noise abatement where appropriate.

- Provide noise attenuating pavement surface on all travel lanes.
- Relocate underground and aboveground utilities as needed.
- Lengthen cross culverts to accommodate additional pavement width.
- Construct maintenance vehicle pullout areas.
- Construct stormwater treatment facilities within the project limits and on publicly owned property near the Bailard Interchange (PM 1.6).

Unique Design Features of the Build Alternatives

Alternative 1: Balanced Resources

- This alternative proposes to balance competing resource interests such as scenic views, wetlands, and median/outside landscaping.
- Provide median landscaping, where appropriate, at several additional locations: from 0.2 mile from the southern limits of the project to Linden Avenue; the South Padaro Lane Interchange; and at the North Padaro Lane Interchange.
- The freeway outside edge of pavement requires widening in all locations where additional median landscaping is proposed.

Alternative 2: Maximize Median Planting

- This alternative proposes to maximize landscaping in the median, and recognizes that some identified scenic resources may be partially blocked and some wetland areas impacted.
- Provide median landscaping, where appropriate, at several additional locations: from 0.2 mile from the southern limits of the project to Reynolds Avenue; and from Santa Monica Road to the Evans Avenue Interchange.
- The freeway outside edge of pavement requires widening in all locations where additional median landscaping is proposed.
- Construct additional southbound auxiliary lanes between 1) the Santa Claus Lane on ramp and the Carpinteria Avenue off ramp and 2) the Reynolds Avenue on ramp and the Linden Avenue off ramp.
- Construct 3 additional retaining walls. One on the southbound shoulder at the right of way line ending at the Santa Claus Lane southbound on ramp (500 feet in length), one on the northbound shoulder near Greenwell Creek (700 feet in length) and one on the northbound shoulder near the northbound offramp to Summerland (300 feet in length.)

Alternative 3: Maximize Outside Planting

- This alternative proposes to construct all new paved lanes within the existing available median and maximizes the retention of outside planting.
- A single concrete barrier separating the two inside paved shoulders will be provided in the median between Carpinteria Creek and Olive Mill Road, which largely retains the existing outside edge of pavement within these areas.

No-Build Alternative

The No-Build Alternative would add no additional lanes to the highway, and would not relieve existing and future congestion. Air quality would not be improved by eliminating low speed air pollutants including carbon monoxide and greenhouse gas emissions.

3. Federal, State, and Local Regulations

The primary legislation that governs federal air quality regulations is the Clean Air Act Amendments of 1990 (CAAA). The CAAA delegates primary responsibility for clean air to the U.S. Environmental Protection Agency (EPA). The EPA develops rules and regulations to preserve and improve air quality and delegates specific responsibilities to state and local agencies. Under the Clean Air Act, the EPA has established the National Ambient Air Quality Standards (NAAQS) for six potential air pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), suspended particulate matter (PM_{10} & $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). The significance of a given pollutant can be evaluated by comparing its atmospheric concentration to State and Federal air quality standards, which are presented in Table 1. These standards represent allowable atmospheric contaminant concentrations at which the public health and welfare are protected, and include a factor of safety.

The California Clean Air Act (CCAA) was signed into law in September of 1988. It requires all areas of the State to achieve and maintain the California ambient air quality standards by the earliest practicable date. These standards are generally more stringent than the Federal standards; thus, emission controls to comply with the State law are more stringent than necessary for attainment of the Federal standards (refer to Table 2). The CCAA requires that all Air Pollution Control Districts (APCD's) adopt and enforce regulations to achieve and maintain the State ambient air quality standards for the area under its jurisdiction.

Table 1: Federal and State Ambient Air Quality Standards

Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards [1]		Federal Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15.0 µg/m^3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)	Gas Phase Chemiluminescence	53 ppb (100 µg/m^3) (see footnote 8)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 µg/m^3)		100 ppb (188 µg/m^3) (see footnote 8)	None	
Sulfur Dioxide (SO_2)	24 Hour	0.04 ppm (105 µg/m^3)	Ultraviolet Fluorescence	—	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)[9]
	3 Hour	—		—	0.5 ppm (1300 µg/m^3) (see footnote 9)	
	1 Hour	0.25 ppm (655 µg/m^3)		75 ppb (196 µg/m^3) (see footnote 9)	—	
Lead[10]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average[11]	—		0.15 µg/m^3		
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page ...

For more information please call ARB-PIO at (916) 322-2990 California Air Resources Board (09/08/10)

See footnotes next page.

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

8. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010). Note that the (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.

9.On June 2, 2010, the U.S. EPA established a new 1-hour SO2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum of 0.14 ppm and the annual primary SO2 standard of 0.030 ppm, effective August 23, 2010. EPA also proposed a new automated Federal Reference Method (FRM) using ultraviolet technology, but will retain the older pararosaniline methods until the new FRM have adequately permeated State monitoring networks. The EPA also revoked both the existing 24-hour SO2 standard of 0.14 ppm and the annual primary SO2 standard of 0.030 ppm, effective August 23, 2010. The secondary SO2 standard was not revised at that time; however, the secondary standard is undergoing a separate review by EPA. Note that the new standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the new primary national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

10. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

11. National lead standard, rolling 3-month average: final rule signed October 15, 2008.

The Air Resources Board (ARB), which is part of the California EPA regulatory agency, develops air quality regulations at the state level. The state regulations mirror federal regulations by establishing industry-specific pollution controls for criteria, toxic, and nuisance pollutants. California also requires that plans and strategies for attaining state ambient air quality standards as set forth in the CCAA of 1988 be developed throughout the state. The ARB also is responsible for developing motor emissions standards for California vehicles.

The project is located in the South Central Coast Air Basin. The Santa Barbara County Air Pollution Control District (SBCAPCD) administers air quality regulations developed at the federal, state, and local levels in Santa Barbara County.

Pursuant to the requirements of the law, the SBCAPCD adopted a Clean Air Plan (CAP) for their jurisdiction. The *Final 2007 Santa Barbara County Clean Air Plan* is used by the SBCAPCD to address attainment of national and State fugitive dust (PM_{10}) and Ozone (O_3) standards for the entire County (SBCAPCD 2007). The CAP is a comprehensive planning document intended to provide guidance to the APCD, the County, and other local agencies on how to attain and maintain the State standard for ozone and PM_{10}. The CAP presents a detailed description of the sources and pollutants which impact the jurisdiction, future air quality impacts to be expected under current growth trends, and an appropriate control strategy for reducing ozone precursor emissions, thereby improving local air quality. The CAP is updated every three years to assess air quality trends and determine if additional measures are needed on a countywide basis to address regional impacts.

4. Air Quality Pollutants and Standards

Traffic-generated compounds impact air quality through three major pathways: vehicle emissions of gaseous and particulate compounds, secondary formation during plume transport of gases and particles, and mechanical processes that abrade particles from brakes, tires, and the road surface. Carbon monoxide (CO), nitrogen oxides (NO_x), and volatile organic compounds (VOCs), as well as particulate matter (PM) and constituents such as hydrocarbons and black carbon, are among the numerous compounds that have been identified at elevated concentrations near major highways.

Emission reduction programs implemented by various government agencies have significantly reduced emission rates of air pollutants from motor vehicles. Since 1970, average per vehicle emissions in the United States have been reduced by more

than 90% for VOCs and 80% for PM_{10} and NO_x[2]. In spite of these reductions, motor vehicles still contribute to pollution in urban areas, often due to large increases in vehicle use offsetting per vehicle emission reductions. Furthermore, emissions from some vehicle associated sources (e.g., brake and tire wear) are not regulated, and pollutants generated from these sources may also increase in the future with increased vehicle use.

On a regional basis, ozone is the pollutant of greatest concern in Santa Barbara County. Ozone is a secondary pollutant, formed in the atmosphere by complex photochemical reactions involving precursor pollutants and sunlight. The amount of ozone formed is dependent upon both the ambient concentration of chemical precursors and the intensity and duration of sunlight. Consequently, ambient ozone concentration tends to vary seasonally with the weather. Reactive Organic Gases (ROG), also called Reactive Hydrocarbons (RHC), and Nitrogen Oxides (NO_X) are the primary precursors to ozone formation. NO_X emissions result primarily from the combustion of fossil fuels; ROG emissions are also generated by fossil fuel combustion and through the evaporation of petroleum products. Emissions of ROG and NO_X are fairly equally divided between mobile and stationary sources.

The federal and state governments have established ambient air quality standards for six criteria pollutants: carbon monoxide (CO), ozone (O_3), particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb) (Table 1). O_3 and PM are generally considered to be regional pollutants because they or their precursors affect air quality on a regional scale. Pollutants such as CO, NO_2, SO_2, and Pb are considered to be local pollutants because they tend to accumulate in the air locally. PM is also considered as a local pollutant. In the area of the proposed project site, ozone and PM are of particular concern.

Carbon Monoxide (CO): Carbon Monoxide is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. Effects on humans range from slight headaches to nausea to death. State and federal CO standards have been set for both 1-hour and 8-hour averaging times. The state 1-hour standard is 20 parts per million (ppm) by volume, and the federal 1-hour is 35 ppm. Both the state and federal standards are 9 ppm for the 8-hour averaging period. Motor vehicles are the dominant source of CO

[2] National Emission Inventory Air Pollutant Emission Trends Data; U.S. Environmental Protection Agency: Washington, DC, 2009; www.epa.gov/ttn/chief/trends/index.html. Highway Statistics; U.S. Federal Highway Administration: Washington, DC, 2007; www.fhwa.dot.gov/policyinformation/statistics/2007 (accessed may 2009).

emissions in most areas. High CO levels develop primarily during winter when periods of light wind combine with ground-level temperature inversions. These conditions result in reduced dispersion of vehicle emissions. In addition, motor vehicles emit more CO in cool temperatures than in warm temperatures.

