2.2 Physical Environment

2.2.1 Hydrology and Floodplain

2.2.1.1 Regulatory Setting

Executive Order (EO) 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The Federal Highway Administration (FHWA) requirements for compliance are outlined in 23 Code of Federal Regulations (CFR) 650 Subpart A.

To comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments.
- Risks of the action.
- Impacts on natural and beneficial floodplain values.
- Support of incompatible floodplain development.
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values affected by the Project.

The base floodplain is defined as "the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year." An encroachment is defined as "an action within the limits of the base floodplain."

2.2.1.2 Affected Environment

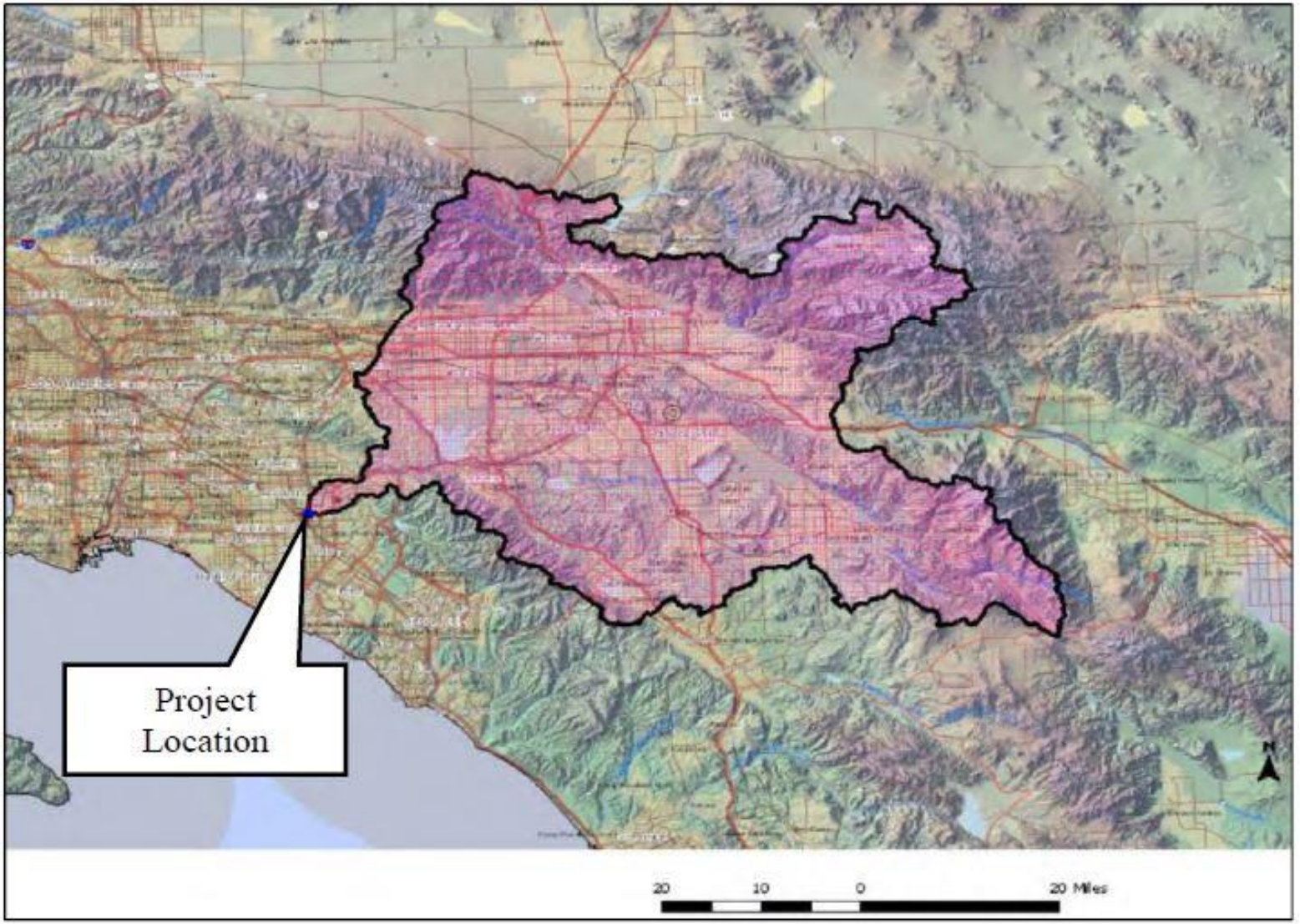
The information presented in this section draws from the Floodplain Evaluation Report (December 2017), the Water Quality Assessment Report (July 2017), the Natural Environment Study (July 2017), the Storm Water Data Report (August 2017), and the Delineation of Waters and Wetlands (Appendix to NES 2018).

Santa Ana River

The project site is an elevated roadway which crosses over the Santa Ana River along a segment of SR 57. The Santa Ana River Floodplain is located in a 2,340 square mile watershed (see **Figure 2-15: Santa Ana River Floodplain Watershed**). The Santa Ana River is a relocated tributary within the watershed, i.e., an excavated flood control facility that conveys storm water and run off from the adjacent land uses and entirety of the watershed.

The river begins in the San Bernardino Mountains, flows southwest past the cities of Anaheim, Orange, and Santa Ana and drains into the Pacific Ocean.

Figure 2-15: Santa Ana River Floodplain Watershed



Source: Santa Ana Watershed Project Authority (SAWPA), Maps 2017. http://www.sawpa.org/collaboration/maps/

The Santa Ana River Bridge, located where the SR 57 crosses over the Santa Ana River, has existing pier wall supports and retaining walls embedded within the unlined channel bed and slopes. Along the sides of the Santa Ana River, the paved Santa Ana River Trail runs along the western slope within the confines of the levees. The area is urbanized with substantial areas of impervious, paved surfaces with little or no vegetation. The River is channelized and has levee slopes grouted with stones to allow water to percolate into underground aquifers.

Precipitation and Flooding

Seasonal rainfall occurs predominantly in the winter months of December through February for this region of Southern California. Precipitation data for the Anaheim region (DWR Weather Station No. 62), located approximately 1 mile east of the Project, reports average annual precipitation within the region is 13.4 inches. As seen in the FIRM map, portions of the Project are located in either Zone A or Zone X of the 100-year floodplain. Zone A is the flood hazard area subject to inundation by the 1 percent annual chance flood event, or the 100-year floodplain. This refers to a 1 percent annual chance of potential flood depth of 1 to 3 feet. The Santa Ana River Bridge is located in Zone A of the Federal Emergency Management Agency (FEMA)'s Flood Insurance Rate Map (FIRM) panel number 06059C0142J (last revised on December 3, 2009). The Stadium OH Bridge is located in Zone X, which is an area of 0.2 percent annual chance of flood, or the 500-year floodplain. This refers to a 1 in 500 annual chance of flooding, which is a relatively low flood hazard.

Natural and Beneficial Floodplain Values

Natural and beneficial floodplain values include, but are not limited to: fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and ground water recharge.

The existing and proposed bridge piers are within the 100-year base floodplain. According to the Santa Ana River Basin Water Quality Control Plan (Santa Ana Regional Water Quality Control Board 2016), the natural and beneficial floodplain values associated with the Santa Ana River segment that includes the Project site are agriculture, groundwater recharge, contact and non-contact recreation, warm freshwater habitat, wild habitat, and rare and endangered species habitat. The natural and beneficial floodplain values are defined for the segment of river that spans from 17th Street in Santa Ana to the Prado Dam. Technical review and survey as part of the preparation of the NES for the project has concluded that no vegetation, agriculture, or wildlife species habitat is present at the site in association with the river within the Project's boundaries. The watershed the Project is located in is highly urbanized with poor ground water recharge potential. The portion of the SAR north of the Project area consist of an unlined channel bottom with permeable sandy and pervious alluvial materials that allow for groundwater recharge; within the Project boundary, the SAR acts as a flood control channel with a lesser role

in groundwater recharge since the SR 57 project area crosses the SAR approximately 1.3 miles downstream from the recharge area.

2.2.1.3 Environmental Consequences

Temporary Impacts

Alternative 1– No Build

Under the No Build Alternative, no changes would be made to the existing environment. Therefore, the No Build would not affect the existing floodplain and hydrology of the area.

Alternative 2 (Preferred Alternative), 2A, 2B – Build Alternatives

Clear water diversion may be necessary during the bridge widening construction so that the water does not interfere with construction. If needed, water diversion would begin upstream of the construction area and be diverted around the construction site and released downstream such that flows exceeding the low flow channel do not affect construction. Dewatering may also occur during construction if cast-in-drilled hole piles were to encounter groundwater. Temporary environmental impacts from construction activities for the proposed Project would be minimized with standard measures such as best management practices, and other activities that meet the requirements of the project's permit conditions. With implementation of these minimization measures, impacts to natural and beneficial floodplains would be minimal.

Permanent Impacts

Alternative 1 – No Build

Under the No Build Alternative, no changes would be made to the existing environment. Therefore, the No Build would not affect the existing floodplain and hydrology of the area.

Alternative 2 (Preferred Alternative), 2A, 2B – Build Alternatives

Encroachment

Significant encroachments is defined by the Federal Highway Administration (FHWA) as any base floodplain development that would involve one or more of the following construction or flood related impacts:

1. Significant potential for interruption or termination of a transportation facility that is needed for emergency vehicles or provides a community's only evacuation route;
2. A significant risk (potential for property loss and hazard to life) and;
3. A significant adverse impact on the natural and beneficial floodplain values would be considered a permanent impact to a flood control channel.

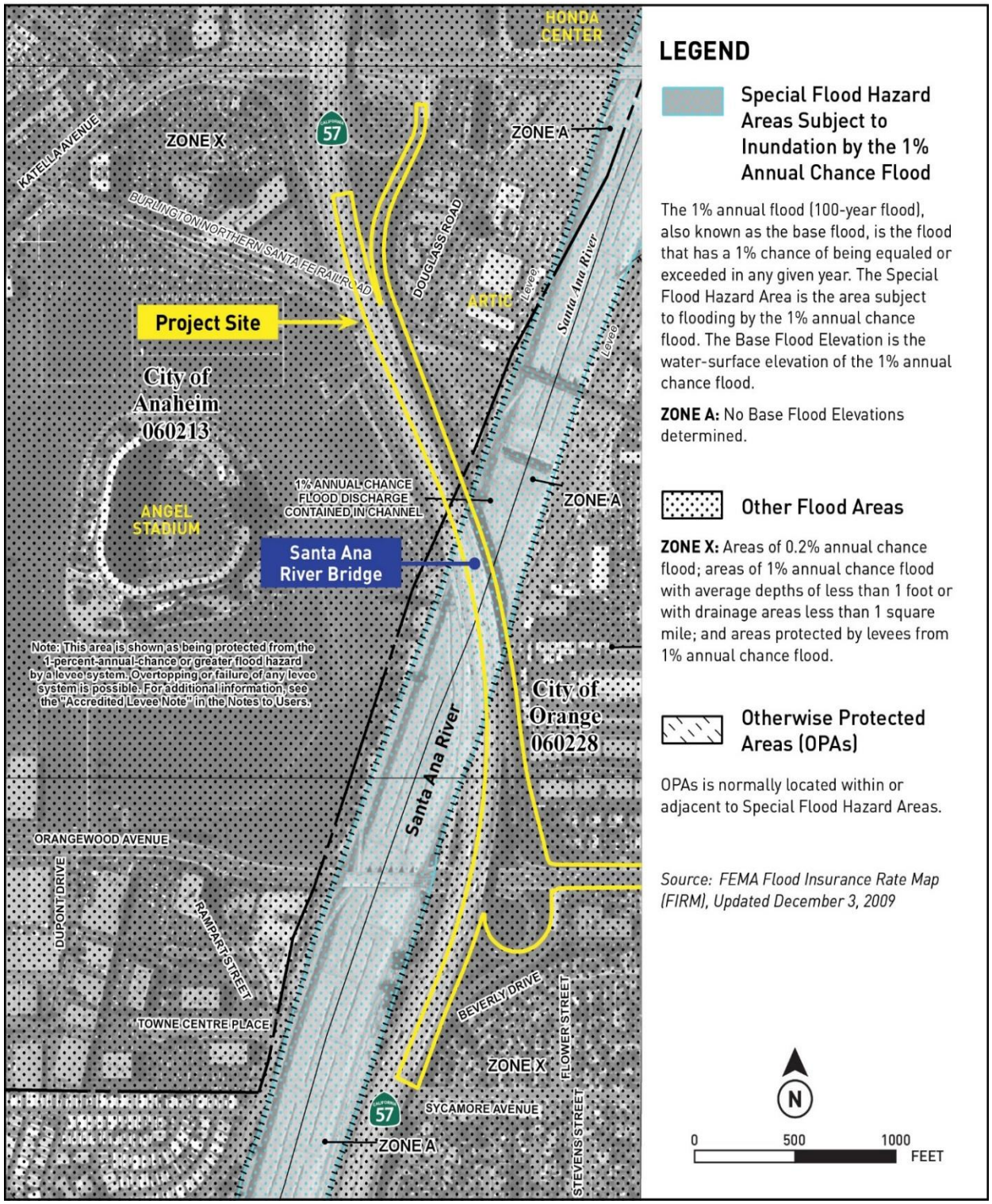
The FIRM (**Figure 2-16: FIRM Map**) shows that the existing bridge and proposed improvements are within the 100-year floodplain. The Project would widen the existing bridge platform to accommodate the proposed improvements. The widening would be along the same alignment as the existing bridge. To support the wider bridge the five existing pier walls beneath the bridge would also have to be widened. The pier walls would have to be extended an additional two feet. Hydraulic modeling was conducted to assess the effect of lengthening the bridge piers on the floodplain.

An existing hydraulic model provided by Orange County Public Works was prepared by the United States Army Corps of Engineers (USACE) for use as the base hydraulic model for the Project. Hydraulic analyses of the existing and proposed conditions used this model to project flow rates for the Santa Ana River portion of the Project for each of the alternatives. Each of the three Build Alternatives are hydraulically identical up to the highest modeled water surface elevation and flow rate. Therefore, modeling was completed for one cumulative scenario. Results showed that the proposed improvements to the Santa Ana River Bridge would raise existing water surface elevation (WSE) less than 0.1ft in. This is not considered a longitudinal encroachment to the base floodplain or an encroachment that is parallel to the direction of the river flow.

The proposed Project would not significantly change the 100-year water surface elevations within the project vicinity; therefore, a Letter of Map Revision (LOMR) is not required. The LOMR is FEMA's modification to an effective FIRM and is based on implementation of physical measures that affect the hydrology of an existing regulatory floodway, received through coordination with FEMA. Regulatory permits and approvals would be required as the Project enters into the final design phase. The Project would not trigger incompatible floodplain development; therefore, the overall risk and adverse impacts with the proposed Project are anticipated to be low.

The increase in WSE is not expected to increase erodibility of the river bed or slopes, increase sediment contribution to the river bed, or pose a risk or interruption of emergency vehicles, life, or property.

Figure 2-16: FIRM Map



Source: FEMA, Flood Insurance Rate Map (FIRM) panel number 06059C0142J 2009.

Natural and Beneficial Floodplain Values

Based on the Project's NES Biological Environmental for all alternatives, there is no vegetation or wildlife species habitat athe the Project site in association with the river. In addition, neither would agricultural value or groundwater recharge potential be impacted by the project due to their absence in the Project boundary.

Environmental impacts that could result from the construction activities could be minimized with standard measures discussed in Section 1.3.1 including but not limited to best management practices, revegetation, establishing a boundary for work around sensitive habitat, implementing erosion control measures, or other requirements that are part of the Project's permit conditions. These standard measures would reduce impacts to floodplain values and aid in the preservation of natural and beneficial floodplain values within the project limits, as well as downstream of the project site.

Therefore, there are no potential adverse effects on any natural and beneficial floodplain values due to the Project's work within the SAR.

2.2.1.4 Avoidance, Minimization, and/or Mitigation Measures

With the implementation of the standard measures described above, the Project will not require additional avoidance, minimization, or mitigation measures.

2.2.2 Water Quality and Storm Water Runoff

2.2.2.1 Regulatory Setting

Federal Requirements

Clean Water Act

In 1972, Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the United States (U.S.) from any point source[8] unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. This act and its amendments are known today as the Clean Water Act (CWA). Congress has amended the act several times. In the 1987 amendments, Congress directed dischargers of storm water from municipal and industrial/construction point sources to comply with the NPDES permit scheme. The following are important CWA sections:

- Sections 303 and 304 require states to issue water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the U.S. to obtain certification from the state

[8] A point source is any discrete conveyance such as a pipe or a man-made ditch.

that the discharge will comply with other provisions of the act. This is most frequently required in tandem with a Section 404 permit request.

- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. Regional Water Quality Control Boards (RWQCB) administer this permitting program in California. Section 402(p) requires permits for discharges of storm water from industrial/construction and municipal separate storm sewer systems (MS4s).
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the United States. This permit program is administered by the USACE.
- Section 408 permitting is triggered when a project proposes to modify, alter, or occupy any existing USACE-constructed facility. For the USACE to approve any proposed alteration requests, it must meet their standards, and must not be injurious to the public interest or affect the USACE project's ability to meet its authorized purpose.

The goal of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

The USACE issues two types of 404 permits: General and Standard permits. There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to allow a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of the USACE's Standard Individual permits. There are two types of Individual permits: Standard permits and Letters of Permission. For Individual permits, the USACE decision to approve is based on compliance with U.S. Environmental Protection Agency's (U.S. EPA) Section 404 (b)(1) Guidelines (40 Code of Federal Regulations [CFR] Part 230), and whether the permit approval is in the public interest. The Section 404(b)(1) Guidelines were developed by EPA in conjunction with USACE and allow the discharge of dredged or fill material into the aquatic system (i.e., waters of the U.S.) only if there is no practicable alternative that would have less adverse effects. The Guidelines state that USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have lesser effects on waters of the U.S. and not have any other significant adverse environmental consequences. According to the Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent[9] standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the U.S. In addition, every permit

[9] The U.S. EPA defines "effluent" as "wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall."

from the USACE, even if not subject to the Section 404(b)(1) Guidelines, must meet general requirements. See 33 CFR 320.4. A discussion of the LEDPA determination, if any, for the document is included in Section 2.3.2, Wetlands and Other Waters.

State Requirements

Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the state. It predates the CWA and regulates discharges to waters of the state. Waters of the state include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined, and this definition is broader than the CWA definition of "pollutant." Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board and Regional Water Quality Control Boards (SWRCB) and Regional Water Quality Control Boards (RWQCBs) are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA and regulating discharges to ensure compliance with the water quality standards. Details about water quality standards in a project area are included in the applicable RWQCB Basin Plan. In California, RWQCBs designate beneficial uses for all water body segments in their jurisdictions and then set criteria necessary to protect these uses. As a result, the water quality standards developed for particular water segments are based on the designated use and vary depending on that use. In addition, the SWRCB identifies waters failing to meet standards for specific pollutants. These waters are then state-listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more constituents and the standards cannot be met through point source or non-point source controls (NPDES permits or WDRs), the CWA requires the establishment of TMDLs. TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

State Water Resources Control Board and Regional Water Quality Control Boards

The SWRCB administers water rights, sets water pollution control policy, and issues water board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, TMDLs, and NPDES permits. (RWQCBs) are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

National Pollutant Discharge Elimination System (NPDES) Program

Municipal Separate Storm Sewer Systems (MS4)

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of storm water discharges, including Municipal Separate Storm Sewer Systems (MS4s). An MS4 is defined as "any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over storm water, that is designed or used for collecting or conveying storm water." The SWRCB has identified the Department as an owner/operator of an MS4 under federal regulations. The Department's MS4 permit covers all Department rights-of-way, properties, facilities, and activities in the state. The SWRCB or the RWQCB issues NPDES permits for five years, and permit requirements remain active until a new permit has been adopted.

