2.3.5 Air Quality

2.3.5.1 Regulatory Setting

The Federal Clean Air Act (CAA), as amended, is the primary federal law that governs air quality, while the California Clean Air Act is its companion state law. These laws, and related regulations by the U.S. 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). 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.

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 Federal CAA also applies.

Conformity

The conformity requirement is based on the Federal CAA 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. 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. In California this includes carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and particulate matter (PM) (PM_{10} and $PM_{2.5}$). Regional conformity is based on emission analysis of Regional Transportation Plans (RTP) Federal Transportation Improvement Programs (FTIP) 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 Federal CAA and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization, 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 Federal

CAA. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained.

Project-level conformity is achieved by demonstrating that:

- The project comes from a conforming RTP and FTIP.
- The project has a design concept and scope that has not changed significantly from those in the RTP and FTIP. “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 project that would clearly affect capacity and thus any regional emissions analysis, such as the number of lanes and the length of the project.
- Project analyses have used the latest planning assumptions and U.S. EPA-approved emissions models.
- In PM areas, the project complies with any control measures in the SIP.

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.

2.3.5.2 Affected Environment

The information in this section is based on the *Supplemental Air Quality Report (AQR) for the Interstate 5/El Toro Road Interchange Improvement Project* (Caltrans 2025). The findings of the report are summarized in this section. The methodologies and assumptions for the air quality analysis are described in the Supplemental AQR (Caltrans 2025).

Climate and Meteorological Conditions

The Project site is in southern Orange County in the South Coast Air Basin (SCAB or Basin), an approximately 6,745-square-mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The SCAB includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The terrain and geographical location determine the distinctive climate of the SCAB, which is a coastal plain that has connecting broad valleys and low hills. The topography and climate of Southern California combine to make the SCAB an area of high air pollution potential.

Data from the Laguna Beach climatological station were used to characterize Project vicinity climate conditions because it is nearest to the Project site (Caltrans 2025). The average Project area summer (August and September) high temperature is 79 degrees Fahrenheit (°F), while the average winter (December and January) low temperature is 44°F. Temperature inversions are common, affecting localized pollutant concentrations in the winter and enhancing ozone formation in the summer. Mountains averaging 10,000 feet in altitude tend to trap pollutants in the region by limiting air flow. The average annual rainfall is 2.95 inches.

Attainment Status

Existing air quality conditions in the Project area can be characterized in terms of the ambient air quality standards that the State of California and the federal government have established for several different pollutants. For some pollutants, separate standards have been set for different measurement periods. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as protection of crops, protection of materials, or avoidance of nuisance conditions).

If a pollutant concentration is lower than the state or federal standard, the area is classified as being in attainment for that pollutant. If a pollutant violates the standard, the area is considered a nonattainment area. If data are insufficient to determine whether a pollutant is violating the standard, the area is designated unclassified. The State of California has designated the SCAB as being a nonattainment area for O_3, $PM_{2.5}$, and PM_{10}. U.S. EPA has designated the SCAB as being an extreme nonattainment area for O_3, a moderate nonattainment area for $PM_{2.5}$, and an attainment/maintenance area for PM_{10} and CO. Table 2.3.5-1 shows the state and federal standards and the attainment status of the Project region of the SCAB.

Ambient Air Quality

The monitoring station closest to the Project site is the Mission Viejo Station, approximately 2.5 miles to the east. Figure 2.3.5-1 shows the location of this monitoring station. This station is representative of the Project area because the climate, topography, and urban setting are similar.

