Prepared by:

U.S. Department
of Transportation
Maritime Administration

Combined Final Environmental Impact Statement/Record of Decision and Final Section 4(f) Evaluation

Port of Long Beach
Pier B On-Dock Rail Support Project
April 2022
Docket No. MARAD-2019-0109

MAR-400-220307-001

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ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
AB	Assembly Bill
ACM	asbestos-containing materials
ADL	aerially deposited lead
APE	area of potential effects
AQMP	Air Quality Management Plan
ASL	American Sign Language
BHC	Board of Harbor Commissioners
BMP	Best Management Practice
CAAP	Clean Air Action Plan
CAAQS	California Ambient Air Quality Standards
CalEnviroScreen	California Communities Environmental Health Screening Tool Version 3.0
CalEPA	California Environmental Protection Agency
CalGEM	California Geologic Energy Management Division
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERP	Community Emissions Reduction Plan
CFR	Code of Federal Regulations
CGP	Community Grants Program
CMP	Congestion Management Plan
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
COLA	City of Los Angeles
COLB	City of Long Beach
dB	decibel
dBA	A-weighted decibel
DDOT	District Department of Transportation
DEIS	Draft Environmental Impact Statement
DIP Letters	Dear Interested Party Letters
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FOE	Findings of Effect
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
g/bhp-hr	grams per brake horsepower-hour
g/m^2	gram per square meter
GBtu	billion British thermal units
GHG	greenhouse gas
GVWR	Gross Vehicle Weight Rating
hp	horsepower

HRA	Health Risk Assessment
I-	Interstate
kV	kilovolt
LBHD	Long Beach Harbor Department
LBP	lead-based paint
LED	light-emitting diode
LEED	Leadership in Energy and Environmental Design
LOS	level of service
MARAD	Maritime Administration
MBTA	Migratory Bird Treaty Act
MLLW	mean lower low water
MSC	Multi-Service Center
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OA	Operating Administration
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
PCH	Pacific Coast Highway
PHL	Pacific Harbor Line
PM	particulate matter
PM10	particulate matter less than 10 micrometers
PMP	Port Master Plan
POLB or Port	Port of Long Beach
ppm	parts per million
PPS	Pacific Pipeline System, LLC
Project	Pier B On-Dock Rail Support Facility Project
PWCT	Plains West Coast Terminals
ROD	Record of Decision
ROW	right-of-way
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	Southern California Air Quality Management District
SCRAM	Support Center for Regulatory Atmospheric Modeling
Section 106	National Historic Preservation Act Section 106
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLF	Sacred Lands File
SOI	Secretary of the Interior

SO_X	sulfur oxide
SPBP	San Pedro Bay Ports
SVOC	Semi-volatile organic compounds
SWPPP	Stormwater Pollution Prevention Plan
TAC	toxic air contaminant
TAP	Technology Advancement Program
TIP	Transportation Improvement Program
TRU	transport refrigeration unit
TWW	treated wood waste
U.S.C.	United States Code
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
V/C	volume to capacity
VdB	vibration decibel
VOC	volatile organic compound

CHAPTER 1
INTRODUCTION

The Maritime Administration (MARAD)—in cooperation with the California Department of Transportation (Caltrans) and with participation from the Federal Railroad Administration (FRA)—has prepared a Combined Final Environmental Impact Statement (FEIS), Final Section 4(f) Evaluation, and Record of Decision (ROD) for the Port of Long Beach (POLB or Port) Pier B On-Dock Rail Support Facility Project (Project).

Pursuant to 49 United States Code (U.S.C.) 24201 and 23 U.S.C. 139(n)(2), MARAD is issuing a single document that consists of the FEIS and ROD. One of the primary purposes of this combined FEIS/ROD is to respond to substantive comments received during the public and agency review and comment period. Responses are in the form of factual corrections or clarifications and are presented as errata-style edits in tabular format. These errata document the changes made to the Draft Environmental Impact Statement (DEIS) that are now reflected in the combined FEIS/ROD. The use of errata sheets and this combined FEIS/ROD comply with the requirements of 23 U.S.C. 139(n). The ROD states the decision, identifies the alternatives considered in reaching the decision, and summarizes avoidance, minimization, and mitigation strategies appropriate for this EIS.

Members of the public, Project stakeholders, local governments, elected officials, non-governmental organizations, Native American Tribes, and federal, state, and local agencies were provided opportunities to comment and review the Project during the EIS development process.

1.1 OVERVIEW

This FEIS/ROD has been prepared in accordance with the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.), the Council on Environmental Quality regulations for implementing NEPA (40 Code of Federal Regulations [CFR] parts 1500–1508), and the U.S. Department of Transportation (USDOT) and MARAD Procedures for Considering Environmental Impacts (USDOT Order 5610.1C and Maritime Administration Order 600-1, respectively). This FEIS/ROD has been developed to assist in the evaluation of anticipated federal financial support application(s) from the City of Long Beach (COLB), acting by and through its Board of Harbor Commissioners (BHC) to support the Project.

1.2 PROVISIONS FOR USE OF ERRATA SHEETS AND COMBINED ENVIRONMENTAL IMPACT STATEMENTS/RECORD OF DECISION

Operating Administrations (OAs) within the USDOT must develop, to the maximum extent practicable, a single document that combines the FEIS and ROD, unless certain conditions exist.[1] USDOT may also prepare an FEIS by attaching errata sheets to the DEIS if certain conditions are met. The following sections describe the conditions for use of errata sheets and the combined FEIS/ROD.

1.2.1 Use of Errata Sheets

The use of errata sheets in lieu of rewriting the DEIS is appropriate when comments received on the DEIS are minor and the responses to those comments are limited to factual corrections or explanations

[1] 23 U.S.C. 139 (n), 49 U.S.C. 24201, 49 U.S.C. 304a. The Federal Highway Administration, FRA, and Federal Transit Administration have incorporated this provision into their NEPA implementing procedures at 23 CFR 771.124.

of why the comments do not warrant further response. This approach is consistent with the Council on Environmental Quality regulations implementing NEPA and existing statutory authorities.[2] When using this approach, the lead agency must make the errata sheets publicly available to the same extent as the DEIS and ensure continued availability of the DEIS.[3]

Comments on the Pier B On-Dock Rail Support Facility Project DEIS require factual corrections and minor clarifications to the DEIS; however, no comments warrant further response in the form of modifications to alternatives, development and evaluation of additional alternatives, or modification of analyses.

The Pier B On-Dock Rail Support Facility Project DEIS is currently available to the public on the *Federal Register*. The DEIS errata sheets are included in this combined FEIS/ROD.

1.2.2 Combined Environmental Impact Statement/Record of Decision

Traditionally, and in accordance with the Council on Environmental Quality regulations, the lead agency issues FEIS and ROD documents separately with a minimum 30-day period between the FEIS and the ROD. However, consistent with 23 U.S.C. 139(n), 49 U.S.C. 24201, and 49 U.S.C. 304a, to the maximum extent practicable, when a USDOT OA is a lead agency, it must combine the FEIS and ROD[4] unless one of the following occurs:

- The FEIS makes substantial changes to the proposed action that are relevant to environmental or safety concerns
- There is a significant new circumstance or information relevant to environmental concerns that bears on the proposed action or the impacts of the proposed action.

The combined FEIS/ROD must meet applicable requirements for both an FEIS and ROD. The format of the FEIS/ROD can be flexible depending on the complexity of the action and other considerations such as accommodating the needs of Cooperating and Joint Lead Agencies. The Pier B On-Dock Rail Support Facility Project FEIS does not include substantial changes to the proposed action in terms of environmental or safety concerns, nor are there significant new circumstances or information relevant to environmental concerns of the proposed action or its impacts. Therefore, MARAD is using a combined FEIS/ROD for the Project.

The combined FEIS/ROD includes:

- Identification of the preferred alternative and evaluation of all reasonable alternatives considered (Section 2.2, *Purpose and Need, Proposed Action, and Alternatives*)
- Summary of public and agency coordination activities that have taken place since the issuance of the DEIS (Section 2.4, *Public Outreach and Agency Coordination for the DEIS*)
- Basis of the decision (Section 3.3, *Basis of Decision*)

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[2] 40 CFR 1503.4(c).

[3] U.S. Department of Transportation. 2019, *Guidance on the Use of Combined Final Environmental Impact Statements/Records of Decision and Errata Sheets in National Environmental Policy Act Reviews*, April 25. Accessed: https://www.transportation.gov/sites/dot.gov/files/docs/mission/transportation-policy/permittingcenter/337371/feis-rodguidance-final-04302019.pdf. Accessed: September 29, 2020.

[4] 40 CFR 1506.10(b)(2).

- Summary of mitigation measures that would be incorporated in the Project (Section 3.10, *Measures to Minimize Harm*)
- Demonstration of compliance, to the extent possible, with all applicable environmental laws and executive orders, or provision of reasonable assurance that requirements can be met (Section 3.12, *Agency Findings and Determinations*)
- Discussion of substantive comments received on the DEIS and responses to comments (Section 2.4.5, *DEIS Comments Received and Response to Comments*)

CHAPTER 2
FINAL ENVIRONMENTAL IMPACT STATEMENT

2.1 INTRODUCTION

This Final Environmental Impact Statement (FEIS) has been prepared in accordance with the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] 4321 et seq.), the Council on Environmental Quality regulations for implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508), and the U.S. Department of Transportation (USDOT) and Maritime Administration (MARAD) Procedures for Considering Environmental Impacts (USDOT Order 5610.1C and Maritime Administration Order 600-1, respectively). This FEIS has been developed to assist in the evaluation of anticipated federal financial support application(s) from the City of Long Beach (COLB), acting by and through its Board of Harbor Commissioners (BHC) to support the Port of Long Beach (POLB or Port) Pier B On-Dock Rail Support Facility Project (Project).

2.2 PURPOSE AND NEED, PROPOSED ACTION, AND ALTERNATIVES

This section discusses the Project's purpose and need, Proposed Action, and alternatives considered. It describes the potential transportation and environmental effects of the Proposed Action as compared to the 10th Street Alternative, 9th Street Alternative, and the No Action Alternative. This section demonstrates why the Proposed Action remains the Preferred Alternative following the formal Draft Environmental Impact Statement (DEIS) review and comment period.

No substantive comments were received on the DEIS that would result in changes to the Proposed Action. Additionally, no comments raised new circumstances or provided new information relevant to environmental or safety concerns that would warrant a change to the recommended Preferred Alternative.

2.2.1 Purpose and Need

The Port is a primary gateway for U.S. international trade. The Port has evaluated the existing cargo movement within the Port and the existing Port infrastructure and has concluded that the most efficient means of moving the 30–35 percent anticipated cargo increase to its ultimate destination is by rail. This is relative to the Port's goal to provide a sufficient facility to accommodate the anticipated increase in cargo volume and demand for rail transport of that cargo into the foreseeable future. The Port's goal for the proposed Project would be to transfer containers directly to rail, assemble trains carrying an average of 250 containers each, and dispatch those trains to their respective Class I railroad main lines as quickly as possible. The Port has determined that modifying the existing on-dock facilities rather than constructing a new facility would be the most efficient method for handling transfer of the anticipated cargo load. Both near-dock and off-dock facilities assist in this effort. To the extent that more containers can be handled via the on-dock facilities, rather than near- and off-dock facilities, cargo-handling would be more efficient.

The Pier B Rail Yard is a critical component of overall goods movement handling within the Port because it is the only rail-serving facility within the entire San Pedro Bay Ports (SPBP) Complex that can assist the on-dock terminals with the task of assembling trains and dispatching them onto the

Alameda Corridor and then to the Class I railroad main lines. However, it does not have the necessary storage tracks or sufficient track lengths to handle the longer trains that are becoming standard.

2.2.1.1 Purpose of the Project

The purpose of the proposed Project, which would reconfigure and expand the Pier B On-Dock Rail Support Facility is to:

- Relieve current inefficiencies and bottlenecks in the POLB rail cargo handling system.
- Provide a sufficient facility to accommodate the anticipated increase in cargo volume and demand for rail transport of that cargo into the foreseeable future.
- Support the transition to a more efficient, more economically competitive and less polluting freight transport system as envisioned in the California Sustainable Freight Action Plan (State of California 2016).
- Support the shared goals of local and regional transportation agencies to increase Port, rail, and highway capacities.
- Promote a mode shift from containers shipped by truck to near-dock and/or off-dock facilities to containers shipped by rail from the on-dock and supporting rail yards.
- Maximize on-dock rail operations to a targeted goal of 30 to 35 percent of containers handled by the Port, as defined in the 2006 Port Rail Study Update (POLA and POLB 2006).
- Receive and depart, within the confines of the rail yard, up to 10,000-foot-long trains to accommodate the increasing use of such trains by the Class I railroads.
- Improve motorist and rail safety by eliminating an existing at-grade crossing where 9th Street meets Pico Avenue.

2.2.1.2 Need for the Project

There is a need to expand and improve the Pier B Rail Yard to accommodate current and future demand for container handling by rail, which has been increasing over time and is expected to continue to increase through the next decade (POLB 2016). In addition to growth in overall demand, typical container trains have been increasing in length from 8,000 feet to 10,000 feet and greater. These two factors have made it necessary for the POLB to consider options for maximizing efficient container management into the future.

The ability of the POLB to address increasing demand for cargo handling by rail to and from the Port is currently limited. Longer trains (8,000 feet or more) must be broken down off site into smaller units, called cuts, that are then moved into the Port to have them loaded via the existing POLB on-dock facilities because there is currently no space within the Port that can handle the assembly/ disassembly of the longer trains. This movement of cuts requires track space, including active main line tracks, at varying locations in the Port. Expansion of the existing Pier B Rail Yard was identified by the POLB as the most efficient and cost-effective solution to address the Port's rail needs with the least impact on the Port's existing operations. The Pier B Rail Yard does not currently have space to handle 10,000-foot-long trains without using tracks outside the rail yard, these 10,000-foot-long trains are becoming more common as the industry evolves. Delays at grade crossings in the vicinity are caused by needing to use tracks outside the existing rail yard. Therefore, the proposed Project is needed for more efficient and rational rail operations—both within and to/from the SPBP Complex—to address the physical deficiencies and shortcomings of the existing Pier B Rail Yard with respect to supporting on-dock rail operations, and to address local roadway deficiencies and enhance utilities and aging infrastructure.

The need for the proposed Project—as underscored by the currently deficient rail operations, existing site operations and deficiencies, and local roadway and utility deficiencies—is discussed throughout this FEIS.

2.2.2 Summary of the Proposed Action/Proposed Project

The Proposed Action involves the reconfiguration and expansion of the existing 82-acre Pier B On-Dock Rail Support Facility. The proposed Project would be constructed within a contiguous 171-acre footprint in three phases over an estimated 7 years. Figure 2-1 shows the proposed Project components.

Components of the proposed Project would include the following:

- Adding 31 yard tracks and five arrival/departure tracks, thereby expanding the yard from an existing 12 tracks (2 main line tracks, 10 yard tracks, and no arrival/departure tracks) to a total of 48 tracks (2 main line tracks, 41 yard tracks, and five arrival/departure tracks)
- Providing for up to 10,000-foot-long receiving/departure tracks
- Widening the existing rail bridge over Dominguez Channel to accommodate one additional track

Realignments and closures of some roadways would be required to accommodate the expanded rail yard. Pier B Street would be realigned to the south, its geometrics would be improved, and two lanes of traffic in each direction would be provided.

- The realignment of Pier B Street would require the reconstruction of two intersections, at Anaheim Way and Edison Avenue.
- The existing at-grade 9th Street railroad grade crossing would be closed, and the existing access ramps to the Shoemaker Bridge would be removed.
- Pico Avenue would be realigned to the west beginning at the Interstate (I-) 710 ramps south to approximately Pier D Street, allowing space for four additional tracks between Pico Avenue and I-710.
- Areas needed for new rail tracks would require the closure of portions of 9th, 10th, 11th, and 12th Streets and Edison, Jackson, Santa Fe, Canal, Caspian, Harbor, and Fashion Avenues between Anaheim Street to the north and Pier B Street to the south, in the COLB.
- Portions of Farragut, Foote, Cushing, Macdonough, and Schley Avenues would be closed in the vicinity of existing railroad right-of-way (ROW) in the City of Los Angeles (COLA).

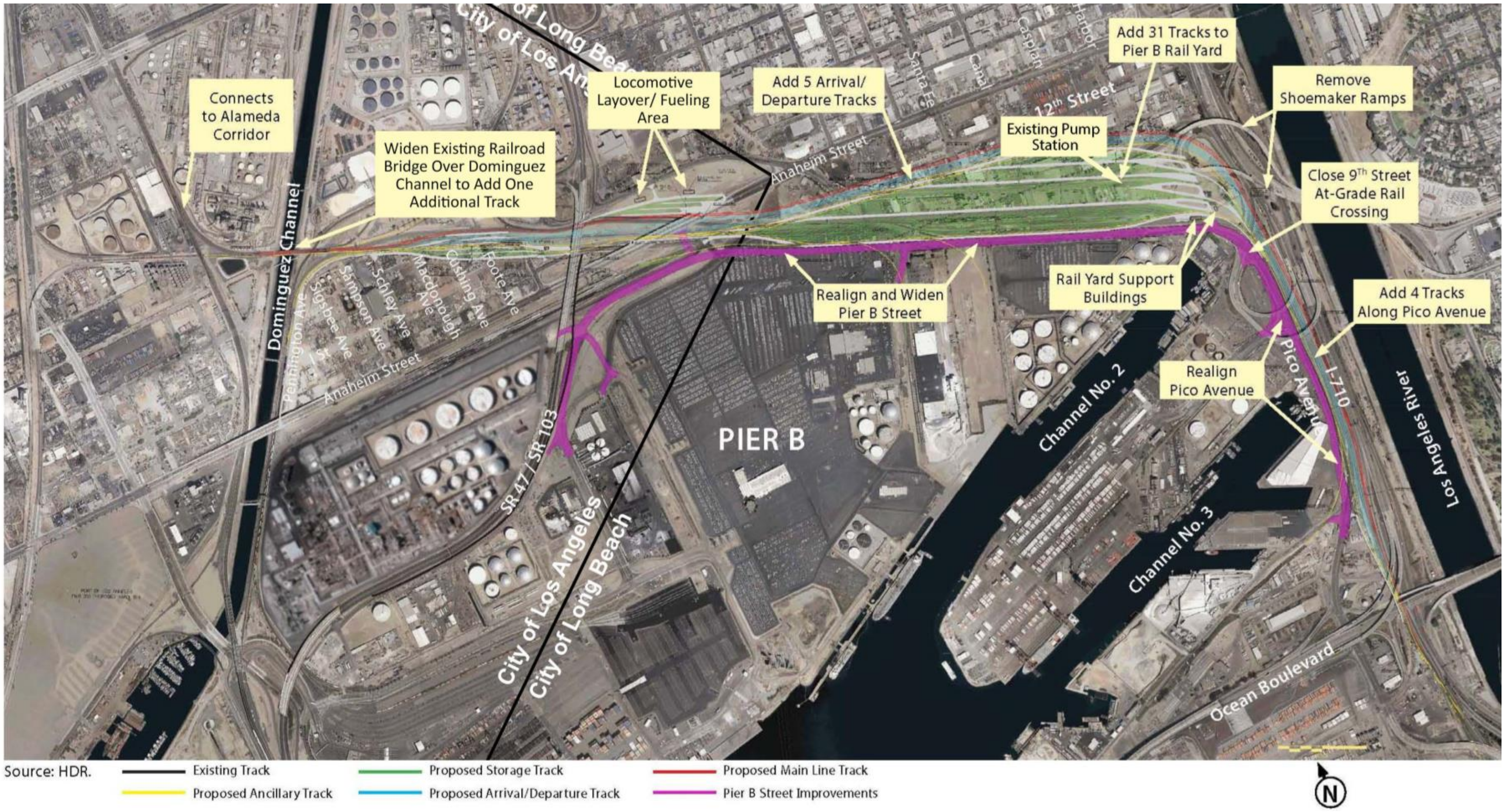

Figure 2-1
Pier B On-Dock Rail Support Facility, Proposed Project (12th Street) Components

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The reconfigured Pier B On-Dock Rail Support Facility would:

- Shift approximately 10 percent of container volume handled at the Port from truck to rail
- Be used to receive/depart and stage inbound and outbound intermodal trains up to 10,000 feet in length
- Include storage tracks for empty rail cars required to support on-dock intermodal operations
- Provide rail car storage and classification facilities
- Provide an assembly area for departing trains
- Provide an area where inspection and departure brake tests would be performed
- Include staging tracks for non-intermodal cars bound to and from non-container terminals
- Provide trackage for rail car repair activities

The proposed Project would support the following rail operations:

- Up to four Pacific Harbor Line (PHL) locomotives would operate on site to manage movement of rail cars within the rail yard each day by 2025 and up to eight by 2035.
- Approximately five rail and rail car repair vehicles would operate within the on-dock support facility.
- Locomotive operation support personnel vehicles would consist mostly of passenger vans. which would be used to pick up and drop off train crews at the on-dock support facility.
- Daily rail yard administrative staff would arrive/depart via individual passenger vehicles for each shift. Approximately 10 workers per shift would be required to operate the yard.
- Vehicle operations associated with the on-dock rail support facility would include rail and rail car repair vehicles, as well as locomotive operation support personnel vehicles. These operations would occur 24 hours per day, 7 days per week, in three shifts.

2.2.3 Alternatives Considered and Analyzed in this EIS

Following the evaluation of alternative locations and site-specific alternatives, two build alternatives were determined to offer the best potential for achieving the purpose and need. This EIS also analyzes the No Action Alternative. Therefore, this EIS addresses the following alternatives in detail:

- 10th Street Alternative
- 9th Street Alternative
- No Action Alternative

Table 2-1 provides a brief comparative side-by-side summary of the proposed Project and each of the alternatives analyzed in this EIS.

TABLE 2-1
COMPARISON OF PIER B ON-DOCK RAIL SUPPORT FACILITY ALTERNATIVES

	Existing Configuration (No Action)	**Proposed Project (12th Street)**	**10th Street Alternative**	**9th Street Alternative**
Total Area (gross acres)	82	171	155	140
Total Number of Tracks	12 existing tracks: • 2 main line tracks • 10 yard tracks • 0 arrival/ departure tracks	48 total tracks (new + existing): • 2 main line tracks (existing) • 41 yard tracks (31 new) • 5 arrival/ departure tracks (5 new)	34 total tracks (new + existing): • 2 main line tracks (existing) • 29 yard tracks (19 new) • 3 arrival/ departure tracks (3 new)	21 total tracks (new + existing): • 2 main line tracks (existing) • 16 yard tracks (6 new) • 3 arrival/ departure tracks (3 new)
Dominguez Channel Bridge	No change	1 track added	1 track added	No change
Pico Avenue Corridor	No change	Realign street westerly; add 4 tracks	Realign street westerly; add 2 tracks	Realign street westerly; add 2 tracks
Permanent Street Closures	COLB: No streets would require closure. COLA: No streets would require closure. Shoemaker Ramps: The Shoemaker ramps would remain unchanged.	COLB: Portions of the following roads would be closed: • Edison Avenue • Jackson Avenue • Santa Fe Avenue • Canal Avenue • Caspian Avenue • Harbor Avenue • 9th, 10th, 11th, and 12th Streets • Fashion Avenue COLA: Portions of the following roads would be closed: • Farragut Avenue • Foote Avenue • Cushing Avenue • Macdonough Avenue • Schley Avenue Shoemaker Ramps: The Shoemaker	COLB: Portions of the following roads would be closed: • Edison Avenue • Jackson Avenue • Santa Fe Avenue • Canal Avenue • Caspian Avenue • Harbor Avenue • 9th and 10th Streets COLA: Portions of the following roads would be closed: • Farragut Avenue • Foote Avenue • Cushing Avenue • Macdonough Avenue • Schley Avenue Shoemaker Ramps: The Shoemaker ramps would be	COLB: Portions of the following roads would be closed: • Edison Avenue • Jackson Avenue • Santa Fe Avenue • Canal Avenue • Caspian Avenue • 9th Street COLA: Portions of the following roads would be closed: • Farragut Avenue • Foote Avenue • Cushing Avenue • Macdonough Avenue • Schley Avenue Shoemaker Ramps: The Shoemaker ramps would remain unchanged.

TABLE 2-1
COMPARISON OF PIER B ON-DOCK RAIL SUPPORT FACILITY ALTERNATIVES

	Existing Configuration (No Action)	Proposed Project (12th Street)	10th Street Alternative	9th Street Alternative
		ramps would be removed.	reconfigured to maintain a connection between Anaheim Street and downtown via Harbor Avenue.	
Operational Employees	5/shift	10/shift	8/shift	5/shift
Construction Period	N/A	7+ years (3 phases)	7+ years (3 phases)	3+ years (2 phases)
Opening Year	N/A	2025	2025	2020
Trains/Day	7	17	15	14
Vehicle Trips/Day	5	10	8	5

The Proposed Action achieves the purpose and need and represents the least environmentally significant practicable alternative as compared with the other action alternatives. Therefore, MARAD has identified the Proposed Action as the Preferred Alternative.

2.3 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

This section presents the summary of potential impacts of the Proposed Project as well as the Mitigation Measures, Avoidance and Minimization Measures, and Best Management Practices (BMPs) that will be implemented for the proposed Project.

2.3.1 Environmental Consequences

2.3.1.1 Geology, Soils, and Seismic Conditions

Impacts on the topography as a result of construction activities are anticipated to be limited to natural erosion or other depositional processes. Erosion would be controlled by the use of BMPs.

The proposed Project would preclude future onsite oil or gas extraction from the Wilmington Oil Field within Project boundaries; however, petroleum reserves beneath the site could be recovered from remote locations, using directional (e.g., slant) drilling techniques.

There are no known active or potentially active faults crossing the proposed Project area that might result in ground rupture or attendant damage to structures.

Seismic activity along numerous regional faults could produce ground shaking, liquefaction, differential settlement, or other seismically induced ground failure. Construction in accordance with

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the COLB Building Code requirements would limit the severity of consequences from severe seismically induced ground movement.

There would be an extremely low risk of coastal flooding due to tsunamis and seiches as the proposed Project elevation is approximately 10 to 25 feet above mean lower low water (MLLW) and is inland from the shoreline.

Impacts from construction and operation of the proposed Project on geology, groundwater, soils, and seismic conditions would be less than significant, and mitigation measures are not required.

2.3.1.2 Air Quality

Construction activities for the proposed Project would require the use of off-road construction equipment and on-road vehicles. Most equipment of this type operates on diesel fuel, resulting in combustion exhaust emissions in the form of volatile organic compounds (VOC), carbon monoxide (CO), nitrogen oxides (NO_X), sulfur oxide (SO_X), and particulate matter (PM). Earth-disturbing activities, such as grading and driving over unpaved surfaces, would also generate PM emissions in the form of fugitive dust. Criteria pollutant emission sources associated with future operation of the Pier B On-Dock Rail Support Facility would include switch locomotives, line haul locomotives, yard equipment, and on-road vehicles. Dispersion modeling was performed to estimate the local offsite ambient pollutant concentrations resulting from emissions during construction and operation.

Unmitigated localized pollutant concentrations during construction would exceed National Ambient Air Quality Standards (NAAQS) thresholds. With mitigation, the NAAQS would still be exceeded during construction for the maximum 1-hour federal nitrogen dioxide (NO_2) concentrations during all phases of construction. Therefore, even with mitigation, construction would result in an adverse effect related to the local ambient 1-hour NO_2 concentration. There are no known additional feasible mitigation measures to further reduce ambient concentrations during Project construction. As a result, impacts of construction of the proposed Project would remain adverse for the 1-hour NO_2 concentrations.

During long-term Project operation, the proposed Project would exceed the NAAQS for the localized maximum offsite 1-hour NO_2 concentrations in all operation years analyzed. Therefore, without mitigation, the proposed Project would result in an adverse effect related to localized 1-hour NO_2 concentrations. The proposed Project already incorporates many regulations and Clean Air Action Plan (CAAP) measures that reduce air pollutant impacts. There are no additional feasible mitigation measures identified for the proposed Project at present. However, to keep pace with emerging emission reduction technologies, a mandatory 5-year technology review would be made part of the proposed Project as avoidance and minimization measure BMP AQ-1. (Refer to Table 2.2 of this FEIS.)

With regard to regional emissions, the proposed Project is subject to *General Conformity* and *Transportation Conformity* under the federal Clean Air Act.

The general conformity determination process is intended to demonstrate that a proposed federal action will not: (1) cause or contribute to new violations of a NAAQS; (2) interfere with provisions in the applicable State implementation Plan (SIP) for maintenance of any NAAQS; (3) increase the frequency or severity of existing violations of any standard; or (4) delay the timely attainment of any standard. The South Coast Air Quality Management (SCAQMD) determined that proposed Project emissions subject to General Conformity conformed to the SIP on April 15, 2021 (Exhibit A of this FEIS).

Regarding transportation conformity, the proposed Project's project-level conformity analysis indicates that the project-level transportation conformity requirements of 40 CFR Part 93 have been met. The project is included in the Southern California Association of Governments' (SCAG) current Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP), as amended. The design concept and scope of the preferred alternative have not changed significantly from those assumed in the regional emissions analysis. As required by 40 CFR 93.116 and 93.123, the localized $PM_{2.5}$ and PM_{10} analyses are included in the documentation. The analyses, presented in Appendix A of this FEIS, demonstrate that the project will not create any new violations of the standards or increase the severity or number of existing violations. Federal Highway Administration (FHWA) concurred with this determination on March 10, 2021 (Exhibit B of this FEIS).

Since the proposed Project's general conformity and transportation conformity determination requirements have been satisfied, the Project's regional emissions would conform to the latest U.S. Environmental Protection Agency (EPA)-approved Air Quality Management Plan (AQMP). The emissions from the Project are accommodated within the AQMP's emissions budgets, and the proposed Project is not expected to result in any new or additional violations of the NAAQS or impede the projected attainment of the NAAQS.

A Health Risk Assessment (HRA) was conducted to quantify certain health effects associated with toxic air contaminant (TAC) emissions during construction and operation of the proposed Project. Emissions of TAC would occur from the following:

- Internal combustion of diesel fuel in locomotives, on-road vehicles, yard equipment, and construction equipment
- Internal combustion of gasoline in on-road vehicles
- Diesel vapors from locomotive refueling
- Particulate emissions from vehicle tire and brake wear

Construction and operation of the proposed Project would result in the individual cancer risk exceeding the threshold of 10 chances per million at the residential and sensitive receptor types. Additionally, the population cancer burden would exceed the threshold of 0.5 additional cancer cases. Therefore, without mitigation, there would be an adverse effect related to individual cancer risk and population cancer burden associated with construction and operation of the proposed Project. With the implementation of Mitigation Measures AQ-1 through AQ-5 (Table 2.2 of this FEIS), individual cancer risk would no longer exceed the threshold of 10 chances per million at the maximally affected residential and sensitive receptors. The mitigation measures would reduce the individual cancer risks to below the threshold at the maximally affected residential and sensitive receptors. The mitigation measures would also reduce the population cancer burden impact to below the thresholds. With mitigation, the proposed Project would not result in an adverse effect related to public health effects from construction and operation.

2.3.1.3 Greenhouse Gases and Climate Change

The proposed Project would produce greenhouse gas (GHG) emissions during construction and operations. Construction emissions were calculated and amortized over a 30-year period to be included in the operations analysis. The majority of construction emissions (58 percent) are associated with on-road vehicles, while the remaining emissions (42 percent) are associated with construction equipment. The majority of operational emissions (90 percent) are associated with switcher locomotive and line haul locomotive activity. The proposed Project would include implementation of Mitigation Measures AQ-1 and AQ-3 (Table 2.2 of this FEIS), which would reduce GHG emissions from construction. The proposed Project would also include implementation of Mitigation Measures GCC-1 through GCC-9, which would reduce GHG emissions from construction and operation.

As it not possible to assign a “significance” value or impact to the emissions themselves, the emissions estimate is presented as a proxy for potential climate effects. Emissions from the proposed Project would ultimately add to regional and global budgets and may contribute to and affect local, regional, and global conditions associated with climate change. Because the proposed Project would contribute to the overall regional and global budget of GHGs in the atmosphere, the proposed Project would contribute to climate change effects, resulting in an adverse effect. However, given the global and complex nature of climate change, it is not possible to link projected GHG emissions associated with the proposed Project to specific climate change impacts within the air quality analysis area.

2.3.1.4 Water Quality/Hydrology

Construction and operation of the proposed Project would not result in violation of regulatory standards or guidelines. Project construction and operation would not involve any direct or intentional discharges of wastes to harbor waters. All work would be conducted in accordance with Project-specific permits that include measures to minimize impacts on water quality. Leaks or spills of petroleum products from equipment would be handled by appropriate waste management construction site BMPs; therefore, the impacts would be less than significant, and mitigation measures are not required.

Construction and operation of the proposed Project would not result in exceedances of the Enclosed Bays and Estuaries Plan criteria for sediment-introduced contaminants. Implementation of a Stormwater Pollution Prevention Plan (SWPPP) and construction site BMP, and adherence to National Pollutant Discharge Elimination System (NPDES) permit requirements would be required during construction. Because implementation of the proposed Project would result in a reduction of stormwater runoff, Project operations would have little potential to affect harbor water quality in the immediate vicinity of storm drains and other locations where runoff of soils can enter the harbor. As a result, exceedances of the Enclosed Bays and Estuaries Plan criteria would be less than significant, and mitigation measures are not required.

Construction and operation of the proposed Project would not result in flooding. Construction of the proposed Project would not increase the potential for flooding on site because drainage would be controlled. The stormwater drainage system would be designed to safely and adequately convey flows to ensure that there would be no adverse effects on the area hydrology or floodplain. Most of the eastern portion of the Project area is in Zone A, which is the 100-year floodplain. Although portions of the proposed Project are within the 100-year flood zone, construction of the proposed Project would not increase the potential for flooding on site because drainage would be maintained and the overall elevation of the site would not be changed. Construction and demolition activities for the proposed Project would result in minor reconfigurations of drainage basins and would redirect stormwater flows; however, the design of the stormwater drainage system would safely and adequately convey flows to ensure that there would be no adverse effects on hydrology or floodplains. Flooding would not be increased as a result of Project construction. The proposed Project would be designed to not impede or redirect flood flows during site operations in a manner that would alter the elevation or flow of existing flood patterns. The design of the storm drain system would safely and adequately convey flows when the rail yard is operating and would ensure that there would be no adverse effect on the area's hydrology or floodplain. Additionally, there are no levees or dams in the vicinity. Impacts would be less than significant, and mitigation measures are not required.

Construction and operation of the proposed Project would not result in wind or water erosion that would cause substantial soil runoff. Runoff from general construction activities would have short-term, localized less-than-significant impacts on water quality. Construction and operational activities would not accelerate the natural processes of wind and water erosion and would be controlled onsite through implementation of BMPs. Because implementation of the proposed Project would reduce stormwater runoff, Project operations would have little potential to affect harbor water quality in the immediate vicinity of storm drains and other locations where runoff of soils can enter the harbor. Therefore, impacts would be less than significant, and mitigation is not required.

2.3.1.5 Biological Resources

Construction and operational activities would not substantially affect any rare, threatened, or endangered species or their habitat; interfere with wildlife movement or migration corridors; result in a substantial loss or alteration of marine habitat; substantially affect a natural habitat or plant community, including wetlands; or substantially disrupt local biological communities.

There is no habitat within the Project site for state or federally listed threatened or endangered species. The proposed Project area is fully developed and does not facilitate movement of wildlife within the Port/Project area for birds or terrestrial wildlife. The Dominguez Channel would be the same as it is now, during construction and during future operations of the proposed Project. The proposed Project area does not include any marine habitats.

The proposed Project area is fully developed, and there are no biological communities or natural habitats therein. Species within the proposed Project area are already well adapted to the heavily industrialized conditions of the proposed Project area. Construction and operational activities would not disrupt the existing local biological communities or natural habitats of the proposed Project area.

There is a potential for bats to be present at the Dominguez Channel rail bridge and migratory birds to be nesting in landscaping, including ornamental trees that would be removed as part of construction. The loss of migratory birds and bats from Project construction would be a potentially significant impact. To avoid potentially significant impacts on bats and migratory birds that could result from construction activities, the following mitigation measures would be required:

- Mitigation Measure BIO-1 requires that a qualified bat specialist conduct a pre-construction survey and that appropriate subsequent actions be identified and implemented.
- Mitigation Measure BIO-2 requires that construction activities that could remove trees or structures that may support the nests of protected birds follow the requirements of the Migratory Bird Treaty Act (MBTA).

With incorporation of these two mitigation measures, impacts on bats and migratory birds would be considered less than significant.

2.3.1.6 Transportation

The proposed Project would consist of rail yard improvements and roadway network changes, which include realigning Pier B Street, closing the 9th Street/Pier B Street at-grade crossing, and removing or closing portions of several local streets in the study area.

The proposed Project would have the following construction effects on roadway segments:

- **#19A/B – northbound and southbound I-710 freeway:** The construction-related traffic at this location would add fewer than 150 vehicles during the analyzed peak hours. Per the Congestion Management Plan (CMP) guidelines, further analysis of study roadway segments is required if the Project adds 150 or more trips, in either direction, during either AM or PM weekday peak hours. Therefore, no further analysis is required.
- **#20A/B – eastbound and westbound Pacific Coast Highway (PCH) at the I-710 interchange:** With the addition of construction-related traffic, level of service (LOS) would not change during any of the three peak-hour periods analyzed and would not fall below LOS C.
- **#21A/B – eastbound and westbound PCH at the Los Angeles River:** With the addition of construction-related traffic, LOS would not change for any of the three peak-hour periods analyzed. Only the westbound segment of PCH would operate at an LOS less than C (i.e., LOS D during the AM peak period).

Construction of the proposed Project would not result in any changes to LOS, and it would not cause volume to capacity (V/C) ratio increases for arterial and freeway segments. Therefore, the proposed Project would not have an adverse effect on LOS and V/C ratios and would not require avoidance, minimization, and/or mitigation measures.

For safety reasons, access to the Pier B Rail Yard is currently restricted to rail yard workers only, although pedestrians and bicyclists may access streets adjacent to the rail yard. Access to the proposed Project also would be restricted to rail yard workers; pedestrians would continue to have access to all businesses on streets outside of the rail yard, including the Long Beach Multi-Service Center (MSC), using reconstructed sidewalks.

