3.13 AIR QUALITY

The information in this section is based on the *Air Quality and Health Risk Assessment* (AQ/HRA) (February 2012). Given the existing air quality/health risk concerns in the Interstate 710 (I-710) Corridor (see discussion of project need in Chapter 1), the Los Angeles County Metropolitan Transportation Authority (Metro), the California Department of Transportation (Caltrans), and the I-710 Funding Partners conducted special analyses beyond the standard Caltrans analyses typically done for roadway/freeway projects (as described in Caltrans' Standard Environmental Reference at www.dot.ca.gov/ser/vol1/sec3/physical/ch11air/chap11.htm). These additional special project analyses over and above the standard analyses done for freeway projects were conducted because of the unique goods movement component of the project and the air quality purpose of the project.

The I-710 Corridor Project's effects on air quality were evaluated for three different geographic areas: (1) the South Coast Air Basin (SCAB), (2) the I-710 "Area of Interest" (AOI), which generally corresponds to the overall I-710 Corridor Project Study Area described in Chapter 1, and (3) the I-710 freeway corridor.

3.13.1 REGULATORY SETTING

The Federal Clean Air Act (CAA) as amended in 1990 is the Federal law that governs air quality. The California Clean Air Act of 1988 is its companion State law. These laws, and related regulations by the United States Environmental Protection Agency (U.S. EPA) and California Air Resources Board (ARB), set standards for the quantity of pollutants that can be in the air. At the Federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS and State ambient air quality standards have been established for six transportation-related criteria pollutants that have been linked to potential health concerns. The criteria pollutants are: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM, broken down for regulatory purposes into particles of 10 micrometers or smaller – PM_{10} and particles of 2.5 micrometers and smaller – $PM_{2.5}$), lead (Pb), and sulfur dioxide (SO_2). In addition, State standards exist for visibility reducing particles, sulfates, hydrogen sulfide (H_2S), and vinyl chloride. The NAAQS and State standards are set at a level that protects public health with a margin of safety, and are subject to periodic review and revision. Both State and Federal regulatory schemes also cover toxic air contaminants (air toxics). Some criteria pollutants are also air toxics or may include certain air toxics within their general definition.

Federal and State air quality standards and regulations provide the basic scheme for project-level air quality analysis under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). In addition to this type of environmental analysis, a parallel "Conformity" requirement under the FCAA also applies.

FCAA Section 176(c) prohibits the U.S. Department of Transportation and other Federal agencies from funding, authorizing, or approving plans, programs or projects that are not first found to conform to State Implementation Plan (SIP) for achieving the goals of Clean Air Act requirements related to the NAAQS. “Transportation Conformity” takes place on two levels: the regional, or planning and programming, level, and the project level. The proposed project must conform at both levels to be approved. Conformity requirements apply only in nonattainment and “maintenance” (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. U.S. EPA regulations at 40 CFR 93 govern the conformity process.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the standards set for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and in some areas sulfur dioxide (SO_2). California has attainment or maintenance areas for all of these transportation-related “criteria pollutants” except SO_2, and also has a nonattainment area for lead. However, lead is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on Regional Transportation Plans (RTPs) and Federal Transportation Improvement Programs (FTIPs) that include all of the transportation projects planned for a region over a period of at least 20 years for the RTP, and four years for the FTIP. RTP and FTIP conformity is based on use of travel demand and air quality models to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that requirements of the Clean Air Act and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization (MPO), Federal Highway Administration (FHWA), and Federal Transit Administration (FTA), make determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept, scope, and open to traffic schedule of a proposed transportation project are the same as described in the RTP and FTIP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

Conformity at the project-level also requires “hot spot” analysis if an area is “nonattainment” or “maintenance” for carbon monoxide (CO) and/or particulate matter (PM_{10} or $PM_{2.5}$). A region is “nonattainment” if one or more of the monitoring stations in the region measures violation of the relevant standard, and U.S. EPA officially designates the area nonattainment. Areas that were previously designated as nonattainment areas but subsequently meet the standard may be officially redesignated to attainment by U.S. EPA, and are then called “maintenance” areas. “Hot spot” analysis is essentially the same, for technical purposes, as CO or particulate matter analysis performed for NEPA purposes. Conformity does include some specific procedural and documentation standards for projects that require a hot spot analysis. In general, projects must not cause the “hot spot”-related standard to be violated, and must not cause any increase in the number and severity of violations in nonattainment areas. If a known CO or particulate matter violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

3.13.2 AFFECTED ENVIRONMENT

3.13.2.1 CLIMATIC CONDITIONS

The project site is in Los Angeles County, an area within the South Coast Air Basin (Basin), which includes Orange County and the nondesert parts of Los Angeles, Riverside, and San Bernardino Counties. Air quality regulation in the Basin is administered by the South Coast Air Quality Management District (SCAQMD).

The Basin climate is determined by its terrain and geographical location. The Basin is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the southwestern boundary of the Basin, and high mountains surround the rest of the Basin. The region lies in the semipermanent high-pressure zone of the eastern Pacific Ocean. The resulting climate is mild and tempered by cool ocean breezes. This climatological pattern is rarely interrupted. However, periods of extremely hot weather, winter storms, and Santa Ana wind conditions do occur in the Basin.

The annual average temperature varies little throughout the Basin, ranging from the low to middle 60s measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological stations closest to the project limits that monitor temperature are the Long Beach WSCMO Station and the Los Angeles Civic Center Station.[1] The annual average maximum temperature recorded at these stations is 74.0 to 74.2°F, and the annual average minimum temperature is 54.8 to 55.8°F. December is typically the coldest month in this area of the Basin.

The majority of rainfall in the Basin occurs between November and April. Summer rainfall is minimal and generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern part of the Basin along the coastal side of the mountains. The climatological stations closest to the project limits that monitor precipitation are the Long Beach WSCMO Station and the Los Angeles Civic Center Station. Average rainfall measured at these stations varied from a high 2.94 to 3.40 inches in February to 0.28 inches or less between May

1 Western Regional Climatic Center. 2010. http://www. wrcc.dri.edu, accessed February 24, 2010.

and September, with an average annual total of 11.89 to 14.76 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

The Basin experiences a persistent temperature inversion (increasing temperature with increasing altitude) as a result of the Pacific high. This inversion limits the vertical dispersion of air contaminants, holding them relatively near the ground. As the sun warms the ground and the lower air layer, the temperature of the lower air layer approaches the temperature of the base of the inversion (upper) layer until the inversion layer finally breaks, allowing vertical mixing with the lower layer. This phenomenon is observed from mid-afternoon to late afternoon on hot summer days, when the smog appears to clear up suddenly. Winter inversions frequently break by midmorning.

Winds in the vicinity of the Study Area blow predominantly from the west and southwest at relatively low velocities, with wind speeds averaging approximately 4 miles per hour (mph). Summer wind speeds average slightly higher than winter wind speeds. Low average wind speeds together with a persistent temperature inversion limit the vertical dispersion of air pollutants throughout the Basin. Strong, dry, northerly or northeasterly winds, known as Santa Ana winds, occur during the fall and winter months, dispersing air contaminants. Santa Ana conditions tend to last for several days at a time.

Inversion layers have a substantial role in determining O_3 formation. Ozone and its precursors will mix and react to produce higher concentrations under an inversion. The inversion will also simultaneously trap and hold directly emitted pollutants such as CO. PM_{10} is both directly emitted and created indirectly in the atmosphere as a result of chemical reactions. Concentration levels are directly related to inversion layers due to the limitation of mixing space.

Surface or radiation inversions are formed when the ground surface becomes cooler than the air above it during the night. The earth's surface goes through a radiative process on clear nights, when heat energy is transferred from the ground to a cooler night sky. As the earth's surface cools during the evening hours, the air directly above it also cools, while air higher up remains relatively warm. The inversion is destroyed when heat from the sun warms the ground, which in turn heats the lower layers of air; this heating stimulates the ground-level air to float up through the inversion layer.

The combination of stagnant wind conditions and low inversions produces the greatest concentration of pollutants. On days of no inversion or high wind speeds, ambient air pollutant concentrations are the lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problems are CO and nitrogen oxide (NO_X) because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog.

3.13.2.2 MONITORED AIR QUALITY

The I-710 Corridor Project is in the jurisdiction of the SCAQMD. As shown in Figure 3.13-1, the SCAQMD maintains ambient air quality monitoring stations throughout the Basin. The closest monitoring stations to the Study Area are the North Long Beach Station, located at 3648 North Long Beach Blvd.; the Los Angeles Station, located at 1630 N. Main St.; and the Lynwood Station, located at 11220 Long Beach Blvd. Tables 3.13-1, 3.13-2, and 3.13-3 provide monitoring data from these stations for 2006, 2007, and 2008.

From the ambient air quality data provided in Tables 3.13-1, 3.13-2, and 3.13-3, it can be seen that CO and SO_2 levels are below the relevant State and Federal standards. One-hour O_3 levels exceeded the State standard up to eight times per year within the past three years. Eight-hour O_3 levels exceeded the Federal standard up to three times per year and the State standards up to seven times per year in the past three years. The annual NO_2 concentration exceeded the State standard at the Lynwood Station in 2008. The PM_{10} levels in the project area exceeded the State standards in each of the past three years. The Federal 24-hour $PM_{2.5}$ standard was exceeded in each of the past three years. The State annual $PM_{2.5}$ standard was also exceeded in each of the past three years. It should be noted that exceedance of a standard is not necessarily a violation, especially for many Federal standards.

3.13.2.3 CRITERIA POLLUTANT ATTAINMENT/NONATTAINMENT STATUS

The national and California ambient air quality standards (AAQS) for the criteria pollutants are summarized in Table 3.13-4.

Air quality monitoring stations are located throughout the nation and maintained by the local air districts and State air quality regulating agencies. Data collected at permanent monitoring stations are used by the EPA to identify regions as “attainment,” “nonattainment,” or “maintenance,” depending on whether the regions meet the requirements stated in the primary NAAQS. Nonattainment areas are imposed with additional restrictions as required by the EPA. In addition, different classifications of nonattainment, such as marginal, moderate, serious, severe, and extreme, are used to classify each air basin in the State on a pollutant-by-pollutant basis. The classifications are used as a foundation to create air quality management strategies to improve air quality and comply with the NAAQS. Attainment status for each of the criteria pollutants in the Basin is listed in Table 3.13-4.

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Figure 3.13-1 Air Quality Monitoring Stations and Modeled Receptor Locations

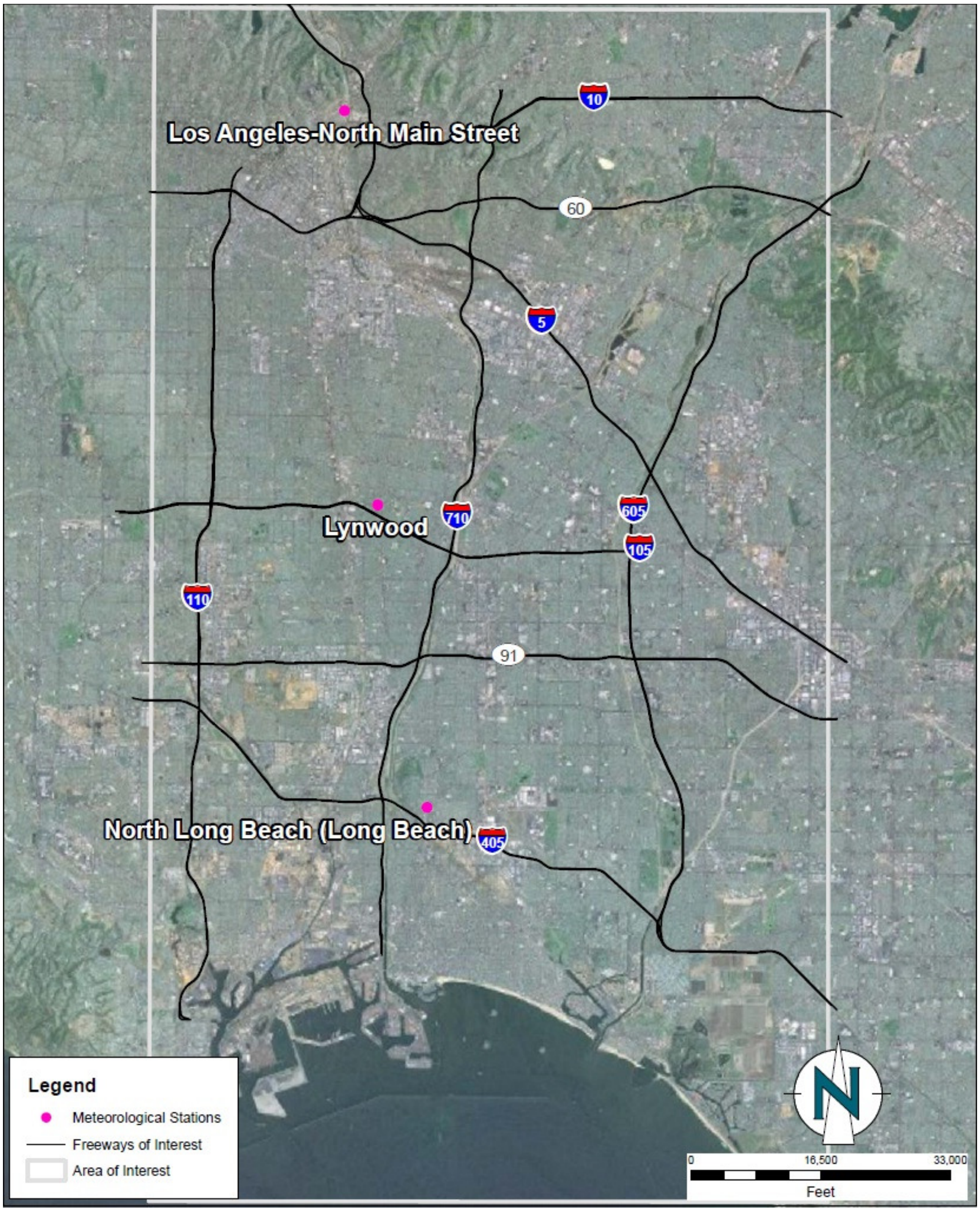

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Table 3.13-1 N. Main St. Air Quality Concentrations

Pollutant		Standard	2008	2007	2006
Carbon Monoxide					
Max 1-hour concentration (ppm)			3	3	3
No. days exceeded:	State	> 20 ppm/1-hour	0	0	0
	Federal	> 35 ppm/1-hour	0	0	0
Max 8-hour concentration (ppm)			2.1	2.2	2.6
No. days exceeded:	State	> 9 ppm/8-hour	0	0	0
	Federal	> 9 ppm/8-hour	0	0	0
Ozone					
Max 1-hour concentration (ppm)			0.109	0.115	0.11
No. days exceeded:	State	> 0.09 ppm/1-hour	3	3	8
Ozone					
Max 8-hour concentration (ppm)			0.090	0.102	0.079
No. days exceeded:	State	> 0.07 ppm/8-hour	7	6	4
	Federal	> 0.075 ppm/8-hour	3	3	3
Particulates (PM_{10})					
Max 24-hour concentration ($\mu g/m^3$)			66	78	59
No. days exceeded:	State	> 50 $\mu g/m^3$	2	5	3
	Federal	> 150 $\mu g/m^3$	0	0	0
Annual avg. concentration ($\mu g/m^3$)			30.9	33.3	30.3
Exceeds standard?	State	> 20 $\mu g/m^3$	Yes	Yes	Yes
Particulates ($PM_{2.5}$)					
Max 24-hour concentration ($\mu g/m^3$)			78.3	64.2	56.2
No. days exceeded:	Federal[2]	> 35 $\mu g/m^3$	10	20	11
Annual avg. concentration ($\mu g/m^3$)			15.7	16.8	15.6
Exceeds standard?	State	> 12 $\mu g/m^3$	Yes	Yes	Yes
	Federal	> 15 $\mu g/m^3$	No	No	No
Nitrogen Dioxide					
Max 1-hour concentration (ppm): State		> 0.18 ppm/1-hour	0.12	0.10	0.11
No. days exceeded			0	0	0
Annual avg. concentration: Federal		0.053 ppm annual avg.	0.028	0.030	0.029
Exceeds Federal standard?			No	No	No
Sulfur Dioxide					
Max 24-hour concentration (ppm)			0.002	0.003	0.006
No. days exceeded:	State	0.04 ppm	0	0	0
	Federal	0.14 ppm	0	0	0
Annual avg. concentration: Federal		0.030 ppm annual avg.	0.0003	0.0009	0.0019
Exceeds Federal standard?			No	No	No

Sources: EPA and ARB, 2006 to 2008.
$\mu g/m^3$ = micrograms per cubic meter
ARB = California Air Resources Board
EPA = United States Environmental Protection Agency
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ppm = parts per million