Figure 2.3.5-1. Air Quality Monitoring Stations near the Project

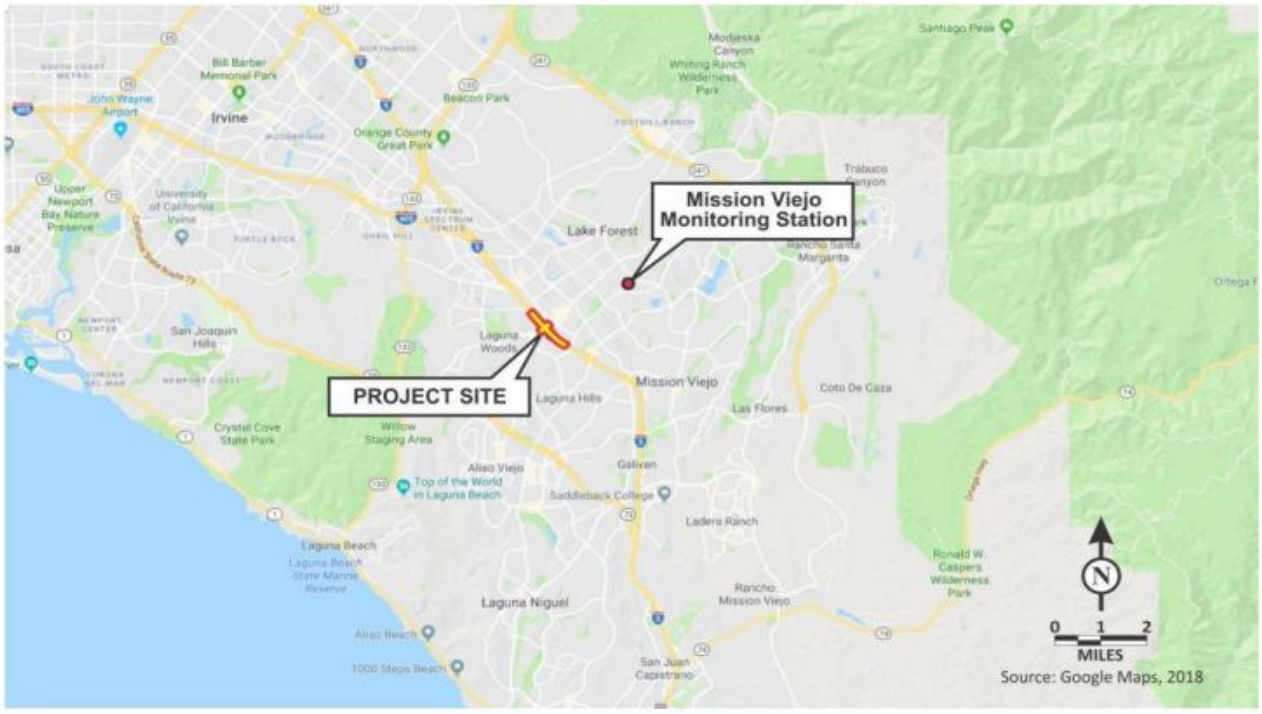

Table 2.3.5-1. State and Federal Criteria Air Pollutant Standards and Attainment Status of the Project Area

Pollutant	Averaging Time	State Standard [a]	Federal Standard [b]	Attainment Status
Ozone (O_3) [c]	1 hour 8 hours	0.09 ppm 0.070 ppm	-- 0.070 ppm (4th highest in 3 years)	Federal: Extreme Nonattainment (1-hour and 8-hour) State: Nonattainment (1-hour and 8-hour)
Carbon Monoxide (CO) [d]	1 hour 8 hours 8 hours (Lake Tahoe)	20 ppm 9.0 ppm 6 ppm	35 ppm 9 ppm --	Federal: Attainment/ Maintenance State: Attainment
Respirable Particulate Matter (PM_{10})	24 hours Annual	50 µg/m^3 20 µg/m^3	150 µg/m^3 (expected number of days above standard < or equal to 1) --	Federal: Attainment/ Maintenance State: Nonattainment
Fine Particulate Matter ($PM_{2.5}$) [e]	24 hours Annual (primary) Annual (secondary)	-- 12 µg/m^3 --	35 µg/m^3 9.0 µg/m^3 15 µg/m^3	Federal: Serious Nonattainment (24 hour and Annual) State: Nonattainment
Nitrogen Dioxide (NO_2)	1 hour Annual	0.18 ppm 0.030 ppm	0.100 ppm [f] (98th percentile over 3 years) 0.053 ppm	Federal: Attainment/ Maintenance (annual) State: Attainment
Sulfur Dioxide (SO_2)	1 hour 3 hours 24 hours Annual	0.25 ppm -- 0.04 ppm --	0.075 ppm [g] (99th percentile, over 3 years) 0.5 ppm [h] 0.14 ppm 0.010 ppm (over 3 years)	Federal: Attainment State: Attainment
Lead (Pb) [i]	Monthly Calendar Quarter 3-month average	1.5 µg/m^3 -- --	-- 1.5 µg/m^3 (for certain areas) 0.15 µg/m^3	Federal: Attainment State: Attainment
Sulfate	24 hours	25 µg/m^3	--	State Only: Attainment
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm	--	State Only: Attainment

Pollutant	Averaging Time	State Standard [a]	Federal Standard [b]	Attainment Status
Visibility-Reducing Particles (VRP) [j]	8 hours	Visibility of 10 miles or more (Tahoe: 30 miles) at relative humidity less than 70%	--	State Only: Attainment
Vinyl Chloride [k]	24 hours	0.01 ppm	--	State Only: Attainment

Source: Caltrans 2025.

µg/m^3 = micrograms per cubic meter; NO_X = nitrogen oxides; ppm = parts per million; ROG = reactive organic gas; ppm = parts per million; SO_X = sulfur oxides; VOC = volatile organic compound.

[a] California standards for O_3, CO (except 8-hour Lake Tahoe), SO_2 (1 and 24 hour), NO_2, and PM (PM_{10}, $PM_{2.5}$, 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.

[b] Federal standards (other than O_3, PM, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The O_3 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 PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, 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 U.S. EPA for further clarification and current national policies.

[c] On October 1, 2015, the national 8-hour O_3 primary and secondary standards were lowered from 0.075 to 0.070 ppm. Transportation conformity applies in newly designated nonattainment areas for the 2015 national 8-hour O_3 primary and secondary standards on and after August 4, 2019 (see https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100UN3X.pdf)

[d] Transportation conformity requirements for CO no longer apply after June 1, 2018 for the following California Carbon Monoxide Maintenance Areas (see https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/co-maintenance-letter-a11y.pdf).

[e] On March 6, 2024, the national annual $PM_{2.5}$ primary standard was lowered from 12 µg/m^3 to 9 µg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[f] Final 1-hour NO_2 National Ambient Air Quality Standards (NAAQS) published in the Federal Register on February 9, 2010, effective March 9, 2010. Initial area designation for California (2012) was attainment/unclassifiable throughout. Project-level hot spot analysis requirements do not currently exist. Near-road monitoring starting in 2013 may cause re-designation to nonattainment in some areas after 2016.

[g] On June 2, 2010, a new 1-hour sulfur dioxide (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 parts per billion. The 1971 SO_2 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.

[h] Secondary standard, the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant rather than health. Conformity and environmental analysis address both primary and secondary NAAQS.

[i] Lead NAAQS are not considered in transportation conformity analysis.