The Department's MS4 Permit, Order No. 2012-0011-DWQ (adopted on September 19, 2012 and effective on July 1, 2013), as amended by Order No. 2014-0006-EXEC (effective January 17, 2014), Order No. 2014-0077-DWQ (effective May 20, 2014) and Order No. 2015-0036-EXEC (conformed and effective April 7, 2015) has three basic requirements:

1. The Department must comply with the requirements of the Construction General Permit (see below);
2. The Department must implement a year-round program in all parts of the State to effectively control storm water and non-storm water discharges; and
3. The Department storm water discharges must meet water quality standards through implementation of permanent and temporary (construction) Best Management Practices (BMPs), to the maximum extent practicable, and other measures as the SWRCB determines to be necessary to meet the water quality standards.

To comply with the permit, the Department developed the Statewide Storm Water Management Plan (SWMP) to address storm water pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within the Department for implementing storm water management procedures and practices as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes the minimum procedures and practices the Department uses to reduce pollutants in storm water and non-storm water discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The proposed Project will be programmed to follow the guidelines and procedures outlined in the latest SWMP to address storm water runoff.

Construction General Permit

Construction General Permit, Order No. 2009-0009-DWQ (adopted on September 2, 2009, and effective on July 1, 2010) as amended by Order No. 2010-0014-DWQ (effective February 14, 2011) and Order No. 2012-0006-DWQ (effective on July 17, 2012) regulates storm water discharges from construction sites that result in a Disturbed Soil Area (DSA) of one acre or greater, and/or are smaller sites that are part of a larger common plan of development. By law, all storm water discharges associated with construction activity where clearing, grading, and excavation result in soil disturbance of at least one acre must comply with the provisions of the Construction General Permit. Construction activity that results in soil disturbances of less than one acre is subject to this Construction General Permit if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB. Operators of regulated construction sites are required to develop a Storm Water Pollution Prevention Plan~~s~~ (SWPPP~~s~~); to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the Construction General Permit.

The Construction General Permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and are based on potential erosion and transport to receiving waters. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory storm water runoff pH and turbidity monitoring, and before construction and after construction aquatic biological assessments during specified seasonal windows. For all projects subject to the permit, applicants are required to develop and implement an effective SWPPP. In accordance with the Department's SWMP and Standard Specifications, a Water Pollution Control Program (WPCP) is necessary for projects with DSA less than one acre.

Section 401 Permitting

Under Section 401 of the CWA, any Project requiring a federal license or permit that may result in a discharge to a water of the U.S. must obtain a 401 Certification, which certifies that the Project will be in compliance with state water quality standards. The most common federal permits triggering 401 Certification are CWA Section 404 permits issued by the USACE. The 401 permit certifications are obtained from the appropriate RWQCB, dependent on the Project location, and are required before the USACE issues a 404 permit.

In some cases, the RWQCB may have specific concerns with discharges associated with a Project. As a result, the RWQCB may issue a set of requirements known as Waste Discharge Requirements (WDRs) under the State Water Code (Porter-Cologne Act) that define activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

Regional and Local Requirements

As required by the Porter-Cologne Act, the Santa Ana RWQCB has established water quality objectives (WQOs) for waters within their jurisdiction to protect the beneficial uses of those waters and published them in their Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) (Santa Ana RWQCB, 1995). The Basin Plan also identifies implementation programs to achieve these WQOs and requires monitoring to evaluate the effectiveness of these programs. WQOs must comply with the State anti-degradation policy (State Board Resolution No. 68-16), which is designed to maintain high quality waters while allowing some flexibility if beneficial uses are reasonably affected.

The Project lies within the boundary of the Santa Ana RWQCB, which makes water quality decisions for the region. Its responsibilities include setting standards, issuing waste discharge requirements, determining compliance with those requirements, and taking appropriate enforcement actions.

Basin Plans and Water Quality Objectives

All projects within the Santa Ana region are subject to the requirements of the Santa Ana RWQCB. The Santa Ana RWQCB has prepared the Basin Plan to help preserve and enhance water quality and to protect the beneficial uses of State waters. The Basin Plan designates beneficial uses for surface and ground waters, and it sets qualitative and quantitative objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's anti-degradation policy. The Basin Plan also describes implementation programs to protect the beneficial uses of all waters in the region, as well as surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan (Santa Ana RWQCB, 1995).

Dewatering Activities

Care is required for the removal of nuisance water because of high turbidity and other pollutants resulting from construction activities such as dewatering. The Santa Ana RWQCB's Dewatering Permit is identified as Order No. R8-2015-0004 (NPDES NO. CAG998001). This permit covers General Waste Discharge Requirements for Discharges to Surface Water which Pose an Insignificant (De Minimus) Threat to Water Quality from dewatering activities.

Municipal Storm Water

Section 402(p) of the CWA requires NPDES permits for storm water discharges from municipal separate storm sewer system (storm drains or MS4s) as well as other designated storm water discharges that are considered significant contributors of pollutants to waters of the United States (waters of the US) (Santa Ana RWQCB 2009). The Santa Ana RWQCB has issued a NPDES permit (Order No. R8-2009-0030, NPDES No. CAS618030, as amended by Order No. R8-2010-0062) and the City of Orange and the City of Anaheim are listed as permittees. The purpose of this NPDES permit is to prohibit non-storm water discharges and to reduce pollutants in

discharges to the "maximum extent practicable" to maintain and/or attain WQOs that are protective of beneficial uses of receiving waters. Provisions of this permit requires the implementation of management practices to address storm water runoff quality. The management practices represent the best practicable treatment and control of urban runoff discharges. In general the NPDES permit requires structural controls to infiltrate or treat runoff from specified storm events and recommend or require other non-structural BMPs.

As such the City of Orange and the City of Anaheim are bound to comply with all aspects of the permit requirements for any development within their right of way. For development in areas within the Caltrans right of way, the cities of Orange and Anaheim along with OCTA defer to the Caltrans MS4 permit. Therefore, the NPDES requirements for areas outside of Caltrans right of way in the cities of Anaheim or Orange are not applicable to the Project.

2.2.2.2 Affected Environment

This section discusses the existing water quality of the project site. The primary sources used in the preparation of this section are the *Water Quality Assessment Report* (WQAR) (March 2018) prepared for the Project.

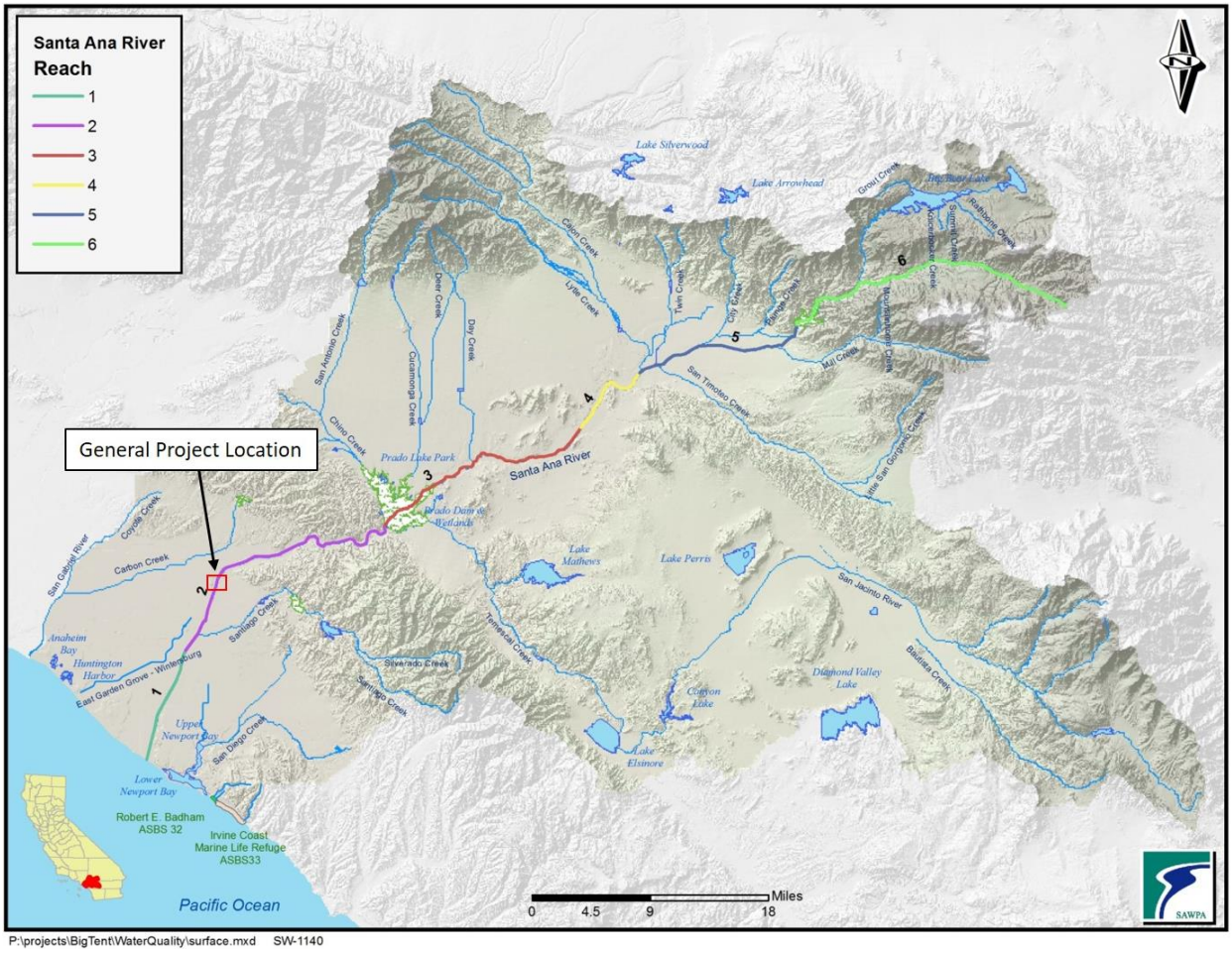
Regional Hydrology

The Project lies entirely within the East Coastal Plain hydrologic sub-area (HSA 801.11) in the Lower Santa Ana River hydrologic area and the Santa Ana River hydrologic unit. The watershed area for the East Coastal Plain HSA is approximately 195,000 acres (Caltrans 2017). Santa Ana River Reach 2 flows southwesterly for approximately 12 miles and empties into the Pacific Ocean near Newport Beach. Flowing over 100 miles from the San Bernardino Mountains to the Pacific Ocean, the Santa Ana River traverses portions of San Bernardino, Riverside and Orange Counties (See **Figure 2-17: Santa Ana River Reaches**). The river drains an area of over 2,700 square miles before flowing into the Pacific Ocean. Hydrology within the Santa Ana River is relatively permanent (i.e., flowing for more than 3 months). Direct and indirect receiving water bodies associated with the Project are identified in **Table 2-36: Direct and Indirect Receiving Water Bodies.**

Table 2-36: Direct and Indirect Receiving Water Bodies

Direct	Santa Ana River Reach 2
Indirect	Santa Ana River Reach 1
	Newport Beach

Figure 2-17: Santa Ana River Reaches



Source: Santa Ana Watershed Project Authority (SAWPA), Maps 2017.
http://www.sawpa.org/collaboration/maps/

Receiving Waters

The project corridor crosses over Reach 2 of the Santa Ana River. At the area where the Project crosses over Santa Ana River Reach 2, the river is conveyed in a trapezoidal channel with a top width of approximately 340 feet and a bottom width of approximately 250 feet. The channel drains and receives storm water flows from seasonal precipitation events as well as from surface water runoff from excess landscape irrigation. Point source discharges associated with commercial and residential developments as well as transportation infrastructure contribute to Reach 2 of the Santa Ana River. The channel is not vegetated or lined. There are no other creeks, streams or river crossings within the project limits. The designated beneficial uses for the Santa Ana River Reach 2 are identified in **Table 2-37: Santa Ana River Reach 2 Beneficial Uses**.

Table 2-37: Santa Ana River Reach 2 Beneficial Uses

Inland Surface Stream	MUN	GWR	AGR	REC1	REC2	WARM	RARE	WILD
Santa Ana River, Reach 2	+	•	•	•	•	•	•	•

• Existing or Potential Beneficial Use
I Intermittent Beneficial Use
+ Excepted from Municipal and Domestic Supply
Beneficial Use Definitions: MUN (Municipal and Domestic Supply); AGR (Agricultural Supply); GWR (Groundwater Recharge); RARE (Rare, Threatened or Endangered Species); REC1 (Water Contact Recreation); REC2 (Non-Contact Water Recreation); WARM (Warm Freshwater Habitat); WILD (Wildlife Habitat).
Source: Water Quality Assesment Report, 2018

Groundwater Resources

The Orange County groundwater basin underlies the northern half of Orange County, covering approximately 310 square miles, bordered by the Coyote and Chino Hills to the north, the Santa Ana Mountains to the northeast, the Pacific Ocean to the southwest, and terminating near the Orange County line to the northwest, where it connects to the Central Basin of Los Angeles. Based on well data from Orange County Water District (OCWD), groundwater levels in the Anaheim area generally range from approximately 20 feet below mean sea level (MSL) at the western limits to approximately 300 feet above MSL along the eastern limits in the Santa Ana River channel area. Based on the SWRCB GeoTracker tool, depth to groundwater at a monitoring well within the project area ranged from 69 feet below ground surface (bgs) to 163 feet bgs; median depth to groundwater was 122 feet for data collected from 1988 – 2016 (SWRCB GeoTracker GAMA 2017).

The Santa Ana River serves as OCWD's main source for groundwater recharge. Approximately 270,000 acre-feet of water is pumped for use each year. Groundwater reserves are maintained by a recharge system, which replaces water pumped from wells. OCGB's facilities have a recharge capacity of about 300,000 acre-feet per year. Approximately two million people depend on this source for more than seventy five percent of their water. Along a six-mile section of the Santa Ana River that belongs to OCWD, a system of diversion structures and recharge basins captures most of the water that would otherwise flow into the Pacific Ocean. The Northbound SR 57 Improvement Project crosses the Santa Ana River approximately 1.3 miles downstream from the OCWD Recharge Basins (Caltrans 2016).

Existing Water Quality

The 2014/2016 Integrated Report includes a combined list of CWA Section 303(d) water bodies that are listed as not meeting water quality standards and Section 305(b) water bodies that identifies water bodies still requiring the development of a TMDL, those that have a completed TMDL approved by the U.S. Environmental Protection Agency, and those that are being addressed by actions other than a TMDL. According to the Final California 2014/2016 Integrated Report, (SWRCB, 2018), Santa Ana River Reach 2, Santa Ana River Reach 1 and Newport

Beach are not listed as impaired and therefore TMDLs have not been established for these indirect receiving water bodies.

As part of runoff and characterization monitoring studies, Caltrans identified pollutants that were discharged from Caltrans facilities with a load or concentration that commonly exceeded allowable standards and were still considered treatable by currently available Caltrans-approved Treatment BMPs. These pollutants, designated as targeted design constituents (TDCs), include sediment; metals (i.e., total and dissolved fractions of zinc, lead, and copper); nitrogen (e.g., ammonia); phosphorus; and general metals.

2.2.2.3 Environmental Consequences

Temporary Impacts

No Build - Alternative 1

No improvements or changes to existing conditions will be made to the project site under the No Build alternative. No impacts to the water quality of Santa Ana River Reach 2 are anticipated under this alternative.

Alternative 2 (Preferred Alternative), 2A, & 2B – Build Alternatives

Construction activities common to all Build Alternatives and that also have the greatest potential to impact water quality would be the work over Santa Ana River Reach 2 and in the Santa Ana River channel. Construction activities include demolition, excavation, extending the bridge deck and piers, slope protection and water diversion. These activities have the potential to result in increased erosion and polluted storm water runoff that could enter Santa Ana River Reach 2, affecting water quality. Diversion activities could constrict the waterway, which could obstruct flood flows, causing flooding, washouts or create an insufficient stream flow to support aquatic species. Water diversion may require the removal of vegetation which could impact wildlife habitats.

Construction materials, waste handling, and the use of construction equipment could result in storm water contamination and affect water quality. Spills or leaks from heavy equipment and machinery can result in oil and grease contamination. Operation of vehicles during construction could result in tracking of dust and debris. Staging areas can also be sources of pollutants because of the use of paints, solvents, cleaning agents, and metals during construction. Pesticide use, including herbicides, fungicides, and rodenticides, associated with site preparation is another potential source of storm water contamination. Larger pollutants, such as trash, debris, and organic matter, are also associated with construction activities. As such, the discharge of storm water may cause or threaten to cause violations of WQOs. These pollutants would occur in both the storm water discharges and non-storm water discharges and could potentially cause chemical degradation and aquatic toxicity in the receiving waters.

Disturbed soils are susceptible to high rates of erosion from wind and rain, resulting in sediment transport via storm water runoff from the project area (See **Table 2-38: Temporary Disturbed Soil Area (DSA) per Build Alternative**. Potential temporary changes associated with sediment transport to receiving water bodies would be a decrease in water clarity, which would cause a decrease in aquatic plant production and obscure sources of food, habitat, refuges, and nesting sites of fish downstream of the section of the river in the project site. The deposition of sediment or silt in a water body can fill gravel spaces in stream bottoms, smothering fish eggs and juvenile fish. Construction of the Build Alternatives has the potential to cause temporary changes to normal ambient temperature and dissolved oxygen levels of receiving water bodies by contributing pollutants to receiving water bodies. Pollutants include sediment and silt, associated with soil disturbance and chemical pollutants associated with construction materials that are used on the project site with the potential to discharge offsite into the aquatic environment.

Table 2-38: Temporary Disturbed Soil Area (DSA) per Build Alternative

Alternative	2	2A	2B
Area Disturbed (in acres)	9.4	9.6	8.7

Source: Natural Environment Study (NES) 2018

Where removal of groundwater from excavation may be required when working in the channel to widen the bridge abutments or for the driven piles for the separate bridge structure at Katella Avenue, it is possible that dewatering activities could result in the release of high levels of fine sediment if discharged directly to the environment. Water diversion activities would also have the potential to impact water quality, especially during installation and removal of the diversion system. The 2014/2016 Integrated Report includes a combined list of CWA Section 303(d) water bodies that are listed as not meeting water quality standards and Section 305(b) water bodies that identifies water bodies still requiring the development of a TMDL, those that have a completed TMDL approved by the U.S. Environmental Protection Agency, and those that are being addressed by actions other than a TMDL. According to the Final California 2014/2016 Integrated Report, (SWRCB, 2018), Santa Ana River Reach 2, Santa Ana River Reach 1 and Newport Beach are not listed as impaired and therefore TMDLs have not been established for these indirect receiving water bodies.

If dewatering is expected for the preferred alternative, the Project will fully conform to the requirements specified in Order No. R8-2015-0004, NPDES No. CAG998001, General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant (De Minimis) Threat to Water Quality. This NPDES permit covers construction site dewatering and stream diversions that this Project will potentially implement. Project Feature PF-WQ-4 would minimize any temporary impact due to the discharge of groundwater to surface water.