Table 3.13-2 North Long Beach Air Quality Concentrations

Pollutant	Standard	2008	2007	2006
Carbon Monoxide				
Max 1-hour concentration (ppm)		3	3	4
No. days exceeded: State	> 20 ppm/1-hour	0	0	0
Federal	> 35 ppm/1-hour	0	0	0
Max 8-hour concentration (ppm)		2.5	2.6	3.4
No. days exceeded: State	> 9 ppm/8-hour	0	0	0
Federal	> 9 ppm/8-hour	0	0	0
Ozone				
Max 1-hour concentration (ppm)		0.093	0.099	0.081
No. days exceeded: State	> 0.09 ppm/1-hour	0	1	0
Ozone				
Max 8-hour concentration (ppm)		0.074	0.073	0.058
No. days exceeded: State	> 0.07 ppm/8-hour	1	1	0
Federal	> 0.075 ppm/8-hour	0	0	0
Particulates (PM_{10})				
Max 24-hour concentration ($\mu g/m^3$)		62	75	78
No. days exceeded: State	> 50 $\mu g/m^3$	1	6	5
Federal	> 150 $\mu g/m^3$	0	0	0
Annual avg. concentration ($\mu g/m^3$)		29	30	31
Exceeds standard? State	> 20 $\mu g/m^3$	Yes	Yes	Yes
Particulates ($PM_{2.5}$)				
Max 24-hour concentration ($\mu g/m^3$)		57.2	82.9	58.5
No. days exceeded: Federal[2]	> 35 $\mu g/m^3$	8	12	5
Annual avg. concentration ($\mu g/m^3$)		14.2	14.6	14.2
Exceeds standard? State	> 12 $\mu g/m^3$	Yes	Yes	Yes
Federal	> 15 $\mu g/m^3$	No	No	No
Nitrogen Dioxide				
Max 1-hour concentration (ppm): State	> 0.18 ppm/1-hour	0.13	0.11	0.10
No. days exceeded		0	0	0
Annual avg. concentration: Federal	0.053 ppm annual avg.	0.021	0.021	0.022
Exceeds Federal standard?		No	No	No
Sulfur Dioxide				
Max 24-hour concentration (ppm)		0.012	0.011	0.010
No. days exceeded: State	0.04 ppm	0	0	0
Federal	0.14 ppm	0	0	0
Annual avg. concentration: Federal	0.030 ppm annual avg.	0.0022	0.0027	0.0022
Exceed Federal standard?		No	No	No

Sources: EPA and ARB, 2006 to 2008.
$\mu g/m^3$ = micrograms per cubic meter
ARB = California Air Resources Board
EPA = United States Environmental Protection Agency
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ppm = parts per million

Table 3.13-3 Lynwood Air Quality Concentrations

Pollutant		Standard	2008	2007	2006
Carbon Monoxide					
Max 1-hour concentration (ppm)			6	8	8
No. days exceeded:	State	> 20 ppm/1-hour	0	0	0
	Federal	> 35 ppm/1-hour	0	0	0
Max 8-hour concentration (ppm)			4.3	5.1	6.4
No. days exceeded:	State	> 9 ppm/8-hour	0	0	0
	Federal	> 9 ppm/8-hour	0	0	0
Ozone					
Max 1-hour concentration (ppm)			0.078	0.102	0.080
No. days exceeded:	State	> 0.09 ppm/1-hour	0	1	0
Ozone					
Max 8-hour concentration (ppm)			0.060	0.077	0.066
No. days exceeded:	State	> 0.07 ppm/8-hour	0	2	0
	Federal	> 0.075 ppm/8-hour	0	1	0
Particulates (PM_{10})					
Max 24-hour concentration (µg/m^3)			NM	NM	NM
No. days exceeded:	State	> 50 µg/m^3	NM	NM	NM
	Federal	> 150 µg/m^3	NM	NM	NM
Annual avg. concentration (µg/m^3)			NM	NM	NM
Exceeds Standard?	State	> 20 µg/m^3	Yes	Yes	Yes
Particulates ($PM_{2.5}$)					
Max 24-hour concentration (µg/m^3)			44.2	49.0	55.0
No. days exceeded:	Federal[2]	> 35 µg/m^3	3	4	4
Annual avg. concentration (µg/m^3)			15.5	15.9	16.7
Exceeds Standard?	State	> 12 µg/m^3	Yes	Yes	Yes
	Federal	> 15 µg/m^3	Yes	Yes	Yes
Nitrogen Dioxide					
Max 1-hour concentration (ppm): State		> 0.18 ppm/1-hour	0.12	0.10	0.14
No. days exceeded			0	0	0
Annual avg. concentration: Federal		0.053 ppm annual avg.	0.030	0.029	0.031
Exceed Federal standard?			No	No	No
Sulfur Dioxide					
Max 24-hour concentration (ppm)			NM	NM	NM
No. days exceeded:	State	0.04 ppm	NM	NM	NM
	Federal	0.14 ppm	NM	NM	NM
Annual avg. concentration: Federal		0.030 ppm annual avg.	NM	NM	NM
Exceed Federal standard?			NM	NM	NM

Sources: EPA and ARB, 2006 to 2008.
µg/m^3 = micrograms per cubic meter
ARB = California Air Resources Board
EPA = United States Environmental Protection Agency
NM = Not Monitored at this Station
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ppm = parts per million

Table 3.13-4 State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[8]	Federal Standard[8]	Principal Health and Atmospheric Effects	Typical Sources	Attainment Status
Ozone (O_3)	1 hour 8 hours	0.09 ppm 0.070 ppm	--- 0.075 ppm	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage and cancer. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include many known toxic air contaminants. Biogenic VOC may also contribute.	Low-altitude ozone is almost entirely formed from ROG or VOC and NO_x in the presence of sunlight and heat. Major sources include motor vehicles and other mobile sources, solvent evaporation, and industrial and other combustion processes.	Federal: Extreme Nonattainment (8-hour) State: Nonattainment (1-hour and 8-hour)
Carbon Monoxide (CO)	1 hour 8 hours 8 hours (Lake Tahoe)	20 ppm 9.0 ppm[1] 6 ppm	35 ppm 9 ppm[1] ---	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO also is a minor precursor for photochemical ozone.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.	Federal: Attainment/ Maintenance State: Attainment
Respirable Particulate Matter (PM_{10})[2]	24 hours Annual	50 $\mu g/m^3$ 20 $\mu g/m^3$	150 $\mu g/m^3$ ---	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many aerosol and solid compounds are part of PM_{10}.	Dust- and fume-producing industrial and agricultural operations; combustion smoke; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources (wind-blown dust, ocean spray).	Federal: Serious Nonattainment State: Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	24 hours Annual	--- 12 $\mu g/m^3$	35 $\mu g/m^3$ 15.0 $\mu g/m^3$	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – a toxic air contaminant – is in the $PM_{2.5}$ size range. Many aerosol and solid compounds are part of $PM_{2.5}$.	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical (including photochemical) reactions involving other pollutants including NO_x, SO_x, ammonia, and ROG.	Federal: Nonattainment State: Nonattainment

Table 3.13-4 State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[8]	Federal Standard[8]	Principal Health and Atmospheric Effects	Typical Sources	Attainment Status
Nitrogen Dioxide (NO_2)[4]	1 hour Annual	0.18 ppm 0.030 ppm	0.100 ppm[3] (98th percentile over 3 years) 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain. Part of the "NO_x" group of ozone precursors.	Motor vehicles and other mobile sources; refineries; industrial operations.	Federal: Attainment/ Maintenance State: Nonattainment
Sulfur Dioxide (SO_2)[5]	1 hour 24 hours Annual	0.25 ppm 0.04 ppm ---	0.075 ppm (98th percentile over 3 years) 0.14 ppm (for certain areas) 0.030 ppm (for certain areas)	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.	Federal: Attainment/ Unclassified State: Attainment/ Unclassified
Lead (Pb)[2, 6]	Monthly Quarterly Rolling 3-month average	1.5 µg/m³ --- ---	--- 1.5 µg/m³ 0.15 µg/m³	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a toxic air contaminant and water pollutant.	Lead-based industrial processes like battery production and smelters. Lead paint, leaded gasoline. Aerially deposited lead from gasoline may exist in soils along major roads.	Federal: Nonattainment (LA County only) State: Nonattainment (LA County only)
Sulfate	24 hours	25 µg/m³	---	Premature mortality and respiratory effects. Contributes to acid rain. Some toxic air contaminants attach to sulfate aerosol particles.	Industrial processes, refineries and oil fields, mines, natural sources like volcanic areas, salt-covered dry lakes, and large sulfide rock areas.	Federal: Attainment/ Unclassified State: Attainment/ Unclassified
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm	---	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea.	Industrial processes such as: refineries and oil fields, asphalt plants, livestock operations, sewage treatment plants, and mines. Some natural sources like volcanic areas and hot springs.	Federal: Attainment/ Unclassified State: Attainment/ Unclassified
Visibility Reducing Particles (VRP)[7]	8 hours	Visibility of 10 miles or more (Tahoe: 30 miles) at relative humidity less than 70 percent	---	Reduces visibility. Produces haze. NOTE: not related to the Regional Haze program under the Federal Clean Air Act, which is oriented primarily toward visibility issues in National Parks and other "Class I" areas.	See particulate matter above.	Federal: Attainment/ Unclassified State: Attainment/ Unclassified

Table 3.13-4 State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[8]	Federal Standard[8]	Principal Health and Atmospheric Effects	Typical Sources	Attainment Status
Vinyl Chloride[2]	24 hours	0.01 ppm	---	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes	Federal: Attainment/ Unclassified State: Attainment/ Unclassified

Source: www.arb.ca.gov/research/aaqs/aaqs2.pdf, February 7, 2012; California Air Resources Board, *Area Designations,* accessed May 2012.

Footnotes:

1 Rounding to an integer value is not allowed for the State 8-hour CO standard. Violation occurs at or above 9.05 ppm. Violation of the Federal standard occurs at 9.5 ppm due to integer rounding.

2 The ARB has identified vinyl chloride and the particulate matter fraction of diesel exhaust as toxic air contaminants. Diesel exhaust particulate matter is part of PM_{10} and, in larger proportion, $PM_{2.5}$. Both the ARB and U.S. EPA have identified lead and various organic compounds that are precursors to ozone and $PM_{2.5}$ as toxic air contaminants. There are no exposure criteria for adverse health effect due to toxic air contaminants, and control requirements may apply at ambient concentrations below any criteria levels specified above for these pollutants or the general categories of pollutants to which they belong. Lead NAAQS are not required to be considered in Transportation Conformity analysis.

3 Final 1-hour NO_2 NAAQS published in the Federal Register on 2/9/2010, effective 3/9/2010. Initial nonattainment area designations should occur in 2012 with conformity requirements effective in 2013. Project-level hot spot analysis requirements, while not yet required for conformity purposes, are expected.

4 To attain the 1-hour standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb. Note that the national standards are in units of parts per billion (ppb). California standards are in units of parts per million (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

5 On June 2, 2010, the new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour 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.

6 The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standards are approved.

7 In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basins, respectively.

8 State standards are "not to exceed" unless stated otherwise. Federal standards are "not to exceed more than once a year" or as noted above.

$\mu g/m^3$ = micrograms per cubic meter
ARB = California Air Resources Board
EPA = United States Environmental Protection Agency
mg/m^3 = milligrams per cubic meter
ppm = parts per million
ppb = parts per billion
ROG = reactive organic gases
SO_x = sulfur oxides
volatile organic compounds

3.13.2.4 Regional Air Quality Conformity

The project is in the 2008 RTP, which was found to conform by the FHWA/FTA on June 5, 2008 (Project ID: iC0401; Description: I-710 Corridor user-fee backed capacity enhancement – widen to five mixed flow plus two dedicated lanes for clean technology trucks [each direction], and interchange improvements). The design concept and scope of Alternative 6B is consistent with the project description in the 2008 RTP. This same concept and design scope is also included in the Draft 2012 RTP.

A project to reconstruct the I-710 interchanges at Interstate 105 (I-105), State 91 (SR-91), Interstate 405 (I-405), and Interstate 5 (I-5) as part of the I-710 Corridor Project is included in the SCAG-adopted 2011 Federal Transportation Improvement Program (FTIP) (Project ID No. LA0B952). The project is also included in the list of financially constrained projects in the SCAG 2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (Project ID No. LAOB952). The project is also included in the Metro Final 2009 Long-Range Transportation Plan (LRTP) as a Funded Freeway Improvement. The list of financially constrained projects in the 2012 RTP/SCS also includes the full I-710 Corridor Project (Project ID No. ICO401) and is described as follows:

> I-710 Corridor User-Fee Backed Capacity Enhancement – Widen to five mixed flow + two dedicated lanes for clean technology trucks (each direction) and interchange improvements, from Ocean Blvd. in Long Beach to the intermodal railroad yards in Commerce/Vernon.

This description is consistent with the description of Alternatives 6B and 6C provided in Chapter 2 of this Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS). The 2011 FTIP and 2012 RTP/SCS project listings are provided in Appendix I of this Draft EIR/EIS.

3.13.2.5 Project Level Air Quality Conformity

Because the I-710 Corridor Project is within an attainment/maintenance area for CO and a nonattainment area for Federal $PM_{2.5}$ and PM_{10} standards, local hot-spot analyses for CO, $PM_{2.5}$, and PM_{10} are required for conformity purposes. The results of these hot-spot analyses are provided in Section 3.13.3, Environmental Consequences.

3.13.3 Environmental Consequences

3.13.3.1 Permanent Impacts

Carbon Monoxide (CO). The Caltrans *Transportation Project-Level Carbon Monoxide Protocol* (December 1997) was used to assess the project's impact on local CO concentrations. Based on this protocol, a screening analysis was conducted to determine whether the project would result in any CO hot spots. Localized emissions of CO may increase with implementation of the project. Based on I-710 Corridor Project traffic study data, afternoon (PM) peak-hour data were considered the worst-case scenario and used as the basis for the intersection selection and "hot spot" modeling process. Because traffic conditions (delay) under Alternative 6B were generally worse compared to the other build alternatives, modeling results associated with projected future conditions at ten selected intersections under proposed Alternative 6B were used to quantitatively assess the potential for traffic-related impacts of the proposed project.

The hot spot analysis assessed the potential for localized CO impacts due to the project and whether the project alternatives would either cause violation of the CO ambient air quality standards or exacerbate the air quality conditions to delay the progress of meeting attainment of the standard. The one-hour and eight-hour NAAQS for CO are 35 parts per million (ppm) and nine ppm, respectively. Of the ten intersections studied, the highest one-hour concentration for Alternative 6B was seven ppm and the highest eight-hour concentration was five ppm. Based on the modeling performed using EPA-approved methods and the traffic study data, the build alternatives would not cause CO concentrations to exceed the CO standards or delay the timely attainment of the standards.

PARTICULATE MATTER ($PM_{2.5}$ AND PM_{10}).

PROJECTS OF AIR QUALITY CONCERN. The first step in the hot-spot analysis is to determine whether a project meets the standard for a project of air quality concern (POAQC). The EPA specified in 40 CFR 93.123(b)(1) of the 2006 Final Rule that POAQC are certain highway and transit projects that involve significant levels of diesel vehicle traffic, or any other project that is identified in the $PM_{2.5}$ and PM_{10} SIP as a localized air quality concern. The 2006 Final Rule defines the POAQC that require a $PM_{2.5}$ and PM_{10} hot-spot analysis in 40 CFR 93.123(b)(1) as:

i. New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;

ii. Projects affecting intersections that are at level of service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;

iii. New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;

iv. Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; or

v. Projects in or affecting locations, areas, or categories of sites that are identified in the $PM_{2.5}$ and PM_{10} applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

As the proposed I-710 Corridor Project would expand the existing facility and would impact existing intersections, and as the existing highway has a substantial number of diesel vehicles, it would meet the criteria in Items i and ii above. Therefore, this project is considered to be a POAQC, and a project-level $PM_{2.5}$ and PM_{10} hot-spot analysis has been conducted to assess whether the project would cause or contribute to any new localized $PM_{2.5}$ or PM_{10} violations, increase the frequency or severity of any existing violations, or delay timely attainment of the $PM_{2.5}$ and PM_{10} AAQS.

TYPES OF EMISSIONS CONSIDERED. In accordance with the EPA/FHWA Guidance, this hot-spot analysis is based on directly emitted and re-entrained $PM_{2.5}$ and PM_{10} emissions. Tailpipe, brake wear, tire wear, and road dust $PM_{2.5}$ and PM_{10} emissions were considered in this hot-spot analysis.

Vehicles cause dust from paved and unpaved roads to be re-entrained, or resuspended, in the atmosphere. According to the 2006 Final Rule, road dust emissions are to be considered for PM_{10} hot-spot analyses. For $PM_{2.5}$, road dust emissions are only to be considered in hot-spot analyses if the EPA or the State air agency has made a finding that such emissions are a significant contributor to the $PM_{2.5}$ air quality problem (40 CFR 93.102(b)(3)). The EPA has published a guidance on the use of AP-42 for re-entrained road dust for SIP development and conformity (August 2007); therefore, re-entrained $PM_{2.5}$ is considered in this analysis.