[j] In 1989, the California Air Resources Board (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 Basin standards, respectively.

[k] ARB has identified vinyl chloride and the PM fraction of diesel exhaust as toxic air contaminants. Diesel exhaust PM is part of PM10 and, in larger proportion, PM2.5. Both ARB and U.S. EPA have identified lead and various organic compounds that are precursors to O_3 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.

Table 2.3.5-2 lists air quality trends in data collected at the Mission Viejo monitoring station for the past 5 years, where data were available. During the 2018 to 2022 monitoring period, exceedances were recorded at the monitoring station for the state 1-hour O_3 standard, state and federal 8-hour O_3 standards, and state PM_{10} standard. Refer to Table 2.3.5-2 for the federal and state ambient air quality standards.

Table 2.3.5-2. Ambient Air Quality Monitoring Data Measured at the Mission Viejo Station

Pollutant Standards	2018	2019	2020	2021	2022
1-Hour Ozone					
Maximum 1-hour concentration (ppm)	0.121	0.106	0.171	0.105	0.110
Number of days standard exceeded					
State (> 0.09 ppm)	2	3	20	2	1
8-Hour Ozone					
Maximum 8-hour concentration (ppm)	0.088	0.087	0.122	0.081	0.088
Number of days standard exceeded					
Federal 8-hour (> 0.070 ppm)	9	11	32	8	5
State 8-hour (> 0.070 ppm)	9	11	32	8	6
1-Hour Carbon Monoxide					
Maximum 1-hour concentration (ppm)	1.2	1.0	1.7	1.0	1.2
Number of days standard exceeded					
Federal 1-hour (> 35 ppm)	0	0	0	0	0
State 1-hour (> 20 ppm)	0	0	0	0	0
8-Hour Carbon Monoxide					
Maximum 8-hour concentration (ppm)	0.9	0.8	0.8	0.8	1.0
Number of days standard exceeded					
Federal 8-hour (> 9.0 ppm)	0	0	0	0	0
State 8-hour (> 9 ppm)	0	0	0	0	0
24-hour Particulate Matter (PM10)					
Maximum 24-hour concentration (mg/m^3)	55	45	53	35	31
Number of days standard exceeded					
NAAQS 24-hour (> 150 mg/m^3)	0	0	0	0	0
CAAQS 24-hour (> 50 mg/m^3)	1	0	1	0	0
Annual Particulate Matter (PM10)					
Annual average (mg/m^3)	19.0	16.6	16.8	15.6	15.3
Annual average exceeded?					
CAAQS annual average (> 20 mg/m^3)	NA	NA	NA	NA	NA
24-hour Particulate Matter (PM2.5)					
Maximum 24-hour concentration (mg/m^3)	20.8	20.8	35.0	28.7	NA
Number of days standard exceeded					
NAAQS 24-hour (> 35 mg/m^3)	0	0	0	0	NA

Pollutant Standards	2018	2019	2020	2021	2022
Annual Particulate Matter (PM2.5)					
Annual average (mg/m^3)	8.3	7.1	8.8	8.3	NA
Annual average exceeded?					
NAAQS annual average (> 12 mg/m^3)	NA	NA	NA	NA	NA
CAAQS annual average (> 12.0 mg/m^3)	NA	NA	NA	NA	NA
1-hour Nitrogen Dioxide (NO_2)					
Maximum 1-hour concentration (ppb)	NA	NA	NA	NA	NA
Number of days standard exceeded					
NAAQS 1-hour average (> 100 ppb)	NA	NA	NA	NA	NA
CAAQS 1-hour average (> 180 ppb)	NA	NA	NA	NA	NA
Annual Nitrogen Dioxide (NO_2)					
Maximum annual concentration (ppb)	NA	NA	NA	NA	NA
Annual average exceeded?					
NAAQS annual average (> 53 ppb)	NA	NA	NA	NA	NA
CAAQS annual average (> 30ppb)	NA	NA	NA	NA	NA

Source: Caltrans 2025.
mg/m^3 = micrograms per cubic meter; CAAQS = California Ambient Air Quality Standards; NAAQS = National Ambient Air Quality Standards; NO_2 = nitrogen dioxide; ppb = parts per billion; ppm = parts per million; NA = insufficient data available to determine the value.

Pollutant Overview

Air pollutants are governed by multiple federal and state standards to regulate and mitigate health impacts. At the federal level, there are six criteria pollutants for which NAAQS have been established: CO, lead (Pb), NO_2, O_3, PM ($PM_{2.5}$ and PM_{10}), and sulfur dioxide (SO_2) (see Table 2.3.5-1). U.S. EPA has also identified nine priority mobile source air toxics (MSATs): 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel PM, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter (FHWA 2023). In California, the six federal criteria pollutants are regulated, as well as sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride (see Table 2.3.5-1).

Criteria Pollutants

The Federal CAA requires U.S. EPA to set NAAQS. It also permits states to adopt additional or more protective air quality standards if needed. California has set standards for certain pollutants. Table 2.3.5-3 summarizes the sources and health effects of the six criteria pollutants and additional pollutants regulated in California.