PF-WQ-4 **Construction Site Dewatering.** If dewatering is expected for the preferred alternative, the Project shall fully conform to the requirements specified in Order No, R8-20015-0004, General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant (De Minimus) Threat to Water Quality. This NPDES permit is applicable to construction dewatering waste and dewatering waste from subterranean seepage.

During the construction phase, the Northbound SR 57 Improvement Project would be required to comply with the requirements of the NPDES Permit for Construction Activities, Order No. 2009-0009-DWQ, NPDES General Permit No. CAS000002, as well as implementation of the BMPs specified in Caltrans' SWMP (Caltrans 2016b). Construction site BMPs would be implemented to treat storm water and non-storm water discharges to the maximum extent practicable and therefore runoff from the construction area would not likely create any surface water quality impacts.

The Project would also be required to prepare and implement an acceptable Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall contain BMPs that have demonstrated effectiveness at reducing storm water pollution. The SWPPP shall address all construction-related activities, equipment, and materials that have the potential to affect water quality. All Construction Site BMPs would follow the latest edition of the Storm Water Quality Handbooks, Construction Site BMPs Manual to control and minimize the impacts of construction-related pollutants. The SWPPP would include BMPs to control pollutants, sediment from erosion, storm water runoff, and other construction-related impacts. In addition, the SWPPP shall include implementation of specific storm water effluent monitoring requirements based on the project's risk level to ensure that the implemented BMPs are effective in preventing discharges from exceeding any of the water quality standards. Project Features PF-WQ-2 and PF-WQ-3 would minimize any temporary impacts to receiving waters.

PF-WQ-2 **Implement Temporary Construction Site BMPs.** The Northbound SR 57 Improvement Project would be required to comply with the requirements of the NPDES Permit for Construction Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002, as well as implementation of the BMPs specified in Caltrans' Storm Water Management Plan (Caltrans 2016b).

PF-WQ-3 **Prepare and Implement a Storm Water Pollution Prevention Plan.** The Project would be required to prepare and implement an acceptable SWPPP. The SWPPP shall contain BMPs that have demonstrated effectiveness at reducing storm water pollution. The SWPPP shall address all construction-related activities, equipment, and materials that have the potential to affect water quality. All Construction Site BMPs would follow the latest edition of the Storm Water Quality Handbooks, Construction Site BMPs Manual to control and minimize the impacts of construction-related pollutants. The SWPPP shall include BMPs to control pollutants, sediment from erosion, storm water runoff, and other construction-

related impacts. In addition, the SWPPP shall include implementation of specific storm water effluent monitoring requirements based on the Project's risk level to ensure that the implemented BMPs are effective in preventing discharges from exceeding any of the water quality standards.

Permanent Impacts

Alternative 1 – No Build

No improvements or changes to existing conditions will be made to the project site under the No Build alternative. No impacts to the water quality of Santa Ana River Reach 2 are anticipated under this alternative.

Alternative 2 (Preferred Alternative), 2A, 2B – Build Alternatives

Construction of highway widening projects generally impact existing drainage areas and streams in a watershed by altering the natural flow patterns through the addition of impervious surface area and variations in contributing drainage area. The additional impervious area created by the Project may result in impacts to the existing hydrograph, including increases in low flow and peak flow, velocity, and volume to Santa Ana River Reach 2. Alternative 2A would have the largest increase in new impervious surface area (3.7 acre) as it would retain the westbound on-ramp to northbound SR 57. In addition, alternative 2A will also replace an area of 2.2 acres of existing pavement.

All Build Alternatives would be designed to preserve existing surface drainage at each offsite discharge location. Modifications to existing drainage features and new drainage improvements would be required to collect and convey the runoff generated by the proposed widening for a total of 5.9 acres of impervious surface. Therefore, change associated with circulation or drainage patterns are anticipated to be low.

The increase in impervious surface would not interfere with groundwater recharge given that the Santa Ana River provides approximately 70 percent of the total groundwater recharge for the basin and the increase represents less than 1 percent increase within the HSA. (See **Table 2-39: Impervious Surface Addition to the East Coastal Plain Hydrologic Sub-Area (HSA) within Project Limits**.

Table 2-39: Impervious Surface Addition to the East Coastal Plain Hydrologic Sub-Area (HSA) within Project Limits

Alternatives	Existing Surface (Acres)	Proposed Impervious Surface Increase (Acres)	Proposed % Increase to HSA
Total HSA Existing	194,575	--	--
Alternative 2A	--	3.7	<1

Source: Water Quality Assessment Report, 2018.

Potential pollutants associated with the operation of transportation facilities include: sediment from natural erosion; nutrients, such as phosphorus and nitrogen, associated with replace-in-kind landscaping associated with removal/reconfiguration of on-ramps at Orangewood; mineralized organic matter in soils; nitrite discharges from automobile exhausts and atmospheric fallout; litter; and metals from the combustion of fossil fuels, the wearing of brake pads, and corrosion of galvanized metal. These pollutants would occur in both the storm water discharges and non-storm water discharges and could potentially cause chemical degradation and aquatic toxicity in the receiving waters. Sediment yield from the road would be negligible during operations because disturbed areas after construction would be paved. Some incremental effect on turbidity at the discharge location and in the downstream receiving waters may also occur due to sediment discharges. The implementation of appropriate BMPs to treat TDCs, should adequately address any potential permanent water quality impacts to groundwater and surface water. The proposed Project would not permanently alter the alignment of a stream or the configuration of a water body.

Treatment BMPs are permanent measures that improve storm water quality after construction is complete. The Treatment BMP strategy for the Project would first evaluate the possibility of infiltrating the Net New Impervious (NNI) area by using Design Pollution Prevention (DPP) Infiltration Areas (IA) located within existing state right of way. DPP IAs are used to maximize infiltration of storm water runoff without the need of constructing a traditional Treatment BMP (Infiltration Basin, Biofiltration Swale, Detention Basin, etc.). The Caltrans Infiltration Tool would also be utilized to determine the approximate amount of the water quality volume that could be infiltrated with the use of soil amendments. Treatment BMPs implemented for the Project would comply with the Caltrans NPDES Storm Water Permit (Order No. 2012-0011-DWQ, NPDES No. CAS000003). The implementation of Treatment BMPs and/or natural IAs would be considered a water quality benefit given that there are no existing Treatment BMPs within the Project area. By complying with SWMP requirements, the proposed Project is not anticipated to contribute to violations of water quality standards or objectives. Project Features PF-WQ-1 and PF-WQ-5 would minimize any permanent impacts to water quality.

PF-WQ-1 Implement Storm Water Treatment BMPs. The Northbound SR 57 Improvement Project would be required to conform to the requirements of the Caltrans Statewide NPDES Storm Water Permit, Order No. 2012-0011-DWQ, NPDES No. CAS000003, adopted by the SWRCB on September 19, 2012, and any subsequent permit in effect at the time of construction. The Caltrans Statewide Permit requires the implementation of Treatment BMPs to minimize potential water quality and hydrological impacts associated with operation of the Project.

PF-WQ-5 Implement Design Pollution Prevention BMPs. As specified in Caltrans' Storm Water Management Plan (Caltrans 2016a), the Northbound SR 57 Improvement Project would be required to incorporate Design Pollution Prevention BMPs which prevent erosion and promote infiltration.

2.2.2.4 Avoidance, Minimization, and/or Mitigation Measures

The Project will incorporate project features and standardized measures that include temporary and permanent BMPs as outlined above. With the implementation of these project features, no adverse impacts to water quality would occur. No avoidance, minimization, and/or mitigation measures are required.

2.2.3 Geology/Soil/Seismicity/Topography

2.2.3.1 Regulatory Setting

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects "outstanding examples of major geological features." Topographic and geologic features are also protected under the California Environmental Quality Act (CEQA).

This section also discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. Structures are designed using the Department's Seismic Design Criteria (SDC). The SDC provides the minimum seismic requirements for highway bridges designed in California. A bridge's category and classification will determine its seismic performance level and which methods are used for estimating the seismic demands and structural capabilities. Further, the structures are designed in general accordance with the design guideliens set in the California Amendments (to the AASHTO LRFD Bridge Design Specifications – Fourth Edition). For more information, please see the Department's Division of Engineering Services, Office of Earthquake Engineering, Seismic Design Criteria.

2.2.3.2 Affected Environment

Sources used in the preparation of this section include the City of Anaheim General Plan (May 2004), Preliminary Geotechnical Design Report for Earth Retaining Systems (June 2017), Preliminary Materials Report (July 2017), the City of Orange General Plan (March 2010), the Paleontological Identification Report (May 2018), the Historic Property Survey Report (May 2018), and the District Preliminary Geotechnical Report (July 2017).

The information provided in this section is also based on review of available regional geologic maps and as-built log of test borings (LOTBs), existing subsurface and groundwater data in the project vicinity, and discussions with the Project Design Team (PDT).

Topography

The project site is located on the Tustin Plain, a broad coastal plain in Orange County, California. It is bounded by the Puente and Coyote Hills, Santa Ana Mountains, San Joaquin Hills, and Pacific Ocean. Orange County is part of the coastal section of the Peninsular Range Geomorphic Province, which is characterized by elongated northwest-trending mountain ridges separated by sediment-floored valleys. Faults branching off from the San Andreas Fault to the east create the local mountains and hills. The Peninsular Ranges Geomorphic Province is located in the southwestern corner of California and is bounded by the Transverse Ranges Geomorphic Province to the north and the Colorado Desert Geomorphic Province to the east. From the project corridor, the San Bernardino Mountains and the Saddleback formation are visible in the background of views under fair local climatic conditions (i.e. lack of haze, clouds, smog). The local topography of the site also characterizes the project site to have a low landslide and rockfall potential.

Geology and Soils

The project site lies on subsurface soils mapped as young alluvial fan deposits, characterized as lenses of mixtures of silt, sand, clay, and gravel associated with the Santa Ana River channel and floodplain deposits. Due to the urbanized nature of the area the project site lies within, artificial fill is also present in most of the areas to be excavated. Soils found in the project site are considered permeable and may potentially fall into the Natural Resources Conservation Service (NRCS) hydrologic soil group (HSG) A. This soil order includes Alfisols, Andisols, and Aridisols, which are known to be clay enriched, poorly sorted, and dry, respectively. Based on corrosion test results, the on-site soils site can be considered to be non-corrosive to structural elements in accordance with the Caltrans corrosion guidelines.

A majority of the subsurface soils encountered are classified as coarse-grained soils and, therefore, are not anticipated to have potential for expansion. Soil sampling and laboratory testing will be required during final design to confirm expansion, swell, and collapse potential.

The embankment slopes near the Santa Ana River appear stable with no evidence of local slope failure or soil erosion during site reconnaissance. However, the slopes fronting the Santa Ana River Bridge Abutments were observed to have evidence of erosion since they are not paved.

The exhumed Mesozoic metamorphic basement rocks near the project site are approximately 12,000 feet below the ground surface (bgs) and are overlain by approximately 5,000 feet of Late Cretaceous and Tertiary marine sedimentary rocks, which are overlain by approximately 7,000 feet of Late Tertiary to Quaternary marine and terrestrial deposits (District Preliminary Geotechnical Report, DPGR, 2017).

According to the Anaheim General Plan's "Green Element" chapter, the City identifies three zones in its jurisdiction with a high potential for significant mineral deposits. These zones do not

fall in or near the project site. The City of Orange General Plan does not identify mineral resources located in the project area, and therefore, they are assumed to be nonexistent.

Surface and Ground Water

The surface water drainage in the project area was controlled by storm drains along the NB SR-57 shoulder. The Santa Ana River serves as the local drainage/flood control channel for the project area and adjacent areas. The Santa Ana River bottom is unlined within the project limit, but the levee slopes are grouted with stones (DPGR, 2017). Historically, the highest groundwater level near the project site has been reported as high was 20 feet below ground surface (bgs), which corresponds to an elevation range of 130 to 140 feet.

Seismic Hazards and Faults

The Project is located in the seismically active region of Southern California; however, it is not located within an Alquist-Priolo Earthquake Fault Zone (APEFZ) (i.e. is not on or near the surface traces of active faults). Therefore, potential for surface rupture is considered low. The project area is not within a designated landslide hazard zone mapped by the California Geological Survey (CGS) which decreases the chances of landslides triggered by an earthquake.

During a seismic event, liquefaction is generally the main cause of damage to buildings and infrastructure. Liquefaction is a seismically induced form of ground failure caused by soils that are loosely compacted and are saturated, such as those soils overlaying shallow groundwater. Groundwater levels have been reported during boring tests by USGS in the project area, and provide insight to potential seismic ground failure based on water table heights and presence. The project site includes areas located within a designated liquefaction hazard zone mapped by CGS. In these areas, loose to medium-dense sands are present below groundwater and could result in liquefaction during a seismic event.

The Puente Hills and Upper Elysian Park are two blind thrust faults underlying the northern Los Angeles Basin that may cause ground shaking in the project vicinity in the event of seismic ground movement. The San Joaquin Hills blind thrust fault is also located on the south end of the Los Angeles Basin. The Elsinore fault to the northeast and Newport-Inglewood fault system located to the southwest are the two-major strike-slip faults in the area that accommodate the northwestward motion of the Pacific Plate relative to the North American Plate. Seismic activity from nearby and distant faults may cause those in the City of Anaheim to experience strong ground motion in the event of an earthquake. Active fault zones lie outside of the City of Anaheim, and the site could be subjected to strong ground motion.

2.2.3.3 Environmental Consequences

Temporary Impacts

Alternative 1- No Build

Under the No Build Alternative, no changes are anticipated to be made to the existing environment in association with the Project. Therefore, no impacts or changes to existing geologic or seismic conditions are anticipated. The area would still be vulnerable to future seismic hazards due to its location in the seismically active region of Southern California.

Alternative 2 (Preferred Alternative), 2A, & 2B – Build Alternatives

All Build Alternatives cover similar geologies, topographies, and soils along the project site. All of the Build Alternatives would be exposed to similar ground disturbing activities along the project corridor, and therefore, environmental consequences would be similar in nature.

A common design feature for all of the Build Alternatives is the widening of the Santa Ana River Bridge, which requires construction on the piers in the riverbed. To minimize potential erosion and safety hazards such as soil and slope instability to workers working in the Santa Ana Riverbed, dewatering (removal of groundwater prior to excavation) may be necessary. Construction activities within the Santa Ana River cannot be restricted to a give season due to on-going water management activities; however, precautions would be in place in case of groundwater fluctuations. Seasonal groundwater recharge from the Santa Ana River may also cause temporary localized perched groundwater near the river channel portion of the project site.

Proposed retaining walls near the Santa Ana River levee would be checked for potential slope instabilities (if any). Ground stability improvement techniques such as deep soil mixing and/or jet grouting can be considered to mitigate foundation settlements resulting from liquefaction and associated ground movements. The Santa Ana River pier foundation caps need to be designed with consideration of the river's hydraulics and the potential settlement resulting from the weight of the bridge, dewatering and liquefaction. Along other portions of the project site outside of the Santa Ana River work, dewatering would most likely not be necessary and therefore, dewatering induced settlement may not be an issue.

Excavation and ground disturbing activities are projected to be at a depth of less than 5 feet for freeway embankments and slopes and approximately 10 to 12 feet for the construction of the pier walls in the Santa Ana River. The stability of soils and geology of the project site are not expected to be impacted significantly by these activities. Construction activities, such as grading and trenching, would temporarily displace soils and increase the potential for erosion. Erosion control measures to manage soil stability can be found in the Water Quality and Storm Water section of this report. The Project will be constructed and designed in accordance with Caltrans Standard Specifications 19 regarding avoidance of damaging groundwater utilities or structures during excavations associated with the project constructions. In areas where compacted fill will

be placed, the soil, dry or saturated soil, and otherwise unsuitable materials, will be removed prior to fill placement. Fill placed on sloping ground will be properly keyed and benched into existing ground and placed as specified in the Caltrans Standard Specifications.

Permanent Impacts

Alternative 1 – No Build

Under the No Build Alternative, no changes are anticipated to be made to the existing environment in association with the Project. Therefore, no impacts or changes to existing geologic or seismic conditions are anticipated. The area would still be vulnerable to future seismic hazards due to its location in the seismically active region of Southern California.

Alternative 2 (Preferred Alternative), 2A, 2B – Build Alternatives

Since the site is not located in the APEFZ, there is a low possibility of surface rupture at the project site in the event of seismic activity. The structures have been designed with the CBC's earthquake design standards for increased safety and ground stability. Impacts associated with landslides or mudslides are not anticipated. There is a potential for coarse grained soils below groundwater to experience liquefaction during a seismic event. Due to seasonal variances in ground water level, the potential for liquefaction in the event of a seismic hazard would be a potential hazard since the site is located in a liquefaction zone. With the implementation of GEO-1, adverse impacts to liquefaction during a seismic event would be minimized.

Due to the sloped embankments for the proposed bridges, improving the northbound SR 57 by widening the ramps will require the construction of retaining walls to avoid erosion of the slopes and decrease the risk of infrastructure loss by ground instability or through a seismic hazard. Design of the proposed bridge structures are based on Caltrans seismic design procedures, which are designed to withstand a high level of seismic ground shaking. Since mineral resources are not identified in the project area by any local general, specific, or land use plan, it is assumed to be nonexistent and the Project will not result in a loss of a known mineral resources that would be of value to the region.

Design of the Project will be based on site specific studies including exploratory borings in the project area to investigate site-specific soils and conditions. Samples of subsurface soils will be collected for laboratory testing. During final design, appropriate foundation types and depths will be designated (including foundation modifications for existing structures) so that ground movements will not adversely affect structural elements of the Project.

2.2.3.4 Avoidance, Minimization, and/or Mitigation Measures

OCTA and Caltrans have voluntarily elected to impose the following measure to evaluate the risk associated with liquefaction during a seismic event:

GEO – 1: Seismic Induced Liquefaction: Subsurface investigations will be performed at the beginning of the PS&E phase to determine the effects of seismically induced liquefaction on the bridge structures, the extent of the risk and whether additional retrofit strategies will be required.

No additional avoidance, minimization, and/or mitigation measures are required.

2.2.4 Paleontology

2.2.4.1 Regulatory Setting

Paleontology is a natural science focused on the study of ancient animal and plant life as it is preserved in the geologic record as fossils.

A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized Projects.

- 16 United States Code (USC) 431-433 (the "Antiquities Act") prohibits appropriating, excavating, injuring, or destroying any object of antiquity situated on federal land without the permission of the Secretary of the Department of Government having jurisdiction over the land. Fossils are considered "objects of antiquity" by the Bureau of Land Management, the National Park Service, the Forest Service, and other federal agencies.
- 16 USC 461-467 established the National Natural Landmarks (NNL) program. Under this program property owners agree to protect biological and geological resources such as paleontological features. Federal agencies and their agents must consider the existence and location of designated NNLs, and of areas found to meet the criteria for national significance, in assessing the effects of their activities on the environment under NEPA.
- 16 USC 470aaa (the Paleontological Resources Preservation Act) prohibits the excavation, removal, or damage of any paleontological resources located on federal land under the jurisdiction of the Secretaries of the Interior or Agriculture without first obtaining an appropriate permit. The statute establishes criminal and civil penalties for fossil theft and vandalism on federal lands.
- 23 USC 1.9(a) requires that the use of Federal-aid funds must be in conformity with all federal and state laws.
- 23 USC 305 authorizes the appropriation and use of federal highway funds for paleontological salvage as necessary by the highway department of any state, in compliance with 16 USC 431-433 above and state law.

