2.11 Air Quality

2.11.1 Regulatory Setting

The Federal Clean Air Act (FCAA), as amended, is the primary federal law that governs air quality while the California Clean Air Act (CCAA) is its companion state law. These laws, and related regulations by the United States Environmental Protection Agency (U.S. EPA) and the California Air Resources Board (ARB), set standards for the concentration of pollutants 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: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM)—which is broken down for regulatory purposes into particles of 10 micrometers or smaller (PM_{10}) and particles of 2.5 micrometers and smaller ($PM_{2.5}$)—and sulfur dioxide (SO_2). In addition, national and state standards exist for lead (Pb), and state standards exist for visibility reducing particles, sulfates, hydrogen sulfide (H_2S), and vinyl chloride. The NAAQS and state standards are set at levels that protect 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 in their general definition.

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

2.11.1.1 Conformity

The conformity requirement is based on FCAA Section 176(c), which prohibits the U.S. Department of Transportation and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to State Implementation Plan (SIP) for attaining the NAAQS. "Transportation Conformity" applies to highway and transit projects and 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 Code of Federal Regulations (CFR) 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS and do not apply at all for State standards, regardless of the status of the area.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and in some areas (although not in California), sulfur dioxide (SO_2). California has nonattainment or maintenance areas for all of these transportation-related "criteria pollutants" except SO_2, and also has a nonattainment area for Pb; however, lead is not currently required by the

FCAA to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of Regional Transportation Plans (RTPs) and Federal Transportation Improvement Programs (FTIPs) that include all transportation projects planned for a region over a period of at least 20 years (for the RTP) and 4 years (for the FTIP). RTP and FTIP conformity uses travel demand and emission models to determine whether or not the implementation of those projects would conform to emission budgets or other tests at various analysis years showing that requirements of the FCAA 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 the determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the FCAA. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept and scope and the “open-to-traffic” schedule of a proposed transportation project are the same as described in the RTP and FTIP, then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Project-level conformity is achieved by demonstrating that the project comes from a conforming RTP and TIP; the project has a design concept and scope[1] that has not changed significantly from those in the RTP and TIP; project analyses have used the latest planning assumptions and EPA-approved emissions models; and in PM areas, the project complies with any control measures in the SIP. Furthermore, additional analyses (known as hot-spot analyses) may be required for projects located in CO and PM nonattainment or maintenance areas to examine localized air quality impacts.

2.11.2 Affected Environment

This section is based on the *Revised Air Quality Report* (March 2019) prepared for the proposed project.

2.11.2.1 Climate and Meteorology

The proposed project is within the South Coast Air Basin (SCAB). Therefore, per 40 CFR, Part 93, analyses for conformity purposes are only required for the portions of the project that fall within the SCAB region.

Climate in the SCAB is determined by its terrain and geographical location. The SCAB is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the southwestern boundary, and high mountains surround the rest of the SCAB. The region lies in the semi-permanent high-pressure zone of the eastern Pacific. 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.

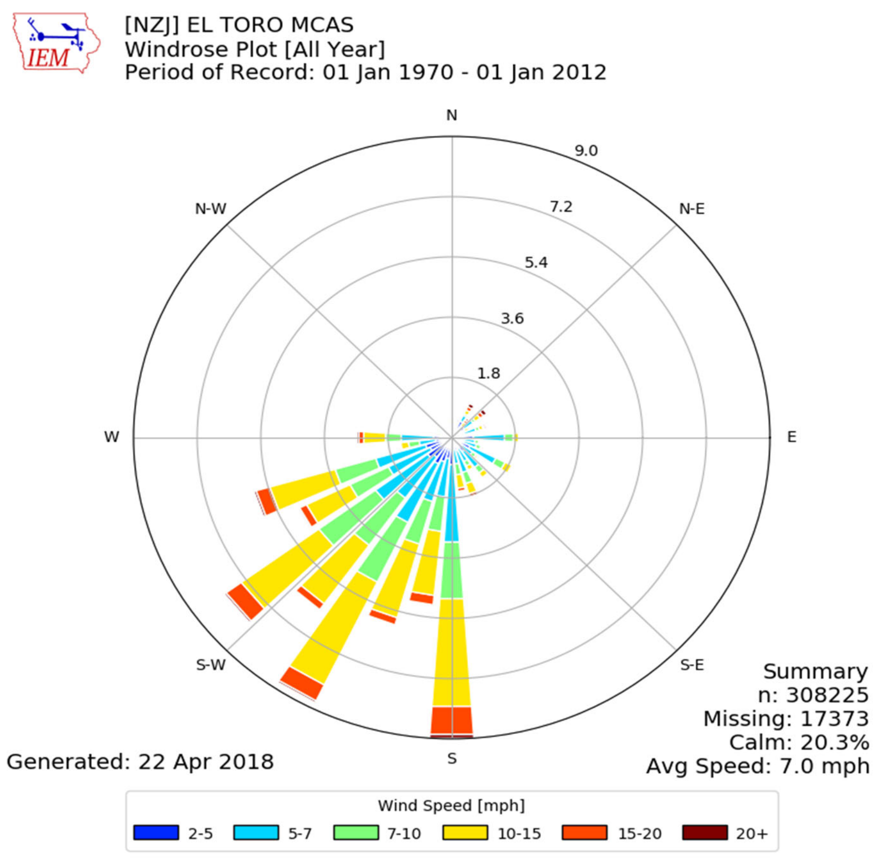
The annual average temperature in the SCAB ranges from the low to middle 60s, measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence,

[1] “Design concept” means the type of facility that is proposed, such as a freeway or arterial highway. “Design scope” refers to those aspects of the Build Alternatives that would clearly affect capacity and thus any regional emissions analysis, such as the number of lanes and the length of the Build Alternatives.

coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station closest to the site monitoring temperature is the Laguna Beach Climatological Station. The annual average maximum temperature recorded at this station is 72.3°F, and the annual average minimum is 51.8°F. January is typically the coldest month in this area of the SCAB.