Table 2.3.5-3. State and Federal Criteria Air Pollutant Effects and Sources

Pollutant	Principal Health and Atmospheric Effects	Typical Sources
Ozone (O_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 volatile organic compounds (VOC) may also contribute.	Low-altitude ozone is almost entirely formed from reactive organic gases (ROG)/VOC and nitrogen oxides (NO_X) in the presence of sunlight and heat. Common precursor emitters include motor vehicles and other internal combustion engines, solvent evaporation, boilers, furnaces, and industrial processes.
Carbon Monoxide (CO)	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. Colorless, odorless.	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.
Respirable Particulate Matter (PM_{10})	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 toxic and other 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.
Fine Particulate Matter ($PM_{2.5}$)	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 and photochemical reactions involving other pollutants including NO_X, sulfur oxides (SO_X), ammonia, and ROG.
Nitrogen Dioxide (NO_2)	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain & nitrate contamination of stormwater. Part of the NO_X group of ozone precursors.	Motor vehicles and other mobile or portable engines, especially diesel; refineries; and industrial operations.
Sulfur Dioxide (SO_2)	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.
Lead (Pb)	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 older gasoline use may exist in soils along major roads.

Pollutant	Principal Health and Atmospheric Effects	Typical Sources
Sulfates	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.
Hydrogen Sulfide (H_2S)	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea. Strong odor.	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.
Visibility-Reducing Particles (VRP)	Reduces visibility. Produces haze. NOTE: not directly related to the Regional Haze program under the Federal CAA, which is oriented primarily toward visibility issues in National Parks and other Class I areas. However, some issues and measurement methods are similar.	See particulate matter. May be related more to aerosols than to solid particles.
Vinyl Chloride	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes.

Mobile Source Air Toxics

Controlling air toxic emissions became a national priority with the passage of the CAA Amendments of 1990, whereby Congress mandated that U.S. EPA regulate 188 air toxics, also known as hazardous air pollutants. U.S. EPA has assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of U.S. EPA's Integrated Risk Information System (https://www.epa.gov/iris). In addition, U.S. EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-hazard contributors from the 2011 National Air Toxics Assessment (https://www.epa.gov/national-air-toxics-assessment). These are *1,3-butadiene*, *acetaldehyde*, *acrolein*, *benzene*, *diesel PM*, *ethylbenzene*, *formaldehyde*, *naphthalene*, and *polycyclic organic matter*. While the FHWA considers these the priority MSATs, the list is subject to change and may be adjusted in consideration of future U.S. EPA rules.

The 2007 U.S. EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using U.S. EPA's MOVES3 model, even if vehicle activity (vehicle-miles traveled [VMT]) increases by 31 percent from 2020 to 2060 as forecast, a combined reduction of 76 percent in the total annual emission rate for the priority MSATs is projected for the same time period.

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 ARB 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.

Serpentine may contain chrysotile asbestos, especially near fault zones. Ultramafic rock, a rock closely related to serpentinite, may also contain asbestos minerals. Asbestos can also be associated with other rock types in California, though much less frequently than serpentinite and/or ultramafic rock. Serpentinite and/or ultramafic rock are known to be present in 44 of California's 58 counties. These rocks are particularly abundant in counties of the Sierra Nevada foothills, the Klamath Mountains, and Coast Ranges. The California Department of Conservation, Division of Mines and Geology has developed a map showing the general location of ultramafic rock in the state (www.conservation.ca.gov/cgs/minerals/hazardous_minerals/asbestos/Pages/index.aspx).

2.3.5.3 Environmental Consequences

As discussed in Chapter 1, *Introduction*, two Build Alternatives are being considered for the Project: Build Alternative 1 (Southbound I-5 Hook Ramps) and Build Alternative 3 (TSM/TDM). Build Alternative 1 also includes a design option (Build Alternative 1a) with a new public street at the new southbound I-5/Avenida De La Carlota ramp terminal intersection south of El Toro Road.

Temporary Impacts

Build Alternatives

Build Alternative 1

Construction Conformity

Construction activities will 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 Code of Federal Regulations [CFR] 93.123(c)(5)).

Criteria Pollutant Emissions

During construction, short-term degradation of air quality may occur because of the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and other activities related to construction. Emissions from construction equipment powered by gasoline and diesel engines also are anticipated and would include O_3 precursors—ROG and NO_X—CO, PM_{10}, $PM_{2.5}$, and SO_2. Construction activities may also increase traffic congestion in the area, resulting in increases in emissions from traffic during the delays. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Construction emissions from most highway projects typically fall into two main categories.

- **Fugitive Dust**: A major emission from construction due to ground disturbance. All air districts and the California Health and Safety Code (Sections 41700–41701) prohibit "visible emissions" exceeding 3 minutes in 1 hour—this applies not only to dust but also to engine exhaust. In general, this is interpreted as visible emissions crossing the right-of-way line.

  Sources of fugitive dust include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site may deposit mud on local streets, which could be an additional source of airborne dust after it dries. Dust emissions may vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Dust emissions depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles settle near the source, while fine particles disperse over greater distances from the construction site.

- **Construction Equipment Emissions:** Diesel PM is a California-identified toxic air contaminant, and localized issues may exist if diesel-powered construction equipment is operated near sensitive receptors.

Construction emissions for the Project were estimated using the Caltrans Construction Emissions Tool (CAL-CET2021 version 1.0.4). The maximum number of construction-related emissions during a peak construction day are presented in Table 2.3.5-4 for Build Alternative 1. The emissions estimates are based on the best information available at the time of calculations and specify that the schedules for the Build Alternative that is anticipated to take approximately 2.5 to 3 years beginning in December 2029. Refer to Appendix C of the Supplemental AQR for the model outputs.