On the Long Beach side, in the North Harbor area, streets currently run south from Anaheim to 9th or 10th Streets. Construction of the proposed Project would affect streets as follows: for north-south streets, Fashion, Harbor, and Caspian Avenues would end at 11th Street, and Canal, Santa Fe, and Jackson Avenues would end at the 12th Street ROW. For east-west streets, 10th would be closed and 9th would run between the 12th Street ROW and Anaheim Street.

On the Los Angeles side, north-south streets currently run north from Anaheim Street to the existing Terminal Island Lead Tracks. Construction of the proposed Project would affect streets as follows: the addition of four staging tracks would shorten Farragut, Foote, Cushing, and MacDonough Avenues. Schley, Sampson, and Sigsbee Avenues would remain essentially untouched.

Construction of the proposed Project would not affect pedestrian access or existing bicycle or public transit. Therefore, the proposed Project would not require any avoidance, minimization, and/or mitigation measures.

Within the Project footprint, the 9th Street at-grade rail crossing would be removed. Accordingly, vehicular delay caused by trains blocking the crossing would be eliminated at that location. A minor amount of additional travel time for autos using the reconfigured local street network would occur.

The proposed Project would not have a substantial adverse effect on vehicular delays on Pier B Street or at the Pier B Street/Anaheim Way at-grade crossing. None of the at-grade railroad crossings are expected to experience significant delays with operation of the proposed Project. Therefore, the proposed Project would not require any avoidance, minimization, and/or mitigation measures.

None of the study intersections would experience decreases in LOS or increases in V/C ratios at signalized intersections or cause additional delays at unsignalized intersections.

The proposed Project would neither conflict with policies regarding public transit, bicycle, or pedestrian facilities, nor adversely affect such facilities.

2.3.1.7 Land Use, Coastal Zone Consistency, and Recreation

Project construction and operational activities would be consistent with the adopted goals, objectives and policies of applicable local, regional, and state plans. Land use impacts due to Project construction and operational activities would be less than significant, and mitigation measures are not required.

The proposed Project would be consistent with goals and policies contained within the Port Master Plan (PMP), which seeks to increase primary Port use and encourage more effective use of existing land in the Port. The proposed Project would also be consistent with the COLB Mobility Element, which calls for increased on-dock rail support. The proposed Project would address these goals by substantially increasing the efficiency of rail service to and from existing on-dock facilities, thereby increasing economic development. Project operations would not introduce uses or activities incompatible with existing and future land uses. The proposed Project would not physically conflict or interfere with operation of the COLB MSC currently 1,270 feet from the existing rail yard. The proposed Project is consistent with the COLA General Plan's Wilmington-Harbor City Community Plan goals and objectives because it represents a continuation of existing land uses. Impacts would be less than significant, and mitigation is not required.

The proposed Project would not require relocation of any residences; therefore, it would not require replacement housing elsewhere. POLB, COLB, and COLA would be required to follow procedures and legal requirements for relocations of industrial and commercial properties; adequate compensation would be provided for acquisitions. Construction of replacement buildings or structures would not be required because industrial and commercial space is expected to be available in the North Harbor area. Impacts would be less than significant, and mitigation measures are not required.

2.3.1.8 Public Services and Safety

Project construction activities would not burden police, fire, or other security agency staff levels, and acceptable service ratios, response times, and other performance objectives would be maintained. Construction activities requiring roadway closures and modifications would be conducted in accordance with the Transportation Management Plan (see Section 6.3.4 of the DEIS). Construction of the proposed Project would not degrade law enforcement response times, emergency service levels, and MSC performance objectives. The additional traffic control services required by proposed Project construction activities are not expected to have a substantial impact on police or fire service levels. The standard security measures to be implemented during construction of the proposed Project would minimize the burden on police, fire, and other security agency staff levels. Therefore, construction of the proposed Project would have a less-than-significant impact on public services/health and safety, and mitigation is not required.

Proposed Project operations would not affect first responder response times, emergency service levels, or performance objectives. The local area street system would be designed such that all required emergency access routes would be made available. Because impacts on public services would be less than significant, mitigation measures are not required.

Relocation of fire hydrants, water supply trunk lines, and distribution mains in the proposed Project area would be conducted in consultation with the affected public service agencies and would be appropriately managed so that there would be minimal, if any, disruptions to service. No other impacts on public facilities are anticipated. All public service locations would continue to be accessible. Operation of the proposed Project would have a less-than-significant impact on public services and safety; mitigation is not required.

2.3.1.9 Noise

Construction activity would not result in noise levels of 3 decibels (dB) or greater over baseline ambient levels and would not exceed COLB or COLA noise limits and restrictions; therefore, impacts would be less than significant.

Predicted construction noise levels would not exceed ambient levels, and such noise would not be discernible; therefore, construction noise would neither be discernible at any sensitive receptors nor exceed either the COLB or COLA impact standards.

Construction activity would not result in vibration levels that exceed Federal Transit Administration (FTA) human annoyance or building damage thresholds. Due to attenuation with distance from the source, construction vibration from the proposed Project would not result in vibration levels at the MSC that exceed 83 vibration decibels (VdB); therefore, the vibration impact during construction would be less than significant.

The highest energy source of underwater sound during operation of the Project would be from expansion of the railroad bridge at Dominguez Channel.

Major operational noise sources under the proposed Project would include train movements within the yard (i.e., low-speed light engine locomotive moves, wheel/rail noise from container car sets, coupler engaging/de-coupling), vehicular traffic (i.e., primarily trucks) traveling on adjacent streets, and additional trains from the proposed Project after they leave the Pier B Rail Yard.

Changes in noise levels at receptor locations would range from a change of 0 A-weighted decibels (dBA) to an increase of 1 dBA equivalent sound level (L_{eq}). Because the largest increase is no greater than the 3-dB threshold, vehicular traffic noise impacts would be considered less than significant, and mitigation measures are not required.

The expected noise levels from railroad operations would be lower than ambient noise levels at all of the sensitive receptors. Because of this, no exceedances of either the COLB or COLA standards would occur. The proposed Project would not result in ambient operational noise levels that exceed Long Beach Municipal Code limits. Impacts from rail yard operations would be less than significant.

The number of trains operating within the Alameda Corridor would increase relative to the baseline condition as a result of the proposed Project; however, operational noise levels from proposed Project train activity within the Alameda Corridor would not exceed FTA severe impact criteria or add 3 dBA or more noise above baseline ambient conditions. Because train noise is only one component of the overall ambient noise environment, the effect of this minimal increase on the overall ambient noise levels is expected to be less than 1 dB. Based on representative ambient noise levels measured for the Alameda Corridor, the estimated less-than-1-dB increase would result in a noise exposure in the No Impact level.

Operational noise levels would not exceed the COLB allowable limit of 45 dBA interior noise at schools within the Project influence area. There is no COLA allowable noise limit for interior noise at schools. The impact from proposed Project operational noise levels would be less than significant.

Operational noise levels would not exceed normally acceptable noise levels for the Industrial Manufacturing land use category in the COLA portion of the Project influence area. There are no known noise-sensitive receptors near the COLA portion of the Project footprint. The only applicable land use in the COLA portion of the Project influence area is categorized as Industrial Manufacturing. Because of the relatively distant proximity of proposed Project operational activities that could affect sensitive receptors, the COLA normally acceptable noise levels (50–75 dBA Community Noise Equivalent Level [CNEL]) for this land use category are not expected to be exceeded. Therefore, operational noise impacts in the COLA portion of the Project influence area would be less than significant, and mitigation measures are not required.

2.3.1.10 Hazards and Hazardous Materials

Neither construction nor operational activities would adversely affect the public through the routine transport, storage, use, or disposal of hazardous materials. Hazardous substances could potentially be spilled or exposed during Project construction and operations, but implementation of standard BMPs, proper use and storage of hazardous materials and petroleum products, and proper removal of asbestos-containing materials (ACM), lead-based paint (LBP), and polychlorinated biphenyls (PCB)—in accordance with applicable federal, state, and local regulations—would result in less-than-significant Project construction and operational impacts on hazards and hazardous materials.

The proposed Project would be constructed in accordance with applicable federal, state, and local regulations; standard BMPs; and proper use and storage of hazardous materials and petroleum products to address onsite hazards, including the presence of contaminated soils or groundwater, during construction. Therefore, proposed Project construction would not adversely affect the public or environment as a result of being located on a site that is known to contain hazardous materials. Impacts would be less than significant, and mitigation measures are not required.

Although the proposed Project would result in less-than-significant impacts as a result of being located on a site that is known to contain hazardous materials, special conditions would be imposed on the proposed Project, including establishing a safety plan before work is started, conducting soil and groundwater sampling as necessary, conducting Phase II investigations where appropriate, and performing a risk assessment prior to starting work in possible contaminated areas.

Project construction and operations would not adversely affect the public or environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment. Should there be a release of hazardous materials resulting from a rail-related accident during Project construction or operation, established emergency/hazardous materials response procedures would be immediately mobilized. Impacts would be less than significant, and mitigation measures are not required.

Local agency requirements would be incorporated into construction planning, and appropriate response procedures would be established as required by law. Contractors and the railroads would continue to comply with all emergency response and evacuation regulations. The Project would not impair or interfere with emergency response or evacuation plans. Impacts would be less than significant, and mitigation measures are not required.

Neither Project construction nor operational activities would result in noncompliance with state guidelines associated with abandoned oil wells. Implementation of standard California Geologic Energy Management Division (CalGEM) measures would reduce adverse health and safety effects on construction and operational personnel and the general public; therefore, impacts would be less than significant, and mitigation is not required.

Hazardous materials would not be handled within 0.25 mile of an existing or planned school; therefore, there would be no impact, and mitigation measures are not required.

Because hazardous materials used on site would be handled in accordance with federal, state, and local requirements, impacts would be less than significant, and mitigation measures are not required.

Project operational activities would not adversely affect the public or environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment. Rail activity associated with hazardous materials in marine containers would be substantially concentrated at the Project site, which would employ established safety procedures for the handling of rail cars. In addition, a well-defined program of immediate actions, notifications, and onsite responses would be in place, which would substantially minimize the likelihood of an incident with harmful exposure. Should there be a release of hazardous materials resulting from a rail-related accident during Project operation, however, established emergency/hazardous materials response procedures would be implemented. Therefore, impacts would be less than significant, and mitigation measures are not required.

Onsite hazardous materials and soil and groundwater contamination would be properly managed during construction; therefore, impacts during operations would be less than significant, and mitigation measures are not required.

The proposed Project would be incorporated into existing emergency response plans, and emergency response and evacuation systems would continue to be managed. Standard security measures would be implemented during Project operation, and access to Joint Command and Control Center services would not be impeded. Adequate safeguards and appropriate response procedures would be in place during Project operation; therefore, impacts related to implementation of or interference with an adopted emergency response or evacuation plan would be less than significant, and mitigation measures are not required.

Because Project operations would not interfere with abandoned oil wells, there would be no impacts, and mitigation measures are not required.

No onsite hazardous materials would be handled within 0.25 mile of an existing or planned school. Accordingly, there would be no impact, and mitigation measures are not required.

2.3.1.11 Socioeconomics and Environmental Justice

Given the temporary nature of construction industry jobs, the relatively large regional construction industry, and the small number of construction jobs generated by the proposed Project, the 1,135 workers projected for Project construction would likely be readily supplied by the labor force from within the region. Construction of the proposed Project would not require workers to migrate into the region, so no new housing units would be necessary.

While the area surrounding the Project site is primarily industrial and commercial, there are residences in Long Beach and the Wilmington community within 0.4 mile of the Project footprint that include predominantly low-income and minority populations. During construction, significant and unavoidable air quality impacts would constitute a disproportionately high and adverse effect on low-income and/or minority populations. Even with application of mitigation measures to reduce pollutant emissions, residual impacts from CO and NO_X during construction would be significant and unavoidable. Residual impacts of construction of the proposed Project would remain significant for 1-hour and annual NO_2 concentrations during all three construction phases.

During operation of the proposed Project, air pollutant emissions would remain significant and unavoidable for CO in 2025 and 2035, and NO_X in all analysis years after application of mitigation measures. The proposed Project would be subject to Mitigation Measures AQ-1 through AQ-5 (Table 2.2 of this FEIS) and would incorporate many regulatory requirements and CAAP measures; however, there are no additional feasible mitigation measures that would further reduce air quality impacts.

Also during operation of the proposed rail yard Project, the maximum offsite 1-hour (federal) and the annual NO_2 concentrations would exceed significance thresholds. The proposed Project would be subject to Mitigation Measures AQ-1 through AQ-5 (Table 2.2 of this FEIS) and already incorporates many regulations and CAAP measures that reduce air pollutant impacts. There are no additional feasible mitigation measures identified for Project operation at present. However, to keep pace with emerging emission reduction technologies, a mandatory 5-year technology review will be made part of the Project as a Special Condition (Section 3.3 of the DEIS). Peak 1-hour (federal) and annual NO_2 concentrations would represent a significant and unavoidable impact. Because such impacts could overlay residences in Long Beach and the Wilmington community within 0.4 mile of the Project footprint that include predominantly low-income and minority populations, these impacts would constitute a disproportionately high and adverse effect on low-income or minority populations.

2.3.1.12 Utilities, Service Systems, and Energy Conservation

Proposed Project construction activities would require the relocation and reorganization of various water lines, wastewater lines, storm drains, natural gas pipelines, electrical utility lines and infrastructure, and oil pipelines within the Project site. While demolition and construction of utility infrastructure would occur with the proposed Project, there would be no additional demands on the existing utilities. Demolition of existing utility infrastructure and construction of new infrastructure would be conducted in a manner designed to prevent service interruptions for adjacent tenants. Any new construction would be in conformance with current design standards to serve the proposed Project structures. Utility lines would be newly constructed or relocated into subsurface utility corridors that would run between areas of tracks designed within the Project footprint, thereby providing ease of access for repair and maintenance of the lines. If utility relocations need to occur outside of the Project footprint, the Port will seek any necessary additional permitting, as needed. Effects on utilities and service systems would be less than significant, and mitigation is not required.

Because it is estimated that a maximum of 10 workers per shift would be required for operation of the proposed Project, the increase in water and sewer demand would be minimal. There would be a minimal increase in electrical consumption.

Project construction and operational activities would not exhaust or exceed existing water, wastewater, or landfill capacities; therefore, effects on utilities and service systems would be less than significant, and mitigation measures are not required.

Construction and operation of the proposed Project would be consistent with established energy conservation plans and policies. The improvements proposed under this alternative would result in greater energy efficiency in the future. Therefore, impacts would be less than significant, and mitigation measures are not required.

Energy consumption for proposed Project construction would be approximately 180 billion British thermal units (GBtu) over 8 years, or approximately 23 GBtu per year. Energy consumption for proposed Project construction would be used efficiently and would represent a negligible portion of statewide energy consumption. Therefore, impacts would be less than significant, and mitigation measures are not required.

Operational energy consumption under the proposed Project would employ state-of-the art methods and equipment, and the Project would support a substantially greater level of train operations at Pier B, making more efficient use of existing facilities. The expanded facilities would allow longer rail car cuts, reducing switching locomotive operations and decreasing the time and energy needed to assemble and disassemble trains. New equipment would be required to meet California energy efficiency standards. Furthermore, moving containers by rail instead of truck drayage operations would offset at least 90 percent of the increase in energy consumption from expanded rail yard operations by the year 2035. Impacts of the proposed Project on energy resources would be less than significant, and mitigation measures are not required.

2.3.1.13 Cultural Resources

The transit shed at Berths D52–D54 (Figure 2-1) is individually eligible for the National Register of Historic Places (NRHP) under Criterion A at the local level of significance, with a period of significance of 1951 to 1969, and under Criterion C at the local level of significance, with a period of significance of 1951 to 1954. Changes to the visual setting and increased noise during construction would be temporary and would result in no impact. The transit shed’s reinforced-concrete structure would not be vulnerable to impacts from construction-related vibration. Partial demolition of the transit shed, including a section of its primary elevation to accommodate the Project through the “bottleneck,” between the Transit Shed and I-710, would result in a long-term significant impact. Neither neglect of the transit shed nor a change in use is anticipated with operation of the Proposed Action. Therefore, no operational impacts are anticipated.

The transit shed at Berths D52–D54 would experience a significant impact under the Proposed Action. Measures to address the significant impact under NEPA (and the adverse effect under Section 106) would be developed in consultation with the State Historic Preservation Officer (SHPO) and incorporated into a Memorandum of Agreement (MOA). The Section 106 MOA approved by the SHPO stipulates that the Port shall prepare three mitigation reports. These include a Historic Property Treatment Plan and a Post-Construction Report for the transit shed and a Survey of Pre-Containerization Port of Long Beach. The MOA signed by MARAD, Caltrans, and the Federal Railroad Administration (FRA) received final SHPO concurrence on December 9, 2021. The final MOA is included in Appendix B.

Southern California Edison’s Long Beach–Laguna Bell 60-kilovolt (kV) and 220-kV Transmission Lines carry a California Historical Resource status code of 2S2, with a period of significance of 1928.

The Proposed Action would not physically alter or damage the transmission lines, and no impact would result. Changes to the visual setting and increased noise during construction would be temporary. The proposed Project would replace existing industrial infrastructure with similar infrastructure, consistent with the regional setting. Moreover, the setting is not an important element of the resource. Therefore, setting changes during construction would result in no impact. With continued operation of the transmission lines, no impact from a change in use is anticipated.

Section 4(f)

The proposed Project would not result in a constructive use of the transmission lines because the proposed Project would not physically alter or damage the transmission lines and would therefore not result in an adverse effect under Section 106. The Long Beach–Laguna Bell 60-kV and 220-kV Transmission Lines enter the area of potential effects (APE) approximately 315 feet northeast of the intersection of Pier B and Carrack Avenue. A very small portion of the property (less than 0.5 mile of the 16.5-mile span) crosses into the APE. None of the towers is within the Project footprint. As part of the proposed Project, the property would remain in place, and the property's setting would be limited to roadway improvements at Pier B Street and Anaheim Way. Due to the height of the transmission lines as well as the active and highly industrial environment surrounding the property, the proposed Project would not introduce new visual, audible, or atmospheric elements to its setting, and the transmission lines would remain eligible for the NRHP. Therefore, the proposed Project would not result in an adverse effect under Section 106.

Consultation with the SHPO and other cultural resources stakeholders has been initiated and is documented in the Section 106 documentation (Section 106 Identification and Evaluation Technical Report and Draft Findings of Effect [FOE]). The SHPO was also consulted regarding the Section 106 FOE for this resource during circulation of the DEIS.

Implementation of the Proposed Action would result in the constructive use of the transit shed at Berths D52–D54, which is a Section 4(f) resource. Under the proposed Project, the current design requires that Pico Avenue, a presently narrow corridor, be realigned slightly to the west beginning at the I-710 ramps at the 9th Street/Pier B Street/Pico Avenue intersection and continue south to approximately Pier D Street, a portion of which runs along the subject property. This realignment would accommodate the construction of four additional tracks. The current design of the Pico Avenue realignment impinges on 555 N. Pico Avenue's historic property boundary. In order to accomplish the design, engineers would need to demolish approximately 16,400 square feet of the transit shed's eastern corner. Because a portion of the property would be demolished, the proposed Project would result in an adverse effect under Section 106, and therefore would result in a Section 4(f) use of the property.

The Section 106 MOA approved by the SHPO stipulates that the identified mitigation measures must be carried out prior to the expiration of the approved December 9, 2021 MOA. As identified in the MOA, the mitigation measures include Historic Property Treatment Plan for Transit Shed at Berths D52–D54, Post-Construction Report for Transit Shed at Berths D52–D54, and Survey of Pre-Containerization Port of Long Beach. Refer to Table 2.2 of this FEIS for a summary of these mitigation measures.

The 10th Street Alternative and 9th Street Alternative would also result in demolition of the transit shed, resulting in a Section 4(f) use of the property. Additional alternatives were considered as part of the Section 4(f) analysis in the DEIS. Under the Pier B Intermodal Transfer Yard Alternative and the

Reconfigured Yard with Additional Pinwheel Ladder Storage Tracks Alternative, the transit shed would require demolition, resulting in a Section 4(f) use of the property. Under the No Action Alternative, Alternative Site A, Alternative Site B, Alternative Site C, Reconfigured Yard with Additional Storage Tracks and Reconfigured Mead Yard Alternative, and Mead Yard Alternative, the transit shed at D52–D54 (555 N. Pico Avenue) would not be demolished, and no Section 4(f) use would result.

However, all of the avoidance alternatives are considered not prudent and Alternative Site A is also considered not feasible. Each alternative would involve the minimization and mitigation for the loss of the transit shed specified above. In other words, the ability to mitigate for the loss of the transit shed is the same for these alternatives. The relative severity of the remaining harm, after mitigation to the Section 4(f) resource, would also be the same for these alternatives. However, the degree to which each alternative meets the purpose and need differs. Only the proposed Project fully meets the purpose and need. The DEIS includes all possible planning to minimize harm to the Section 4(f) area.

2.3.1.14 Aesthetics and Visual Resources

The proposed Project construction activities would not substantially contrast with the existing industrial visual character of the proposed Project area. The Project site is not located in any scenic vista that can be viewed from a scenic route identified in the COLB General Plan Scenic Routes Element or California Department of Transportation (Caltrans) Scenic Highway Program. There are no designated state scenic highways within the POLB or the COLB. The Project site is not visible from the nearest state scenic highways due to distance, intervening buildings, and topography.

The proposed Project would not introduce aesthetic or visual elements that would degrade the character or quality of existing views. The proposed Project would not introduce a source of daytime glare because additional lighting would incorporate modern, anti-glare technology and sensitive receptors are not within sight distance of the Project site. The proposed Project's impact on day- or nighttime views would be less than significant, and mitigation measures are not required.

2.3.2 Mitigation Measures/Avoidance and Minimization Measures/Best Management Practices

Table 2-2 summarizes the Mitigation Measures, Avoidance and Minimization Measures, and BMPs that would be implemented for the proposed Project.

TABLE 2-2
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact	Mitigation Measures/Avoidance and Minimization Measures/BMPs	Impacts
Geology, Soils, and Seismic Conditions (Section 3.2; all cross-references are to DEIS sections/chapters)	No mitigation is required.	Less than significant
Air Quality, Greenhouse Gases, and Climate Change (Section 3.3)	***Mitigation Measures:*** **AQ-1: On-Road Construction Trucks.** All on-road heavy-duty trucks with a fifth-wheel tractor/trailer and a gross vehicle weight rating of 19,500 pounds or more transporting materials to and from the construction site will meet EPA 2010 on-road heavy-duty diesel engine emission standards. **AQ-2: Tier 4 Construction Equipment.** All self-propelled, diesel-fueled off-road construction equipment 25 hp or greater will meet EPA/CARB Tier 4 off-road engine emission standards. **AQ-3: Off-Road Construction Equipment.** Off-road diesel-powered construction equipment will comply with the following: • Maintain all construction equipment according to manufacturer’s specifications. • Construction equipment will not idle for more than 5 minutes when not in use. • High-pressure fuel injectors will be installed on construction equipment vehicles. **AQ-4: Increased Watering Frequency for Fugitive Dust Control.** Construction site watering, which would be required by SCAQMD Rule 403, will be increased such that the watering interval is no greater than 2.1 hours. A watering interval of 2.1 hours, which was the basis of an emission test, would increase the fugitive dust emissions control from 61 percent to 74 percent. **AQ-5:** Additional Fugitive Dust Control. Contractors will: • Apply approved nontoxic chemical soil stabilizers according to manufacturers’ specifications to all inactive construction areas or replace groundcover in disturbed areas. • Provide temporary wind fencing around sites being graded or cleared. • Cover truck loads that haul dirt, sand, or gravel or maintain at least 2 feet of freeboard in accordance with Section 23114 of the California Vehicle Code.	Adverse

TABLE 2-2
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact	Mitigation Measures/Avoidance and Minimization Measures/BMPs	Impacts
	• Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off tires of vehicles and any equipment leaving the construction site. • Suspend all soil disturbance activities when winds exceed 25 miles per hour or when visible dust plumes emanate from the site and stabilize all disturbed areas. *The benefits to be achieved by the above-listed components of this measure were not quantified in the analysis due to the wide range of variables involved. This measure is applied, however, to further reduce fugitive dust emissions.* **AQ-6: Cumulative Air Quality Impact Reduction Program.** The Port would mitigate cumulative air quality impacts associated with operation of the proposed Project by implementing and funding the POLB CGP. The CGP provides additional funding for community-based GHG reductions. The mitigation amount is calculated based on the proposed Project's peak daily operation emissions, which are disclosed in the Final EIR prepared for the proposed Project (Port of Long Beach 2016). The Port will make a contribution to the CGP in the amount of $149,757 to mitigate emissions of PM and NOX associated with proposed Project operations. The timing of the payments determined by the methodology will be made by the later of the following two dates: (1) the date that the Port issues a Notice to Proceed or otherwise authorizes commencement of construction on the Pier B On-Dock Rail Support Facility Construction Contract, or (2) the date that the Pier B On-Dock Rail Support Facility Final EIR is conclusively determined to be valid, either by operation of PRC Section 21167.2 or by final judgment or final adjudication. The emission reductions that may result from the Projects funded into the CGP are excluded from this analysis because it is not possible to quantify such emission reduction until Project grants are awarded. ***Avoidance and Minimization Measure:*** **BMP AQ-1: Special Condition**. Every 5 years following the Project approval date, the Port will conduct a review of new air quality technological advancements. These technologies would be evaluated based on operational feasibility, technical feasibility, and cost effectiveness and financial feasibility for application in the Pier B Rail Yard. If a technology is determined to be feasible in terms of financial, technical, and operational feasibility, the Port will implement such technology.	

TABLE 2-2
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact	Mitigation Measures/Avoidance and Minimization Measures/BMPs	Impacts
Greenhouse Gases and Climate Change (Section 3.3.3.2)	***Mitigation Measures:*** **GCC-1: LEED.** New buildings constructed as part of the proposed Project will pursue Leadership in Energy and Environmental Design (LEED) if they meet the criteria requirements for certification (including building size). COLB exempts buildings of fewer than 7,500 square feet of occupied space from its Green Building Policy. LEED certification is made at one of the following four levels, in ascending order of environmental sustainability: certified, silver, gold, and platinum. The certification level points are given for various design features that address the following areas: • Sustainable sites; • Water efficiency; • Energy and atmosphere; • Materials and resources; • Indoor environmental quality; and • Innovation and design process. As a result, a LEED-certified building would be more energy efficient, thereby reducing GHG emissions compared to a conventional building design. The effects of this measure are not quantified in this analysis. **GCC-2: Recycling of Construction Materials.** Pursuant to the POLB Sustainable Business Practices Administrative Directive, construction debris must be recycled, reused, or otherwise diverted from landfills to the maximum extent possible. Recyclable construction waste generated by the proposed Project shall be taken to an accredited recycling center. **GCC-3: Recycling and Sustainable Business Practices.** During operation, the Port will follow recycling objectives and measures established by the Port's Administrative Directive for Sustainable Business Practices (Port of Long Beach 2016). In general, products made with recycled materials require less energy and raw materials to produce than products made with unrecycled or raw materials. This MM also includes energy conservation practices, purchasing of "Green" products, energy-efficient lighting, low-VOC paint and finishes, and use of recycled or remanufactured carpeting and office furnishings. This directive also includes minimizing the use of paper and plastic, reusing materials and equipment, and proper disposal of alkaline	Because the proposed Project would contribute to the overall regional and global budget of GHGs in the atmosphere, the proposed Project would contribute to climate change effects, resulting in an adverse effect. However, given the global and complex nature of climate change, it is not possible to link projected GHG emissions associated with the proposed Project to specific climate change impacts within the air quality analysis area.

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TABLE 2-2 SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS		
Potential Impact	**Mitigation Measures/Avoidance and Minimization Measures/BMPs**	**Impacts**
	batteries. This savings in energy and raw material use translates into GHG emission reductions. The effectiveness of this MM was not quantified due to the lack of a standard emission estimation approach. **GCC-4: Xeriscaping.** Water conservation features, including drought-tolerant plant materials, are required for all projects undertaken in the Port. Xeriscape landscaping shall incorporate the use of water conservation features including, but not limited to, drought-tolerant plants; hardscape; permeable material such as concrete, asphalt, and pavers; recycled material such as concrete, gravel, granite, and shredded redwood; and drip irrigation systems and timers. **GCC-5: Tree Planting.** The Port will plant shade trees around the main office and maintenance buildings in accordance with species identified in the Green Port Long Beach Sustainable Landscape Palette and POLB Sustainable Development Guidelines. Trees act as insulators from weather, thereby decreasing energy requirements. Onsite trees also provide carbon storage. Although not quantified, implementation of this measure is expected to reduce the proposed Project's GHG emissions by less than 0.1 percent. **GCC-6: Tree Planting – Transportation Corridors.** The Port will plant new shade trees on Port-controlled lands adjacent to the roads that lead into the facility, to the extent practicable, consistent with safety and other land use considerations. The effectiveness of this MM was not quantified due to the lack of a standard emission estimation approach. **GCC-7: Employee Carpooling**. The construction contractor and the Port will encourage construction and facility employees to carpool or to use public transportation. These employers will provide incentives to promote the measure, such as preferential parking for carpoolers or vanpool subsidies, and they will provide information to employees regarding the benefits of alternative transportation methods. The effectiveness of this MM was not quantified due to the lack of a standard emission estimation approach. The Port is in the process of developing the GHG Strategic Plan. This plan will outline the overall approach for mitigating potential proposed Project-specific and/or cumulative GHG impacts of Projects through the modernization and/or upgrading of marine terminals and other facilities in the Long Beach Harbor District. **GCC-8: Community Grants Program.** The Port will mitigate GHG impacts of the proposed Project by implementing and funding the CGP to partially address the cumulative GHG impacts of the proposed Project. The Port will provide $1.4 million to mitigate emissions of GHG associated with proposed Project operations. The timing of the payment determined by the methodology will be made by the later of the following two dates: (1) the date that the Port issues a Notice to Proceed or otherwise authorizes	

TABLE 2-2
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact	Mitigation Measures/Avoidance and Minimization Measures/BMPs	Impacts
	commencement of construction on the Pier B On-Dock Rail Support Facility Construction Contract; or (2) the date that the Pier B On-Dock Rail Support Facility Final EIR is conclusively determined to be valid, either by operation of PRC Section 21167.2 or by final judgment or final adjudication. The contribution to be made to the CGP is calculated based on operational emissions using the methodology for GHG emissions described in the POLB CGP and Investment Plan. This methodology is consistent with SCAQMD Rule 2702 (adopted February 6, 2009), which established the participation fee for GHG mitigation at $15 per MT of CO_2e. This contribution will be used to pay for projects in the energy efficiency, transportation, renewable energy, and landscaping categories pursuant to the CGP. Not all projects that fall into these categories are eligible for grant funding; specific eligible projects will be identified in the CGP Guidelines being developed by the Port. Projects approved pursuant to the CGP can be implemented shortly after grant funding becomes available, which will occur in accordance with the timing set forth in this MM. The emission reductions that may result from the projects funded into the CGP are excluded from this analysis because it is not possible to quantify such emission reduction until project grants are awarded. **GCC-9: Indirect GHG Emission Avoidance and Mitigation.** The Port will minimize indirect GHG emissions through measures that reduce or avoid electricity consumption at the facility. Such measures may include, but are not limited to, the use of low-energy-demand lightings (e.g., fluorescent or light-emitting diode [LED]), and use of energy-efficient floodlights. To identify future opportunities to reduce indirect GHG emissions, the Port will conduct a third-party energy audit every 5 years and install innovative power-saving technologies where feasible, such as power factor correction systems and lighting power regulators. Such systems help to maximize usable electric current and eliminate wasted electricity, thereby lowering overall electricity use.	

TABLE 2-2 SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS		
Potential Impact	**Mitigation Measures/Avoidance and Minimization Measures/BMPs**	**Impacts**
Water Quality (Section 3.4)	***Best Management Practices:*** **WQ-1:** Prior to the start of construction, Permittee shall obtain coverage under the Los Angeles Regional Water Quality Control Board's General Permit for Storm Water Discharges Associated with Construction and Land Disturbing Activities (CAS000002). A copy of the Notice of Intent (NOI) and Storm Water Pollutant Prevention Program (SWPPP) shall be provided to the Director of Environmental Planning prior to the start of construction. **WQ-2:** Groundwater displaced or extracted by construction activities shall be contained and tested to guide appropriate storage, discharge, or disposal. Laboratory analyses would include petroleum hydrocarbons (full carbon chain range), Title 22 metals, volatile organic compounds (VOC), Semi-volatile organic compounds (SVOC), polycyclic aromatic hydrocarbons (PAH), pesticides, and polychlorinated biphenyls (PCB). If unexpected, potentially contaminated soil or groundwater is discovered during construction, work shall stop in the affected area. Sampling and analysis of the soil or groundwater shall be conducted to determine proper handling and disposal methods. **WQ-3:** Post-construction Best Management Plans (BMPs) will be implemented to the maximum extent practicable, consistent with the requirements of MS4 Permit Order No. R4-2014-0024.	Less than significant
Biological Resources (Section 3.5)	***Mitigation Measures:*** **BIO-1 (Migratory Birds):** To minimize effects on nesting migratory birds, construction activities that include the removal of trees or structures that may support the nests of protected birds would follow the requirements of the MBTA. If construction activities occur during the bird breeding season (February 15 through August 31), a qualified ornithologist would survey trees, shrubs, and structures to be removed, not more than 3 days prior to removal. If the ornithologist detects any occupied nests or nesting behavior, POLB would conspicuously flag off the area(s) and provide a minimum buffer of 100 feet (300 feet for raptors) between the nest and limits of construction. Construction crews would be instructed to avoid any activities in this zone. Construction activities could resume within the buffer at the direction of the ornithologist when fledglings have left the nest or if the nest is abandoned. **BIO-2 (Bats):** To avoid harm to bats from modifications to structures that may provide roosting or breeding habitat, the following procedure would be followed: prior to the start of construction, a qualified bat specialist shall conduct a pre-construction survey. If bats are found or determined to be potentially present, the area of presence would be inspected no more than 7 days before any disturbance to confirm the presence of	Less than significant

TABLE 2-2
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact	Mitigation Measures/Avoidance and Minimization Measures/BMPs	Impacts
	roosting bats. The bat specialist would have authority to stop construction activity likely to be disruptive of breeding or roosting. The bat specialist would identify an appropriate course of action for the POLB to follow. Example actions are: (a) precluding bat access from the area before work proceeds; (b) establishing an appropriate buffer area; and (c) monitoring work to ensure that bats are not killed or substantially disturbed. Weekly reports to the POLB and CDFW shall be provided, describing monitoring actions, relevant observations, and any protective actions taken. **BIO-3 (Water Quality):** No debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, oil, or petroleum products from construction shall be allowed to enter or be placed where it may be washed by rainfall or runoff into waters of the U.S. Therefore, the Permittee shall employ all standard BMPs to ensure that toxic materials, silt, debris, or excessive erosion do not enter waters of the United States during Project construction. Upon completion of work, any excess material or debris shall be removed from the work area and disposed of in an appropriate upland site. Water quality impacts will be avoided or minimized through implementation of a Stormwater Pollution Prevention Plan, NPDES permit conditions, BMPs, and specific stormwater effluent monitoring requirements of applicable Project permits. **BIO-4 (Sound Abatement):** During steel pile-driving, the contractor shall be required to use sound abatement techniques to reduce both noise and vibrations from pile-driving activities. At the initiation of each pile-driving event, the pile-driving shall also employ a “soft start” in which the hammer is operated at less than full capacity (i.e., approximately 40–60 percent energy levels) with no less than a 1-minute interval between each strike for a 5-minute period.	
Transportation (Section 3.6)	No mitigation is required.	Less than significant
Land Use, Coastal Zone Consistency, and Recreation (Section 3.7)	No mitigation is required.	Less than significant
Public Services and Safety (Section 3.8)	No mitigation is required.	Less than significant

TABLE 2-2
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact	Mitigation Measures/Avoidance and Minimization Measures/BMPs	Impacts
Noise (Section 3.9)	No mitigation is required.	Less than significant
Hazards and Hazardous Materials (Section 3.10)	***Avoidance and Minimization Measures:*** • Pursuant to Port requirements and prior to conducting site investigation, site investigations plans—which include topics such as soil, risk assessment, safety, aerially deposited lead (ADL), groundwater, ACMs, lead, and treated wood waste (TWW)—shall be submitted to the Port's Director of Environmental Planning for review and approval. Test results will be provided to the Director of Environmental Planning as soon as they are available. • Prior to construction, a Phase II Site Investigation shall be performed in areas of known contamination where excavation would exceed 5 feet below ground surface, where groundwater may be encountered, and in areas where underground storage tanks were removed without closure. The results of the Phase II investigation shall be incorporated into the HASP to protect construction workers against known contamination in construction areas. A Hazardous Waste Management Plan based on the results of the Phase II investigation shall also be incorporated in the final design to ensure proper disposal of contaminated materials and contaminated groundwater found in the construction areas. • A risk assessment shall be performed prior to construction to determine how construction activities would affect the water-bearing levels and, as applicable, to determine health risks to construction workers. • A HASP shall be required to address any exposure to hazardous materials. The HASP shall include proper PPE work requirements, soil and air space monitoring requirements, documentation and reporting requirements, and action levels. • Prior to construction, areas within the proposed Project corridor where soil may be disturbed shall be tested for ADL. If ADL levels meet or exceed the action level set forth by the Hazardous Waste Management Plan for the Project, ADL-contaminated soils would be removed in accordance with federal, state, and local regulations. • To minimize cross-contamination of the water-bearing zones, construction techniques to minimize the need for dewatering shall be used. • Groundwater displaced or extracted by construction activities shall be contained and tested to guide appropriate storage, discharge, or disposal. Laboratory analyses would include petroleum hydrocarbons	Less than significant

TABLE 2-2
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact	Mitigation Measures/Avoidance and Minimization Measures/BMPs	Impacts
	(full carbon chain range), Title 22 metals, VOC, SVOC, polycyclic aromatic hydrocarbons (PAH), pesticides, and PCB. • An Unanticipated Discoveries Plan will be developed and implemented during construction to address specific actions that would be taken if unexpected hazardous materials, potentially contaminated soil, or groundwater is discovered during construction. If encountered, work shall stop in the affected area. Sampling and analysis of the materials, soil, or groundwater shall be conducted to confirm the conditions and, if warranted, to determine proper handling and disposal methods. • In all buildings subject to demolition, a survey to screen for ACM shall be conducted. ACM shall be removed prior to demolition to mitigate ACM hazards. • Lead and other heavy metals, such as chromium, may be present within yellow thermoplastic paint markings on the pavement. A Lead Compliance Plan shall be prepared in accordance with CCR Title 8 Section 1532.1. The Lead Compliance Plan shall be approved by an industrial hygienist certified in comprehensive practice by the American Board of Industrial Hygiene. • An environmental monitoring program during construction shall include soil testing to identify and monitor soils affected by petroleum hydrocarbons or other hazardous constituents, such as metals. The extent of the testing and monitoring shall be based on the final disposition of the excavated soil. Laboratory analyses shall include petroleum hydrocarbons (full carbon chain range), Title 22 metals, VOC, SVOC, PAH, pesticides, and PCB. Shallow surface soils within the railroad ROW may contain arsenic from historical weed control practices and shall be tested for arsenic. • Railroad ties shall be managed as TWW. Railroad ties designated for reuse shall be managed in accordance with Alternative Management Standards provided in CCR Title 22 Section 67386. Railroad-tie materials designated for disposal shall be considered potentially hazardous TWW and would be managed and disposed of in accordance with Title 22 Section 67386.	
Socioeconomics and Environmental Justice (Section 3.11)	***Mitigation Measures:*** AQ-1, AQ-2, AQ-3, AQ-4, AQ-5, and AQ-6.	Significant and adverse

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TABLE 2-2
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact	Mitigation Measures/Avoidance and Minimization Measures/BMPs	Impacts
Utilities, Service Systems, and Energy Conservation (Section 3.12)	No mitigation is required.	Less than significant
Cultural Resources (Section 3.13)	The transit shed at Berths D52–54 would experience a significant impact under the Proposed Action. Measures to address the significant impact under NEPA (and the adverse effect under Section 106) would be developed in consultation with the SHPO and incorporated into a memorandum of agreement. The following measures to minimize harm are proposed and are subject to change, pending consultation with the SHPO: • **Historic Property Treatment Plan for Transit Shed at Berths D52–54.** Prior to beginning demolition and construction activities related to the transit shed and areas immediately surrounding it, the Port shall develop a Historic Property Treatment Plan (HPTP) for the transit shed at Berths D52–D54. The HPTP will guide the transit shed's partial demolition and construction with the goal of minimizing physical and visual effects on the historic property to the greatest extent possible. The Port shall revise the HPTP until MARAD accepts it. No demolition or construction work on the transit shed and the areas immediately surrounding it may begin until the HPTP is approved by MARAD and consulting parties have had an opportunity to comment on the HPTP. The HPTP shall include: ○ Description of the transit shed's physical condition, including photo-documentation of the areas of the building subject to demolition and the areas immediately surrounding it. ○ Demolition and construction plans related to the transit shed. • **Post-Construction Report for Transit Shed at Berths D52–D54.** Within thirty (30) calendar days following construction of the transit shed, the Port shall produce a Post-Construction Report (P-C Report) for the transit shed at Berths D52–D54 illustrating the partial demolition and construction. The Port shall revise the P-C Report until MARAD accepts it. The P-C Report shall include: ○ Before-and-after photographs of ten (10) different views of the transit shed, of which seven (7) will focus on the primary elevation. ○ Before-and-after photographs of the setting adjacent to the transit shed, along Pico Avenue.	Significant and adverse

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TABLE 2-2
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact	Mitigation Measures/Avoidance and Minimization Measures/BMPs	Impacts
	○ Narrative description of work conducted, describing how and why the construction adheres to the HPTP. • **Survey of Pre-Containerization POLB.** Prior to beginning demolition and construction activities for the transit shed and areas immediately surrounding it, the Port shall produce a Pre-Containerization Resources Technical Report (Survey Report) memorializing a historic resources survey of pre-1969 resources within the Port. The historic resources survey will assess buildings, structures, and objects constructed prior to 1969 for their significance under the theme of pre-containerization Port activity. The Port shall revise the Survey Report until MARAD accepts it. No demolition or construction work on the transit shed and the areas immediately surrounding it may begin until the HPTP is approved by MARAD and consulting parties have had an opportunity to comment. This Survey Report shall include: ○ Historic context of Port rail and shipment operations prior to the advent of containerization. ○ Survey of the Port related to the above context and identification buildings, structures, and objects within this context. ○ Evaluation of significance of all the pre-1969 resources using NRHP and California Register of Historical Resources (CRHR) criteria, including consideration of historic district potential. If a historic district is discovered, contributors and non-contributors shall be identified.	
Aesthetics and Visual Resources (Section 3.14)	***Best Management Practices:*** BMPs include implementing a standard measure to reduce potential night illumination beyond the proposed Project boundaries and to avoid the use of structural surfaces capable of reflecting daylight glare.	Less than significant

2.4 PUBLIC OUTREACH AND AGENCY COORDINATION FOR THE DEIS

The following sections present information on the public outreach and interagency coordination conducted since the DEIS was released.