The majority of annual rainfall in the SCAB 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 portion of the SCAB along the coastal side of the mountains. The climatological station closest to the site that monitors precipitation is the Laguna Beach Station. Average rainfall measured at this station varied from 3.52 inches in February to 0.49 inch or less between May and October, with an average annual total of 10.32 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

Predominant wind patterns are captured at El Toro, located at the former Marine Corps Air Station El Toro. Figure 2.11-1 shows a wind rose illustrating the predominant wind patterns near the Study Area.



Source: Iowa State University, 2108. Iowa Environmental Mesonet (IEM), Wind Rose Plot for El Toro MCAS. http://mesonet.agron.iastate.edu/sites/windrose.phtml?station=NZJ&network=CA_ASOS

Figure 2.11-1: Predominant Wind Patterns at El Toro

The SCAB 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 midafternoon to late afternoon on hot summer days, when the smog appears to clear up suddenly. Winter inversions frequently break by midmorning.

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 in Los Angeles and Orange Counties are transported predominantly onshore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problems are CO and oxides of nitrogen (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.

The South Coast Air Quality Management District (SCAQMD) Mission Viejo Air Quality Monitoring Station (26081 Via Pera) monitors five criteria pollutants (O_3, CO, PM_{10}, $PM_{2.5}$, and NO_2). Table 2.11.1 lists air quality trends identified for data collected between 2013 and 2017.

Attainment Status

Criteria pollutants are defined as those pollutants for which the Federal and State governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health and prevent degradation of the environment. The standards for these pollutants are shown in Table 2.11.2.

Air quality monitoring stations are located throughout the nation and are maintained by local air districts and state air quality regulating agencies. Data collected at permanent monitoring stations are used by the USEPA 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 USEPA. In addition, different classifications of nonattainment (e.g., 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. Table 2.11.2 lists the State and Federal attainment status for all regulated pollutants.

Table 2.11.1: Air Quality Concentrations Measured at Mission Viejo Monitoring Station

Pollutant	Standard	2013	2014	2015	2016	2017
Ozone						
Max 1-hr concentration		0.104	0.115	0.099	0.122	0.103
No. days exceeded: State	0.09 ppm	2	4	2	5	3
Max 8-hr concentration		0.082	0.088	0.088	0.094	0.084
No. days exceeded: State Federal	0.070 ppm 0.070 ppm	5 5	10 10	8 8	13 13	27 25
Carbon Monoxide						
Max 1-hr concentration		1.5	1.2	1.4	1.3	1.4
No. days exceeded: State Federal	20 ppm 35 ppm	0 0	0 0	0 0	0 0	0 0
Max 8-hr concentration		1.2	0.8	0.7	0.7	0.9
No. days exceeded: State Federal	9.0 ppm 9 ppm	0 0	0 0	0 0	0 0	0 0
PM_{10}						
Max 24-hr concentration		50.0	40.0	49.0	59.0	58.2
No. days exceeded: State Federal	50 µg/m^3 150 µg/m^3	0 0	0 0	0 0	1 0	1 0
Max annual concentration		19.3	20.2	18.0	21.0	18.8
No. days exceeded: State	20 µg/m^3	0	1	0	1	0
$PM_{2.5}$						
Max 24-hr concentration		28.0	25.5	31.7	24.7	19.5
No. days exceeded: Federal	35 µg/m^3	0	0	0	0	0
Max annual concentration		8.0	7.0	7.0	7.3	7.4
No. days exceeded: State Federal	12 µg/m^3 12.0 µg/m^3	0 0	0 0	0 0	0 0	0 0
Nitrogen Dioxide						
Max 1-hr concentration		0.075	0.060	0.052	0.059	0.045
No. days exceeded: State Federal	0.18 ppm 100 ppb	0 0	0 0	0 0	0 0	0 0
Max annual concentration		0.011	0.010	0.011	0.010	0.011
No. days exceeded: State Federal	0.030 ppm 53 ppb	0 0	0 0	0 0	0 0	0 0

Source: United States Environmental Protection Agency, Air Data: Air Quality Data Collected at Outdoor Monitors Across the US. Website: https://www.epa.gov/outdoor-air-quality-data (accessed November 2018).
µg/m^3 = micrograms per cubic meter
avg. = average
hr = hour
max = maximum
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ppb = parts per billion
ppm = parts per million

Table 2.11.2: State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[1,3]	Federal Standard[2,3,4]	Principal Health and Atmospheric Effects	Typical Sources	Attainment Status
Ozone (O_3)	1 hour 8 hours[5]	0.09 ppm (180 µg/m^3) 0.070 ppm (137 µg/m^3)	--- [4] 0.070 ppm (137 µg/m^3)	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 reactive organic gases/volatile organic compounds (ROG or VOC) and nitrogen oxides (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)	8 hours 1 hour 8 hours (Lake Tahoe)	9.0 ppm (10 mg/m^3) 20 ppm (23 mg/m^3) 6 ppm (7 mg/m^3)	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3) ---	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})[6]	24 hours Annual Arithmetic Mean	50 µg/m^3 20 µg/m^3	150 µg/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 and vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.	Federal: Attainment/Maintenance State: Nonattainment
Fine Particulate Matter ($PM_{2.5}$)[6]	24 hours Annual Arithmetic Mean	No Separate State Standard 12 µg/m^3	35 µg/m^3 12.0 µg/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 toxic and other 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: Moderate Nonattainment State: Nonattainment
Nitrogen Dioxide (NO_2)[7]	Annual Arithmetic Mean 1 hour	0.030 ppm (57 µg/m^3) 0.18 ppm (339 µg/m^3)	53 ppm (100 µg/m^3) 100 ppb (188 µg/m^3)	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain. Part of the "NOx" group of ozone precursors.	Motor vehicles and other mobile sources; refineries; industrial operations.	Federal: Attainment/Maintenance State: Nonattainment