Table 2.3.5-4. Build Alternative 1 – Construction Emissions Estimates (pounds per day)

Construction Phase	PM_{10}	$PM_{2.5}$	CO	NO_X	ROG
Land Clearing/Grubbing	12	2	13	14	2
Roadway Excavation	6	3	33	33	5
Structural Excavation	22	3	6	11	2
Base/Subbase/Imported Borrow	10	5	57	53	8

Construction Phase	PM_{10}	$PM_{2.5}$	CO	NO_X	ROG
Structural Concrete	1	1	8	12	2
Paving	3	3	18	43	6
Drainage/Environment/Landscaping	1	1	7	14	2
Traffic Signalization/Signage/Striping/Painting	1	1	9	15	2
Daily Maximum	22	5	57	53	8
SCAQMD Regional Emissions Daily Significance Threshold [a]	150	55	550	100	75

Source: Caltrans 2025.
[a] SCAQMD thresholds are provided for informational purposes only. Caltrans has not adopted and does not recognize SCAQMD thresholds.
CO = carbon monoxide; NO_x = nitrogen oxides; PM = particulate matter; ROG = reactive organic gases; SCAQMD = South Coast Air Quality Management District.

The Project would comply with all applicable construction requirements and standard measures for Caltrans projects related to construction emissions, as specified in Project Features **PF-AQ-1** and **PF-AQ-2**.

PF-AQ-1 The contractor will adhere to Caltrans Standard Specifications for Construction (Section 14-9.02), which 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.

PF-AQ-2 During clearing, grading, earthmoving, or excavation operations, fugitive dust emissions will be controlled by regular watering or other dust preventive measures using the procedures specified in SCAQMD Rule 403.

In addition, the Project would implement avoidance and minimization measures **AQ-1**, **AQ-2**, and **GHG-1** to further reduce construction-related emissions to the extent feasible.

Additional Environmental Analysis

Asbestos

The Project is in Orange County, which is not known to contain serpentine or ultramafic rock, according to the California Department of Conservation, Division of Mines and Geology (2000). During demolition activities, the likelihood of encountering structural asbestos is low due to the nature of the demolished materials (i.e., the material would consist of concrete and metal piping). Therefore, the potential for naturally occurring asbestos (NOA) to be present within the Project limits is considered to be low. Furthermore, prior to the commencement of construction, qualified geologists would further examine the soils and makeup of the existing structure. Should the Project geologist encounter asbestos during the analysis, proper steps will be executed to handle the materials. Therefore, the impact from NOA during Project construction would be minimal to none. In the unlikely event that naturally NOA, serpentine, or ultramafic

rock is discovered, the South Coast Air Quality Management District (SCAQMD) will be notified per 17 California Code of Regulations 93105.

Lead

Pb is normally not an air quality issue for transportation projects unless the project involves disturbance of soils containing high levels of aerially deposited lead (ADL) or painting or modification of structures with lead-based coatings. As discussed in Section 2.3.4.4, *ISA Findings*, due to the age of El Toro Road and I-5, there is potential for ADL to exist in the Project area. Soil sampling for the presence of ADL should be performed in unpaved locations of the construction zone within the Project limits prior to construction activities. Implementation of Measure HAZ-5 would require soils that are contaminated with ADL to be handled, treated, and disposed of properly. Should Build Alternative 1 be selected as the Preferred Alternative, Measure HAZ-5 would require that studies be conducted within the Project disturbance limits to determine whether lead contamination exists. As a result, Build Alternative 1 would not result in adverse impacts related to ADL exposure for construction personnel and the surrounding environment.

Mobile Source Air Toxics

Construction activities associated with the Project would be sporadic, transitory, and short term in nature, and would proceed in segments so that localized impacts would not be concentrated in a given area for a substantial amount of time. Diesel exhaust would be emitted by construction equipment near residences, sometimes in areas adjacent to residences; however, the assessment of cancer risk typically is based on a 30-year exposure period. Because exposure to diesel exhaust would be well below the 30-year exposure period, construction of the Project is not anticipated to result in an elevated cancer risk to exposed persons. Consequently, the estimation of diesel risks associated with construction activities would be expected to show that such risks are trivial for humans. Construction activities would be consistent with all applicable SCAQMD rules, including those related to the permitting and proper maintenance of construction equipment.

Odors

The Project is not expected to be a substantial source of odors. The Project involves reconfiguring the I-15/El Toro Road interchange, and any odors generated by the Project would be similar to odors generated from the existing roadways in the adjacent area. Therefore, the Project is not anticipated to generate substantial odors. Construction of the Project is not expected to create substantial levels of odors in the surrounding area. Exhaust emissions from construction equipment and vehicles and fugitive emissions from construction activities would be tightly controlled. The minor amounts of odors generated by onsite construction activities would be substantially dispersed and diluted to negligible levels in adjacent offsite areas.

Design Variation: Build Alternative 1a

Required construction activity for Build Alternative 1a would be marginally higher than for Build Alternative 1 due to the new roadway associated with Build Alternative 1a. However, the additional construction activity would be negligible compared to the total

construction activity required for the Project. Therefore, the required construction activity for Build Alternative 1 and its design variation (Build Alternative 1a) are considered to be the same. Accordingly, there would be no difference in estimated construction emissions (Table 2.3.5-4) or construction air quality impacts under Build Alternative 1a compared to Build Alternative 1. The same avoidance and minimization measures described above for Build Alternative 1 would also apply to Build Alternative 1a. Refer to the above discussion under *Build Alternative 1*.

Build Alternative 3

Build Alternative 3 includes only technological improvements; no physical or geometric changes would occur. Accordingly, Build Alternative 3 would not result in any temporary construction emissions or construction air quality impacts.