Under California law, paleontological resources are protected by the California Environmental Quality Act (CEQA).

2.2.4.2 Affected Environment

The primary source used in the preparation of this section is the *Paleontological Identification Report* (PIR) (May 2018).

Project Study Area

The project site is an elevated highway along an approximately 1-mile long corridor that is bounded by Katella Ave to the north and Sycamore Ave to the South, with intersections with Douglass Road, and Orangewood Avenue.

The project study area is located in sections 24 and 25 of Township 4 South, Range 10 West of the Anaheim United States Geological Service 7.5' topographic map.

Stratigraphy

The Project is mapped as late Holocene (less than 3,000 years old) very young wash deposits and Holocene to late Pleistocene (modern to 126,000-year-old) young alluvial fans. Although not appearing on Morton and Miller's (2006) geological map, modern artificial fill is common in previously developed areas.

Methodology

For paleontological resources, a reconnaissance survey was conducted for the project's environmental assessment phase. The purpose is to confirm that field observations conform to the geological maps of the project area. Sediments are assessed for their potential to contain fossils. Additionally, if there are known paleontological resources the survey will verify the exact location of those resources, the condition or integrity of each resource, and the proximity of the resource to the project area. All undeveloped ground surface areas within the ground disturbance portion of the project area are examined. Existing ground disturbances (e.g., cutbanks, ditches, animal burrows, etc.) are visually inspected. Photographs of the project area, including ground surface visibility and items of interest, are taken with a digital camera. Overall ground visibility ranged from 0% to 100% due to existing hardscaping and plant coverage. As such, much of the study area could not be surveyed. The visible sediments were primarily artificial fill, late Holocene wash sands in the Santa Ana River, and the surficial sediments of the Holocene to late Pleistocene young alluvial fans. No culverts or other cuts extended more than a couple of feet below the surface of the Holocene to late Pleistocene young alluvial fans. No fossils were encountered during the survey. Only two localities were identified in the records search in late Pleistocene alluvium within 5 miles of the Project and both proved to be modern vertebrates (LACM specimens). On this basis, it is considered unlikely that fossils meeting significance criteria will be encountered.

Existing Conditions

The proposed project location lies in a broad coastal plain called the Tustin Plain in Orange County, California, which is bounded by the Puente Hills and Coyote Hills, the Santa Ana Mountains, San Joaquin Hills, and Pacific Ocean. Orange County is part of the coastal section of the Peninsular Range Geomorphic Province, which is characterized by elongated northwest-trending mountain ridges separated by sediment-floored valleys. Faults branching off from the San Andreas Fault to the east create the local mountains and hills. The Peninsular Ranges Geomorphic Province is located in the southwestern corner of California and is bounded by the Transverse Ranges Geomorphic Province to the north and the Colorado Desert Geomorphic Province to the east.

Results of the record search indicate that no previous fossil localities have been recorded within the project boundaries. No records of fossil localities were found from late Pleistocene alluvial sediments from within five miles of the Project.

No fossils were encountered during the field reconnaissance survey. Since most of the overall ground visibility was limited in most of the study area due to hardscaping and plant coverage, the only visible sediments for observation was primarily artificial fill, late Holocene wash sands in the Santa Ana River, and the sediments of Holocene to late Pleistocene young alluvial fans. Alluvial fans were deposited by streams and rivers and are poorly sorted, consolidated, permeable clays and sands.

Based on the PIR, no significant paleontological resources were found in the project area through a records search or through a field survey.

2.2.4.3 Environmental Consequences

Temporary Impacts

Alternative 1 - No Build

No construction on behalf of the proposed Project is associated with Alternative 1. Therefore, no impacts to potential paleontological resources would be possible under this Alternative.

Alternative 2 (Preferred Alternative), 2A, & 2B – Build Alternatives

No records of fossil localities were found. Two records of fossils recovered within proximity to the project site were from eight to ten feet deep and proved to be modern. No fossils were encountered during the survey.

Depth of excavations and ground disturbing work for the Project range from less than 5 feet to a maximum of 12 feet. Anticipated depths for excavations are:

- 10 to 12 feet for pier walls in the Santa Ana River,
- 3 to 5 feet for freeway embankments and slopes, and

- 1 to 2 feet for roadbed.
- Based on the maximum planned depth and types of impacts, as well as the results of the records search and survey, it was determined that fossils are unlikely to be encountered during construction.
- Auguring and pile driving activities may rotate up fragmentary fossils but will lack context including depth/elevation, formation identification and other elements that are critical to scientific significance. A fossil with an undetermined source will only be significant if the specimen recovered is a species that is currently not known in the area. On this basis, auguring and pile driving activities are exempt from monitoring.

Permanent Impacts

Alternative 1 – No Build

No construction on behalf of the proposed Project is associated with Alternative 1. Therefore, no impacts to potential paleontological resources would be possible under this Alternative.

Alternative 2 (Preferred Alternative), 2A, 2B – Build Alternatives

No known resources have been identified and the potential for encountering resources was determined to be very low. Therefore, permanent impacts to paleontological resources are not expected. No records had indicated previous recordings of fossils in the project boundaries and the site reconnaissance did not result in fossil discoveries. Only two locations were identified in the records search in later Pleistocene alluvium within 5 miles of the Project and both proved to be modern vertebrates. Based on that, it is considered unlikely that fossils meeting significance criteria will be encountered on this Project. No Mitigation measures are recommended. However, Caltrans standard specification 14-7.03 requires that work be halted within 60 feet of an unanticipated discovery until a qualified paleontologist has evaluated the find. The qualified paleontologist will investigate the discovery and modify the dimensions of the secured area if needed. If unanticipated paleontological resources are discovered at the job site workers are required to not disturb, move or take the resources, secure the area and notify the resident engineer. Work cannot resume within the radius of the discovery until authorized.

2.2.4.4 Avoidance, Minimization, and/or Mitigation Measures

If there is an unanticipated discovery, Caltrans standard specifications require that work be halted within 60 feet of the unanticipated discovery until a qualified paleontologist has evaluated the find. This potential impact and required standard specification is also discussed in further detail in Permanent Impacts, Alternative 2 (Preferred Alternative), 2A, 2B – Build Alternatives.

2.2.5 Hazardous Waste and Materials

2.2.5.1 Regulatory Setting

Hazardous materials, including hazardous substances and wastes, are regulated by many state and federal laws. Statutes govern the generation, treatment, storage and disposal of hazardous materials, substances, and waste, and also the investigation and mitigation of waste releases, air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, and the Resource Conservation and Recovery Act (RCRA) of 1976. The purpose of CERCLA, often referred to as "Superfund," is to identify and cleanup abandoned contaminated sites so that public health and welfare are not compromised. The RCRA provides for "cradle to grave" regulation of hazardous waste generated by operating entities. Other federal laws include:

- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety and Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, Executive Order (EO) 12088, *Federal Compliance with Pollution Control Standards*, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

California regulates hazardous materials, waste, and substances under the authority of the CA Health and Safety Code and is also authorized by the federal government to implement RCRA in the state. California law also addresses specific handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning of hazardous waste. The Porter-Cologne Water Quality Control Act also restricts disposal of wastes and requires cleanup of wastes that are below hazardous waste concentrations but could impact ground and surface water quality. California regulations that address waste management and prevention and cleanup of contamination include Title 22 Division 4.5 Environmental Health Standards for the Management of Hazardous Waste, Title 23 Waters, and Title 27 Environmental Protection.

Worker and public health and safety are key issues when addressing hazardous materials that may affect human health and the environment. Proper management and disposal of hazardous material is vital if it is found, disturbed, or generated during project construction.

2.2.5.2 Affected Environment

This section discusses the investigation, existing conditions, affected environment, and environmental consequences for the SR 57 Project as it relates to hazardous materials. The resource for this section is the *Initial Site Assessment Report* (ISA) (January 2018).

The surrounding properties consisted of various types of land uses including commercial, light industrial, residential, and special event use (Angel Stadium of Anaheim and the Honda Center).

Methodology

To evaluate potential hazardous waste and materials present on the corridor of the Project, specialists conducted reconnaissance, evaluated aerial photographs and historic topographic maps of the corridor, and reviewed a compilation of public records from governmental databases that provided insight to historic uses of nearby facilities. Sites with known or potential contamination were determined through review and interpretation of information contained within the database search. During reconnaissance of the corridor, specialists surveyed the field to look for potential sources of contaminants. Adjacent properties were viewed from public right of way to help identify off-site sources of contamination that could impact the corridor. Aerial photographs from publicly accessible sources were checked for evidence of potential contaminant sources.

The assessment of hazardous wastes and materials for the project site span across the general project boundary to account for the various areas and common areas covered by the three Build Alternatives. The study evaluated properties immediately adjacent or near the project site for potential and existing contaminants. Over 300 facility listings were initially identified in the governmental databases; however, after evaluating and consolidating the duplicative listings and verifying locations during the reconnaissance, the number of facilities was reduced to 80. Using risk ratings, defined below, the facilities were ranked according to the potential contamination risk each posed to the project site. No facilities were deemed to pose a high risk; 11 of the existing facilities were designated by the analysis as medium risks to the project site and are summarized in **Table 2-40: Evaluation of Medium to High Risk Facilities' Contamination Types and Presence of USTs**. The approximate location of each of the medium and nearby low risk facilities are depicted on **Figure 2-18: Sites of Potential Environmental Concern (Northern Portion of Project)** and **Figure 2-19: Sites of Potential Environmental Concern (Southern Portion of Project)**, below and within the ISA (WSP, 2018).

Table 2-40: Evaluation of Medium to High Risk Facilities' Contamination Types and Presence of USTs

Site Name / Assigned Site #	Location	Potential Contaminants	Risk Rating	Reasoning
Anaheim No.6 Transfer/Leo F Douglass/Transfer Station III / (#1)	100 feet north of corridor. Northwest corner of Douglass Rd and Katella Ave.	Gasoline. UST.	Medium.	Although no contamination was directly identified with this facility (currently a parking lot), details about the operation of this former waste transfer station is unknown and a UST system found on site assign this facility a Medium risk. UST systems have a potential for leaking.
Anaheim Arena, City of Anaheim/Anaheim Arena Project / (#2)	100 feet north of corridor. Northwest corner of South Douglass Rd and Katella Ave.	Waste oil. UST.	Medium.	Although no contamination was directly identified with this facility (currently a parking lot), a UST system found on site assigns this facility a Medium risk. UST systems have a potential for leaking. The facility was formerly associated with Anaheim Transfer Station.
Trucparco Charlie Ray Gann / (#3)	470 feet northeast of the corridor. Northeast corner of Douglass Rd and Katella Ave.	Waste oil. Gasoline. UST.	Medium.	Although no contamination was directly identified with this facility (currently a parking lot / Honda Center), a UST system found on site assigns this facility a Medium risk. UST systems have a potential for leaking.
Honda Center, Anaheim Arena, Arrowhead Pond / (#4)	500 feet northeast of the corridor. Northeast corner of the Douglass Road and Katella Avenue.	UST. Unspecified solvent mixture waste.	Medium.	Although no contamination was directly identified with this facility, details about this facility's use/handling/disposal of unspecified solvent mixtures and a UST system found on site assign this facility a Medium risk. UST systems have a potential for leaking. The facility appeared to have been used for commercial/industrial purposes prior to the Honda Center development.
Bleckerts Diesel Repair / (#5)	470 feet northeast of the corridor. Northeast corner of Douglass Rd and Katella Ave.	Diesel. UST. Waste oil.	Medium.	Although no contamination was directly identified with this facility, details about the operation of this facility show it was likely another former facility associated with the property associated currently occupied by the Honda Center. A UST system found on site and appearance of prior commercial/industrial uses assign the facility a Medium risk.

Table 2-40: Evaluation of Medium to High Risk Facilities' Contamination Types and Presence of USTs (continued)

Site Name / Assigned Site #	Location	Potential Contaminants	Risk Rating	Reasoning
GSA/Transportation Shop 2/Katella Yard / (#6)	400 feet northeast or east of the corridor. Douglass Rd.	Several USTs. Diesel. Gasoline.	Medium.	A former GSA/transportation shop facility, the facility is listed with several known USTs containing diesel and gasoline. A release of both fuels from the UST system was discovered in 1993. The LUST investigation received a "completed - case closed" designation in 1998. It is unknown whether residual contamination exists on the property, and therefore was assigned a medium risk.
Malibu Grand Prix / (#8)	220 feet west of the corridor. East Katella Ave.	Leaking UST (LUST). Sewage.	Medium.	A former entertainment facility in the 1970's-80's (including a track and arcade), the site is now occupied by a restaurant, commercial retail strip mall, and part of an adjacent large office building and parking structure. The facility was listed for disposal of an unspecified waste and cleanup of contaminated soil was conducted for a 1986 LUST release. Although the LUST investigation was "closed" 1993, it is unknown whether residual contamination exists on the property, and therefore was assigned a medium risk.
Canyon Carpet Cleaning / (#12)	Immediately east of the corridor. South Douglass Rd.	Dry cleaning chemical solvents.	Medium.	Although no contamination is known at this carpet cleaning facility, previous potential use of dry-cleaning solvents present a potential risk of contamination. It was assigned a Medium risk due to the potential use of dry-cleaning solvents and its close proximity immediately east of the corridor.
Inland Specialty Chemical Corporation / (#18)	1,200 feet east of the corridor. West Collins Ave.	Halogenated, oxygenated, and chlorinated solvents. Unspecified wastes. Several USTs.	Medium.	Currently an OC Public Works Fleet Services Vehicle Maintenance Facility and CNG Fuel Station. In 1990, evidence of soil and groundwater contamination from previous uses of this facility was found to have migrated off-site. It is assigned a medium risk due to its distance from the corridor and the Cleanup Program's 'completed - case closed' status in 2005.

Table 2-40: Evaluation of Medium to High Risk Facilities' Contamination Types and Presence of USTs (continued)

Site Name / Assigned Site #	Location	Potential Contaminants	Risk Rating	Reasoning
Yellow Transportation, Yellow Freight Systems / (#21)	Immediately east of the corridor. N. Eckhoff St.	USTs. Gasoline. Diesel. VOC.	Medium.	The trucking facility received a 'completed-cased closed' designation for three UST removals; however, the closure letter implies that contamination remains on the property. The closure letter suggests that VOC-contaminated groundwater has likely migrated onto the Yellow Transportation site from one or more upgradient sources. Although residual VOC-contaminated groundwater contamination exists in association with the upgradient Inland Specialty Chemical Corporation, no dewatering is planned in this area of the Project, therefore, this site was assigned a medium risk.
Caremark Infant Care / (#29)	120 feet northeast of the corridor. West Orangewood Ave.	UST.	Medium.	Although no contamination was directly identified with this site, a UST system found on site and its close proximity to the corridor, assigns this facility a Medium risk. UST systems have a potential for leaking.

Source: Initial Site Assessment Report (ISA) 2017.

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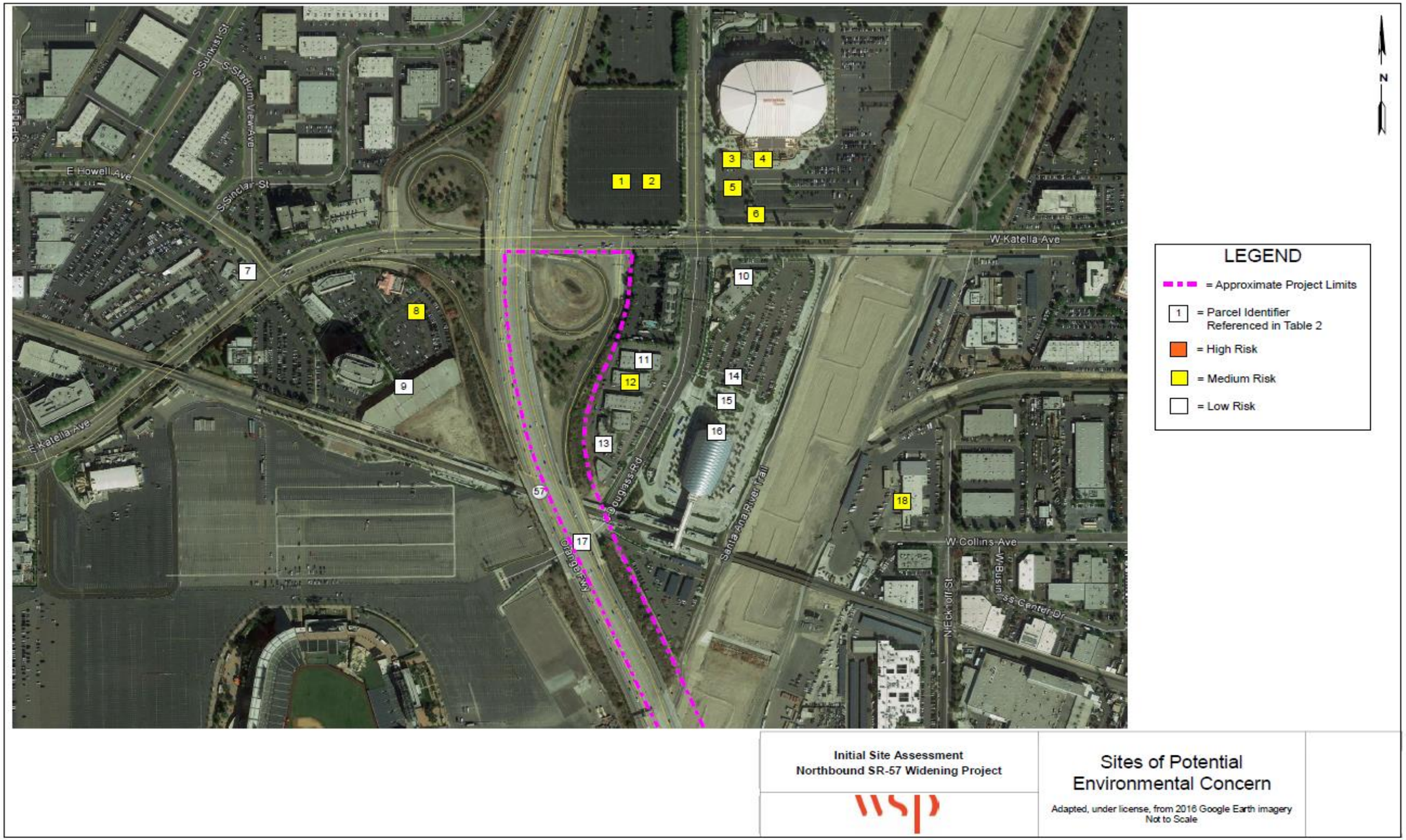
Figure 2-18: Sites of Potential Environmental Concern (Northern Portion of Project)



Source: ISA 2017.