Table 2.11.2: State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[1,3]	Federal Standard[2,3,4]	Principal Health and Atmospheric Effects	Typical Sources	Attainment Status
Sulfur Dioxide (SO_2)8	Annual Arithmetic Mean 24 hours 3 hours 1 hour	--- 0.04 ppm (105 μg/m³) --- 0.25 ppm (655 μg/m³)	0.03 ppm (for certain areas)[7] 0.14 ppm (for certain areas)[7] 0.5 ppm (1300 μg/m³) 75 ppb (196 μg/m³)	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)[9,10]	30-day Average Calendar Quarter Rolling 3-month Average	1.5 μg/m³ --- ---	--- 1.5 μg/m³ (for certain areas)[9] 0.15 μg/m³ [9]	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 (Los Angeles County only) State: Nonattainment (Los Angeles 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: N/A State: Attainment/Unclassified
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm (42 μg/m³)	---	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: N/A State: Attainment/Unclassified
Visibility Reducing Particles (VRP)[11]	8 hours	Visibility of 10 miles or more (Tahoe: 30 miles) at relative	---	Reduces visibility. Produces haze. Note: Not related to the Regional Haze program under the Federal Clean Air Act, which is oriented primarily toward visibility	See PM above.	Federal: N/A State: Attainment/Unclassified

Table 2.11.2: State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[1,3]	Federal Standard[2,3,4]	Principal Health and Atmospheric Effects	Typical Sources	Attainment Status
		humidity less than 70 percent		issues in National Parks and other "Class I" areas.		
Vinyl Chloride9	24 hours	0.01 ppm (26 µg/m^3)	---	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes	Federal: N/A State: Attainment/Unclassified

Sources: *Revised Air Quality Report* (March 2019); Ambient Air Quality Standards (ARB, May 2016).

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California Ambient Air Quality Standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once per year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than 1. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
5. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
6. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 µg/m3 to 12.0 µg/m3. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 µg/3, as was the annual secondary standard of 15 µg/m3. The existing 24-hour PM10 standards (primary and secondary) of 150 µg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
7. To attain the 1-hour standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards, the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
8. On June 2, 2010, the new 1-hour SO2 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 SO2 national standards (24-hour and annual) remain in effect until 1 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.
9. The ARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
10. The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until 1 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.
11. 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.

µg/m^3 = micrograms per cubic meter
N/A = Not Available
ppb = parts per billion
ROG = reactive organic gases
SO_X = sulfur oxides
ARB = California Air Resources Board
PM = particulate matter
ppm = parts per million
SIP = State Implementation Plan
VOC = volatile organic compounds
EPA = United States Environmental Protection Agency

Mobile Source Air Toxics

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

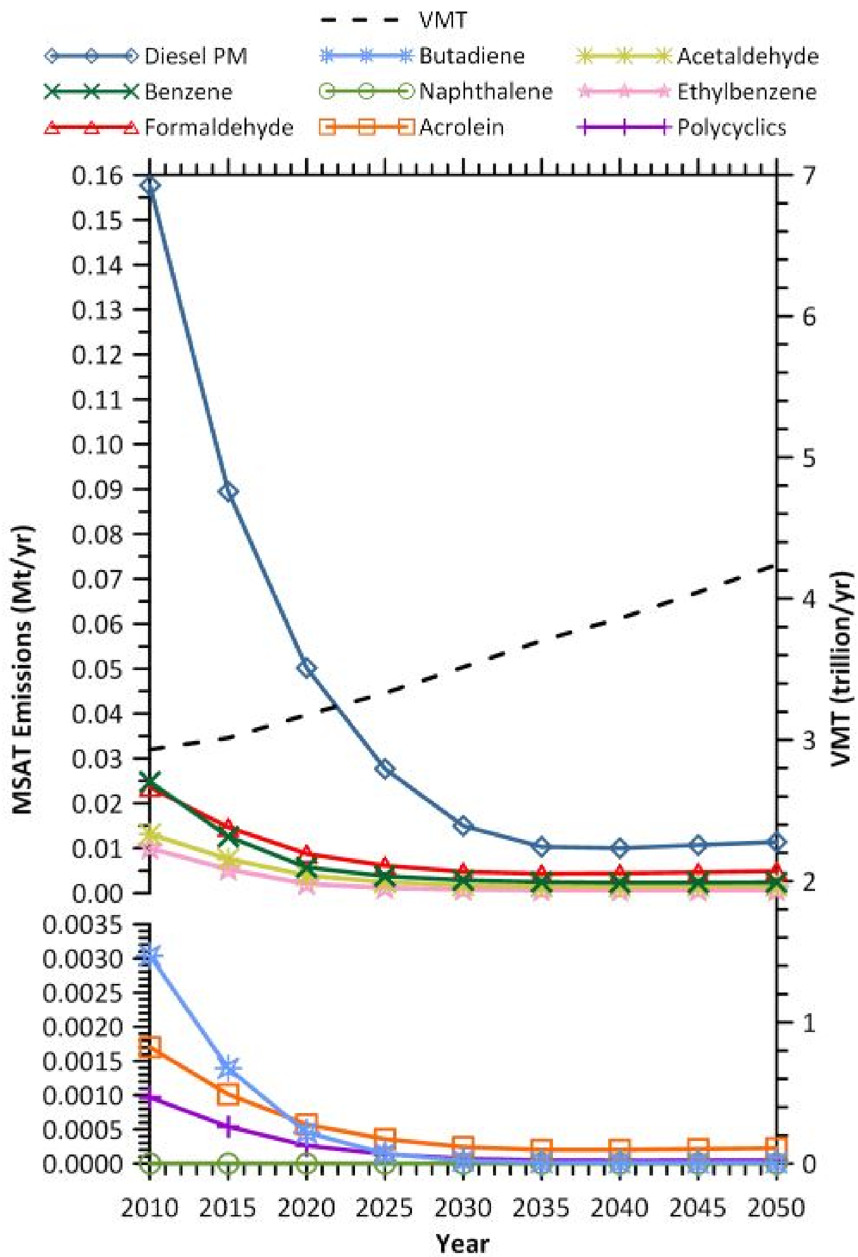
Controlling air toxic emissions became a national priority with the passage of the FCAA Amendments of 1990, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in its latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Volume 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in its Integrated Risk Information System. In addition, the EPA identified nine compounds with significant contributions from mobile sources that are among national and regional-scale cancer risk drivers or contributors and non-hazard contributors from its 2014 National Air Toxics Assessment. These are acrolein, benzene, 1,3-butadiene, acetaldehyde, diesel PM, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While the FHWA considers these seven compounds to be the priority mobile source air toxics (MSAT), the list is subject to change and may be adjusted in consideration of future USEPA rules.