2.4.1 Notice of Availability

The EPA published the Notice of Availability (NOA) for the Pier B On-Dock Rail Support Facility Project's DEIS in the *Federal Register* on July 8, 2020, which began the formal 45-day public review and comment period. The review and comment period ended on August 31, 2020.

2.4.2 Distribution of DEIS

The following sections present information on public outreach and agency coordination conducted since the release of the DEIS.

2.4.2.1 Dear Interested Party Letters

MARAD sent Dear Interested Party Letters (DIP Letters) to the interested party mailing list, which consisted of 357 recipients, including local, federal, and state agencies, stakeholders, tribal governments, interested and affected parties, and affected property owners. The DIP Letters contained information on the public comment and review period—including where, how, and by when comments should be made on the DEIS—and how to access the full DEIS and its supporting appendices. The DIP Letter also contained information on the virtual public hearing and open house. The DIP Letter sent to recipients can be found in Appendix E of the DEIS.

2.4.2.2 Newspaper Notices

The NOA was published in the *Long Beach Press Telegram* (an English publication) on July 18 and 19, 2020. It was also published in two Spanish publications—*Excelsior LA* and *Excelsior OC*—on July 17 and 18, 2020, respectively. The *Long Beach Press-Telegram* also included information on the virtual public hearing and open house.

2.4.3 Public Hearing and Open House

MARAD held a virtual[1] public hearing and open house on July 28, 2020, from 4:00 p.m. to 8:00 p.m. to present the DEIS and obtain comments on the DEIS. The virtual public hearing was held over the web-conferencing platform, WebEx. Participants joined via the web platform and were able to listen and view the public hearing and open house materials over WebEx. A call-in phone number was also provided for participants who chose to listen to the open house and public meeting over the phone instead of the web platform. Participants were able to leave comments or questions during the open house and public hearing by using the WebEx platform "chat box," and the facilitator prompted the

[1] A virtual public meeting was held due to the Covid-19 pandemic.

participants who joined over the phone to state their comment or question thereafter. A Spanish interpreter and American Sign Language (ASL) interpreter were made available. In addition, the Open House and Public Hearing were recorded in their entirety and were fully transcribed for the record.

The meeting opened with the open house for the proposed Project from 4:00 p.m. to 6:00 p.m. The open house was led by the Port, as the applicant. The Port gave a presentation of the overall Project in English and Spanish. Following each presentation, participants were invited to ask questions.

The second half of the meeting was the public hearing from 6:00 p.m. to 8:00 p.m. MARAD provided an overview of the proposed Project, information on the public review and comment period, and instructions for commenting on the DEIS. No comments were received at the public hearing. All materials related to the public review process for the Project are located in Appendix B of the FEIS, including public comments received on the DEIS.

2.4.4 Agency Coordination

Early and continuous agency cooperation in the NEPA process is emphasized in 40 CFR Part 1501. Other federal agencies that have jurisdiction by law will be cooperating agencies. In addition, any other federal agency that has special expertise with respect to any environmental issue that should be addressed in the statement may be a cooperating agency upon request of the lead agency. The DEIS went through interagency review with the cooperating agencies that were established early on in the NEPA process. The cooperating agencies included:

- USDOT Federal Railroad Administration
- EPA, Region 9
- Caltrans, District 7

The cooperating agencies worked with MARAD on the DEIS to provide review and comment throughout the development of the DEIS.

2.4.5 DEIS Comments Received and Response to Comments

Five public comments were received on the DEIS during the public comment period. The comments were sent via email to the *Federal Register*. Commenters included three public agencies and two private companies. The commenters were as follows:

- California Air Resources Board (CARB)
- South Coast Air Quality Management District (SCAQMD)
- EPA
- Pacific Pipeline System, LLC (PPS)
- Plains West Coast Terminals (PWCT)

The five public comment letters have been annotated into separate comments, and MARAD has provided responses to the comments included in each comment letter (see Tables 2-3 and 2-4). The tables are organized in alphabetical order starting with the public agencies. The tables contain the comment number that was assigned during the annotation process, the direct comment text, and MARAD’s response to each comment.

TABLE 2-3
COMMENTS AND RESPONSES TO PUBLIC AGENCY COMMENTS

Comment Number	Comment Text	Response to Comment
CALIFORNIA AIR RESOURCES BOARD **RICHARD BOYD, CHIEF, RISK REDUCTION BRANCH, TRANSPORTATION AND TOXICS** **DATED SEPTEMBER 3, 2020**		
CARB General Comments		
CARB-1	Thank you for providing the California Air Resources Board (CARB) with the opportunity to comment on the Pier B On-Dock Rail Support Facility Project (Project) Draft Environmental Impact Statement (DEIS), docket number MARAD-2019-0109. The Project proposes the reconfiguration and expansion of the existing 82-acre Pier B On-Dock Rail Support Facility located at the Port of Long Beach (Port) in California. The Project was designed by the Port to increase the volume of containers handled by on-dock rail from its current capacity of 23 percent to 30 to 35 percent of all cargo handled by the Port. The Maritime Administration (MARAD) of the United States Department of Transportation (U.S. DOT) is the lead federal agency for this Project under the National Environmental Quality Act (NEPA). According to the DEIS, the current configuration of the existing Pier B Rail Yard cannot accommodate the longer trains required to meet the Port's goal of handling 30 to 35 percent of all cargo by on-dock rail. Due to a lack of on-site train storage capacity, the existing Pier B Rail Yard cannot accommodate 10,000 foot-long trains without disassembling and reassembling train cars before entering or leaving the Port. The need to disassemble and reassemble trains outside of the Port has resulted in congestion within the existing Pier B Rail Yard, restricting the amount of cargo that can be transported in and out of the Port by train. To accommodate longer trains, the Project would expand the Pier B Rail Yard from its existing 12 tracks to 48 tracks. Of the 36 new tracks, 5 would be used as new dedicated arrival/departure tracks that would allow longer trains to transit along the northernmost portion of the Port. The other 31 new, and 12 existing, yard tracks would be used to disassemble and reassemble trains within the Port without blocking the dedicated	The comment is introductory in nature. It reiterates the description of the Project from the DEIS. No direct response is required.

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TABLE 2-3
COMMENTS AND RESPONSES TO PUBLIC AGENCY COMMENTS

Comment Number	Comment Text	Response to Comment
	arrival/departure tracks. The Pier B Rail Yard would also be improved by modifying existing tracks and installing new tracks from the western end of the current yard to the vicinity of the intersection of State Route 47 and State Route 103. As a result of on-site rail improvements, the Project includes the realignment of Pier B Street, closure of the existing 9th Street grade crossing, and removal of existing ramps to and from the Shoemaker Bridge. Approximately 17 trains per day, on average, would depart the Pier B Rail Yard and enter the Alameda Corridor once the Project is operating at capacity. This would result in an increase of 10 trains over the existing conditions of 7 trains per day.	
CARB-2	Freight facilities, such as on-dock rail facilities, can result in high volumes of heavy-duty diesel trucks, line-haul and switcher locomotive traffic, and operation of on-site equipment (e.g., forklifts and yard tractors) that emit toxic diesel emissions, and contribute to regional air pollution and global climate change.[1] CARB has reviewed the DEIS and is concerned about the air pollution and health risk impacts that would result should MARAD approve the Project. [1] With regard to greenhouse gas emissions from this project, CARB has been clear that local governments and project proponents have a responsibility to properly mitigate these impacts. CARB's guidance, set out in detail in the Scoping Plan issued in 2017, makes clear that in CARB's expert view, local mitigation is critical to achieving climate goals and reducing greenhouse gases below levels of significance.	MARAD acknowledges CARB's concern regarding air pollution and health risk impacts and appreciates CARB's participation in and comments on the Project. Potential impacts were adequately disclosed in the DEIS, and this comment does not question the adequacy or completeness of impacts disclosure.
CARB Detailed Comments		
CARB-3	I. The Project Would Increase Exposure to Air Pollution in Disadvantaged Communities. The Project, if approved, will expose nearby disadvantaged communities to elevated air pollution. Addressing the disproportionate impacts that air pollution has on disadvantaged communities is a pressing concern across the State, as evidenced by statutory requirements compelling California's	The regulatory discussion has been expanded to include these senate bill and assembly bill summaries; however, no new impact analysis or mitigation measures are warranted. The DEIS evaluated the proposed Project's cumulative impacts as well as its contribution to impacts on air quality. The Project has included all feasible environmental control measures to reduce air quality impacts. Although the Port

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	public agencies to target these communities for clean air investment, pollution mitigation, and environmental regulation. The following three pieces of legislation need to be considered and included in the Final Environmental Impact Statement (FEIS) when developing a project like this in a disadvantaged community: a. Senate Bill 535 (De León, 2012) Senate Bill 535 (De León, Chapter 830, 2012)[2] recognizes the potential vulnerability of low-income and disadvantaged communities to poor air quality and requires funds to be spent to benefit disadvantaged communities. The California Environmental Protection Agency (CalEPA) is charged with the duty to identify disadvantaged communities. CalEPA bases its identification of these communities on geographic, socioeconomic, public health, and environmental hazard criteria (Health and Safety Code, section 39711, subsection (a)). In this capacity, CalEPA currently defines a disadvantaged community, from an environmental hazard and socioeconomic standpoint, as a community that scores within the top 25 percent of the census tracts, as analyzed by the California Communities Environmental Health Screening Tool Version 3.0 (CalEnviroScreen).[3] This Project falls within the boundary of the Wilmington, Carson, West Long Beach Community. The maximum CalEnviroScreen score for the Wilmington, Carson, West Long Beach Community is in the top 1 percent, indicating that the area is home to some of the most vulnerable neighborhoods in the State. The air pollution levels in the Wilmington, Carson, West Long Beach Community routinely exceed State and federal air quality standards. CARB urges MARAD to ensure that the Project does not adversely impact neighboring disadvantaged communities. b. Senate Bill 1000 (Leyva, 2016) Senate Bill 1000 (SB 1000) (Leyva, Chapter 587, Statutes of 2016)[4] amended California's Planning and Zoning Law. SB 1000 requires local governments that have identified disadvantaged communities to incorporate the addition of an environmental justice element into their general plans upon the adoption or next	makes every effort to lessen the impact of cumulative air pollution and GHG emissions, not all impacts can be addressed with on-site mitigation measures alone. The Port acknowledges that the Project has cumulative air quality and GHG emissions impacts; therefore, the Port has included measures to provide funding for projects that will help reduce air quality impacts on vulnerable groups in the vicinity of the Port and reduce GHG emissions associated with the project. In 2009, the Port launched its original Mitigation Grants Program to address cumulative air and health impacts arising from new development projects, such as the Middle Harbor Redevelopment Project and the Gerald Desmond Bridge Replacement Project. Since establishing the program in 2009, the two projects have allocated $17.4 million to the program and funded nearly 120 community-based mitigation projects (e.g., projects concerning air filters, new windows and doors, an asthma education program, energy-efficiency projects, and tree planting). Additional development projects have contributed more than $788,000 toward the mitigation programs. In March 2017, the Long Beach Board of Harbor Commissioners approved an updated program, the Community Grants Program (CGP), which allocated an initial $46.4 million for an implementation period covering the next 12 to 15 years. Three specific programs (Facility Improvements, Community Infrastructure, and Community Health), each with its own set of detailed guidelines, provide the framework for Project mitigation projects to alleviate or reduce impacts from Port-related activities. Additional funding will be provided from Port development projects that result in significant adverse impacts. Projects with adverse impacts will be required to mitigate those impacts and may be required to contribute funding, in accordance with the methodologies and formulas identified in the Port's CGP and Investment Plan (Port of Long Beach 2016).

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	revision of 2 or more elements concurrently on or after January 1, 2018. SB 1000 requires environmental justice elements to identify objectives and policies to reduce unique or compounded health risks in disadvantaged communities. Generally, environmental justice elements will include policies to reduce the community's exposure to pollution through air quality improvement. SB 1000 affirms the need to integrate environmental justice principles into the planning process to prioritize improvements and programs that address the needs of disadvantaged communities. c. Assembly Bill 617 (Garcia, 2017) The State of California has emphasized protecting local communities from the harmful effects of air pollution through the passage of Assembly Bill 617 (AB 617) (Garcia, Chapter 136, Statutes of 2017).[5] AB 617 requires new community-focused and community-driven action to reduce air pollution and improve public health in communities that experience disproportionate burdens from exposure to air pollutants. In response to AB 617, CARB established the Community Air Protection Program with the goal of reducing exposure in communities heavily impacted by air pollution. The Wilmington, Carson, West Long Beach Community is 1 of 13 communities statewide chosen thus far for inclusion in the Community Air Protection Program. The Wilmington, Carson, West Long Beach Community was selected for both community air monitoring and the development of an emissions reduction program due to its high cumulative exposure burden, the presence of a significant number of sensitive populations (children, elderly, and individuals with pre-existing conditions), and the socioeconomic challenges experienced by its residents. Health-harming emissions, including particulate matter (PM), toxic air contaminants, and diesel PM generated during the construction and operation of the Project may negatively impact the community, which is already disproportionally impacted by air pollution from the existing port and other freight operations as well as stationary sources of air pollution. Part of the AB 617	The Port has established criteria for eligible projects and programs and the types of organizations and facilities that can apply for grant funding under the CGP, in accordance with the public trust doctrine and guidance from the California State Lands Commission. Although the entire City of Long Beach is eligible for grant funding, there are two geographic zones, a "Priority Zone" and an "Eligibility Zone." The Priority Zone includes areas that are most affected by Port-related operations and where CGP investments are directed. The Eligibility Zone is the area in which significant Port impacts have been identified and, at a minimum, mitigation projects must take place. The Priority Zone is a subset of the Eligibility Zone and experiences the highest community impact from Port-related operations. The Port intends to invest the majority of mitigation dollars in the Priority Zone; as such, projects in this zone will receive the highest consideration during the evaluation process. Both zones also include parts of Wilmington, Carson, Compton, and Paramount. A Community Grants Advisory Committee appointed by the mayor of Long Beach assists in selecting projects for funding. Before any grant funding is awarded, however, the Port must conduct a thorough staff review of all applications and present them to the Long Beach Board of Harbor Commissioners for approval. Since 2017, the Port has awarded almost $11.2 million in community grant funding for various projects within the Priority and Eligibility Zones. Under the Facility Improvements Program, more than $1.5 million in funding has been awarded to various facilities and schools for heating, ventilation, and air-conditioning systems; high-performance filter upgrades and replacements; replacement doors and windows; insulation; and energy-efficient lighting. In addition, approximately $6.7 million in grants has been provided under the Community Infrastructure Program, which has funded stormwater treatment projects, an edible garden, and park development projects, thereby adding more recreation and green space. Under the Community Health Program, almost $3 million has been granted to local hospitals and community health

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	process required CARB and the South Coast Air Quality Management District (SCAQMD) to create a highly-resolved inventory of air pollution sources within this community. CARB would be more than happy to share this community emissions inventory with MARAD and the applicant to aid in the FEIS's cumulative impact analysis. [2] Senate Bill 535, De Leon, K., Chapter 800, Statutes of 2012, modified the California Health and Safety Code, adding §39711, §39713, §39715, §39721 and §39723. [3.] "CalEnviroScreen 3.0." Oehha.ca.gov, California Office of Environmental Health Hazard Assessment, June 2018, https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30. [4.] Senate Bill 1000, Leyva, S., Chapter 587, Statutes of 2016, amended the California Health and Safety Code, § 65302. [5.] Assembly Bill 617, Garcia, C., Chapter 136, Statutes of 2017, modified the California Health and Safety Code, amending § 40920.6, § 42400, and § 42402, and adding § 39607.1, § 40920.8, § 42411, § 42705.5, and § 44391.2.	organizations for respiratory health and wellness education programs. The Pier B On-Dock Rail Support Facility Project would contribute funds to the CGP as mitigation for cumulative impacts associated with air quality and GHG emissions. Funding will be prioritized to mitigation projects that benefit sensitive populations, which include children, pregnant women, the elderly, the chronically ill, and those with respiratory or other cardiopulmonary conditions.
CARB-4	II. The DEIS Should Include a Mitigation Measure that Ensures the Project Uses the Cleanest Switchers and Line-Haul Locomotives Available to Service Pier B. According to the DEIS, the Tier 2 switcher locomotives operating within the Project site were repowered in 2011 to meet federal Tier 3 standards for nitrogen oxides (NOx) and Tier 4 standards for particulate matter less than 10 micrometers (PM10). The DEIS does not specify the engine tier level of the existing and future line-haul locomotives that will transport cargo to and from Pier B. It was assumed in the Project's air quality impact analysis that the emission factors from the U.S. Environmental Protection Agency (U.S. EPA) projected for the national line-haul locomotive fleet were representative of the Project's locomotives.[6] Based on CARB's review of the 2035 operational annual air pollutant emission rates provided in Appendix A1 of the DEIS (see Table A1.2-54), air pollutant emissions from the switcher	The comment suggests that MARAD include a mitigation measure in the FEIS that would require the Pacific Harbor Line (PHL), as well as other rail operators at the Port, to include a schedule for expeditiously replacing the existing switcher and line-haul locomotive fleet with units that have cleaner engines. As discussed in the DEIS, all feasible mitigation has been applied in all instances where it would be effective. Regarding line-haul locomotives, it would not be feasible for MARAD or the Port to require Class 1 line-haul locomotive operators to turn over their fleets because of federal preemption. As such, the EPA "fleet average" Tier distribution was assumed for line-haul locomotives at each evaluation year. In 2017, the California Supreme Court confirmed this in *Friends of the Eel River vs. North Coast Railroad Authority* (2017), 3 Cal. 5th 677. In addition, the 1998 and 2005 railroad agreements among CARB, Burlington Northern Santa Fe, and Union Pacific Railroad indicate that railroads "…are federally

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	and line-haul locomotives would account for the vast majority of the Project's total operational emissions of NOx and PM10. Since the Project's air quality impacts are a direct result of on-site and off-site rail operations, CARB is concerned that the DEIS does not include a mitigation measure that specifically addresses the potential air quality and public health impacts from the switcher and line-haul locomotives serving Pier B. CARB urges MARAD to include a mitigation measure in the FEIS that would require the Pacific Harbor Line (PHL), and other rail operators at the Port, to include a schedule to expeditiously replace their existing switcher and line-haul locomotive fleet with cleaner engines. The gradual introduction of new switcher and line-haul locomotives that meet U.S. EPA's current Tier 4 or future Tier 5 emission standards will substantially reduce the Project's impact on air quality and public health. However, to protect the health of the people living in disadvantaged communities near the Project, it should be the goal of MARAD and the applicant to transition the switcher and line-haul locomotives serving the Project to those that approach zero-emissions. CARB has, and continues to, sponsor demonstration projects to accelerate the adoption of clean freight technologies and reduce the air pollution caused by the movement of goods throughout the state. As part of CARB's Zero and Near Zero-Emission Freight Facilities Program, there are demonstration projects on the use of battery-electric switcher and line-haul locomotives that could be applied to the Project.[7] Based on research already done by CARB and other agencies and organizations, it is reasonable that zero and near zero-emission technologies would be available to the Port in the future. To protect the health of people living in disadvantaged communities located near the Project, CARB urges MARAD and the applicant to include in the FEIS a mitigation measure to reduce the Project's air pollutant emissions from the switcher and line-haul locomotives. The measure should require all switcher and line-haul locomotives serving Pier B to be equipped with Tier	regulated and that aspects of state and local authority are pre-empted." As a result, the parties entered into mutual agreements to reduce emissions from locomotives (i.e., Memorandum of Mutual Understandings and Agreements [CARB 1998] and CARB/Rail Yard Statewide Agreement [CARB 2005]). The Class 1 line-haul operators operate a fleet of thousands of locomotives nationwide, with most dedicated to a long-haul interstate network. It would also not be feasible to require Class 1 railroads to redistribute their locomotives geographically to provide a higher percentage of Tier 4 locomotives for a single project's rail yard. Locomotives are connected to trains that travel to and from California and destinations throughout the United States. This requires hundreds, if not thousands, of locomotives to enter and leave California each day. For a national carrier to switch out locomotives for a specific facility would require additional switching yards and would be prohibitively expensive for both the railroad and its customers. It would also disrupt the national transportation system. Requiring the use of line-haul locomotives that would meet Tier 4 standards sooner than normal would need to be implemented on a national scale rather than in connection with operation of a single on-dock rail support facility. Regarding the switching locomotive fleet operated by PHL, PHL has been a partner with the ports and has demonstrated several technologies for powering locomotives, including liquefied natural gas and hybrid-electric power. PHL is now recognized as the operator of one of the cleanest fleets in North America after converting its fleet to clean diesel, which meets Tier 3-plus ultra-low-emission standards. The Tier 3-plus engines emit 85 percent less diesel particulate matter and 38 percent less nitrogen oxide compared with the Tier 2 locomotives they replaced. To upgrade the locomotives, the Port extended PHL's operating agreement term, provided PHL commits to use the ultra-low-emission locomotives in the SPBP Complex through 2024. In March 2017, PHL began a demonstration of a locomotive developed by Progress Rail

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	4 engines in the short-term and Tier 5 engines in the long-term, with the ultimate goal to only allow zero-emission and near zero-emission line-haul locomotives to serve Pier B. [6] United States Environmental Protection Agency (U.S. EPA). 2009. Emission factors for Locomotives. Technical Highlights. 2009. Accessible at: https://nepis.epa.gov/EPA/html/DLwait.htm?url=Exe/ZyPDF.cgi/P100500B.PDF?Dockey=P100500B.PDF. [7] California Air Resources Board (CARB), 2020. CARB's Zero and Near Zero Emission Freight Facility Program. Accessible at https://ww2.arb.ca.gov/news/carb-announces-more-200-million-new-funding-clean-freight-transportation#:~:text=The%20goal%20of%20CARB's%20Zero,commercialization%20of%20these%20technologies%20statewide.	that has been verified by CARB as meeting EPA Tier 4 emission standards. Given that the current PHL operating agreement is set to expire at the end of 2024, if the proposed Project is approved, the Port would negotiate with the short-haul switching operator to incorporate requirements into subsequent operating agreements that call for demonstration and/or implementation of a new technology, provided one is determined to be feasible in terms of cost and technical and operational feasibility. Through the San Pedro Bay Ports Technology Advancement Program (TAP), the Port provides funding, guidance, and staff support to accelerate deployment of zero-emission technologies. The goal of the TAP is to bring clean air technologies from testing to commercialization and, eventually, widespread adoption in the port market. A critical component of the TAP is the Advisory Committee, which includes representatives from the SCAQMD, CARB, EPA, and California Energy Commission. The ports consult with the Advisory Committee to incorporate their expertise, knowledge, and perspective into the program. It is noted that, as a special condition of the proposed Project, the Port would conduct a technology review every 5 years following the Project approval date. New air quality technological advancements are subject to consideration by the Port on the basis of operational feasibility, technical feasibility, and cost effectiveness/financial feasibility.
CARB-5	III. The Best Management Practice AQ-1 Should be Revised to Include Specific Details on Enforceability. The DEIS included a Best Management Practice AQ-1 (BMP AQ-1) that requires the Port to conduct a review of new air quality technological advancements every 5 years. BMP AQ-1 requires the Port to implement the new technologies if it is determined to be financially, technically, and operationally feasible. Since BMP AQ-1 does not include any specific details regarding how the measure will be enforced, CARB is concerned that	Under the 2017 Clean Air Action Plan (CAAP) Update, the ports have committed to regular feasibility assessments to evaluate the status of the technology and supporting infrastructure needed to achieve the CAAP strategies for new technologies, including zero-emission technologies. In November 2017, the ports released their Framework for Feasibility Assessments (https://cleanairactionplan.org/documents/ feasibility-assessment-framework.pdf/). The feasibility assessments consider whether the ports are on track with respect to meeting CAAP goals and providing critical

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	future advancement in zero-emission freight technologies may not be fully implemented in the Project. To ensure BMP AQ-1 is implemented, CARB urges MARAD to modify BMP AQ-1 in the FEIS to require the Port to prepare a full technical feasibility report that evaluates how the latest zero-emission technologies could be applied to the Project and how they could be implemented expeditiously as possible. The technical feasibility report should be reviewed by either CARB or SCAQMD for accuracy. To incentivize the Port to implement zero-emission technologies, the Port should be required to pay into a fund managed by SCAQMD. The fund should be used to help finance pilot programs to accelerate the deployment of zero-emission technologies to offset the Project's air quality impacts.	information on where challenges remain and where focused attention and support is needed. The following parameters are evaluated: (i) technical viability, (ii) operational feasibility, (iii) availability of supporting infrastructure and fuels, (iv) key economic considerations, and (v) commercial availability. Stakeholder input is a critical component of the feasibility assessments, including public review and comment on the draft document. The ports, in developing the feasibility assessment, may consult with technical experts who bring unique knowledge or perspective to the evaluation process. These experts may include technology developers, regulatory agencies, academics, and end users with operations expertise. The experts may also provide assistance with outlining assessment scopes and reviewing final documents. The comment expresses concern that BMP AQ-1 does not include any specific details regarding how the measure will be enforced. There is also concern that future advancements in zero-emission freight technologies may not be fully implemented by the project. To ensure that BMP AQ-1 is implemented, CARB urges MARAD to modify BMP AQ-1 in the FEIS and require the Port to prepare a full technical feasibility report that evaluates how the latest zero-emission technologies could be applied to the Project and how they could be implemented as expeditiously as possible. The report should be reviewed by either CARB or SCAQMD for accuracy. For reference, BMP AQ-1 states: "To promote new emission control technologies, every five years following the Project approval date, the Port will conduct a review of new air quality technological advancements. These technologies would be evaluated based on operational feasibility, technical feasibility, and cost-effectiveness and financial feasibility for application in the Pier B Rail Yard. If a technology is determined to be feasible in terms of financial, technical, and operational feasibility, the Port will implement such technology."

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		The minimization measure/special condition does not preclude zero-emission technologies from being considered for application on the project. As previously mentioned, the Port is committed to conducting regular technology feasibility assessments, during which time the ports may consult with technology experts and regulatory agencies (e.g., CARB and SCAQMD). The technology feasibility assessments would include stakeholder engagement, including a public process with opportunity for review and comment on the draft document. It is envisioned that the technology feasibility assessments prepared under the 2017 CAAP Update would inform periodic review of the new air quality technology advancements that would be considered for application at the Pier B on-dock rail support facility. PHL will operate the proposed Pier B on-dock rail support facility. Given that the current PHL operating agreement is set to expire at the end of 2024, if the proposed Project is approved, the Port would negotiate with the short-haul switching operator to incorporate requirements into subsequent operating agreements that call for demonstration and/or implementation of a new technology, provided one is determined to be feasible in terms of cost and technical and operational feasibility. It is anticipated that PHL will continue to partner with the Port to evaluate and demonstrate promising technologies as they become available. The comment states that the Port should be required to pay into a fund managed by the SCAQMD and that the fund should be used to help finance pilot programs that would accelerate the deployment of zero-emission technologies and offset the project's air quality impacts. As previously discussed, the Port provides funding, guidance, and staff support to accelerate the deployment of zero-emission technologies through its TAP. The goal of the TAP is to bring successful clean air technologies from testing to commercialization and, eventually, widespread adoption in the port market. A critical component of the TAP is the Advisory Committee, which

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		includes representatives from SCAQMD, CARB, EPA, and the California Energy Commission. The ports consult with the Advisory Committee to incorporate their expertise, knowledge, and perspective into the program. In addition, there have been several technology advancement projects, with a particular focus on near-zero-emission and zero-emission vehicles and equipment demonstrations as well as the development of supporting infrastructure, such as charging equipment. In 2019, the Ports of Long Beach and Los Angeles led 12 major near-zero-emission and zero-emission demonstration projects, with more than $313 million in funding from the various Project sponsors. Although not specific to rail locomotives, the ports are providing indirect support in the form of expertise and in-kind labor for SCAQMD's new partnership with Volvo Group North American under a grant from CARB for the development and demonstration of more than 50 on- and off-road zero-emission trucks and equipment, along with associated infrastructure and solar power. The ports are also facilitating participation of a demonstration fleet for SCAQMD's Zero-Emission Drayage Truck Demonstration Project under CARB's Greenhouse Gas Reduction Fund Program. In terms of direct support, the ports have provided cost-share funding for SCAQMD's Zero-Emission Cargo Transport II Demonstration Project, with each allocating $1 million to support SCAQMD's demonstration of Daimler heavy-duty trucks (see 2019 TAP Annual Report, https://cleanairactionplan.org/documents/ 2019-tap-annual-report.pdf/). A report of projects supported by the TAP is prepared annually by the ports and can be found on the CAAP website (cleanairactionplan.org).

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CARB-6	IV. The DEIS Should Include an Alternative Where Zero-Emission Trucks are Used to Transport Cargo Rather than Line-Haul Locomotives. As required under NEPA, the DEIS compared the Project's environmental impacts to 3 separate alternatives. These alternatives included a No Action Alternative, a 10th Street Alternative, and a 9th Street Alternative. In addition to these alternatives, CARB would like MARAD to add a fourth alternative in the FEIS that would require the Port to exclusively use zero-emission light, medium, and heavy-duty trucks (trucks) to transport cargo to and from the Port, rather than line-haul locomotives. CARB anticipates air pollutant emission standards for trucks will become more stringent at a faster pace than for line-haul locomotives. Presently, the air pollutant emissions from moving freight by trucks or line-haul locomotives vary by pollutant. If freight is transported exclusively using Tier 4 locomotives, the associated air pollutant emissions are less than when transporting the same amount of freight by a typical truck fleet operating in California. However, as existing and proposed CARB regulations move truck fleets toward zero-emissions, this will not continue to be the case. The list below details the CARB regulations that limit the diesel PM and NOx emissions from trucks: • **Drayage Truck Regulation**: The existing Drayage Truck Regulation requires all drayage trucks to operate with an engine that is a 2007 model year or newer. In 2021, CARB expects to consider an Advanced Clean Fleet Regulation that includes requirements for all drayage trucks to transition to zero-emission technologies by 2035. • **Truck and Bus Regulation**: The Truck and Bus Regulation requires trucks to have 2010 or newer model year engines by January 1, 2023. • **Advanced Clean Trucks Regulation**: On June 25, 2020, CARB approved the Advanced Clean Truck Regulation. The regulation requires manufacturers to transition from diesel	The DEIS, under NEPA, must consider a reasonable range of alternatives to the Proposed Action to foster informed decision-making and public participation and avoid or minimize adverse effects of actions upon the quality of the human environment. A zero-emission truck alternative was not included in the alternative analysis because, at present, such an alternative, based on zero-emission technology, would be infeasible. The proposed Project has been designed to address the anticipated increase in cargo capacity and subsequent rail demand. The Port's goal for the Project is to maximize on-dock intermodal operations by (a) increasing the volume of containers handled by on-dock rail, from its current capacity of 23 percent to 30 to 35 percent of all cargo handled by the Port; (b) providing a facility that can accept and handle longer container trains within the Port; and (c) implementing an expansion design that can be constructed and operated on a scale that is cost effective and fiscally prudent for the Port and the City of Long Beach. This objective would not be achieved by a zero-emission trucks alternative. In addition, since release of the DEIS on September 23, 2020, CARB has released a draft analysis that compares both current and future projected air pollution emissions from moving freight by trucks and locomotives. The Port is currently reviewing the analysis. However, as previously mentioned, with respect to line-haul locomotives, it would not be feasible for MARAD or the Port to require Class 1 line-haul locomotive operators to turn over their fleets because of federal preemption. In 2017, the California Supreme Court confirmed this in *Friends of the Eel River vs. North Coast Railroad Authority* (2017), 3 Cal. 5^{th} 677. In addition, the 1998 and 2005 railroad agreements among CARB, Burlington Northern Santa Fe, and Union Pacific Railroad indicate that the railroads "…are federally regulated and that aspects of state and local authority are pre-empted."