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Figure 2-19: Sites of Potential Environmental Concern (Southern Portion of Project)

Source: ISA 2017

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Professional judgement was used to assign these ratings; and the following summary of the general guidelines were followed to designate the facility with this rating:

- High Risk: Facilities with known contamination that has likely affected the project corridor and will likely affect construction activities. This includes open LUST sites and other known contamination sites, landfills, and unknown sites that have been identified as former heavy industrial areas, former gasoline stations with potential underground tanks, or areas where chemicals may have been buried. Examples of land uses or conditions of this high-risk rating include maintenance facilities, bulk oil, metal plating, chemical storage, blending, or manufacturing facilities, dry cleaning facilities, junk yards and landfills, railroad yards, and industrial properties with greater than 20 years of use or with apparent poor best management practices.
- Medium Risk: Sites with a reasonable chance that contamination exists and could affect the project corridor and construction activities. These include potential sites that have been identified as former gas stations, processing and manufacturing facilities with little to no information available, or where the limits of known contamination are well defined and are in close proximity to the corridor. Examples of land uses and conditions that are designated as medium risk include ASTs, ADL, agricultural fields/crop dusting operations, debris laden fill, mines/quarries, railroad lines, naturally occurring asbestos, asbestos and lead based paint in building materials, and industrial property with less than 20 years of use or with apparent good best management practices.
- Low Risk: Sites that have been remediated and are officially closed with no use restrictions, facilities that may have had small spills in the past, businesses that handle hazardous waste with no violations, no indications or improper management or disposal, and/or no obvious releases. These facility operations are a *de minimis* condition, which generally does not present a threat to human health or the environment. Low risk sites could also include contaminated facilities too distant from project corridor to pose significant contamination potential.

Limitations

This inquiry was not an exhaustive assessment. Contaminants may be hidden in subsurface materials, having been intentionally covered, or undetectable because they were covered by foliage, concrete, water, asphalt, or other materials. This contamination may not be present in predictable locations, instead, logical assessments were made to reduce future potential contamination discoveries. No facilities were analyzed from the interior of the structure on the field reconnaissance.

Evaluation of Sites

No odors, pools of liquids, or drums or containers (in connection with an identified use, unidentified use, or unidentified substances) were observed within the corridor. No pits, ponds, or lagoons (associated with waste disposal or treatment), stained soil or pavement, stressed

vegetation, or solid waste (e.g. fill soil, significant dumping of debris, trash, etc.) were observed during reconnaissance.

To assess the potential impact of these sites, best professional efforts were used to evaluate the possible contaminants that could be present, the toxicity and mobility of these contaminants, and geological factors that could influence the migration of possible contaminants. The high and medium risk facilities are described below in **Table 2-40: Evaluation of Medium to High Risk Facilities' Contamination Types and Presence of USTs**, as these are the sites that may pose potential contamination for the project corridor due to contaminant history and proximity to the project corridor limits. Several of these facilities have been found to have current or former underground storage tank (UST) systems, which typically contain petroleum and are a potential concern because USTs commonly leak. Previous leaking underground storage tank (LUST) incidents, known and potential soil and groundwater contamination, and history of land uses and remediation were also considered in the analysis. Contamination from these offsite facilities may migrate onto the project corridor through such methods as groundwater movement, storm water runoff and drains, and soil movement.

2.2.5.3 Environmental Consequences

Temporary Impacts

Alternative 1 - No Build

No construction is associated with Alternative 1. Therefore, no impacts to potential hazardous sites and material impacts would be possible under this Alternative.

Alternative 2 (Preferred Alternative), 2A, & 2B – Build Alternatives

Several general potential environmental concerns exist for the corridor, including yellow thermoplastic pavement marking, aerially deposited lead, polychlorinated biphenyls, and dewatering which are discussed below. These contaminants may be encountered for any of the alternatives during construction and operations. These general potential concerns should be considered and addressed during the Plans, Specifications and Estimate (PS&E) phase. These include the following:

Thermoplastic Pavement Marking

Historically, lead was used as a pigment and drying agent in oil-based paint until 1978, when the federal government banned the consumer use of lead-containing paint. Yellow thermoplastic pavement markings and other types or colors of street or municipal markings may contain lead and chromium.

Aerially Deposited Lead

Aerially deposited lead (ADL) from the historical use of leaded gasoline, exists along roadways throughout California. There is the likely presence of soils with elevated concentrations of lead as a result of ADL on the state highway system right of way within the limits of the project alternatives. Soil determined to contain lead concentrations exceeding stipulated thresholds must be managed under the July 1, 2016, ADL Agreement between Caltrans and the California Department of Toxic Substances Control. This ADL Agreement allows such soils to be safely reused within the project limits as long as all requirements of the ADL Agreement are met.

Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs), classified as chlorinated hydrocarbons, were manufactured from 1929 until their production was banned in 1979. PCBs were used in hundreds of industrial and commercial applications due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties. Equipment that might contain PCBs includes electrical transformers and capacitors, motor oil and hydraulic fluid, and thermal insulation material (e.g., fiberglass and felt). The area surrounding the corridor was developed during this period, and electrical equipment in the corridor area may contain PCBs.

Railroad Right of Way

Contaminants common in railway corridors include wood preservatives (e.g., creosote and arsenic) and heavy metals in ballast rock. Asbestos-containing materials might also occur in ballast rock and soils associated with railroad tracks. In addition, soils in and adjacent to these corridors might contain herbicide residues as a result of historical and ongoing weed-abatement practices. Materials and wastes would be handled, transported, and disposed of in accordance with applicable state and federal regulations, such as RCRA, CERCLA, the Hazardous Materials Release Response Plans and Inventory Law, and the Hazardous Waste Control Act.

Groundwater Dewatering

Groundwater dewatering may become necessary for construction of the bridge at Katella Avenue. Dewatering activities could collect contaminated groundwater, or alter the natural groundwater flow of the area and draw contaminated groundwater toward the project area.

Caltrans Standard Specification Section 13, 13-4.03G Dewatering controls dewatering work and discharge activities associated with dewatering. Dewatering consists of discharging accumulated stormwater, groundwater, or surface water from excavations or temporary containment facilities. Dewatering work shall be performed as specified for the work items involved, such as a temporary Active Treatment Systems (ATS) or dewatering and discharge. If dewatering and discharging activities are not specified for a work item and dewatering activities are performed the contractor shall:

1. Conduct dewatering activities under the Department's Field Guide for Construction Site Dewatering.
2. Ensure any dewatering discharge does not cause erosion, scour, or sedimentary deposits that could impact natural bedding materials.
3. Discharge the water within the project limits. Dispose of the water if it cannot be discharged within project limits due to site constraints or contamination.
4. Do not discharge stormwater or nonstormwater that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface. Immediately notify the Engineer upon discovering any such condition.

Permanent Impacts

Alternative 1- No Build

No construction is associated with Alternative 1. Therefore, no impacts to potential hazardous sites and material impacts would be possible under this Alternative.

Alternative 2 (Preferred Alternative), 2A, 2B – Build Alternatives

Project operations would not result in creation of hazardous material or hazardous waste and would not increase people's exposure to hazardous material. Transportation of hazardous material is governed by existing rules and regulations for storage and transport of such material. It is not anticipated that the Build Alternatives would result in impacts on people and environmental resources from hazardous material and hazardous waste.

2.2.5.4 Avoidance, Minimization, and/or Mitigation Measures

HAZ-1: **Thermoplastic Pavement Marking:** During Final Design (PS&E) additional investigation to determine whether pavement markings contain lead and chromium shall be conducted and appropriate measures to address these potential contaminants will be included in the final bid package, if needed.

HAZ-2: **Aerially Deposited Lead:** During Final Design (PS&E) surface soils in unpaved areas along the project corridor that will be disturbed during construction shall be tested for ADL according to Caltrans ADL testing guidelines. Methods for handling and disposal, if required, as well as Caltrans Standard Specifications or Special Provisions required to comply with rules and regulations applicable to handling ADL contaminated soils, shall be determined prior to earth moving activities.

HAZ-3: **Polychlorinated Biphenyls:** During Final Design (PS&E) additional environmental investigations to determine the potential for impacts resulting from Polychlorinated Biphenyls (PCBs) shall be conducted to determine proper management, handling and disposal, if needed, as well as to identify Caltrans Standard Specifications

required to comply with rules and regulations applicable to handling any identified hazardous material.

HAZ-4: **Groundwater Dewatering:** Should dewatering be required an NPDES permit under Caltrans jurisdiction for temporary discharge will be required. During dewatering activities, groundwater sampling shall be conducted to evaluate proper management, handling, and disposal of excess groundwater.

2.2.6 Air Quality

2.2.6.1 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 is its companion state law. These laws, and related regulations by the United States Environmental Protection Agency (U.S. EPA) and California Air Resources Board (ARB), set standards for the 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 NEPA. In addition to this environmental analysis, a parallel "Conformity" requirement under the FCAA also applies.

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 State Implementation Plan (SIP) for attainting 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" 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 if the project is not federally funded.

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 $PM_{2.5}$). 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 TIP). Travel demand and emission models are used 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 Clean Air Act and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization (MPO), Federal Highway Administration (FHWA), and Federal Transit Administration (FTA), make determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the FCAA. Otherwise, the Projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept, scope, and "open-to-traffic" schedule of a proposed transportation Project are the same as described in the RTP and FTIP, then the proposed Project meets regional conformity requirements for purposes of Project-level analysis.

Project-level conformity is achieved by demonstrating the Project comes from a conforming RTP and TIP; the Project has a design concept and scope[10] 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 hot-spot analyses may be required for projects located in CO and PM nonattainment or maintenance areas to examine localized air quality impacts.

2.2.6.2 Affected Environment

The report used in preparation of this section was the *Air Quality Report* (*AQR*) (June 2018).

Regional Climate and Topography

The project area lies in the South Coast Air Basin (SCAB), which includes all of Orange County as well as the non-desert portions of Los Angeles, Riverside and San Bernardino Counties. The distinctive climate of the SCAB is determined by its terrain and geographical location. The Basin is located in a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant with high mountains forming the remainder of the perimeter. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

[10] "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.

The annual average temperature has little fluctuation throughout the SCAB ranging from the low 60's to the high 80's. However, with a less pronounced oceanic influence, the inland portion shows greater variability in the annual minimum and maximum temperatures. The climatological station closest to the project area is the Santa Ana Fire Station (Western Regional Climate Center, https://wrcc.dri.edu). The mean annual high and low temperatures in the project area are 85° and 43° Fahrenheit (°F), respectively. The overall climate is a mild Mediterranean, with temperatures reaching over 88 °F in the summer and dipping to 41 °F in the winter. In contrast to a very steady pattern of temperature, rainfall is seasonally and annually highly variable. The total average annual precipitation is 13.69 inches, and the majority of precipitation occurs between December and March.

Although the Basin has a semi-arid climate, the air near the surface is typically moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the Basin by offshore winds, the ocean effect is dominant. Periods of heavy fog, especially along the coastline, are frequent; and low stratus clouds, often referred to as "high fog" are a characteristic climatic feature. Annual average humidity ranges from a high of about 72% at the coast to about 58% in the eastern portion of the Basin.

Wind patterns across the south coastal region are characterized by westerly and southwesterly on-shore winds during the day and easterly or northeasterly breezes at night. Wind speed is somewhat greater during the dry summer months than during the rainy winter season. Typical summer winds in the project area range from 4 to 7 miles per hour (mph) during the day and 2 to 6 mph during the night.

Between the periods of dominant airflow, periods of air stagnation may occur, both in the morning and evening hours. Whether such a period of stagnation occurs is one of the critical determinants of air quality conditions on any given day. During the winter and fall months, surface high-pressure systems over the Basin, combined with other meteorological conditions, can result in very strong, downslope Santa Ana winds. These winds normally have a duration of a few days before predominant meteorological conditions are reestablished. Within the project area, Santa Ana winds have a decidedly distinct pattern. Santa Ana winds from a northerly direction flow through the Cajon Pass and then follow the Santa Ana River in a southwestward motion direction to the coast. The highest wind speeds typically occur during the afternoon due to daytime thermal convection caused by surface heating. This convection brings about a downward transfer of momentum from stronger winds aloft. While the maximum wind speed during Santa Ana conditions is undefined, sustained winds of 60 mph with higher gusts are not uncommon in the project vicinity.

In conjunction with the two characteristic wind patterns that affect the rate and orientation of horizontal pollutant transport, there are two similarly distinct types of temperature inversions that control the vertical depth through which pollutants are mixed. These inversions are the marine/subsidence inversion and the radiation inversion. The height of the base of the inversion

at any given time is known as the "mixing height." This mixing height can change under conditions when the top of the inversion does not change. The combination of winds and inversions are critical determinants in leading to the highly degraded air quality in summer, and the generally good air quality in the winter in the project area.

Existing Air Quality

Criteria Pollutants and Attainment Status

Table 2-41: State and Federal Criteria Air Pollutant Standards, Effects, and Sources describes pollutants for which there are state and/or federal air quality standards and ambient measurements, the effects and typical sources of pollutants, and the attainment/nonattainment status for criteria pollutants. The Project is located in the Cities of Anaheim and Orange, California, which are in the SCAB portion of the SCAQMD. Under federal standards, the SCAB is classified as a nonattainment area for O_3 and $PM_{2.5}$ and a maintenance area for CO and PM_{10}. The area is a federal attainment area and/or unclassified for all other pollutants. Under state standards, the SCAB is classified as a nonattainment area for O_3, $PM_{2.5}$, and PM_{10}. The area is a state attainment area and/or unclassified for all other pollutants. The table also describes visibility-reducing particles, sulfates, and hydrogen sulfide, for which California has established air quality standards.

Table 2-42: Air Quality Concentrations for the Past 3 Years Measured at Monitoring Locations shows the ambient air quality monitor data for two monitoring locations in the Anaheim area for the years 2014-2016. These monitoring locations were chosen due to their proximity to the project area (**Figure 2-18: Sites of Potential Environmental Concern (Northern Portion of Project)** and **Figure 2-19: Sites of Potential Environmental Concern (Southern Portion of Project)**and because they contain monitored data for a majority of the criteria pollutants. The Anaheim-Pampas Lane monitor is approximately six miles from the project location; the Costa Mesa-Mesa Verde Drive monitor is approximately 10.5 miles from the project location.

Table 2-41: State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State[11] Standard	Federal[12] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Ozone (O_3)	1 hour	0.09 ppm[13]	--- [14]	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 (NOx) 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.	Non-attainment	Non-attainment (Extreme)
	8 hours	0.070 ppm	0.070 ppm (4th highest in 3 years)				
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	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.	Attainment	Attainment – Unclassified
	8 hours	9.0 ppm [1]	9 ppm				
	8 hours (Lake Tahoe)	6 ppm	---				

[11] State standards are "not to exceed" or "not to be equaled or exceeded" unless stated otherwise.

[12] Federal standards are "not to exceed more than once a year" or as described above.

[13] ppm = parts per million

[14] Prior to 6/2005, the 1-hour ozone NAAQS was 0.12 ppm. Emission budgets for 1-hour ozone are still be in use in some areas where 8-hour ozone emission budgets have not been developed, such as the San Francisco Bay Area.

Table 2-41: State and Federal Criteria Air Pollutant Standards, Effects, and Sources (continued)

Pollutant	Averaging Time	State[15] Standard	Federal[16] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Respirable Particulate Matter (PM_{10})[17]	24 hours	50 µg/m^3 [18]	150 µg/m^3 (expected number of days above standard < or equal to 1)	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 & other aerosol and solid compounds are part of PM_{10}.	Dust- and fume-producing industrial and agricultural operations; combustion smoke & vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.	Nonattainment	Attainment – Maintenance
	Annual	20 µg/m^3	--- [5]				

[15] State standards are "not to exceed" or "not to be equaled or exceeded" unless stated otherwise.

[16] Federal standards are "not to exceed more than once a year" or as described above.

[17] Annual PM_{10} NAAQS revoked October 2006; was 50 µg/m^3. 24-hr. $PM_{2.5}$ NAAQS tightened October 2006; was 65 µg/m^3. Annual $PM_{2.5}$ NAAQS tightened from 15 µg/m^3 to 12 µg/m^3 December 2012 and secondary annual standard set at 15 µg/m^3.

[18] µg/m^3 = micrograms per cubic meter

Table 2-41: State and Federal Criteria Air Pollutant Standards, Effects, and Sources (continued)

Pollutant	Averaging Time	State[15] Standard	Federal[16] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Fine Particulate Matter ($PM_{2.5}$)[5]	24 hours	---	35 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 & 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 NOx, sulfur oxides (SOx), ammonia, and ROG.	Nonattainment	Nonattainment (Moderate)
	Annual	12 µg/m^3	12.0 µg/m^3				
	24 hours (conformity process[19])	---	65 µg/m^3				
	Secondary Standard (annual; also for conformity process[5])	---	15 µg/m^3 (98th percentile over 3 years)				
Nitrogen Dioxide (NO_2)	1 hour	0.18 ppm	0.100 ppm[20]	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain & nitrate contamination of storm water. Part of the "NOx" group of ozone precursors.	Motor vehicles and other mobile or portable engines, especially diesel; refineries; industrial operations.	Attainment	Attainment – Unclassified
	Annual	0.030 ppm	0.053 ppm				

[19] The 65 µg/m^3 $PM_{2.5}$ (24-hr) NAAQS was not revoked when the 35 µg/m^3 NAAQS was promulgated in 2006. The 15 µg/m^3 annual $PM_{2.5}$ standard was not revoked when the 12 µg/m^3 standard was promulgated in 2012. The 0.08 ppm 1997 ozone standard is revoked FOR CONFORMITY PURPOSES ONLY when area designations for the 2008 0.75 ppm standard become effective for conformity use (7/20/2013). Conformity requirements apply for all NAAQS, including revoked NAAQS, until emission budgets for newer NAAQS are found adequate, SIP amendments for the newer NAAQS are approved with a emission budget, EPA specifically revokes conformity requirements for an older standard, or the area becomes attainment/unclassified. SIP-approved emission budgets remain in force indefinitely unless explicitly replaced or eliminated by a subsequent approved SIP amendment. During the "Interim" period prior to availability of emission budgets, conformity tests may include some combination of build vs. no build, build vs. baseline, or compliance with prior emission budgets for the same pollutant.

[20] Final 1-hour NO_2 NAAQS published in the Federal Register on 2/9/2010, effective 3/9/2010. 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.

Table 2-41: State and Federal Criteria Air Pollutant Standards, Effects, and Sources (continued)

Pollutant	Averaging Time	State[15] Standard	Federal[16] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Sulfur Dioxide (SO_2)	1 hour	0.25 ppm	0.075 ppm[21] (99th percentile over 3 years)	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.	Attainment	Attainment – Unclassified
	3 hours	---	0.5 ppm[22]				
	24 hours	0.04 ppm	0.14 ppm (for certain areas)				
	Annual	---	0.030 ppm (for certain areas)				
Lead (Pb)[23]	Monthly	1.5 µg/m^3	---	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.	Attainment	Attainment – Unclassified
	Calendar Quarter	---	1.5 µg/m^3 (for certain areas)				
	Rolling 3-month average	---	0.15 µg/m^3 [24]				

[21] EPA finalized a 1-hour SO_2 standard of 75 ppb (parts per billion [thousand million]) in June 2010. Nonattainment areas have not yet been designated as of 9/2012.

[22] Secondary standard, set to protect public welfare rather than health. Conformity and environmental analysis address both primary and secondary NAAQS.

[23] The ARB has identified vinyl chloride and the particulate matter fraction of diesel exhaust as toxic air contaminants. Diesel exhaust particulate matter is part of PM_{10} and, in larger proportion, $PM_{2.5}$. Both the ARB and U.S. EPA have identified lead and various organic compounds that are precursors to ozone and $PM_{2.5}$ as toxic air contaminants. There are no exposure criteria for adverse health effect due to toxic air contaminants, and control requirements may apply at ambient concentrations below any criteria levels specified above for these pollutants or the general categories of pollutants to which they belong.