The 2007 USEPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using the USEPA MOVES2014a model, even if vehicle activity (vehicle miles traveled) increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emission rate for the priority MSATs is projected for the same time period, as shown on Figure 2.11-2, Projected National MSAT Trends, 2010–2050.

Naturally Occurring Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a known human carcinogen by State, federal, and international agencies and was identified as a toxic air contaminant by CARB in 1986. All types of asbestos are hazardous and may cause lung disease and cancer.

Asbestos can be released from serpentine and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos-bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed.



Source: Federal Highway Administration (FHWA). 2016. Air Quality Transportation & Toxic Air Pollutants. Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. October 18, 2016.

Figure 2.11-2: Projected National MSAT Trends, 2010–2050

The project is in Orange County, which is among the counties listed as containing serpentine and ultramafic rock. However, the portion of Orange County in which the project lies is not known to contain serpentine or ultramafic rock.

Sensitive Receptors

Sensitive populations are more susceptible to the effects of air pollution than the general population. Sensitive populations (sensitive receptors) that are in proximity to localized sources of toxics and CO are of particular concern. Land uses considered to be sensitive receptors include residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Sensitive land uses located directly adjacent to the project limits include residences as depicted in Figure 2.11-3, Sensitive Receptor Locations. Table 2.11.3 presents the list of sensitive receptors location and distance.

Table 2.11.3: List of Sensitive Receptors Location and Distance

Sensitive Receptors	Location	Nearest Distance to Project Limits
Single-Family Residential	Northwest of Study Area	120 feet
St. George's Episcopal Church Pathway School	Northwest of Study Area, adjacent to SB I-5 Off-Ramp	27 feet
Single-Family Residential	Northeast of Study Area, adjacent to Bridger Road and NB I-5 Off-Ramp	44 feet
Single-Family Residential	Southeast of Study Area	50 feet
Single-Family Residential	Southwest of Study Area	115 feet
Medical Facilities	West of the Study Area	1,450 feet

Source: Compiled by LSA Associates, Inc. (2019).
I-5 = Interstate 5
NB = northbound
SB = southbound

2.11.3 Environmental Consequences

Temporary impacts associated with construction of the Build Alternatives (including Design Option B) are addressed in the Construction (Short-term Impacts) section below. Long-term impacts on air quality in terms of regional air quality conformity and project-level conformity are addressed in the Operational Emissions (Long-term Impacts) section below. Two Build Alternatives, Alternatives 2 Southbound I-5 off-ramp flyover connecting to Bridger Road and Alternative 4 Southbound Collector Distributor and Hook Ramps, have been considered and evaluated in the environmental document. The two Build Alternatives (including Design Option B) focus primarily on redistributing the southbound I-5 off-ramp traffic by adding alternatives to bypass local arterial intersections that separate eastbound and westbound El Toro Road traffic.

2.11.3.1 Short-Term Impacts

Build Alternatives (Alternatives 2 and 4 [including Design Option B])

During construction, short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other activities related to construction. Emissions from construction equipment also are anticipated and would include CO, NO_X, volatile organic compounds (VOCs), directly emitted particulate matter ($PM_{2.5}$ and PM_{10}), and toxic air contaminants such as diesel exhaust particulate matter.

Alternative 2 would involve a bridge flyover structure by traversing over the existing southbound I-5 hook off-ramps, and additional northbound I-5 on-ramps from Bridger Road. Alternative 4 (including Design Option B) would involve two hook-style interchange at southbound I-5 and the additions of northbound I-5 on-ramps from Bridger Road.