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	trucks and vans to electric zero-emission trucks beginning in 2024. The rule is expected to result in about 100,000 electric trucks in California by the end of 2030 and about 300,000 by 2035. CARB is currently preparing an analysis to compare both current and future projected air pollution emissions from moving freight by trucks and locomotives. This analysis is anticipated to be released to the public in September 2020. The preliminary results of the analysis show that locomotives may not always be the cleaner mode to move freight, especially as a large percentage of the trucks operating in California will be zero-emission trucks. Once the analysis has been finalized, CARB can share the results with MARAD and the applicant to aid in the FEIS's alternative analysis.	
CARB-7	V. The Project Proposed Under the DEIS Must Comply with the Advanced Clean Trucks Regulation. The Advanced Clean Trucks Regulation requires truck manufacturers to transition from diesel trucks and vans to electric zero-emission trucks beginning in 2024 and increasing over time. The proposed regulation has 2 components: a manufacturer sales requirement and a reporting requirement. • **Zero-emission truck sales**: Manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines would be required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales would need to be 55 percent of Class 2b-3 straight truck sales, 75 percent of Class 4-8 straight truck sales, and 40 percent of truck tractor sales. • **Company and fleet reporting**: Large employers including retailers, manufacturers, brokers, and others would be required to report information about shipments and shuttle services. Fleet owners with 50 or more trucks would be required to report about their existing fleet operations. This information would help identify future strategies to ensure that	As an on-dock rail support facility, the Pier B on-dock rail support facility differs from near-dock or off-dock rail yards in that, during its operation, trucks would not be used to transport containers to the site; all cargo would either arrive or depart the facility on rail. A primary objective of the Project is to provide an on-dock rail support facility, with the fundamental purpose of allowing for a greater number of containers to be transported to their destinations more efficiently via rail. Heavy-duty trucks used to construct the Project would be required to comply with Mitigation Measure AQ-1, which requires all construction-related on-road heavy-duty trucks with a fifth-wheel tractor/trailer and a gross vehicle weight of 19,500 pounds or more used to transport materials to and from the construction site to meet, at a minimum, the EPA 2010 on-road heavy-duty diesel engine emissions standards. Operators of trucks used for construction would also need to comply with all applicable regulations, including proof that the truck fleet, including the fleets of subcontractors from which on-road trucks would be hired or dispatched for the project, is in compliance with CARB regulations by providing either a truck and bus regulation certificate printed from the CARB website or a written statement from the fleet owner that verifies

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	fleets purchase available zero-emission trucks and place them in service where suitable to meet their needs. CARB urges MARAD to include an emission reduction measure in the FEIS that would require all trucks entering the Project site to be model year 2014 or later, transition to zero-emission trucks beginning no later than 2023, and be fully zero-emission no later than 2030.	that the owner is aware of the CARB truck and bus regulation and the fleet is in compliance with the engine model year schedule specified in the truck and bus regulation.
CARB-8	VI. The Health Risk Assessment Used Inappropriate Assumptions When Modeling the Project's Health Risk Impacts from On-Site Transport Refrigeration Units. Chapter 3.3 (Air Quality, Greenhouse Gases, and Climate Change) of the DEIS states that transport refrigeration units (TRU) will operate on rail cars during Project operation. Based on CARB's research, TRUs on rail cars, trucks, trailers, and shipping containers can emit large quantities of diesel exhaust while operating within a facility. Residences and other sensitive receptors (e.g., daycare facilities, senior care facilities, and schools) located near the Project would be exposed to diesel exhaust emissions that would result in significant cancer risk. CARB has reviewed the Project's health risk analysis and has concerns regarding the assumptions used to estimate the Project's health impacts from TRUs. The HRA modeled cancer risks from TRUs on rail cars. Although this is consistent with the Project's description, CARB is concerned that the HRA may not account for the potential cancer risk impacts from trucks with trailer or container TRUs accessing the Project site. If trucks will not operate to and from Pier B, CARB urges MARAD to include a design measure in the FEIS restricting trucks with TRUs from accessing the Project site. If trucks with TRUs will be accessing the Project site, the cancer risk impacts in the HRA and DEIS should be revised. The revised HRA should assume a conservative percentage of the trucks entering the Project site are equipped with trailer or container TRUs. The revised DEIS should include a design measure that would require all on-site trailer or container spaces to be equipped with electrical hookups for trucks with TRUs or auxiliary	The health risk assessment used appropriate assumptions and was consistent with the project description in that it modeled the Project's health risk impacts from transport refrigeration units (TRUs) on railcars. Including a design measure in the FEIS that would restrict trucks with TRUs from accessing the Project site is not necessary. The project, by design, is an on-dock rail support facility, which differs from near-dock and off-dock rail yards in that no trucks will call at the facility, nor will cargo-handling equipment operate at the site. Cargo would be transported via railcar exclusively to and from the facility.

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	power units and require all TRUs accessing the Project site to be plug-in capable. Once these revisions have been made, the revised DEIS should be recirculated for public review. According to Figure A2-23 of Appendix B (Criteria Pollutant Dispersion Modeling Analyses), diesel PM emissions from on-site TRUs were modeled along rail tracks located within the Project site. To account for potential cancer risks from off-site TRUs, CARB urges MARAD to revise the Project's Criteria Pollutant Dispersion analysis and HRA to include the operation of TRUs operating outside of the Project boundary. The HRA assumed TRUs accessing the Project site would have an average power rating of 31 horsepower (hp). TRUs with a power rating of less than 25 hp have a PM emission rate of 0.3 grams per brake horsepower-hour (g/bhp-hr), whereas TRUs with a power rating greater than 25 hp have a PM emission rate of 0.02 g/bhp-hr. To account for TRUs with a higher PM emission rate, the Project's HRA should be revised to assume a conservative percentage of the TRUs entering the Project site have a power rating of less than 25 hp, supported by substantial evidence. Based on CARB's review of Table A1.2-30 (Transport Refrigeration Unit Activities at Pier B Yard) of Appendix A1, it was assumed that each on-site TRU would have an average dwell time ranging from 8.9 hours in 2017 to 7.6 hours in 2035. TRUs on rail cars can emit large quantities of diesel PM while operating within the Project site. To minimize the potential cancer risk impacts associated with the operation of TRUs, CARB urges MARAD to include a mitigation measure that requires all TRUs to be plugged into electric power until they are ready to be transported directly out of the Port.	

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CARB-9	VII. Conclusion CARB is concerned about the Project's potential public health impacts, the lack of mitigation measures presented in the DEIS, and the omission of statutory considerations that address the disproportionate impacts of air pollution on disadvantaged communities. The DEIS does not include any mitigation measures to reduce the air pollutant emissions generated by the Project-related switcher and line-haul locomotives and does not provide enough enforcement language in BMP AQ-1. The DEIS does not evaluate the environmental impacts of using exclusively clean trucks, rather than line-haul locomotives, during Project operation. Lastly, the DEIS may not have accounted for diesel PM emissions from trucks with TRUs or accounted for off-site TRUs on rail cars when evaluating the Project's cancer risk impacts. If trucks with TRUs are allowed to access the Project site, CARB urges MARAD and the applicant to revise the Project's HRA and report the findings in a revised DEIS. Given the breadth and scope of projects subject to NEPA review throughout California that have air quality and greenhouse gas impacts, coupled with CARB's limited staff resources to substantively respond to all issues associated with a project, CARB must prioritize its substantive comments here based on staff time, resources, and its assessment of impacts. CARB's deliberate decision to substantively comment on some issues does not constitute an admission or concession that it substantively agrees with the lead agency's findings and conclusions on any issues on which CARB does not substantively submit comments. CARB appreciates the opportunity to comment on the DEIS for the Project and can provide assistance on zero-emission technologies and emission reduction strategies, as needed. If you have questions, please contact Stanley Armstrong, Air Pollution Specialist, via email at stanley.armstrong@arb.ca.gov.	The comment is conclusive in nature and reiterates CARB's comments on the project. MARAD and the Port acknowledge CARB's concern regarding air pollution and health risk impacts and appreciate CARB's participation in and comments on the project.

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT JILLIAN WONG, PH.D., PLANNING & RULES MANAGER DATED AUGUST 28, 2020		
SCAQMD-1	South Coast Air Quality Management District (South Coast AQMD) staff previously submitted comments under the California Environmental Quality Act process for the Pier B On-Dock Rail Support Facility Project (Proposed Project) put forward by the City of Long Beach Harbor Department (LBHD). South Coast AQMD staff's comment letter on the Draft Environmental Impact Report for the Proposed Project is incorporated by reference in Exhibit A. The U.S. Department of Transportation, Maritime Administration (MARAD) is evaluating the Proposed Project's environmental impacts under the National Environmental Policy Act (NEPA) process.	This comment incorporates, by reference, the comment letter dated March 13, 2017, from the SCAQMD to the Port of Long Beach on the Draft Environmental Impact Report (EIR). The Port's responses to that comment letter are provided (see Exhibit C at the end of this chapter), as extracted from the Final EIR for the Pier B On-Dock Rail Support Facility Project, which was certified by the Long Beach Board of Harbor Commissioners pursuant to the California Environmental Quality Act (CEQA) on January 22, 2018.
SCAQMD-2	The Proposed Project is located in an area heavily impacted by air pollution and poses environmental justice concerns. The Wilmington, Carson, West Long Beach community is a designated AB 617 community that has identified reductions of emissions from railyards including switchers and line haul locomotives as an air quality priority in the community. The Draft EIS shows that the Proposed Project would exceed the ambient air quality standard for nitrogen dioxide (NO2) by 36 percent during operation. South Coast AQMD staff believes the Proposed Project presents an opportunity for MARAD to work with the LBHD and Pacific Harbor Line (PHL) to implement utilization of cleaner locomotives on an expedited schedule. PHL has already started to introduce locomotives with the Tier 4 engines as pointed out in the 2017 Clean Air Action Plan Update. Additionally, in December 2019, South Coast AQMD's Governing Board approved a program announcement with $30 million from the Volkswagen Environmental Mitigation Fund for the Combustion Freight and Marine Projects, which will provide $1.35 million for repowering and replacement of switch locomotives to Tier 4 engines. Therefore, MARAD can and should accelerate the turnover of switch locomotives to Tier 4	The comment references a DEIS that shows that the Project would exceed the ambient air quality standard of 188 micrograms per cubic meter ($\mu g/m^3$) for nitrogen dioxide (NO_2) by 36 percent during operation. MARAD and the Port acknowledge the exceedance; however, the 255 $\mu g/m^3$ of NO_2 during operation in 2024 includes the project's contribution of 89 $\mu g/m^3$, which is only 35 percent of the total concentration. The background contribution of 166 $\mu g/m^3$ would represent the majority of the overall concentration, at 65 percent. The background concentration was measured with instrumentation at the closest monitoring station, which is the Inner Harbor (Superblock) Air Monitoring Station. In theory, the background concentration represents the maximum local NO_2 concentration from all sources in the air basin, except the Project itself. In the DEIS, background concentrations make up 88 percent of the federal 1-hour standard for NO_2 and 51 percent of the annual standard. With background concentrations already high, there is very little room for the modeled Project increment plus the background concentration to come in below the federal 1-hour standard for NO_2. In addition, the estimated concentrations are very likely

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	engines sooner than the turnover schedule in 2037 as indicated in the Draft EIS. Given that the Proposed Project is in an environmental justice area identified under AB 617 and the Proposed Project results in significant air quality impacts to an area which is already heavily burdened by air pollution and poses environmental justice concerns, MARAD should also require the use of line haul locomotives meeting Tier 4 engines standards sooner than the normal fleet turnover and typical remanufacturing schedules from EPA	conservative because the air quality modeling assumes that the peak-hour background concentration would remain at its highest level during an entire year of operations and peak rail yard activity would occur every hour of the year. The comment also suggests that MARAD should work with the Long Beach Harbor District and PHL to bring cleaner locomotives online under an expedited schedule. As discussed in the DEIS, feasible mitigation has been applied in all instances where it would be effective. Furthermore, although MARAD is the federal lead agency for the EIS, it has no contractual obligations or authority for the turnover of locomotives at the Port. PHL provides short-haul transportation services at POLB and POLA under operating agreements, which are set to expire at the end of 2024. At that time, both ports will negotiate with the short-haul operator to incorporate requirements into subsequent operating agreements that call for demonstration and/or implementation of a new technology, provided one is determined to be feasible in terms of cost and technical and operational feasibility. The commenter also cites SCAQMD's December 2019 announcement of $30 million in funding from the Volkswagen Environmental Mitigation Fund for the Combustion Freight and Marine Projects, which includes $1.35 million for replacing locomotives or repowering them with Tier 4 engines. According to the SCAQMD's "California VW Mitigation Trust" website (https://xappprod.aqmd.gov/vw/ index.html), the "Combustion Freight and Marine Projects Category" is intended to "accelerate the replacement of older, higher-polluting engines, particularly in areas that are disproportionately affected by air pollution, such as freight corridors, ports, and rail yards." Based on the "Eligibility and Funding Summary" provided on the website, the "Baseline Technology" identifies pre-Tier 1 locomotive engines as eligible for funding to cover the cost of replacing or repowering existing engines with Tier 4 units. PHL's current locomotive fleet does not include any pre-Tier 1 locomotives. The current

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		fleet consists of six "genset" units, 18 Tier 3-plus units, and one Tier 4 locomotive. Therefore, none of the 25 locomotives in PHL's fleet is eligible for repowering or replacement under the Volkswagen Environmental Mitigation Fund for Combustion Freight and Marine Projects. The commenter also asserts that MARAD should require the use of line-haul locomotives that meet Tier 4 standards sooner than required under the normal fleet turnover and typical manufacturing schedules from the EPA. As previously discussed, although MARAD is the federal lead agency for the EIS, it has no contractual obligations or authority for the turnover of locomotives at the Port. It would not be feasible for the Port to require Class 1 line-haul locomotive operators to turn over their fleets because of federal preemption. In 2017, the California Supreme Court confirmed this in *Friends of the Eel River vs. North Coast Railroad Authority* (2017), 3 Cal. 5th 677. In addition, the 1998 and 2005 railroad agreements among the CARB, Burlington Northern Santa Fe, and Union Pacific Railroad indicate that the railroads "…are federally regulated and that aspects of state and local authority are pre-empted." As a result, the parties entered into mutual agreements to reduce emissions from locomotives (i.e., Memorandum of Mutual Understandings and Agreements [CARB 1998] and CARB/Rail Yard Statewide Agreement [CARB 2005]). The Class 1 line-haul operators operate a fleet of thousands of locomotives nationwide, with most of them dedicated to a long-haul interstate network. It would also not be feasible to require Class 1 railroads to redistribute their locomotives geographically to provide a higher percentage of Tier 4 locomotives for a single project's rail yard. Locomotives are connected to trains that travel to and from California and destinations throughout the United States. This requires hundreds, if not thousands, of locomotives to enter and leave California each day. For a national carrier to switch out locomotives for a specific facility would require additional switching yards and be prohibitively expensive for

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		both the railroad and its customers. It would also disrupt the national transportation system. Requiring the use of line-haul locomotives that would meet Tier 4 standards sooner than normal would need to be implemented on a national scale rather than in connection with the operation of a single on-dock rail support facility.
SCAQMD-3	South Coast AQMD staff is available to work with MARAD to address any questions that may arise from this comment letter. Please feel free to call me at (909) 396-3176 if you have questions or wish to discuss our comments.	MARAD appreciates SCAQMD's review of and comments on the DEIS.
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION IX **JEAN PRIJATEL, MANAGER, ENVIRONMENTAL REVIEW BRANCH** **DATED AUGUST 31, 2020**		
EPA General Comments		
EPA-1	The U.S. Environmental Protection Agency has reviewed the above-referenced document. Our review is pursuant to the National Environmental Policy Act, Council on Environmental Quality Regulations (40 CFR Parts 1500-1508, and our NEPA review authority under Section 309 of the Clean Air Act. The Port of Long Beach is proposing to expand the existing Pier B On-Dock Rail Facility in order to manage the anticipated increase in throughout over the coming years, maximize the use of on-dock rail, and accommodate longer container trains. The Proposed Action would add 36 tracks, provide sufficient receiving/departure tracks to handle up to 10,000-foot-long container trains, and construct on-site refueling facilities. In our letter dated August 20, 2019, the EPA accepted the Maritime Administration's request to become a participating and cooperating agency under NEPA for this project. We submitted comments on this project's scoping notice on August 26, 2019 and provided further feedback following our review of the Administrative Draft EIS on May 29, 2020. We also coordinated with MARAD and Caltrans regarding the project's general and transportation conformity analyses. We appreciate MARAD's	The comment is introductory in nature; it reiterates the project description from the DEIS. MARAD appreciates the EPA's engagement as a participating and cooperating agency for the Project under NEPA.

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	engagement with our agency during the development of the Draft EIS.	
EPA-2	The Draft EIS addressed several recommendations expressed in our comments on the Administrative Draft EIS, including additional discussion of public engagement efforts undertaken by the POLB and MARAD, clarification regarding the No Action Alternative, additional information about health effects associated with exposure to criteria pollutants, and corrections to the project's particulate matter concentration estimates, among others. We appreciated confirmation that MARAD is working to incorporate our feedback into the project's draft general conformity determination, which is expected to be included in the Final EIS.	MARAD appreciates EPA's review of and comments on the administrative DEIS. The general conformity determination was publicly noticed and circulated prior to FEIS circulation (newspaper ads published in the *Long Beach Press Telegram* and the *Los Angeles Excélsior* on 8/27/21 and the *Orange County Excélsior* on 8/28/21). The public noticing language and general conformity determination are being restated in this FEIS under Exhibit D.
EPA-3	The proposed project would take place in an area that faces some of the worst air quality in the country. Communities living near the Pier B facility have historically faced adverse impacts from port activity and could be susceptible to any additional adverse effects associated with the project. We understand that the project is consistent with the objectives of the San Pedro Bay Ports 2017 Clean Air Action Plan Update; however, as indicated in the Draft EIS, despite these benefits, the project would continue to result in significant adverse air quality impacts even after mitigation measures are applied. Given the poor air quality in the project area, the presence of nearby vulnerable populations, and the impacts disclosed in the Draft EIS, we continue to recommend that MARAD consider additional methods to reduce the project's air quality impacts. These recommendations and other are further described in the attached detailed comments. We appreciate the opportunity to provide feedback on the Draft EIS. Please send an electronic copy of the Final EIS when it becomes available to capilla.morgan@epa.gov. If you have any questions, please contact me at 415-947-4167, or Morgan Capilla, the lead reviewer for this project, at 415-972-3504 or capilla.morgan@epa.gov	MARAD appreciates EPA's review of and comments on the administrative DEIS. The commenter recommends that MARAD consider additional methods to reduce the Project's air quality impacts. To the extent that specific recommendations are raised in the detailed comments provided by the commenter, the recommendations will be addressed in later responses.

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EPA Detailed Comments		
EPA-4	Air Quality The proposed project would take place in an area that experiences some of the worst air quality challenges in the country. The South Coast Air Basin is in nonattainment for several National Ambient Air Quality Standards, including ozone (extreme) and particulate matter 2.5 (serious). It is also a maintenance area for PM_{10} and carbon monoxide, we understand that the project is consistent with the San Pedro Bay Ports' 2017 Clean Air Action Plan Update, which includes an objective to increase the quantity of cargo transported via on-dock rail. Despite being pursuant to a CAAP goal, the air quality chapter of the Draft EIS indicates that the project would result in significant adverse air quality impacts even after the proposed mitigation measures are applied. For example, according to Table 3.3-10, the project would result in exceedances of the 1-hour nitrogen dioxide NAAQS during all project phases. Table 3.3-8 indicates that the project would continue to exceed the *de minimis* threshold for NOx, which is 10 tons per year, for seven years of the ten years analyzed. More specifically, the project would generate 15.3 tpy of NOx in 2021, 106 tpy in 2025, 105.1 tpy in 2026, 104.6 tpy in 2027, 129.9 tpy in 2029, and 184 tpy in 2039. We understand that MARAD is in the process of revising emissions estimates in Table 3.3-8 to be consistent with information provided in Appendix A4; however, given the poor air quality in the area, the presence of nearby heavily burdened populations, and the significant air quality impacts currently disclosed in the Draft EIS, we continue to encourage MARAD to consider additional means to further reduce the project's air quality impacts.	As discussed in the DEIS, feasible mitigation has been applied in all instances where it would be effective. It is important to note that the fundamental purpose of the Project is to allow a greater number of containers to be transported to their destinations more efficiently (i.e., via rail rather than drayage trucks). Replacing trucks trips with on-dock rail transport is one of the primary objectives of the project. This supports the City of Long Beach's goal of improving citywide freight-related infrastructure, especially on-dock rail facilities.

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EPA-5	According to the Draft EIS, 6 genset locomotive switcher locomotives would be repowered to meet Tier 4 standards in 2022. The remaining 17 Tier 3-plus switchers would not be replaced with Tier 4 switchers, which achieve a reduction in NOx emission of more the 70% per locomotive, until the end of their 30-year useful lifetimes starting in 2037 (p. 3.3-35). We support the San Pedro Bay Ports' efforts to test near-zero emissions rail technologies, such as through the Technology Advancement Project VeRail demonstration project, and to participate in efforts to replace older switcher locomotives with new Tier 4 switchers. We encourage MARAD and the POLB to use the proposed expansion project as an opportunity to further incorporate clean rail technologies at the Pier B facility. ***Recommendations for the Final EIS:*** Include commitments to expedite the deployment of Tier 4 switcher locomotives beyond what is currently proposed in the project and to support the demonstration and/or incentivizing of the deployment of cleaner line haul locomotives associated with the project.	PHL has been a partner with the ports and has demonstrated several technologies for powering locomotives, including liquefied natural gas and hybrid-electric power. PHL has also been involved in the development of zero-emission locomotives. PHL is now recognized as the operator of one of the cleanest fleets in North America after converting its fleet to clean diesel, which meets Tier 3-plus ultra-low-emission standards. The Tier 3-plus engines emit 85 percent less diesel particulate matter and 38 percent less nitrogen oxide compared with the Tier 2 locomotives they replaced. In 2017, PHL demonstrated a locomotive designed by Progress Rail that meets Tier 4 emissions standards. The current operating agreements under which PHL provides short-haul transportation services for the POLB and the neighboring POLA are set to expire at the end of 2024. At that time, both ports will negotiate with the short-haul operator to incorporate requirements into subsequent operating agreements that call for demonstration and/or implementation of a new technology, provided one is determined to be feasible in terms of cost and technical and operational feasibility. For Class I line-haul locomotives, federal law specifically precludes government agencies such as the state and the POLB from imposing requirements that interfere with private rail operations (see 49 United States Code 43, Section 10101 et seq.). Furthermore, neither MARAD nor POLB has the authority to implement emission control measures on line-haul engines operated by Burlington Northern Santa Fe or Union Pacific Railroad, which are separate entities and not under the control of the Port.
EPA-6	General Conformity In our Administrative Draft EIS comments we provided MARAD with several recommendations concerning the project's general conformity analysis. We appreciate that, in response to our comments, MARAD committed to incorporation our	The general conformity determination was publicly noticed and circulated in newspaper ads published in the *Long Beach Press Telegram* and the *Los Angeles Excélsior* on 8/27/21 and the *Orange County Excélsior* on 8/28/21 prior to this FEIS circulation; however, the public noticing language and general conformity determination are restated in this FEIS in Exhibit D. Per EPA's suggestion, the FEIS will explicitly request that

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	recommendation in the draft general conformity determination that is current being prepared. The draft EIS states that the conformity determination will be included in the Final EIS (p. 3.3-47). Despite the uncertainty concerning the project's emissions, we concur that a conformity determination appears to be necessary based on the construction emissions in Years 2 and 3 (i.e., Years 2021 and 2022). We remind MARAD that a conformity determination includes public notice requirements (40 CFR 93.156). ***Recommendations for the Final EIS:*** The EPA recommends that if a draft conformity determination is included in the Final EIS, MARAD should explicitly explain that that agency if seeking public comments on the determination, regardless of whether the determination goes through a public notice process that is separate from the EIS process. Inform community members where they can access the final conformity determination and view responses to any comments received on the draft determination.	public comments on the determination be provided and inform community members where they can access the final conformity determination and view responses to any comments received on the draft determination.
EPA-7	Sensitive Receptors We appreciate inclusion of additional information on community outreach that MARAD provided response to our Administrative Draft EIS comments. According to Figure 3.3-2, the Proposed Action would bring rail operations roughly 350 feet away from Sensitive Receptors #63-65 (City of Long Beach Multi Service Center/Playhouse, designated as "Child Care, Sensitive in Table 3.3-4). This location would experience adverse impacts by being in closer proximity to increased rail activity resulting from the project. Various other sensitive land uses could also be adversely affected by the project. ***Recommendation for the Final EIS:*** Consider supporting any additional efforts to reduce exposure to project-related emissions at sensitive receptor locations, including City of Long Beach Multi Service Center/Playhouse (#63-65), Edison Elementary School (#105-109), Chavez Park (#144-146), Chavez Elementary School (#99-102), and Loves Family Child Care (#37). Examples of additional protective measures include supporting the	As indicated by the commenter, the EIS includes a discussion of community outreach conducted by the Port and MARAD (see Section 3.11.5.5, Community Outreach, of the DEIS). The commenter indicates that the Proposed Action would bring rail operations within roughly 350 feet of sensitive receptors (i.e., the City of Long Beach Multi-Service Center/Playhouse, which was designated as "Child Care Sensitive" in Table 3.3-4 of the DEIS). The Multi-Service Center provides services for the homeless, including outreach, intake and assessment, referrals to shelters, and social service programs. The Multi-Service Center, which is not a residential facility, is open 5 days a week from 8:30 a.m. to 4:00 p.m. (2:00 on Thursdays); no one lives at the center. The center provides showers, laundry service, mail delivery, a medical clinic, employment assistance, case management, and shelter and housing placement assistance (City of Long Beach 2013–2021 Housing Element, prepared by Long Beach Development Services, adopted January 7, 2014). Use of the

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	installation and/or maintenance of air filtration systems, as appropriate.	facility by staff and clientele is limited by the hours of operation and visitation patterns; people arrive at and leave the site as necessary. There are no overnight or long-term occupants at the facility, and no child-care services or outdoor recreation programs are provided, thereby reducing the number of sensitive receptors on site. The replacement of truck trips with rail transport would be particularly beneficial to the Multi-Service Center, given its proximity to I-710. The Multi-Service Center, Edison Elementary School, Chavez Park, Chavez Elementary School, and Loves Family Child Care were considered sensitive receptors in the air quality and noise analyses. Table 3.3-12 of the DEIS presents maximum individual cancer risk increments, chronic and acute hazard index increments, and the population cancer burden during construction and operation of the Project with mitigation measures. The individual cancer risk, chronic and acute hazard indices, and population cancer burden are all below the respective significance thresholds for all receptors, including those identified as sensitive. The commenter requests that additional efforts be made to reduce the exposure to Project-related emissions at the locations of sensitive receptors. As previously mentioned, the DEIS evaluated the proposed Project's contribution to air quality impacts. The Project has included all feasible environmental control measures to reduce effects on air quality and GHG emissions. Although the Port makes every effort to lessen the effects of air pollution and GHG emissions, not all effects can be addressed with on-site mitigation measures alone. Therefore, the Port has included measures to provide funding for projects and help reduce air quality impacts on vulnerable groups within the vicinity of the Port and reduce GHG emissions. In 2009, the Port launched its original Mitigation Grants Program to address cumulative air and health impacts arising from new development projects, such as the Middle Harbor

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		Redevelopment Project and the Gerald Desmond Bridge Replacement Project. Since establishing the program in 2009, the two projects have allocated $17.4 million to the program and funded nearly 120 community-based mitigation projects (e.g., projects concerning air filters, new windows and doors, an asthma education program, energy-efficiency projects, and tree planting). Additional development projects have contributed more than $788,000 toward the mitigation programs. In March 2017, the Long Beach Board of Harbor Commissioners approved an updated program, the Community Grants Program (CGP), which allocated an initial $46.4 million for an implementation period covering the next 12 to 15 years. Three specific programs (Facility Improvements, Community Infrastructure, and Community Health), each with its own set of detailed guidelines, provide the framework for Project mitigation projects to alleviate or reduce impacts from Port-related activities. Since 2017, the Port has awarded almost $11.2 million in community grant funding for various projects within the Priority and Eligibility Zones. Under the Facility Improvements Program, more than $1.5 million in funding has been awarded to various facilities and schools for heating, ventilation, and air-conditioning systems; high-performance filter upgrades and replacements; replacement doors and windows; insulation; and energy-efficient lighting. In addition, approximately $6.7 million in grants has been provided under the Community Infrastructure Program, which has funded stormwater treatment projects, an edible garden, and park development projects, thereby adding more recreation and green space. Under the Community Health Program, almost $3 million has been granted to local hospitals and community health organizations for respiratory health and wellness education programs. Additional funding will be provided from Port development projects that result in significant adverse effects. Projects with

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		adverse effects are required to mitigate those effects and may be required to contribute funding in accordance with the methodologies and formulas identified in the Port's CGP and Investment Plan (Port of Long Beach 2016). As discussed in Section 3.3 of the DEIS (page 3.3-62, starting on line 35), to mitigate cumulative air quality impacts associated with operation of the Project, the Port will make a contribution to the CGP in the amount of $149,757 to mitigate emissions of particulate matter and oxides of nitrogen. The Port will provide $1.4 million toward the CGP to mitigate emissions of GHG emissions associated with operation of the Project (see page 3.3-77 of the DEIS). Although it is not known which projects will be ultimately proposed and selected for funding, the level of proposed funding provides a means for reducing cumulative impacts on sensitive individuals through the support of Community Health, Facility Improvements, and Community Infrastructure Programs.
EPA-8	Environmental Justice The proposed project would lead to an increase in rail activity along the Alameda Corridor. Based on Figures 3.11-1 through 3.11-3, it appears as though the current boundary for the affected community in the project's environmental justice analysis excludes off-port rail trips associated with this project. We appreciate the clarification that the boundary for the project's environmental justice analysis is a local boundary. ***Recommendation for the Final EIS:*** We continue to recommend ensuring that the affected community boundary accounts for all project-related rail activity, including any off-port rail trips associated with the project. Disclose mitigation measures for any additional impacts identified.	As discussed in DEIS Section 3.3.3, pages 34 and 35, and Appendix A1, *Criteria Pollutant and Greenhouse Gas Emission Calculations*, locomotive activities were accounted for in the EIS analyses, including sorting railcars at the Pier B rail yard, assembling and disassembling trains within the yard, and moving trains between the yard and nearby intermodal rail yards at the POLB, POLA, and the Dolores/Intermodal Container Transfer Facility. Line-haul locomotives were also accounted for in the analyses. The locomotives haul trains to and from the Pier B rail yard; idle within the yard post-arrival, pre-departure, and during in-yard refueling; and move without trains to and from staging, refueling, and servicing areas. As discussed in Appendix A1 (page A1-8), trains that pass through the Pier B rail yard and travel directly to or from the Port's on-dock marine terminals were not considered to be part of Project-related operations and were not included in the emissions analyses. Train emissions are calculated all the way to the South Coast Air Basin boundary for criteria pollutants and the California border for GHG emissions. As discussed in

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		the DEIS, all feasible mitigation has been applied in all instances where it would be effective.
EPA-9	California Assembly Bill 617 The project would take place near the communities of Wilmington, West Long Beach, and Carson, which face high cumulative exposure burdens to criteria pollutants and toxic air contaminants and were thus selected to participate in California's Community Air Protection Program under Assembly Bill 617. We previously recommended that MARAD and POLB notify the AB 617 community groups about the project, offer them opportunities to inform the project's mitigation measures, and provide them with project-related updates. We also recommend that the EIS document any coordination that has taken place with AB 617 communities and demonstrate how the project would be consistent with the emission reduction plan that is being developed. We note that, following our comments on the Administrative Draft EIS, MARAD included additional details on general community outreach undertaken by MARAD and the POLB. ***Recommendation for the Final EIS:*** We continue to recommend that MARAD and the POLB undertake the abovementioned engagement with the AB 617 communities and document such coordination in the Final EIS.	The Community Emissions Reduction Plan (CERP) for Wilmington, Carson, and West Long Beach aims to reduce air pollution in these communities through actions that include measurements and observations; enforcement of existing rules and regulations; development of new rules and regulations; incentives for cleaner equipment; collaboration with agencies, organizations, businesses, and stakeholders; awareness programs and air filtration at schools; and educational outreach programs for equipment operators. Port staff members regularly attend SCAQMD community meetings and participate in SCAQMD's development of the CERP. Furthermore, the Port provided formal comment on the Assembly Bill (AB) 617 Community Air Protection Program Draft Blueprint on July 23, 2018, expressing support for the strategies outlined in the document and future collaboration to reduce emissions from Port-related operations. The actions identified in the CERP reflect strategies in the San Pedro Bay Ports Clean Air Action Plan (CAAP). The CAAP outlines strategies for reducing air emissions from goods movement–related sources. The CERP incorporates CAAP initiatives such as incentives for cleaner ships and harbor craft and at-berth regulations for ocean-going vessels. In addition, in the final CERP (September 2019), the POLB and POLA were listed as implementing agencies for Action 2 of Chapter 5, *Ports*, in the CERP. Based on this action, the ports are responsible for one outreach event per year to provide equipment owners and operators with information about incentives (e.g., opportunities for cleaner ships and harbor craft). POLB staff members held a funding opportunity workshop jointly with POLA on November 14, 2019. POLB held the previous workshop January 30, 2020. The next workshop will take place virtually in winter 2020. POLB will continue to monitor the efforts of the CERP and implement its own initiatives and measures under the CAAP. POLB will also

TABLE 2-3
COMMENTS AND RESPONSES TO PUBLIC AGENCY COMMENTS

Comment Number	Comment Text	Response to Comment
		continue its outreach efforts in this regard. In addition, the Port has held numerous outreach events for the Pier B on-dock rail support facility throughout the NEPA process, including two sessions at the Multi-Service Center on December 3, 2019, and March 4, 2020, as well as a recent session, held via Webex, on September 2, 2020. As previously discussed, POLB established its CGP to fund Community Health, Facility Improvements, and Community Infrastructure Programs and alleviate or reduce impacts from Port-related activities. Funding is prioritized to mitigation projects that benefit sensitive populations, which include children, pregnant women, the elderly, the chronically ill, and those with respiratory or other cardiopulmonary conditions. The Port has established criteria for eligible projects and programs and the types of organizations and facilities that can apply for grant funding under the CGP, in accordance with the public trust doctrine and guidance from the California State Lands Commission. Although the entire City of Long Beach is eligible for grant funding, there are two geographic zones, a "Priority Zone" and an "Eligibility Zone." The Priority Zone includes areas that are most affected by Port-related operations and where CGP investments are directed. The Eligibility Zone is the area in which significant Port impacts have been identified and, at a minimum, mitigation projects must take place. The Priority Zone is a subset of the Eligibility Zone and experiences the highest community impact from Port-related operations. Both zones include parts of Wilmington, Carson, Compton, and Paramount. The Port intends to invest the majority of mitigation dollars in the Priority Zone; projects in this zone will receive highest consideration during the evaluation process. Before any grant funding is awarded, Port staff members conduct a thorough evaluation process of all applications received. A Community Grants Advisory Committee, appointed by the mayor of Long Beach, selects projects for funding.

TABLE 2-3
COMMENTS AND RESPONSES TO PUBLIC AGENCY COMMENTS

Comment Number	Comment Text	Response to Comment
EPA-10	Noncontainerized Cargo According to page 2-27, the project "…would also provide staging for other types of rail cars bound to and from noncontainer terminals (e.g., auto, dry bulk, scrap, break bulk, and liquid bulk terminals), and trackage for rail car repair activities, which are functions that current rail yard also provides". We appreciate the reference to the operating agreement between the POLB and the Pacific Harbor Line in response to our Administrative Draft EIS comments. Recommendations for the Final EIS: • Include detailed information about the project's impacts on noncontainer terminals that would benefit on the project. For example, please include details on what specific types of dry bulk, break bulk, liquid bulk cargo the project would serve. • Describe the potential health impacts associated with future uses of uncovered dry bulk cargo such as petroleum coke and coal and implement stringent fugitive dust controls for future storage and transport of such cargo. • Consider describing relevant safety and operation measures of the POLB and PHL agreement that would be implemented under the project. • Clarify whether increasing staging capacity for non-container terminals could increase operations at those terminals, and if so, ensure that the Final EIS accounts for such impacts.	The commenter suggests that the EIS should include detailed information about the Project's impacts on non-container terminals. Bulk cargo would be handled on the marine terminals and transferred to either truck or rail carriers, depending on whether the material is destined for national, regional, or local distribution. The types of bulk cargo that would be transported via on-dock rail from non-container marine terminals at the Port include, but are not limited to, recycled metal and steel products, lumber and lumber products, large machinery, petroleum, coke, sodium sulfate, soda ash, sulfur, and automobiles. Information on the types of cargo handled at the Port is available at https://www.polb.com/business/port-operations-and-facilities#weekly-ocean-carrier-services (accessed September 14, 2020). Bulk cargo and non-intermodal cargo that may be transported to the Pier B rail yard via on-dock rail operations would be handled in the same manner as containerized cargo. Based on Project operations, there is no distinction between the two forms of cargo (i.e., containerized or bulk cargo) for the purposes of understanding rail yard operations. Therefore, a separate impact analysis is not necessary. Although the Pier B on-dock rail support facility could handle trains that transport bulk cargo, such as petroleum, coke, and coal, the Project in and of itself would not involve loading/unloading dry bulk cargo to/from railcars at the facility. Therefore, implementation of fugitive dust controls for future storage and transport of such cargo is outside the scope of the Project. How specific cargo is transported is within the discretion of the terminal operators. Terminals that handle dry bulk cargo, such as petroleum, coke, and coal, are subject to SCAQMD Rule 1158 regarding the storage, handling, and transport of coke, coal, and sulfur. Rule 1158 requires facility operators that load coke, coal, or sulfur into railcars to immediately cover the cars before they leave the facility. This can be done with a solid sliding cover on top of the railcar,

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TABLE 2-3
COMMENTS AND RESPONSES TO PUBLIC AGENCY COMMENTS

Comment Number	Comment Text	Response to Comment
		which is kept completely closed; a continuous tarp that completely covers the top of the railcar and prevents wind from entering the leading edge of the railcar; or an alternative method of control that has been proven effective in preventing visible fugitive particulate matter emissions from escaping and has been approved by the Executive Officer of the SCAQMD prior to its use (SCAQMD Rule 1158, Storage, Handling, and Transport of Coke, Coal, and Sulfur, adopted December 2, 1993, amended June 11, 1999, and July 11, 2008). The operating agreement between PHL and the Port includes an article regarding safety and security that requires PHL, as the operator, to establish and observe a safety program for all of its activities at the Port, in accordance with prevailing industry standards, and use reasonable care in all of its activities in, on, or about the Port. As such, PHL maintains a *Switching Guide* (April 1, 2019) that provides switching instructions and safety measures for PHL activities at each of the facilities that PHL services at the POLB and POLA. In addition, PHL maintains a corporate Emergency Response Plan that contains information for the management of hazardous materials incidents on PHL property or involving PHL employees, regardless of the cause (e.g., derailment, equipment failure, vehicular accident, third-party incident [leak]). The Emergency Response Plan contains the PHL Hazmat Incident Response Checklist and two decision aides, a Hazmat Responsibility Map for determining which entity has reporting responsibility and a Hazmat Radius Map for identifying safe distances at various geographic points, depending on the specific hazard. PHL is also required in its operating agreement with the Port to provide derailment notification as soon as practicable but within 24 hours of the occurrence. If a derailment occurs on a weekend, notification is required by the end of the first business day thereafter. Per the operating agreement, PHL is required to submit a summary report with the date, time, location, and a general description of the incident, including

TABLE 2-3 COMMENTS AND RESPONSES TO PUBLIC AGENCY COMMENTS		
Comment Number	**Comment Text**	**Response to Comment**
		any correction measures, if applicable and available. All applicable agencies, including public safety personnel, would be contacted in the event of a derailment. In regard to the comment as to whether staging capacity for non-container terminals could increase operations at those terminals, staging capacity for non-container terminals is not expected to increase as result of the project. The Pier B on-dock rail support facility does not include any physical changes outside the Project footprint or improvements to any berths, docks, terminals, or piers at the marine terminals. In addition, most non-container terminals, such as dry bulk facilities, must comply with throughput limits in their permits to operate issued by the SCAQMD.