Secondary particles formed through $PM_{2.5}$ and PM_{10} precursor emissions from a transportation project take several hours to form in the atmosphere, giving emissions time to disperse beyond the immediate project area of concern for localized analyses; therefore, they were not considered in this hot-spot analysis. Secondary emissions of $PM_{2.5}$ and PM_{10} are considered as part of the regional emission analysis prepared for the conforming RTP and FTIP.

ANALYSIS METHOD. According to hot-spot methodology, estimates of future localized $PM_{2.5}$ and PM_{10} pollutant concentrations need to be determined. This analysis establishes that the local air quality is consistent with the 2007 Air Quality Management Plan (AQMP) by comparing the locally monitored $PM_{2.5}$ and PM_{10} concentrations to the AQMP's projections. Additionally, the impacts of the project on the regional $PM_{2.5}$ and PM_{10} emissions and the likelihood of these impacts interacting with the ambient $PM_{2.5}$ and PM_{10} levels to cause hot spots are discussed.

RE-ENTRAINED DUST. The ARB has recently prepared a revised methodology for entrained road dust emissions. This methodology will be used in the 2012 AQMP being prepared by the SCAQMD for the required December 2012 $PM_{2.5}$ SIP submittal.[1] The I-710 Corridor Project AQ/HRA used the January 2011 EPA method (with local ARB/SCAQMD silt loadings) for entrained road dust. When compared to the AP-42 method of calculating re-entrained dust, the ARB method (1) uses lower silt loadings in Los Angeles County for nonfreeway roadways, (2) uses a 15 percent $PM_{2.5}/PM_{10}$ ratio rather than the 25 percent ratio in AP-42, and (3) changes in future entrained road dust emissions (for all road types) are proportional to increases in centerline miles, not vehicle miles traveled. In this way, the ARB method is very similar to the SCAQMD's 2007 AQMP methodology.

Based on the inconsistencies using the AP-42 method paved road dust method with the 2007 AQMP method and new ARB method, entrained road dust emissions (as calculated by AP-42) were not used in these emissions comparisons (build to No Build) in this report; instead, the latest ARB approach for future year emissions was used. The build alternatives do not change the centerline length of I-710; they add lanes (one lane in each direction for Alternative 5A and three lanes in each direction for Alternatives 6A/B/C) to the existing I-710 (8 lanes). In the ARB methodology, adding lanes does not increase emissions; the silt (which results from track-out, erosion, etc.) is distributed over the increased roadway surface (i.e., silt amount stays the same, even as the per-area silt loading decreases). Some trucks that would travel the mainline (or decide to go onto the local roads) in Alternative 1 will travel in the freight corridor. This would not increase the amount of track-out onto I-710 (mainline and freight corridor). There is also no source of soil erosion onto the freight corridor, which is elevated for much of its length.

DATA CONSIDERED. The closest air monitoring stations to the Study Area are the North Long Beach and Los Angeles Main St. stations. All of these stations monitor $PM_{2.5}$ and PM_{10} concentrations. These monitoring stations are located in Los Angeles County within the vicinity of I-405, State Route 110 (SR-110), United States Route 101 (US-101), Interstate 10 (I-10), and I-710. The North Long Beach Station is located approximately 2,500 feet from I-405 and 1 mile from I-710. The Long Beach Pacific Coast Hwy. Station is located approximately two miles from I-710. The Los Angeles Station is located approximately 3,000

[1] http://www.aqmd.gov/gb_comit/stmpradvgrp/2012AQMP/meetings/2011/dec15/PavedRoadDust.pdf.

feet from SR-110, 3,000 feet from US-101, and 1 mile from I-10. The I-405, I-710, SR-110, US-101, and I-10 freeways currently carry between 7,000 and 23,000 daily truck trips. Therefore, the air quality concentrations monitored at these stations are representative of the conditions within the Study Area.

TRENDS IN BASELINE $PM_{2.5}$ CONCENTRATIONS. The monitored $PM_{2.5}$ concentrations at the North Long Beach, Long Beach Pacific Coast Hwy., and Los Angeles Stations are shown in Table 3.13-5. These data show that the Federal 24-hour $PM_{2.5}$ AAQS (35 micrograms per cubic meter [$\mu g/m^3$]) has been exceeded at the North Long Beach Station in five out of the past six years, at the Long Beach Pacific Coast Hwy. Station in four out of the past six years, and at the Los Angeles Station in each of the past six years. In addition, the annual average $PM_{2.5}$ AAQS (15 $\mu g/m^3$) at the North Long Beach and the Long Beach Pacific Coast Hwy. Stations was exceeded in 2005 and 2006 and at the Los Angeles Station from 2005 through 2009; however, the concentrations continue to diminish every year.

Table 3.13-5 Ambient PM2.5 Monitoring Data ($\mu g/m^3$)

	2005	2006	2007	2008	2009	2010
North Long Beach Air Quality Monitoring Station						
3-year average 98th percentile	44.6	40.7	39.0	38.2	37.9	33.5
Exceeds Federal 24-hour standard (35 $\mu g/m^3$)?	Yes	Yes	Yes	Yes	Yes	No
3-year National annual average	17.3	16.0	14.9	14.3	13.9	12.5
Exceeds Federal annual average standard (15 $\mu g/m^3$)?	Yes	Yes	No	No	No	No
Long Beach PCH Air Quality Monitoring Station						
3-year average 98th percentile	44.3	38.3	35.5	35.1	33.8	31.7
Exceeds Federal 24-hour standard (35 $\mu g/m^3$)?	Yes	Yes	Yes	Yes	No	No
3-year National annual average	17.3	15.2	14.3	13.9	13.3	12.2
Exceeds Federal annual average standard (15 $\mu g/m^3$)?	Yes	Yes	No	No	No	No
Los Angeles – N. Main St. Air Quality Monitoring Station						
3-year average 98th percentile	56.3	48.8	47.8	43.5	41.8	35.1
Exceeds Federal 24-hour standard (35 $\mu g/m^3$)?	Yes	Yes	Yes	Yes	Yes	Yes
3-year National annual average	19.6	17.6	16.6	16.1	15.7	14.3
Exceeds Federal annual average standard (15 $\mu g/m^3$)?	Yes	Yes	Yes	Yes	Yes	No

Source: ARB website: http://www.arb.ca.gov/adam/, February 2012.
$\mu g/m^3$ = micrograms per cubic meter

PROJECTED 24-HOUR CONCENTRATIONS. The levels of $PM_{2.5}$ in the project vicinity exceeded the Federal 24-hour standard between 2005 and 2009. The Federal 24-hour standard was not exceeded at either Long Beach station in 2010. Using various methodologies, the 2007 AQMP estimated the 2015 24-hour $PM_{2.5}$ concentrations. Table V-2-16 in the 2007 AQMP estimates that the 24-hour $PM_{2.5}$ concentration in Long Beach will range from 31.2 to 41.9 µg/m³ in 2015. However, based on the data in Table 3.13-5, the concentrations measured in 2010 range from 31.7 to 35.1 µg/m³. Therefore, it is estimated that the 24-hour $PM_{2.5}$ level would be 31.2 µg/m³, 11 percent below the Federal standard.

PROJECTED ANNUAL CONCENTRATIONS. While the current levels of $PM_{2.5}$ in the project vicinity are generally above the Federal annual standard, indications are that levels in the future will continue to decrease. Table V-2-15c in the 2007 AQMP estimates that the annual $PM_{2.5}$ concentration in long beach will be 12.7 µg/m³ in 2014, which is approximately 15 percent below the Federal standard.

TRENDS IN BASELINE PM_{10} CONCENTRATIONS. The PM_{10} concentrations monitored at the North Long Beach, the Long Beach Pacific Coast Hwy., and the Los Angeles Stations are shown in Table 3.13-6. With the exception of 2007 at the North Long Beach Station, the Federal 24-hour PM_{10} AAQS (150 µg/m³) was not exceeded between 2005 and 2010.

Table 3.13-6 Ambient PM10 Monitoring Data (µg/m³)

	2005	2006	2007	2008	2009	2010
North Long Beach Air Quality Monitoring Station						
First Highest	66	78	232	62	62	44
Second Highest	61	64	75	45	56	41
Third Highest	57	63	54	45	55	38
Fourth Highest	54	58	53	44	50	36
No. of days above National 24-hour standard (150 µg/m³)	0	0	1	0	0	0
Long Beach PCH Air Quality Monitoring Station						
First Highest	131	117	123	81	83	76
Second Highest	74	113	87	64	78	53
Third Highest	72	92	67	64	60	50
Fourth Highest	72	90	66	63	58	47
No. of days above National 24-hour standard (150 µg/m³)	0	0	0	0	0	0
Los Angeles – N. Main St. Air Quality Monitoring Station						
First Highest	70	59	78	66	72	42
Second Highest	68	55	77	65	62	41
Third Highest	68	55	63	50	57	41
Fourth Highest	51	48	58	49	63	41
No. of days above National 24-hour standard (150 µg/m³)	0	0	0	0	0	0

Source: ARB website: http://www.arb.ca.gov/adam/, February 2012.
µg/m³ = micrograms per cubic meter

The 2007 AQMP (SCAQMD) reports that since the Federal annual PM_{10} standard has been revoked, the Basin is expected to be declared in attainment for the 24-hour Federal PM_{10} standard since 2000. Table V-3-1 in the 2007 AQMP lists the projected 24-hour PM_{10}

concentrations at various stations within the Basin. It is estimated that the 24-hour concentration in Long Beach will be 77 µg/m^3 by 2015, 51 percent of the Federal standard.

TRANSPORTATION AND TRAFFIC CONDITIONS. Existing and future (2035) No Build average daily traffic (ADT) volumes and average daily truck volumes for I-710 in the project area are shown in Table 3.13-7. The table indicates that I-710 currently experiences more than 10,000 trucks annual average daily traffic (AADT).

Table 3.13-7 Existing (2008) and No Build (2035) Average Daily Traffic Volumes

I-710 Segment		Existing (2008)		2035 No Build	
From	**To**	**Total**	**Trucks**	**Total**	**Trucks**
SR-60	I-5	185,700	17,600	212,700	23,200
I-5	Washington Blvd.	215,300	20,100	233,400	25,300
Washington Blvd.	Atlantic St.	206,900	19,400	235,800	27,800
Atlantic St.	Florence Blvd.	196,600	28,600	224,600	37,800
Florence Blvd.	Firestone Blvd.	196,600	28,600	224,600	37,800
Firestone Blvd.	Imperial Hwy.	205,600	30,400	232,200	39,700
Imperial Hwy.	I-105	206,600	31,500	237,600	43,200
I-105	Rosecrans Ave.	213,100	31,700	242,000	43,400
Rosecrans Ave.	Alondra Blvd.	135,500	26,300	170,400	38,500
Alondra Blvd.	SR-91	213,800	36,700	267,100	59,300
SR-91	Long Beach Blvd.	214,200	37,000	264,100	60,100
Long Beach Blvd.	Del Amo Blvd.	188,100	42,100	238,200	74,100
Del Amo Blvd.	I-405	179,800	42,000	227,600	74,300
I-405	Wardlow Rd.	179,600	41,600	227,500	74,400
Wardlow Rd.	Willow St.	160,700	41,200	202,700	71,600
Willow St.	Pacific Coast Hwy.	150,000	41,400	186,000	71,800
Pacific Coast Hwy.	Anaheim St.	131,800	33,900	170,100	60,100
Anaheim St.	9th St.	52,000	26,000	76,100	46,600
9th St.	Ocean Blvd.	22,200	10,300	32,100	20,100

Source: *I-710 Corridor Project Traffic Operations Analysis Report,* February 2012.
I-5 = Interstate 5
I-105 = Interstate 105
I-405 = Interstate 405
SR-60 = State Route 60
SR-91 = State Route 91

TRAFFIC CHANGES DUE TO THE PROPOSED PROJECT. The proposed project is a highway expansion project. Based on the *Freeway Traffic Operations Analysis Report* (August 2011), the proposed project would increase the traffic volumes along I-710. The future traffic volumes along I-710 for each of the build alternatives are shown in Table 3.13-8. As shown, the proposed project would increase the total traffic volume and the number of trucks using I-710.

Table 3.13-8 2035 Project Alternative Average Daily Traffic Volumes

I-710 Segment		Alternative 5A		Alternative 6A		Alternative 6B		Alternative 6C	
From	**To**	**Total**	**Trucks**	**Total**	**Trucks**	**Total**	**Trucks**	**Total**	**Trucks**
SR-60	I-5	266,900	28,500	273,400	40,300	273,400	40,300	273,400	40,300
I-5	Washington Blvd.	315,800	32,400	328,000	45,000	328,000	45,000	328,000	45,000
Washington Blvd.	Atlantic St.	304,600	33,800	322,400	50,600	322,400	50,600	322,400	50,600
Atlantic St.	Florence Blvd.	316,800	45,900	344,300	65,300	344,300	65,300	344,300	65,300
Florence Blvd.	Firestone Blvd.	302,000	46,300	330,800	64,600	330,800	64,600	330,800	64,600
Firestone Blvd.	Imperial Hwy.	303,800	47,000	332,300	64,800	332,300	64,800	332,300	64,800
Imperial Hwy.	I-105	297,700	49,600	327,700	65,800	327,700	65,800	327,700	65,800
I-105	Rosecrans Ave.	296,300	49,700	328,500	70,000	328,500	70,000	328,500	70,000
Rosecrans Ave.	Alondra Blvd.	209,600	43,500	238,100	65,300	238,100	65,300	238,100	65,300
Alondra Blvd.	SR-91	311,000	65,300	341,300	80,900	341,300	80,900	341,300	80,900
SR-91	Long Beach Blvd.	269,100	63,600	297,400	79,000	297,400	79,000	297,400	79,000
Long Beach Blvd.	Del Amo Blvd.	296,100	80,300	328,800	93,200	328,800	93,200	328,800	93,200
Del Amo Blvd.	I-405	286,000	80,600	317,400	93,400	317,400	93,400	317,400	93,400
I-405	Wardlow Rd.	291,000	80,900	314,100	89,500	314,100	89,500	314,100	89,500
Wardlow Rd.	Willow St.	246,000	76,300	265,900	85,400	265,900	85,400	265,900	85,400
Willow St.	Pacific Coast Hwy.	218,000	76,600	238,000	85,500	238,000	85,500	238,000	85,500
Pacific Coast Hwy.	Anaheim St.	95,800	50,300	90,000	43,900	90,000	43,900	90,000	43,900
Anaheim St.	9th St.	73,800	42,500	71,400	41,500	71,400	41,500	71,400	41,500
9th St.	Ocean Blvd.	35,400	21,300	35,900	24,500	35,900	24,500	35,900	24,500

Source: *I-710 Corridor Project Traffic Operations Analysis Report,* February 2012.
I-5 = Interstate 5
I-105 = Interstate 105
I-405 = Interstate 405
SR-60 = State Route 60
SR-91 = State Route 91

Table 3.13-9 shows the 2035 Alternative 1 LOS and delay in the project area for the a.m. and p.m. peak hours. Tables 3.13-10, 3.13-11, 3.13-12, and 3.13-13 show the 2035 LOS and delay in the project area for Alternatives 5A and 6A/B/C, respectively. As shown, the proposed project would improve the LOS and reduce the delay at some intersections in the project area while worsening the LOS and increasing the delay at other intersections within the project area. Therefore, a vehicle emission analysis was prepared to determine the proposed project's effect on the region attaining the Federal $PM_{2.5}$ and PM_{10} AAQS.