[24] Lead NAAQS are not considered in Transportation Conformity analysis.

Table 2-41: State and Federal Criteria Air Pollutant Standards, Effects, and Sources (continued)

Pollutant	Averaging Time	State[15] Standard	Federal[16] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Sulfate	24 hours	25 µg/m^3	---	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.	Attainment	No Federal Standard
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm	---	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.	Unclassified	No Federal Standard
Visibility Reducing Particles (VRP)	8 hours	Visibility of 10 miles or more (Tahoe: 30 miles) at relative humidity less than 70%	---	Reduces visibility. Produces haze. NOTE: not directly related to the Regional Haze program under the Federal Clean Air Act, which is oriented primarily toward visibility issues in National Parks and other "Class I" areas. However, some issues and measurement methods are similar.	See particulate matter above. May be related more to aerosols than to solid particles.	Unclassified	No Federal Standard

Source: AQR 2018

Table 2-42: Air Quality Concentrations for the Past 3 Years Measured at Monitoring Locations

			Anaheim-1630 Pampas Lane			Costa Mesa – Costa Mesa Verde Drive		
Pollutant		**Standard**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**
Ozone								
Max 1-hr concentration (ppm)			0.111	0.100	0.103	0.090	0.099	0.096
No. days exceeded: State		0.09 ppm	2	1	2	1	1	0
Max 8-hr concentration (ppm)			0.082	0.081	0.075	0.080	0.080	0.069
No. days exceeded:	State	0.070 ppm	6	1	4	6	2	0
	Federal	0.070 ppm	6	1	4	6	2	0
Carbon Monoxide								
Max 1-hr concentration (ppm)			3.1	3.1	2.6	2.7	3.0	2.1
No. days exceeded:	State	20 ppm	0	0	0	0	0	0
	Federal	35 ppm	0	0	0	0	0	0
Max 8-hr concentration (ppm)			2.1	2.2	2.1	1.9	2.2	1.7
No. days exceeded:	State	9.0 ppm	0	0	0	0	0	0
	Federal	9 ppm	0	0	0	0	0	0
PM_{10}								
Max 24-hr concentration (µg/m³)			84.0	59.0	NA	NM	NM	NM
No. days exceeded:	State	50 µg/m³	12	12	NA	NM	NM	NM
	Federal	150 µg/m³	0	0	NA	NM	NM	NM
Max annual concentration (µg/m³)			26.1	25.3	NA	NM	NM	NM
$PM_{2.5}$								
Max 24-hr concentration (µg/m³)			46.5	53.8	45.5	NM	NM	NM
No. days exceeded: Federal		35 µg/m³	NA	NA	1	NM	NM	NM
Max annual concentration (µg/m³)			16.4	14.8	9.4	NM	NM	NM
Nitrogen Dioxide								
Max 1-hr concentration (ppb)			70	70	70	70	60	60
No. days exceeded:	State	0.18 ppm	0	0	0	0	0	0
	Federal	100 ppb	0	0	0	0	0	0
Max annual concentration (ppb)			NA	14	14	10	11	10

Notes: 2017 data is not yet available from CARB.
The number of days above the standard is not necessarily the number of violations of the standard for the year.
NA = not available
Source: California Air Resources Board: http://www.arb.ca.gov/adam/welcome.html and EPA Air Data (for CO only): https://www.epa.gove/outdoor-air-quality-data/monitor-values-report

The following is a description of air toxics for which there are no established standards.

Mobile Source Air Toxics (MSAT)

In addition to the criteria pollutants for which there are NAAQS, the EPA also regulates air toxics. Toxic air pollutants are those pollutants known or suspected to cause cancer or other serious health effects. 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). The amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT), assuming the vehicle mix does not change.

Naturally Occurring Asbestos (NOA)

Naturally Occurring Asbestos (NOA) is a naturally occurring fibrous minerals that are a human health hazard when airborne. Asbestos is classified as a known human carcinogen by state, federal, and international agencies and was identified as a toxic air contaminant. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California.

All types of asbestos are hazardous and may cause lung disease and cancer. The California Geological Survey identifies ultramafic rocks in California to be the source of NOA, and in August of 2000 they published a report titled A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos. According to this guide, the project area does not contain ultramafic rocks and therefore is not a NOA area**.**

Sensitive Receptors

Sensitive populations (sensitive receptors) are more susceptible to the effects of air pollution than the general population. Sensitive populations that are in proximity to localized sources of toxics and CO are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes.

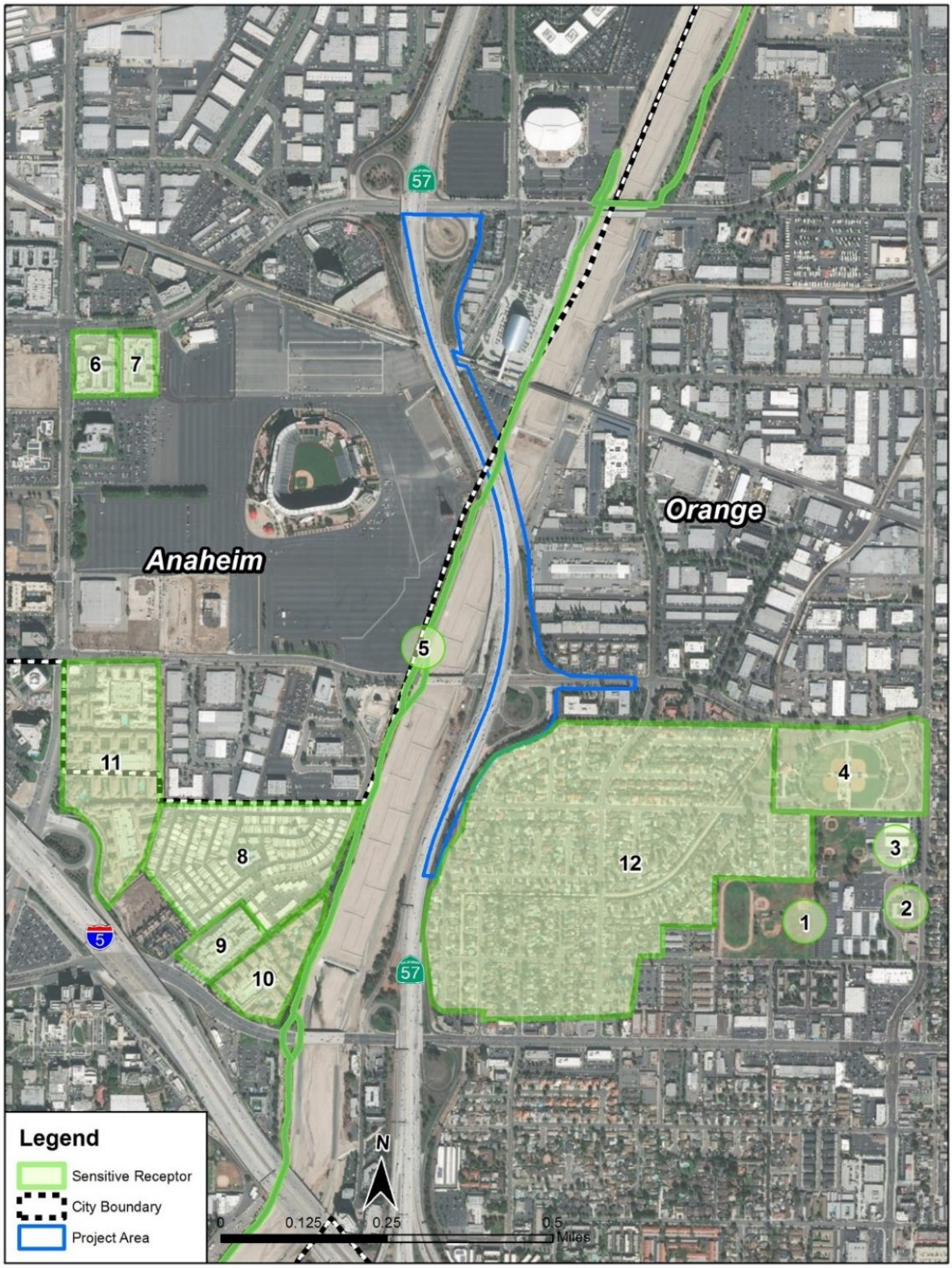
Table 2-43: Sensitive Receptors near the Project Arealists and **Figure 2-20: Sensitive Receptors and Community Facilities Near the Project Area** maps various community facilities in the study area, some of which can be considered sensitive receptors.

Table 2-43: Sensitive Receptors near the Project Area

ID	Schools
1	Portola Middle School
2	Far Horizons Montessori School
3	Sycamore Elementary School
ID	**Parks, Playgrounds, Recreation**
4	El Camino Real Park
5	Santa Ana River Trail
ID	**Residential**
6	1818 Platinum Triangle
7	2100 E. Katella Avenue
8	Park Royale Mobile Home Park
9	Allure Apartments
10	Renaissance Apartments
11	Gateway Apartment Homes
12	Residential Area

Source: Air Quality Report (AQR) 2018.

Figure 2-20: Sensitive Receptors and Community Facilities Near the Project Area



Source: AQR 2018

2.2.6.3 Environmental Consequences

Temporary Impacts

Alternative 1 – No Build

No construction or physical changes are proposed under the No-Build Alternative; therefore, no changes to the existing air quality are anticipated.

Alternative 2 (Preferred Alternative), 2A, 2B – Build Alternatives

Short-Term (Construction) Impacts

Construction Equipment, Traffic Congestion, and Fugitive Dust:

During construction, short-term degradation of air quality may occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and other construction-related activities. Emissions from construction equipment also are expected and would include CO, NO_X, volatile organic compounds (VOCs), directly-emitted PM10 and PM2.5, and toxic air contaminants such as diesel exhaust particulate matter. Ozone is a regional pollutant that is derived from NO_X and VOCs in the presence of sunlight and heat.

Site preparation and roadway construction typically involves clearing, cut-and-fill activities, grading, removing or improving existing roadways, building bridges, and paving roadway surfaces. Construction-related effects on air quality from most highway 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. These activities could temporarily generate enough PM_{10}, $PM_{2.5}$, and small amounts of CO, SO_2, NO_X, and VOCs to be of concern. 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 could deposit mud on local streets, which could be an added source of airborne dust after it dries. 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, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

The U.S. EPA estimates that fugitive dust from disturbed soil can be reduced by up to 50 percent when water or other soil stabilizers are used to control the dust. The Department's Standard Specifications (Section 14-9.03) on dust minimization requirements requires use of water or dust palliative compounds and will reduce potential fugitive dust emissions during construction.

In addition to dust-related PM_{10} emissions, heavy-duty trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NO_X, VOCs and some soot particulate (PM_{10} and $PM_{2.5}$) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

SO_2 is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Under California law and CARB regulations, off-road diesel fuel used in California must meet the same sulfur and other standards as on-road diesel fuel (not more than 15 ppm sulfur), so SO_2-related issues due to diesel exhaust will be minimal.

Some phases of construction, particularly asphalt paving, may result in short-term odors in the immediate area of each paving site(s). Such odors would quickly disperse to below detectable levels as distance from the site(s) increases.

Construction activities will last for approximately 24 months. As they will not last for more than 5 years at one general location, construction-related emissions do not need to be included in regional and project-level conformity analysis (40 CFR 93.123(c)(5)).

For disclosure purposes, the construction-related emissions have been estimated using a typical phasing schedule and defaults included in the California Emissions Estimator Model (CalEEMod). CalEEMod was run assuming all the land use type option "Other Asphalt Surfaces" assuming a total disturbed area of 14.29 acres, and all other recommended defaults. The estimated short-term emissions from construction are presented in **Table 2-44: Estimated Short-term Construction Emissions.** Details of the CalEEMod input and output are provided in Appendix E of the Air Quality Report.

Table 2-44: Estimated Short-term Construction Emissions

Year	ROG[1] tons/year	NO_X tons/year	CO tons/year	SO_2 tons/year	Total PM_{10}[2] tons/year	Total $PM_{2.5}$[2] tons/year	CO2e MT/year[3]
2021	0.4310	4.0074	3.4932	0.0094	0.7347	0.3458	861.2501
2022	0.2629	1.3832	1.4680	0.0041	0.2294	0.0942	379.1094
Total	0.6939	5.3906	4.9612	0.0136	0.9641	0.4400	1240.36

[1] CalEEMod Emission results can be found in Appendix E, Table 2.1, Overall Construction (Page E-2) of the AQR.
Sample calculation: Total ROG = 0.4310 ton/year + 0.2629 ton/year = 0.6939 ton/year
[2] Total PM Emissions include fugitive and exhaust emissions
[3] MT/year = metric tons per year

Implementation of the following measures, some of which may also be required for other purposes such as storm water pollution control, will reduce air quality impacts resulting from construction activities.

- The construction contractor must comply with the Caltrans' Standard Specifications in Section 14-9 (2018). 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.

- Construction equipment and vehicles will be properly tuned and maintained. All construction equipment will use low sulfur fuel as required by CA Code of Regulations Title 17, Section 93114.
- The project's contractors will comply with the South Coast Air Quality Management District (SCAQMD) rules and regulations during construction operations. This includes rules:
    - Rule 401 - Visible Emissions. Rule 401 states that no person shall discharge air contaminants of specified opacity for more than 3 minutes in 1 hour.
    - Rule 402 - Nuisance. Under Rule 402, no air contaminant shall be released into the atmosphere that causes a public nuisance. The rule prohibits discharge of air contaminants that could cause injury, detriment, nuisance, or annoyance to the public. An offensive odor can be considered a nuisance or annoyance.
    - Rule 403 – Fugitive Dust. The purpose of this Rule is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions.
    - Rule 403.1 – Supplemental Fugitive Dust Control Requirements for Orange County Sources. The purpose of this rule is to reduce or prevent the amount of fine particulate matter (PM10) entrained in the ambient air from anthropogenic (man-made) fugitive dust sources.
    - Rule 404 – Particulate Matter – Concentration. Under Rule 404, a person shall not discharge into the atmosphere from any source, particulate matter in excess of the concentration at standard conditions, as specified in the rule.
    - Rule 405 – Solid Particulate Matter – Weight. Under Rule 405, a person shall not discharge into the atmosphere from any source, solid particulate matter including lead and lead compounds, in excess of the rates specified in the rule.

Permanent Impacts

Alternative 1 – No Build

No construction or physical changes are proposed under the No-Build Alternative; therefore, no changes to the existing air quality are anticipated.

Alternative 2 (Preferred Alternative), 2A, 2B – Build Alternatives

Regional Conformity

The proposed Project is listed in the 2016-2040 RTP/SCS financially constrained Regional Transportation Plan, and FHWA and FTA made a regional conformity determination finding on June 1, 2016. The RTP was last amended in July 2017, and the amendment was determined to conform by FHWA and FTA on August 1, 2017. The Project is also included in the SCAG financially constrained 2019 FTIP. The SCAG 2019 FTIP was determined to conform by FHWA and FTA on December 17, 2018. The design concept and scope of the proposed Project is consistent with the project description in the 2016-2040 RTP, 2019 FTIP, and the "open to traffic" assumptions of the SCAG regional emissions analysis. Adoption and approval dates are summarized in **Table 2-45: Status of Plans Related to Regional Conformity**.

Table 2-45: Status of Plans Related to Regional Conformity

MPO	Plan/TIP	Date of adoption by MPO	Date of Approval by FHWA	Last Amendment	Date of Approval by FHWA of Last Amendment
Southern California Association of Governments	Regional Transportation Plan	April 7, 2016	June 1, 2016	Amendment #2	August 1, 2017
Southern California Association of Governments	Transportation Improvement Program (FTIP approval)	September 1, 2016	December 17, 2018	Not Applicable	Not Applicable

Source: SCAG, Final 2016 RTP/SCS 2016. http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx; SCAG, Adopted 2018 Federal Transportation Improvement Program (FTIP) 2019. http://ftip.scag.ca.gov/Pages/2019/adopted.aspx

Long Term Effects (Operational Emissions)

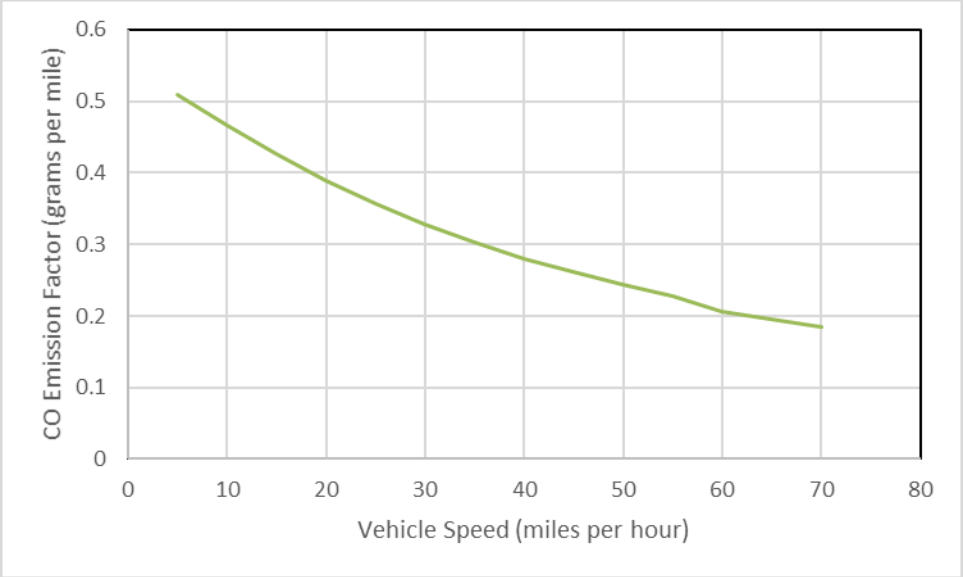
Operational emissions take into account long-term changes in emissions due to the Project (excluding the construction phase). The operational emissions analysis compares forecasted emissions for existing/baseline, No-Build, and all Build Alternatives.

The project-area emissions were estimated using Caltrans' CT-EMFAC2014 model. CT-EMFAC is a California-specific project-level analysis tool that models on-road vehicle emissions for criteria pollutants, mobile source air toxics (MSATs), and carbon dioxide (CO_2). CT-EMFAC includes a graphical user interface and an underlying database that contains emissions factors based on the California Air Resources Board (CARB) EMFAC model. With inputs of project-level travel activity data, CT-EMFAC can be used to estimate on-road vehicle emissions for an existing or proposed transportation project.

Two segments were included in the emissions burden: Northbound SR-57 from Chapman Avenue loop on-ramp to Orangewood Avenue loop on-ramp and Northbound SR-57 from Orangewood Avenue loop on-ramp to Katella loop on-ramp. Emissions were estimated for existing conditions, Opening Year build and no build, and design year build and no build. Model inputs included the daily VMT, average speed, and truck percentage presented in Chapter 1 of this document. The model was run with Orange County defaults. Traffic data was not available to differentiate between peak and off-peak periods, so all VMT was entered as peak with no off-peak VMT.

Pollutant emissions vary by vehicle speed as demonstrated in **Figure 2-21: Carbon Monoxide Emission Rate Variation with Speed**. The TOAR provided an aggregated average speed during peak travel, and CT-EMFAC was run assuming all VMT traveled at this average speed.