TABLE 2-4
RESPONSES TO INTERESTED PARTY COMMENTS

Comment Number	Comment Text	Response to Comment
PACIFIC PIPELINE SYSTEM LLC **AUGUST 28, 2020**		
Pacific Pipeline System General Comments		
PPS-1	Thank you for the opportunity to comment on the above referenced project. Pacific Pipeline System, LLC (PPS) has reviewed the draft Environmental Impact Statement (EIS) and submits the following observations and comments.	MARAD and the Port appreciate Pacific Pipeline System's participation in and comments on the project.
PPS-2	PPS owns an idle oil pipeline (Line 48) within the project area. Instead of conducting a large scale excavation operation within the road/right-of-way, it would be far less damaging to the environment if PPS could fill the pipeline with petroleum mud/slurry cement and abandon the pipeline in place. The approach discussed in the draft EIS would require excavating down to the pipeline, removing the pipeline itself, and soils, before backfilling and compacting the excavation with clean fill dirt transported from outside the area.	The comment is introductory in nature; it will be addressed in the discussion below. It should be noted that the author offers no evidence that abandonment of the pipeline in place is less damaging to the environment.
Pacific Pipeline System Detailed Comments		
PPS-3	The Port of Long Beach should evaluate other methods available to abandon pipelines in place as an alternative to the dig and remove approach discussed in the DEIS. The dig and remove approach would consequently encounter significantly more natural resources and result in greater environmental disturbance, not to mention the additional cost entailed with this method.	Abandoned pipelines pose a risk of degradation over time, creating pathways for potential contaminants. They also create obstacles for future development and difficulty with respect to maintaining records and a contact point for communication with the responsible utility owner because ownership can change over time. The Port will consider each proposed pipeline relocation and evaluate abandoning in place only in specific cases where removal of the line would significantly affect Port operations (e.g., by closing a mainline railroad track).
PPS-4	With so many utility companies affected by this project, there needs to be a more collaborative, transparent, environmentally efficient, and feasible approach to the current designated utility corridors, including addressing future operational activities and safety in the designated corridor. We urge the Port to conduct joint meetings of utility corridor users so that those impacted by the project can better understand and potentially benefit from other points of view.	The relocation of utilities, including those owned and operated by Pacific Pipeline System, would be conducted in a manner that would avoid unacceptable service interruptions. Consultation with utility owners and operators would determine the optimal timing for the switchover from the existing lines to the new lines, which would be provided in designated utility corridors within the yard. Details regarding these procedures will be provided as final engineering occurs. It should be noted that an ongoing dialog with utility providers has been under way during the preliminary engineering and planning process, including information exchanges regarding the status of preliminary engineering activities and identification/

TABLE 2-4
RESPONSES TO INTERESTED PARTY COMMENTS

Comment Number	Comment Text	Response to Comment
		specification of utility locations. This process will continue as the final design proceeds.
PPS-5	The proposed project area has been an industrial site for over a hundred years. The potential for contaminated soils exists in the new utility corridors. Who will be responsible for the cleanup, treatment and cradle to grave disposition of the soils in the new community utility corridors? Similarly, how will other environmental impacts (waste, groundwater, etc.) be managed during the demolition, movement, and reconstruction of these utility lines?	The possibility of encountering soil or groundwater contamination during construction is discussed in Section 3.10 of the DEIS, beginning on page 3.10-1. Avoidance and minimization measures would be imposed on contractors who work on the Project to address issues related to contamination. Section 3.10.3.4 details the procedures for stopping work in the affected area as well as sampling and testing so that proper storage, discharge, or disposal operations can be completed. The responsibility for the cost of remediation associated with contaminated soil encountered during construction, including utility relocations, would be determined on a case-by-case basis. In certain cases, the Port may elect to handle excavation, stockpiling, soil characterization, and soil management itself, with cost sharing among the responsible parties, where applicable. All contaminated soil encountered would be handled in accordance with the law and Port policy.
PPS-6	PPS recognizes as do the other public utility companies and the general public, that if the necessary environmental and permitting clearances are obtained, the Port of Long Beach has the authority to decide to do this project to increase their revenue, while all the utility companies must abide by their directive to relocate the utility lines. Given the scope of the project, and the significant level of effort to accomplish the required relocation of our infrastructure, PPS requests that our direct/associated costs as a result of the proposed project be reimbursed.	Pursuant to the existing pipeline license (PP-04-01), Pacific Pipeline System has agreed, as the “Licensee,” to the following: Pacific Pipeline System, “at its cost, (shall) alter the pipelines and change the location thereof whenever and as often as the City deems it convenient or necessary, whether on account of any construction authorized, permitted, or contemplated by City or its tenants, assignees or Licensees or otherwise. Licensee shall alter or change the location, or both, within sixty (60) days (or within such other time limit as may be specified) after the receipt of a written notice from the Executive Director of the Long Beach Harbor Department (“Executive Director”) so to do.”

TABLE 2-4
RESPONSES TO INTERESTED PARTY COMMENTS

Comment Number	Comment Text	Response to Comment
PLAINS WEST COAST TERMINALS LLC AUGUST 28, 2020		
Plains West Coast Terminals General Comments		
PWCT-1	Thank you for the opportunity to comment on the above-referenced project. Plains West Coast Terminals LLC (PWCT) has reviewed the draft Environmental Impact Statement (EIS) and submits the following observations and comments.	MARAD and the Port appreciate Plains West Coast Terminals LLC's (PWCT's) participation in and comments on the Project.
PWCT-2	PWCT owns and operates Lines 529 and 536 which are an integral part of our Southern California terminal system. Both lines are primarily used to pump crude oil received from vessels at our leased Port of Long Beach terminal into our crude oil system storage terminals located throughout the Los Angeles Basin. The crude oil is stored and later delivered to our customers as requested who are many of the major refineries in the Los Angeles Basin. Without the ability to move product through Lines 529 and 536, PWCT would be unable to operate our terminal system which would have a significant adverse effect on the operations of many local refineries and on residents who depend on refinery products throughout southern California.	The comment is introductory in nature and will be addressed in the specific comments discussed below.

TABLE 2-4 RESPONSES TO INTERESTED PARTY COMMENTS		
Comment Number	**Comment Text**	**Response to Comment**
Plains West Coast Terminals Detailed Comments		
PWCT-3	Customer curtailments will likely occur during the relocation construction project. The Port of Long Beach should be required to implement specific measures to minimize any pipeline outages so as to reduce impacts on nearby communities and minimize adverse impacts from shutdowns on customers and residents throughout southern California. Customer curtailments may occur if operational upsets take place due to damage to Lines 529 and 536 during third-party relocation construction projects within the new utility corridors. Customers could encounter demurrage fees due to such curtailments, as these pipeline segments affect timely ocean-going tanker import operations.	The various pipelines that would be affected by the proposed Project, based on their location, are governed by agreements with different parties. Specific to PWCT's agreements with COLB, PWCT would be responsible, at its cost, for altering pipeline facilities and changing the location thereof whenever and as often as COLB deems it convenient or necessary. For those pipelines in areas that are subject to agreements with other parties, in addition to close coordination with PWCT, the Port would ensure that there is early and continuous coordination with all of the respective owners and operators regarding relocation of the respective pipelines to accommodate the proposed Project. Details about the relocation of pipelines would be specified as final engineering occurs. It should also be noted that ongoing dialog between the Port and pipeline companies has been under way during the preliminary engineering and planning process, including information exchanges regarding the status of preliminary engineering activities and identification/specification of utility location. This process will continue onward as the final design proceeds.
PWCT-4	PWCT requests pre-construction vibration studies and calculations be performed in accordance with ASME standards to determine if the integrity of our existing and relocated oil lines will be affected by the proposed construction and relocation activity and overall construction and operation of the proposed project.	Predicted vibration from freight train pass-bys was based on actual measurements conducted by the Federal Transit Administration/ Federal Railroad Administration with a variety of trains, loads, and lengths. An adequate number of trains were measured to determine vibration generated by freight trains in general at various distances. The criteria took into account vibration caused by all train pass-bys, including double-stacked loads. Relocated pipelines would be designed, constructed, operated, and maintained to modern standards in accordance with all applicable regulations. Pipelines and pipeline subsurface construction are regulated by modern design standards to protect the pipelines from surface loads, especially concentrated loads, such as truck traffic and rail lines. In recognized load areas pipelines are buried at a depth to protect the pipeline and distribute anticipated loads (Moser, A.P., *Buried Pipe Design*, second edition, McGraw Hill, 2001). Furthermore, the American Railway Engineering and Maintenance of Way Association has adopted standards for protecting railroads and pipelines that cross each other. These standards vary by utility type but typically include encasement within a carrier pipe and minimum depth requirements.

TABLE 2-4
RESPONSES TO INTERESTED PARTY COMMENTS

Comment Number	Comment Text	Response to Comment
		Pipelines have been found to be very resistant to shaking from earthquakes, which produce much higher stress levels than construction activities or train vibration (Federal Emergency Management Agency, *Earthquake-Resistant Construction of Gas and Liquid Fuel Pipeline Systems Serving, or Regulated by, the Federal Government*, FEMA 233, July 1992). It is customary to compact backfill around pipes using vibratory compaction equipment; therefore, the pipes have most likely been exposed to vibration from construction equipment and at levels that would be much higher than those from distant trains. The most common causes of pipeline failure are bends, elbows, and other eccentricities that can be subjected to ground movement caused by earthquakes (i.e., with ground movement measured in feet). The Port's action would also allow older pipelines to be moved and replaced to modern standards.
PWCT-5	Relocating pipelines may require additional construction of pipeline appurtenances or facilities adjacent to the proposed rail system to comply with engineering standards and regulatory requirements in effect at the time of pipeline construction and/or relocation, and may trigger additional regulatory requirements or approvals that apply to PWCT as a result of or in connection with the construction/relocation of the lines. PWCT requests that these be accounted for as part of the project development.	Close consultation with utility providers has been under way during the preliminary engineering and planning process, including information exchanges regarding the status of preliminary engineering activities and identification/specification of utility locations. This process will continue as the final design proceeds. All necessary permits and/or approvals will be identified and incorporated into construction plans.
PWCT-6	Instead of relocating the various utility lines, the Port of Long Beach should explore protect-in-place solutions. What depth is satisfactory for the oil lines to stay in place? Can engineering controls be put in place instead of relocation? The draft EIS should evaluate these and similar alternatives and their potential for impacts as a result of the proposed project to determine the preferred alternative.	The Port will consider each proposed pipeline relocation and evaluate abandoning in place only in specific cases where removal of the line would significantly affect Port operations (e.g., by closing a mainline railroad track).

TABLE 2-4
RESPONSES TO INTERESTED PARTY COMMENTS

Comment Number	Comment Text	Response to Comment
PWCT-7	The Port of Long Beach should evaluate methods used to abandon pipelines in place as an alternative to removal, which can result in significantly greater environmental disturbance.	Abandoned pipelines pose a risk of degradation over time, creating pathways for potential contaminants. They also create obstacles for future development and difficulty with respect to maintaining records and a contact point for communication with the responsible utility owner because ownership can change over time. The Port will consider each proposed pipeline relocation and evaluate abandoning in place only in specific cases where removal of the line would significantly affect Port operations (e.g., by closing a mainline railroad track).
PWCT-8	The proposed project area has been an industrial site for over a hundred years. The potential for contaminated soils exists in the new utility corridors. Who will be responsible for the cleanup, treatment and cradle to grave disposition of the soils in the new community utility corridors? Similarly, how will the other environmental impacts (waste, groundwater, etc.) be managed during the demolition, movement, and reconstruction of these utility lines?	The possibility of encountering soil or groundwater contamination during construction is discussed in DEIS Section 3.10, beginning on page 3.10-1. Avoidance and minimization measures would be imposed on contractors who work on the Project to address issues related to contamination. Section 3.10.3.4 details the procedures for stopping work in the affected area as well as sampling and testing so that proper storage, discharge, or disposal operations can be completed. The responsibility for the cost of remediation associated with contaminated soil encountered during construction, including utility relocations, would be determined on a case-by-case basis. In certain cases, the Port may elect to handle excavation, stockpiling, soil characterization, and soil management itself, with cost sharing among the responsible parties, where applicable. All contaminated soil encountered would be handled in accordance with the law and Port policy.
PWCT-9	With so many utility companies affected by this project, there needs to be a more collaborative, transparent, environmentally efficient, and feasible approach to the current designated utility corridors, including addressing future operational activities and safety in the designated corridor. We urge the Port to conduct joint meetings of utility corridor users so that those impacted by the project can better understand and potentially benefit from other points of view.	The relocation of utilities, including those owned and operated by PWCT, would be conducted in a manner that would avoid unacceptable service interruptions. Consultation with utility owners and operators would determine the optimal timing for the switchover from the existing lines to the new lines, which would be provided in designated utility corridors within the yard. Details regarding these procedures will be provided as final engineering occurs. It should be noted that an ongoing dialog with utility providers has been under way during the preliminary engineering and planning process, including information exchanges regarding the status of preliminary engineering activities and identification/ specification of utility locations. This process will continue as the final design proceeds.

TABLE 2-4
RESPONSES TO INTERESTED PARTY COMMENTS

Comment Number	Comment Text	Response to Comment
PWCT-10	We ask that the Port consider PWCT's own preferred directional path of relocation as opposed to being confined to the utility corridors suggested by the drawings provided in the draft EIS.	As discussed previously, consultation with utility owners and operators would determine the optimal timing for the switchover from the existing lines to the new lines, which would be provided in designated utility corridors within the yard. Details regarding these procedures will be provided as final engineering occurs. It should be noted that an ongoing dialog with utility providers has been under way during the preliminary engineering and planning process, including information exchanges regarding the status of preliminary engineering activities and identification/ specification of utility locations. This process will continue as the final design proceeds.
PWCT-11	PWCT recognizes, as do the other public utility companies and the general public, that if the necessary environmental and permitting clearances are obtained, the Port of Long Beach has the authority to decide to do this project to increase their revenue, while all the utility companies must abide by their directive to relocate the utility lines. Given the scope of the project, and the significant level of effort to accomplish the required relocation of our infrastructure, PWCT requests that our direct/associated costs as a result of the proposed project be reimbursed.	Pursuant to the existing pipeline license (PP-85-5), PWCT has agreed, as the "Permittee," to the following: PWCT "(shall), at its own cost and expense, alter said pipelines and change the location thereof whenever and as often as the City deems it convenient or necessary on account of any construction authorized, permitted, or contemplated by City, and Permittee shall commence such alteration or change of location, or both, within sixty (60) days after the receipt of a written notice from City so to do and shall proceed to complete the same with due diligence thereafter."

2.5 DEIS ERRATA SHEETS AND OTHER CHANGES

Errata sheets are being used for the Port of Long Beach Pier B On-Dock Rail Support Facility FEIS in lieu of rewriting the DEIS. This approach is appropriate because the comments received on the DEIS were minor, and responses to those comments are limited to factual corrections or clarifications. The DEIS errata sheets are included in this combined FEIS/ROD. Table 2-5 provides the errata sheet and the corrected text or clarification.

TABLE 2-5
DEIS ERRATA SHEET

ID	Chapter/ Appendix	Page #	Line #	FEIS Corrected Text/Clarification
1	Executive Summary, Cultural Resources	ES-29 ES-30 ES-31	N/A	The transit shed at Berths D52–54 would experience a significant impact under the Proposed Action. Measures to address the significant impact under NEPA (and the adverse effect under Section 106) would be developed in consultation with the SHPO and incorporated into a memorandum of agreement. The following measures to minimize harm are proposed and are subject to change, pending consultation with the SHPO: ~~**Treatment Plan for Transit Shed at Berths D52–54.** In order to minimize adverse effects, the POLB proposes to develop a treatment plan to guide the transit shed at Berths D52–54's demolition and repair with the goal of reducing physical and visual effects on the historic property to the greatest extent possible. The goal is to retain as many of the building's character-defining features as possible. Character-defining features include the symmetry of the northeast and south façades; the large footprint covering the majority of the pier; the north and south façades' close proximity to the waterfront; low and wide massing; rhythmic fenestration; smooth stucco; smooth-textured barrel-vaulted roof; Moderne-style parapet; incised lettering; and the original arrangement of the metal doors and steel-sash windows that characterize the use of the style for a massive industrial port building. Development of the treatment plan shall occur prior to drafting demolition, and repair plans and would include the following:~~ • ~~Secretary of the Interior (SOI)-Qualified Architectural Historians shall inspect the transit shed's physical condition and photograph the area of the building subject to demolition and the areas immediately surrounding it.~~ • ~~POLB shall engage an SOI-Qualified architectural historian to consult with POLB engineers on development of demolition and repair plans.~~ • ~~In consultation with an architectural historian, POLB engineers shall develop detailed demolition and repair plans~~

TABLE 2-5 DEIS ERRATA SHEET				
ID	Chapter/ Appendix	Page #	Line #	FEIS Corrected Text/Clarification
				~~informed by existing and historic conditions. Repair may include removal and reapplication, or reconstruction of a portion or the entirety, of the affected façades.~~ • ~~POLB shall provide detailed demolition and repair plans to the SHPO and consulting parties and request comments.~~ • ~~POLB shall revise demolition and repair plans in accordance with the SHPO and consulting party comments as practicable.~~ • ~~POLB shall provide a post-construction report to the SHPO and consulting parties illustrating the repaired building.~~ ~~**Survey of Pre-Containerization POLB.** The transit shed at Berths D52–54 is significant in connection with a shipping system that relied heavily on dockworkers' manual labor and rail, prior to the advent of containerization at the POLB (roughly 1969). Containerization slowly replaced the need for this property type, leading to the elimination or relocation of transit sheds. In order to mitigate the adverse effect incurred by its partial demolition, SOI-Qualified Architectural Historians shall conduct a survey to mitigate the loss of other properties, including transit sheds, associated with pre-containerization POLB. This work would include the following:~~ • ~~SOI-Qualified Architectural Historians shall prepare a historic context of POLB rail and shipment operations prior to the advent of containerization.~~ • ~~SOI-Qualified Architectural Historians shall conduct a survey of the POLB related to the above context and identify buildings, structures, and objects that bear significance within this context. This includes the potential identification of a historic district (possibly, a non-contiguous district) related to the context. If a historic district is discovered, the SOI-Qualified Architectural Historians shall identify its contributors and non-contributors.~~ • ~~POLB shall provide a copy of the report (historic context and survey findings report) to the SHPO and consulting parties.~~ • <u>**Historic Property Treatment Plan for Transit Shed at Berths D52–54.** Prior to beginning demolition and construction activities related to the transit shed and areas immediately surrounding it, the Port shall develop a Historic Property Treatment Plan (HPTP) for the transit shed at Berths D52–D54. The HPTP will guide the transit shed's partial demolition and construction with the goal of minimizing physical and visual effects on the historic property to the greatest extent possible. The Port shall revise the HPTP until MARAD accepts it. No demolition or</u>

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TABLE 2-5 DEIS ERRATA SHEET				
ID	**Chapter/ Appendix**	**Page #**	**Line #**	**FEIS Corrected Text/Clarification**
				construction work on the transit shed and the areas immediately surrounding it may begin until the HPTP is approved by MARAD and consulting parties have had an opportunity to comment on the HPTP. The HPTP shall include: ○ Description of the transit shed's physical condition, including photo-documentation of the areas of the building subject to demolition and the areas immediately surrounding it. ○ Demolition and construction plans related to the transit shed. • **Post-Construction Report for Transit Shed at Berths D52–D54.** Within thirty (30) calendar days following construction of the transit shed, the Port shall produce a Post-Construction Report (P-C Report) for the transit shed at Berths D52–D54 illustrating the partial demolition and construction. The Port shall revise the P-C Report until MARAD accepts it. The P-C Report shall include: ○ Before-and-after photographs of ten (10) different views of the transit shed, of which seven (7) will focus on the primary elevation. ○ Before-and-after photographs of the setting adjacent to the transit shed, along Pico Avenue. ○ Narrative description of work conducted, describing how and why the construction adheres to the HPTP. • **Survey of Pre-Containerization POLB.** Prior to beginning demolition and construction activities for the transit shed and areas immediately surrounding it, the Port shall produce a Pre-Containerization Resources Technical Report (Survey Report) memorializing a historic resources survey of pre-1969 resources within the Port. The historic resources survey will assess buildings, structures, and objects constructed prior to 1969 for their significance under the theme of pre-containerization Port activity. The Port shall revise the Survey Report until MARAD accepts it. No demolition or construction work on the transit shed and the areas immediately surrounding it may begin until the HPTP is approved by MARAD and consulting parties have had an opportunity to comment. This Survey Report shall include: ○ Historic context of Port rail and shipment operations prior to the advent of containerization.

TABLE 2-5
DEIS ERRATA SHEET

ID	Chapter/ Appendix	Page #	Line #	FEIS Corrected Text/Clarification
				○ Survey of the Port related to the above context and identification buildings, structures, and objects within this context. ○ Evaluation of significance of all the pre-1969 resources using NRHP and California Register of Historical Resources (CRHR) criteria, including consideration of historic district potential. If a historic district is discovered, contributors and non-contributors shall be identified.
2	Chapter 2, Description of Proposed Action and Alternatives	2-69	20–21	***2.5.1.7 Magnuson-Stevens Fishery Conservation and Management Act*** The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act (16 U.S.C. 1801 et seq.) require federal agencies that fund, permit, or carry out activities that may affect Essential Fish Habitat (EFH) to consult with NMFS and respond in writing to the conservation recommendations provided by NMFS. In addition, NMFS is required to comment on any state agency activities that would affect EFH.
3	Section 3.3 Air Quality	3.3-17	6	*Assembly Bill 617* The State of California has emphasized protecting local communities from the harmful effects of air pollution through the passage of Assembly Bill (AB) 617 (Garcia). AB 617 requires new community-focused and community-driven action to reduce air pollution and improve public health in communities that experience disproportionate burdens from exposure to air pollutants. In response to AB 617, CARB established the Community Air Protection Program with the goal of reducing exposure in communities heavily impacted by air pollution.
4	Section 3.3 Air Quality	3.3-17	14	*Senate Bill 535* Senate Bill (SB) 535 (De Leon) was signed into law on September 30, 2012 by Governor Jerry Brown. SB 535 is largely based on the actions introduced by Global Warming Solutions Act of 2006, commonly known as AB 32. AB 32 was passed in 2006 and its goal is to reduce greenhouse gas emissions in California. The process outlined by AB 32 resulted in the creation of a cap-and-trade system in California. Companies must purchase emissions credits when they exceed their allotted emissions amount. Each year, funds generated from companies purchasing credits is expected to generate about $1 billion of state revenue. SB 535 requires that 25 percent of the fund is spent on projects that benefit disadvantaged communities, and the at least 10 percent of the

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TABLE 2-5
DEIS ERRATA SHEET

ID	Chapter/ Appendix	Page #	Line #	FEIS Corrected Text/Clarification
				25 percent is spent on projects located in disadvantaged communities. Cal Enviroscreen is a screening methodology that identifies disadvantaged communities that are eligible to benefit from SB 535 funds. *Senate Bill 1000* SB 1000 (Leyva, 2016) amended California's Planning and Zoning Law. SB 1000 requires local governments that have identified disadvantaged communities to incorporate the addition of an environmental justice element into their general plans upon the adoption or next revision of two or more elements concurrently on or after January 1, 2018. SB 1000 requires environmental justice elements to identify objectives and policies to reduce unique or compounded health risks in disadvantaged communities. Generally, environmental justice elements will include policies to reduce the community's exposure to pollution through air quality improvement. SB 1000 affirms the need to integrate environmental justice principles into the planning process to prioritize improvements and programs that address the needs of disadvantaged communities.
5	Section 3.3 Air Quality	3.3-36	27	These emissions estimates, along with underlying assumptions and calculations, were submitted to the SCAQMD as part of the proposed Project's general conformity determination consultation process. Based on SCAQMD staff review, NO_X emissions above *de minimis* thresholds can be accommodated within the general conformity budgets established in the 2016 AQMP pursuant to the SIP set-aside budget established in the 2016 AQMP.
6	Section 3.3 Air Quality	3.3-37	4	Table 3.3-8 Construction and Operations Emissions of the Proposed Project with Mitigation (tons/year) See revised Table below.
7	Chapter 3, Affected Environment and Environmental Consequences Section 3.5, Biological Resources	3.5-14	12–21	MARAD determined that the Project would have no effect on green sea turtle. While consultation for the Project was not required for a no effect determination under Section 7 of the ESA, MARAD provided NMFS with written analysis supporting the no effect determination and requested concurrence. ~~MARAD is awaiting written response from~~ NMFS declined to provide comment or concurrence. All agency correspondence can be found in Appendix G. ***3.5.2.4 The Marine Mammal Protection Act of 1972***

TABLE 2-5
DEIS ERRATA SHEET

ID	Chapter/ Appendix	Page #	Line #	FEIS Corrected Text/Clarification
				The MMPA protects all marine mammals, some of which are also protected by the federal ESA of 1973. MARAD initiated coordination with NMFS to ensure MMPA compliance ~~and is expecting to receive written confirmation from NMFS to complete the MMPA coordination process~~ (Appendix G). No comments were received from NMFS regarding MMPA compliance.
8	Chapter 3, Affected Environment and Environmental Consequences Section 3.5, Biological Resources	3.5-15	13–19	***3.5.2.8 Magnuson-Stevens Fishery Conservation and Management Act*** The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act (16 U.S.C. 1801 et seq.) require federal agencies that fund, permit, or carry out activities that may affect EFH to consult with NMFS and respond in writing to the conservation recommendations provided by NMFS. In addition, NMFS is required to comment on any state agency activities that would affect EFH. Consultation for EFH with NMFS ~~has been initiated for the Project~~ was completed, and ~~MARAD is awaiting written response~~ NMFS determined the Proposed Action would adversely affect EFH for various federally managed fish species within the Coastal Pelagic Species and Pacific Coast Groundfish Fishery Management Plans. Specifically, EFH would temporarily be adversely affected by increased turbidity and noise associated with pile-driving activity. However, NMFS has determined these impacts would not be substantial and the proposed minimization measures adequately address expected impacts. (Appendix G.)~~.~~

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TABLE 2-5 DEIS ERRATA SHEET				
ID	**Chapter/ Appendix**	**Page #**	**Line #**	**FEIS Corrected Text/Clarification**
9	Chapter 3, Affected Environment and Environmental Consequences Section 3.6, Transportation	3.6-14	28–36	***3.6.2.6 SCAG Regional Transportation Plan*** Pursuant to SB 375, the Southern California Association of Governments (SCAG) adopted the ~~2016–2040~~2020–~~2016~~2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS); the ~~2016~~2020 plan is an update of the ~~2012–2035~~2016–2040 RTP/SCS. The primary goal of the ~~2016~~2020 RTP/SCS is to increase mobility for the region's residents and visitors. Although SB 375 focuses on light-duty vehicle emissions, the ~~2016~~2020 RTP/SCS includes regional strategies directed at Goods Movement. The ~~2016~~2020 RTP/SCS Goods Movement Appendix identifies strategies for regional highway improvements, regional rail improvements (i.e., on-dock and near-dock rail), and San Pedro Bay ports access projects.
10	Chapter 3, Affected Environment and Environmental Consequences Section 3.13, Cultural Resources	3.13-1	7–12	**3.13.1 Affected Environment** This section includes an impacts analysis under NEPA. For impacts under National Historic Preservation Act, the effects analysis is documented in the *Finding of Effect, Port of Long Beach Pier B On-Dock Rail Support Facility Project, Long Beach, California* (FoE), which ~~has not yet been submitted to~~ received State Historic Preservation Officer (SHPO) concurrence on July 23, 2020~~for review, comment, and concurrence~~.
11	Chapter 3, Affected Environment and Environmental Consequences Section 3.13, Cultural Resources	3.13-5	9–22	***3.13.1.5 Archaeological Resources*** In the context of the National Historic Preservation Act Section 106 (Section 106) compliance effort, described in Section 3.13.2.2, Section 106 of the National Historic Preservation Act, professionally qualified archaeologists performed an intensive pedestrian field survey of the non-developed areas and a reconnaissance-level survey of all developed areas within the archaeological area of potential effects (APE), or the Project footprint. No previously recorded or newly recorded archaeological sites or resources were revisited or identified during the survey. The results of the records search~~, Sacred Lands File (SLF) search,~~ and field surveys provided negative results for archaeological resources within the undertaking's APE. No known archaeological sites are within or near the APE. In addition, the likelihood of encountering buried archaeological resources within the APE is low.

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TABLE 2-5
DEIS ERRATA SHEET

ID	Chapter/ Appendix	Page #	Line #	FEIS Corrected Text/Clarification
				MARAD consulted with two-federally recognized Tribes for this project: • Soboba Band of Luiseno Indians; and • Torres Martinez Desert Cahuilla Indians. No tribal cultural resources were identified as a result of these communications. A Sacred Lands File (SLF) search was requested from the State of California's Native American Heritage Commission (NAHC). A response from the NAHC was received on July 19, 2019. A copy of this letter is included in Appendix H. The results of the SLF check were negative. The NAHC provided a list of Native American tribes who may have knowledge of cultural resources in the project area. The tribes identified by the NAHC included: • Gabrieleno Band of Mission Indians—Kizh Nation; • Gabrieleno/Tongva San Gabriel Ban of Mission Indians; • Gabrielino/Tongva Nation; • Gabrielino Tongva Indians of California Tribal Council; and • Gabrielino-Tongva Tribe. Letters were mailed to these tribes to solicit any information that they may have regarding any possible cultural resources in the project area. To date, no responses have been received. These determinations are memorialized in the technical report, attached as Appendix H. The SHPO concurred with the conclusions in the technical report on March 26, 2020.
12	Chapter 3, Affected Environment and Environmental Consequences Section 3.13, Cultural Resources	3.13-9 3.13-10	38–40 1–3	**3.13.3 Environmental Consequences** The effects analysis under Section 106 is documented in the FoE, which ~~has not yet been submitted to SHPO for review, comment, and concurrence~~ received SHPO concurrence on July 23, 2020. Neither physical changes nor impactful setting changes are anticipated related to the transmission lines. They will experience no adverse effect. Partial demolition of the Transit Shed at Berths D52–54, however, will result in an adverse effect.

TABLE 2-5
DEIS ERRATA SHEET

ID	Chapter/ Appendix	Page #	Line #	FEIS Corrected Text/Clarification
13	Chapter 3, Affected Environment and Environmental Consequences Section 3.13, Cultural Resources	3.13-11 3.13-12 3.13-13	37–41 1–43 1–4	The transit shed at Berths D52–54 would experience a significant impact under the Proposed Action. Measures to address the significant impact under NEPA (and the adverse effect under Section 106) would be developed in consultation with the SHPO and incorporated into a memorandum of agreement. The following measures to minimize harm are proposed and are subject to change, pending consultation with the SHPO: ~~**Treatment Plan for Transit Shed at Berths D52–54.** In order to minimize adverse effects, the POLB proposes to develop a treatment plan to guide the transit shed at Berths D52–54's demolition and repair with the goal of reducing physical and visual effects on the historic property to the greatest extent possible. The goal is to retain as many of the building's character-defining features as possible. Character-defining features include the symmetry of the northeast and south façades; the large footprint covering the majority of the pier; the north and south façades' close proximity to the waterfront; low and wide massing; rhythmic fenestration; smooth stucco; smooth-textured barrel-vaulted roof; Moderne-style parapet; incised lettering; and the original arrangement of the metal doors and steel-sash windows that characterize the use of the style for a massive industrial port building. Development of the treatment plan shall occur prior to drafting demolition, and repair plans and would include the following:~~ • ~~Secretary of the Interior (SOI)-Qualified Architectural Historians shall inspect the transit shed's physical condition and photograph the area of the building subject to demolition and the areas immediately surrounding it.~~ • ~~POLB shall engage an SOI-Qualified architectural historian to consult with POLB engineers on development of demolition and repair plans.~~ • ~~In consultation with an architectural historian, POLB engineers shall develop detailed demolition and repair plans informed by existing and historic conditions. Repair may include removal and reapplication, or reconstruction of a portion or the entirety, of the affected façades.~~ • ~~POLB shall provide detailed demolition and repair plans to the SHPO and consulting parties and request comments.~~ • ~~POLB shall revise demolition and repair plans in accordance with the SHPO and consulting party comments as practicable.~~

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TABLE 2-5
DEIS ERRATA SHEET

ID	Chapter/ Appendix	Page #	Line #	FEIS Corrected Text/Clarification
				• ~~POLB shall provide a post-construction report to the SHPO and consulting parties illustrating the repaired building.~~ ~~**Survey of Pre-Containerization POLB.** The transit shed at Berths D52–54 is significant in connection with a shipping system that relied heavily on dockworkers' manual labor and rail, prior to the advent of containerization at the POLB (roughly 1969). Containerization slowly replaced the need for this property type, leading to the elimination or relocation of transit sheds. In order to mitigate the adverse effect incurred by its partial demolition, SOI-Qualified Architectural Historians shall conduct a survey to mitigate the loss of other properties, including transit sheds, associated with pre-containerization POLB. This work would include the following:~~ • ~~SOI-Qualified Architectural Historians shall prepare a historic context of POLB rail and shipment operations prior to the advent of containerization.~~ • ~~SOI-Qualified Architectural Historians shall conduct a survey of the POLB related to the above context and identify buildings, structures, and objects that bear significance within this context. This includes the potential identification of a historic district (possibly, a non-contiguous district) related to the context. If a historic district is discovered, the SOI-Qualified Architectural Historians shall identify its contributors and non-contributors.~~ • ~~POLB shall provide a copy of the report (historic context and survey findings report) to the SHPO and consulting parties.~~ • **Historic Property Treatment Plan for Transit Shed at Berths D52–54.** Prior to beginning demolition and construction activities related to the transit shed and areas immediately surrounding it, the Port shall develop a Historic Property Treatment Plan (HPTP) for the transit shed at Berths D52–D54. The HPTP will guide the transit shed's partial demolition and construction with the goal of minimizing physical and visual effects on the historic property to the greatest extent possible. The Port shall revise the HPTP until MARAD accepts it. No demolition or construction work on the transit shed and the areas immediately surrounding it may begin until the HPTP is approved by MARAD and consulting parties have had an opportunity to comment on the HPTP. The HPTP shall include: ○ Description of the transit shed's physical condition, including photo-documentation of the areas of the

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TABLE 2-5 DEIS ERRATA SHEET				
ID	**Chapter/ Appendix**	**Page #**	**Line #**	**FEIS Corrected Text/Clarification**
				building subject to demolition and the areas immediately surrounding it. ○ Demolition and construction plans related to the transit shed. • **Post-Construction Report for Transit Shed at Berths D52–D54.** Within thirty (30) calendar days following construction of the transit shed, the Port shall produce a Post-Construction Report (P-C Report) for the transit shed at Berths D52–D54 illustrating the partial demolition and construction. The Port shall revise the P-C Report until MARAD accepts it. The P-C Report shall include: ○ Before-and-after photographs of ten (10) different views of the transit shed, of which seven (7) will focus on the primary elevation. ○ Before-and-after photographs of the setting adjacent to the transit shed, along Pico Avenue. ○ Narrative description of work conducted, describing how and why the construction adheres to the HPTP. • **Survey of Pre-Containerization POLB.** Prior to beginning demolition and construction activities for the transit shed and areas immediately surrounding it, the Port shall produce a Pre-Containerization Resources Technical Report (Survey Report) memorializing a historic resources survey of pre-1969 resources within the Port. The historic resources survey will assess buildings, structures, and objects constructed prior to 1969 for their significance under the theme of pre-containerization Port activity. The Port shall revise the Survey Report until MARAD accepts it. No demolition or construction work on the transit shed and the areas immediately surrounding it may begin until the HPTP is approved by MARAD and consulting parties have had an opportunity to comment. This Survey Report shall include: ○ Historic context of Port rail and shipment operations prior to the advent of containerization. ○ Survey of the Port related to the above context and identification buildings, structures, and objects within this context. ○ Evaluation of significance of all the pre-1969 resources using NRHP and California Register of Historical Resources (CRHR) criteria, including consideration of historic district potential. If a historic district is discovered, contributors and non-contributors shall be identified.

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TABLE 2-5
DEIS ERRATA SHEET

ID	Chapter/ Appendix	Page #	Line #	FEIS Corrected Text/Clarification
14	Appendix F	F-ii	18	Table F-6. Estimate of Opening Year 2026 and Horizon Year 2045 AADT Volumes
15	Appendix F	F-1	40	• Pico Avenue. Pico Avenue is located within a narrow corridor between I-710 and several buildings, terminals, and ramps. Pico Avenue would be realigned to the west from Pier B St/I-710 ramps south to approximately Pier D Street to accommodate the addition of four railroad tracks. The existing at-grade crossing at Pico Avenue/Pier D Street would be closed.
16	Appendix F	F-14	2–13	**Environmental Consequences** **Regional Conformity** The Pier B Street Freight Corridor Reconstruction Project is included in the regional emissions analysis conducted by the Southern California Association of Governments (SCAG) for the conforming~~ 2016-2040~~ 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) ~~Amendment 3~~, under project number ~~1AL0~~41AL04-LAF7204. The project's design concept and scope have not changed significantly from what was analyzed in the~~ 2016-2040~~ 2020–2045 RTP/SCS~~ Amendment 3~~. The conformity analysis found that the~~ 2016–2040~~ 2020–2045 RTP/SCS ~~Amendment 3~~ conformed to the State Implementation Plan (SIP), therefore, the individual projects contained in the plan, are conforming projects, and will have air quality impacts consistent with those identified in the SIP for achieving the National Ambient Air Quality Standards (NAAQS). FHWA determined the~~ 2016-2040~~ 2020–2045 RTP/SCS ~~Amendment 3~~ to conform to the SIP on ~~December 17, 2018~~ June 5, 2020.
17	Appendix F	F-14	17–24	**3.1.5: Is there a currently conforming RTP and TIP?** **Response**: Yes. The~~ 2016~~ 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and 2019 FTIP are conforming programs (proceed to 3.1.6). **3.1.6: Is the project included in the regional emissions analysis supporting the currently conforming RTP and TIP?** **Response:** Yes. The project is identified in the~~ 2016~~ 2020–2045 RTP/SCS under project ID~~ 1AL04~~ 1AL04-LAF7204 and 2019 FTIP under project ID LAF7204 (see **Air Quality** Attachment). Thus, it has been included in the regional emissions analysis (proceed to 3.1.7).