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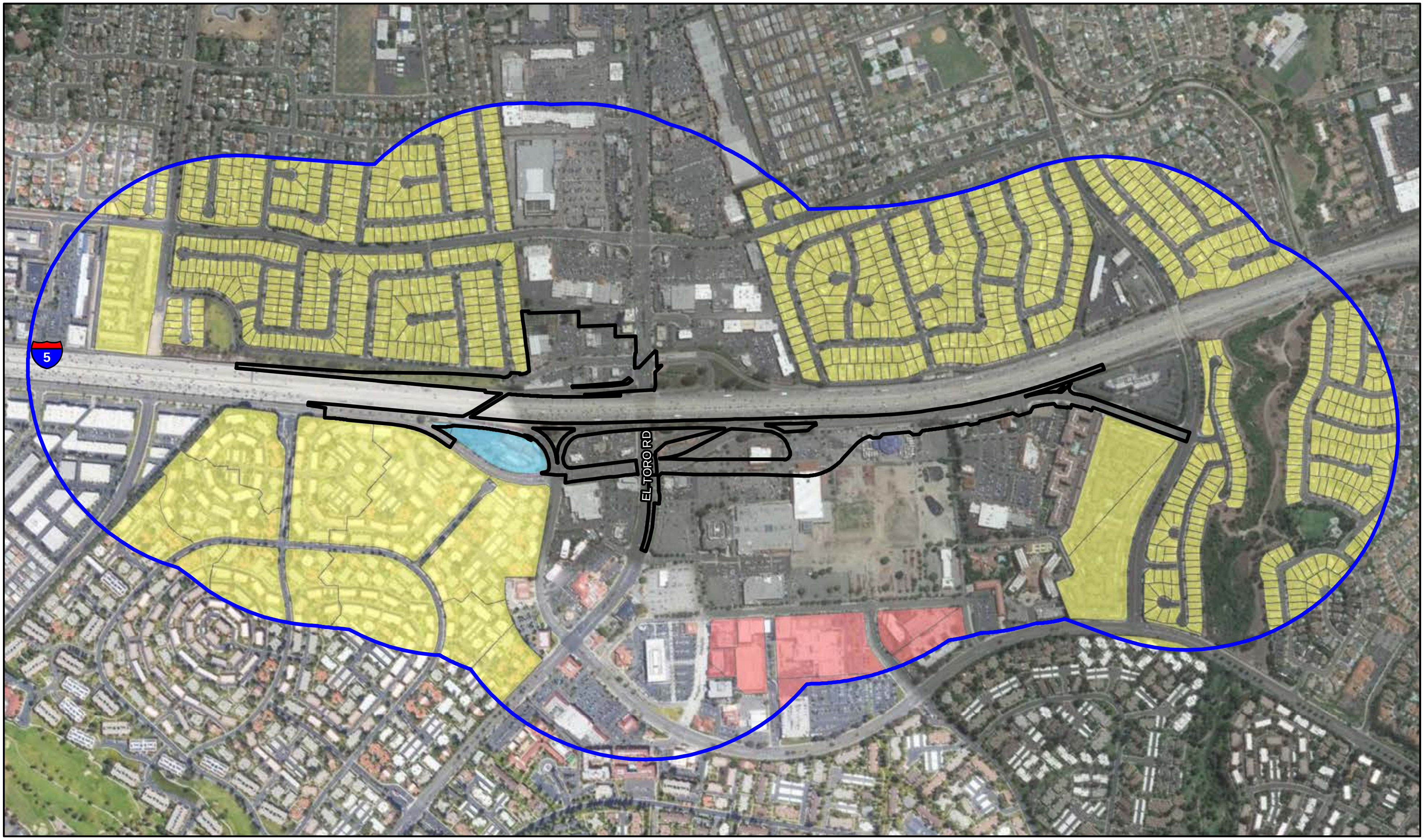

LEGEND

Project Limits

1,500-foot Radius of Project Footprint

Sensitive Receptors

Residential

School

Medical Facilities

0 500 1000
FEET

SOURCE: Google Earth (2018); Caltrans (12/18/2018)

FIGURE 2.11-3

I-5/El Toro Road Interchange Project

Sensitive Receptor Locations

12-ORA-5 PM 17.8/19.7

EA 0M9800

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

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, NO_X, VOCs, and some soot particulate ($PM_{2.5}$ and PM_{10}) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site. Areas within 500 feet of ARB-defined sensitive land uses would be labeled as no-idle areas where material storage/transfer and equipment maintenance activities are not to occur (Caltrans 2018c).

SO_2 is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Off-road diesel fuel meeting federal standards can contain up to 5,000 parts per million of sulfur, whereas on-road diesel is restricted to less than 15 parts per million of sulfur (ARB 2012). However, under California law and ARB regulations, off-road diesel fuel used in California must meet the same sulfur and other standards as on-road diesel fuel, so SO_2-related issues due to diesel exhaust would be minimal.

The construction emissions were estimated for the Build Alternatives using the Sacramento Metropolitan Air Quality Management District Road Construction Emissions Model (RoadMod), Version 8.1.0, which is consistent with the guidance provided by SCAQMD for evaluating construction impacts from roadway projects with the EMFAC2014 motor vehicle emission factor data. The maximum amount of construction-related emissions during a peak construction day is presented in Table 2.11.4 (model data are provided in Appendix D). The PM_{10} and $PM_{2.5}$ emissions assume a 50-percent control of fugitive dust as a result of watering and associated dust-control measures. Additionally, SCAQMD has established rules for reducing fugitive dust emissions. The Build Alternatives would comply with SCAQMD Rule 403 requiring the implementation of best available dust control measures during active operations capable of generating fugitive dust. Project Features would include specific measures such as frequent watering (e.g., a minimum of twice per day) to reduce any air quality impacts resulting from construction activities. The emissions presented below are based on the best information available at the time of calculations and specify that the schedules for the Build Alternatives (including Design Option B) are anticipated to take 24 to 36 months beginning in 2023.