Table 3.13-9 2035 Alternative 1 - No Build Intersection Levels of Service

Intersection		AM Peak Hour		PM Peak Hour	
		LOS	**Delay (sec)**	**LOS**	**Delay (sec)**
10	Pico Ave. and 9th St.	D	37.8	C	26.3
19	Pacific Coast Hwy. and Santa Fe Ave.	F	246.8	F	243.4
22	Pacific Coast Hwy. and Atlantic Ave.	C	31.1	D	47.7
34	Del Amo Blvd. and Santa Fe Ave.	E	56.8	E	76.1
41	Alondra Blvd. and Santa Fe Ave.	D	50.8	E	63.8
43	Alondra Blvd. and Atlantic Ave.	E	59.9	D	47.9
45	Alondra Blvd. and Paramount Blvd.	D	35.3	E	76.7
71	Slauson Ave. and Eastern Ave.	D	35.3	F	93.0
112	I-710 northbound ramps and Long Beach Blvd.	D	36.8	C	31.1
148	Wardlow Rd. and Cherry Ave.	D	36.8	F	88.7
155	Wilmington Ave. and 223rd St.	D	50.1	F	170.2
159	38th St. and Santa Fe Ave.	C	25.5	D	53.8

Source: *I-710 Corridor Project Intersection Traffic Impact Analysis Report,* February 2012.
I-710 = Interstate 710
LOS = Level of Service
sec = seconds

Table 3.13-10 2035 Alternative 5A Intersection Levels of Service

Intersection		AM Peak Hour		PM Peak Hour	
		LOS	Delay (sec)	LOS	Delay (sec)
10	Pico Ave. and 9th St.	C	32.0	C	25.8
19	Pacific Coast Hwy. and Santa Fe Ave.	F	146.8	F	143.0
22	Pacific Coast Hwy. and Atlantic Ave.	D	36.1	F	145.9
34	Del Amo Blvd. and Santa Fe Ave.	E	62.5	F	96.6
41	Alondra Blvd. and Santa Fe Ave.	D	54.5	F	90.0
43	Alondra Blvd. and Atlantic Ave.	E	71.1	F	92.9
45	Alondra Blvd. and Paramount Blvd.	E	59.7	F	125.1
71	Slauson Ave. and Eastern Ave.	E	77.1	F	107.8
112	I-710 northbound ramps and Long Beach Blvd.	D	40.4	C	27.6
148	Wardlow Rd. and Cherry Ave.	D	48.2	F	137.4
155	Wilmington Ave. and 223rd St.	D	42.0	F	166.9
159	38th St. and Santa Fe Ave.	D	52.9	D	51.2

Source: *I-710 Corridor Project Intersection Traffic Impact Analysis Report,* February 2012.
I-710 = Interstate 710 sec = seconds
LOS = Level of Service

Table 3.13-11 2035 Alternative 6A Intersection Levels of Service

Intersection		AM Peak Hour		PM Peak Hour	
		LOS	Delay (sec)	LOS	Delay (sec)
10	Pico Ave. and 9th St.	F	123.0	E	41.1
19	Pacific Coast Hwy. and Santa Fe Ave.	F	125.5	F	114.8
22	Pacific Coast Hwy. and Atlantic Ave.	C	33.5	F	132.6
34	Del Amo Blvd. and Santa Fe Ave.	E	72.1	F	138.7
41	Alondra Blvd. and Santa Fe Ave.	D	44.0	F	28.0
43	Alondra Blvd. and Atlantic Ave.	E	64.3	F	90.8
45	Alondra Blvd. and Paramount Blvd.	D	52.5	F	103.8
71	Slauson Ave. and Eastern Ave.	E	63.6	F	87.5
112	I-710 northbound ramps and Long Beach Blvd.	D	53.5	C	31.0
148	Wardlow Rd. and Cherry Ave.	E	71.1	F	167.2
155	Wilmington Ave. and 223rd St.	D	52.5	F	154.0
159	38th St. and Santa Fe Ave.	E	79.3	F	129.2

Source: *I-710 Corridor Project Intersection Traffic Impact Analysis Report,* February 2012.
I-710 = Interstate 710 sec = seconds
LOS = Level of Service

Table 3.13-12 2035 Alternative 6B Intersection Levels of Service

Intersection		AM Peak Hour		PM Peak Hour	
		LOS	Delay (sec)	LOS	Delay (sec)
10	Pico Ave. and 9th St.	F	139.1	E	61.1
19	Pacific Coast Hwy. and Santa Fe Ave.	F	125.4	F	122.5
22	Pacific Coast Hwy. and Atlantic Ave.	C	33.7	F	137.6
34	Del Amo Blvd. and Santa Fe Ave.	E	72.1	F	137.7
41	Alondra Blvd. and Santa Fe Ave.	D	43.4	F	94.2
43	Alondra Blvd. and Atlantic Ave.	E	64.4	F	94.6
45	Alondra Blvd. and Paramount Blvd.	D	49.5	F	102.5
71	Slauson Ave. and Eastern Ave.	E	61.7	F	85.9
112	I-710 northbound ramps and Long Beach Blvd.	D	49.5	C	28.8
148	Wardlow Rd. and Cherry Ave.	E	64.8	F	169.5
155	Wilmington Ave. and 223rd St.	D	51.4	F	165.3
159	38th St. and Santa Fe Ave.	F	93.8	F	120.8

Source: *I-710 Corridor Project Intersection Traffic Impact Analysis Report,* February 2012.
I-710 = Interstate 710 sec = seconds
LOS = Level of Service

Table 3.13-13 2035 Alternative 6C Intersection Levels of Service

Intersection		AM Peak Hour		PM Peak Hour	
		LOS	Delay (sec)	LOS	Delay (sec)
10	Pico Ave. and 9th St.	E	64.1	E	59.3
19	Pacific Coast Hwy. and Santa Fe Ave.	F	121.8	F	108.3
22	Pacific Coast Hwy. and Atlantic Ave.	C	34.1	F	123.1
34	Del Amo Blvd. and Santa Fe Ave.	E	73.3	F	134.8
41	Alondra Blvd. and Santa Fe Ave.	D	45.5	F	92.8
43	Alondra Blvd. and Atlantic Ave.	E	56.1	F	92.1
45	Alondra Blvd. and Paramount Blvd.	D	48.8	F	97.1
71	Slauson Ave. and Eastern Ave.	E	63.2	F	85.6
112	I-710 northbound ramps and Long Beach Blvd.	F	94.1	D	38.5
148	Wardlow Rd. and Cherry Ave.	E	70.9	F	171.5
155	Wilmington Ave. and 223rd St.	D	51.6	F	165.6
159	38th St. and Santa Fe Ave.	E	71.6	F	103.1

Source: *I-710 Corridor Project Intersection Traffic Impact Analysis Report,* February 2012.
I-710 = Interstate 710 sec = seconds
LOS = Level of Service

DAILY VEHICLE EMISSION CHANGES DUE TO THE PROPOSED PROJECT. The $PM_{2.5}$ and PM_{10} emissions for the I-710 are presented in Tables 3.13-14 and 3.13-15, respectively. These emissions were calculated using the I-710 Traffic model data. As noted above in the Analysis Method section, the entrained paved road emissions for the 2035 Alternatives (including Alternative 1) would be equal to the 2008 emissions, as calculated using EPA's January 2011 AP-42 method with local silt loadings.

Table 3.13-14 I-710 Freeway $PM_{2.5}$ Emissions (lbs/day)

Source	2008	2035				
		Alt 1	Alt 5A	Alt 6A	Alt 6B	Alt 6C
Exhaust	690	391	465	600	**354**	**387**
Re-entrained	252	252	252	252	252	252
Total	942	642	717	852	**605**	**639**
% Change from 2035 Alt 1	-	-	12%	33%	**-6%**	**-1%**

Source: Environ, 2012.
Note: Numbers in **bold** represent emission levels at or below the Alternative 1 (No Build) level
Alt = Alternative
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
lbs/day = pounds per day

Table 3.13-15 I-710 Freeway PM_{10} Emissions (lbs/day)

Source	2008	2035				
		Alt 1	Alt 5A	Alt 6A	Alt 6B	Alt 6C
Exhaust	868	569	678	857	**534**	578
Re-entrained	1,025	1,025	1,025	1,025	1,025	1,025
Total	1,893	1,594	1,703	1,882	**1,559**	1,603
% Change from 2035 Alt 1	-	-	7%	18%	**-2%**	1%

Source: Environ, 2012.
Note: Numbers in **bold** represent emission levels at or below the Alternative 1 (No Build) level
Alt = Alternative
PM_{10} = particulate matter less than 10 microns in diameter
lbs/day = pounds per day

Within the I-710 region, Alternatives 5A and 6A would increase the $PM_{2.5}$ and PM_{10} emissions, Alternative 6C would result in a small increase in PM_{10} emissions while having no effect on $PM_{2.5}$ emissions, and Alternative 6B would result in a net decrease in $PM_{2.5}$ and PM_{10} emissions.

ZEE Design Option. Implementing the ZEE design option for Alternative 6B would reduce the alternative's $PM_{2.5}$ exhaust emissions by a further 18 lbs/day to 336 lbs/day, 55 lbs/day less than the Alternative 1 conditions. The ZEE design option for Alternative 6B would reduce the alternative's PM_{10} exhaust emissions by a further 24 lbs/day to 510 lbs/day, 59 lbs/day less than the Alternative 1 conditions.

Implementing the ZEE design option for Alternative 6C would reduce the alternative's $PM_{2.5}$ exhaust emissions by a further 15 lbs/day to 372 lbs/day, 19 lbs/day less than the Alternative 1 conditions. The ZEE design option for Alternative 6C would reduce the alternative's PM_{10} exhaust emissions by a further 20 lbs/day to 558 lbs/day, 11 lbs/day less than the Alternative 1 conditions.

CONCLUSION. Transportation conformity is required under Section 176(c) of the CAA to ensure that Federally supported highway and transit project activities are consistent with the purpose of the SIP. Conformity for the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant AAQS. As required by the 2006 Final Rule, this qualitative $PM_{2.5}$ and PM_{10} hot-spot analysis demonstrates that this project meets the CAA conformity requirements to support State and local air quality goals with respect to potential localized air quality impacts.

It is not expected that changes to $PM_{2.5}$ and PM_{10} emissions levels associated with the proposed project would result in new violations of the Federal air quality standards for the following reasons:

- Based on the projected $PM_{2.5}$ concentrations listed in the 2007 AQMP, without the proposed project, the 24-hour $PM_{2.5}$ concentrations within the project area would be reduced to 11 percent below the Federal standard by 2015.
- Based on the projected $PM_{2.5}$ concentrations listed in the 2007 AQMP, without the proposed project, the annual average $PM_{2.5}$ concentrations within the project area would be reduced to 15 percent below the Federal standard by 2014.
- With the exception of 2007, the ambient PM_{10} concentrations have not exceeded the 24-hour or annual Federal standard.
- Based on the projected PM_{10} concentrations listed in the 2007 AQMP, without the proposed project, the 24-hour PM_{10} concentrations would be 49 percent below the Federal standard by 2015.

- Alternatives 5A and 6A would increase the $PM_{2.5}$ and PM_{10} emissions, Alternative 6C would have little or no affect on the $PM_{2.5}$ and PM_{10} emissions, and Alternative 6B would decrease the $PM_{2.5}$ and PM_{10} emissions on the I-710 freeway.
- Under the ZEE design options, Alternative 6B and Alternative 6C would result in a net decrease in $PM_{2.5}$ and PM_{10} emissions.

For these reasons, future new or worsened $PM_{2.5}$ and PM_{10} violations of any standards are not anticipated; therefore, the project meets the conformity hot-spot requirements in 40 CFR 93-116 and 93-123 for both $PM_{2.5}$ and PM_{10}.

In regard to the related interagency consultation required for this project, SCAG's Transportation Conformity Working Group (TCWG) reviewed and discussed this project during its meetings in January and February 2012. Because a preferred alternative has not yet been identified, the TCWG has not yet concurred on a conformity determination for the project. At the February 2012 meeting, a subcommittee was formed to review the Particulate Matter Hot-Spot Qualitative Analysis, which will be submitted to the TCWG once a preferred alternative is identified following public review of the Draft EIR/EIS.

PROJECT-LEVEL MOBILE SOURCE AIR TOXICS (MSAT). In addition to the criteria air pollutants for which there are NAAQS, the EPA also regulates air toxics. Most air toxics originate from humanmade sources, including on-road mobile sources, other mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Controlling air toxic emissions became a national priority with the passage of the CAA Amendments of 1990, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA assessed this expansive list in its latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (FR, Volume 72, No. 37, page 8,430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in its Integrated Risk Information System (IRIS).[1] In addition, the EPA identified the following seven compounds with substantial contributions from mobile sources that are among the national- and regional-scale cancer risk drivers from its 1999 National Air Toxics Assessment (NATA)[2]: acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (DPM), formaldehyde, naphthalene, and polycyclic organic matter

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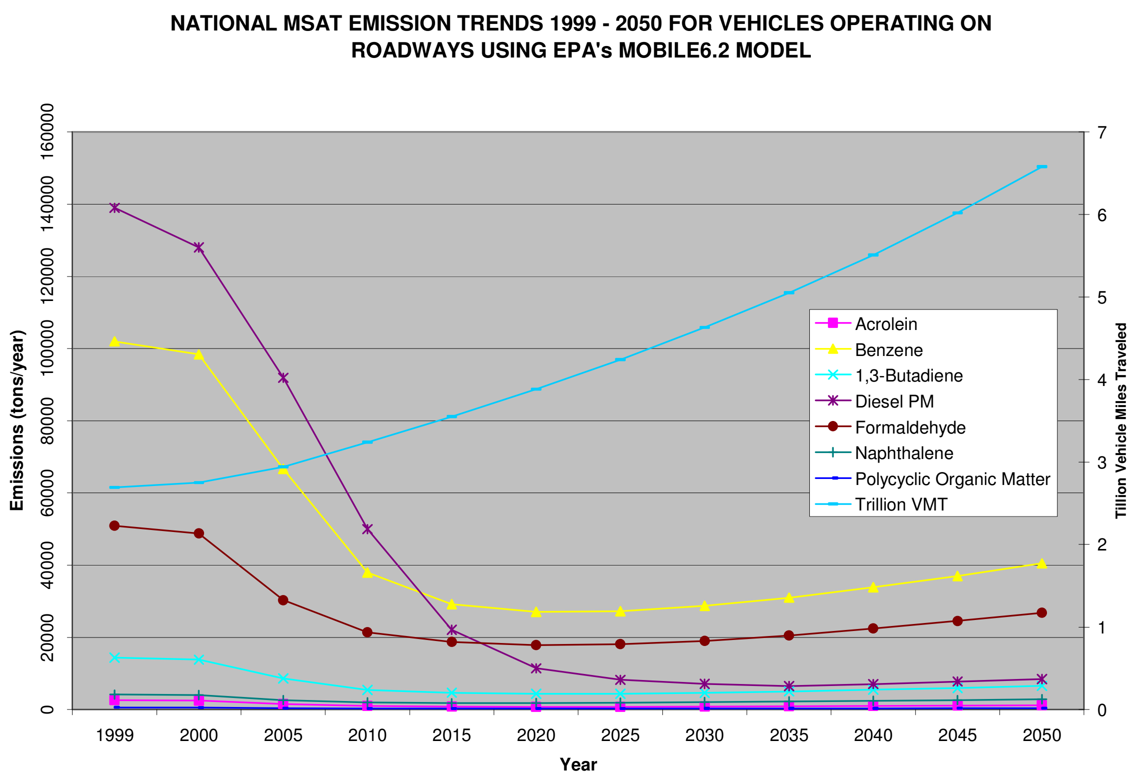
1 http://www.epa.gov/ncea/iris/index.html.

2 http://www.epa.gov/ttn/atw/nata1999/.

(POM). While FHWA considers these to be the priority MSAT, the list is subject to change and may be adjusted in response to future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if VMT increase by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSATs is projected from 1999 to 2050, as shown in Figure 3.13-2. The projected reduction in MSAT emissions would be slightly different in California due to the use of the EMFAC2007 emission model in place of the MOBILE6.2 model.

Figure 3.13-2 National MSAT Emission Trends



Source: http://www.fhwa.dot.gov/environment/airtoxic/100109guidmem.htm.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

In September 2009, FHWA issued a memorandum titled *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents*[1] to advise FHWA division offices as to when and how to analyze MSATs in the NEPA process for highways. This document is an update to the previous guidance released in February 2006. The guidance is described as interim because

MSAT science is still evolving. As the science progresses, FHWA will update the guidance. This analysis follows the FHWA guidance.

MSAT ANALYSIS METHODOLOGY. Depending on the specific project circumstances, FHWA has identified three levels of analysis.

- **Exempt Projects or Projects with No Meaningful MSAT Impacts:** Exempt projects typically include those with no effects on traffic volume or vehicle mix. Projects qualifying as categorical exclusions under 23 CFR 771.117I or that are exempt from CAA conformity under 40 CFR 93.126 are also considered projects with no meaningful MSAT impacts.
- **Projects with Low Potential MSAT Effects:** These projects have average annual daily trips less than 140,000 per day and for which the project does not add substantially to the number of trips. In California, the corresponding AADT criteria are 100,000 on urban nonfreeways and 50,000 on rural nonfreeways. In addition, California has a third criterion, which states that if freeway modifications are to be completed more than 500 to 1,000 feet from a sensitive land use (e.g., residences, schools, day care centers, playgrounds, and medical facilities), the project will result in low potential MSAT effects (Brady pers. comm.; ARB 2005). These projects are usually evaluated qualitatively.
- **Projects with Higher Potential MSAT Effects:** These projects typically are those that have average annual daily trips exceeding 140,000 per day and that have the potential to significantly increase diesel particulate matter exhaust. In California, the corresponding AADT criteria are 100,000 on urban nonfreeways and 50,000 on rural nonfreeways. In addition, California considers a project to have a higher potential MSAT effect if modifications to freeways are proposed to take place within 500 to 1,000 feet of sensitive land uses (Brady pers. comm.; ARB 2005). These projects require a quantitative evaluation.

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1 http://www.fhwa.dot.gov/environment/airtoxic/100109guidmem.htm.