TABLE 2-5 DEIS ERRATA SHEET				
ID	**Chapter/ Appendix**	**Page #**	**Line #**	**FEIS Corrected Text/Clarification**
18	Appendix F	F-21	11–18	At Horizon Year 2045, AADT volumes along Pier B Street are projected to increase by approximately 452 percent from approximately ~~1,458~~ 1,414 vehicles per day to approximately ~~6,591~~ 7,805 vehicles per day under the Build alternative. When compared to the No-Build Alternative, the total estimated volume of ~~6,591~~ 7,805 vehicles per day would be considerably lower than the 140,000 to 150,000 AADT range that FHWA considers having a high potential for MSAT effects. The second point to consider is the fact that no sensitive land uses are present within the local project vicinity. Project vicinity land uses include the I-710 Freeway to the east, port/logistics land uses to the south and west, and logistics land uses to the north.

TABLE 3.3-8
CONSTRUCTION AND OPERTION EMISSIONS OF THE PROPOSED PROJECT WITH MITIGATION (TONS/YEAR)

Evaluation Year	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
2021	3.75	0.36	1.13	0.01	0.27	0.07
2022	41.04	3.79	15.28	0.10	3.85	1.35
2023	20.80	1.80	6.55	0.08	4.13	1.33
2024	25.05	2.53	57.99	0.10	2.86	1.67
2025	27.08	2.61	55.61	0.11	2.89	1.60
2036	23.94	2.25	51.06	0.10	3.12	1.64
2027	22.79	2.00	48.40	0.10	2.69	1.41
2028	21.47	1.84	44.98	0.09	1.92	1.15
2029	18.87	1.42	40.40	0.07	0.78	0.72
2030	18.87	1.35	37.56	0.07	0.71	0.65
2031	18.87	1.20	34.73	0.07	0.71	0.65
2032	18.87	1.13	32.60	0.07	064	0.59
2033	18.87	1.06	30.48	0.07	0.57	0.52
2034	18.87	0.99	28.35	0.07	0.50	0.46
2035	18.87	0.92	26.22	0.07	0.50	0.46

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EXHIBIT A

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT POLB PIER B ON-DOCK RAIL CONFORMITY LETTER, APRIL 15, 2021

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
South Coast AQMD (909) 396-2000 • www.aqmd.gov

April 15, 2021

Alan J Finio
Maritime Administration
Office of Environment
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Mr. Finio,

This letter is in response to your letter dated February 23, 2021 requesting South Coast AQMD to accommodate the anticipated emissions from the Port of Long Beach Pier B On-Dock Rail Support Facility Project in the Air Quality Management Plan (AQMP)/State Implementation Plan (SIP) emissions budget for general conformity purposes.

The general conformity determination process is intended to demonstrate that a proposed Federal action will not: (1) cause or contribute to new violations of a national ambient air quality standard (NAAQS); (2) interfere with provisions in the applicable SIP for maintenance of any NAAQS; (3) increase the frequency or severity of existing violations of any standard; or (4) delay the timely attainment of any standard. As such, for general conformity determination, the proposed federal action needs to conform to the latest approved SIP/AQMP.

The South Coast Air Basin (Basin) is designated as an extreme non-attainment area for ozone, serious non-attainment for PM2.5 and maintenance area for Carbon Monoxide. In order to accommodate projects subject to general conformity requirements and to streamline the review process, general conformity budgets for NOx and VOC emissions are established in the AQMP. The 2016 AQMP (https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp), which is the latest plan approved by U.E. EPA, established set aside accounts to accommodate emissions subject to general conformity requirements. The set-aside accounts include 2 tons per day (tpd) or 730 tons per year (tpy) of NOx and 0.5 tpd or 182.5 tpy of VOC each year starting in 2017 through 2030, and 0.5 tpd (182.5 tpy) of NOx and 0.2 tpd (73 tpy) of VOC each year in 2031 and thereafter.

The proposed Project involves reconfiguration and expansion of the existing Port of Long Beach Pier B On-Dock Railyard. The anticipated emissions from the proposed project exceed the General Conformity de minimis thresholds of NOx in the years 2022 and 2024 through 2035 as indicated in Tables 1 to 4 of your letter. These emissions are from construction equipment and increased locomotive activities after the completion of the proposed expansion of the on-dock rail support facility. Detailed methodology to estimate emissions included in the general conformity determination is available on the Port of Long Beach's website, https://www.polb.com/documents/#ceqa-nepa

South Coast AQMD staff has reviewed the proposed project emissions based on the information provided in your letter. Based on our review, we have determined that NOx emissions above de minimis thresholds can be accommodated within the general conformity budgets established in the 2016 AQMP. The emissions accommodated in the general conformity budgets, as listed in Table 1 below, are for 2022, and 2024 through 2031, pursuant to the SIP set-aside budget established in the 2016 AQMP.

Table 1. Proposed Project Emissions Accommodated in 2016 AQMP General Conformity Budgets (tons per year)[1]

Year	Construction	Operation	Total
2022	15.28	-	15.28
2024	2.00	55.99	57.99
2025	3.16	52.45	55.61
2026	2.16	48.90	51.06
2027	2.33	46.07	48.40
2028	1.75	43.23	44.98
2029	-	40.40	40.40
2030	-	37.56	37.56
2031	-	34.73	34.73

In summary, based on our evaluation, the proposed project will conform to the latest EPA approved AQMP as the emissions from the project are accommodated within the AQMP's emissions budgets, and the proposed project is not expected to result in any new or additional violations of the NAAQS or impede the projected attainment of the NAAQS.

[1] Construction missions are not expected to exceed the de minimis threshold in 2023. No changes in locomotive emissions are expected due to the completion of the project in 2023, as indicated in Draft EIS, which is available at https://polb.com/documents/#ceqa-nepainformation. Details are provided in Table ES-1 on page ES-7, "Proposed Project - 12th Street Alternative".

If you have any questions, please contact me at (909) 396-2856 or srees@aqmd.gov or Sang-Mi Lee, Program Supervisor at (909)-396-3169 or slee@aqmd.gov.

Sincerely,

Sarah Rees

Sarah L. Rees, Ph.D.
Deputy Executive Officer
Planning, Rule Development & Area Sources
South Coast Air Quality Management District

Attachment:
Letter from Maritime Administration dated February 23, 2021

cc: Tom Kelly, US EPA Region IX
Rongsheng Luo, SCAG
Barbara Baird, South Coast AQMD
Zorik Pirveysian, South Coast AQMD
Sang-Mi Lee, South Coast AQMD
Jillian Wong, South Coast AQMD
Lijin Sun, South Coast AQMD

ZP:SL

EXHIBIT B
FEDERAL HIGHWAY ADMINISTRATION CONCURRENCE

U.S. Department of Transportation
Federal Highway Administration

California Division

650 Capitol Mall, Suite 4-100
Sacramento, CA 95814
(916) 498-5001
(916) 498-5008 (FAX)

March 10, 2021

In Reply, Refer To:
HDA-CA

Tony Tavares, District Director
California Department of Transportation
District 7
100 South Main Street, Suite 100
Los Angeles, CA 90012-3606

SUBJECT: Project Level Conformity Determination for the Pier B Street Freight Corridor Reconstruction Project (MPO FTIP ID LAF7204)

Dear Mr. Tavares:

On February 18, 2021, the California Department of Transportation (Caltrans) submitted to the Federal Highway Administration (FHWA) a complete request for a project level conformity determination for the Pier B Street Freight Corridor Reconstruction Project. The project is in an area that is designated Non-Attainment or Maintenance for Ozone, Carbon Monoxide (CO) and Particulate Matter (PM10, PM 2.5).

The project level conformity analysis submitted by Caltrans indicates that the project-level transportation conformity requirements of 40 CFR Part 93 have been met. The project is included in the Southern California Association of Governments' (SCAG) current Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP), as amended. The design concept and scope of the preferred alternative have not changed significantly from those assumed in the regional emissions analysis.

As required by 40 CFR 93.116 and 93.123, the localized PM2.5 and PM10 analyses are included in the documentation. The analyses demonstrate that the project will not create any new violations of the standards or increase the severity or number of existing violations.

Based on the information provided, FHWA finds that the Pier B Street Freight Corridor Reconstruction Project conforms with the State Implementation Plan (SIP) in accordance with 40 CFR Part 93.

If you have any questions pertaining to this conformity finding, please contact Joseph Vaughn at (916) 498-5346 or Joseph.Vaughn@dot.gov.

Sincerely,

Antonio Johnson
Team Leader, Planning & Air Quality
Federal Highway Administration

EXHIBIT C
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT EIR COMMENT, MARCH 13, 2017

11.2.3.5 South Coast Air Quality Management District (AQMD)

South Coast
Air Quality Management District
South Coast AQMD
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SENT VIA EMAIL & USPS: March 13, 2017
heather.tomley@polb.com
Ms. Heather A. Tomley
Director of Environmental Planning
Port of Long Beach
4801 Airport Plaza Drive
Long Beach, CA 90815

Draft Environmental Impact Report (DEIR) for the Proposed Pier B On-Dock Rail Support Facility Project (SCH No. 2009081079)

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document. The following comments are meant as guidance for the Lead Agency and should be incorporated into the Final Environmental Impact Report (Final EIR).

The proposed project would modernize and increase on-dock rail capacity at Pier B. This is an important strategy for transitioning to an environmentally sustainable freight transport system by promoting the shift to containers moved by rail at on-dock facilities, which is preferable to the use of trucks to move containers to near- or off-dock facilities.

In the project description, the Lead Agency proposes to redevelop and expand the existing Pier B On-Dock Rail Yard area providing 'for additional railcar storage and staging capacity, including rail tracks for locomotive fueling and railcar repair to accommodate more efficient assembly of cargo trains up to 10,000 feet long[1]". The proposed project[2] also includes "realignment of Pier B Street, closure of the existing 9th Street grade crossing, and removal of existing ramps to and from the Shoemaker Bridge.[3]" Finally, utility and other infrastructure work are also included to support the proposed redevelopment construction. The proposed project seeks to relieve existing train congestion that currently can block through rail traffic while trains are being assembled/disassembled. The proposed changes in the Pier B Rail Yard will also allow for longer-length trains, which will then require fewer trips by local light-duty switching locomotives to assemble/disassemble the different trains. The proposed project will be constructed in three phases[4] over an approximate 86-month period with overlap between construction Phases 1 and 2. The Pier B Rail Yard will continue to operate during construction, so overlapping construction and operation emissions were evaluated in the DEIR minus the baseline emissions from existing operations. At full operational capacity in 2035,[5] approximately 17 trains would depart the yard each day, an increase of 10 trains from the existing configuration.[6] Construction related traffic will include approximately 3,172 daily trips.[7]

AQMD-1

[1] POLB Project Description from the January 26, 2017 Amended Notice of Completion.
[2] DEIR Chapter 1, Project Description, Page 1-1 The Proposed Project is the 12th Street Alternative.
[3] *Ibid*, See Footnote No. 1
[4] DEIR, Section 3.2 Air Quality and Health Risk. At the time of analysis: Years 1-4 correspond to Phase 1 and 2 (Years Including Fall 2016 – 2019) and Years 5-8 correspond to Phase 3 (Years 2020 – 2023).
[5] DEIR, Project Description, page 1-23.
[6] DEIR, Project Description, Table 1.8-1 page 1-24 for the 12th Street Alternative (Proposed Project).
[7] DEIR, Traffic Impact Analysis Report (Cambridge Systematics, December 2016), page B-40, 3.2 Construction Trips, Table 11: Construction Trips (Two-Way) including autos and trucks.

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Ms. Heather Tomley 2 March 13, 2017

Based on the DEIR analyses, the proposed project will cause significant impacts after mitigation for the overlapping construction and operation activities during construction Phases 1 and 2 in 2016 – 2019, as well as construction Phase 3 in Year 2020 - 2023. The proposed project's regional emissions impacts[8] under CEQA will remain significant after mitigation for CO and NOx for all construction phases and VOC[9] during Phase 3. Construction and operation impacts will also cause exceedances of the significance thresholds for the localized impacts[10] from NO_2 during all construction phases. The proposed project's mitigated maximum cancer risk (MICR) is 8.7 in 1 million for residential receptors and the mitigated cancer burden of 0.27 are below significance thresholds. However, after a review of the DEIR's air quality and health risk analyses and supporting technical documents, SCAQMD staff has concerns about the air quality analysis and health risk assessment in the DEIR, which have likely led to an under-estimation of the project's impacts. **AQMD-2**

First, the DEIR improperly credits the proposed project with emission reductions in air quality and health risks that will occur independent of the proposed project due to adopted state and federal rules and regulations. Second, the modeling performed for this project used improper parameters and outdated meteorological data. These have likely led to an under-estimation of the project's air quality and health risk impacts in the DEIR and additional mitigation should be included to reduce impacts. Additional details are included in the attachment. The attachment also includes a discussion of recommended changes to an existing mitigation measure for air quality which the Lead Agency should implement. **AQMD-3**

Pursuant to Public Resources Code Section 21092.5, the SCAQMD staff requests that the Lead Agency provide SCAQMD with written responses to all comments contained herein prior to the certification of the Final EIR. Further, staff is available to work with the Lead Agency to address these issues and any other questions that may arise. If you have any questions regarding this letter, please contact me at jwong1@aqmd.gov or Lijin Sun, Program Supervisor, CEQA IGR, at lsun@aqmd.gov.

Sincerely,

Jillian Wong

Jillian Wong, Ph.D.
Planning and Rules Manager
Planning, Rule Development & Area Sources

Attachment
SN:JW:LS/JC/MS/GM
LAC161216-06
Control Number

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[8] DEIR, Regional: Section 3.2 Air Quality and Health Risk, Overlapping emissions and the use of operational thresholds discussion on page 3.2-35 (unmitigated) and 3.2-36 (mitigated). Emissions: Table 3.2-10 Peak Daily Criteria Pollutant Emissions – Construction and Operation Overlap Mitigated Proposed Project. Phases 1 & 2, Significant for CO and NOx; Phase 3 Significant for VOC, CO and NOx, see discussion page 3.2-35.

[9] DEIR, Air Quality Section, Page 3.2-35, Paragraph four includes comparing overlapping VOC emissions with SCAQMD operational threshold of significance.

[10] *Ibid*, Localized Construction With Mitigation: Table 3.2-15 and Table 3.2-17 (NO_2 for 1-hour federal and state, and annual) for Construction Phases 1 & 2. Table 3.2-17, page 3.2-44 for Localized Construction With Mitigation (NO_2 for 1-hour federal, state, and annual) for Construction With Mitigation for Construction Phase 3.

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ATTACHMENT

CEQA Baseline

1. The DEIR should include a realistic baseline which accurately reflects the improvements in air quality and health risks that will occur, independent of the proposed project. The Notice of Preparation (NOP) for the proposed project was released in 2009. The Lead Agency chose a CEQA baseline year of 2012 for determination of air quality impacts from criteria pollutants and health risks. For analysis of Air Quality Impacts and Health Risk Assessment (HRA), this baseline is held constant (i.e. using emission rates from 2012) and compared to future years under the proposed project (i.e. using emission rates from future years). This approach using a comparison between the proposed project's impacts in future years (using emission rates from those years) and a 2012 baseline (using emission rates from 2012) improperly credits the proposed project with emission reductions in air quality and health risks that will occur independent of the proposed project due to adopted state and federal rules and regulations, since these rules and regulations are expected to improve air quality and lower health risks, even in the absence of the proposed project. Therefore, the SCAQMD staff believes that the proposed project may have underestimated the true impacts attributable to the proposed project's activities. In *Neighbors for Smart Rail v. Exposition Metro Line Construction (2013) 57 Cal.4th 439*, the California Supreme Court held that using a future baseline is proper in some cases. The purpose of CEQA is to disclose environmental impacts from the proposed project to the public and decision makers in order to provide the public and decision makers with the actual changes to the environment from the activities involved in the proposed project. By taking credit for future emission reductions from existing air quality rules and regulations, the proposed project's air quality and health risk impacts are underestimated. Therefore, the SCAQMD staff recommends that the Lead Agency revise the air quality and health risk analyses to include a comparison between the build-out year with the proposed project (using the emission rates from the build-out year) and the build-out year without the proposed project (also using the same emission rates from the build-out year) and use this analysis to determine the level of significance for the proposed project. By using a consistent emission rate for the analysis, the air quality and health risk impacts of the project will be accurately disclosed (i.e. impacts based on the change in activity due to the proposed project). **AQMD-4**

Air Dispersion Modeling Parameters

2. Some of the receptors were placed within the volume source exclusion zone, which means that concentration results might be erroneous. The SCAQMD staff recommends that the Lead Agency remodel volume sources according to the SCAQMD's Health Risk Assessment Guidance[11] and U.S. EPA's Guidance[12]. One option would be to model each lane of traffic with smaller individual volume sources to reduce the exclusion zone radius. **AQMD-5**

3. The Lead Agency used differing Locomotive Moving – Day and Night release heights in their source parameters (Day – 5.6 meters and Night – 14.6 meters). Section A2.3 Dispersion Model Selection **AQMD-6**

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[11] "Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis" accessed at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis.

[12] U.S. EPA. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas. Appendix J. Section J.3.3. Page J-4. December 2010. Accessed at: https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/20101201_otaq_epa-420_b-10-040_transport_conform_hot-spot_analysis_appx.pdf

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and Inputs states that the "amount of plume rise differs between daytime and nighttime because of differences in atmospheric conditions." Changes in atmospheric conditions are already accounted for within AERMOD. By using higher nighttime release heights, the Lead Agency has likely underestimated health risks. The Lead Agency should revise the HRA to use the same release heights for daytime and nighttime and re-evaluate the health risks. AQMD-6 (Cont'd)

4. Appendix A2 of the DEIR states that 2006-2007 meteorological data from the Superblock station was used for dispersion modeling for both criteria pollutants and toxic air contaminants (TACs). The Lead Agency used AERMET version 12345 to process the Superblock meteorological data. Additionally, lines 10-15 of Page 3.2-51 state that background concentration data is collected from the Superblock monitoring station over the last three years (2013-2015). The U.S. EPA recommends that for on-site meteorological data, the most recent five-year data be used for the purposes of air dispersion modeling. Therefore, the SCAQMD staff recommends that the Lead Agency update the meteorological data with the latest five years of available data and use AERMET version 16216 (or the most recent version available at the time of analysis) to process the data. Updates and improvements to AERMET may also affect the air dispersion modeling results. Alternatively, the SCAQMD staff has prepared AERMOD-ready meteorological data which could be used by the Lead Agency in its air quality analysis. The meteorological data is available for download at SCAQMD's website[13]. AQMD-7

5. The SCAQMD has developed the localized significance methodology to assist the Lead Agencies in performing localized air quality analyses. According to this methodology, site-specific meteorological data may be used with the concurrence from SCAQMD. However, the meteorological data used in the DEIR does not appear to have been reviewed or validated by the SCAQMD staff. The SCAQMD staff recommends that the Lead Agency provide SCAQMD with the meteorological data information for validation to ensure that the meteorological data was properly collected and processed in accordance with SCAQMD procedures. Alternatively, the Lead Agency could use the SCAQMD meteorological data collected at the Long Beach station[14]. AQMD-8

Morbidity and Mortality Methodology

6. On page 3.2-60 of the DEIR, the Lead Agency describes the methodology that was used to determine when a mortality and morbidity analysis would be conducted for the proposed Project. Mortality is a measure of the number of deaths in a population, scaled to the size of that population, per unit time. Morbidity refers to the number of individuals who have contracted a disease during a given time period (the incidence rate) or the number who currently have that disease (the prevalence rate), scaled to the size of the population. The DEIR determined that mortality and morbidity significance would be identified by air dispersion modeling where the incremental operational emissions would result in off-site 24-hour PM2.5 concentrations that exceed the SCAQMD significance criterion of 2.5 $\mu g/m^3$. AQMD-9

   The SCAQMD staff does not agree with using a screening threshold of an incremental increase of 2.5 $\mu g/m^3$ for determining mortality and morbidity. The SCAQMD's PM2.5 significance threshold of 2.5 $\mu g/m^3$ was designed to determine the significance of localized impacts on nearby receptors, and was made consistent to existing permitting requirements under SCAQMD Rule 1303. The PM2.5 significance threshold of 2.5 $\mu g/m^3$ was not intended to be used as a screening tool to further analyze

[13] South Coast Air Quality Management District. Meteorological Data for AERMOD. Available at: http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/data-for-aermod
[14] *Ibid.*

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mortality and morbidity impacts. The SCAQMD staff recommends that the Lead Agency revise the PM mortality analysis to use the methods described in CARB's 2008 guidance document[15]. AQMD-9 (Cont'd)

Technology Review

7. The DEIR includes Mitigation Measure (MM) AQ-3, which requires a review and implementation of new, feasible lower-emission technologies every five years. The SCAQMD staff believes that the Lead Agency should take this opportunity to aggressively deploy the lowest emission technologies possible. This deployment should include those technologies that are "capable of being accomplished in a successful manner within a reasonable period of time" (Public Resources Code §21061.1), such as zero and near-zero emission technologies that are expected to be available in the life of the project. As such, for a phased project where there will be an overlap between construction and operation such as this, the SCAQMD staff recommends that the Lead Agency assess equipment availability, equipment fleet mixtures, and best available emissions control devices every two years. Additionally, to ensure that the biennial technology review is enforceable during operation, the SCAQMD staff recommends that the Lead Agency require all of the lease or development agreements to include the biennial technology review. Furthermore, when a new emission control technology is found feasible and would substantially reduce air emissions, but the Lead Agency declines to implement such technology, a subsequent EIR shall be prepared (CEQA Guidelines Section 15162(a)(3)(C)). The SCAQMD staff recommended revisions to the MM AQ-3 are below: AQMD-10

   MM AQ-3: POLB will implement a Special Condition (see Section 6.3.2) for ~~Periodic~~ Biennial Technology Review as a mandatory condition in a lease or development agreement. To promote new emission control technologies, every ~~5~~ 2 years following the Project approval date, the Port shall conduct a review of new air quality technological advancements. These technologies would be evaluated based on operational feasibility, technical feasibility, and cost effectiveness and financial feasibility for application in the Pier B Rail Yard. If a technology is determined to be feasible in terms of financial, technical, and operational feasibility, the Port shall implement such technology, subject to the requirements as set forth in the CEQA Guidelines Section 15162(a)(3)(C).

[15] Methodology for Estimating Premature Deaths Associated with Long-term Exposure to Fine Airborne Particulate Matter in California. October 24, 2008. Accessed at: http://www.arb.ca.gov/research/health/pm-mort/PMmortalityreportFINALR10-24-08.pdf

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Responses to South Coast Air Quality Management District EIR Comment, March 13, 2017

Response to Comment AQMD-1: Thank you for your review of the Draft EIR and your comments. The comment described the proposed Project for the Pier B On-Dock Rail Support Facility and is noted. No further response is necessary.

Response to Comment AQMD-2: The comment's statement on the impacts associated with the proposed Project is correct, except that the overlapping construction and operational emissions of volatile organic compounds (VOC) during Phase 3 would be less than significant with mitigation. As documented on page 3.2-35 of the Draft EIR, the Port uses the construction significance threshold for emissions that occur during the construction period. As noted on page 3.2-35, if the operational thresholds are used, the VOC emissions under certain scenarios would be significant. Regarding the concern that proposed Project impacts may be understated, please see the responses to Comments AQMD-4 through AQMD-9 for individual technical issues.

Response to Comment AQMD-3: Please see responses to Comments AQMD-4 through AQMD-9 for individual technical issues to which this comment refers.

Response to Comment AQMD-4: The baseline used in the Draft EIR is appropriate under CEQA. As discussed in Section 3.2.3 (Impacts and Mitigation Measures) of the Draft EIR, the CEQA baseline is a fixed point, year 2012, in this study. Since 2012, the line haul locomotive fleet has gradually become cleaner due to the normal retirement of older, higher emissions locomotives and their replacement with newer, cleaner locomotives. To account for the reduction in the emission factors since 2012, the baseline emissions were calculated using 2012 activity levels and 2014 emission factors. This adjustment to the baseline emissions is conservative because it results in lower baseline emissions, which in turn results in higher incremental emissions for the proposed Project and alternatives. Moreover, analysis of emissions based on a future condition ("floating") baseline was included in the Draft EIR for informational purposes. Specifically, as discussed in Section 3.2.3.4, Operational Impact AQ-3, on pages 3.2-47 through 3.2-48, although not required by CEQA nor used to evaluate the significance of Project-related impacts, a comparison of future proposed Project emissions to the future No Project Alternative emissions in common analysis years is shown in Table 3.2-20 for informational purposes. Because the No Project Alternative assumes no growth at the Pier B Rail Yard (the existing rail yard was already operating at capacity), it is equivalent to a future baseline. The effects of existing regulations on future emissions factors are incorporated into No Project Alternative emissions, just as they are the proposed Project emissions. As a result, the No Project Alternative is equivalent to a floating baseline. Therefore, the emissions shown in Table 3.2-20 show how the proposed Project would compare to a future-conditions (floating) baseline instead of an existing-conditions baseline. Additionally, as explained on page 3.2-55 of the Draft EIR, the cancer risk impacts in Impact AQ-6 were evaluated relative to a future baseline because the cancer risk exposure periods for baseline (up to 70 years) do not fit within the baseline year.

Response to Comment AQMD-5: The volume source exclusion zone is defined as the distance within ($2.15 \times \sigma_y$ + 1 meter) from the center of each modeled volume source, where σ_y is known as the lateral dispersion coefficient (EPA, *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas.* Appendix J. EPA-420-B-15-084. November 2015). AERMOD will calculate a zero concentration from a volume source at a receptor that is located within the exclusion zone for that source because the dispersion algorithm is invalid at very close source-receptor distances. Point sources, which were used to model idling locomotives in the Draft EIR, do not have exclusion zones and therefore produce valid results at all receptors. As shown in Table A2-2 of Appendix A2, the σ_y values for the volume sources modeled in the Draft EIR ranged from 2.5 to 55.8 meters, depending on the source, which means that the exclusion zones ranged from about 6 to 121 meters from each volume source. Because some of the rail lines on the Project site would lie relatively close to the site boundary, many of the modeled receptors located along the site boundary were within the exclusion zones of several of the nearly six thousand modeled volume sources in the Draft EIR analysis. Receptors located outside all volume source exclusion zones, which are generally those away from the site boundary, modeled roadways, and modeled rail lines, are not affected by the exclusion zones.

As recommended by the commenter, to determine the effect of the volume source exclusion zones on pollutant concentrations modeled in the Draft EIR, the Port updated the model runs for the proposed Project for operational criteria pollutant concentrations and health risk values. These model runs were selected for updating because they had less-than-significant impacts that were closest to the thresholds in the Draft EIR. The updated AERMOD runs had reduced volume source sizes and reduced volume source spacing along rail lines and roadways to eliminate exclusion zones in all areas where maximum impacts could potentially occur. The selected sizes and spacing of the updated volume sources depended on their distance to the nearest receptors; however, most updated volume sources were between 3 and 6 meters wide, resulting in σ_y values of 1.4 to 2.8 meters. Sources with emissions that are spread out over large areas, such as TRUs in the Pier B storage yard and certain construction zones, were modeled as area sources, which have no exclusion zones. The release heights, vertical dispersion coefficients, and stack release parameters (temperature, exit velocity, and diameter) listed in Table A2-2 of Appendix A2 of the Draft EIR remained unchanged in the updated AERMOD runs.

The updated AERMOD runs also accounted for the refined site boundary and elimination of the west yard layover tracks and fueling facility associated with the proposed Project, as discussed in the Final EIR. The refined site boundary would tend to increase maximum pollutant concentrations by having site boundary receptors closer to the on-site sources. The elimination of the west yard layover tracks and fueling facility would tend to reduce maximum pollutant concentrations by reducing on-site locomotive idling and refueling emissions. Other refinements in the updated modeling include:

- The current versions of AERMOD (v. 16216r) and HARP2 (v. 17052) were used. Based on a review of the model changes since the Draft EIR analysis, no appreciable effects on modeled pollutant concentrations or health risk values are expected from this update (EPA, Support Center for Regulatory Atmospheric Modeling [SCRAM], AERMOD Modeling System, Test Cases, https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models#aermod, website accessed 4/26/17;
  and CARB, Air Dispersion Modeling and Risk Tool [ADMRT], https://www.arb.ca.gov/toxics/harp/admrt.htm, website accessed 3/20/17).
- The paved road dust emission factors for automobiles and trucks (originally shown in Table A1.2-37 of Appendix A1 of the Draft EIR) were updated using California-specific and, where available, Los Angeles County-specific roadway silt loading data from the CARB Emission Inventory Chapter 7.9 (November 2016) instead of the very conservative national factors from EPA AP-42 Section 13.2.1 (January 2011). The updated paved road dust emission factors are lower than those used in the Draft EIR.
- The NO_2 and carbon monoxide (CO) background concentrations (originally shown in Table A2-3 of Appendix A2 of the Draft EIR) were updated using Superblock Station monitoring data from 2014-2016 instead of 2013-2015. The updated background concentrations are generally lower than those in the Draft EIR.

Tables 11.2-4 and 11.2-5 show the paved road dust emission factors and background concentrations, respectively, used in the updated AERMOD analysis for the proposed Project.

TABLE 11.2-4 UPDATED PAVED ROAD DUST EMISSION FACTORS						
CARB Roadway Category	**(sL) Silt Loading (g/m^2)**	**PM_{10} Particle Size Multiplier (g/mi)**	**$PM_{2.5}$ Particle Size Multiplier (g/mi)**	**Average Vehicle Weight (tons)**	**Uncontrolled PM_{10} Emission Factor (g/mi)**	**Uncontrolled $PM_{2.5}$ Emission Factor (g/mi)**
Onsite Trucks	0.135	1.00	0.15	25.0	4.310	0.647
Onsite Autos	0.135	1.00	0.15	2.4	0.395	0.059
Local	0.135	1.00	0.15	2.4	0.395	0.059
Collector	0.013	1.00	0.15	2.4	0.047	0.007
Major	0.013	1.00	0.15	2.4	0.047	0.007
Freeway	0.015	1.00	0.15	2.4	0.053	0.008

Notes:

1. Source: CARB Emission Inventory Chapter 7.9: Miscellaneous Process Methodology. Entrained Road Travel, Paved Road Dust. https://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2016.pdf. November 2016.
2. Emission factors exclude engine exhaust, tire wear, and brake wear.
3. The equation is: Emission Factor = (Particle Size Multiplier) x (sL)^0.91 x (Vehicle Weight) ^1.02
4. The silt loading value of 0.135 gram per square meter (g/m^2) for local roadways was assumed to be representative of onsite conditions because of the relatively low number of onsite truck and automobile trips.
5. The average vehicle weight for onsite trucks is based on a modern tanker truck that holds 9,000 gallons of diesel fuel (approximately 31.7 tons of fuel) and has a Gross Vehicle Weight Rating (GVWR) of 80,000 pounds (40 tons) (GVWR includes the weight of cargo). Therefore, a loaded fuel truck would weigh 40 tons and an empty fuel truck would weigh 8.3 tons. The average weight is therefore assumed to be approximately 25 tons. Trucks and autos would generally take different routes onsite.
6. This table updates Table A1.2-37 of Appendix A1 of the Draft EIR.

TABLE 11.2-5 UPDATED NO_2 AND CO BACKGROUND CONCENTRATIONS						
Pollutant	**Averaging Period**	**Monitored Concentration (ppm) [a]**			**Background Concentration [c]**	
		2014	**2015**	**2016**	**(ppm)**	**($\mu g/m^3$) [d]**
NO_2	1-Hour State	0.116	0.096	0.115	0.116	219
	1-Hour Federal [b]	n/a	n/a	0.088	0.088	166
	Annual	0.027	0.022	0.022	0.027	50.9
CO	1-Hour	3.2	3.4	3.2	3.4	3,903
	8-Hour	2.5	2.7	2.5	2.7	3,099

Notes:

[a] Each reported value represents the highest recorded concentration during the year unless otherwise noted.

[b] The 2016 1-hour federal NO_2 concentration represents the 3-year average (2014-2016) of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations. Because the 2016 value is a 3-year average, the individual year concentrations in 2014 and 2015 are not shown.

[c] The background concentration for all pollutants except the 1-hour federal NO_2 concentration is the maximum of the concentrations for the 3 reported years.

[d] The concentration in micrograms per cubic meter ($\mu g/m^3$) is calculated as follows: $\mu g/m^3$ = parts per million (ppm) x MW / 0.0244. The molecular weights (MW) are 28.01 for CO and 46.0055 for NO_2.

[e] Source: *Air Quality Monitoring Program at the Port of Long Beach. Annual Summary Reports*. Calendar Years 2014, 2015, and 2016. San Pedro Bay Ports Clean Air Action Plan - Air Monitoring - Reports. http://caap.airsis.com/Reports.aspx. Website accessed 8/27/2015, 8/9/2016, and 8/23/2017.

[f] This table updates Table A2-3 of Appendix A2 of the Draft EIR.

Table 11.2-6 shows the updated maximum NO_2 and CO concentrations associated with operation of the proposed Project without mitigation. This table updates the results shown in Table 3.2-21 of the Draft EIR. None of the significance findings in the updated table has changed from the Draft EIR. The five significant impacts are exceedance of the 1-hour (federal) NO_2 standard in 2020, 2025, and 2035; and exceedance of the annual NO_2 standard in 2020 and 2025. All three of the significant 1-hour NO_2 concentrations are higher than in the Draft EIR at the maximum receptor locations, while the two significant annual NO_2 concentrations are less than or equal to the Draft EIR.

Figures 11.2-1, 11.2-2, and 11.2-3 show the updated areas where operation of the unmitigated proposed Project would exceed the 1-hour (federal) NO_2 significance threshold in 2020, 2025, and 2035, respectively. These three figures update the results shown in Figures A2-32, A2-33, and A2-34 of Appendix A2 of the Draft EIR. In each case, the updated area of significant impact is smaller than in the Draft EIR. The updated figures also show that the maximum receptor locations are on vacant land along the proposed Project southern boundary, north of Anaheim Way and east of the Terminal Island Freeway. By comparison, the maximum receptor locations in the Draft EIR are on occupied commercial/industrial land, along the proposed Project southern boundary, near McDonough Avenue, as seen in Figure A2-31 of Appendix A2 of the Draft EIR. Therefore, because the updated areas of significant 1-hour (federal) NO_2 impact are smaller than in the Draft EIR, and the updated maximum receptor locations have moved from occupied to vacant land, the Port's air quality expert for the proposed Project has concluded that the updated 1-hour (federal) NO_2 significant impacts are not substantially greater than in the Draft EIR.

TABLE 11.2-6
UPDATED MAXIMUM POLLUTANT CONCENTRATIONS OF NO_2 AND CO DURING OPERATION OF THE PROPOSED PROJECT WITHOUT MITIGATION

Pollutant	Averaging Time	Project Increment ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	Significance Threshold ($\mu g/m^3$)	Significant?
Year 2020						
NO_2	1-Hour (state)	80	219	299	339	No
	1-Hour (federal)	73	166	239	188	Yes
	Annual	10.1	50.9	61.0	57	Yes
CO	1-Hour	90	3,903	3,993	23,000	No
	8-Hour	54	3,099	3,153	10,000	No
Year 2025						
NO_2	1-Hour (state)	64	219	283	339	No
	1-Hour (federal)	62	166	228	188	Yes
	Annual	6.8	50.9	57.7	57	Yes
CO	1-Hour	91	3,903	3,994	23,000	No
	8-Hour	59	3,099	3,158	10,000	No
Year 2035						
NO_2	1-Hour (state)	64	219	283	339	No

TABLE 11.2-6 UPDATED MAXIMUM POLLUTANT CONCENTRATIONS OF NO_2 AND CO DURING OPERATION OF THE PROPOSED PROJECT WITHOUT MITIGATION						
Pollutant	**Averaging Time**	**Project Increment ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Total Concentration ($\mu g/m^3$)**	**Significance Threshold ($\mu g/m^3$)**	**Significant?**
	1-Hour (federal)	59	166	225	188	Yes
	Annual	5.9	50.9	56.8	57	No
CO	1-Hour	122	3,903	4,025	23,000	No
	8-Hour	78	3,099	3,177	10,000	No

Notes:

1. For NO_2 and CO, the significance thresholds apply to the total concentration.
2. The Project increment equals the model-predicted change in ambient concentration associated with proposed Project operational emission sources relative to CEQA baseline emission sources. The background concentration represents the highest monitored concentration at the Superblock monitoring station over the last 3 years (2014-2016) of available data. The total concentration equals the Project increment plus background concentration.
3. This table presents the highest modeled Project increments. The increments at all other modeled receptors would be less than the displayed values.
4. The state 1-hour NO_2 concentration is the highest modeled concentration. The federal 1-hour NO_2 concentration is the 98th percentile of the daily maximum 1-hour concentrations.
5. Exceedances of the significance thresholds are shown in bold.
6. This table updates Table 3.2-21 of the Draft EIR.

Figures 11.2-4 and 11.2-5 show the updated areas where operation of the unmitigated proposed Project would exceed the annual NO_2 significance threshold in 2020 and 2025, respectively. These two figures update the results shown in Figures A2-35 and A2-36 of Appendix A2 of the Draft EIR. In each case, the updated area of significant impact is smaller than in the Draft EIR. Therefore, because the updated areas of significant annual NO_2 impact are smaller than in the Draft EIR, and the updated impacts at the maximum receptors are less than or equal to the Draft EIR, the Port's air quality expert for this proposed Project has concluded that the updated annual NO_2 significant impacts are not substantially greater than in the Draft EIR.