Table 2.11.4: Construction Emissions for Build Alternatives 2 and 4

Project Phases (lbs/day)	ROG	CO	NO_X	Total PM_{10}	Total $PM_{2.5}$
Build Alternative 2					
Grubbing/Land Clearing	2.27	18.34	16.81	50.83	11.10
Grading/Excavation	6.15	54.23	54.88	52.57	12.68
Drainage/Utilities/Sub-Grade	4.09	39.16	32.92	51.59	11.81
Paving	2.54	25.57	19.40	1.02	0.86
Maximum (lbs/day)	**6.15**	**54.23**	**54.88**	**52.57**	**12.68**
Total (tons/construction project)	**1.21**	**11.04**	**10.34**	**11.71**	**2.77**
Build Alternative 4 (including Design Option B)					
Grubbing/Land Clearing	2.38	19.04	17.30	50.84	11.12
Grading/Excavation	6.27	54.92	55.37	52.59	12.70
Drainage/Utilities/Sub-Grade	4.21	39.94	33.50	51.61	11.84
Paving	2.65	26.28	19.98	1.05	0.89
Maximum (lbs/day)	**6.27**	**54.92**	**55.37**	**52.59**	**12.70**
Total (tons/construction project)	**1.25**	**11.23**	**10.48**	**11.72**	**2.78**

Source: Compiled by LSA Associates, Inc. (2018).
CO = carbon monoxide
lbs/day = pounds per day
NO_X = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ROG = reactive organic compound

Implementation of the following standard California Department of Transportation (Caltrans) construction measures, some of which may also be required for other purposes, such as stormwater pollution control, would reduce air quality impacts resulting from construction activities.

Naturally Occurring Asbestos

The Build Alternative (including Design Option B) are in Orange County, which is among the counties listed as containing serpentine and ultramafic rock. However, the portion of Orange County in which the Build Alternatives lie is not known to contain serpentine or ultramafic rock. Therefore, the impact from naturally occurring asbestos during construction of the Build Alternatives would be minimal to none.

Construction Conformity

The construction schedule for all improvements is anticipated to be 24 to 36 months, beginning in 2023 and ending in 2026. Therefore, construction activities would not last for more than 5 years at one general location, so construction-related emissions do not need to be included in regional and project-level conformity analysis (40 CFR 93.123(c)(5)).

Implementation of the following standard Caltrans construction measures, some of which may also be required for other purposes, such as stormwater pollution control, would reduce air quality impacts resulting from construction activities. The following Project Features will be implemented during construction activities.

PF-AQ-1 The construction contractor must comply with the California Department of Transportation's (Caltrans) Standard Specifications in Section 14-9 (2018) to minimize impacts to Air Quality.

PF-AQ-2 California Department of Transportation's (Caltrans) Standard Specifications Section 14-9.02 specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances.

- During clearing, grading, earthmoving, or excavation operations, excessive fugitive dust emissions will be controlled by regular watering or other dust preventive measures using the following procedures, as specified in the South Coast Air Quality Management District (SCAQMD) Rule 403.

  - All material excavated or graded will be sufficiently watered to prevent excessive amounts of dust.

  - Watering will occur at least twice daily with complete coverage, preferably in the late morning and after work is done for the day.

  - All material transported on site or off site shall be either sufficiently watered or securely covered to prevent excessive amounts of dust.

  - The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized to prevent excessive amounts of dust.

  - Fugitive dust emission will be controlled by applying water or dust palliative to the disturbed soil and unpaved area.

  - Dust control plan will be prepared and will be followed to control the fugitive dust emissions.

  These control techniques will be indicated in project specifications. Visible dust beyond the property line emanating from the project will be prevented to the maximum extent feasible.

  - Project grading plans will show the duration of construction. Ozone precursor emissions from construction equipment vehicles will be controlled by maintaining equipment engines in good condition and in proper tune per manufacturers' specifications.

  - All trucks that are to haul excavated or graded material on site will comply with State Vehicle Code Section 23114, with special attention to Sections 23114(b)(F), (e)(2), and (e)(4), as amended, regarding the prevention of such material spilling onto public streets and roads.

  - Should the project geologist determine that asbestos-containing materials (ACMs) are present at the project study area during final inspection prior to construction, the appropriate methods will be implemented to remove ACMs.

  - All construction vehicles both on and off site shall be prohibited from idling in excess of 5 minutes.

PF-AQ-3 Construction contractor must comply with the California Department of Transportation's (Caltrans) Standard Specifications Section 14-9.03.

2.11.3.2 Operational Emissions (Long-Term Impacts)

This section discusses long-term impacts on air quality in terms of regional air quality conformity and project-level conformity.

Permanent Impacts

Build Alternatives (Alternatives 2 and 4 [including Design Option B])

Based on the Traffic Study Report (August 2018), the Build Alternatives would improve traffic flow without increasing the traffic volumes along I-5. Therefore, the Build Alternatives (including Design Option B) would show slight increases in long-term regional vehicle air emissions compared to the No Build Alternative. Table 2.11.5 presents a summary of comparative emissions analysis.