Figure 2-21: Carbon Monoxide Emission Rate Variation with Speed



Source: AQR 2018

The results of the regional emissions analysis are shown in **Table 2-46: Regional Emission Burden Summary (tons/year)**. The Project slightly increases regional VMT estimates by 1.6 percent, as compared to the No Build Alternative. The estimated change in pollutant burdens under the Build Alternatives vary by pollutant, ranging from an increase of 8.4 percent to a decrease of 4.5 percent. the emissions from the Build scenario are all significantly decreased from existing conditions for all criteria pollutants except PM_{10} and $PM_{2.5}$, ranging from 54 percent to 76 percent lower. PM_{10} emissions increased by 15 percent, and $PM_{2.5}$ emissions increased by 2 percent, as compared to the No Build Alternative. Copies of input and output from CT-EMFAC are provided in Appendix E of the Air Quality Report.

Table 2-46: Regional Emission Burden Summary (tons/year)

Scenario	Daily Vehicle Miles Traveled (VMT)[2]	Emission Burdens (tons/day)					
		CO[5]	TOG	NOx[5]	PM_{10}	$PM_{2.5}$	CO_2
2016 Existing	123,898	0.57	0.0575	0.196	0.0261	0.0120	207
2045 No Build	145,336	0.22	0.0259	0.050	0.0277	0.0113	157
2045 Build[1]	147,655	0.23	0.0262	0.048	0.0300	0.0123	168
% Change from Existing[3]	19%	-60%[2]	-54%	-76%	15%	2.0%	-19%
% Change from No Build[4]	1.6%	4.5%[2]	1.2%	-4.5%	8.4%	8.3%	7%

[1] Alternative represents Build Alternatives 2 (Preferred Alternative), 2A, and 2B
[2] Sum of daily VMT from Table 1-1, Table 1-2, or Table 1-4
Sample calculation: 2016 Existing VMT = 49,126 + 74,772 = 123,896
[3] % Change from Existing = (2045 Build – 2016 Existing) / 2016 Existing * 100
Sample calculation: CO % change from existing = (0.23 ton/day – 0.57 ton/day) / 0.57 ton/day * 100 = -60%
[4] % Change from No Build = (2045 Build – 2045 No Build) / 2045 No Build * 100
Sample calculation: CO % change from no build = (0.23 ton/day – 0.22 ton/day) / 0.22 ton/day * 100 = 4.5%
[5] Project emission burdens can be found in Appendix E, Table E-6 (page E-38), CT-EMFAC Results of the AQR

Project Level Hot-Spot Analysis

The Project is located in the Cities of Anaheim and Orange, California, which are in the SCAB portion of the SCAQMD. This area is in maintenance for CO, maintenance for PM_{10}, and nonattainment for $PM_{2.5}$, thus a project-level hot-spot analysis for CO and PM is required under 40 CFR 93.109.

CO Analysis

In order to determine the CO conformity requirements and the project-level CO impacts of a specific project, the flowcharts on pages 3-2 and 4-10 of the Transportation Project-Level Carbon Monoxide Protocol (UCD-ITS-RR-97-21) (CO Protocol) document, as revised in December 1997, are consulted.

The following series of questions and answers can be followed along with the flowcharts (highlighted in yellow in Appendix G of the project's 2018 *Air Quality Report*).

Is this Project exempt from all emissions analyses? NO

According to 1 on page 2-6 of the Transportation Project-Level Carbon Monoxide Protocol, this Project is not exempt from all emissions analyses.

Is this Project exempt from regional emissions analyses? NO

According to Table 2 on page 2-7 of the Project-Level Carbon Monoxide Protocol, this project is not exempt from regional emissions analyses**.**

Is this Project locally defined as regionally significant? YES

According to the FHWA Transportation Conformity Reference Guide:

> "[a] regionally significant project means [a] transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals as well as most terminals themselves) and would normally be included in the modeling of a metropolitan area's transportation network, including, at minimum, all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel."

The Project is locally defined as regionally significant because it is included in the RTP modeling.

Is this Project in a federal attainment area? NO

Is there a currently conforming RTP and TIP? YES

Is the project included in the regional emissions analysis supporting the currently conforming RTP and TIP? YES

Has project design concept and/or scope changed significantly from that in the regional analysis? NO

Examine local impacts.

Local CO impacts are examined in the section below.

Is the Project in a CO non-attainment area? NO

The Project is in a federal CO maintenance area and a state CO attainment area.

Was the area re-designated as "attainment" after the 1990 Clean Air Act? YES

Orange County was designated a federal CO maintenance area on June 11, 2007[25].

Has "continued attainment" been verified with the local Air District, if appropriate? YES

Based on CARB monitored CO data for the SCAB, from years 2007 through the most recent records, there have been no exceedances of state or federal CO standards since Orange County was re-designated as a maintenance area.

Does the Project worsen air quality? YES

- Project does not significantly increase cold start percentage.
- Project does not significantly increase traffic volumes.
- Project improves traffic flow.

[25] Source: EPA Green Book, http://www3.epa.gov/airquality/greenbook/anayo_ca.html

The project area, which is located within Orange County, is classified as a maintenance area for CO. Therefore, a screening analysis has been performed considering the project's location, nearby receptors, traffic volumes, LOS and air quality conditions for current and future years to determine if microscale CO modeling is necessary.

This Project does not include any parking facilities where vehicles would be cold-started. Therefore, this Project would not affect cold start percentages in the area.

The Project would, however, increase traffic volumes. According to the CO Protocol, increases in traffic volumes in excess of five percent should be considered potentially significant. **Table 2-47: 2045 No Build and 2045 Build Peak Hour Traffic Volumes** displays the peak hour volumes, for both a.m. and p.m. conditions, at the major intersections in the project area. Three of the eleven of the intersections analyzed will experience over a five percent increase in peak hour traffic volumes in the Build scenarios (Alternatives 2 [Preferred Alternative], 2A and 2B), when compared to the No Build scenario. Overall, when comparing the 2045 Build peak-hours with the 2045 No Build peak-hours, the traffic volumes would increase by 3% for p.m. peak-hour in the Preferred Alternative and 2% for p.m. peak-hour in the Alternative 2A and 2B. The traffic volume at SR 57 Northbound On-Off Ramps / Orangewood Avenue would increase by approximately 28%. In the current condition, westbound traffic enters the freeway without entering the intersection. All Build Alternatives include construction of a full intersection at Orangewood Avenue that shifts eastbound traffic using the direct onramp to northbound SR 57 to the reconstructed Orangewood Avenue signalized intersection.

Table 2-47: 2045 No Build and 2045 Build Peak Hour Traffic Volumes

#	Intersection	2045 No Build Peak Hour Volumes		2045 Alternative 2 (Preferred Alternative) Peak Hour Volumes		2045 Alternative 2A & 2B Peak Hour Volumes	
		a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
1	SR 57 Northbound Off-Ramp / Ball Road	2,974	3,201	2,943	3,212	2,943	3,212
2	SR 57 Northbound Off-Ramp / Katella Ave	3,441	3,890	**3,906**	3,859	**3,906**	3,859
3	Douglass Road / Katella Ave	3,765	4,144	3,899	**4,465**	3,899	4,165
4	Main Street / Katella Ave	4,488	3,956	4,467	3,916	4,467	3,914
5	Main Street / Collins Ave	3,071	3,096	3,019	3,065	3,019	3,065
6	SR 57 Northbound On-Off Ramps / Orangewood Ave	2,508	2,787	**3,228**	**3,647**	**3,228**	**3,647**
7	North Eckhoff Street / Orangewood Ave	2,763	2,958	2,788	2,963	2,788	2,963
8	Main Street / Orangewood Avenue	3,342	3,423	3,313	3,402	3,313	3,402
9	SR 57 Northbound Off-Ramp/Chapman Ave	3,342	3,185	3,342	3,155	3,342	3,155
10	North Eckhoff Street / Chapman Ave	2,840	3,274	1,476	3,295	1,476	3,295
11	Main Street / Chapman Ave	4,348	5,382	4,357	5,361	4,357	5,361
	Total:	36,882	39,296	36,738	40,340	36,738	40,038

Bolded values represent an increase from No Build
Source: Air Quality Report, 2018.

A decrease in delay is considered an improvement in traffic flow. Delay values were calculated using the average delay, in seconds, per approaching vehicle over a one-hour time-period. The a.m. traffic commute period represents the highest traffic volume hour between 7 and 9 a.m., and the p.m. traffic commute period represents the highest traffic volume hour between 4 and 6 p.m. As shown in **Table 2-48: 2045 No Build and 2045 Build Delay**, delay will increase, and therefore worsen traffic flow, at six of the ten signalized intersections evaluated. Delay will decrease or remain the same at four intersections, and the two-way stop controlled intersection will continue to experience overflow.

Table 2-48: 2045 No Build and 2045 Build Delay

#	Intersection	2045 No Build Delay (seconds)		2045 Alternative 2 (Preferred Alternative) Delay (seconds)		2045 Alternative 2A & 2B Delay (seconds)	
		a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
1	SR 57 Northbound Off-Ramp/Ball Road	22	24.5	22	24.5	22	24.5
2	SR 57 Northbound Off-Ramp / Katella Avenue	14	9.5	**14.3**	**9.7**	**14.3**	**9.7**
3	Douglass Road / Katella Avenue	30.2	25	**31.3**	24.5	**31.3**	24.5
4	Main Street / Katella Avenue	34	34	**34.1**	32.9	**34.1**	32.9
5	Main Street / Collins Avenue	26	30.3	25.9	29.5	25.9	29.5
6	SR 57 Northbound On-Off Ramps / Orangewood Avenue	25.6	13.9	20[1]	11.9[1]	20.3[1]	**20.9**[1]
7	North Eckhoff Street / Orangewood Avenue	19.4	27	**20.7**	**27.4**	**20.5**	**27.4**
8	Main Street / Orangewood Avenue	37.5	30.2	**38.5**	**30.4**	**38.5**	**30.4**
9	SR 57 Northbound Off-Ramp / Chapman Avenue	9.4	14.7	**9.5**	**15**	**9.5**	**15**
10	North Eckhoff Street / Chapman Avenue[2]	OVF[3]	OVF[3]	OVF[3]	OVF[3]	OVF[3]	OVF[3]
11	Main Street / Chapman Avenue	51.6	39.4	**51.7**	39.2	**51.7**	39.2

Bolded values represent an increase from No Build

[1] The delay at SR 57 Northbound On-Off Ramps/Orangewood Avenue improves despite a 28% increase in volume due to the intersection reconstruction to accommodate westbound traffic turning northbound onto SR 57.

[2] Two-way stop controlled

[3] Over flow

Source: Air Quality Report, (July, 2018)

As shown in **Table 2-49: 2045 No Build and 2045 Build Level of Service**, LOS will improve or remain the same at ten intersections in the a.m. peak period and at all eleven intersections in the p.m. peak period for the Preferred Alternative. LOS will improve or remain the same at ten intersections in the a.m. peak period and p.m. peak period for Alternatives 2A and 2B. LOS will decline at one intersection in the a.m. peak period and at no intersections in the p.m. peak period for the Preferred Alternative. LOS will decline at one intersection in the a.m. and p.m. peak period for Alternatives 2A and 2B.

Table 2-49: 2045 No Build and 2045 Build Level of Service

#	Intersection	2045 No Build LOS		2045 Alternative 2 (Preferred Alternative) LOS		2045 Alternative 2A & 2B LOS	
		a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
1	SR 57 Northbound Off-Ramp / Ball Road	C	C	C	C	C	C
2	SR 57 Northbound Off-Ramp / Katella Avenue	B	A	B	A	B	A
3	Douglass Road / Katella Avenue	C	C	C	C	C	C
4	Main Street / Katella Avenue	C	C	C	C	C	C
5	Main Street / Collins Avenue	C	C	C	C	C	C
6	SR 57 Northbound On-Off Ramps / Orangewood Avenue	C	B	**B**[1]	B	C	**C**
7	North Eckhoff Street / Orangewood Avenue	B	C	**C**	C	**C**	C
8	Main Street / Orangewood Avenue	D	C	D	C	D	C
9	SR 57 Northbound Off-Ramp / Chapman Avenue	A	B	A	B	A	B
10	North Eckhoff Street / Chapman Avenue[2]	F	F	F	F	F	F
11	Main Street / Chapman Avenue	D	D	D	D	D	D

[1] The LOS at SR 57 Northbound On-Off Ramps/Orangewood Avenue improves in the Preferred Alternative despite a 28% increase in volume due to the intersection reconstruction to accommodate westbound traffic turning northbound onto SR 57.
[2] Two-way stop controlled
Source: TOAR, January 2018

In summary, this Project will increase traffic volumes at two intersections and worsen traffic flow at five intersections in the project area under the Preferred Alternative. The Project will increase traffic volumes at two intersections and worsen traffic flow at six intersections in the project area under Alternatives 2A and 2B. The Project therefore has the potential to worsen air quality.

Is project suspected of resulting in higher CO concentrations than those existing within the region at the time of attainment demonstration? **YES**

Since this Project will be adding a lane to a segment of SR 57 and moving traffic closer to receptors in the project area, it is suspected of resulting in higher CO concentrations.

Does project involve a signalized intersection at LOS E or F? **NO**

Does project affect a signalized intersection worsening its LOS E or F? **NO**

Are there any other reasons to believe the project may have adverse air quality impacts? **NO**

Project satisfactory, no further analysis needed.

PM Analysis

PM emissions were estimated for Baseline, No-Build, and all Build Alternatives for the horizon year (2045). As shown in **Table 2-46: Regional Emission Burden Summary (tons/year)**, estimates of $PM_{2.5}$ and PM_{10} pollutant burdens under the Build Alternatives are predicted to increase in the project area by 8.3% and 8.4% as compared to the No Build Alternative. The $PM_{2.5}$ concentrations from the Build scenario are 2.0% lower than existing conditions, and the PM_{10} concentrations from the Build scenario are 15% lower than existing conditions.

The Transportation Conformity Guidance requires a hot-spot analysis to be completed for a project of air quality concern (POAQC). The final rule in 40 CFR 93.123(b)(1) defines a POAQC as:

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

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

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

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

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

The proposed project is not considered a POAQC for PM_{10} and/or $PM_{2.5}$ because it does not meet the definition of a POAQC as defined in U.S. EPA's Transportation Conformity Guidance.

The Project is not a new or expanded highway project with a significant number of or significant increase in diesel vehicles (U.S. EPA's Transportation Conformity Guidance defines significant as greater than 125,000 AADT and 8% or more of such AADT is diesel truck traffic, or in practice 10,000 truck AADT or more regardless of total AADT; significant increase is defined in practice as a 10% increase in heavy duty truck traffic). As shown in **Table 2-50: 2045 AADT and Truck Percentages**, this segment of SR 57 has a forecast total AADT and truck AADT greater than the guidance values. However, the Project does not increase diesel vehicles, as the truck AADT and percentages do not change from No Build to Build Conditions.

Table 2-50: 2045 AADT and Truck Percentages

Segment	No Build			Build Alternative 2 (Preferred Alternative)			Build Alternatives 2A & 2B		
	AADT Total	AADT Trucks	Truck %	AADT Total	AADT Trucks	Truck %	AADT Total	AADT Trucks	Truck %
Northbound State Route 57 (Chapman Ave loop on-ramp to Orangewood Ave loop on-ramp)	142,060	9,944	7.0%	144,190	10,093	7.0%	144,190	10,093	7.0%
Northbound State Route 57 (Orangewood Ave loop on-ramp to Katella Ave loop on-ramp)	146,080	10,226	7.0%	148,500	10,395	7.0%	148,500	10,395	7.0%

Note: Truck Percentage of 7% is consistent with worksheets included in the Draft Operations Analysis Appendices for the Project Approval & Environmental Document
Source: AQR, 2018

The Project does not affect intersections that are at a Level of Service D, E or F with a significant number of diesel vehicles, or that will change to Level of Service D, E or F because of increased traffic volumes from a significant number of diesel vehicles related to the Project. As shown in **Table 2-51: 2045 Level of Service**, the Project does not cause LOS at any signalized intersections in the project area to degrade to D, E or F, when Build conditions are compared to No Build Conditions.

The Project does not involve new or expanded bus and rail terminals and transfer points that have a significant number of or increase in diesel vehicles congregating at a single location.

Furthermore, the Project is not in or affecting locations, areas, or categories of sites which are identified in the $PM_{2.5}$ or PM_{10} implementation plan or implementation plan submission, as appropriate, as sites of possible violation.

As such, PM hot-spot analysis is not required. The Project underwent Interagency Consultation and was presented for consideration by the SCAG Transportation Conformity Working Group (TCWG) on January 23, 2018, and it was agreed upon by the TCWG that the Project is not a POAQC.

Following selection of the Preferred Alternative in January 2019, Caltrans submitted a project level conformity analysis to FHWA for concurrence. The conformity request was submitted on January 14, 2019. FHWA concurred with the project-level conformity determination on February 11, 2019. (See Appendix E for FHWA's conformity finding.)

Table 2-51: 2045 Level of Service

Intersection	2045 No Build				2045 Alternative 2 (Preferred Alternative)				2045 Alternative 2A & 2B			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
SR 57 Northbound Off-Ramp / Ball Road	22	C	24.5	C	22	C	24.5	C	22	C	24.5	C
SR 57 Northbound Off-Ramp / Katella Avenue	14	B	9.5	A	14.3	B	9.7	A	14.3	B	9.7	A
Douglass Road / Katella Avenue	30.2	C	25	C	31.3	C	24.5	C	31.3	C	24.5	C
Main Street / Katella Avenue	34	C	34	C	34.1	C	32.9	C	34.1	C	32.9	C
Main Street / Collins Avenue	26	C	30.3	C	25.9	C	29.5	C	25.9	C	29.5	C
SR 57 Northbound On-Off Ramps / Orangewood Avenue	25.6	C	13.9	B	20[1]	B[1]	11.9[1]	B	20.3[1]	C	20.9[1]	C
North Eckhoff Street / Orangewood Avenue	19.4	B	27	C	20.7	C	27.4	C	20.5	C	27.4	C
Main Street / Orangewood Avenue	37.5	D	30.2	C	38.5	D	30.4	C	38.5	D	30.4	C
SR 57 Northbound Off-Ramp / Chapman Avenue	9.4	A	14.7	B	9.5	A	15	B	9.5	A	15	B
North Eckhoff Street / Chapman Avenue[2]	OVF[3]	F	OVF[3]	F	OVF[3]	F	OVF[3]	F	OVF[3]	F	OVF[3]	F
Main Street / Chapman Avenue	51.6	D	39.4	D	51.7	D	39.2	D	51.7	D	39.2	D

[1] The delay at SR 57 Northbound On-Off Ramps/Orangewood Avenue improves despite a 28% increase in volume (see Table 2-20) due to the intersection reconstruction to accommodate westbound traffic turning northbound onto SR 57.
[2] Two-way stop controlled
[3] Over flow
Source: AQR, 2018

NO_2 Analysis

The U.S. EPA modified the NO_2 NAAQS to include a 1-hr standard of 100 ppb in 2010. Currently there is no federal project-level nitrogen dioxide (NO_2) analysis requirement. However, NO_2 is among the near-road pollutants of concern and project analysts will be expected to explain how transportation projects affect near-road NO_2.

For project-level analysis, NO_2 assessment protocol is not available. As shown in **Table 2-46: Regional Emission Burden Summary (tons/year)**, nitrogen oxide (NO_X) emissions in 2045 from the build scenario decrease by 4.5%, as compared to the no build scenario. These emissions decrease by 76% as compared to the existing year because of improvements in vehicle technology and fuel economy regulations. NO_X emissions are a combination of NO and NO_2, and can serve as a useful analysis surrogate for NO_2.