No-Build Alternative

Under the No-Build Alternative, the improvements would not be implemented and there would be no construction-related air quality impacts.

Permanent Impacts

Build Alternatives

Build Alternative 1

Regional Conformity

The Project is exempt from regional (40 CFR Section 93.127) conformity requirements. Separate listing of the Project in the RTP and FTIP, and their regional conformity analyses, is not necessary. The Project will not interfere with timely implementation of Transportation Control Measures identified in the applicable SIP and regional conformity analysis.

The Project is listed in the Southern California Association of Governments' (SCAG) financially constrained 2024–2050 RTP/Sustainable Communities Strategy (SCS) under project number 2M0717, which was adopted by SCAG on April 4, 2024, and FHWA and the FTA made a regional conformity determination finding on May 10, 2024. The Project is also included in the SCAG financially constrained 2025 FTIP, under project number ORA131105. The SCAG 2025 FTIP was determined to conform by FHWA and the FTA on December 16, 2024. See Appendix E, *Air Quality Conformity Documentation*, for copies of the Project listing. The design concept and scope of the Project are consistent with the Project description in the 2024–2050 RTP/SCS, 2025 FTIP, and the "open to traffic" assumptions of the SCAG's regional emissions analysis.

Project Level Conformity

Carbon Monoxide

Caltrans, in coordination with the University of California, Davis, Institute of Transportation Studies, has developed a transportation project-level CO Protocol (Garza et al. 1997). This CO Protocol details a qualitative step-by-step screening procedure to determine whether project-related CO concentrations have a potential to generate new air quality violations, worsen existing violations, or delay attainment of

NAAQS for CO. If the screening procedure reveals that such a potential may exist, then the CO Protocol details a quantitative method to ascertain project-related CO impacts.

The ambient air quality effects of traffic emissions for the Project were evaluated qualitatively according to the CO Protocol. Sections 3 and 4 of the CO Protocol describe the methodology for determining whether a CO hot-spot analysis is required, along with a flowchart that details the steps involved. The following provides a step-by-step explanation of the flowchart. Each level cited is followed by a response, which in turn determines the next applicable level of the flowchart for the Project.

3.1.1: Is the Project exempt from all emissions analyses?

3.1.1 Response: No. The Project is not exempt because it does not fit any of the exemption categories identified in 40 CFR 93.126.

3.1.2: Is the Project exempt from regional emissions analyses?

3.1.2 Response: Yes. Because the Project is an interchange reconfiguration project, it is exempt from regional emission analysis per Table 3 of 40 CFR 93.127.

3.1.9: The conclusion from this series of questions and answers is that the Project needs to be examined for its local air impacts (proceed to Section 4, Figure 3, of the CO Protocol).

Based on the answers to the first flowchart, a second flowchart, Figure 3 of the CO Protocol, is used to determine the level of local CO effect analysis required for the improvement. The questions that are applicable to the Project are in the second flowchart (provided in Appendix D of the Supplemental AQR), and the answers to those questions are as follows.

Level 1: Is the Project in a CO nonattainment area?

Response: No. The Project and its respective air basin are in an attainment/ maintenance area for the federal CO standards (Table 2.3.5-1).

Level 1 (cont.): Was the area redesignated as an attainment area after the 1990 Clean Air Act?

Response: Yes. Orange County was redesignated as an attainment area on June 11, 2007, and the associated maintenance plan will expire in 2027.

Level 1 (cont.): Has "continued attainment" been verified with the local air district, if appropriate?

Response: Yes. Based on ambient air monitoring data collected by SCAQMD, the SCAB has continually met the NAAQS for CO since 2002.

Level 7: Does the Project worsen air quality?

Response: No. Because the Project would not meet any of the criteria discussed below, it would not potentially worsen air quality.

- *The Project substantially increases the percentage of vehicles operating in the cold-start mode. Increasing the number of vehicles in cold-start mode by as little as 2 percent should be considered potentially substantial.*

  The percentage of vehicles operating in cold-start mode is expected to be the same or lower for the segments under study compared to those used for the interchange in the attainment plan. It is assumed that all vehicles within the segments are in a fully warmed-up mode. Therefore, this criterion is not met.

- *The Project substantially increases traffic volumes. Increases in traffic volumes in excess of 5 percent should be considered potentially substantial. Increasing the traffic volume by less than 5 percent may still be potentially substantial if there is also a reduction in average speeds.*

  The Project is a congestion relief project, and the number of the vehicles in the Project segments is projected to be almost the same as the No-Build Alternative scenario (see Appendix B of the Supplemental AQR). Thus, the change in traffic volumes for the Build Alternative scenario would be less than 5 percent compared to the No-Build Alternative. As a result, the Project is not projected to increase the daily traffic volumes within each segment. Therefore, this criterion is not met.

- *The Project worsens traffic flow. For uninterrupted roadway segments, a reduction in average speeds (within a range of 3 to 50 miles per hour) should be regarded as worsening traffic flow. For intersection segments, a reduction in average speed or an increase in average delay should be considered a worsening of traffic flow.*

  When compared to the No Build conditions in 2035, 2050, and 2055, the Build Alternatives would not reduce the average speed or increase the vehicle hours of delay within the Project limits (see Appendix B of the Supplemental AQR). Therefore, this criterion is not met.

This concludes the Caltrans CO flowchart evaluation. Using the levels and criteria in Figure 3 of the CO Protocol, the Project would be considered satisfactory, and no further analysis is needed. The Project is not expected to result in any concentrations exceeding the 1-hour or 8-hour CO NAAQS or California Ambient Air Quality Standards (CAAQS).