Ozone (O_3): Ozone is not emitted directly into the air but is formed by a photochemical reaction in the atmosphere. Ozone precursors, which include oxides of nitrogen and reactive organic gases, react in the atmosphere in the presence of sunlight to form ozone. State and federal standards for ozone have been set for a 1-hour averaging time. The state requires that ozone concentration not exceed .09 ppm of ozone being produced in a given area in 1 hour. The federal 1-hour ozone standard is .12 ppm, but it does not apply in California. The federal 8-hour ozone standard is .075 ppm and the state standard is .07 ppm.

Particulate Matter (PM_{10}) & ($PM_{2.5}$): Particulate matter emissions are generated by a wide variety of sources, including agricultural activities, industrial emissions, dust suspended by vehicle traffic and construction equipment, and secondary aerosols formed by reactions in the atmosphere. The NAAQS for particulate matter applies to two classes of particulate: particulate matter 2.5 microns or less in diameter ($PM_{2.5}$) and particulate matter 10 microns or less in diameter (PM_{10}). The state PM_{10} standards are 50 micrograms per cubic meter ($\mu g/m^3$) as a 24-hour average and 20 $\mu g/m^3$ as an annual arithmetic mean. The federal PM_{10} standards are 150 $\mu g/m^3$ as a 24-hour average. The federal standards for $PM_{2.5}$ are 15 $\mu g/m^3$ and 35 $\mu g/m^3$ for annual and 24 hours respectively. The state standard for $PM_{2.5}$ is 12 $\mu g/m^3$ as an annual arithmetic mean. There is no separate state standard for 24-hour $PM_{2.5}$.

Nitrogen Dioxide (NO_2): Nitrogen dioxide belongs to a family of highly reactive gases called nitrogen oxides (NOx). These gases form when fuel is burned at high temperatures, and come principally from motor vehicle exhaust and stationary sources such as electric utilities and industrial boilers. A suffocating, brownish gas, nitrogen dioxide is a strong oxidizing agent that reacts in air to form corrosive nitric acid, as well as toxic organic nitrates. It also plays a major role in the atmospheric reactions that produce ground-level ozone (or smog). EPA's health-based national air quality standard for nitrogen dioxide is .053 ppm.

Sulfur Dioxide (SO_2): Sulfur dioxide belongs to the family of sulfur oxide gases (SOx). These gases are formed when fuel containing sulfur (mainly coal and oil) is

burned, and during metal smelting and other industrial processes. EPA's health-based national air quality standard for sulfur dioxide is .030 ppm (measured on an annual average) and .14 ppm (measured over 24 hours).

Lead (Pb): Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been motor vehicles and industrial sources. Due to the phase out of leaded gasoline, metal processing is the major source of lead emissions to the air today. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Mobile Source Air Toxics (MSATs): These toxics are a subset of the 188 air toxics defined in the Clean Air Act. They are now federally regulated under 40 Code of Federal Regulations 1502.22 by the U.S. Environmental Protection Agency. Mobile source air toxics are 21 compounds emitted from highway vehicles and non-road equipment. There are six main toxics including diesel exhaust, benzene, and formaldehyde. The Federal Highway Administration issued interim guidance on February 3, 2006 for analysis in National Environmental Policy Act documents. Currently, available technical tools do not enable us to predict the project-specific health impacts, so only a qualitative analysis is conducted.

5. Air Quality Conformity

The 1990 Federal Clean Air Act Amendments (CAAA), enacted on November 15, 1990, placed tough new requirements on sources and causes of air pollution in areas failing to meet federal air quality standards. The CAAA require substantial reduction from all pollution sources, including pollutants from the transportation sector. The CAAA included more stringent requirements for demonstrating that transportation plans and projects contributed to improvement in air quality contained in the conformity provisions in section 176(a). On November 15, 1993, the EPA published a conformity rule delineating specific criteria and procedures for fulfilling the conformity requirements of the CAAA. This rule was recently updated and published in the Federal Register August 15, 1997. It became effective September 15, 1997.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) made a number of revisions to the Clean Air Act's transportation conformity provisions. In particular, SAFETEA-LU made the following changes:

- Changes 18-month trigger to two years for re-determination of conformity after certain air quality planning actions.
- Changes frequency of conformity for plans and Transportation Improvement Programs (TIPs) from every 3 years to every 4 years.
- Provides option for Metropolitan Planning Organizations (MPOs) to shorten the time horizon for conformity determination.
- Allows Transportation Conformity Measures (TCMs) to be substituted or to be added to existing TCMs without a State Implementation Plan (SIP) mechanism.
- Provides a 12-month grace period before a lapse occurs after an applicable deadline is missed.
- Limits Conformity SIPs to interagency consultation and enforcement provisions.

SAFETEA-LU required the EPA to revise the Transportation Conformity Rule by August 10, 2007, two years after the enactment of SAFETEA-LU.

6. Transportation Conformity

The federal Clean Air Act requires that all transportation plans and programs pass the air quality conformity test. This process involves forecasting future emissions of air pollution to determine whether the amount of future pollution resulting from the plan or program would be within the allowable limit for motor vehicle emissions.

Transportation conformity must be determined for all nonattainment area pollutants classified as regional pollutants. In the South Coast Air Basin, there are no pollutants that are considered non-attainment for federal standards. Transportation projects also generate CO, which is considered a localized pollutant. CO micro-scale modeling is required to determine whether a transportation project would cause or contribute to localized violations of CO NAAQS.

Regional conformity must be determined based on a full study at least every three years. In California, it is determined at least every two years when the state-required Regional Transportation Plan (RTP) updates are done. In addition, a new federal TIP is required every four years, for which a conformity determination is required. Amendments to both the RTP and TIP between mandated conformity analysis also must have conformity demonstrated, including a full-scale revision of the regional analysis if regionally significant projects are added, deleted, or significantly modified.

Regional conformity is demonstrated by showing that the project is included in a conforming RTP and TIP with substantially the same design concept and scope that was used for the regional conformity analysis.

Project level conformity is demonstrated by showing that it will not cause a localized exceedance of CO and/or PM_{10} standards, and that it will not interfere with "timely implementation" of Transportation Control Measures called out in the State Implementation Plan.

The Final Rule has the following Key Elements:

- This rule requires that $PM_{2.5}$ hot spot analyses be performed only for new transportation projects with significant diesel traffic. Examples of such "projects of air quality concern" include intermodal freight or bus terminals, and major highway projects and congested intersections involving significant diesel traffic. No hot spot analyses will be required for most projects in $PM_{2.5}$ areas, because most projects are not an air quality concern. This final rule also streamlines existing PM_{10} hot spot requirements in a similar way.
- The streamlined approach in this final rule will ensure that transportation and air quality agencies in $PM_{2.5}$ and PM_{10} areas use their resources efficiently, while achieving clean air goals.
- In both $PM_{2.5}$ and PM_{10} areas, a quantitative hot spot analysis is not required until EPA issues a new motor vehicles emissions model capable of estimating local emissions as well as future hot spot modeling guidance. Qualitative analyses will apply in the interim.
- This rule extends an existing flexibility by allowing the U.S. Department of Transportation to make "categorical hot spot findings," which waive $PM_{2.5}$ and PM_{10} hot spot reviews for categories of projects where modeling shows that there is no air quality concern.

7. Regional Climate and Topography

Santa Barbara County's air quality is influenced by both local topography and meteorological conditions. The following climate and topography section has been summarized as presented in the SBCAPCD Clean Air Plan, (2007).

Topography

The project is located on a coastal terrace on the south-facing coast of southern Santa Barbara County. The area is bound to the west and south by the Pacific Ocean, and to

the north by the Santa Ynez Mountains with elevations up to 4,600 feet. The distance from the highway to the crest of the Santa Ynez Mountains Range is about 4.5 miles. Further to the north are the San Rafael Mountains with elevations up to 6,800 feet.

Meteorology

Surface and upper-level wind flow varies both seasonally and geographically in the county and inversion conditions common to the area can affect the vertical mixing and dispersion of pollutants. The prevailing wind flow patterns in the county are not necessarily those that cause high ozone values. In fact, high ozone values are often associated with atypical wind flow patterns.

Semi-permanent high pressure that lies off the Pacific Coast leads to limited rainfall (around 18 inches per year), with warm, dry summers and relatively damp winters. Maximum summer temperatures average about 70 degrees Fahrenheit near the coast and in the high 80s to 90s inland. During winter, average minimum temperatures range from the 40s along the coast to the 30s inland. Additionally, cool, humid, marine air causes frequent fog and low clouds along the coast, generally during the night and morning hours in the late spring and early summer. The fog and low clouds can persist for several days until broken up by a change in the weather pattern.
The sea breeze (from sea to land) is typically from the southwest in the southern portion of the county. During summer, these winds are stronger and persist later into the night. At night, the sea breeze weakens and is replaced by light land breezes (from land to sea). The alternation of the land-sea breeze cycle can sometimes produce a "sloshing" effect, where pollutants are swept offshore at night and subsequently carried back onshore during the day. This effect is exacerbated during periods when wind speeds are low.