Table 2.11.5: Summary of Comparative Emissions Analysis

	CO (lbs/day)	ROG (lbs/day)	NO_X (lbs/day)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)
Opening Year 2030					
2017 Existing	1,688.29	66.67	356.28	81.45	32.23
No Build Alternative	816.85	35.91	124.84	68.43	30.62
Change from Existing	-871.44	-30.75	-231.45	-13.02	-1.61
Alternative 2	846.03	38.24	132.80	70.00	31.37
Change from Existing	-842.26	-28.43	-223.48	11.45	-0.86
Change from No Build	29.18	2.33	7.96	1.57	0.75
Alternative 4 (including Design Option B)	857.48	38.93	135.16	70.71	31.71
Change from Existing	-830.81	-27.74	-221.13	10.74	0.52
Change from No Build	40.63	3.02	10.32	2.28	1.09
Design Year 2050					
2017 Existing	1,688.29	66.67	356.28	68.48	32.23
No Build Alternative	684.59	36.58	119.39	71.36	31.38
Change from Existing	-1,003.70	-30.08	-236.89	2.88	-0.85
Alternative 2	707.76	38.64	127.37	72.91	32.08
Change from Existing	-980.53	-28.03	-228.91	4.43	0.15
Change from No Build	23.17	2.06	7.99	1.55	0.70
Alternative 4 (including Design Option B)	716.91	39.27	129.64	73.64	32.41
Change from Existing	-971.38	-27.40	-226.64	5.16	0.18
Change from No Build	32.32	2.69	10.25	2.28	1.03

Source: Compiled by LSA Associates, Inc. using CT-EMFAC2014 (2018).
CO = carbon monoxide
lbs/day = pounds per day
NO_X = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ROG = reactive organic gases
tons/day = tons per day

Regional Conformity

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for CO, NO_2, O_3, PM_{10}, and $PM_{2.5}$, and in some areas (although not in California) SO_2. California has nonattainment or maintenance areas for all of these transportation-related "criteria pollutants" except SO_2, and also has a nonattainment area for Pb; however, the CCAA does not currently require Pb to be covered in transportation conformity analysis.

Conformity determinations require the analysis of direct and indirect emissions associated with the Build Alternatives and their comparison with conditions without the project (No Build Alternative). If the total of direct and indirect emissions from the Build Alternatives reach or exceeds the regionally significant thresholds, the Lead Agency must perform a conformity determination to demonstrate the positive conformity of the federal action.

The Build Alternatives (including Design Option B) are included in the 2016 RTP, which was found to be conforming by the FHWA/FTA in June 2016. The Build Alternatives (including Design Option B) are included in Amendment #19-03 of the 2019 FTIP (Project ID: ORA131105) which was found to be conforming by the FHWA/FTA in March 2019.

Therefore, the Build Alternatives would not result in adverse impacts related to regional conformity.

Project-Level Conformity

Historical air quality data show that existing CO levels for the project limits and the general vicinity do not exceed either the state or federal ambient air quality standards. The Build Alternatives (including Design Option B) would help to improve traffic flow and reduce congestion on roadway links in the Study Area and surrounding vicinity. The Build Alternatives are in an attainment/maintenance area for federal CO standards. Using the Caltrans Transportation Project-Level Carbon Monoxide Protocol, a screening CO hot-spot analysis was conducted to determine whether the Build Alternatives would result in any CO hot spots. It was determined that the Build Alternatives (including Design Option B) would not result in any exceedances of the 1-hour or 8-hour CO standards. Therefore, the Build Alternatives (including Design Option B) would not result in adverse impacts related to CO hot spots.

Results from Carbon Monoxide Hot-Spot Analysis Common to all Build Alternatives

The methodology required for a CO local analysis is summarized in the Caltrans Transportation Project-Level Carbon Monoxide Protocol (Protocol), Section 3 (Determination of Project Requirements) and Section 4 (Local Analysis). In Section 3, the Protocol provides two conformity requirement decision flowcharts that are designed to assist the project sponsors in evaluating the requirements that apply to specific projects. The flowchart provided as Appendix E in the *Revised Air Quality Report* (March 2019) applies to the Build Alternatives and was used in this local analysis conformity decision. The Build Alternatives (including Design Option B) are not expected to result in any concentrations exceeding the 1-hour or 8-hour CO standards. Therefore, a detailed CALINE4 CO hot-spot analysis is not required.

Particulate Matter Conformity Hot-Spot Analysis and Results from Modeling

The Build Alternatives are within a nonattainment area for federal $PM_{2.5}$ and within an attainment/maintenance area for federal PM_{10} standards. Therefore, per 40 CFR, Part 93, analyses are required for conformity purposes. However, the USEPA does not require hot-spot analyses, qualitative or quantitative, for projects that are not listed in Section 93.123(b)(1) as an air quality concern. The

Build Alternatives do not qualify as a project of air quality concern (POAQC) because of the Build Alternatives would improve the I-5/El Toro Road Interchange. The Build Alternatives would show slight increases in long-term regional vehicle air emissions as compared to the No Build Alternative. It should be noted that the increase in emissions was accounted for in the conforming RTP/Sustainable Communities Strategy (SCS) and conformity budget that is used for attainment of the standards. Because this Build Alternatives (including Design Option B) conform, the Build Alternatives would have no adverse impact to air quality.

On August 28, 2018, the Transportation Conformity Working Group (TCWG) determined that the Build Alternatives are not a POAQC. Per the transportation conformity rules and regulations, all nonexempt projects must go through review by the TCWG. The Build Alternatives (including Design Option B) were approved and concurred upon by Interagency Consultation at the TCWG meeting as a project not having adverse impacts on air quality, and the Build Alternatives (including Design Option B) meet the requirements of the FCAA and 40 CFR 93.116.

Therefore, the Build Alternatives (including Design Option B) meet the FCAA requirements and 40 CFR 93.116, without any explicit hot-spot analysis. The Build Alternatives are listed in the 2016 RTP/SCS and 2019 FTIP under ID # ORA131105. Thus, the Build Alternatives (including Design Option B) were included in the regional emissions analysis that was used to meet regional conformity and would not delay timely attainment of the PM_{10} or $PM_{2.5}$ NAAQS for the SCAB. In June 2018, the FHWA published its determination that 2016 RTP/SCS Amendment No. 3 conforms with the SIP in accordance with 40 CFR 93. Long-term operation of the Build Alternatives would therefore be considered consistent with the purpose of the SIP, and the Build Alternatives would conform to the requirements of the FCAA.