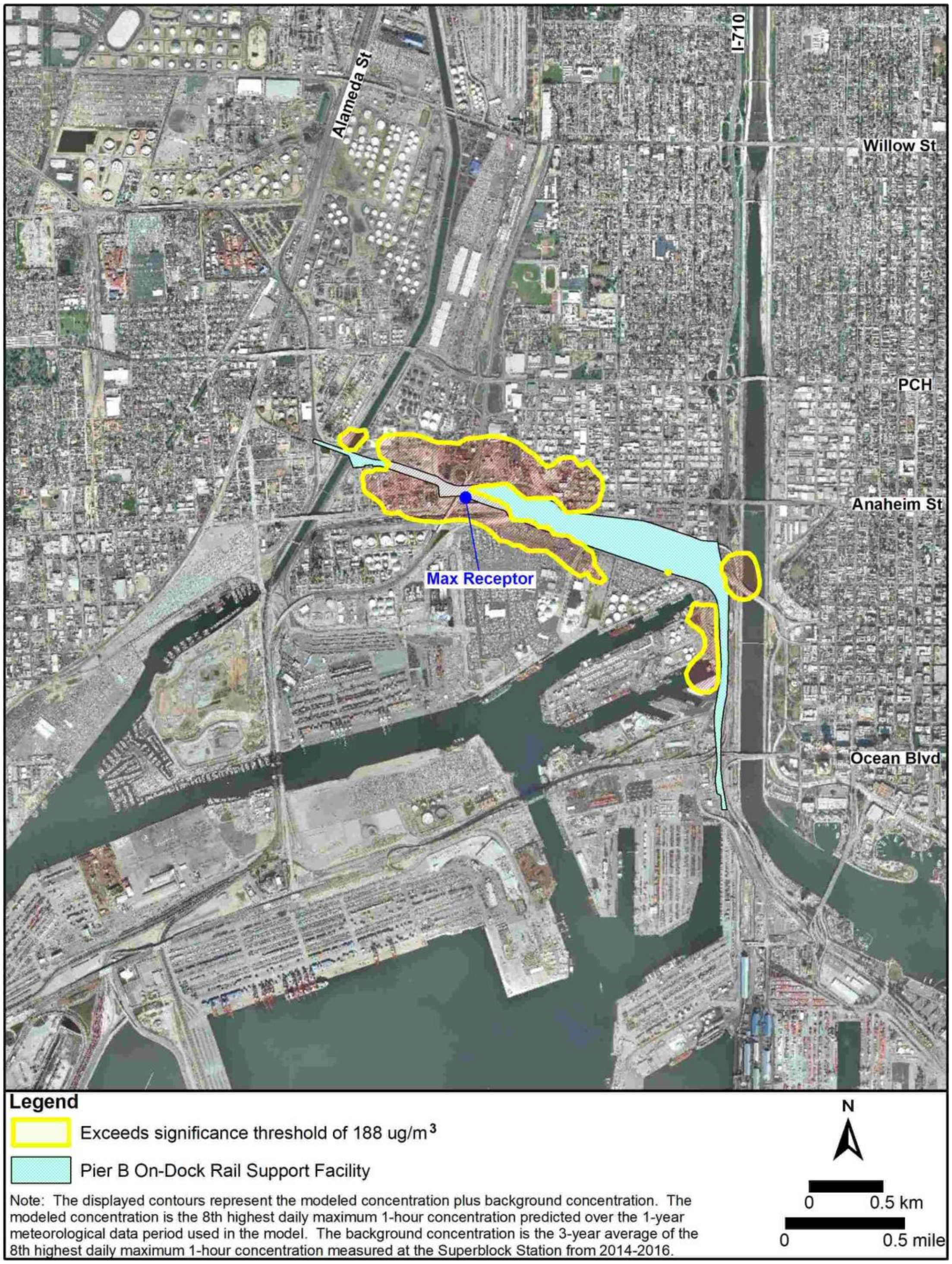

Figure 11.2-1

Updated Area of Exceedance of the 1-Hour Federal NO_2 Threshold during Operation in 2020 – Proposed Project without Mitigation

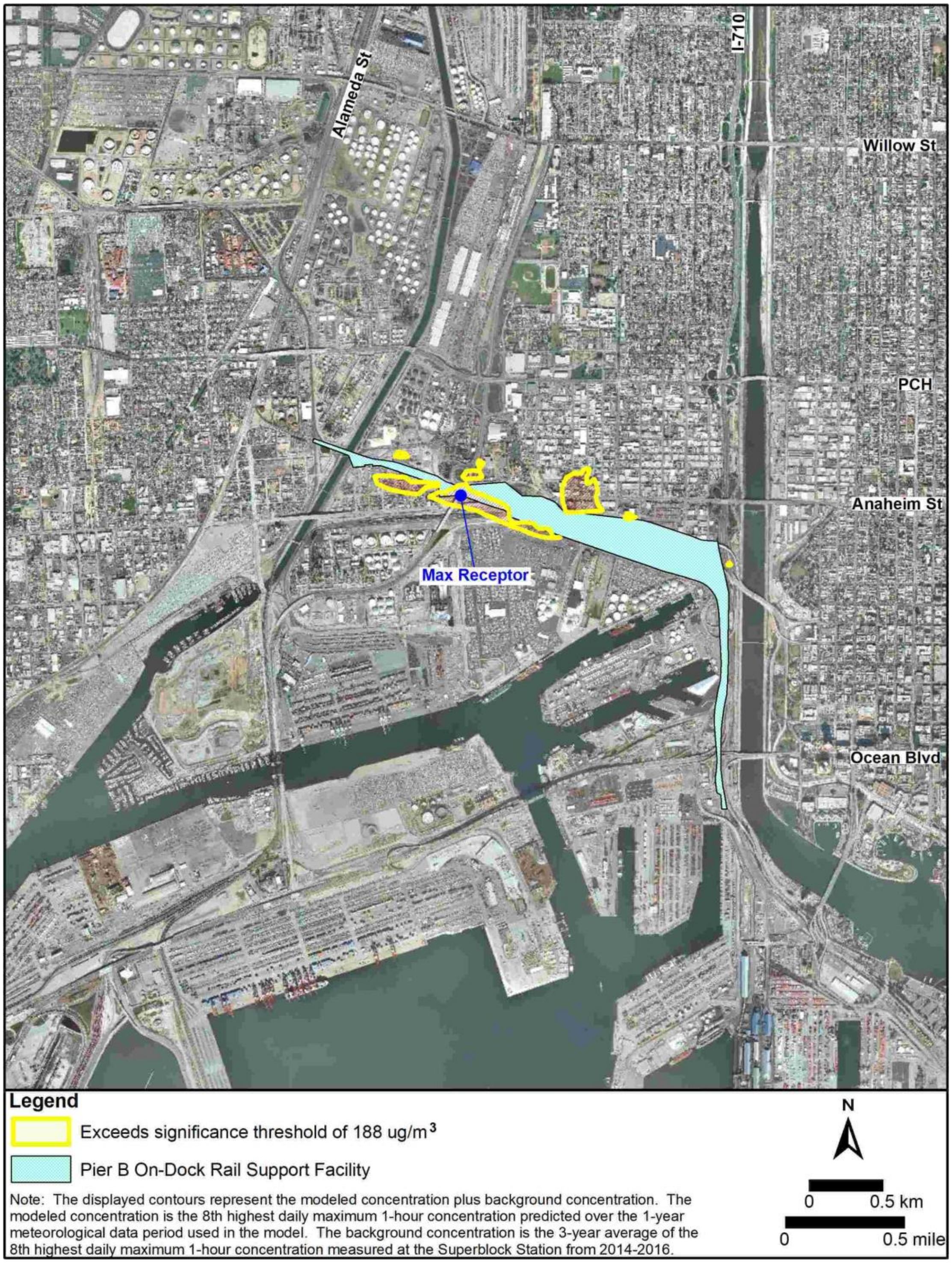

Figure 11.2-2

Updated Area of Exceedance of the 1-Hour Federal NO_2 Threshold during Operation in 2025 – Proposed Project without Mitigation

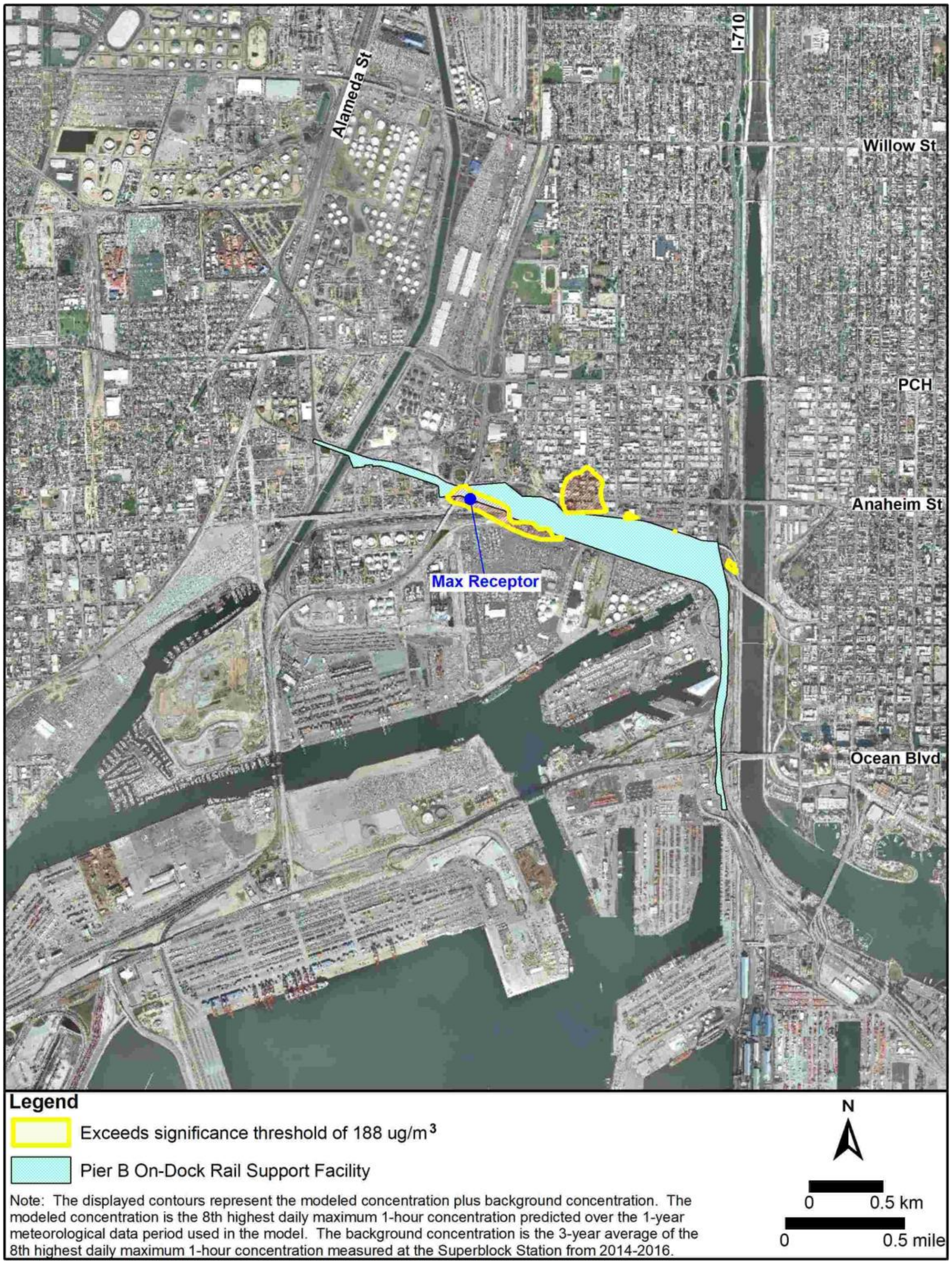

Figure 11.2-3
Updated Area of Exceedance of the 1-Hour Federal NO_2 Threshold during Operation in 2035 – Proposed Project without Mitigation

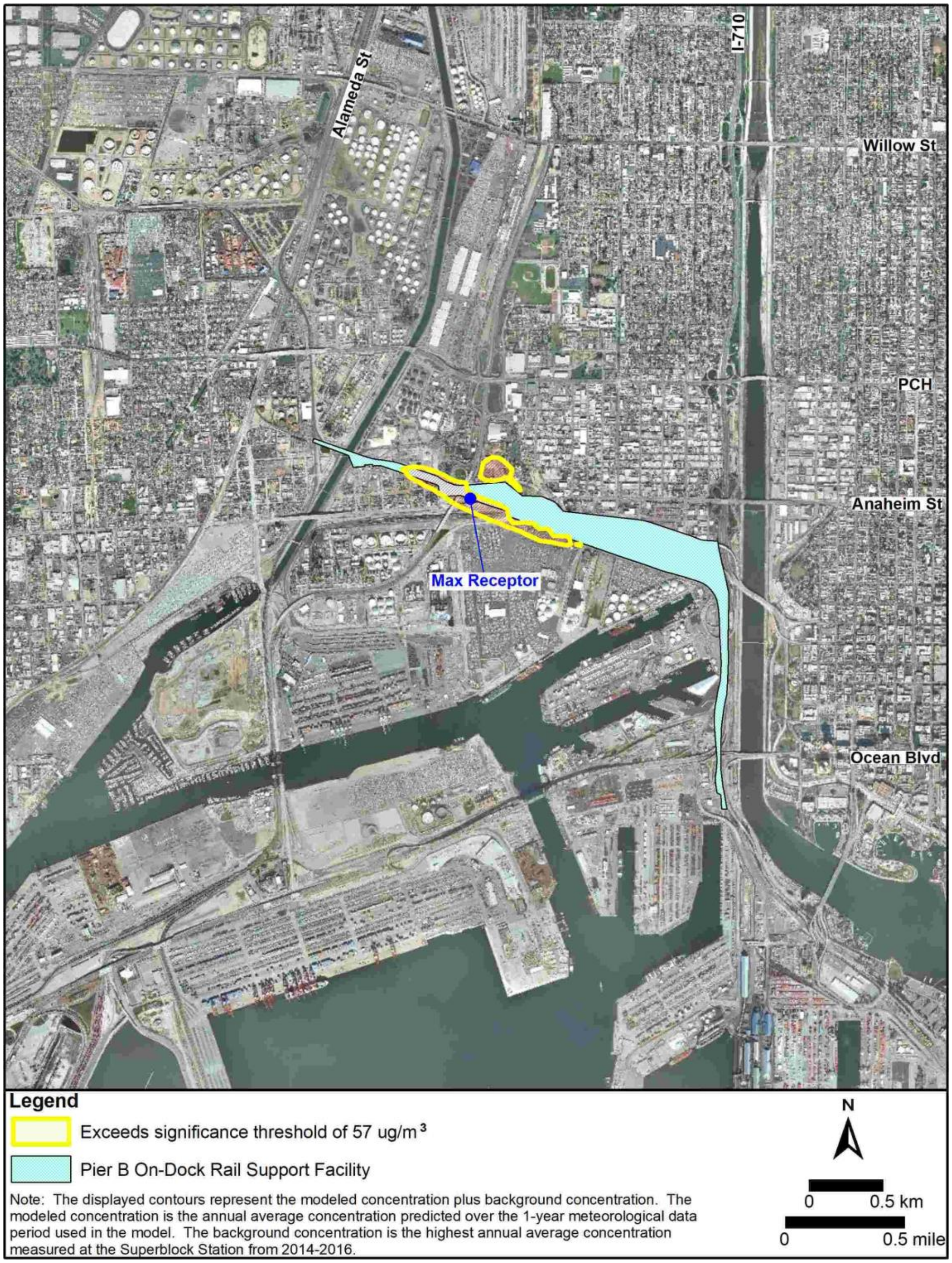

Figure 11.2-4

Updated Area of Exceedance of the Annual NO_2 Threshold during Operation in 2020 – Proposed Project without Mitigation

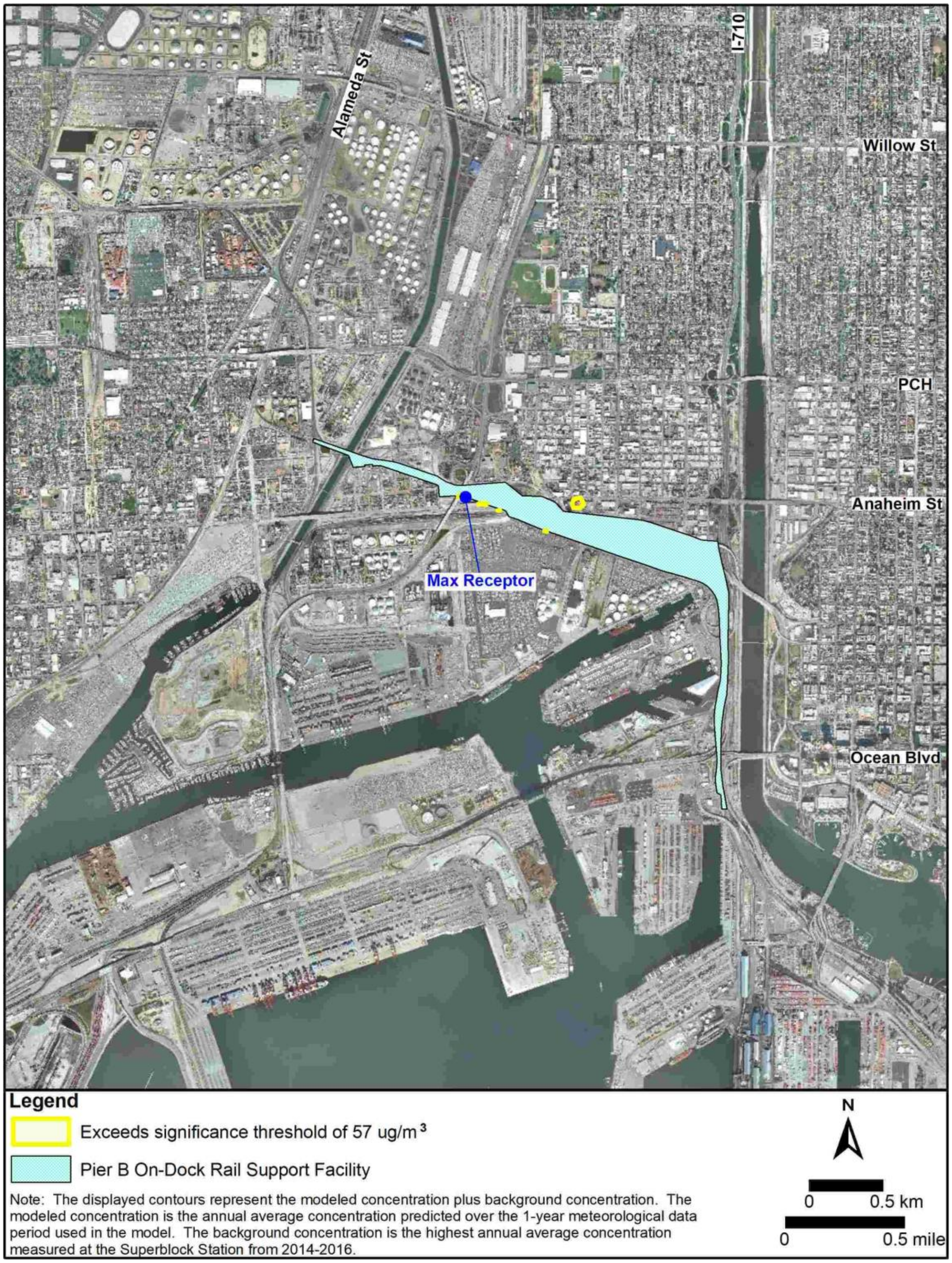

Figure 11.2-5
Updated Area of Exceedance of the Annual NO_2 Threshold during Operation in 2025 – Proposed Project without Mitigation

Table 11.2-7 shows the updated maximum PM_{10} and $PM_{2.5}$ concentrations associated with operation of the proposed Project without mitigation. This table updates the results shown in Table 3.2-22 of the

Draft EIR. None of the significance findings in the table has changed from the Draft EIR. All significance findings remain less than significant.

TABLE 11.2-7 UPDATED MAXIMUM POLLUTANT CONCENTRATIONS OF PM_{10} AND $PM_{2.5}$ DURING OPERATION OF THE PROPOSED PROJECT WITHOUT MITIGATION				
Pollutant	**Averaging Time**	**Project Increment ($\mu g/m^3$)**	**Significance Threshold ($\mu g/m^3$)**	**Significant?**
Year 2020				
PM_{10}	24-Hour	0.5	2.5	No
	Annual	0.3	1.0	No
$PM_{2.5}$	24-Hour	0.3	2.5	No
Year 2025				
PM_{10}	24-Hour	0.9	2.5	No
	Annual	0.5	1.0	No
$PM_{2.5}$	24-Hour	0.3	2.5	No
Year 2035				
PM_{10}	24-Hour	0.9	2.5	No
	Annual	0.4	1.0	No
$PM_{2.5}$	24-Hour	0.3	2.5	No

Notes:

1. For PM_{10} and $PM_{2.5}$, the significance thresholds apply to the Project increment.
2. The Project increment equals the model-predicted change in ambient concentration associated with proposed Project operational emission sources relative to CEQA baseline emission sources.
3. This table presents the highest modeled Project increments. The increments at all other modeled receptors would be less than the displayed values.
4. This table updates Table 3.2-22 of the Draft EIR.

Table 11.2-8 shows the updated maximum health impacts associated with construction and operation of the proposed Project without mitigation. This table updates the results shown in Table 3.2-23 of the Draft EIR. None of the significance findings in the table has changed from the Draft EIR. The two significant impacts are individual cancer risk at residential and sensitive receptors. In both cases, the updated significant individual cancer risks are less than in the Draft EIR. Therefore, the Port’s air quality expert for this proposed Project has concluded that the updated significant health impacts are not substantially greater than in the Draft EIR.

TABLE 11.2-8 UPDATED MAXIMUM HEALTH IMPACTS ESTIMATED FOR CONSTRUCTION AND OPERATION OF THE PROPOSED PROJECT WITHOUT MITIGATION				
Health Category	**Receptor Type**	**Project Increment**	**Significance Threshold**	**Significant?**
Individual Cancer Risk	Residential	16.1 × 10-6	10×10^{-6}	Yes
	Occupational	9.2 × 10-6		No
	Sensitive	12.0 × 10-6		Yes

TABLE 11.2-8 UPDATED MAXIMUM HEALTH IMPACTS ESTIMATED FOR CONSTRUCTION AND OPERATION OF THE PROPOSED PROJECT WITHOUT MITIGATION				
Health Category	**Receptor Type**	**Project Increment**	**Significance Threshold**	**Significant?**
Chronic Hazard Index	Residential	0.007	1.0	No
	Occupational	0.2		No
	Sensitive	0.01		No
8-Hour Chronic Hazard Index	Residential	0.02	1.0	No
	Occupational	0.6		No
	Sensitive	0.03		No
Acute Hazard Index	Residential	0.09	1.0	No
	Occupational	0.6		No
	Sensitive	0.08		No
Notes: 1. The Project Increment equals the proposed Project minus the CEQA baseline. 2. Exceedances of the significance thresholds are shown in bold. 3. This table updates Table 3.2-23 of the Draft EIR.				

Table 11.2-9 shows the updated maximum health impacts associated with construction and operation of the proposed Project with mitigation. This table updates the results shown in Table 3.2-24 of the Draft EIR. None of the significance findings in the table has changed from the Draft EIR. All significance findings remain less than significant after mitigation.

TABLE 11.2-9 UPDATED MAXIMUM HEALTH IMPACTS ESTIMATED FOR CONSTRUCTION AND OPERATION OF THE PROPOSED PROJECT WITH MITIGATION				
Health Category	**Receptor Type**	**Project Increment**	**Significance Threshold**	**Significant?**
Individual Cancer Risk	Residential	6.7 × 10-6	10×10^{-6}	No
	Occupational	7.8 × 10-6		No
	Sensitive	1.3 × 10-6		No
Chronic Hazard Index	Residential	0.001	1.0	No
	Occupational	0.04		No
	Sensitive	0.002		No
8-Hour Chronic Hazard Index	Residential	0.004	1.0	No
	Occupational	0.1		No
	Sensitive	0.007		No
Acute Hazard Index	Residential	0.09	1.0	No
	Occupational	0.4		No
	Sensitive	0.1		No
Notes:				

TABLE 11.2-9 UPDATED MAXIMUM HEALTH IMPACTS ESTIMATED FOR CONSTRUCTION AND OPERATION OF THE PROPOSED PROJECT WITH MITIGATION				
Health Category	**Receptor Type**	**Project Increment**	**Significance Threshold**	**Significant?**
1. The Project Increment equals the proposed Project minus the CEQA baseline. 2. This table updates Table 3.2-24 of the Draft EIR.				

Based on the updated criteria pollutant modeling and HRA results presented and discussed here, the Port's air quality expert for the proposed Project has concluded that the elimination of volume source exclusions zones is not expected to change the significance findings or substantially increase the significant impacts in the Draft EIR for any Project alternative.

Response to Comment AQMD-6: Please see response to Comment CARB-11. Volume sources do not have a plume rise algorithm, so manual adjustments were made to the volume source heights to account for plume rise.

Response to Comment AQMD-7: The meteorological data used in the air dispersion modeling analyses were recorded from September 2006 through August 2007, the first complete 12-month period recorded at all six of the site-specific monitoring stations operated by the Ports of Long Beach and Los Angeles. ENVIRON evaluated the climatological representativeness of the data collected during September 2006 to August of 2007 in comparison to more recent data collected during years 2009 to 2012. ENVIRON evaluated the completeness of the average wind speed data by quarter and visually examined the wind pattern based on wind roses. The evaluation showed that the average wind speed and wind pattern of the original data period is very similar to that of the 2009 to 2012 data period across the ports' meteorological stations. Therefore, ENVIRON concluded that the original data period is representative (ENVIRON, transmittal from Min Hou, May 28, 2013).

Additionally, the use of 1 year of meteorological data is consistent with EPA guidelines, which state that "at least 1 year of site-specific" data are required (USEPA, *Revisions to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches to Address Ozone and Fine Particulate Matter.* 40 CFR Part 51. January 17, 2017).

The Project air dispersion modeling analyses in the Draft EIR were performed with the most recent version of AERMOD at the time of the analysis (version 15181, released June 30, 2015), but the meteorological data used in the analyses were processed with AERMET version 12345 (released December 11, 2012). At the time of the analysis, EPA had updated AERMET three times since version 12345: (1) version 13350 (released December 16, 2013); (2) version 14134 (released May 14, 2014); and (3) version 15181 (released June 30, 2015). Since the time of the analysis, AERMET version 16216 (the current version, released August 3, 2016) has also been released. Because updated versions of AERMET usually do not have any appreciable effect on Port-related AERMOD results, the Port typically re-processes its meteorological data with the latest AERMET version only when warranted. The following paragraphs provide a justification for the use of AERMET 12345 on the meteorological data.

As part of its ongoing documentation of AERMOD and AERMET, EPA performs sensitivity analyses that compare model updates to past model versions to enable users to understand the effects of new model updates. Sensitivity analyses that directly compare AERMET versions 12345 and 15181 are not available; however, analyses are available showing that there are not significant differences between consecutive versions of AERMET. For example, the use of AERMOD version 13350 to simulate the same source types as those in the Project analyses (volume or point sources in flat terrain) with AERMET versions 12345 and 13350 resulted in differences in impacts of no greater than 0.5 percent and in some cases no differences at all between these two versions of AERMET (EPA Support Center for Regulatory Atmospheric Modeling [SCRAM] website http://www.epa.gov/ttn/scram/dispersion_prefrec.htm#aermod).

Additional analyses from the EPA SCRAM site also show that use of AERMOD version 14134 to simulate the same source types with AERMET versions 13350 and 14134 resulted in no differences in impacts. Furthermore, the use of AERMOD version 15181 to simulate the same source types with AERMET versions 14134 and 15181 resulted in no differences in impacts.

These analyses show that since impacts from (1) AERMET version 12345 are nearly equal to version 13350, (2) AERMET version 13350 are equal to version 14134, and (3) AERMET version 14134 are equal to version 15181, then (4) AERMET version 12345 are nearly equal to 15181. Therefore, use of AERMET version 15181 instead of version 12345 in the Project dispersion modeling analyses would not produce a substantial difference in impacts compared to those presented in the Draft EIR.

The Superblock monitoring station was the preferred site for meteorological data for the Draft EIR because it is part of the Port's site-specific monitoring network and is located just 0.1 mile north of the existing Pier B Rail Yard. The Port appreciates the offer to use AERMOD-ready meteorological data processed by SCAQMD. However, because these data were collected several miles from the Port area, they are not as representative of conditions within the Project region as the Port's data.

Response to Comment AQMD-8: The SCAQMD reviewed and approved the meteorological data set selection and AERMET processing methodology for the 2006–2007 meteorological data that were used in the Draft EIR. The review and approval took place in 2007 during development of the Bay-Wide Regional Human Health Risk Assessment, which was part of the technical analysis supporting the San Pedro Bay CAAP. The protocol that was reviewed and approved by the SCAQMD is titled "Protocol Bay-Wide Regional Human Health Risk Assessment for Diesel Exhaust Particulate Matter (DPM)" (December 14, 2009) and is located in Appendix B3 of the CAAP 2010 Update.

The 2006–2007 meteorological data from the Superblock station (and other Port Complex stations) were first processed in 2008 in accordance with the SCAQMD-approved modeling protocol, except that necessary updates to the methodology were made as recommended by the 2008 EPA AERMOD Implementation Guide. These necessary updates focused on methodology used to determine surface characteristics (i.e., Bowen ratio, Albedo, and Surface Roughness). A more recent AERMOD Implementation Guide was published in March 2009, but no changes were made to the meteorological data processing procedure. The meteorological data were then used in multiple Port EIRs prepared by the Ports of Long Beach and Los Angeles. The processed AERMOD-ready datasets were also sent to SCAQMD in April 2010. In 2013, the 2006–2007 data were reprocessed using the most recent EPA AERMET version 12345 and AERSURFACE version 13016. Month-to-season allocation and the land use sector were defined following the Bay-wide health risk assessment modeling protocol. The precipitation condition (i.e., wet, dry, or average) used to estimate Bowen Ratio was determined in comparison to the 30-year historical data at representative stations as dictated by the Bay-wide health risk assessment modeling protocol.

Response to Comment AQMD-9: Neither CARB nor SCAQMD has established a CEQA significance threshold for $PM_{2.5}$-related mortality and morbidity. Furthermore, neither CARB nor SCAQMD has established a $PM_{2.5}$ ambient concentration threshold above which mortality and morbidity should be quantified in a project-level CEQA document. In its response to the Notice of Preparation (NOP) of the Draft EIR, SCAQMD did not reference any requirement for conducting a mortality and morbidity analysis for the proposed Project nor provide any suggestion as to how such an analysis would be undertaken (CARB did not respond to the NOP). Moreover, CARB's 2008 and 2010 documents addressing mortality and morbidity, which estimate premature deaths associated with $PM_{2.5}$, do not provide any guidance as to whether or when such an analysis should be prepared for a project-level CEQA assessment where incremental $PM_{2.5}$ concentrations and the affected population are on much smaller scales than the regional and statewide impacts quantified by CARB. Therefore, in the absence of such guidance, the Port developed its own approach to addressing mortality and morbidity, described in detail in Section 3.2.3 of the Draft EIR, Impact AQ-6, and summarized below.

Mortality and morbidity studies examining health effects of exposure to fine particulate matter have been used by EPA and CARB to set the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS), respectively, and by SCAQMD to set the CEQA significant concentration thresholds for particulate matter. For this reason, a comparison of the Project's modeled $PM_{2.5}$ concentrations to SCAQMD's CEQA significance threshold for $PM_{2.5}$, which is more stringent than the NAAQS and CAAQS, implicitly accounts for mortality and morbidity effects on sensitive receptors. Therefore, the Port's position is that a maximum modeled $PM_{2.5}$ concentration less than SCAQMD's threshold is considered sufficiently low such that mortality and morbidity effects in the surrounding population would not be significant; hence, a quantification of mortality and morbidity would not be warranted.

Therefore, to determine whether quantification of mortality and morbidity was necessary for the proposed Project, the Port compared the ambient $PM_{2.5}$ impacts predicted for proposed Project operation to the 2.5 $\mu g/m^3$ 24-hour threshold set by SCAQMD. Table 3.2-22 of the Draft EIR indicates that the maximum $PM_{2.5}$ concentration increment of 0.4 $\mu g/m^3$ during proposed Project operation, occurring in 2020 and 2025, would be only 17 percent of the SCAQMD threshold of 2.5 $\mu g/m^3$. (The updated $PM_{2.5}$ concentration increments for the proposed Project in Table 11.2-7 of response to Comment AQMD-5 are even lower; 0.3 $\mu g/m^3$ in all 3 analysis years). Moreover, Figure A2-31 in Appendix A of the Draft EIR shows that the locations of the maximum modeled $PM_{2.5}$ concentrations are nearly 0.5 mile from the closest residential receptor. Because the Project-related $PM_{2.5}$ concentrations would be so low at the nearest residential or sensitive receptor, mortality and morbidity effects would be less than significant, and quantification of mortality and morbidity is not warranted for this Project.

Response to Comment AQMD-10: The comment recommends that the POLB re-examine potential new emission control technologies every 2 years rather than every 5 years under Mitigation Measure AQ-3. The POLB believes that the 5-year review cycle is sufficient, is consistent with the timeline for technology review cycles for other port-related projects and leases, and that no substantial additional air quality benefit would be obtained by adopting a shorter review cycle. Given the typical timeline for development, demonstration, and deployment of new technologies, which can take a decade or more, the 5-year review cycle will provide adequate time to identify and discuss opportunities for demonstration and implementation of emerging technologies. Further, as evidenced by PHL's history in working with the Port on technology demonstrations through the Port's TAP or independently, and as discussed in CARB-7, it is anticipated that PHL will continue to partner with the Port to evaluate and demonstrate promising technologies as they become available.

The comment also recommends incorporating into the mitigation measure a reference to *CEQA Guidelines* Section 15162 (a)(3)(C). This section of the *Guidelines* would not apply to the approved Pier B On-Dock Rail Support Facility Project, however, unless and until a subsequent discretionary approval is required because it is subject to *CEQA Guidelines* Section 15162(c), which reads:

(c) Once a project has been approved, the lead agency's role in project approval is completed, unless further discretionary approval on that project is required. Information appearing after an approval does not require reopening of that approval. If after the project is approved, any of the conditions described in subdivision (a) occurs, a subsequent EIR or negative declaration shall only be prepared by the public agency which grants the next discretionary approval for the project, if any. In this situation, no other responsible agency shall grant an approval for the project until the subsequent EIR has been certified or subsequent negative declaration adopted.

The referenced subsection (Section 15162 (a)(3)(C)) is not intended to trigger the requirement of a subsequent EIR in the context described in the comment. Instead, it would apply if the Port was considering a future discretionary approval relating to the Project, and at that time, a mitigation measure previously rejected by the Port as infeasible has, with the passage of time, become feasible. In such a circumstance, the now feasible mitigation measure may be considered "new information" that would cause a subsequent environmental review.

Moreover, CEQA and the CEQA Guidelines do not need to be referenced in mitigation measures. To the extent that they apply to the actions of the Port, they must be followed whether or not they are specifically referenced.

EXHIBIT D
GENERAL CONFORMITY NEWSPAPER AD

PUBLIC NOTICE

Notice of Availability of the Draft General Conformity Determination for the Port of Long Beach Pier B On-Dock Rail Support Facility Project

Project Description: The proposed Pier B On-Dock Rail Support Facility Project (Project) involves reconfiguration and expansion of the existing Port of Long Beach Pier B On-Dock Railyard. This Project is needed to accommodate current and future demand for container transport by rail, which has been increasing over time and is expected to continue to increase through the next decade.

This Project is subject to the National Environmental Policy Act (NEPA) and requires a General Conformity Determination under the U.S. Clean Air Act. Maritime Administration (MARAD) is currently preparing the Final Environmental Impact Statement (EIS) for this Project.

The Clean Air Act requires all federal actions to conform to applicable state plans to attain and maintain national ambient air quality standards (NAAQS) [i.e., State Implementation Plan (SIP)] (42 U.S.C. 7506(c), section 176(c)). MARAD prepared a Draft General Conformity Determination for the proposed Project to demonstrate conformity with the California SIP, in accordance with the requirements established by the U.S. Environmental Protection Agency (40 CFR 93.150 et seq.).

The General Conformity Process: The General Conformity Determination process is intended to demonstrate that a proposed federal action will not:

1. Cause or contribute to new violations of an NAAQS;
2. Interfere with provisions in the applicable SIP for maintenance of any NAAQS;
3. Increase the frequency or severity of existing violations of any standard; or
4. Delay the timely attainment of any standard. As such, for a General Conformity Determination, the proposed federal action needs to conform to the latest approved SIP/Air Quality Management Plan (AQMP). The general conformity process for a proposed action involves two distinct steps: Applicability Analysis and General Conformity Determination.

The Applicability Analysis is an assessment of whether a proposed action is subject to the General Conformity Rule. If the General Conformity Rule is applicable for the proposed action, then a General Conformity Determination may be required.

A General Conformity Determination is an assessment of how the proposed action conforms to the applicable SIP. The Draft General Conformity Determination for the proposed Project is available electronically at https://www.polb.com/documents/#ceqa-nepa or http://www.regulations.gov under docket number MARAD-2019-0109. Copies of the Draft Conformity Determination are available upon request. Contact Alan Finio, Office of Environment, Maritime Administration at (202) 366-8024 or by email at Alan.Finio@dot.gov.

Comment Submittal:

The Draft General Conformity Determination provides the opportunity for public and agency involvement and comment. The public comment period on the Draft General Conformity Determination will close 30 days after publication of this notice. MARAD encourages public questions and comments on the air quality Draft General Conformity Determination for the Pier B On-Dock Rail Support Facility Project. Written comments may be submitted to Alan Finio, Maritime Administration, Office of Environment, MAR 410. Mail Drop #1, U.S. Department of Transportation, Southeast Federal Center, West Building, 1200 New Jersey Avenue SE, W25-205, Washington, DC 20590 or via email: Alan.Finio@dot.gov.