The proposed project includes the expansion of an existing highway that has average annual daily trips exceeding 140,000 per day and a high percentage of diesel vehicles. Therefore, the project qualifies as having higher potential MSAT effect.

The basic procedure for analyzing emissions for on-road MSATs is to calculate emission factors using EMFAC2007 and apply the emission factors to speed and VMT data specific to the project. EMFAC2007 is the emission inventory model developed by the California Air Resources Board (ARB) that calculates emission inventories for motor vehicles operating on roads in California. The emission factors information used in this analysis is from EMFAC2007 and is specific to the Basin.

This analysis focuses on the seven MSAT pollutants identified by the EPA as being the highest priority MSATs: acrolein, benzene, 1,3-butadiene, DPM, formaldehyde, naphthalene, and POM. EMFAC2007 provides emission factor information for DPM, but does not provide emission factors for the remaining six MSATs. Each of the remaining six MSATs, however, is a constituent of motor vehicle total organic gas (TOG) emissions, and EMFAC2007 provides emission factors for TOG. ARB has supplied Caltrans with speciation factors for each of the remaining six MSATs not directly estimated by EMFAC2007.[1] Each speciation factor represents the portion of TOG emissions estimated to be a given MSAT. For example, if a speciation factor of 0.03 is provided for benzene, its emissions level is estimated to be 3 percent of total TOG emissions, utilizing the speciation factor as a multiplier once TOG emissions are known. This analysis used the ARB-supplied speciation factors to estimate emissions of the aforementioned six MSATs as a function of TOG emissions.

The University of California, Davis (UCD), in cooperation with Caltrans, developed a spreadsheet tool that incorporates EMFAC2007 emission factors, ARB speciation factors, and project-specific traffic activity data such as peak- and off-peak-hour VMT, speed, travel times, and traffic volumes. The spreadsheet tool applies the traffic activity data to the emission factors and estimates MSAT emissions for the I-710 Corridor and build alternatives. The spreadsheet used in this analysis is based on FHWA's 2006 MSAT guidance. Once speciation factors for naphthalene and POM have been established, a new spreadsheet will be developed that is capable of calculating a project's emissions for all seven MSATs.

[1] As of February 2010, speciation factors were not available for naphthalene and POM.

MSAT Analysis Results. Table 3.13-20 presents an analysis of MSAT incremental emissions for each of the project alternatives compared with the 2008 existing conditions (baseline) for all study areas. Table 3.13-21 presents a similar comparative analysis of incremental emissions of each of the 2035 build alternatives compared to Alternative 1. As speciation factors are not available for naphthalene and POM, the emissions for these pollutants are not included in Tables 3.13-20 and 3.13-21 However, as with benzene, 1,3-butadiene, acrolein, and formaldehyde, these pollutants are a subset of TOG. Therefore, the future with and without project naphthalene and POM emissions would have a similar increase or decrease as the other MSATs.

In every instance (all project alternatives, all study areas [SCAB, I-710 AOI, and I-710]), decreases in incremental MSAT emissions compared to 2008 were calculated. Reductions in DPM (the main risk driver) were approximately 78 percent (SCAB), 77 percent to 81 percent (AOI), and 38 percent to 76 percent along I-710. Compared to 2008, reductions were greatest for Alternative 6B with Alternative 6C, Alternative 1, Alternative 5A, and Alternative 6A, following in descending order.

In 2035, compared to Alternative 1, DPM emissions (the main health risk concern) increased for Alternative 6A in all study areas, whereas Alternative 5A DPM emissions were similar in the SCAB and increased within the AOI and along I-710. Alternative 6B and Alternative 6C DPM emissions decreased compared to Alternative 1 in all study areas, with the greatest decreases in Alternative 6B.

ZEE Design Option. Implementing the ZEE Design Option for Alternative 6B would reduce the alternative's DPM emissions, within the I-710 region, by a further 20 lbs/day to 480 lbs/day less than the Alternative 1 conditions. The ZEE Design Option for Alternative 6B would not change the results of the remaining MSAT pollutants.

Implementing the ZEE Design Option for Alternative 6C would reduce the alternative's DPM emissions within the I-710 region, by a further 10 lbs/day to 440 lbs/day less than the Alternative 1 conditions. The ZEE Design Option for Alternative 6C would not change the results of the remaining MSAT pollutants.

Figures 5 and 6 (Appendix R) present the incremental gridded emission maps for DPM emissions for Alternative 6B and Alternative 6C, respectively; reductions in incremental DPM emissions for the ZEE Design Option can be seen north of the northern terminus of the freight corridor.

Table 3.13-20 Comparison of Incremental Air Toxics Emissions for All Project Alternatives Compared to 2008 for all Study Areas[1]

Mobile Source Air Toxic Name	Study Area	2008 Baseline Emissions (lbs/day)	Comparison to 2008: 2035 Alt 1 vs. 2008 (lbs/day)	2035 Alt 5A vs. 2008 (lbs/day)	2035 Alt 6A vs. 2008 (lbs/day)	2035 Alt 6B vs. 2008 (lbs/day)	2035 Alt 6C vs. 2008 (lbs/day)
Diesel Particulate Matter	SCAB	30,000	-23,000	-23,000	-23,000	-23,000	-23,000
	AOI	6,900	-5,500	-5,400	-5,400	-5,600	-5,600
	I-710	610	-390	-350	-230	-460	-430
	I-710 Post	840	-570	-530	-410	-660	-630
Benzene	SCAB	3,400	-3,000	-3,000	-3,000	-3,000	-3,000
	AOI	850	-760	-760	-760	-760	-760
	I-710	24	-22	-21	-21	-21	-21
	I-710 Post	21	-19	-19	-18	-18	-18
Acetaldehyde	SCAB	650	-600	-600	-600	-600	-600
	AOI	160	-150	-150	-150	-150	-150
	I-710	4.7	-5	-4	-4	-4	-4
	I-710 Post	4.2	-4	-4	-4	-4	-4
Formaldehyde	SCAB	2600	-2,300	-2,300	-2,300	-2,300	-2,300
	AOI	640	-580	-580	-580	-580	-580
	I-710	18	-17	-16	-16	-16	-16
	I-710 Post	16	-15	-14	-14	-14	-14
1,3- butadiene	SCAB	790	-700	-700	-700	-700	-700
	AOI	200	-180	-180	-180	-180	-180
	I-710	5.6	-5	-5	-5	-5	-5
	I-710 Post	5.0	-4	-4	-4	-4	-4
Acrolein	SCAB	180	-160	-160	-160	-160	-160
	AOI	46	-41	-41	-41	-41	-41
	I-710	1.3	-1	-1	-1	-1	-1
	I-710 Post	1.1	-1	-1	-1	-1	-1

Source: *I-710 Corridor Project Air Quality and Health Risk Assessments Technical Study,* February 2012.

[1] The emissions for naphthalene and POM are not included because speciation factors are not available for use with EMFAC2007

Alt = Alternative
AOI = Area of Interest
lbs/day = pounds per day
I-710 Post = Post-Processed Traffic Data
POM = polycyclic organic matter
SCAB = South Coast Air Basin

Table 3.13-21 Comparison of Incremental Air Toxics Emissions for All Project Alternatives Compared to Alternative 1 (No Build) for all Study Areas[1,2]

Mobile Source Air Toxic Name	Study Area	2035 Alt 1 Baseline Emissions (lbs/day)	Comparison to 2035 Alternative 1 (No Build)			
			2035 Alt 5A vs. Alt 1 (lbs/day)	2035 Alt 6A vs. Alt 1 (lbs/day)	2035 Alt 6B vs. Alt 1 (lbs/day)	2035 Alt 6C vs. Alt 1 (lbs/day)
Diesel Particulate Matter	SCAB	6600	0	96	-140	-94
	AOI	1400	27	110	-130	-82
	I-710	210	44	160	-71	-38
Benzene	SCAB	440	0	0	0	0
	AOI	96	0	-1.4	-1.4	-1.3
	I-710	2.5	0.4	0.6	0.6	0.6
Acetaldehyde	SCAB	50	0	0	0	0
	AOI	11	0	-0.2	-0.2	-0.1
	I-710	0.29	0.04	0.06	0.06	0.06
Formaldehyde	SCAB	280	0	0	0	0
	AOI	61	0	-0.9	-0.9	-0.8
	I-710	1.6	0.3	0.4	0.4	0.4
1,3- butadiene	SCAB	97	0	0	0	0
	AOI	21	0	-0.3	-0.3	-0.3
	I-710	0.56	0.09	0.1	0.1	0.1
Acrolein	SCAB	24	0	0	0	0
	AOI	5.2	0	-0.07	-0.07	-0.07
	I-710	0.14	0.02	0.03	0.03	0.03

Source: *I-710 Corridor Project Air Quality and Health Risk Assessments Technical Study*, February 2012.

1 Numbers rounded to two significant figures. Emission changes of 1 percent or smaller are presented as zero emission changes.

2 The emissions for naphthalene and POM are not included because speciation factors are not available for use with EMFAC2007

Alt = Alternative

AOI = Area of Interest

lbs/day = pounds per day

POM = polycyclic organic matter

SCAB = South Coast Air Basin

ADDITIONAL ANALYSES. The I-710 Corridor Project is a cooperative venture of several agencies responsible for both transportation and goods movement in the greater Los Angeles area. Therefore, additional analyses were conducted because of the unique goods movement component of the project and the stated purpose of the project to improve air quality.

CRITERIA POLLUTANT TRAFFIC EMISSIONS. Mass emissions of criteria pollutants and/or their precursors (NO_x, volatile organic compounds [VOC], PM_{10}, $PM_{2.5}$, CO, SO_2) from traffic were calculated for the I-710 mainline to determine the impact of the proposed project on the surrounding area. In addition, the SCAB mass emissions and mass emissions for the AOI were also evaluated to determine the impact of the proposed I-710 Corridor Project on a regional scale. The AQ/HRA Protocol describes the methodology for calculating traffic-related mass emissions. The method for calculating regional emissions impacts from the project alternatives is summarized below.

REGIONAL EMISSION IMPACT METHODOLOGY. The vehicle activity data was obtained from I-710 Traffic Model, which is based on the SCAG regional traffic model. Four different peak time periods were evaluated in the model: AM (6:00 a.m.–9:00 a.m.), Midday (9:00 a.m.–3:00 p.m.), PM (3:00 p.m.–7:00 p.m.) and Nighttime (7:00 p.m.–6:00 a.m.). The I-710 Traffic Model is composed of a series of traffic links that represent the flow of traffic from one geographic point to another. The output of the I-710 Traffic Model is in the form of traffic flows and an average speed for each traffic link amongst other parameters. This model output data is hereinafter referred to as “The I-710 Traffic model data.”

EMFAC2007 Version 2.3 was used to develop emission factors for the various criteria pollutants. The EMFAC model was run for both baseline year 2008 and build-out year 2035. (Details of how EMFAC was used are included in the AQ/HRA Protocol and AQ/HRA Technical Study [February 2012].) EMFAC2007 does not account for rules and regulations enacted by the California Air Resources Board after 2007. Two notable regulations not captured in EMFAC are those designed to reduce NO_X and DPM. The Statewide Bus and Truck Rule and Drayage Truck Rule will require fleets to reduce DPM and NO_X emissions. Additionally, the Ports of Los Angeles and Long Beach have enacted the Clean Trucks Program (CTP), mandating trucks that operate within the Ports to reduce DPM and NO_x emissions by meeting set standards during phase in years (2008–2012). Adjustments were made to EMFAC emission factors to account for the Statewide Bus and Truck Rule and CTP. Based on a comparison made between the CTP and the Drayage Rule, it was determined that the CTP is more stringent that the Drayage Rule, and hence, no adjustments were made for Drayage Rule.

SUMMARY OF REGIONAL TRAFFIC EMISSION IMPACTS. The incremental emissions of criteria pollutants for SCAB, AOI, and I-710 as compared to 2008 existing conditions and Alternative 1 (2035 No Build) are presented in Tables 3.13-22 and 3.13-23, respectively. These comparisons are performed for each of the criteria pollutants and for the three project study areas (SCAB, I-710 Study AOI, and I-710, which includes the freight corridor under Alternatives 6A/B/C).

Each of the alternatives will result in lower NO_x, CO, $PM_{2.5}$ (except Alternative 6A along I-710) and reactive organic gas (ROG) emissions for all study areas when compared to 2008. The greatest reductions from 2008 occur in Alternatives 6B and 6C, which include a zero-emission freight corridor component.

Table 3.13-22 Comparison of Incremental Criteria Pollutant Emissions for All Alternatives compared to 2008, for all Study Areas[1,2]

Pollutant	Study Area	2008 Baseline Emissions	Comparison with 2008 Baseline: 2035 Alt.1 vs. 2008 (lbs/day)	2035 Alt 5A vs. 2008 (lbs/day)	2035 Alt 6A vs. 2008 (lbs/day)	2035 Alt 6B vs. 2008 (lbs/day)	2035 Alt 6C vs. 2008 (lbs/day)	SCAQMD CEQA Mass Emission Thresholds[2] (lbs/day increase)
NO_x	SCAB	103,4982	-870,000	-870,000	-870,000	-880,000	-880,000	55
	AOI	238,709	-200,000	-200,000	-200,000	-200,000	-200,000	
	I-710	18,050	-13,000	-13,000	-11,000	-15,000	-14,000	
	I-710 Post	24,212	-18,000	-17,000	-16,000	-20,000	-20,000	
CO	SCAB	2,860,036	-2,000,000	-2,000,000	-2,000,000	-2,000,000	-2,000,000	550
	AOI	688,363	-510,000	-510,000	-510,000	-510,000	-510,000	
	I-710	26,234	-19,000	-17,000	-16,000	-18,000	-18,000	
	I-710 Post	26,939	-19,000	-17,000	-16,000	-18,000	-18,000	
PM_{10} (Total)	SCAB	154,589	23,000	23,000	24,000	23,000	23,000	150
	AOI	36,992	1,800	1,900	2,100	1,800	1,800	
	I-710	1,893	230	580	1,300	1,000	920	
	I-710 Post	2,345	120	400	1,100	800	680	
PM_{10} (Exhaust)	*SCAB*	*58,876*	*-9,500*	*-9,400*	*-9,400*	*-9,800*	*-9,700*	
	AOI	*36,992*	*-3,400*	*-3,400*	*-3,300*	*-3,600*	*-3,600*	
	I-710	*868*	*-300*	*-190*	*-10*	*-330*	*-290*	
	I-710 Post	*1,105*	*-470*	*-360*	*-190*	*-540*	*-500*	
PM_{10} (Entrained)	*SCAB*	*95,713*	*33,000*	*33,000*	*33,000*	*33,000*	*33,000*	
	AOI	*23,024*	*5,200*	*5,300*	*5,400*	*5,500*	*5,400*	
	I-710	*1,025*	*530*	*770*	*1,300*	*1,400*	*1,200*	
	I-710 Post	*1,240*	*590*	*800*	*1,300*	*1,300*	*1,200*	
$PM_{2.5}$ (Total)	SCAB	67,381	-2,300	-2,300	-2,200	-2,500	-2,400	55
	AOI	16,115	-2,000	-1,900	-1,900	-2,100	-2,100	
	I-710	942	-170	-40	230	0	0	
	I-710 Post	1,201	-320	-190	70	-190	-200	

Table 3.13-22 Comparison of Incremental Criteria Pollutant Emissions for All Alternatives compared to 2008, for all Study Areas[1,2]

Pollutant	Study Area	2008 Baseline Emissions	Comparison with 2008 Baseline					SCAQMD CEQA Mass Emission Thresholds[2] (lbs/day increase)
			2035 Alt.1 vs. 2008 (lbs/day)	2035 Alt 5A vs. 2008 (lbs/day)	2035 Alt 6A vs. 2008 (lbs/day)	2035 Alt 6B vs. 2008 (lbs/day)	2035 Alt 6C vs. 2008 (lbs/day)	
$PM_{2.5}$ (Exhaust)	*SCAB*	*43,888*	*-10,000*	*-10,000*	*-10,000*	*-11,000*	*-11,000*	
	AOI	*10,464*	*-3,200*	*-3,200*	*-3,200*	*-3,400*	*-3,400*	
	I-710	*690*	*-300*	*-230*	*-90*	*-340*	*-300*	
	I-710 Post	*895*	*-460*	*-390*	*-260*	*-520*	*-490*	
$PM_{2.5}$ (Entrained)	*SCAB*	*23,493*	*8,100*	*8,100*	*8,100*	*8,100*	*8,100*	
	AOI	*5,651*	*1,300*	*1,300*	*1,300*	*1,300*	*1,300*	
	I-710	*252*	*130*	*190*	*320*	*330*	*300*	
	I-710 Post	*306*	*150*	*200*	*320*	*330*	*290*	
ROG	SCAB	23,4677	-170,000	-160,000	-170,000	-170,000	-170,000	55
	AOI	58,803	-43,000	-43,000	-44,000	-44,000	-44,000	
	I-710	2,204	-1,500	-1,500	-1,300	-1,600	-1,600	
	I-710 Post	2,482	-1,700	-1,700	-1,500	-1,800	-1800	
SO_2	SCAB	3,867	1,300	1,300	1,300	1,200	1,300	150
	AOI	934	160	160	160	140	150	
	I-710	39	15	23	36	13	15	
	I-710 Post	41	17	24	37	12	14	

Source: *I-710 Corridor Project Air Quality and Health Risk Assessments Technical Study,* February 2012.