The terrain around Point Conception, combined with the change in orientation of the coastline from north-south to east-west can cause counterclockwise circulation (eddies) to form east of the Point. These eddies fluctuate temporally and spatially, often leading to highly variable winds along the southern coastal strip. Point Conception also marks the change in the prevailing surface winds from northwesterly to southwesterly.

Santa Ana winds are northeasterly winds that occur primarily during fall and winter, but occasionally in spring. These are warm, dry winds blown from the high inland desert that descend down the slopes of a mountain range. Wind speeds associated with Santa Ana's are generally 15-20 mph, though they can sometimes reach speeds

in excess of 60 mph. During Santa Ana conditions, pollutants emitted in Santa Barbara, Ventura County, and the South Coast Air Basin (the Los Angeles region) are moved out to sea. These pollutants can then be moved back onshore into Santa Barbara County in what is called a "post-Santa Ana condition." The effects of the post-Santa Ana condition can be experienced throughout the county. Not all post-Santa Ana conditions, however, lead to high pollutant concentrations in Santa Barbara County.

Upper-level winds (measured at Vandenberg Air Force Base once each morning and afternoon) are generally from the north or northwest throughout the year, but occurrences of southerly and easterly winds do occur in winter, especially during the morning. Upper-level winds from the south and east are infrequent during the summer. When they do occur during summer, they are usually associated with periods of high ozone levels. Surface and upper-level winds can move pollutants that originate in other areas into the county.

Surface temperature inversions (0-500 ft) are most frequent during the winter, and subsidence inversions (1000-2000 ft) are most frequent during the summer. Inversions are an increase in temperature with height and are directly related to the stability of the atmosphere. Inversions act as a cap to the pollutants that are emitted below or within them and ozone concentrations are often higher directly below the base of elevated inversions than they are at the earth's surface. For this reason, elevated monitoring sites will occasionally record higher ozone concentrations than sites at lower elevations. Generally, the lower the inversion base height and the greater the rate of temperature increase from the base to the top, the more pronounced effect the inversion will have on inhibiting vertical dispersion. The subsidence inversion is very common during summer along the California coast, and is one of the principal causes of air stagnation.

Poor air quality is usually associated with "air stagnation" (high stability/restricted air movement). Therefore, it is reasonable to expect a higher frequency of pollution events in the southern portion of the county where light winds are frequently observed, as opposed to the northern part of the county where the prevailing winds are usually strong and persistent.

8. Emissions Analysis

The Federal Highway Administration (FHWA) and Environmental Protection Agency (EPA) issued final air quality conformity guidelines in December 1993. The

conformity guidelines list certain categories of projects that are exempt from local and regional air quality analysis because they have little if any potential to degrade air quality. Examples of these projects include safety improvement programs, pavement resurfacing and/or rehabilitation, and operational improvements that relieve congestion. These kinds of projects are exempt from the requirement that an (air quality) conformity determination be made according to Title 40 CFR (Code of Federal Regulations) Section 93.126.

Since the SBCAPCD is in attainment for all NAAQS, the project is exempt from project-level emission analysis at the federal level. Additionally, since the project has been initiated as a congestion relief / operational improvement, it is not expected to increase local concentrations of air pollutants, therefore it is consistent with the state air quality goals of the SBCAPCD.

A. Regional Analysis

The project is located in an attainment/unclassified area for all current federal air quality standards (refer to Table 2). Therefore, air quality conformity requirements do not apply. The project would provide an operational air quality improvement over existing conditions by relieving congestion (gridlock conditions and low speed idling) and improving mobility. The proposed South Coast 101 HOV project is consistent with and included within the SBCAG approved 2008 Regional Transportation Plan (RTP). It is also included in the 2007 Metropolitan Transportation Plan (MTP) amended into the SBCAG approved 2009 Federal Transportation Improvement Program (FTIP)[3].

The design concept and scope of the proposed project is consistent with the project description in the 2008 RTP, the 2009 FTIP, and the assumptions in SBCAG's regional emissions analysis. These plans are deemed consistent with the applicable State Implementation Program (SIP) that is the 2007 Clean Air Plan. Therefore, the project is consistent with the CAP, which is the applicable State Implementation Plan for Santa Barbara County.

[3] Projects in the FTIP are specifically identified in the SBCAG adopted Regional Transportation Plan (RTP) or are consistent with the RTP's goals, policies, and objectives. The RTP is a comprehensive, long-range transportation planning document. It is a 20-year plan of regional transportation needs, goals, and projects that guides public policy decisions regarding transportation expenditures and financing. goals, and projects that guides public policy decisions regarding transportation expenditures and financing.

Table 2: Federal and State Attainment Status

Criteria Pollutant	Federal Standard (National Ambient Air Quality Standards)	Federal Attainment Status	State Standard	State Attainment Status
Carbon Monoxide (CO)	9.0 ppm (10 mg/m^3 (8-hour)	Attainment/ unclassified	9 ppm (10 mg/m^3 (8-hour)	Attainment
Nitrogen Dioxide (NO_2)	0.053 ppm (100 µg/m^3) (Annual Arithmetic Mean)	Attainment/ unclassified	0.030 (57 µg/m^3) (Annual Arithmetic Mean)	Attainment
Ozone (O_3)	0.075 ppm (100 µg/m^3) (8-hour)	Attainment/ unclassified	0.070 (137 µg/m^3) (8-hour)	Non-attainment
Respirable particulate (PM_{10})	150 µg/m^3 (24-hour) --	Unclassified	50 µg/m^3 (24-hour) 20 µg/m^3 (Annual Arithmetic Mean)	Non-attainment
Fine particulate ($PM_{2.5}$)	15 µg/m^3 (Annual Arithmetic Mean)	Attainment/ unclassified	12 µg/m^3 (Annual Arithmetic Mean)	Attainment

Source: http://www.arb.ca.gov/desig/adm/adm.htm

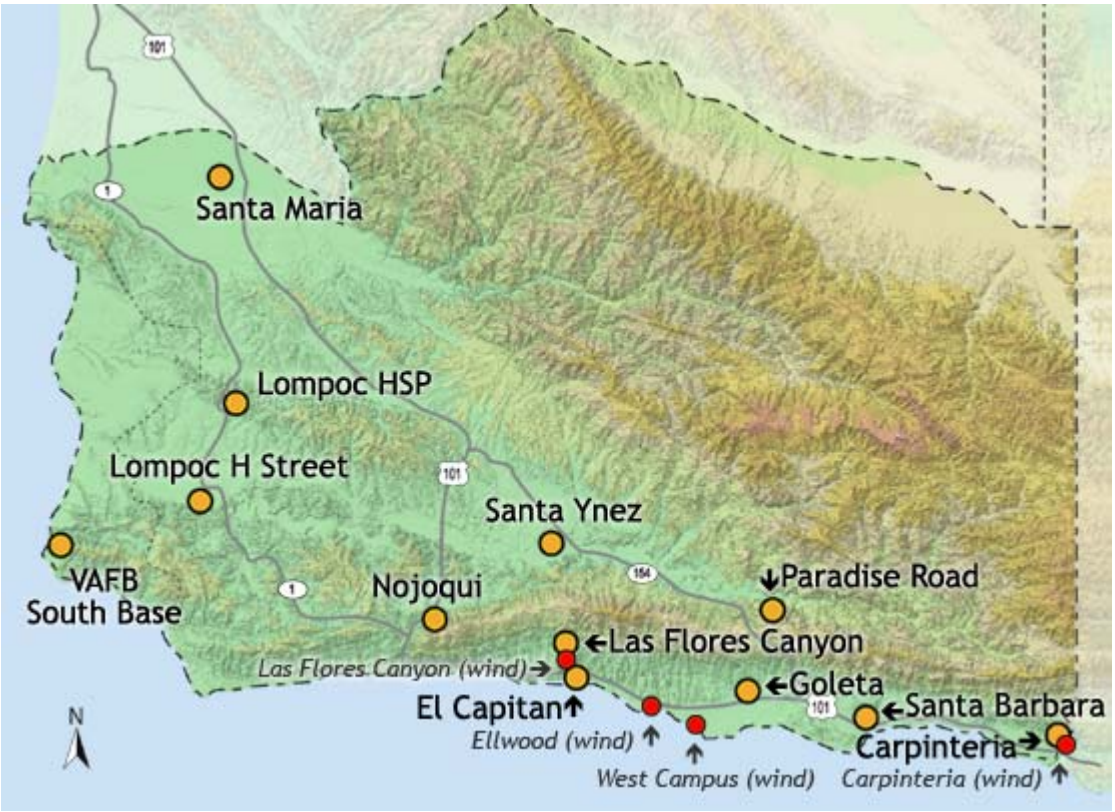
Air quality is monitored at 15 locations in Santa Barbara County. These locations are shown on Table 3 and Figure 2.

Table 3: Monitor Locations-Santa Barbara County

ID#	Location	ID#	Location
42402	Carpinteria-Gobernador Road	42098	Lompoc-Odor
42370	El Capitan Beach	42381	Lompoc-South H Street
42399	Gaviota - Nojoqui	42395	Los Padres National Forrest
42404	Goleta-Fairview	42401	Santa Barbara - UCSB Campus
42101	Las Flores Canyon #1	42409	Santa Barbara-National Guard Armory
42037	Las Flores Canyon-Odor site	42408	Santa Maria - South Broadway
42394	Lompoc-HS&P	42369	Santa Ynez
42390	Vandenberg Air Force Base-STS		

Source: http://www.arb.ca.gov/qaweb/mapdemo/map_module.php

Figure 2: Air Quality Monitoring Stations in Santa Barbara County



B. Project Level Analysis

The proposed project is not expected to have a significant adverse impact on long-term air quality. The project is scoped as an operational improvement / congestion relief action, which would help improve traffic circulation, a transportation control measure listed in the SBCAPCD Clean Air Plan.