Particulate Matter (PM10 and PM2.5)

In October 2021, U.S. EPA issued a guidance document titled *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (U.S. EPA 2021). This guidance details a step-by-step screening procedure to determine whether project-related particulate emissions have a potential to generate new air quality violations, worsen existing violations, or delay attainment of NAAQS for $PM_{2.5}$ or PM_{10}.

Although nearly all projects create particulate emissions during construction, construction activities lasting 5 years or less are considered temporary impacts under the U.S. EPA transportation conformity rule and are exempt from project-level conformity analysis. It is expected that the Project would be constructed in 2.5 to 3 years. As such, this project-level hot-spot analysis is limited to operational impacts.

U.S. EPA specifies in 40 CFR 93.123(b)(1) that only "projects of air quality concern" (POAQC) are required to undergo a $PM_{2.5}$ and PM_{10} hot-spot analysis. U.S. EPA defines *POAQC* as certain highway and transit projects that involve significant levels of diesel traffic or any other project that is identified by the $PM_{2.5}$ SIP as a localized air quality concern.

The U.S. EPA Guidance for PM hot-spot analysis and interagency consultation was used to determine whether the Project is a POAQC. On June 24, 2025, the Transportation Conformity Working Group (TCWG) determined that the Project is not a POAQC. The Project was therefore approved and concurred upon by interagency consultation at the TCWG meeting as a Project not having adverse impacts on air quality, and the Project meets the requirements of the Federal CAA and 40 CFR 93.116. A copy of the TCWG finding is included in Appendix F of the Supplemental AQR.

Criteria Pollutant Emissions

The purpose of the Project is to reduce congestion, improve traffic operations and mobility, reduce freeway ramp queuing, and manage traffic demand. Vehicle emissions were quantified under Baseline Year 2023, Opening Year 2035, RTP Horizon Year 2050, and Design Year 2055 with and without Project conditions using VMT data and emission factors from CT-EMFAC2021. CT-EMFAC2021 only provides emission factors through 2050. Accordingly, emissions for Design Year 2055 conditions were modeled using 2050 emission factors. This approach is conservative because emission factors decline as a function of time due to improvements in vehicle efficiency.

Table 2.3.5-5 summarizes the total modeled emissions for the Baseline Year 2023, Opening Year 2035, RTP Horizon Year 2050, and Design Year 2055. Refer to Appendix D of the Supplemental AQR for the model outputs.

Table 2.3.5-5. Criteria Pollutant Emissions Analysis for I-5/El Toro Road Interchange Project (pounds per day)

Scenario/Analysis Year	PM_{10}	$PM_{2.5}$	CO	NO_X	ROG
Baseline Year 2023	*131*	*28*	*1,418*	*195*	*86*
Opening Year 2035					
No-Build Alternative	134	27	924	94	59
Build Alternative 1a	136	27	926	94	59
RTP Horizon Year 2050					
No-Build Alternative	146	28	850	78	56
Build Alternative 1	146	28	852	78	56

Scenario/Analysis Year	PM_{10}	$PM_{2.5}$	CO	NO_X	ROG
Design Year 2055					
No-Build Alternative	148	29	886	85	61
Build Alternative 1	148	30	888	85	61
Net Emissions Comparison to Existing Conditions					
Opening Year 2035					
No-Build Alternative	3	-1	-494	-101	-28
Build Alternative 1	5	< 1	-492	-101	-27
RTP Horizon Year 2050					
No-Build Alternative	15	< 0	-568	-117	-31
Build Alternative 1	15	< 0	-566	-117	-30
Design Year 2055					
No-Build Alternative	17	2	-532	-110	-25
Build Alternative 1	17	2	-530	-110	-25
SCAQMD Regional Emissions Daily Significance Threshold [a]	150	55	550	55	55
Net Emissions Comparison to No-Build Conditions					
Opening Year 2035					
Build Alternative 1	2	< 1	2	< 1	< 1
RTP Horizon Year 2050					
Build Alternative 1	< 0	< 0	2	< 0	< 1
Design Year 2055					
Build Alternative 1	< 0	1	2	< 0	< 1

Source: Caltrans 2025.
[a] SCAQMD thresholds are provided for informational purposes only. Caltrans has not adopted and does not recognize SCAQMD thresholds.
CO = carbon monoxide; NO_x = nitrous oxide; PM = particulate matter; ROG = reactive organic gases; SCAQMD = South Coast Air Quality Management District.

The emissions analysis presented in Table 2.3.5-5 indicates that operation of Build Alternative 1 is projected to generate approximately the same quantities of emissions as under the No-Build Alternative. Compared to existing conditions, operation of Build Alternative 1 and the No-Build Alternative under all future-year conditions is expected to slightly decrease ROG, NO_X, and CO emissions. Emissions of PM_{10} and $PM_{2.5}$ are expected to be similar to those under existing conditions. Build Alternative 1 is not projected to generate emission quantities that would have a significant effect on air quality compared to existing and No-Build conditions.

Additional Environmental Analysis

Asbestos

Although naturally occurring asbestos is common in certain counties of California, it is not likely to be found in the Project vicinity of Orange County (California Department of Conservation 2000). Because roadway operation would not involve the disturbance of

soils outside the right of way, and no structures containing asbestos would be affected by roadway use, no permanent effects would occur.