1 Numbers rounded to two significant figures. Emission changes of 1 percent or smaller are presented as zero-emission changes.

2 The SCAQMD significance thresholds are presented for information only. Caltrans has not adopted these thresholds.

Alt = Alternative
AOI = Area of Interest
CEQA = California Environmental Quality Act
CO = carbon monoxide
I-710 = Interstate 710
I-710 Post = Post-Processed Traffic Data
lbs/day = pounds per day
NO_x = nitrogen oxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 10 microns in diameter
ROG = reactive organic gases
SCAB = South Coast Air Basin
SCAQMD = South Coast Air Quality Management District
SO_2 = sulfur dioxide

Table 3.13-23 Comparison of Incremental Criteria Pollutant Emissions for All Build Alternatives compared to Alternative 1 (No Build), for all Study Areas[1]

Pollutant	Study Area	2035 Alt 1 Baseline Emissions	Comparison with 2035 Alternative 1			
			Alt 5A vs. Alt 1 (lbs/day)	Alt 6A vs. Alt 1 (lbs/day)	Alt 6B vs. Alt 1 (lbs/day)	Alt 6C vs. Alt 1 (lbs/day)
NO_x	SCAB	16,2816	0	0	-4,600	-3,600
	AOI	42,848	0	0	-4,000	-3,200
	I-710	5,111	300	2,000	-2,000	-1,500
CO	SCAB	855,260	0	0	0	0
	AOI	180,695	0	0	-1,900	0
	I-710	7,579	1,400	2,900	650	930
PM_{10} (Total)	SCAB	177,994	0	0	0	0
	AOI	38,787	0	0	0	0
	I-710	2,120	360	1,100	790	690
PM_{10} (Exhaust)	*SCAB*	*49,400*	*0*	*0*	*0*	*0*
	AOI	*10,569*	*0*	*0*	*-240*	*-170*
	I-710	*569*	*110*	*290*	*-35*	*9*
PM_{10} (Entrained)	*SCAB*	*128,593*	*0*	*0*	*0*	*0*
	AOI	*28,217*	*0*	*0*	*0*	*0*
	I-710	*1,552*	*250*	*780*	*830*	*680*
$PM_{2.5}$ (Total)	SCAB	65,099	0	0	0	0
	AOI	14,148	0	0	0	0
	I-710	771	130	400	170	160
$PM_{2.5}$ (Exhaust)	*SCAB*	*33,535*	*0*	*0*	*0*	*0*
	AOI	*7,222*	*0*	*0*	*-200*	*-140*
	I-710	*391*	*74*	*210*	*-37*	*0*
$PM_{2.5}$ (Entrained)	*SCAB*	*31,564*	*0*	*0*	*0*	*0*
	AOI	*6,926*	*0*	*0*	*0*	*0*
	I-710	*381*	*61*	*190*	*200*	*170*

Table 3.13-23 Comparison of Incremental Criteria Pollutant Emissions for All Build Alternatives compared to Alternative 1 (No Build), for all Study Areas[1]

Pollutant	Study Area	2035 Alt 1 Baseline Emissions	Comparison with 2035 Alternative 1			
			Alt 5A vs. Alt 1 (lbs/day)	Alt 6A vs. Alt 1 (lbs/day)	Alt 6B vs. Alt 1 (lbs/day)	Alt 6C vs. Alt 1 (lbs/day)
ROG	SCAB	69,613	0	0	0	0
	AOI	15,431	0	-220	-530	-470
	I-710	688	30	190	-110	-82
SO_2	SCAB	5,144	0	0	0	0
	AOI	1,098	0	0	-24	-19
	I-710	53	8	21	-2	1

Source: *I-710 Corridor Project Air Quality and Health Risk Assessments Technical Study,* February 2012.

[1] Numbers rounded to two significant figures. Emission changes of 1 percent or smaller are presented as zero-emission changes.

Alt = Alternative
AOI = Area of Interest
CEQA = California Environmental Quality Act
CO = carbon monoxide
I-710 = Interstate 710
lbs/day = pounds per day
NO_x = nitrogen oxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 10 microns in diameter
ROG = reactive organic gases
SCAB = South Coast Air Basin
SCAQMD = South Coast Air Quality Management District
SO_2 = sulfur dioxide

Total traffic-related PM emissions consist of exhaust emissions (which include direct brake and tire wear) and entrained dust emissions (particulate matter from roadways lifted into the air by vehicle motion). For entrained PM emissions, this study used the latest EPA methodology (January 2011) with local inputs. This methodology increases entrained emissions as a direct function of VMT. Thus, each of the 2035 alternatives show an increase (approximately 34 percent) in entrained PM emissions compared to 2008. This increase offsets reductions in exhaust PM emissions in future years (as engine and control technology outpaces the effect of the increase in VMT). For $PM_{2.5}$, exhaust emission decreases are great enough that total $PM_{2.5}$ emissions still decrease for all study areas (except for Alternative 6A along I-710). For PM_{10}, calculated increases in entrained emissions are much greater than exhaust PM_{10} reductions, resulting in large calculated increases in PM_{10} emissions in all study areas for all 2035 alternatives compared to 2008.

It should be noted that after the I-710 Corridor Project emission calculations were completed, SCAQMD proposed a modified methodology for entrained PM emissions[1] as part of its 2012 AQMP development, consistent with their approach used in the 2007 AQMP. In SCAQMD's proposed methodology, 2008 PM_{10} and $PM_{2.5}$ estimates will be lower, particularly $PM_{2.5}$ estimates. Most importantly, future year entrained PM will remain constant unless the roadway is lengthened. Thus, actual PM impacts for the project alternatives (compared to 2008) will be more similar to the exhaust PM impacts reflected in Tables 3.13-22 and 3.31-23 than the results presented for total PM impacts.

Exhaust $PM_{2.5}$ and PM_{10} emissions decrease for each of the project alternatives in each study area, compared to 2008. The greatest decreases are in Alternative 6B, followed by Alternative 6C and Alternative 1 having similar decreases, then Alternative 5A and Alternative 6A having the least decreases.

Incremental SO_2 emissions for each alternative increase in the SCAB (compared to the 2008 baseline); the greatest increase is along I-710 and the smallest increase in the AOI. Alternative 6A has the greatest increase along I-710. This increase results from forecasted increases in VMT; the 2008 baseline already reflects the requirement for trucks to use ultralow sulfur diesel fuels in California that was adopted before 2008. SO_2 emissions for all project alternatives show similar increases of about 0.65 tons/day. It should be noted that the SCAQMD has recently adopted amendments to its sulfur oxides (SO_X) RECLAIM rule that will further reduce SO_x emissions by about 5.4

[1] See www.aqmd.gov/gb_comit/stmpradvgrp/2012AQMP/meetings/2011/dec15/PavedRoadDust.pdf.

tons/day. In addition, implementation of ARB rules and the Ports' CAA Plan is projected to reduce SO_X emissions from other goods movement sources (e.g., oceangoing vessel) over 20 tons/day. Most SO_X RECLAIM and oceangoing vessel emission reductions will occur upwind of the I-710 Study AOI.

The comparison of the build alternatives to Alternative 1 for 2035 conditions is presented in Table 3.13-23. In this comparison, the impacts of general VMT increases from 2008 are eliminated, although smaller VMT differences among the project alternatives remain.

For the SCAB and AOI, the incremental impacts of Alternative 5A and Alternative 6A for ALL pollutants compared to Alternative 1 for 2035 conditions is essentially zero (less than a 1 percent difference). NO_x, PM_{10} exhaust, and $PM_{2.5}$ exhaust generally decrease in Alternatives 6B and 6C (compared to Alternative 1) in these study areas, but in general, the differences are small or less than 1 percent. SO_x emissions, which increased in all project alternatives compared to 2008, are essentially the same for the build alternatives compared to Alternative 1.

Along I-710 (including the freight corridor, if applicable), only Alternative 6B and Alternative 6C show decreases in emissions (mostly NO_x and ROG) compared to Alternative 1 for 2035 conditions. Otherwise, all build alternatives have increased emissions along I-710 compared to Alternative 1 for 2035 conditions, with the greatest increases for Alternative 6A and then Alternative 5A.

ZEE Design Option. Implementing the ZEE Design Option for Alternative 6B would reduce the alternative's NO_X, CO, PM_{10} (total), $PM_{2.5}$ (total), ROG, and SO_2 emissions, within the I-710 region, by a further 500, 230, 20, 20, 50, and 2.6 lbs/day, respectively.

Implementing the ZEE Design Option for Alternative 6C would reduce the alternative's NO_X, CO, PM_{10} (total), $PM_{2.5}$ (total), ROG, and SO_2 emissions, within the I-710 region, by a further 400, 180, 20, 10, 38, and 2 lbs/day, respectively.

Implementing the ZEE Design Options would not change the conclusions for the regional emissions analysis for Alternatives 6B or 6C.

CRITERIA POLLUTANT TRAFFIC EMISSION CONCENTRATIONS. Emissions released from traffic are mixed and diluted in ambient air and ultimately transported away from the traffic. The simulation of the release and transport of emissions from traffic in order to estimate the concentrations of the criteria pollutants at specified locations (called receptors) is conducted through air dispersion modeling.

Modeling of the quantities and effects of project traffic-related air pollution was performed using emissions data calculated only for the I-710 mainline (and the freight corridor for Alternatives 6A/B/C), using post processed traffic data, as described above. The modeling results do not, therefore, reflect changes in emissions on the other nearby freeways, local arterials, and other local roadways. Based on the emissions analysis of the build alternatives, emissions of criteria pollutants generally decrease on these nearby freeways, arterials, and roadways as traffic shifts to the I-710. The detailed modeling methodology and results are presented in the AQ/HRA. The modeling results presented are conservative in that they account for impacts from increased traffic on the I-710 for the build alternatives but do not account for any decreases in ambient concentrations related to reduced traffic on nearby freeways, arterials, and roadways for the build alternatives as mobility improves on I-710.

For this study, the EPA's AERMOD dispersion model was used to model the criteria pollutant concentrations that would result from traffic-related emissions on I-710 and the freight corridor. Freeway traffic emissions were represented in AERMOD as a series of volume sources, which is accepted practice for modeling mobile sources in a dispersion model (ENVIRON, 2006b,c,d,e,f,g, 2007a,b, 2008). Appropriately sized and positioned volume sources were placed along the I-710 Corridor using geographic information system (GIS) tools. Hourly resolution meteorological surface data such as wind speed, direction, and upper air data were also employed in the AERMOD analysis of pollutant transport and dispersion. A unique aspect of the I-710 Corridor Project is that I-710 is 18 miles in length, and meteorological conditions vary by location over that distance. Therefore, a "Sphere of Influence" approach was used, and the I-710 Corridor was broken into four reasonably representative meteorological zones. Meteorological data for a station in each zone was processed using AERMET, the EPA meteorological preprocessor program for AERMOD.

As guidance to lead agencies, the SCAQMD has established CEQA significance thresholds for concentration impacts for NO_2 (one-hour and annual average), CO (one-hour and eight-hour), PM_{10} (24-hour and annual average), and $PM_{2.5}$ (24-hour average). Therefore, the concentration impacts for only these criteria pollutants and corresponding averaging periods were calculated and reported. In this section SCAQMD's CEQA significance thresholds are presented for information purposes only; the air quality analysis for CEQA is provided in Chapter 4.0 of this EIR/EIS.

Tables 3.13-24 through 3.13-28 provide the calculated maximum incremental concentration impacts for the project alternatives as compared to 2008 for the criteria pollutants. The CO and NO_2 incremental impacts decrease for all project alternatives (except for Alternative 6A)

Table 3.13-24 Incremental Concentration Impacts from the I-710 Freeway Mainline for Alternative 1 as compared to 2008

Project Increment + Background[a]					
Pollutant	**Averaging Time**	**Incremental Impact (µg/m^3)**	**Maximum (Incremental + Background) Concentration Impact (µg/m^3)**	**SCAQMD CEQA Threshold[b] (µg/m^3)**	**National Ambient Air Quality Standards[b] (µg/m^3)**
NO_2	1-hour	-81.2	145	339	188
	Annual	-0.6	55.6	56.0	100
CO	1-hour	-211	8,950	23,000	40,000
	8-hour	-36	7,300	10,000	10,000

Project Incremental Impact[a]			
Pollutant	**Averaging Time**	**Maximum Incremental Impact (µg/m^3)**	**SCAQMD CEQA Threshold[b] (µg/m^3)**
PM_{10}	24-hour	19.6[b]	2.5
	Annual	13.9[b]	1.0
$PM_{2.5}$	24-hour	0.036	2.5

Source: *I-710 Corridor Project Air Quality and Health Risk Assessments Technical Study*, February 2012.

Notes:

[a] Incremental impacts from the project plus background pollutant concentrations are presented. PM_{10} and $PM_{2.5}$ are incremental impacts, consistent with the SCAB's nonattainment status and, therefore, only the incremental impacts from the project are presented. $PM_{2.5}$ and PM_{10} emissions include AP 42 estimates of entrained road dust; actual incremental impacts would be lower using the recent SCAQMD/ARB methodology.

[b] SCAQMD thresholds presented for information purposes only; see Chapter 4 for the CEQA air quality analysis. Impacts above the SCAQMD's threshold levels are in areas close (300 meters or less) to the mainline and/or freight corridor. Maximum impacts occur within 50 meters.

CEQA = California Environmental Quality Act
CO = carbon monoxide
I-710 = Interstate 710
µg/m^3 = micrograms per cubic meter
NO_2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 2.5 microns in diameter
SCAB = South Coast Air Basin
SCAQMD = South Coast Air Quality Management District

Table 3.13-25 Incremental Concentration Impacts from the I-710 Freeway Mainline for Alternative 5A as compared to 2008

Project Increment + Background[a]

Pollutant	Averaging Time	Incremental Impact (µg/m³)	Maximum (Incremental + Background) Concentration Impact (µg/m³)	SCAQMD CEQA Threshold[b] (µg/m³)	National Ambient Air Quality Standards[b] (µg/m³)
NO_2	1-hour	-79.4	146	339	188
	Annual	-0.6	55.7	56.0	100
CO	1-hour	-203	8,960	23,000	40,000
	8-hour	-34	7,300	10,000	10,000

Project Incremental Impact[a]

Pollutant	Averaging Time	Maximum Incremental Impact (µg/m³)	SCAQMD CEQA Threshold[b] (µg/m³)
PM_{10}	24-hour	60.5 [b]	2.5
	Annual	35.6 [b]	1.0
$PM_{2.5}$	24-hour	15.5 [b]	2.5

Source: *I-710 Corridor Project Air Quality and Health Risk Assessments Technical Study,* February 2012.
Notes:
[a] The thresholds for NO_2 and CO are combined thresholds and, therefore, incremental impacts from the project plus background pollutant concentrations are presented. The thresholds for PM_{10} and $PM_{2.5}$ are incremental and, therefore, only the incremental impacts from the project are presented. $PM_{2.5}$ and PM_{10} emissions include AP 42 estimates of entrained road dust; actual incremental impacts would be lower using the recent SCAQMD/ARB methodology.
[b] SCAQMD thresholds presented for information purposes only; see Chapter 4 for the CEQA air quality analysis. Impacts above the SCAQMD's threshold levels are in areas close (300 meters or less) to the mainline and/or freight corridor. Maximum impacts occur within 50 meters.

CEQA = California Environmental Quality Act
CO = carbon monoxide
I-710 = Interstate 710
µg/m³ = micrograms per cubic meter
NO_2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 2.5 microns in diameter
SCAB = South Coast Air Basin
SCAQMD = South Coast Air Quality Management District

Table 3.13-26 Incremental Concentration Impacts from the I-710 Freeway Mainline for Alternative 6A as compared to 2008

Project Increment + Background[a]					
Pollutant	**Averaging Time**	**Incremental Impact (µg/m³)**	**Maximum (Incremental + Background) Concentration Impact (µg/m³)**	**SCAQMD CEQA Threshold[b] (µg/m³)**	**National Ambient Air Quality Standards[b] (µg/m³)**
NO_2	1-hour	-70.1	156	339	188
	Annual	4.8	62.4	56.0	100
CO	1-hour	-241	8,920	23,000	40,000
	8-hour	-37	7,300	10,000	10,000

Project Incremental Impact [a]			
Pollutant	**Averaging Time**	**Maximum Incremental Impact (µg/m³)**	**SCAQMD CEQA Threshold[b] (µg/m³)**
PM_{10}	24-hour	78.7 [b]	2.5
	Annual	44.4 [b]	1.0
$PM_{2.5}$	24-hour	21.0 [b]	2.5

Source: *I-710 Corridor Project Air Quality and Health Risk Assessments Technical Study,* February 2012.