The South Central Coast Air Basin is in attainment or unclassified for all National Ambient Air Quality Standards. Long-term operational emissions associated with the proposed project are due primarily to the existing operation of motor vehicles in the project vicinity. The proposed project will improve highway circulation, reduce vehicle queuing during peak-hour periods, and thereby reduce low-speed emissions. Traffic volumes on Highway 101, after completion of the project, would be approximately the same as under no-build conditions, but the overall system would function more efficiently.

In addition, the proposed project would improve circulation on local streets during peak periods when the highway is experiencing severely congested conditions as drivers look for alternative routes in the corridor. This condition diverts local trips

from the highway system, forcing them onto local streets, thereby creating additional low speed and idle emissions in closer proximity to sensitive air receptor locations as local streets begin to exceed their capacity creating even more gridlock conditions that are spread out over a much larger area. By constructing the project, these trips are redirected back to the highway system, and away from local streets. Therefore, there should be no significant adverse change in local or regional air quality caused by the project.

With respect to vehicle delay and average travel speeds, the traffic analysis prepared by Dowling and Associates (February 2009) for the proposed project presented the following summary:

Table 4: Forecast Measure of Effectiveness Summary

Performance Metric	2040 No-Build	2040 Build
NB AM Avg Speed (mph)	34	57
SB PM Avg Speed (mph)	48	59
NB AM Peak-hour Avg Speed (mph)	31	48
SB PM Peak-hour Avg Speed (mph)	40	53
NB AM Avg Travel Time (min)	48	29
SB PM Avg Travel Time (min)	34	28
NB AM Hours of Delay (veh/hr)	9258	1492
SB PM Hours of Delay (veh/hr)	3383	1122

As presented in Table 4, travel speeds significantly increase as vehicle hours of delay decrease in the build condition. As delay decreases, fuel is being consumed much more efficiently and overall emissions are improved.

The following scenario assumes that the proposed HOV lanes only reduce congestion during the morning and afternoon peak commute periods, when grid-lock and delay are at their worst. Off peak emissions (assumed to be from 7:00 PM to 5:00 AM) are considered to be equivalent with either the build or no build condition because the highway, under normal operating conditions would operate un-congested, freely flowing with minimal vehicle delays. Additionally, the percentage of trucks in the vehicle mix for analysis in the future years were assumed to be consistent with existing truck volumes (Dowling & Associates 2009). Truck percentages do vary from interchange to interchange within the corridor, so an average of 6% was used and applied throughout the entire length of the project for this analysis.

The no-build condition assumes that a portion of the total vehicle trips during the peak periods are diverted onto local streets in an attempt to avoid the congested highway. These diverted trips have been assumed to be traveling at much lower speeds on local roads and have been added back into the overall emission inventory for the no build condition. Table 5 presents the emissions estimates for the existing and 2040 build versus no-build analysis under the above referenced assumptions using the Caltrans approved air quality modeling program (CT-EMFAC). All estimates have been rounded to three decimal places.

Table 5: Pollutant Emission Estimates (AM & PM Peak)

Pollutant	Existing 2009 (Tons Per Year)	2040 No-Build (Tons Per Year)	2040 Build (Tons Per Year)	Project Difference (Tons Per Year)
TOG	0.43429	0.190	0.194	0.004
SO_2	0.00579	0.011	0.011	0.000
Diesel PM	0.00846	0.007	0.009	0.002
PM 2.5	0.02469	0.040	0.042	0.001
PM 10	0.027	0.044	0.045	0.001
NOX	1.0881	0.303	0.373	0.070
Formaldehyde	0.00825	0.003	0.004	0.001
CO_2	583.494	1052.468	1136.365	83.897
CO	6.3092	2.155	2.193	0.038
Butadiene	0.00204	0.001	0.001	0.000
Benzene	0.0103	0.004	0.004	0.000
Acrolein	0.00001	0.000	0.000	0.000
Acetylaldehyde	0.00209	0.001	0.001	0.000

Based on the project specific peak-period analysis, the proposed project would have a negligible impact on air quality, and relieve a great deal of congestion on the existing through lanes of the highway while also improving low speed and idling emissions. The slight increases in the 2040 build condition emissions versus the 2040 no-build condition with respect to CO_2 is attributable to the addition of the HOV lanes, which allow higher traffic volumes (re-directed trips back onto the highway system) throughout the corridor and improvement in average vehicle speeds. Optimum vehicle speeds for the combustion of fossil fuels and the subsequent release of emissions occurs at approximately 45 mph. CO_2 emission curves show an increase from that point as vehicles travel faster.

The closer a sensitive receptor is to the source of the emissions, the more the receptor is likely to be affected by those emissions. The greatest impacts generally occur to residents within 500 feet of the highway. Since the project would improve local circulation in the immediate area, allowing free-flowing movements with less vehicle queuing and out of direction travel on local surface streets, the additional health risk posed by this project is considered to be negligible. The project would widen some over-crossing structures but would not re-configure any intersections in the corridor, and would not move idling traffic at signal lights or stop signs closer to sensitive air receptor locations.

Carbon Monoxide (CO) Analysis

The project is located in an attainment/unclassified areas for all current federal air quality standards. Therefore, conformity requirements do not apply and emission modeling analysis does not apply. Additionally, the project does not create new intersections, reduces vehicle ques and idling times, and allows significantly higher speeds by relieving existing and projected congestion. Increasingly strict emission controls and improving engine technology is expected to continue to reduce CO (carbon monoxide) emissions in future years. Carbon monoxide is a low speed emission that increases when vehicles idle for longer periods of time. Table 6 presents the four highest CO readings for air quality monitoring stations in Santa Barbara County. Only the Santa Barbara monitoring station is located in close proximity to the project limits and is well within the federal and state concentration standards of 35 ppm and 20 ppm respectively.

Table 6: Four Highest 1 - Hour CO Concentations For 2008 (PPM)

Site	1st	Date/Time	2nd	Date/Time	3rd	Date/Time	4th	Date/Time
SANTA BARBARA	5.2	7/7/2008 10:00	3.4	1/2/2008 8:00	2.9	1/15/2008 7:00	2.9	2/12/2008 7:00
LAS FLORES CANYON	3.5	7/4/2008 21:00	3.4	10/26/2008 6:00	1.2	10/25/2008 23:00	1.2	7/3/2008 13:00
LOMPOC H STREET	2.1	2/7/2008 7:00	1.9	2/8/2008 7:00	1.9	1/29/2008 7:00	1.9	2/15/2008 5:00
SANTA MARIA	2.0	1/10/2008 6:00	2.0	2/4/2008 7:00	1.0	2/5/2008 17:00	1.0	1/18/2008 19:00
VAFB SOUTH BASE	1.6	2/1/2008 8:00	1.3	2/12/2008 6:00	0.9	2/15/2008 19:00	0.9	2/5/2008 10:00
GOLETA	1.4	1/17/2008 8:00	1.2	1/18/2008 8:00	1.2	1/14/2008 9:00	1.2	1/31/2008 7:00

Federal Standard = 35 ppm State standard = 20 ppm

Using the CO Protocol document (1997), developed by University of California, Davis for evaluating project level CO impacts for transportation projects, the proposed project is not required to conduct detailed emission modeling for CO impacts per the process flowcharts (refer to Section 14 of this document). Therefore, impacts on CO are expected to be negligible.

Particulate Matter Analysis

The project is located in an attainment/unclassified areas for all current federal AQ standards. Therefore, conformity requirements do not apply and emission modeling analysis does not apply. Since Santa Barbara County is considered non-attainment with respect to PM-10, the project complies with PM-10 control measures, as applicable, in the local PM-10 air quality plan (SBCAPCD Clean Air Plan, 2007). Using the CT-MFAC air quality modeling software, the 2040 build condition shows a slight decrease with respect to PM-10 versus the 2040 no-build condition, and a dramatic reduction from existing conditions (refer to Table 5).

Mobile Source Air Toxics

The South Coast HOV Lane project proposes to add capacity to the highway primarily by widening in the existing median of the highway. When the widening occurs in the median, the action would not move sources of air toxics (primarily diesel trucks) nearer to sensitive receptors, and should not increase the local burden of these pollutants. When outside widening is required, traffic would be moved approximately 12 feet closer to sensitive receptors located adjacent to the highway than the existing condition, which is not considered to be a substantial change from present conditions.

MSAT's have the potential to affect sensitive receptors, specifically schools, medical centers and health care facilities, child care facilities, parks, and playgrounds within a 500-foot radius of the edge of traveled way[4]. No schools or day-care facilities were found within 500 feet of the edge of traveled way. A review of the project alignment shows the following sensitive receptors within 500 feet of the proposed edge of traveled way.

1. Ninos Drive Park,
2. Santa Barbara Municipal Tennis Courts,
3. Santa Barbara Zoo,

[4] From Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways (Sacramento Metropolitan Air Quality Management District, January 2007)

4. Montecito Golf Course,
5. Medical Facilities off Coast Village Road,
6. Beach near Sheffield Drive,
7. Lookout Park, Summerland;
8. Carpinteria Creek Park.