Mobile Source Air Toxics Analysis

FHWA released updated guidance in October 2016 (FHWA, 2016) for determining when and how to address MSAT impacts in the NEPA process for transportation projects. FHWA identified three levels of analysis:

- No analysis for exempt projects or projects with no potential for meaningful MSAT effects;
- Qualitative analysis for projects with low potential MSAT effects; and
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Projects with no impacts generally include those that a) qualify as a categorical exclusion under 23 CFR 771.117, b) qualify as exempt under the FCAA conformity rule under 40 CFR 93.126, and c) are not exempt, but have no meaningful impacts on traffic volumes or vehicle mix.

Projects that have low potential MSAT effects are those that serve to improve highway, transit, or freight operations or movement without adding substantial new capacity or creating a facility that is likely to substantially increase emissions. The large majority of projects fall into this category.

Projects with high potential MSAT effects include those that:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of Diesel Particulate Matter in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000, or greater, by the design year; and
- Are proposed to be located in proximity to populated areas or, in rural areas, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

Based on the FHWA's recommended tiering approach, this Project falls within the Tier 2 approach (i.e., for projects with a low potential for MSAT effects). The amount of MSATs emitted would be proportional to the VMT, assuming the vehicle mix does not change. As shown in **Table 2-52: Project AADT**, the Build Alternative would cause a 2% increase in AADT in the project area and, as compared to the No Build Alternative and, as such, would not significantly affect VMT or MSATs.

Table 2-52: Project AADT

Segment	2016 Existing	2045 No Build	2045 Build[1]
Northbound State Route 57 (Chapman Ave loop on-ramp to Orangewood Ave loop on-ramp)	121,900	142,060	144,190
Northbound State Route 57 (Orangewood Ave loop on-ramp to Katella Ave loop on-ramp)	124,000	146,080	148,500

[1] Build Alternative represents the Preferred Alternative and Alternative 2A & 2B
Source: Draft Traffic Operations Analysis Report (January 2018)

Because the estimated VMT under each of the alternatives would not significantly change, it is expected there would be no significant difference in overall MSAT emissions among the Build Alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

2.2.6.4 Avoidance, Minimization, and/or Mitigation Measures

With implementation of the project features discussed in Section 2.2.6.3 Environmental Consequences, there are no adverse impacts to air quality. Therefore, no additional Avoidance, Minimization, and/or Mitigation Measures are required.

Climate Change - Neither the United States Environmental Protection Agency (U.S. EPA) nor the Federal Highway Administration (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 the California Environmental Quality Act (CEQA) Chapter of this document. The CEQA analysis may be used to inform the National Environmental Policy Act (NEPA) determination for the project.

2.2.7 Noise

2.2.7.1 Regulatory Setting

The National Environmental Policy Act (NEPA) of 1969 and the California Environmental Quality Act (CEQA) provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

California Environmental Quality Act

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless those measures are not feasible. The CEQA noise analysis is included at the end of this section.

National Environmental Policy Act and 23 CFR 772

For highway transportation Projects with FHWA (and the Department, as assigned) involvement, the federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations include noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 dBA) is lower than the NAC for commercial areas (72 dBA). **Table 2-53: Noise Abatement Criteria** lists the noise abatement criteria for use in the NEPA 23 CFR 772 analysis.

Figure 2-22: Noise Levels of Common Activities lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise levels discussed in this section with common activities.

According to the Department's Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, May 2011, a noise impact occurs when the predicted future noise level with the project substantially exceeds the existing noise level (defined as a 12 dBA or more increase) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

If it is determined that the project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated in the project.

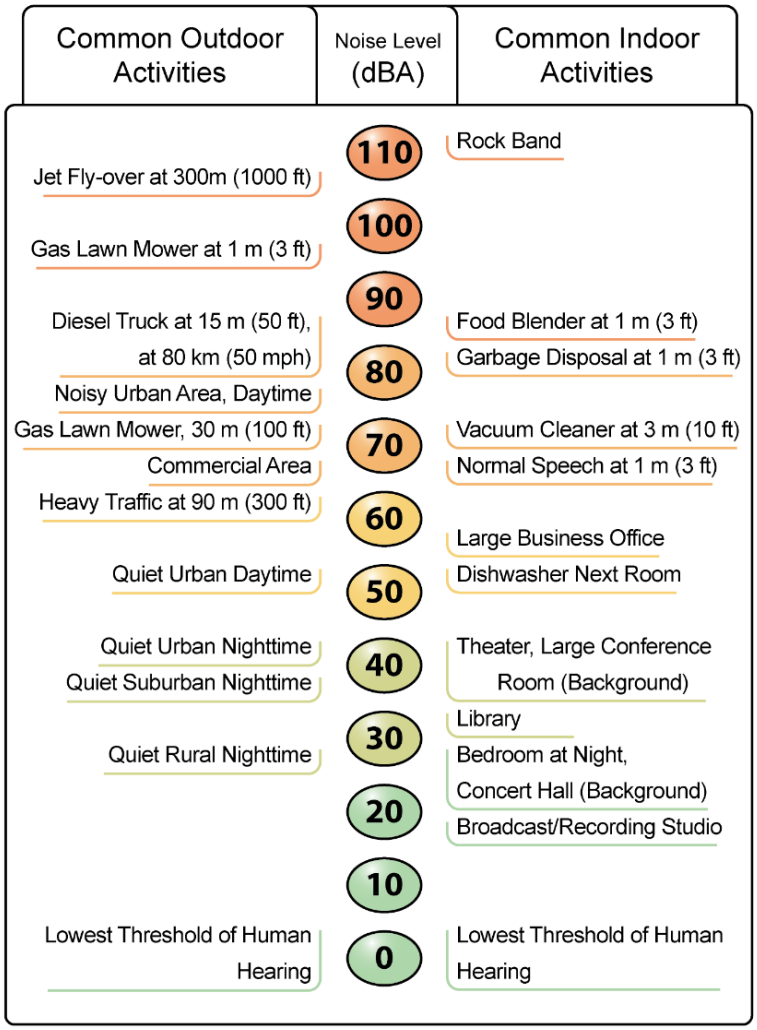
The Department's Traffic Noise Analysis Protocol sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 5 dBA reduction for all impacted receptors in the future noise levels must be achieved for an abatement to be considered feasible. Other considerations include topography, access requirements, other noise sources, and safety considerations. Additionally, a minimum 7 dBA must be achieved at one or more benefited receptors for an abatement measure to be considered reasonable. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include: residents' acceptance and the cost per benefited residence.

Table 2-53: Noise Abatement Criteria

Activity Category	NAC, Hourly A-Weighted Noise Level, Leq(h)	Description of activity category
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[1]	67 Exterior	Residential.
C[1]	67 Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F	No NAC—reporting only	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical, etc.), and warehousing.
G	No NAC—reporting only	Undeveloped lands that are not permitted.

[1] Includes undeveloped lands permitted for this activity category.
Source: NSR 2018.

Figure 2-22: Noise Levels of Common Activities



Source: Caltrans, SER 2017. http://www.dot.ca.gov/ser/forms.htm

Section 216 of the California Streets and Highways Code

Section 216 of the California Streets and Highways Code relates to the noise effects of a proposed freeway project on public and private elementary and secondary schools. Under this code, a noise impact occurs if, as a result of a proposed freeway project, noise levels exceed 52 dBA-Leq(h) in the interior of public or private elementary or secondary classrooms, libraries, multipurpose rooms, or spaces. This requirement does not replace the "approach or exceed" NAC criterion for FHWA Activity Category D for classroom interiors, but it is a requirement that must be addressed in addition to the requirements of 23 CFR 772. If a project results in a noise impact under this code, noise abatement must be provided to reduce noise to a level that is at or below 52 dBA-Leq(h). If the noise levels generated from freeway and roadway sources exceed 52 dBA-Leq(h) prior to construction of the proposed freeway project, then noise

abatement must be provided to reduce the noise to the level that existed prior to construction of the project.

2.2.7.2 Affected Environment

The following section was prepared with reference to the *Noise Study Report* (NSR), (January 2018), prepared for this Project. The section describes existing conditions of the corridor, such as land uses that result in noise and sensitive receptors, as well as the consequences of the project alternatives as it relates to noise impacts.

Methodology

A field investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed Project. A field noise study was conducted in accordance with recommended procedures in Caltrans' Technical Noise Supplement (TeNS) (Caltrans 2013), a technical supplement to the Protocol. Site specific data, such as direction of traffic, vehicle speed, and location of the sound meter was collected along with measurements from a sound meter. This information was used to model existing and projected future noise levels in various alternative scenarios using the Traffic Noise Model Verion 2.5 (TNM 2.5) program.

Existing land uses in the project area were categorized by land use type, acoustically equivalent noise levels, and Activity Categories as defined in **Table 2-54: Summary of Identified Noise Sensitive Receptors Defined by Area**.

Table 2-54: Summary of Identified Noise Sensitive Receptors Defined by Area

Activity Category	Land Use	Corresponding Area
B	Single-family residences and multi-family residences	A
E	Hotel, Restaurant	B C D
F	Commercial retail uses	B C
None	Not Noise Sensitive	E F

Source: Noise Study Report (NSR) 2018.

An acoustically equivalent area is generally defined as an analysis area with the same or equal ambient noise levels for all the receptors due to no other major roadways splitting them and no other major noise source that further divides the area.

- Area A: Area A is located on the east side of SR 57 north of Chapman Avenue and south of Orangewood Avenue. A residential subdivision (Activity Category B) is located in this area.
- Area B: Area B is located on the east side of SR 57 north of Orangewood Avenue and south of the train track. An office building (Activity Category E) and industrial uses (Activity Category F) are located in this area.

- Area C: Area C is located on the east side of SR 57 south of Katella Avenue and north of the train track. The Ayres Hotel (Activity Category E) and industrial buildings (Activity Category F) are located in this area.
- Area D: Area D is located on the west side of SR 57 south of Katella Avenue and north of the train tracks. A retail facility (Hooters Restaurant - Activity Category E) is located in this area.
- Area E: Area E is located on the west side of SR 57 south of the train tracks and north of Orangewood Avenue. The parking lot for Anaheim Stadium and the Santa Ana River (Activity Category F) are located in this area. There are no noise sensitive land uses in Area E, so no noise modeling was done in this area.
- Area F: Area F is located on the west side of SR 57 south of Orangewood Avenue and north of Chapman Avenue. This area includes the Santa Ana River (Activity Category F). There are no noise sensitive land uses in Area E, so no noise modeling was done in this area.

Short-term measurement locations were selected to serve as representative modeling locations. Short-term monitoring was conducted at ten locations in land use Activity Categories B, C, and E between Tuesday, April 11, 2017 and Thursday, April 13, 2017.The purpose of these measurements was to identify variations in sound levels throughout the day.

The long-term sound level data was collected over three consecutive 24-hour periods, beginning Tuesday, April 11, 2017 and ending on Thursday, April 13, 2017. The purpose of these measurements was to identify overall sound characteristics of the area. (See **Figure 2-23: Analysis Areas, Noise Monitoring Positions, and Location of Evaluated Noise Barrier**)

Traffic noise levels were predicted using the FHWA Traffic Noise Model Version 2.5 (TNM 2.5). TNM 2.5 is a computer model based on two FHWA reports: FHWA-PD-96-009 and FHWA-PD-96-010 (FHWA 1998a, 1998b). Key inputs to the traffic noise model were the locations of roadways, traffic mix and speed, shielding features (e.g., topography and buildings), noise barriers, ground type, and receptors. Three-dimensional representations of these inputs were developed using CAD drawings, aerials, and topographic contours provided by OCTA. Traffic noise was evaluated under existing conditions, design-year no-project conditions, and design-year with project conditions. To validate the accuracy of the model calculations, TNM 2.5 was used to compare measured traffic noise levels to modeled noise levels at field measurement locations.

Figure 2-23: Analysis Areas, Noise Monitoring Positions, and Location of Evaluated Noise Barrier

Source: NSR 2018.

2.2.7.3 Environmental Consequences

This impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common use areas at multi-family residences. The Project is considered a Type 1 Project under 23 CFR 772. FHWA defines a Type I Project as a proposed federal or federal-aid highway project for the construction of a highway on a new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment of the highway. Modelling with a Traffic Noise Model 2.5 (TNM 2.5) allowed the study to project predicted noise levels with the Project for each alternative. Construction activities are required to comply with Caltrans Standard Specifications (Section 14-8.02), which restricts the level of noise that can be generated from construction activities at 50 feet from the job site between 9 p.m. and 6 a.m. Local noise ordinances may also apply.

Temporary Impacts

Alternative 1- No Build

The No Build Alternative proposes no changes to existing infrastructure for this project, and therefore no construction related noise impacts would be associated with this alternative.

Alternative 2 (Preferred Alternative), 2A, & 2B – Build Alternatives

Table 2-55: Construction Equipment Noise summarizes noise levels anticipated to be produced by construction equipment that is commonly used on roadway construction projects. Construction equipment is expected to generate noise levels ranging from 70 to 90 dB at a distance of 50 feet, and noise produced by construction equipment would be reduced over distance at a rate of about 6 dB per doubling of distance. Construction noise varies greatly depending on the construction process, type, and condition of the equipment used and layout of the construction site.

Table 2-55: Construction Equipment Noise

Equipment	Maximum Noise Level (dBA at 50 feet)
Scrapers	89
Bulldozers	85
Heavy Trucks	88
Backhoe	80
Pneumatic Tools	85
Concrete Pump	82

Source: Federal Highway Administration (FHWA), Construction Noise Handbook 2006.
https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm

Construction noise associated with all Build Alternatives (2, 2A, 2B) would be minimized through compliance with standard noise reduction measures. Caltrans Standard Specifications (Section 14.8-02) require construction noise be monitored and controlled. The specifications prohibit construction noise from exceeding 86 dBA Lmax at 50 feet from the job site from 9 p.m. to 6 a.m. In addition, the city of Anaheim Municipal Code (6.70.010) prohibits construction noise levels from exceeding 60 dBA at the property line between 7 p.m. and 7 a.m. Likewise, the City of Orange Noise Control Ordinance (2700), sets the not-to-exceed noise levels for residential areas at 55 dBA between 7 a.m. and 10 p.m. and 50 dBA between 10 p.m. and 7 a.m. (construction is exempt from this ordinance between the hours of 7 a.m. and 8 p.m., except on Sunday and federal holidays). Sensitive receptors in Area A (residential units) may experience intermittent increased noise levels during the allowable construction hours depending on their distance from operating construction equipment. However, construction related noise would be short-term and temporary, and primarily overshadowed by local traffic noise.

Permanent Impacts

Alternative 1- No Build

The No Build Alternative proposes no changes to existing infrastructure for this project therefore, existing operational noise impacts would remain the same with this alternative.

Alternative 2 (Preferred Alternative), 2A, & 2B – Build Alternatives

Traffic noise impacts are considered to occur at receptor locations where predicted design-year noise levels are 12 dB or greater than existing noise levels, or where predicted design-year noise levels approach or exceed the NAC for the applicable activity category. Where traffic noise impacts are identified, noise abatement must be considered for reasonableness and feasibility as required by 23 CFR 772 and the Protocol.

For each Build Alternative (2, 2A, 2B) all measurements for sensitive receptor sites and data can be analyzed consistently due to common design features of each alternative. **Table 2-56: Predicted Future Noise and Abatement Analysis Alternative 1 (No Build)** through **Table 2-59: Predicted Future Noise and Abatement Analysis Alternative 2B** show the slight difference among build alternatives based on the modeling.

Table 2-56: Predicted Future Noise and Abatement Analysis Alternative 1 (No Build)

Area	Existing Noise Level (dBA)- Year 2018	Predicted Noise Level without Project (dBA)- Year 2045	Predicted Noise Level with Project (dBA) - Year 2045	Noise Impact Requiring Abatement Consideration?
A	58.9-65.0	59.3-65.0	N/A*	No**
B	68.1	68.4	N/A*	No**
C	64.7-65.5	64.7-65.8	N/A*	No**
D	66.5	66.5	N/A*	No**

*N/A for No Build's "Predicted Noise Level with Project (dBA)" because no infrastructure, and therefore noise levels, would not change as a result of the Project.
**No abatement consideration is needed because impacts do not reach significance threshold or NAC.
Source: NSR 2018.

Table 2-57: Predicted Future Noise and Abatement Analysis Alternative 2 (Preferred Alternative)

Area	Existing Noise Level (dBA) - Year 2018	Predicted Noise Level without Project (dBA) - Year 2045	Predicted Noise Level with Project (dBA) - Year 2045	Noise Impact Requiring Abatement Consideration?
A	58.9-65.0	59.3-65.0	59.8-65.4	No**
B	68.1	68.4	68.2	No**
C	64.7-65.5	64.7-65.8	64.2-67.6	No**
D	66.5	66.5	67.3	No**
E	N/A*	N/A*	N/A*	No**
F	N/A*	N/A*	N/A*	No**

*N/A for Areas E and F because they are not noise sensitive land uses.
**No abatement consideration is needed because impacts do not reach significance threshold or NAC.
Source: NSR 2018.

Table 2-58: Predicted Future Noise and Abatement Analysis Alternative 2A

Area	Existing Noise Level (dBA) - Year 2018	Predicted Noise Level without Project (dBA) - Year 2045	Predicted Noise Level with Project (dBA) - Year 2045	Noise Impact Requiring Abatement Consideration
A	58.9-65.0	59.3-65.0	59.8-65.4	No**
B	68.1	68.4	68.4	No**
C	64.7-65.5	64.7-65.8	62.9-67.7	No**
D	66.5	66.5	66.6	No**
E	N/A*	N/A*	N/A*	No**
F	N/A*	N/A*	N/A*	No**

*N/A for Areas E and F because they are not noise sensitive land uses.
**No abatement consideration is needed because impacts do not reach significance threshold or NAC.
Source: NSR 2018.

Table 2-59: Predicted Future Noise and Abatement Analysis Alternative 2B

Area	Existing Noise Level (dBA) - Year 2018	Predicted Noise Level without Project (dBA) - Year 2045	Predicted Noise Level with Project (dBA) - Year 2045	Noise Impact Requiring Abatement Consideration
A	58.9-65.0	59.3-65.0	59.8-65,4	No**
B	68.1	68.4	68.3	No**
C	64.7-65.5	64.7-65.8	64.2-67.1	No**
D	66.5	66.5	66.6	No**
E	N/A*	N/A*	N/A*	No**
F	N/A*	N/A*	N/A*	No**

*N/A for Areas E and F because they are not noise sensitive land uses.
**No abatement consideration is needed because impacts do not reach significance threshold or NAC.
Source: NSR 2018.

Based on the modeling, sensitive receptors in Area A (residential units) would experience ≤ 2.3 dBA increase in noise levels between the No Build and Build scenarios. Predicted noise levels would not approach or exceed the noise abatement criteria established for each land use type (e.g. 76dBA for activity category A, 72dBA for activity category E, etc.). Design Year (2045) noise levels would be ≤ 1dBA higher than existing noise levels (Year 2018). No noise impacts at sensitive receptor would occur; therefore, noise abatement need not be considered.

2.2.7.4 Avoidance, Minimization, and/or Mitigation Measures

With the implementation of standard measures for abatement of noise impacts during construction, no other noise abatement measures are required.