Lead

Pb is normally not an air quality issue for transportation projects unless the project involves disturbance of soils containing high levels of ADL or painting or modification of structures with Pb-based coatings. Any existing Pb contamination identified within unpaved portions of the Project's construction zone would be handled, treated, and disposed of properly during construction with implementation of **HAZ-5**. No permanent effects associated with Pb would occur, given that roadway operation is not expected to result in soil disturbance.

Mobile Source Air Toxics

FHWA has issued interim guidance on how MSATs should be addressed in NEPA documents for highway projects and has developed a tiered approach for analyzing MSATs in NEPA documents (FHWA 2023). Depending on the specific project circumstances, one of the following three levels of analysis identified by FHWA should be used.

1. Qualitative analysis for projects with low-potential MSAT effects.
2. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

According to FHWA's Interim Guidance, the Project is classified as a Category 2 project (Projects with Low Potential MSAT Effects). The Project is expected to meet this category because projected annual average daily traffic volumes would not exceed the 140,000 annual average daily traffic criterion established by FHWA for projects considered to have higher potential for MSAT effects. Furthermore, the Project would improve traffic flow without increasing the traffic volumes along I-5.

Even though the Project is classified as Category 2 (low) in terms of potential MSAT effects, a quantitative MSAT emissions analysis and estimates were prepared to allow for a comparison of the Project alternatives. Using the CT-EMFAC2021 model, VMT and travel speed profile data provided were used to estimate Project MSAT emissions. A summary of Design Year 2055 MSAT emissions among Build Alternative 1 and the No-Build Alternative, in comparison to the Baseline Year 2023, is provided in Table 2.3.5-6. Refer to Appendix E of the Supplemental AQR for the model outputs.

Table 2.3.5-6. Comparison of 2023 and 2055 MSAT Emissions (pounds per day)

MSAT Pollutant	Baseline Year 2023	Design Year 2055	
		No-Build	Alternative 1
1,3-butadiene	0.13	0.07	0.07
Acetaldehyde	0.66	0.31	0.31
Acrolein	0.01	0.01	0.01
Benzene	2.37	1.39	1.40

MSAT Pollutant	Baseline Year 2023	Design Year 2055	
		No-Build	Alternative 1
Diesel particulate matter	1.20	0.56	0.55
Ethylbenzene	0.99	0.66	0.66
Formaldehyde	1.49	0.70	0.71
Naphthalene	0.14	0.06	0.06
Polycyclic organic matter	0.04	0.02	0.02

Source: Caltrans 2025.

For Build Alternative 1 and the No-Build Alternative, MSAT emissions in the Build scenario (2055) are projected to be lower than in the Baseline Year 2023. A NEPA document must include a discussion of information that is incomplete or unavailable for a project-specific assessment of MSAT impacts. Air toxics analysis is an emerging field and current scientific techniques, tools, and data are not able to accurately estimate the human health effects that would result from a transportation project in a way that would be useful to decision-makers. Please refer to Appendix F of this Draft EIR/EA for a summary of current studies regarding the health effects of MSATs.

Under Build Alternative 1 and the No-Build Alternative, emissions are projected to be lower than present levels in Design Year 2055 as a result of U.S. EPA's national control programs, which are projected to reduce annual MSAT emissions by over 70 percent from 2020 to 2060. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the U.S. EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

Under Build Alternative 1, there would be localized areas where VMT would increase, and other areas where VMT would decrease. Therefore, it is possible that localized increases and decreases in MSAT emissions may occur. However, even if these increases do occur, they too would be substantially reduced in the future as a result of implementation of U.S. EPA's vehicle and fuel regulations.

Design Variation: Build Alternative 1a

There would be no material difference in traffic conditions or VMT under Build Alternative 1 and its design variation (Build Alternative 1a), as Build Alternative 1a represents a minor design variation of Build Alternative 1 with all other improvements remaining the same. In addition, the Traffic Operations Analysis Report for the Project indicates that any differences in operations would be limited to a single intersection and that VMT changes would be negligible (Caltrans 2026). Accordingly, estimated emissions or operational air quality impacts under Build Alternative 1a would be similar to those under Build Alternative 1 (Table 2.3.5-5 and Table 2.3.5-6). Refer to the above discussion under *Build Alternative 1*.

Build Alternative 3

Build Alternative 3 includes only technological improvements; no physical or geometric changes would occur. Although reductions in delay are expected, the operations at the four intersections would remain the same as existing conditions (Caltrans 2026). Accordingly, Build Alternative 3 would not result in any permanent changes to VMT or permanent operational emissions.

No-Build Alternative

Under the No-Build Alternative, the capacity and condition of the roadways in the Project vicinity would remain the same as current conditions. As shown in Table 2.3.5-5, operational emissions would be comparable to Build Alternative 1. Emissions of most pollutants would decrease under the No-Build Alternative relative to the Baseline Year 2023.

2.3.5.4 Avoidance, Minimization, and/or Mitigation Measures

The following avoidance and minimization measures apply to Build Alternative 1 and its design variation (Build Alternative 1a), which would avoid and/or minimize potential effects related to air quality during implementation of the Project.

AQ-1 To the extent feasible, all construction signal/message boards shall be solar powered.

AQ-2 To the extent feasible, electricity shall be obtained from power poles rather than temporary diesel or gasoline generators.

GHG-1 The Project will incorporate the use of energy-efficient lighting, such as light-emitting diode (LED) traffic signals. LED bulbs—or balls, in the stoplight vernacular—consume less electricity than traditional lights, which will also help reduce the Project's carbon dioxide emissions.