Since the proposed project would not significantly increase traffic on Route 101, and because design year traffic is less than 140,000 AADT (truck percentages do vary from intersection to intersection throughout the corridor, but average approximately 6% between the post-mile limits), the project does not have potential meaningful mobile source air toxic effects in the project area.

For each alternative alignment, the amount of MSAT emitted would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for each of the Build Alternatives is slightly higher than that for the No Build Alternative (refer to Table 5), because the additional capacity increases the efficiency of the roadway and attracts diverted or re-routed trips from elsewhere in the transportation network.

This increase in VMT would lead to higher MSAT emissions for the action alternative along the highway 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 to increased speeds; according to EPA's MOBILE6.2 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 will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

Because the estimated VMT under each of the Alternatives are the same, it is expected there would be no difference in overall MSAT emissions among the design alternatives. Also, regardless of the alternative chosen, 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.

The additional travel lanes contemplated as part of the project alternatives will have the effect of slightly moving some traffic closer to nearby homes, schools, and businesses; therefore, under each alternative there may be localized areas where ambient concentrations of MSAT could be higher under certain Build Alternatives than the No Build Alternative. However, the magnitude and the duration of these potential increases compared to the No-Build alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. Generally, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No Build Alternative, but this is usually offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will 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, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

In sum, under all Build Alternatives in the design year it is expected there would be reduced MSAT emissions in the immediate area of the project, relative to the No Build Alternative, due to the reduced VMT associated with more direct routing, and due to EPA's MSAT reduction programs.

9. Short-Term Construction Impacts

During construction, the proposed project will generate air pollutants. The exhaust from construction equipment contains hydrocarbons, oxides of nitrogen, carbon monoxide, suspended particulate matter, and odors. The use of asphalt, concrete, and other chemicals during construction activities would emit organic gases and other potentially harmful compounds. However, the largest percentage of pollutants would be windblown dust generated during excavation, grading, hauling, demolition, and various other activities. The impacts of these activities would vary each day as construction progresses. Dust and odors occurring very close to the right of way could potentially cause occasional annoyance and complaints from nearby residences.

There are six major sources of air pollutants on a construction project. These are Reactive Organic Gas (ROG) emissions from asphalt use; Particulate Matter (PM) from grading; Carbon Monoxide (CO), Reactive Organic Compounds (ROC), Oxides of Nitrogen (NOx), and PM emissions from construction vehicles. ROC and NOx combine in the presence of sunlight to form ozone. These pollutants can contribute to respiratory ailments.

Total Suspended Particulate matter (TSP) will be the major air pollutant generated. Of particular concern will be PM_{10} (particulate matter smaller than 10 microns in diameter). PM_{10} is about 65% of TSP, and is considered a health hazard that can lead to respiratory ailments, especially in the young and the elderly, who are more prone to respiratory ailments. The primary source of air pollutants associated with construction activities will be from soil grading, and application of asphalt products, both from the activities themselves, and the vehicles that perform the operations.

Air emissions are considered to be equivalent for the various project alternatives due to the similar size, scope, and nature of the proposed project features. As such, projected short-term construction related emissions have only been evaluated as a single build alternative under the maximum possible footprint required (Alternative 2). The project is expected to be phased, and each sub-phase would have a unique amount of working days depending on the project features required within the specific jurisdiction. In total, the entire project is expected take between 5-6 years to complete.

Due to uncertainties concerning the exact design, timing, and equipment usage rates associated with specific project features and potential work required, the following analysis assumes a worst case with respect to the amount of soil disturbance, asphalt and concrete usage. While they have no quantitative construction emission thresholds, Santa Barbara County APCD has requested that construction (short-term) emissions be quantified for all construction projects that require surface disturbance[5]. The current estimate of total area that the project would disturb is approximately 97 acres. Table 6 presents an estimate of the six major components of construction related emission sources associated with the proposed project. These six activities constitute the majority of estimated project related emissions, but by no means encompass every possible scenario or activity that may potentially emit air pollutants.

[5] Scope and Content of Air Quality Sections in Environmental Documents (SBCAPCD, August 2007)

Table 7: Estimated Construction Activities and Working Days Per Phase

	Carpinteria	Summerland	Montecito	Santa Barbara	Total Project
DSA (Acres)*					
Sound Wall Area	8	12	5	6	31
Under new surfacing	14	23	9	5	51
Recovery Areas	4	7	1	3	15
Total Acres Per Phase:	**26**	**42**	**15**	**14**	**97**
Est. AC (Tons)*					
1.0 (ft) new pavement	47,818	76,880	30,148	17,283	172,128
0.20 (ft) overlay	16,957	28,022	10,934	12,963	68,877
Total Tons Per Phase:	**64,775**	**104,902**	**41,081**	**30,246**	**241,004**
Est. Concrete (CY)*					
0.8 (ft) New Pavement	18,985	30,523	11,969	6,862	68,338
Sound wall/footings	9,018	8,094	10,423	4,398	31,993
Median Barriers	5,144	7,756	2,344	2,622	17,867
Structures	2,867	4,362	7,895	1,112	16,236
Total CY Per Phase:	**33,147**	**46,373**	**24,736**	**13,882**	**118,139**
Roadway Ex. (CY)*	**89,122**	**143,289**	**56,189**	**32,2111**	**320,211**
Structural Ex. (CY)*					
Sound Wall Footing	3,865	3,469	4,467	1,885	13,686
Bridges	467	846	1,845	138	3,296
Total CY Per Phase:	**4,332**	**4,315**	**6,312**	**2,023**	**16,982**
Base/Sub-base Import (CY)*	**59,415**	**95,526**	**37,459**	**21,474**	**213,874**
Estimated Number of Contract Working Days	**330**	**430**	**410**	**335**	**1,505**

*Quantities presented in Table 6 are preliminary estimates as determined by the design engineer.

Table 8: Estimated Construction Emissions (Vehicles)

Constituent	No Build	Build Alternatives	Build Alternatives
	Quarterly (Tons)	Quarterly (Tons)	Total (Tons)
CO	0	**4.7**	**104.1**
ROG	0	**1.2**	**26.4**
NOx	0	**14.3**	**315.6**
Diesel PM_{10}	0	**0.6**	**14.2**

* These figures include an estimate of all construction vehicles expected to be used on the project. See construction emissions worksheets in Appendices.

Table 9: Estimated Construction Emissions (Asphalt Use)

Factor	No Build	Build Alternatives
Total asphalt concrete (tons)	0	**241,004**
Emulsion (.25% of AC Tons) tons	0	**603**
Asphalt (6% of AC + 65% of emulsion) (tons)	0	**14,852**
ROG (.04 lb/ton ac[6]) (lb.)	0	**9,640**
Days paving*	0	**250**

*Number of days paving estimated using a conservative 0.25 lane miles paved per day.

Assuming a total of 97 acres of soil disturbance and that all project grading is done in an initial 4-month period (88 working days) for each sub-phase (352 total soil disturbing days), and that the disturbed soil is continually worked throughout the 88-day duration per phase, approximately 0.3 acres per day would be disturbed during the initial clear-grub and grading period for each sub-phase. Assuming 10.25 pounds of PM_{10} per acre per day[7] average, average daily emissions of PM_{10} dust is estimated be approximately 10.25 x .3 = 3.1 pounds per day.

Table 10: Estimated Construction Emissions (PM10 From Grading)

Activity	No Build	Build Alternative
Total area to grade (Acres)	0	**97**
Est. max grading per day (Acres)	0	**0.3**
Length of exposure (Months)	0	**4**
Total Pm_{10} /day	0	**3.1**
Quarterly Dust PM_{10} (Tons)	0	**0.14**

6 According to Consideration of a Model Rule for Control of Volatile Organic Compounds from Cutback Paving Materials, California Air Resources Board, May 1979, paving asphalt produces .04 pounds per ton of Total Organic Gasses (TOG). Reactive Organic Gas (ROG) is about 92% of TOG.

7 Letter from Monterey Bay Unified Air Pollution Control District (Janet Brennan) November, 2007

Most air quality rules governing dust emissions apply to activities which destabilize a site surface from its undisturbed natural soil condition. Once the site surface has been disturbed, it is the site operator's duty to prevent or control any fugitive dust emissions that may result so that they do not extend beyond the boundaries of the project site. Disturbing only those portions of surface area that are necessary for immediate operations (i.e., phased grading and construction) are recommenced to help make dust prevention and control more manageable at the site. Implementation of daily watering of all areas disturbed by construction activity will reduce this amount by 50%. Daily watering is required by Caltrans Standard Specifications.

Naturally Occurring Asbestos

Santa Barbara County is among the counties listed as containing serpentine and ultramafic rock (Governor's Office of Planning and Research, October 26, 2000). However, according to the *Geologic Map of the Carpinteria Quadrangle, Santa Barbara County, California* (Thomas Dibblee Jr., 1986), the nearest ultramafic rock occurrence is approximately 7 miles to the northeast of the project area on the north side of the Santa Ynez Mountain Range. Therefore, there is no impact from Naturally Occurring Asbestos (NOA) during project construction.

Asbestos Containing Materials (ACM)

Since structures that contain asbestos are to be demolished, it is the responsibility of the contractor to comply with the Rules and Regulations of the SBCAPCD. According to the *Asbestos and Lead Containing Paint Survey* (GEOCON, February 2010), Chrysotile asbestos was detected in the cement drainpipe inserts on the Cabrillo Boulevard Undercrossing. Because this older bridge structure contains asbestos, a National Elimination System for Hazardous Air Pollutants (NESHAP) notification is required prior to demolition. This notification is given to the local Air Pollution Control District by the construction Contractor. The aforementioned structure will be included in the NESHAP notification.

