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2.9 Air Quality

2.9.1 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 (CCA) 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) that 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\(_2\)S), 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.

2.9.1.1 Conformity
The conformity requirement is based on FCAA Section 176(c), which prohibits the U.S. Department of Transportation (USDOT) and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to the 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\textsubscript{2}), ozone (O\textsubscript{3}), particulate matter (PM\textsubscript{10} and PM\textsubscript{2.5}), and in some areas (although not in California), sulfur dioxide (SO\textsubscript{2}). California has nonattainment or maintenance areas for all of these transportation-related “criteria pollutants” except SO\textsubscript{2}, and also has a nonattainment area for lead (Pb); however, lead is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on emissions 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), the Federal Highway Administration (FHWA), and the 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 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.
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2.9.2 Affected Environment

2.9.2.1 Climate

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

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

2.9.3 Environmental Consequences

2.9.3.1 Regional Conformity

The currently approved transportation plans and/or programs include the 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and the 2017 Federal Transportation Improvement Program (FTIP). The 2016 RTP/SCS was adopted by the Southern California Association of Governments (SCAG) on April 7, 2016; the FHWA and the FTA approved the 2016 RTP/SCS on June 1, 2016. Also, SCAG received its conformity determination from the FHWA and the FTA indicating that all air quality conformity requirements for the 2016 RTP/SCS have been met. The 2017 FTIP was adopted by SCAG on September 14, 2016, and federally approved on December 16, 2016. The most recent Amendment to the 2017 FTIP is No. 17-14, approved by the FHWA and the FTA in October 2017. The SR-74 Safety Improvements Project is included in the conforming 2017 FTIP in the grouped listing for Safety Improvements – SHOPP Collision Reduction Program (FTIP ID: ORA 0011002). Based on the proposed safety improvement program along SR-74, this project is exempt from conformity requirements according to 40 CFR 93.126.

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2.9.3.2  Project-Level Conformity

**Construction**

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 analyses (40 CFR 93.123(c)(5)).

**Operation**

With respect to project-level conformity and localized emissions, the proposed safety improvement project is exempt from the requirement of conformity determination under 40 CFR 93.126. The proposed project is listed in Table 2 in 40 CFR 93.126 under the subtitle “Safety,” and applicable classifications within that subtitle include “Projects that correct, improve, or eliminate a hazardous location or feature,” “Shoulder improvements,” and “Pavement resurfacing and/or rehabilitation.”

2.9.3.3  Temporary Impacts

**Build Alternative (Preferred Alternative)**

**Construction Emissions**

Under NEPA, construction impacts to air quality are considered temporary and there is no requirement to quantify emissions or ascertain a significance conclusion related to construction-period emissions. This is not the case under the California Environmental Quality Act (CEQA). Therefore, to satisfy CEQA requirements, construction-period emissions are quantified.

During construction of the safety improvement project, short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, filling, grading, hauling, and other activities related to construction. Emissions from construction equipment would include CO, NO\textsubscript{X}, volatile organic compounds (VOCs), directly emitted particulate matter (PM\textsubscript{2.5} and PM\textsubscript{10}), and toxic air contaminants such as diesel exhaust particulate matter.

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\textsubscript{10}, PM\textsubscript{2.5}, CO, SO\textsubscript{2}, NO\textsubscript{X}, and VOCs. Sources of fugitive dust could include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site could
deposit mud on local streets, which could be an additional source of airborne dust after drying. 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, SO$_2$, NO$_X$, VOCs, and some soot particulate (PM$_{2.5}$ and PM$_{10}$) in exhaust emissions. If construction activities increase traffic congestion in the area, CO and other emissions from traffic could increase if non-construction-related vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site. The proposed project would incorporate the following standardized measures and Project Features PF-AQ-1 through PF-AQ-5 to reduce any air quality impacts resulting from construction activities.