Notes:

[a] The thresholds for NO_2 and CO are combined thresholds and, therefore, incremental impacts from the project plus background pollutant concentrations are presented. The thresholds for PM_{10} and $PM_{2.5}$ are incremental and, therefore, only the incremental impacts from the project are presented. $PM_{2.5}$ and PM_{10} emissions include AP 42 estimates of entrained road dust; actual incremental impacts would be lower using the recent SCAQMD/ARB methodology.

[b] SCAQMD thresholds presented for information purposes only; see Chapter 4 for the CEQA air quality analysis. Impacts above the SCAQMD's threshold levels are in areas close (300 meters or less) to the mainline and/or freight corridor. Maximum impacts occur within 50 meters.

CEQA = California Environmental Quality Act
CO = carbon monoxide
I-710 = Interstate 710
µg/m³ = micrograms per cubic meter
NO_2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 2.5 microns in diameter
SCAB = South Coast Air Basin
SCAQMD = South Coast Air Quality Management District

Table 3.13-27 Incremental Concentration Impacts from the I-710 Freeway Mainline for Alternative 6B as compared to 2008

Project Increment + Background[a]					
Pollutant	**Averaging Time**	**Incremental Impact (μg/m³)**	**Maximum (Incremental + Background) Concentration Impact (μg/m³)**	**SCAQMD CEQA Threshold[b] (μg/m³)**	**National Ambient Air Quality Standards[b] (μg/m³)**
NO_2	1-hour	-84.5	141	339	188
	Annual	-0.7	55.6	56.0	100
CO	1-hour	-254	8,910	23,000	40,000
	8-hour	-40	7,290	10,000	10,000

Project Incremental Impact[a]			
Pollutant	**Averaging Time**	**Maximum Incremental Impact (μg/m³)**	**SCAQMD CEQA Threshold[b] (μg/m³)**
PM_{10}	24-hour	74.4 [b]	2.5
	Annual	42.5 [b]	1.0
$PM_{2.5}$	24-hour	15.3 [b]	2.5

Source: *I-710 Corridor Project Air Quality and Health Risk Assessments Technical Study,* February 2012.

Notes:

[a] The thresholds for NO_2 and CO are combined thresholds and, therefore, incremental impacts from the project plus background pollutant concentrations are presented. The thresholds for PM_{10} and $PM_{2.5}$ are incremental and, therefore, only the incremental impacts from the project are presented. $PM_{2.5}$ and PM_{10} emissions include AP 42 estimates of entrained road dust; actual incremental impacts would be lower using the recent SCAQMD/ARB methodology.

[b] SCAQMD thresholds presented for information purposes only; see Chapter 4 for the CEQA air quality analysis. Impacts above the SCAQMD's threshold levels are in areas close (300 meters or less) to the mainline and/or freight corridor. Maximum impacts occur within 50 meters.

CEQA = California Environmental Quality Act
CO = carbon monoxide
I-710 = Interstate 710
μg/m³ = micrograms per cubic meter
NO_2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 2.5 microns in diameter
SCAB = South Coast Air Basin
SCAQMD = South Coast Air Quality Management District

Table 3.13-28 Incremental Concentration Impacts from the I-710 Freeway Mainline for Alternative 6C as compared to 2008

Project Increment + Background[a]					
Pollutant	Averaging Time	Incremental Impact ($\mu g/m^3$)	Maximum (Incremental + Background) Concentration Impact ($\mu g/m^3$)	SCAQMD CEQA Threshold[b] ($\mu g/m^3$)	National Ambient Air Quality Standards[b] ($\mu g/m^3$)
NO_2	1-hour	-83.9	142	339	188
	Annual	-0.7	55.6	56.0	100
CO	1-hour	-254	8,910	23,000	40,000
	8-hour	-39	7,290	10,000	10,000

Project Incremental Impact[a]			
Pollutant	Averaging Time	Maximum Incremental Impact ($\mu g/m^3$)	SCAQMD CEQA Threshold[b] (µg/m3)
PM_{10}	24-hour	64.2 [b]	2.5
	Annual	34.9 [b]	1.0
$PM_{2.5}$	24-hour	13.1 [b]	2.5

Source: *I-710 Corridor Project Air Quality and Health Risk Assessments Technical Study,* February 2012.

Notes:

[a] The thresholds for NO_2 and CO are combined thresholds and, therefore, incremental impacts from the project plus background pollutant concentrations are presented. The thresholds for PM_{10} and $PM_{2.5}$ are incremental and, therefore, only the incremental impacts from the project are presented. $PM_{2.5}$ and PM_{10} emissions include AP 42 estimates of entrained road dust; actual incremental impacts would be lower using the recent SCAQMD/ARB methodology.

[b] SCAQMD thresholds presented for information purposes only; see Chapter 4 for the CEQA air quality analysis. Impacts above the SCAQMD's threshold levels are in areas close (300 meters or less) to the mainline and/or freight corridor. Maximum impacts occur within 50 meters.

CEQA = California Environmental Quality Act
CO = carbon monoxide
I-710 = Interstate 710
$\mu g/m^3$ = micrograms per cubic meter
NO_2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 2.5 microns in diameter
SCAB = South Coast Air Basin
SCAQMD = South Coast Air Quality Management District

as compared to 2008. The 2035 ambient concentration levels calculated by adding the incremental impacts to existing background concentrations were found to be below the California Ambient Air Quality Standards (CAAQS) and the NAAQS for most alternatives. Only the calculated annual NO_2 ambient concentration for Alternative 6A exceeds the CAAQS level, and at only one receptor, which is approximately 10 meters from the center of the freight corridor. Several studies have shown that AERMOD predictions tend to be high at receptors this close to the emission source (in this case I-710). Other factors/assumptions that contribute to the exceedance of the CAAQS at this receptor include (1) an annual average background concentration (57.6 $\mu g/m^3$) greater than the CAAQS level (56 $\mu g/m^3$); (2) a conservative assumption that all NO_x is converted to NO_2; (3) overlooking the reductions in NO_x occurring due to reduced traffic on local roadways and nearby freeways, and 4) impossibility of long-term exposure (one year) immediately adjacent to the freight corridor.

Figures 4.2 through 4.6, from the AQ/HRA, and provided in Appendix R of this EIR/EIS, show the change in NO_X emissions for build alternatives as compared to the 2008 baseline and Alternative 1. These gridded mass emission figures have been plotted by adding the NO_X emissions from links or part of links present in a grid size of 0.25 mile by 0.25 mile. The NO_X emissions for all 2035 alternatives as compared to the 2008 baseline, decrease on the freeways, arterials, and roadways in the AOI in spite of the increase in the VMT. This occurs due to the improvement in vehicle technology driven by state and local programs/ regulations.

A comparison of the NO_X emissions for Alternatives 6A/B/C to Alternative 1 (Figures 4.4 to 4.6) shows additional reductions in emissions on I-605, I-105, I-110 and SR-91 due to shifting of trucks from these freeways to the I-710 freight corridor. However, fewer reductions in NO_X emissions for these alternatives in the northern section of I-710 and SR-60 where the freight corridor ends and trucks move off I-710 were observed. The comparison of Alternative 6A to Alternative 1 (Figure 4.4) shows a lower level of NO_X emission reductions (compared to 2008) along I-710 due to increased flow of trucks with the introduction of the freight corridor. This effect disappears for Alternatives 6B and 6C when the freight corridor is restricted to zero-emission vehicles.

Figures 4.7 to 4.11 (Appendix R) of the AQ/HRA, present gridded mass emission plots for total and exhaust $PM_{2.5}$ emissions. These plots were made following the methodology described above for the NO_X mass emission plots. Total $PM_{2.5}$ emissions are a sum of the vehicle exhaust emissions[1] and entrained dust emissions. The comparison of total $PM_{2.5}$

1 Vehicle OM exhaust emissions include break and tire wear also.

mass emissions in the project alternatives to the 2008 baseline shows decreases in emissions on the freeways, arterials, and local roadways near I-710. These emissions also decrease on I-710 for all project alternatives except Alternative 6A. As described earlier for Alternative 6A, the increase in the $PM_{2.5}$ entrained dust emissions as compared to the 2008 baseline far exceeds the decreases seen in the exhaust $PM_{2.5}$ emissions along I-710. The exhaust $PM_{2.5}$ mass emissions of the project alternatives compared to the 2008 baseline show decreases on I-710 as well. These follow a trend similar to those for NO_X.

Total $PM_{2.5}$ emissions for the build alternatives compared to Alternative 1 show an increase in emissions on I-710. This is due to the increased mobility and capacity of the freeway, which results in increased exhaust and entrained dust emissions. For Alternatives 6A/B/C, there are decreases in emissions on sections of nearby freeways, particularly I-605 due to shifting of the trucks to I-710 with the introduction of the freight corridor. As in the case of NO_X emissions, emissions on SR-60 and the northern section of I-710 are greater for Alternatives 6A/B/C compared to Alternative 1, as the freight corridor terminates and trucks transition onto the mainline of these two freeways; however, compared to 2008, there are decreases in total and entrained $PM_{2.5}$ on SR-60.

Figures 4.12 through 4.16, Figures 4.17 through 4.21, and Figures 4.22 through 4.26 (Appendix R) of the AQ/HRA show annual PM_{10} isopleths, 24-hour PM_{10} bubble plots and 24-hour $PM_{2.5}$ bubble plots, respectively, for the comparison of project alternatives to 2008. Each of these figures show plots for both exhaust and total PM impacts. The bubble plots present the maximum 24-hour concentration recorded at each of the modeling grid points over the entire year. The maximum 24-hour concentration at one modeling point may not occur on the same day as the maximum 24-hour concentration on another modeling point. All the build alternatives show an increase in the total PM_{10} and total $PM_{2.5}$ impacts as compared to 2008 that are greater than the SCAQMD incremental thresholds at several receptors. However, it should be noted that the total PM mass emissions were calculated as a sum of the exhaust and entrained dust emissions. EPA's AP-42 methodology was used to estimate the entrained dust emissions, which assumes an infinite volume of silt reservoir. As discussed previously, the SCAQMD 2007 AQMP approach would show no increases due to VMT increases (finite silt reservoir). Therefore, the number of modeling points above the SCAQMD threshold would decrease if a more realistic finite silt reservoir were assumed. A look at the incremental impact isopleths and bubble plots for exhaust PM only impacts are below the SCAQMD's significance threshold for almost all modeling grid points. Those grid points which do exceed the SCAQMD significance threshold are in very close proximity to the I-710 mainline or the freight corridor. All the build alternatives show an increase in impacts compared to Alternative 1. This occurs due to the increased mobility and capacity of I-710 in the build alternatives as compared to Alternative 1, which in turn results in more traffic and greater mass emissions. Alternatives 6B and 6C show the lowest increase (compared to 2035 No Build) in impacts amongst the build alternatives because of the operation of the freight corridor as a zero-emission roadway. Figures 4.27 through 4.30, Figures 4.31 through 4.34, and Figures 4.35 through 4.38, in Appendix R show annual PM_{10} isopleths, 24-hour PM_{10} bubble plots, and 24-hour $PM_{2.5}$ bubble plots, respectively, for the comparison of build alternatives to Alternative 1. These figures show a side-by-side comparison of the calculated impacts for exhaust PM and total PM. As in the case of the comparison to 2008, the number of modeling grid points above the SCAQMD significance threshold for exhaust PM is less than the number of modeling grid points above SCAQMD significance threshold for total PM.

ZEE Design Option. There would be no significant change in incremental emissions for the I-710 freeway between the ZEE Design Option and the original analysis for both Alternatives 6B and 6C, although emissions decrease 10% to 88% on the I-710 mainline north of the northern terminus of the freight corridor compared to the Original Analysis. The incremental criteria pollutant exhaust emissions (compared to Alternative 1) from the entire I-710 freeway decreased by 2% to 15% in the ZEE Design Option; the largest decreases of 11% to 15% were observed in the NO_X emissions.

Figures 1 through 4 (Appendix R) present a comparison of the incremental emission impacts for the ZEE Design Option and the Original Analysis. Figures 1 and 2 present the incremental (vs. 2008 and vs. Alternative 1) gridded mass emission figures of NO_X emissions for Alternatives 6B and 6C, respectively. Figures 3 (3A and 3B) and 4 (4A and 4B) present similar gridded mass emission figures for PM_{10} (total and exhaust) and $PM_{2.5}$ (total and exhaust) emissions. Exhaust emissions decrease for the ZEE Design Option as compared to the Original Analysis.

Figures 7 through 10, from the ZEE Design Option Addendum (Appendix R) show the maximum 24-hr PM_{10} concentration impacts in Meteorological Zone 4 for the ZEE Design Option and the results of Alternatives 6B/6C in the AQ/HRA Technical Study as compared to 2008 baseline and Alternative 1 (No Build). The figures include total (infinite road dust reservoir) and the exhaust-only incremental PM impact results. Figures 11 through 14 (Appendix R) present similar plots for the maximum 24-hr $PM_{2.5}$ concentration impacts. Figures 15 through 22 (Appendix R) present the maximum annual PM_{10} and $PM_{2.5}$ concentration impacts in Meteorological Zone 4 compared to the 2008 baseline and Alternative 1 (for exhaust-only and total emissions). An appreciable decrease in the exhaust PM_{10} and $PM_{2.5}$ impacts can be seen in these figures for the ZEE Design Option (Alternative 6B/6C vs. Alternative 1) as compared to the AQ/HRA Technical Study in the area north of the northern terminus of the freight corridor.

Entrained PM emissions, which form a major portion of the total PM emissions, do not change for the ZEE Design Option as compared to the AQ/HRA Technical Study. Therefore, the total PM_{10} and $PM_{2.5}$ impacts do not show an appreciable decrease for the ZEE Design Option.

In general, the air quality impacts (relative to the 2035 No Build Alternative) north and south of the rail yards are relatively similar for the ZEE Design Option, in contrast to the greater adverse impacts seen north of the rail yards for Alternatives 6B/C without the Zee Design Option in the original analysis.

3.13.3.2 PUBLIC HEALTH CONSIDERATIONS

As with criteria air pollutants, the greatest air toxic emission impacts occur along I-710. This occurs as the increased VMT (all alternatives) and increased capacity (build alternatives) increase emissions along I-710, although improved mobility and less traffic on local roadways can decrease emissions in the larger AOI and SCAB study areas. To address this, incremental health risk impacts (cancer risk and non-cancer acute and chronic hazard indices) resulting from emissions from the project alternatives were modeled.

Table 3.13-29 compares maximum relative health impacts between each of the project alternatives and the 2008 base year.

All project alternatives compared to 2008 show decreases in cancer risk (including 6A for residential areas) and hazard indices far below the SCAQMD's significance thresholds. Cancer risk and hazard indices decrease throughout the study areas for all project alternatives except for Alternative 6A in nonresidential areas in close proximity to I-710 (mainline and/or freight corridor).

All build alternatives have increases in cancer risk in certain locations along I-710 compared to Alternative 1. Figures 4.44 through 4.48 in Appendix R (February 2012) show that Alternative 5A and Alternative 6A have large areas with greater cancer risk (compared to Alternative 1), including very large increases right along I-710 (mainline and/or freight corridor). Some of these increases are due to shifting of the I-710 mainline or addition of the freight corridor; this can be seen when areas of greater and lower incremental impacts are seen in the same location such as in Figure 4.46 (e.g., paired increases/decreases around the I-710/Washington Blvd. and the I-710/I-5 interchanges). Alternative 6B and Alternative 6C (compared to Alternative 1) generally show lower levels of cancer risk until the freight corridor terminates near the rail yards. This is due to the analysis assuming that trucks leaving the zero-emissions freight corridor switch from zero-emissions technologies to conventional technologies (albeit cleaner than the 2008 truck

Table 3.13-29 Comparison of Incremental MSAT Health Risk Impacts for All Alternatives Compared to 2008

Health Impact	Alt 1 vs. 2008	Alt 5A vs. 2008	Alt 6A vs. 2008	Alt 6B vs. 2008	Alt 6C vs. 2008	SCAQMD Significance Threshold[1]
Cancer Risk (Risk in 1 million)	-6	-6	462[2]	-7	-7	10 in 1 million
Chronic Non-Cancer Hazard Index (unitless)	-0.004	-0.004	0.280	-0.005	-0.005	1.0 (Hazard Index)
Acute Non-Cancer Hazard Index (unitless)	-0.017	-0.016	0.079	0.102	-0.0001	1.0 (Hazard Index)

Source: *I-710 Corridor Project Air Quality and Health Risk Assessments Technical Study,* February 2012.
Note: All analyses based on worst-case residential scenario impacts.
[1] The SCAQMD significance thresholds are presented for information only.
[2] Only 15 grid points show incremental increases above ten in a million. These grid points are not in residential areas and are generally located very near the freight corridor. The incremental cancer risk and incremental hazard indices decreased at all sensitive receptors in the modeling domain.
Alt = Alternative
SCAQMD = South Coast Air Quality Management District
MSAT = Mobile Source Air Toxics

fleet). Impacts in those areas would be reduced (compared to Alternative 1) if the trucks continued to use zero-emissions technologies.