Several other structures also contain asbestos sheet packing used in barrier rail systems at the Evans Avenue Undercrossing, South Padaro Lane Undercrossing, Arroyo Parida Creek Bridge, and Santa Monica Creek Bridge. NESHAP regulations do not apply to these structures; however the removal of such material is still covered by Cal/OSHA regulations. The GEOCON report recommended a licensed registered contractor with Cal/OSHA for asbestos-related work performs the removal of such materials.

11. Avoidance, Minimization, and/or Mitigation Measures

Operational Emission Minimization Measures

The proposed project is an operational improvement and congestion relief project, and would be considered an air quality improvement over existing. The HOV and auxiliary lanes will provide air quality improvements by reducing low speed and long-idle conditions resulting from severely congested freeway operations. Ramp queuing will be significantly improved and the overall efficiency of the facilities within the corridor would be improved. These improvements would all be considered long-term air quality benefits, and thus, minimization measures.

Project Design Features Minimizing Air Quality Emissions

Noise barriers reduce noise levels from traffic by blocking and deflecting sound waves. These barriers also affect air pollutant dispersion, leading to increased vertical mixing due to the upward deflection of air flow caused by the structure. Modeling, wind tunnel, and field measurement studies suggest that this upward deflection of air can create a recirculation cavity downwind of the barrier containing a well-mixed, and potentially lower, zone of pollution concentrations (NOAA, 2009).

Vegetation stands also affect near-road pollutant concentrations similarly to noise barriers. The complex and porous structure of trees and bushes can increase air turbulence and promote mixing and dispersion as air flows through and around the vegetation. Vegetation may also reduce pollutant concentrations by enhancing deposition of certain pollutants on leaves and branches. Variables such as the vegetation type, height, and thickness will influence the extent of mixing and deposition experienced at the site, although specific interrelationships of these factors have not been identified. In addition, the porosity of vegetation may promote wind flow off the road and, thus, not lead to elevated on-road pollutant concentrations that may occur with noise barriers.

The following project design features will be utilized to minimize operational air emissions:

- Preserving mature vegetation as a means of mitigating adverse air quality impacts to the maximum degree feasible. The proposed project would be designed to minimize removal of existing trees, especially mature trees.

- Project design would allow consideration of thick vegetative plantings throughout urban areas as a means of reducing population exposures to existing and future emissions from motor vehicles. Tree populations increase the uptake of air and water pollutants from highways. Surface characteristics, such as tree canopy area, also influence the magnitude and extent of the urban heat island effect.
- The project would plant disturbed areas with a variety of native and drought tolerant trees and shrubs in ratios sufficient to replace the air quality and cooling benefits of trees removed by construction of the project. Additional trees would be planted as space allows to further increase those benefits. Trees would be planted from large size containers to accelerate reestablishment of the greenhouse gas sink and to shade the pavement. Riparian planting would also be included to maintain shade along creek corridors.
- Project design features such as paved shoulders and medians (where applicable) will be incorporated to the maximum extent practicable to help minimize longer term dust exposure.
- The project would seed slopes, drainage channels, and other disturbed areas with native and drought tolerant shrubs, perennials and grasses.
- The project will incorporate recycling and waste diversion techniques by promoting the reuse of materials such as steel, road base, concrete, asphalt-concrete, etc. to the extent feasible (DD-17 Recycling Asphalt Concrete).
- Measures proposed to conserve energy and nonrenewable resources include removing and reusing existing thrie beam barrier wherever possible. Also when possible, guide signs within the project limits will be reset.

The following "green" practices and materials would be used in the project as part of highway planting and erosion control work:

- Compost and soil amendments derived from recycled wood products and green waste materials,
- Fiber produced from recycled pulp such as newspaper, chipboard, cardboard,
- Wood mulch made from green waste and/or clean manufactured wood or natural wood,
- Native and drought tolerant seed and plants species,
- Irrigation controllers including water conservation features will use 'smart' irrigation technology that utilizes 'real world' data for only applying the water needed by the plants dependant on actual climate conditions,
- Restricted pesticide use and reduction goals,

- Use of fly-ash in all concrete poured on the project,
- The project will be using recycled water in all areas in the City Limits of Santa Barbara for irrigation, and anywhere else where available;
- Pedestrian walkways would be incorporated into overhead structures to help facilitate pedestrian use allowing crossing of the highway by means other than by car such as on foot or by bicycle.

The State of California maintains several websites, which provide public information on measures to improve renewable energy use, energy efficiency, water conservation and efficiency, land use and landscape maintenance, solid waste measures, and transportation alternatives.

Construction Related Emissions

Caltrans Standard Specification sections pertaining to dust control and dust palliative applications, is a required part of all construction contracts and should effectively reduce and control emission impacts during construction. The provisions of Caltrans Standard Specifications, Section 14 "Air Pollution Control" and Section 10 "Dust Control" require the contractor to comply with all California Air Resources Board and Santa Barbara County Air Pollution Control District rules, ordinances, and regulations.

Santa Barbara County APCD requires the following measures for all projects involving earth-moving activities[8]. The first measure is required for all projects involving earthmoving activities regardless of the project size or duration. The measures are based on policies adopted in the 1979 Air Quality Action Plan for Santa Barbara County. Proper implementation of all of these measures, as necessary, is assumed to reduce fugitive dust emissions to a level of insignificance and is strongly recommended for all projects involving earthmoving.

PM_{10} Mitigation Measures

- During construction, use water trucks or sprinkler systems to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this should include wetting down such areas in the late morning and after work is completed for the day. Increased watering frequency should be required whenever the wind speed exceeds 15 mph. Reclaimed water should be

[8] Scope and Content of Air Quality Sections in Environmental Documents, (SBCAPCD, June 2008)

used whenever possible. However, reclaimed water should not be used in or around crops for human consumption.

- Minimize amount of disturbed area ad reduce on-site vehicle speeds to 15 mph or less.
- Equipment and materials storage sites should be located as far away as possible from residential and public park areas, schools, and other possible sensitive receptors.
- Gravel pads must be installed at all access points to prevent tracking of mud onto public roads. Wheels and undercarriages of construction equipment should be washed off before leaving individual project sites. Placement of automatic wheel washing equipment and/or gravel pads at all site exit points is recommended.
- If importation, exportation and stockpiling of fill material are involved, soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill material to and from the site shall be tarped from the point of origin.
- After clearing, grading, earth moving or excavation is completed, treat the disturbed area by watering, <u>or</u> revegetation, <u>or</u> spreading soil binders until the area is paved or otherwise developed so that dust generation does not occur.
- In areas where the application of water may be impractical or not feasible, the use of chemical based dust suppressants should be considered. Recommended areas include unpaved roads used for construction purposes, project parking areas, and equipment staging areas. The use of dust suppressants also should be considered for areas that may be susceptible to wind erosion after working hours, on weekends, or during holidays.
- Any dust, mud, or other debris tracked out from project sites onto public roads should be cleaned up immediately, with total site clean up (including public access roads) occurring no less than daily. The use of wet vacuum street sweepers is recommended.
- The contractor or builder shall designate a person to monitor the dust control program and to order increased watering, as necessary to prevent transportation of dust offsite. Their duties shall include holiday and weekend periods when work may not be in progress. The name and telephone number of such persons shall be provided to the Air Pollution Control District prior to land use clearance for map recordation and land use clearance for finish grading for the structure.
- Caltrans and its contractors will provide notification of demolitions to the SBCAPCD to ensure compliance with federal and local asbestos removal

requirements. Notifications of demolitions must be made regardless of asbestos content and must be made prior to the start date of demolition activities.

Ozone precursor (NO_x and ROC) Mitigation Measures

As of June 15, 2008, fleet owners are subject to sections 2449, 2449.1, 2449.2, and 2449.3 in Title 13, Article 4.8, Chapter 9, of the California Code of Regulations (CCR) to reduce diesel particulate matter (PM) and criteria pollutant emissions from in-use off-road diesel-fueled vehicles. The following shall be adhered to during project grading and construction to reduce NO_x and $PM_{2.5}$ emissions from construction equipment:

- All portable construction equipment shall be registered with the state's portable equipment registration program OR permitted by the District by September 18, 2008.
- Diesel construction equipment meeting the California Air Resources Board's Tier 1 emission standards for off-road heavy-duty diesel engines shall be used. Equipment meeting Tier 2 or higher emission standards should be used to the maximum extent feasible.
- The engine size of construction equipment shall be the minimum practical size.
- The number of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure that the smallest practical number is operating at any one time.
- Construction equipment shall be maintained in tune per the manufacturer's specifications.
- Construction equipment operating onsite shall be equipped with two to four degree engine timing retard or pre-combustion chamber engines.
- Catalytic converters shall be installed on gasoline-powered equipment, if feasible.
- Diesel catalytic converters, diesel oxidation catalysts and diesel particulate filters as certified and/or verified by EPA or California shall be installed on equipment operating on-site.
- Diesel powered equipment should be replaced by electric equipment whenever feasible.
- Idling of heavy-duty diesel trucks during loading and unloading shall be limited to five minutes; auxiliary power units should be used whenever possible.
- Construction worker trips should be minimized by requiring carpooling and by providing for lunch onsite.