**PF-AQ-1  Fugitive Dust Source Controls.** During clearing, grading, earthmoving, and 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) Rules 402 and 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 will 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 so as to prevent excessive amounts of dust.

These control techniques will be indicated in project specifications. Visible dust beyond the property line emanating from the proposed project will be prevented to the maximum extent feasible.
PF-AQ-2  **Ozone Precursor Emission Controls.** 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.

PF-AQ-3  **Prevention of Spills onto Public Streets.** All trucks hauling 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.

PF-AQ-4  **Caltrans Standard Specifications for Construction.** The construction contractor will adhere to the California Department of Transportation (Caltrans) Standard Specifications for Construction (Section 14-9.02).

PF-AQ-5  **Construction Vehicles Prohibition.** All construction vehicles both on- and off-site shall be prohibited from idling in excess of five minutes.

SO₂ 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 (ppm) of sulfur, whereas on-road diesel is restricted to less than 15 ppm of sulfur. However, under California law and ARB regulations, off-road diesel fuel used in California must meet the same sulfur and additional standards as on-road diesel fuel. Accordingly, SO₂ related to diesel exhaust during construction would be minimal.

To determine project construction emissions, the Sacramento Metropolitan Air Quality Management District’s Roadway Construction Emission Model (RoadMod) was used. The maximum amount of construction-related emissions during a peak construction day is presented in Table 2.9.1. The PM₁₀ and PM₂.₅ emissions assume a 50 percent control of fugitive dust as a result of watering and associated dust-control measures. These emissions are based on the best information available at the time of calculations. The proposed project is anticipated to take approximately 23 months to construct beginning in 2021.
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Table 2.9.1 Maximum Build Alternative Construction Emissions (lbs/day)

<table>
<thead>
<tr>
<th>Project Phases</th>
<th>ROG</th>
<th>CO</th>
<th>NOx</th>
<th>Total PM_{10}</th>
<th>Total PM_{2.5}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grubbing/Land Clearing (lbs/day)</td>
<td>1.75</td>
<td>14.24</td>
<td>15.53</td>
<td>5.71</td>
<td>1.66</td>
</tr>
<tr>
<td>Grading/Excavation (lbs/day)</td>
<td>6.66</td>
<td>56.48</td>
<td>66.75</td>
<td>8.22</td>
<td>3.92</td>
</tr>
<tr>
<td>Drainage/Utilities/Sub-Grade (lbs/day)</td>
<td>3.75</td>
<td>35.59</td>
<td>32.94</td>
<td>6.65</td>
<td>2.55</td>
</tr>
<tr>
<td>Paving (lbs/day)</td>
<td>2.01</td>
<td>21.48</td>
<td>17.35</td>
<td>0.97</td>
<td>0.82</td>
</tr>
<tr>
<td>Maximum (lbs/day)</td>
<td>6.66</td>
<td>56.48</td>
<td>66.00</td>
<td>8.22</td>
<td>3.92</td>
</tr>
<tr>
<td>Total (tons/construction project)</td>
<td>1.16</td>
<td>10.31</td>
<td>11.04</td>
<td>1.62</td>
<td>0.71</td>
</tr>
</tbody>
</table>

Source: LSA (December 2017).

CO = carbon monoxide  
lbs/day = pounds per day  
NOx = oxides of nitrogen  
PM_{10} = particulate matter less than 10 microns in size  
PM_{2.5} = particulate matter less than 2.5 microns in size  
ROG = reactive organic gases

The Environmental Stewardship Section of the California Department of Transportation’s (Caltrans) Standard Specifications - Section 14-9.02 Air Pollution Control and Section 14-9.03 Air Monitoring [for fugitive dust control]\(^1\) during construction activities will be adhered to in order to reduce emissions generated by construction equipment activities. Additionally, the SCAQMD has established Rule 403 for reducing fugitive dust emissions. The best available control measures (BACM), as specified in SCAQMD Rule 403, would be incorporated into the proposed project features. With the implementation of standard construction measures (providing 50 percent effectiveness) such as frequent watering (e.g., minimum twice per day), as outlined in PF AQ-1, fugitive dust and exhaust emissions from construction activities would not result in any adverse direct or indirect air quality impacts.