ZEE Design Option. Figures 23 and 24 (Appendix R) show comparisons of the incremental cancer risks (residential risk scenario for all areas, which is conservative) for the ZEE Design Option and the Original Analysis for Alternatives 6B/6C as compared to the 2008 baseline and Alternative 1 in Meteorological Zone 4.

Compared to 2008, there is little difference in incremental cancer risk between the ZEE Design Option and the Original Analysis (see the left-hand sides of Figures 23 and 24). Compared to 2035 Alternative 1 (No Build), the incremental cancer risks for Alternatives 6B/6C decrease at all of the modeling grid points in the area of the ZEE Design Option OCS when compared with the original analysis. Incremental cancer risk (compared to the 2035 No Build Alternative) decreases both north and south of the rail yards for the ZEE Design Option, in contrast to increases in incremental cancer risk (compared to 2035 No Build) north of the rail yards when the zero-emission extension was not present.

PM MORTALITY AND MORBIDITY. Respirable particulate matter (RPM) is a public health concern as it is known to impact both the respiratory and cardiovascular systems. RPM deposition in the lungs and penetration into the bloodstream (for the smallest particles) triggers a range of inflammation responses and exacerbates health problems such as asthma and chronic bronchitis. Individuals susceptible to higher health risks from exposure to airborne PM include children, the elderly, smokers, and people of all ages with low pulmonary/cardiovascular function. Information about the biological mechanisms by which exposure to ambient particles adversely affects the respiratory and cardiovascular systems may be found in an ARB 2002 review.[1]

Numerous published epidemiological reports substantiate a correlation between the inhalation of ambient PM and increased cases of mortality/morbidity from heart and/or lung diseases. The Office of Environmental Health Hazard Assessment (OEHHA) is in the process of developing guidance on assessing health impacts from PM exposure. In recent studies,[2,3,4,5] ARB reviewed and summarized the nontoxic health effects (i.e., mortality and morbidity) of PM exposure and presented a health effect model attempting to quantify these impacts based on concentration-response functions.[6] This ARB model has been used, for example, to estimate the number of cases of disease and premature deaths linked to PM and ozone exposure from ports and goods movement activity in California.

Although the ARB model has also been used to quantitatively assess project-specific incremental levels of public mortality and morbidity (see for example Chapter 3.2 of the POLB

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1 California Air Resources Board (ARB), 2002b, Air Resources Board Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates, May 3, 2002.

2 California Air Resources Board (CARB), 2002b, Air Resources Board Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates, May 3, 2002.

3 California Air Resources Board (CARB), 2006h, Diesel Particulate Matter Exposure Assessment Study for the Ports of Los Angeles and Long Beach – Final Report.

4 California Air Resources Board (CARB), 2006i, Proposed Emission Reduction Plan for Ports and Goods Movement in California – Appendix A – Quantification of the Health Impacts and Economic Valuation of Air Pollution from Ports and Goods Movement in California.

5 California Air Resources Board (CARB), 2009, Methodology for Estimating Premature Deaths Associated with Long-term Exposure to Fine Airborne Particulate Matter in California, Staff report, December 7, (hhtp://www.arb.ca.gov/research/health/pm-mort/pm-mort_final.pdf).

6 That is, concentration-response functions are used to predict the effect of changes in ambient PM concentrations on health effects such as premature deaths, cardiac and respiratory hospitalizations, asthma, and other lower respiratory symptoms, lost work/school days, etc.

Middle Harbor Redevelopment Project EIR, POLB 2009), such calculations are subject to significant uncertainty. Sources of uncertainty include emission estimates, population exposure estimates, concentration-response functions,[1] baseline rates of mortality and morbidity that are entered into concentration response functions, and occurrence of additional not-quantified adverse health effects. It should be noted that the nature of PM as a complex mixture of various pollutants, as well as the health effects of pollutants such as SO_2, NO_2, CO, and O_3 that tend to co-occur with PM in ambient air, greatly increase the complexity of deriving accurate PM concentration-response functions. Health risk estimates derived in the presence of significant uncertainty tend to rely on very conservative assumptions that may greatly overestimate the potential adverse health effects. As stated by ARB in a 2006 study of DPM exposure from ports and goods movement in California (ARB 2006a): “Risk assessment has various uncertainties in the methodology and is therefore deliberately designed so that risks are not under predicted. Risk assessment is thus best understood as a tool for comparing risks from various sources, usually for purposes of prioritizing risk reduction, and not as literal prediction of the community incidence of disease from exposure”[2].

In light of the uncertainty in quantifying PM mortality and morbidity (particularly for a freeway project such as the I-710 Corridor Project), the analysis of PM mortality and morbidity for this project is a qualitative assessment based on comparative analysis of total $PM_{2.5}$ emissions for the various alternatives. In other words, for the purpose of this qualitative assessment, total $PM_{2.5}$ emissions are used as a potential surrogate for PM exposure. Calculations show that, in general, total I-710 $PM_{2.5}$ emissions (sum of exhaust and entrained road dust emissions) are expected to be lower for each of 2035 Alternatives (1, 5A, 6A, 6B and 6C) than 2008 baseline emissions (except for some quarter-mile areas along I-710 itself); the same is true for total $PM_{2.5}$ emissions within the SCAB. Consequently, the public’s exposure within the AOI to PM-related morbidity and mortality health risks should decrease relative to the 2008 baseline, with the greatest risk reductions in 2035 under Alternatives 6B and 6C. As seen in Figures 4.22 through 4.26 (maximum 24-hour average) and Figures 4.49 through 4.53 (annual average)(Appendix R), incremental total $PM_{2.5}$ concentration impacts from I-710 (and the freight corridor under Alternatives 6A/B/C) for all of the 2035 alternatives compared to 2008 impacts are below the

1 Concentration-response functions may be location-specific, since the composition of particulate matter varies significantly by region, and not all types of particulate matter are expected to have the same health effects. Therefore, the application of concentration-response functions obtained from epidemiologic studies conducted (e.g., outside of California) may introduce significant errors in estimating impacts in the South Coast Air Basin.

2 Additional discussion and explanation of the sources and level of uncertainty in health risk assessments are provided by OEHHA in a 2003 report (OEHHA 2003)

SCAQMD's significance threshold levels; the exceptions are the areas next to the freight corridor (model grids less than about 50 meters from the corridor) with increases above the SCAQMD's significance threshold levels. As can be seen in those figures, these very near-roadway increases are solely because of increases in entrained roadway dust from the 2008 baseline. If those increases in roadway dust are an artifact of the analytical methodology, then the impacts would be more similar to those shown in the exhaust $PM_{2.5}$ Figures. Figures 4.35 through 4.38 (maximum 24-hour average) and Figures 4.54 through 4.57 (annual average) (Appendix R) show that I-710 near-roadway total $PM_{2.5}$ concentrations compared to the 2035 Alternative 1 were about the same for Alternative 5A, were lower than Alternatives 6A, 6B and 6C, with Alternative 6A having greater near-roadway concentrations than the other alternatives compared to Alternative 1. Similar to the comparisons to the 2008 baseline, the appreciable adverse impacts occurred along the roadways (less than 100 meters) and almost all were due to increases in entrained road dust. The near-roadway modeling confirms the conclusion of the emissions analyses for the AOI: the exposure of people along I-710 to PM-related morbidity and mortality health risks should decrease relative to the 2008 baseline with the exception of some locations near the roadways (particularly for Alternative 6A). To the extent that increases in entrained road dust in the 2035 alternatives may be overestimated, the exposure would be even lower for those very near to the roadways (see discussion of ultrafine particulates below, which uses exhaust $PM_{2.5}$ [rather than total $PM_{2.5}$] as a surrogate).

ULTRAFINE PARTICULATES – QUALITATIVE ANALYSIS. As scientific studies and environmental regulations are expanding, their focus on the smaller particles in ambient air (total suspended particulate to PM_{10} to $PM_{2.5}$) has grown. An increasing interest in particles of size less than 0.1 microns, referred to as ultrafine particulate matter or ultrafine particulates (UFP or UFPs) is also developing. Although UFPs generally contribute to a small mass fraction of ambient PM, they are orders of magnitude more numerous than PM_{10} and $PM_{2.5}$ particles. Their number concentrations range from 10 to 40×10^3 UFPs/cm^3 in urban air and 40 to 1000 $\times10^3$ UFPs/cm^3 near highways. UFPs are not currently regulated in the U.S. However, the SCAQMD recommended in its 2007 AQMP that UFPs be specifically addressed in PM and air toxics control strategies.

Fuel combustion in motor vehicles is a major source of UFP, and consequently UFP emissions are concentrated near highways and other roadways. Studies have shown that UFP number concentrations decrease sharply with distance from emission sources as a result of particle growth and accumulation processes; for instance Zhu et al. (Zhu 2002) reported that UFP concentration measurements were equal to background concentrations 300 meters downwind of I-405 near the Los Angeles National Cemetery. Thus, high ambient UFP levels are very localized and exhibit large geographical and temporal variations. Concerns about public exposure to UFPs (especially in areas near freeways) are due to the fact that UFPs and the contaminants they contain are relatively easily transported into the body. This is because (i) smaller particles can be inhaled and deposited deeper into the lungs than larger particles, and (ii) the high surface area/mass ratio of UFPs can facilitate adsorption and result in higher content of trace metals and other toxic organic compounds.

There has been increasing interest among the scientific community in roadway impacts to air quality specific to I-710 (Kozawa et al, 2009, Arhami et al 2009, Moore et al 2009). SCAQMD also conducted a series of near roadway ambient air monitoring studies, which examined traffic impacts on concentrations of a host of pollutants, including UFPs.[1 2] On February 18, 2010, the AQMD reported preliminary findings of a study conducted along I-710. AQMD collected ambient air samples along I-710 in two one-month intensive campaigns (February–March 2009 and July–August 2009). Samples were collected from one background location upwind of the freeway and two locations downwind of the freeway at 15 meters and 80 meters. Air pollutant species measured included UFPs count, black carbon (BC), PM_{10}, $PM_{2.5}$, NO_x, CO, TSP, lead, and VOC. Preliminary results indicate that ambient air near I-710 (15 meters) was enriched in UFP. Similar to the results published by Zhu et al, UFP was significantly higher at the monitoring site closest (15 meters) to the roadway and dropped off with distance (80 meters). Both downwind monitoring sites were significantly higher than the upwind background measurement site. There was no significant difference in UFP count during winter vs. summer.

Information on UFP is limited at this time and is an area of active research. For example, physical transient behaviors, such as particle growth and accumulation, complicate the task of elucidating UFP concentration-response functions. Also, the existing state of knowledge does not yet support the derivation of reliable UFP emission models that account for the particulate growth and accumulation phases. Dispersion modeling of UFPs would also require additional information on the rate of UFP coagulation and absorption so that concentrations can be calculated. Given the lack of information to quantify emissions, dispersion, exposure, and health response to exposure, UFP emissions could not be quantified from the proposed project. However, a qualitative analysis has been conducted by using $PM_{2.5}$ exhaust emissions, and

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1 Ospital, J, “Health Studies & Near Roadway Issues,” South Coast Air Quality Management District, December 2009.

2 SCAQMD. Presentation to the I-710 Corridor Project Community Advisory Committee (CAC). “Preliminary Results from the AQMD I-710 Air Monitoring Study,” South Coast Air Quality Management District, February 18, 2010, www.metro.net/projects_studies/I710/images/AQMD-I-710-Air-Monitoring-Study-to-CAC-February-2010.pdf.

exposure as a surrogate for UFP exposure.[1] The I-710 $PM_{2.5}$ exhaust emissions in 2035 are expected to be lower for each of Alternatives 1, 5A, and 6A/B/C compared to the 2008 baseline emissions; the same is true for $PM_{2.5}$ exhaust emissions within the SCAB. Consequently, we expect that the public's exposure to UFP in 2035 would decrease relative to the 2008 baseline. In addition, because the project (mainline and freight corridor) $PM_{2.5}$ exhaust emissions are lower for Alternatives 6B and 6C than for Alternative 1, it is also expected that implementation of the Project under Alternatives 6B and/or 6C would decrease the public's health risk due to UFP, relative to Alternative 1. As seen in Figures 4.22 through 4.26 (maximum 24-hour average) and Figures 4.49 through 4.53 (annual average) in Appendix R, exhaust $PM_{2.5}$ concentration impacts from the project (and freight corridor, if applicable) are lower than 2008 impacts for all 2035 alternatives (with the exception of 5 modeled grid points immediately adjacent to the freight corridor in Alternative 6A). Figures 4.35 through 4.38 (maximum 24-hour average) and Figures 4.54 through 4.57 (annual average) show that I-710 near-roadway exhaust $PM_{2.5}$ concentrations for Alternatives 6B and 6C were generally higher than Alternative 1, which was lower than incremental concentration impacts in Alternatives 5A and 6A. The near-roadway modeling confirms the conclusion of the emissions analyses: the implementation of the project under Alternatives 6B and/or 6C would decrease the public's health risk due to UFP, relative to the Alternative 1, even near I-710 and the freight corridor.

Lastly, some technical analyses have used CO concentrations as a surrogate for UFP particle number impacts. As seen in Tables 4.3a through 4.3c, calculated CO emissions for all of the 2035 Alternatives decrease more sharply than exhaust $PM_{2.5}$ emissions in the AOI and along I-710 compared to the 2008 baseline. Near-roadway modeling of I-710 (and the freight corridor under Alternatives 6A/B/C) shows no increases in 1-hour or 8-hour CO concentrations in any 2035 alternative compared to the 2008 baseline. The relative reductions among the 2035 alternatives are essentially the same as for exhaust $PM_{2.5}$, although all reductions are proportionally larger. Therefore, use of CO as a surrogate for UFP particle number impacts would be similar to those when exhaust $PM_{2.5}$ is used as a surrogate, only public exposure to UFP would decrease even further compared to 2008, even for those in close proximity to I-710 and/or the freight corridor.

3.13.4 AVOIDANCE, MINIMIZATION AND/OR MITIGATION MEASURES

As discussed above, and as shown in the maps and plots provided in Appendix R, the build alternatives will improve air quality and reduce public health risk in the SCAB and the I-710 AOI.

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[1] The rationale for this choice is that both UFP and $PM_{2.5}$ emissions are primarily the result of internal combustion processes.

Along I-710, air quality will be improved and public health risk will be reduced at most locations, but there are some near-roadway locations where there will be an increase in emissions and an increase in cancer risk. Alternatives 6B and 6C have the fewest areas with these near-roadway impacts. The near-roadway impacts are generated by the on-road vehicles, the emissions of which are controlled by ARB and EPA. There are no feasible mitigation measures to reduce these localized near-roadway impacts; therefore, these localized near-roadway impacts would be unavoidable adverse impacts.

Caltrans is committed to working with SCAQMD, ARB, and EPA to continue to develop data in the I-710 Corridor that will contribute to improved air quality planning and project design in the future. As part of that commitment, the I-710 Corridor Project will provide funding for four new air quality monitoring stations within the I-710 Corridor, per Measure AQ-1 below. This measure would apply to any of the build alternatives:

AQ-1 Within two years of the approval of a Record of Decision for an I-710 Corridor Project build alternative, the California Department of Transportation (Caltrans_ shall make a funding contribution to the South Coast Air Quality Management District (SCAQMD) to provide funding for the design and construction of four new air quality monitoring stations within the I-710 Corridor. The new stations will provide for monitoring meteorology (temperature, relative humidity, pressure, wind speed and direction, and rain) and monitoring the following pollutants: ozone (O_3), nitrogen oxide (NO), nitrogen dioxide (NO_2), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), particulate matter less than 10 microns in diameter (PM_{10}), and carbon monoxide (CO).

3.13.5 CLIMATE CHANGE

Climate change is analyzed in detail in Chapter 4. Neither the EPA nor the FHWA has disseminated explicit guidance or methodology to conduct project-level GHG analysis. As stated on FHWA's climate change website (http://www.fhwa.dot.gov/hep/climate/index.htm), climate change considerations should be integrated throughout the transportation decision-making process—from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will facilitate decision-making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project level decision-making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

Because there have been more requirements set forth in California legislation and executive orders regarding climate change, the issue is addressed in detail in the CEQA chapter of this environmental document and may be used to inform the NEPA decision. The four strategies set forth by FHWA to lessen climate change impacts do correlate with efforts that the State has undertaken and is undertaking to deal with transportation and climate change; the strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and reduction in the growth of vehicle hours traveled.

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