- To the extent possible, route and schedule construction traffic to reduce congestion and related air quality impacts caused by idling vehicles along local roads during peak travel times.
- Gasoline dispensing equipment must have local air district permits, be certified by CARB, and operated in accordance with local air district rules and CARB certification requirements. Periodic maintenance and testing are specified under the CARB Executive Order that was issued for the certification and by many local air district rules. Equipment repairs and testing must be performed by trained personnel with proper certifications by the manufacturers and, depending on the air pollution control district, by the International Code Council (ICC). In addition, local air pollution control districts generally require records of all repair and testing activities to be maintained on site.

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12. Construction Emissions Worksheet

Table 11: Estimated Construction Emissions (Equipment Use)

CONSTRUCTION ACTIVITIES AND EQUIPMENT WORKSHEET
(Please enter estimated quantities ONLY)

PROJECT (Co-Rte-PM): SB-101-PM 2.0/12.3

OPERATION	VEHICLE TYPE	HOURS PER	ESTIMATED QUANTITIES	TOTAL HOURS
AC Paving (tons)		1500	241004.0	
	Paver	8		1285.4
	Roller	24		3856.1
	Heavy duty truck	160		25707.1
	Medium duty truck	8		1285.4
Structure Concrete (cu yds)		50	118139	
	Crane or pumper	1		2363
	Heavy duty truck	5		11814
Structure excavation (cu yds)		20	16982	
	Backhoe	1		849
	Light duty truck	1		849
Roadway excavation (cu yds)		750	320211	
	Scraper	48		20494
	Water truck	8		3416
	Roller/Compactor	8		3416
	Dozer	8		3416
	Motor Grader	8		3416
Base, subbase and imported borrow (cu yds)		600	213874	
	Motor grader	16		5703
	Water truck	8		2852
	Heavy duty truck	120		42775
	Roller/Compactor	8		2852

CONSTRUCTION EMISSIONS FOR DIESEL POWERED VEHICLES (1)

(Emissions in Lb/hr are for a single vehicle)

PROJECT (Co-Rte-PM): SB-101-PM 2.0/12.3

OPERATION	VEHICLE TYPE	# OF VEHICLES	HRS. / DAY / VEHICLE	TOTAL HOURS	TOTAL DAYS	CO Lb/hr	CO Lb/total	ROG Lb/hr	ROG Lb/total	NOx Lb/hr	NOx Lb/total	TSP Lb/hr	PM10 Lb/total
AC Paving (tons)													
	Paver	1	8	1285	160.7	0.65	835.5	0.16	205.7	1.95	2506.4	0.09	111.5
	Roller	3	8	3856	160.7	0.83	3200.5	0.21	809.8	2.52	9717.3	0.12	446.1
	Heavy duty truck	20	8	25707	160.7	1.69	43445.0	0.43	11054.1	5.13	131877.4	0.24	5947.6
	Medium duty truck	1	8	1285	160.7	0.85	1092.6	0.21	269.9	2.56	3290.5	0.12	148.7
					160.7								
Structure Concrete (cu yds)													
	Crane or pumper	1	8	2363	295.3	1.28	3024.4	0.32	756.1	3.87	9144.0	0.18	410.0
	Heavy duty truck	5	8	11814	295.3	1.69	19965.5	0.43	5080.0	5.13	60605.3	0.24	2733.3
					295.3								
Structure excavation (cu yds)													
	Backhoe	1	8	849	106.1	0.57	484.0	0.14	118.9	1.73	1468.9	0.08	65.5
	Light duty truck	1	8	849	106.1	0.59	501.0	0.15	127.4	1.8	1528.4	0.08	65.5
					106.1								
Roadway excavation (cu yds)													
	Scraper	6	8	20494	426.9	2.14	43856.1	0.54	11066.5	6.48	132797.9	0.30	5926.7
	Water truck	1	8	3416	426.9	0.65	2220.1	0.16	546.5	1.95	6660.4	0.09	296.3
	Roller/Compactor	1	8	3416	426.9	0.83	2834.9	0.21	717.3	2.52	8607.3	0.12	395.1
	Dozer	1	8	3416	426.9	0.57	1946.9	0.14	478.2	1.73	5909.0	0.08	263.4
	Motor grader	1	8	3416	426.9	0.91	3108.2	0.23	785.6	2.74	9358.7	0.13	428.0
					533.7								
Base, subbase and imported borrow (cu yds)													
	Motor grader	2	8	5703	356.5	0.91	5190.0	0.23	1311.8	2.74	15627.1	0.13	714.7
	Water truck	1	8	2852	356.5	0.65	1853.6	0.16	456.3	1.95	5560.7	0.09	247.4
	Heavy duty truck	15	8	42775	356.5	1.69	72289.4	0.43	18393.2	5.13	219434.7	0.24	9896.4
	Roller/Compactor	1	8	2852	356.5	0.83	2366.9	0.21	598.8	2.52	7186.2	0.12	329.9
					356.5								
		Total emissions					208214		52776		631280		28426
		Total days			1452								
		Average daily emissions (lbs)					143		36		435		20
		Quarterly emissions (tons)					4.7		1.2		14.3		0.6

42													
43	Emission factors from CARB Off-Road Model MSC 99-32												
44													
45													
46													
47	**Vehicles**	**HP**	**Load**	**CO gm/hr**	**CO lb/hr**		**ROG gm/hr**	**ROG lb/hr**	**NOx gm/hr**	**NOx**	**PM**	**PM**	**PM10**
48										**lb/hr**	**gm/hr**	**lb/hr**	**lb/hr**
49	Backhoe 1996	175	0.55	2.7	0.57		0.68	0.14	8.17	1.73	0.38	0.08	0.08
50	Crane or pumper 1995	500	0.43	2.7	1.28		0.68	0.32	8.17	3.87	0.38	0.18	0.17
51	Dozer 1996	175	0.55	2.7	0.57		0.68	0.14	8.17	1.73	0.38	0.08	0.08
52	Excavator 1995	500	0.57	2.7	1.69		0.68	0.43	8.17	5.13	0.38	0.24	0.23
53	Heavy duty truck 1995	500	0.57	2.7	1.69		0.68	0.43	8.17	5.13	0.38	0.24	0.23
54	(Transit mix truck)												
55	Heavy duty truck 1995	500	0.5	2.7	1.49		0.68	0.37	8.17	4.50	0.38	0.21	0.20
56	Light duty truck 1996	175	0.57	2.7	0.59		0.68	0.15	8.17	1.80	0.38	0.08	0.08
57	Medium duty truck 1995	250	0.57	2.7	0.85		0.68	0.21	8.17	2.56	0.38	0.12	0.11
58	Motor grader 1995	250	0.61	2.7	0.91		0.68	0.23	8.17	2.74	0.38	0.13	0.12
59	Paver 1996	175	0.62	2.7	0.65		0.68	0.16	8.17	1.95	0.38	0.09	0.09
60	Roller/Compactor 1995	250	0.56	2.7	0.83		0.68	0.21	8.17	2.52	0.38	0.12	0.11
61	Scraper 1995	500	0.72	2.7	2.14		0.68	0.54	8.17	6.48	0.38	0.30	0.29
62	Sweeper 1996	175	0.68	2.7	0.71		0.68	0.18	8.17	2.14	0.38	0.10	0.10
63	Water truck 1996	175	0.62	2.7	0.65		0.68	0.16	8.17	1.95	0.38	0.09	0.09
64													
65													