**Naturally Occurring Asbestos**

The proposed project is located in Orange County, which is not among the counties listed as containing serpentine and ultramafic rock. Therefore, the impact from naturally occurring asbestos during project construction would be minimal to none.

With the implementation of the project features, construction air quality emissions would not be adverse.

**Construction Conformity**
Construction activities will not last for more than five 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)).

**No Build Alternative**
As the No Build Alternative would not involve any construction activities, no temporary construction-related air quality impacts would occur.

**2.9.3.4 Permanent Impacts**

**Build Alternative (Preferred Alternative)**

**Long-Term Regional Vehicle Emission Impacts**
Long-term air quality impacts are those associated with motor vehicles operating on the roadway network, predominantly those operating in the vicinity of the proposed project. It is anticipated that the project would improve safety along the SR-74 roadway once the road becomes operational. Because the proposed safety improvement project will not change traffic composition, speed, or volumes, a neutral impact on air quality would occur in the project area.

Also, because the proposed project would not generate new regional vehicular trips, no changes in regional vehicular emissions would occur. The proposed project may have a beneficial effect in helping to reduce congestion and increase safety on the SR-74 roadway in the proposed project vicinity.

**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 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 listed in its Integrated
Risk Information System (IRIS). In addition, the EPA identified the following seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from its 1999 National Air Toxics Assessment (NATA): acrolein, benzene, 1,3-butadiene, DPM plus diesel exhaust organic gases, formaldehyde, naphthalene, and polycyclic organic matter (POM). While the FHWA considers these the priority Mobile Source Air Toxics (MSATs), the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule described above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines.

Based on an FHWA analysis using the EPA’s MOBILE2010b Model, as shown in Figure 2.9-1 below, even if the vehicle miles traveled (VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period. The projected reduction in MSAT emissions would be slightly different in California due to the use of the EMFAC emission model in place of the Motor Vehicle Emission Simulator (MOVES) model.

**Figure 2.9-1 National Annual MSAT Emission Trends 2010–2050**

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

Nonetheless, air toxics concerns continue to be raised regarding highway projects during the NEPA process. Even as the science emerges, the public and other agencies expect environmental analyses to address MSAT impacts. The FHWA, the EPA, the Health Effects Institute, and others have funded and conducted research studies to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field. NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the federal government be interpreted and administered in accordance with its environmental protection goals. NEPA also requires federal agencies to use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment.

**MSAT Analysis Methodology**

For projects that are exempt from conformity requirements under the FCAA pursuant to 40 CFR 93.126, no analysis or discussion of MSATs is required. Project improvements would have no meaningful impacts on traffic volumes, vehicle mix, or any other factor that would cause an increase in emissions impacts relative to the No Build Alternative. Consequently, the proposed project is exempt from analysis for MSATs.

**No Build Alternative**

The No Build Alternative does not include construction of the SR-74 safety improvements. It is expected that the operational emissions would have similar air quality criteria pollutants and MSAT emissions levels in the project area under the No Build Alternative compared to the proposed project alternative.

**2.9.4 Avoidance, Minimization, and/or Mitigation Measures**

With the inclusion of the project features described above in Section 2.9.3.3, the proposed project would not result in adverse temporary air quality impacts, and no avoidance, minimization, and/or mitigation measures are required.
Since the proposed project would not generate any new vehicle trips, but rather provide improved traffic flow throughout the SR-74 corridor, operational effects would remain unchanged.

**Climate Change**
Neither the EPA nor the FHWA has issued explicit guidance or methods to conduct project-level greenhouse gas analysis. The 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 as well as executive orders on climate change, the issue is addressed in Chapter 3, the CEQA chapter of this document. The CEQA analysis may be used to inform the NEPA determination for the project.
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