NO_2 Analysis

The USEPA modified the NO_2 NAAQS to include a 1-hour standard of 100 parts per billion in 2010. Currently there is no Federal project-level NO_2 analysis requirement. However, NO_2 is among the near-road pollutants of concern. Within the Study Area, it is unlikely that NO_2 standards would be approached or exceeded based on the relatively low ambient concentrations of NO_2 in the SCAB and on the long-term trend toward reduction of NO_X emissions. Because of these factors, a specific analysis of NO_2 was not conducted for the Build Alternatives.

Mobile Source Air Toxics (MSATs)

Traffic data from the *Traffic Study Report* (August 2018), along with the CT-EMFAC2014 emission rates, were used to calculate the acrolein, benzene, 1,3-butadiene, acetaldehyde, diesel PM, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter emissions for the Existing (2017) condition, Opening Year 2030, and Design Year 2050.

As Table 2.11.6 shows for the MSAT emissions in 2030 and 2050, the Build condition emissions are all lower than the Existing condition emissions. Because the emission effects of the Build Alternatives (including Design Option B) would be low, it is expected that there would be no appreciable difference in overall MSAT emissions between the Existing condition and the Build Alternatives.

Consequently, the emission effects of the Build Alternatives would be low, and it is expected that there would be no appreciable difference in overall MSAT emissions between the No Build and Build Alternatives (including Design Option B).

No Build Alternative

Implementation of the No Build Alternative would maintain the existing configuration of the I-5/El Toro Road Interchange and would not result in improvements to the interchange. Under the No Build Alternative, the performance of the interchange would continue to deteriorate with the forecasted increase in traffic. The No Build Alternative would potentially be inconsistent with regional plans and programs such as the 2016 RTP/SCS and 2019 FTIP, because the Build Alternatives would not be constructed as approved in the RTP for the area. The No Build Alternative provides a baseline for comparing the impacts associated with the Build Alternatives.

2.11.4 Avoidance, Minimization, and/or Mitigation Measures

With the inclusion of the Project Features described above in Section 2.11.3.1, the Build Alternatives (including Design Option B) would not result in adverse air quality impacts, and no avoidance, minimization, and/or mitigation measures are required.

2.11.4.1 Climate Change

Neither the USEPA nor the FHWA has issued explicit guidance or methods to conduct project-level greenhouse gas analysis. FHWA emphasizes concepts of resilience and sustainability in highway planning, project development, design, operations, and maintenance. Because there have been requirements set forth in California legislation and executive orders on climate change, the issue is addressed in Chapter 3.1 of this document. The CEQA analysis may be used to inform the NEPA determination for the Build Alternatives.

Table 2.11.6: Summary of Comparative MSAT Emissions Analysis

Alternative	MSAT Exhaust (lbs/day)								
	Acrolein	Benzene	1,3-butadiene	Acetaldehyde	Diesel PM	Ethylbenzene	Formaldehyde	Naphthalene	POM
Opening Year (2030)									
Existing (2017)	0.11	2.27	0.49	1.26	2.89	12.27	3.29	0.06	0.09
No Build Alt (2030)	0.06	1.21	0.26	0.66	0.34	6.32	1.73	0.03	0.05
Change From Existing	-0.05	-1.06	-0.23	-0.6	-2.55	-5.95	-1.56	-0.03	-0.04
Alt 2 (2030)	0.06	1.26	0.28	0.72	0.35	6.92	1.87	0.04	0.05
Change From Existing	-0.05	-1.01	-0.21	-0.54	-2.54	-5.35	-1.42	-0.02	-0.04
Change From No Build	0.00	0.05	0.02	0.06	0.01	0.60	0.14	0.01	0.00
Alt 4 (including Design Option B) (2030)	0.06	1.31	0.28	0.74	0.36	7.08	1.91	0.04	0.05
Change From Existing	-0.05	-0.96	-0.21	-0.52	-2.53	-5.19	-1.38	-0.02	-0.04
Change From No Build	0.00	0.1	0.02	0.08	0.02	0.76	0.18	0.01	0.00
Design Year (2050)									
Existing (2017)	0.11	2.27	0.49	1.26	2.89	12.27	3.29	0.06	0.09
No Build Alt (2050)	0.06	1.24	0.27	0.77	0.26	7.63	1.94	0.04	0.04
Change From Existing	-0.05	-1.03	-0.22	-0.49	-2.63	-4.64	-1.35	-0.02	-0.05
Alt 2 (2050)	0.06	1.31	0.28	0.83	0.26	8.19	2.07	0.04	0.04
Change from Existing	-0.05	-0.96	-0.21	-0.43	-2.63	-4.08	-1.22	-0.02	-0.04
Change From No Build	0.00	0.07	0.01	0.06	0.00	0.56	0.13	0.00	0.00
Alt 4 (including Design Option B) (2050)	0.06	1.33	0.28	0.84	0.27	8.35	2.10	0.04	0.05
Change from Existing	-0.05	-0.94	-0.21	-0.42	-2.62	-3.92	-1.91	-0.02	-0.04
Change From No Build	0.00	0.09	0.01	0.07	0.01	0.72	0.16	0.00	0.01

Source: Compiled by LSA Associates, Inc. using CT-EMFAC2014 (2018).
Diesel PM = diesel particulate matter
EMFAC = Emission Factor Model
lbs/day = pounds per day
MSAT = Mobile Source Air Toxics
POM = polycyclic organic matter