13. Carbon Monoxide Protocol: Flowchart Compliance Determination

Figure 3: Flowchart Compliance Determination

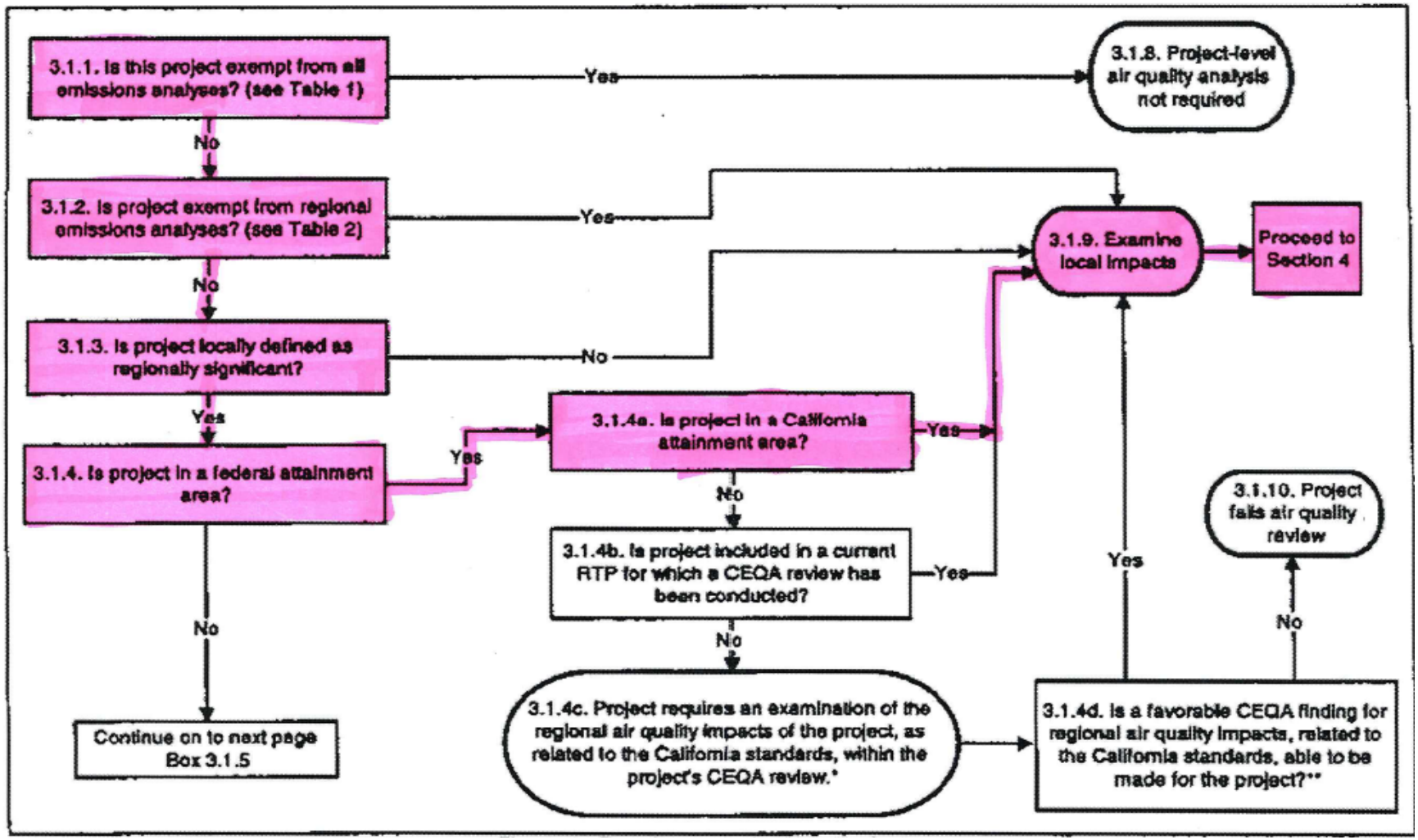


Figure 4: Flowchart Compliance Determination Cont.

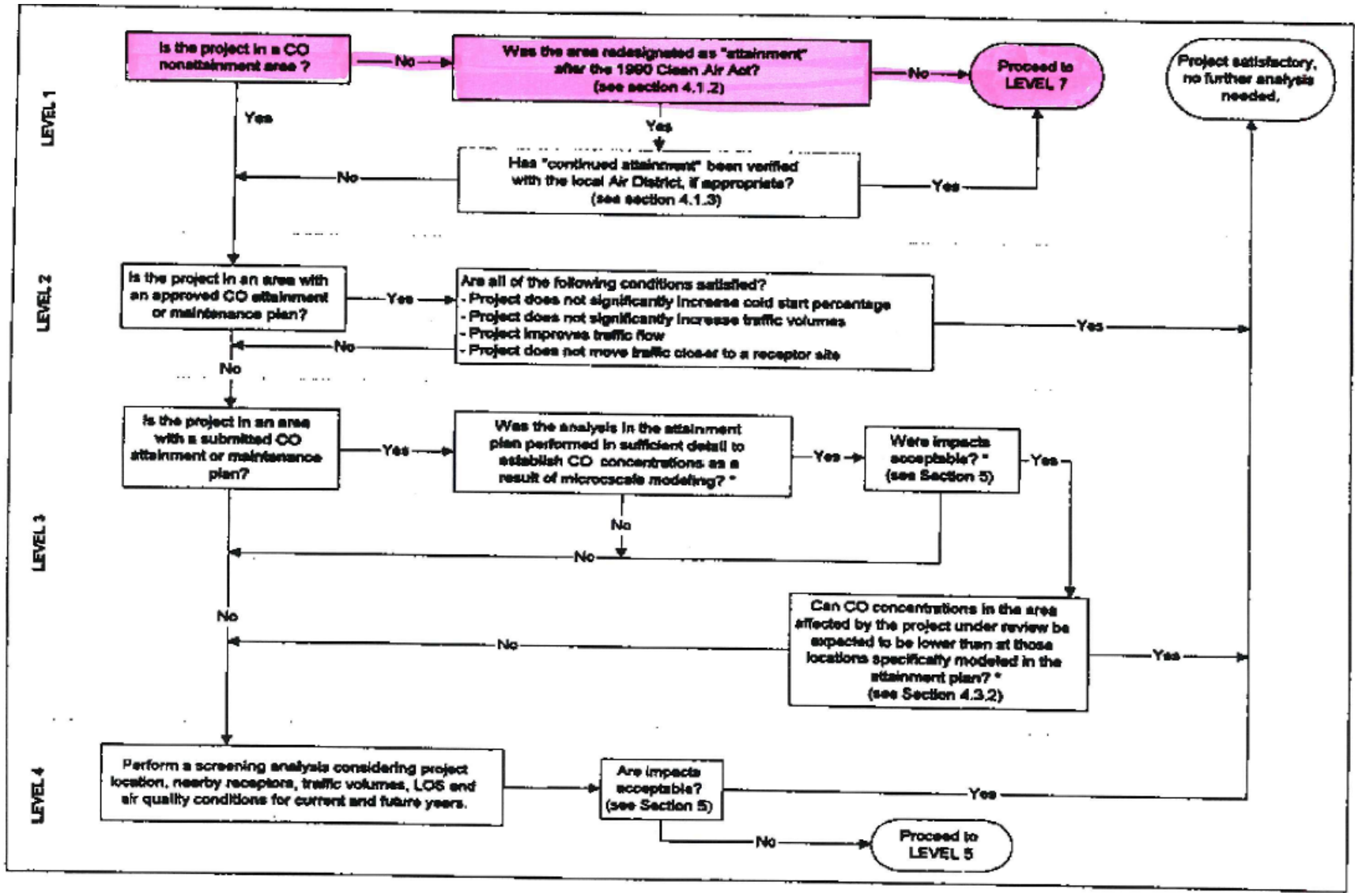
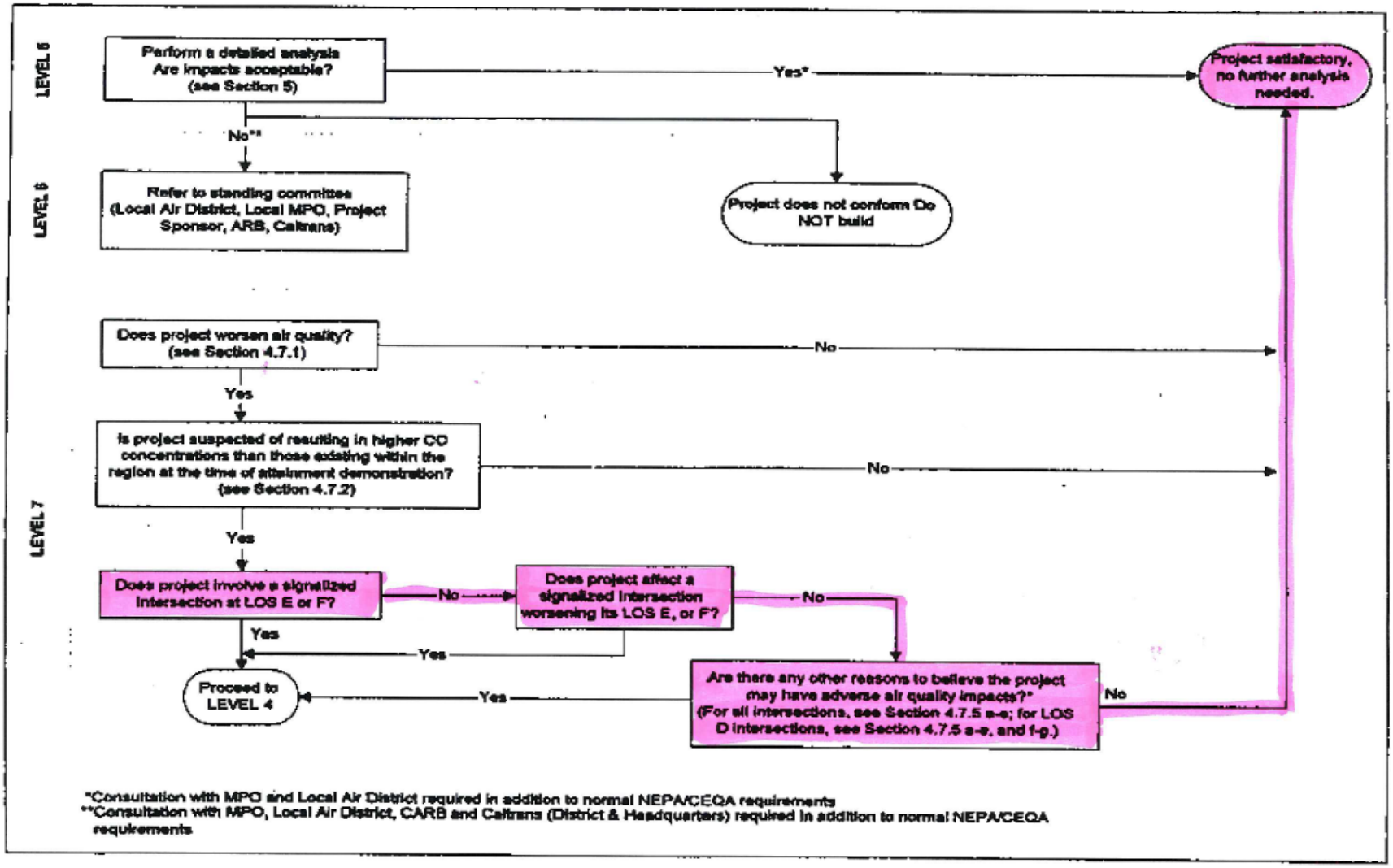


Figure 5: Flowchart Compliance Determination Cont.



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