MAR-400-220307-001

CHAPTER 3
RECORD OF DECISION

3.1 INTRODUCTION

This Record of Decision (ROD) reflects the final environmental determination and approval by the Maritime Administration (MARAD) regarding the proposed Port of Long Beach Pier B On-Dock Rail Support Facility Project, Long Beach, California. The Port of Long Beach (POLB or Port) is owned and operated by the City of Long Beach (COLB), acting by and through its Board of Harbor Commissioners (BHC) to support the Project. The environmental determination and approval are based upon a thorough and careful environmental decision-making process, including review of the analysis of impacts described in the 2022 Final Environmental Impact Statement (FEIS).

This ROD is based on and is being published combined with the FEIS, which was prepared by MARAD as the lead federal agency. The U.S. Environmental Protection Agency (EPA), Federal Railroad Administration (FRA), and the California Department of Transportation (Caltrans) became cooperating agencies pursuant to the requirements of the National Environmental Policy Act (NEPA), as amended (42 United States Code [U.S.C.] § 4321, et seq.) for the Environmental Impact Statement (EIS).

The FEIS was prepared pursuant to the implementing regulations of the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40, Code of Federal Regulations [CFR] parts 1500–1508), and U.S. Department of Transportation (USDOT) and MARAD Procedures for Considering Environmental Impacts (DOT Order 5610.1C and Maritime Administration Order 600-1, respectively). This ROD reflects MARAD's decisions and approvals pursuant to 40 CFR 1506.4.

MARAD has selected the proposed Project (12th Street Alternative), which is also the Environmentally Preferred Alternative, for implementation at the Port. The federal actions identified in Section 3.4 of this ROD are necessary to implement MARAD's Preferred Alternative. The proposed Project is described in detail in the FEIS and is depicted in Figure 3-1.

3.2 MARAD DECISION

Approval by MARAD to implement the proposed Project signifies that applicable federal requirements relating to development and planning have been met and permits the Port to proceed with the Project. This decision does not constitute a commitment of funds. However, it does fulfill the environmental prerequisites to approve applications for federal permits, loans, grants, and funds for the proposed Project in the future.

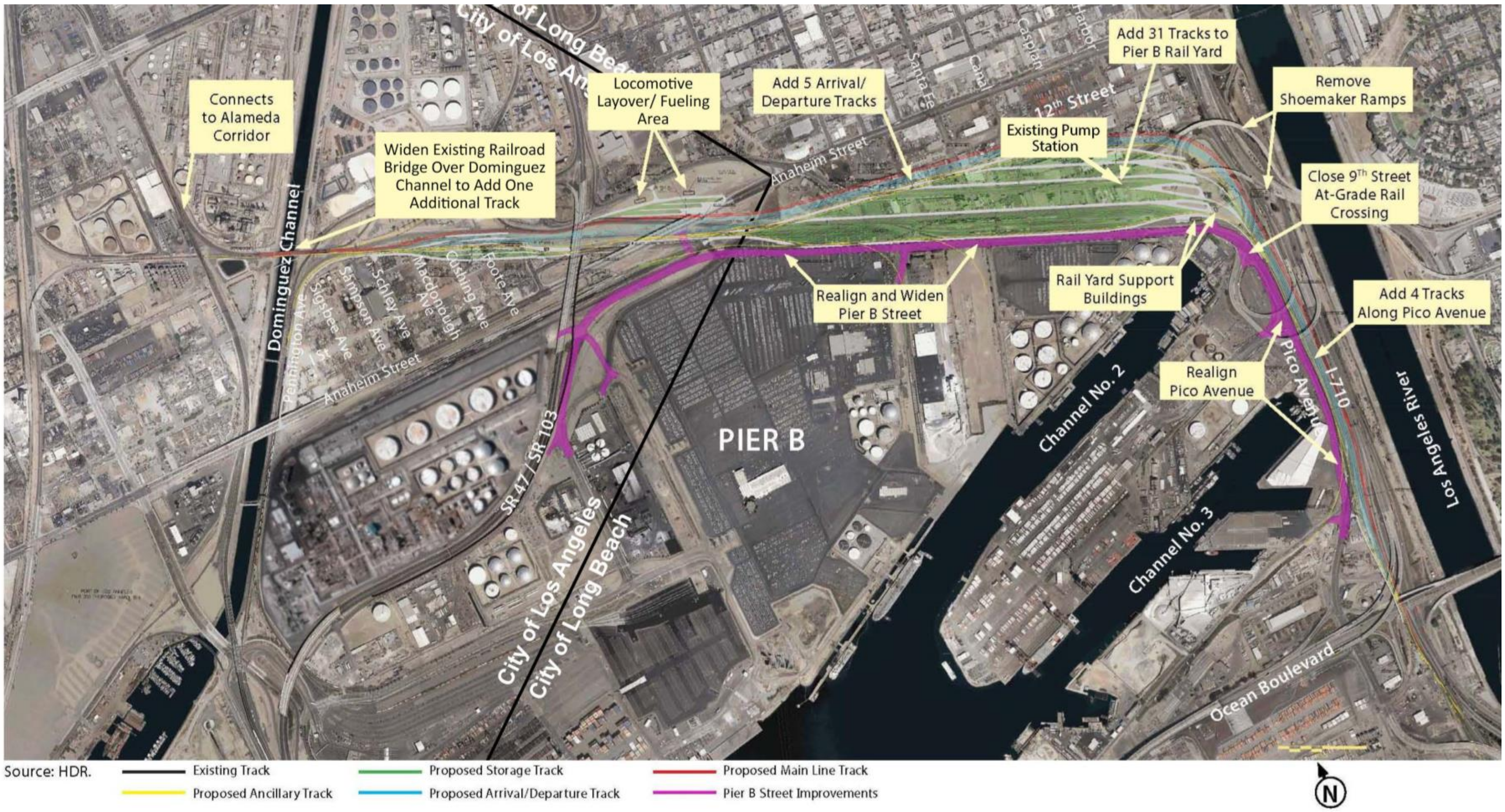

Figure 3-1
Pier B On-Dock Rail Support Facility, Proposed Project (12th Street) Components

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3.3 BASIS OF DECISION

I have carefully considered the MARAD's NEPA evaluation of the Applicant's Pier B On-Dock Rail Support Facility Project as discussed in the FEIS. I have considered the Purpose and Need that this Project would serve; the alternative means of achieving the Purpose and Need; the environmental impacts of these alternatives; and the mitigation to preserve and enhance the human, cultural, and natural environment.

I find that the Project in the ROD is reasonably supported. I therefore direct that the following Agency Actions and Approvals be taken to carry out this decision, including:

Federal Actions by MARAD

Conditional approval of the Pier B On-Dock Rail Support Facility Project.

Approved and Ordered

Date: April 7, 2022

Signature:

Lucinda Lessley
Acting Maritime Administrator

3.4 BACKGROUND

Most international cargo is transported to and from the United States in standardized cargo containers conveyed by ocean-going vessels. The 20-foot by 8.5-foot by 8.5-foot container is the basis for the twenty-foot equivalent unit (TEU), which is the standard measure of containerized cargo volumes. Ocean shipping, especially containerized shipping, is the least expensive (and therefore the most used) method of moving large volumes of goods around the world.

Once standardized containers arrive at the POLB by ship they are moved between the POLB and inland destinations by trucks and trains. Trucks and trains also deliver containers from inland and other ports to the POLB for overseas shipping. The proposed Project would accommodate the anticipated increase in demand for inland movement of international cargo by train to and from the POLB over the next two decades.

The movement of international cargo is a complex and ever-changing enterprise. A wide array of people and businesses forms a goods movement supply chain that brings imported goods to consumers throughout the country and carries exported goods to consumers overseas. The volume of this international trade has grown several-fold over the last 25 years, and this growth is projected to continue into the foreseeable future. The U.S. ports and the POLB play an important role in that goods movement supply chain for the entire country.

The POLB and the adjacent Port of Los Angeles are collectively referred to as the San Pedro Bay Ports (SPBP). The SRBP Complex constitutes the ninth largest port complex in the world, as measured in terms of the volume of goods handled, and it is the largest port complex in the U.S. The POLB is the 21st largest port in the world and the second largest in the U.S. by volume of cargo handled (World Shipping Council 2016).

3.5 PURPOSE AND NEED

Because the Project represents a major federal action and because there is the potential for significant environmental impacts, MARAD determined that an EIS is the appropriate level of review for the Proposed Action. The Project's EIS identifies the potential environmental impacts associated with the proposed Project and alternatives, describes proposed mitigation for identified impacts, and identifies any known irreversible and irretrievable significant environmental consequences.

Through the Port Infrastructure Development Program, MARAD provides expertise on port investment and finance and assists ports of all sizes and functions with infrastructure development, efficiency (agile port systems and cargo handling), deepwater licensing, and conveyance.

The Port is a primary gateway for U.S. international trade. POLB has evaluated the existing cargo movement within the Port and the existing Port infrastructure and has concluded that the most efficient means of moving the 30- to 35-percent anticipated cargo increase to its ultimate destination is by rail. The movement of international cargo is a complex and ever-changing enterprise. A wide array of people and businesses form a goods movement supply chain that brings imported goods to consumers throughout the country and carries exported goods to consumers overseas. The volume of the international trade has grown several-fold over the last 25 years, and this growth is projected to continue into the foreseeable future (POLB 2020). The U.S. ports, and the POLB in particular, play an important role in that goods movement supply chain.

This is relative to the Port's goal to provide a sufficient facility to accommodate the anticipated increase in cargo volume and demand for rail transport of that cargo into the foreseeable future. The Port's goal for the proposed Project would be to transfer containers directly to rail, assemble trains carrying an average of 250 containers each, and dispatch those trains to their respective Class I railroad main lines as quickly as possible. The Port has determined that modifying the existing on-dock facilities rather than constructing a new facility would be the most efficient method for handling transfer of the anticipated cargo load. Both near-dock and off-dock facilities assist in this effort. To the extent that more containers can be handled via the on-dock facilities, rather than near- and off-dock facilities, cargo-handling would be more efficient.

The Pier B Rail Yard is a critical component of overall goods movement handling within the POLB because it is the only rail-serving facility within the entire SPBP Complex that can currently assist the on-dock terminals with the task of assembling trains and dispatching them onto the Alameda Corridor and then, subsequently, to the Class I railroad main lines. However, it does not have the necessary storage tracks or sufficient track lengths within the Port to handle the longer trains that are becoming standard.

3.5.1 Purpose of the Project

The purpose of the proposed Project, which would reconfigure and expand the Pier B On-Dock Rail Support Facility is to:

- Relieve current inefficiencies and bottlenecks in the POLB rail cargo handling system.
- Provide a sufficient facility to accommodate the anticipated increase in cargo volume and demand for rail transport of that cargo into the foreseeable future.
- Support the transition to a more efficient, more economically competitive and less polluting freight transport system as envisioned in the California Sustainable Freight Action Plan (State of California 2016).
- Support the shared goals of local and regional transportation agencies to increase port, rail, and highway capacities.

- Promote a mode shift from containers shipped by truck to near-dock and/or off-dock facilities to containers shipped by rail from the on-dock and supporting rail yards.
- Maximize on-dock rail operations to a targeted goal of 30 to 35 percent of containers handled by the Port, as defined in the 2006 Port Rail Study Update (POLA and POLB 2006).
- Receive and depart, within the confines of the rail yard, up to 10,000-foot-long trains to accommodate the increasing use of such trains by the Class I railroads.
- Improve motorist and rail safety by eliminating an existing at-grade crossing where 9th Street meets Pico Avenue.

3.5.2 Need for the Project

There is a need to expand and improve the Pier B Rail Yard to accommodate current and future demand for container handling by rail, which has been increasing over time and is expected to continue to increase through the next decade (POLB 2016). In addition to growth in overall demand, typical container trains have been increasing in length from 8,000 feet to 10,000 feet and greater. These two factors have made it necessary for the POLB to consider options for maximizing efficient container management into the future.

The ability of the POLB to handle increasing container demand is currently limited, and longer trains (8,000 feet or more) must be broken down into smaller units to have them loaded via the existing POLB on-dock facilities because there currently is no space within the POLB that can handle the assembly/disassembly of the longer trains, requiring track space at varying locations in the Port, including main line tracks. Expansion of the existing Pier B Rail Yard was identified by the POLB as the most efficient and cost-effective solution to address the Port's rail needs with the least impact on the Port's existing operations. The Pier B Rail Yard does not currently have space to handle 10,000-foot-long trains without using tracks outside the railyard, which causes delays at grade crossings in the vicinity. Therefore, the proposed Project is needed for more efficient and rational rail operations—both within and to/from the SPBP Complex—to address the physical deficiencies and shortcomings of the existing Pier B Rail Yard with respect to supporting on-dock rail operations, and to address local roadway deficiencies and enhance utilities and aging infrastructure.

The Need for the proposed Project as underscored by deficient rail operations, existing site operations and deficiencies, and local roadway and utility deficiencies is discussed throughout the EIS.

3.6 PROPOSED PROJECT (12TH STREET)

The proposed Project involves the reconfiguration and expansion of the existing 82-acre Pier B On-Dock Rail Support Facility. A summary of the Project features is provided below, and a detailed description of the Project components is given. The proposed Project would be constructed within a contiguous 171-acre footprint in three phases over an estimated 7 years. Components of the proposed Project would include the following:

- Adding 31 yard tracks and five arrival/departure tracks, thereby expanding the yard from an existing 12 tracks (2 main line tracks, 10 yard tracks, and no arrival/departure tracks) to a total of 48 tracks (2 main line tracks, 41 yard tracks, and five arrival/departure tracks)
- Providing for up to 10,000-foot-long receiving/departure tracks
- Widening the existing rail bridge over Dominguez Channel to accommodate one additional track

Realignments and closures of some roadways would be required to accommodate the expanded rail yard. Pier B Street would be realigned to the south, its geometrics would be improved, and two lanes of traffic in each direction would be provided.

- The realignment of Pier B Street would require the reconstruction of two intersections, at Anaheim Way and Edison Avenue.
- The existing at-grade 9th Street railroad grade crossing would be closed and the Shoemaker ramps removed.
- Pico Avenue would be realigned to the west beginning at the Interstate (I-) 710 ramps south to approximately Pier D Street, allowing space for four additional tracks between Pico Avenue and I-710.
- Areas needed for new rail tracks would require the closure of portions of 9th, 10th, 11th, and 12th Streets and Edison, Jackson, Santa Fe, Canal, Caspian, Harbor, and Fashion Avenues located between Anaheim Street to the north and Pier B Street to the south, in the COLB.
- Portions of Farragut, Foote, Cushing, Macdonough, and Schley Avenues would be closed in the vicinity of existing railroad right-of-way (ROW) in the City of Los Angeles (COLA).

The reconfigured Pier B On-Dock Rail Support Facility would:

- Shift approximately 10 percent of container volume handled at the Port from truck to rail
- Be used to receive/depart and stage inbound and outbound intermodal trains up to 10,000 feet in length
- Include storage tracks for empty rail cars required to support on-dock intermodal operations
- Provide rail car storage and classification facilities
- Provide an assembly area for departing trains
- Provide an area where inspection and departure brake tests would be performed
- Include staging tracks for non-intermodal cars bound to and from non-container terminals
- Provide trackage for rail car repair activities

The proposed Project would support the following rail operations:

- Up to four Pacific Harbor Line (PHL) locomotives would be operating on site to manage movement of rail cars within the rail yard each day by 2025 and up to eight by 2035.
- Approximately five rail and rail car repair vehicles would be operating within the on-dock support facility.
- Locomotive operation support personnel vehicles would consist mostly of passenger vans. These vans would be used to pick up and drop off train crews at the on-dock support facility.
- Daily rail yard administrative staff would arrive/depart via individual passenger vehicles for each shift. Approximately 10 workers per shift would be required to operate the yard.

Vehicle operations associated with the on-dock rail support facility would include rail and rail car repair vehicles, and locomotive operation support personnel vehicles. These operations would occur 24 hours per day, 7 days per week, in three shifts.

3.7 ALTERNATIVES

3.7.1 Evaluation and Screening of Alternatives

MARAD completed a thorough and objective review of a range of reasonable alternatives in accordance with CEQ regulations (40 CFR 1502.14). MARAD established a two-step screening process to identify a range of reasonable rail support alternatives that were capable of achieving the Purpose and Need for MARAD's Preferred Alternative.

- **Step 1:** The first step in the screening process was to identify if an alternative could meet the Purpose for the Sponsor's proposed Project as described in detail in Section 3.5, *Purpose and Need*.
- **Step 2:** The second step was to further evaluate the remaining alternatives for additional considerations. These considerations were:
  - **Environmental.** Alternatives with substantially higher adverse impacts beyond those of the Sponsor's proposed Project were not evaluated in detail.
  - **Operational.** Alternatives that clearly reduced the safe and efficient use of the internal and external rail network supporting the Port were not evaluated in detail.
  - **Cost Considerations.** Alternatives with costs substantially greater than the Sponsor's proposed Project were considered impracticable.
  - **Possible and Prudent Considerations**. Reasonable alternatives are those that are feasible and prudent from a technical and economic standpoint and using common sense.

3.7.2 Alternatives Considered

The alternatives considered included two build alternatives–the 10th Street Alternative and the 9th Street Alternative—as well as the No Action Alternative.

10th Street Alternative

Project Elements

Railroad Track Work
The 10th Street Alternative would be similar to the proposed Project, except that the footprint would not extend as far north as the proposed Project. The 10th Street Alternative would be constructed between Pier B Street and the main line track, to the north of 10th Street from approximately the Anaheim Street Overhead to the 9th Street/I-710 freeway ramps. The yard would be expanded from 12 to 34 tracks, including 29 yard tracks (10 existing, 19 new) and 3 arrival/departure tracks (all new; currently there are none). The two existing main line tracks would be realigned.

Road Work
Road work for the 10th Street Alternative in COLB would be similar to the proposed Project, with the following exceptions: the new rail lines would force the closure of all or portions of Edison, Jackson, Santa Fe, Canal, Caspian, and Harbor Avenues and 10th Street between 11th Street and Pier B Street. The Shoemaker ramps would be reconfigured to maintain the connection between Anaheim Street and downtown Long Beach via Harbor Avenue. The changes in COLA would be the same as the proposed Project.

Utility Work
Utility work for the 10th Street Alternative would be the same as that described under the proposed Project.

9th Street Alternative

Project Elements

The 9th Street Alternative would be similar to the proposed Project, except the facility would have fewer arrival/departure and yard tracks, and less road reconstruction would be necessary. The number of rail cars and trains that could be accommodated would be less than under the proposed Project.

Railroad Track Work

Railroad track work for the 9th Street Alternative would be similar to the proposed Project, except that new tracks would be constructed between Pier B Street and 9th Street (instead of 12th Street) from the Anaheim Street Overhead to the 9th Street/I-710 ramps. The yard would be expanded from 12 to 21 tracks, including 16 yard tracks, 6 of which would be new, and 3 new arrival/departure tracks (currently there are none). The 2 existing main line tracks would be relocated to the north side of the yard and extended west and south.

Road Work

Road work involved with the 9th Street Alternative in COLB would be similar to that for the proposed Project, with the following exceptions: the new rail lines would require Edison, Jackson, Santa Fe, Canal, and Caspian Avenues to dead-end at 9th Street. The Shoemaker ramps would not be removed or realigned under the 9th Street Alternative. Changes in COLA would be the same as described for the proposed Project.

Utility Work

Utility work for the 9th Street Alternative would be the same as that described under the proposed Project, although the area affected would be smaller.

No Action Alternative

The No Action Alternative refers to the continuation of existing conditions of the affected environment, without implementation of the proposed Project. Inclusion of the No Action Alternative is prescribed by the CEQ's NEPA implementing regulations and serves as a benchmark against which federal actions can be evaluated. Under the No Action Alternative, normal ongoing operations and maintenance activities would continue. The existing Pier B Rail Yard's function would continue as it is able. The yard would continue to have 2 main line tracks, 10 yard tracks, and no arrival/departure tracks.

Without any improvements, the facility would not be able to meet the POLB long-term on-dock Purpose and Need of 30 to 35 percent intermodal cargo. Currently when the rail yard reaches the limit of its ability to handle train movements, the remaining direct intermodal cargo that is not accommodated by on-dock rail yards is transported into and out of the POLB by trucks to either a near-dock yard (e.g., Intermodal Container Transfer Facility) or to one of the existing yards located in downtown Los Angeles. This often results in an increase in truck trips from the terminals served by the Pier B Rail Yard. The most recent comprehensive long-term cargo forecast for the San Pedro Bay Port completed in February 2016 projected an increase in the cargo volume handled by POLB from 8.7 million TEUs in 2020 to 15.4 million TEUs in 2035. Under the No Action Alternative, with Pier B Rail Yard's existing limitations to handle train movements and current operations at or near practical limit, the projected increase in cargo at POLB would result in an increased volume of cargo that would need to be transported by trucks to a near-dock yard or yards in downtown Los Angeles, thereby increasing truck traffic. Under the No Action Alternative, the existing at-grade crossing located at the intersection of 9th Street and Pico Avenue would remain in place, forcing increasing numbers of extra train movements (i.e., splitting and building the train) to keep the road open. This requirement would limit the ability of the Pier B Rail Yard to efficiently receive and depart intermodal trains. An estimated five to seven trains per day are currently departing the yard, and the baseline is estimated to be seven trains per day, on average, which reflects operations at capacity.

As part of the No Action Alternative, Pier B Street would not be improved. The roadway would remain poorly aligned and continue with at-grade rail crossings. The Shoemaker ramps would not be removed or realigned, and vehicles would continue to have access to the ramps. None of the roadways would be closed. The No Action Alternative would not result in any property acquisition or business relocations, and it would not displace any people or businesses.

The No Action Alternative does not meet the Purpose and Need for the Project. CFR Title 40, Section 1502.14(d) guidelines require a No Action Alternative be included in the evaluation of environmental consequences; therefore, this alternative was carried forward for detailed analysis.

3.8 SELECTED ALTERNATIVE

The CEQ regulations (40 CFR 1502.14(e)) require that a lead agency identify its Preferred Alternative in the Final EIS and identify the Environmentally Preferred Alternative (40 CFR 1505.2(b)) in the ROD. MARAD's Preferred Alternative is the alternative "the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors." The Environmentally Preferred Alternative is the alternative that best promotes the national environmental policies incorporated into Section 101 of NEPA. In general, this would be the alternative that results in the least impact on the environment while still meeting the Purpose and Need, and that best protects natural and cultural resources.

The Approving Official for this ROD has selected the Preferred Alternative based on a review of "each alternative's ability to fulfill the agency's mission while considering their economic and environmental impacts, and technical factors." MARAD identified the proposed Project (12th Street Alternative) as meeting the Sponsor's Purpose and Need by improving safety, and with similar adverse environmental impacts as identified for the 9th Street Alternative and 10th Street Alternative. As the more comprehensive alternative, the proposed Project (12th Street Alternative) would reduce the need for additional modifications as the use of rail increases over time and the use of truck container transport diminishes.

Of all alternatives considered, the No Action Alternative has the fewest environmental impacts and is considered the Environmentally Preferred Alternative. However, the No Action Alternative does not meet the proposed Project's Purpose and Need. Of the action alternatives, the smaller footprint of the 10th Street Alternative and 9th Street Alternative would have fewer direct impacts. However, the 9th Street Alternative would not support the Port's long-term rail goals. The 10th Street Alternative would address the short-term rail container management, but the bottlenecks left would result in longer delays for trains and would increase localized air emissions over time, as compared to the proposed Project (12th Street Alternative). Based on anticipated increase in demand for rail cargo handling, the 10th Street Alternative would require additional environmental impacts similar to, or greater than, the proposed Project (12th Street Alternative).

3.9 MEASURES TO MINIMIZE HARM

TABLE 3-1
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact (All section cross-references are to the DEIS)	Mitigation Measures/Avoidance and Minimization Measures/BMPs
Geology, Soils, and Seismic Conditions (Section 3.2)	No mitigation is required.
Air Quality, Greenhouse Gases, and Climate Change (Section 3.3)	***Mitigation Measures:*** **AQ-1: On-Road Construction Trucks.** All on-road heavy-duty trucks with a fifth-wheel tractor/trailer and a gross vehicle weight rating of 19,500 pounds or more transporting materials to and from the construction site will meet EPA 2010 on-road heavy-duty diesel engine emission standards. **AQ-2: Tier 4 Construction Equipment.** All self-propelled, diesel-fueled off-road construction equipment 25 hp or greater will meet EPA/CARB Tier 4 off-road engine emission standards. **AQ-3: Off-Road Construction Equipment.** Off-road diesel-powered construction equipment will comply with the following: • Maintain all construction equipment according to manufacturer's specifications. • Construction equipment will not idle for more than 5 minutes when not in use. • High-pressure fuel injectors will be installed on construction equipment vehicles **AQ-4: Increased Watering Frequency for Fugitive Dust Control.** Construction site watering, which would be required by SCAQMD Rule 403, will be increased such that the watering interval is no greater than 2.1 hours. A watering interval of 2.1 hours, which was the basis of an emission test, would increase the fugitive dust emissions control from 61 percent to 74 percent. **AQ-5: Additional Fugitive Dust Control.** Contractors will: • Apply approved nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas or replace groundcover in disturbed areas. • Provide temporary wind fencing around sites being graded or cleared. • Cover truck loads that haul dirt, sand, or gravel or maintain at least 2 feet of freeboard in accordance with Section 23114 of the California Vehicle Code. • Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off tires of vehicles and any equipment leaving the construction site. • Suspend all soil disturbance activities when winds exceed 25 miles per hour or when visible dust plumes emanate from the site and stabilize all disturbed areas

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TABLE 3-1
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact (All section cross-references are to the DEIS)	Mitigation Measures/Avoidance and Minimization Measures/BMPs
	The benefits to be achieved by the above-listed components of this measure were not quantified in the analysis due to the wide range of variables involved. This measure is applied, however, to further reduce fugitive dust emissions. **AQ-6: Cumulative Air Quality Impact Reduction Program.** The Port would mitigate cumulative air quality impacts associated with operation of the proposed Project by implementing and funding the POLB CGP. The CGP provides additional funding for community-based GHG reductions. The mitigation amount is calculated based on the proposed Project's peak daily operation emissions, which are disclosed in the Final EIR prepared for the proposed Project (Port of Long Beach 2016). The Port will make a contribution to the CGP in the amount of $149,757 to mitigate emissions of PM and NOX associated with proposed Project operations. The timing of the payments determined by the methodology will be made by the later of the following two dates: (1) the date that the Port issues a Notice to Proceed or otherwise authorizes commencement of construction on the Pier B On-Dock Rail Support Facility Construction Contract, or (2) the date that the Pier B On-Dock Rail Support Facility Final EIR is conclusively determined to be valid, either by operation of PRC Section 21167.2 or by final judgment or final adjudication. The emission reductions that may result from the Projects funded into the CGP are excluded from this analysis because it is not possible to quantify such emission reduction until Project grants are awarded. ***Avoidance and Minimization Measure:*** **BMP AQ-1: Special Condition**. Every 5 years following the Project approval date, the Port will conduct a review of new air quality technological advancements. These technologies would be evaluated based on operational feasibility, technical feasibility, and cost effectiveness and financial feasibility for application in the Pier B Rail Yard. If a technology is determined to be feasible in terms of financial, technical, and operational feasibility, the Port will implement such technology.
Greenhouse Gases and Climate Change (Section 3.3.3.2)	***Mitigation Measures:*** **GCC-1: LEED.** New buildings constructed as part of the proposed Project will pursue Leadership in Energy and Environmental Design (LEED) if they meet the criteria requirements for certification (including building size). COLB exempts buildings of fewer than 7,500 square feet of occupied space from its Green Building Policy. LEED certification is made at one of the following four levels, in ascending order of environmental sustainability: certified, silver, gold, and platinum. The certification level points are given for various design features that address the following areas: • Sustainable sites; • Water efficiency; • Energy and atmosphere; • Materials and resources;

TABLE 3-1
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact (All section cross-references are to the DEIS)	Mitigation Measures/Avoidance and Minimization Measures/BMPs
	• Indoor environmental quality; and • Innovation and design process. As a result, a LEED-certified building would be more energy efficient, thereby reducing GHG emissions compared to a conventional building design. The effects of this measure are not quantified in this analysis. **GCC-2: Recycling of Construction Materials.** Pursuant to the POLB Sustainable Business Practices Administrative Directive, construction debris must be recycled, reused, or otherwise diverted from landfills to the maximum extent possible. Recyclable construction waste generated by the proposed Project shall be taken to an accredited recycling center. **GCC-3: Recycling and Sustainable Business Practices.** During operation, the Port will follow recycling objectives and measures established by the Port's Administrative Directive for Sustainable Business Practices (Port of Long Beach 2016). In general, products made with recycled materials require less energy and raw materials to produce than products made with unrecycled or raw materials. This MM also includes energy conservation practices, purchasing of "Green" products, energy-efficient lighting, low-VOC paint and finishes, and use of recycled or remanufactured carpeting and office furnishings. This directive also includes minimizing the use of paper and plastic, reusing materials and equipment, and proper disposal of alkaline batteries. This savings in energy and raw material use translates into GHG emission reductions. The effectiveness of this MM was not quantified due to the lack of a standard emission estimation approach. **GCC-4: Xeriscaping.** Water conservation features, including drought-tolerant plant materials, are required for all projects undertaken in the Port. Xeriscape landscaping shall incorporate the use of water conservation features including, but not limited to, drought-tolerant plants; hardscape; permeable material such as concrete, asphalt, and pavers; recycled material such as concrete, gravel, granite, and shredded redwood; and drip irrigation systems and timers. **GCC-5: Tree Planting.** The Port will plant shade trees around the main office and maintenance buildings in accordance with species identified in the Green Port Long Beach Sustainable Landscape Palette and POLB Sustainable Development Guidelines. Trees act as insulators from weather, thereby decreasing energy requirements. Onsite trees also provide carbon storage. Although not quantified, implementation of this measure is expected to reduce the proposed Project's GHG emissions by less than 0.1 percent. **GCC-6: Tree Planting – Transportation Corridors.** The Port will plant new shade trees on Port-controlled lands adjacent to the roads that lead into the facility, to the extent practicable, consistent with safety and other land use considerations. The effectiveness of this MM was not quantified due to the lack of a standard emission estimation approach. **GCC-7: Employee Carpooling**. The construction contractor and the Port will encourage construction and facility employees to carpool or to use public transportation. These employers will provide incentives to promote the measure, such as preferential parking for carpoolers or vanpool subsidies, and they will provide information to

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TABLE 3-1
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact (All section cross-references are to the DEIS)	Mitigation Measures/Avoidance and Minimization Measures/BMPs
	employees regarding the benefits of alternative transportation methods. The effectiveness of this MM was not quantified due to the lack of a standard emission estimation approach. The Port is in the process of developing the GHG Strategic Plan. This plan will outline the overall approach for mitigating potential proposed Project-specific and/or cumulative GHG impacts of Projects through the modernization and/or upgrading of marine terminals and other facilities in the Long Beach Harbor District. **GCC-8: Community Grants Program.** The Port will mitigate GHG impacts of the proposed Project by implementing and funding the CGP to partially address the cumulative GHG impacts of the proposed Project. The Port will provide $1.4 million to mitigate emissions of GHG associated with proposed Project operations. The timing of the payment determined by the methodology will be made by the later of the following two dates: (1) the date that the Port issues a Notice to Proceed or otherwise authorizes commencement of construction on the Pier B On-Dock Rail Support Facility Construction Contract; or (2) the date that the Pier B On-Dock Rail Support Facility Final EIR is conclusively determined to be valid, either by operation of PRC Section 21167.2 or by final judgment or final adjudication. The contribution to be made to the CGP is calculated based on operational emissions using the methodology for GHG emissions described in the POLB CGP and Investment Plan. This methodology is consistent with SCAQMD Rule 2702 (adopted February 6, 2009), which established the participation fee for GHG mitigation at $15 per MT of CO_2e. This contribution will be used to pay for projects in the energy efficiency, transportation, renewable energy, and landscaping categories pursuant to the CGP. Not all projects that fall into these categories are eligible for grant funding; specific eligible projects will be identified in the CGP Guidelines being developed by the Port. Projects approved pursuant to the CGP can be implemented shortly after grant funding becomes available, which will occur in accordance with the timing set forth in this MM. The emission reductions that may result from the projects funded into the CGP are excluded from this analysis because it is not possible to quantify such emission reduction until project grants are awarded. **GCC-9: Indirect GHG Emission Avoidance and Mitigation.** The Port will minimize indirect GHG emissions through measures that reduce or avoid electricity consumption at the facility. Such measures may include, but are not limited to, the use of low-energy-demand lightings (e.g., fluorescent or light-emitting diode [LED]), and use of energy-efficient floodlights. To identify future opportunities to reduce indirect GHG emissions, the Port will conduct a third-party energy audit every 5 years and install innovative power-saving technologies where feasible, such as power factor correction systems and lighting power regulators. Such systems help to maximize usable electric current and eliminate wasted electricity, thereby lowering overall electricity use.

TABLE 3-1
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact (All section cross-references are to the DEIS)	Mitigation Measures/Avoidance and Minimization Measures/BMPs
Water Quality (Section 3.4)	***Best Management Practices:*** **WQ-1:** Prior to the start of construction, Permittee shall obtain coverage under the Los Angeles Regional Water Quality Control Board's General Permit for Storm Water Discharges Associated with Construction and Land Disturbing Activities (CAS000002). A copy of the Notice of Intent (NOI) and Stormwater Pollution Prevention Plan (SWPPP) shall be provided to the Director of Environmental Planning prior to the start of construction. **WQ-2:** Groundwater displaced or extracted by construction activities shall be contained and tested to guide appropriate storage, discharge, or disposal. Laboratory analyses would include petroleum hydrocarbons (full carbon chain range), Title 22 metals, volatile organic compounds (VOC), Semi-volatile organic compounds (SVOC), polycyclic aromatic hydrocarbons (PAH), pesticides, and polychlorinated biphenyls (PCB). If unexpected, potentially contaminated soil or groundwater is discovered during construction, work shall stop in the affected area. Sampling and analysis of the soil or groundwater shall be conducted to determine proper handling and disposal methods. **WQ-3:** Post-construction Best Management Plans (BMPs) will be implemented to the maximum extent practicable, consistent with the requirements of MS4 Permit Order No. R4-2014-0024.
Biological Resources (Section 3.5)	***Mitigation Measures:*** **BIO-1 (Migratory Birds):** To minimize effects on nesting migratory birds, construction activities that include the removal of trees or structures that may support the nests of protected birds would follow the requirements of the MBTA. If construction activities occur during the bird breeding season (February 15 through August 31), a qualified ornithologist would survey trees, shrubs, and structures to be removed, not more than 3 days prior to removal. If the ornithologist detects any occupied nests or nesting behavior, POLB would conspicuously flag off the area(s) and provide a minimum buffer of 100 feet (300 feet for raptors) between the nest and limits of construction. Construction crews would be instructed to avoid any activities in this zone. Construction activities could resume within the buffer at the direction of the ornithologist when fledglings have left the nest or if the nest is abandoned. **BIO-2 (Bats):** To avoid harm to bats from modifications to structures that may provide roosting or breeding habitat, the following procedure would be followed: prior to the start of construction, a qualified bat specialist shall conduct a pre-construction survey. If bats are found or determined to be potentially present, the area of presence would be inspected no more than 7 days before any disturbance to confirm the presence of roosting bats. The bat specialist would have authority to stop construction activity likely to be disruptive of breeding or roosting. The bat specialist would identify an appropriate course of action for the POLB to follow. Example actions are: (a) precluding bat access from the area before work proceeds; (b) establishing an appropriate buffer area; and (c) monitoring work to ensure that bats are not killed or substantially disturbed. Weekly reports to the POLB and CDFW shall be provided, describing monitoring actions, relevant observations, and any protective actions taken **BIO-3 (Water Quality):** No debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, oil, or petroleum products from construction shall be allowed to enter or be placed where it may be washed by rainfall or runoff into waters of the U.S. Therefore, the Permittee shall employ all standard BMPs to ensure that toxic materials,

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TABLE 3-1
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact (All section cross-references are to the DEIS)	Mitigation Measures/Avoidance and Minimization Measures/BMPs
	silt, debris, or excessive erosion do not enter waters of the United States during Project construction. Upon completion of work, any excess material or debris shall be removed from the work area and disposed of in an appropriate upland site. Water quality impacts will be avoided or minimized through implementation of a Stormwater Pollution Prevention Plan, NPDES permit conditions, BMPs, and specific stormwater effluent monitoring requirements of applicable Project permits. **BIO-4 (Sound Abatement):** During steel pile-driving, the contractor shall be required to use sound abatement techniques to reduce both noise and vibrations from pile-driving activities. At the initiation of each pile-driving event, the pile-driving shall also employ a "soft start" in which the hammer is operated at less than full capacity (i.e., approximately 40–60 percent energy levels) with no less than a 1-minute interval between each strike for a 5-minute period.
Transportation (Section 3.6)	No mitigation is required.
Land Use, Coastal Zone Consistency, and Recreation (Section 3.7)	No mitigation is required.
Public Services and Safety (Section 3.8)	No mitigation is required.
Noise (Section 3.9)	No mitigation is required.
Hazards and Hazardous Materials (Section 3.10)	***Avoidance and Minimization Measures:*** • Pursuant to Port requirements and prior to conducting site investigation, site investigations plans—which include topics such as soil, risk assessment, safety, aerially deposited lead (ADL), groundwater, ACMs, lead, and treated wood waste (TWW)—shall be submitted to the Port's Director of Environmental Planning for review and approval. Test results will be provided to the Director of Environmental Planning as soon as they are available. • Prior to construction, a Phase II Site Investigation shall be performed in areas of known contamination where excavation would exceed 5 feet below ground surface, where groundwater may be encountered, and in areas where underground storage tanks were removed without closure. The results of the Phase II investigation shall be incorporated into the HASP to protect construction workers against known contamination in construction areas. A Hazardous Waste Management Plan based on the results of the Phase II investigation shall also be incorporated in the final design to ensure proper disposal of contaminated materials and contaminated groundwater found in the construction areas. • A risk assessment shall be performed prior to construction to determine how construction activities would affect the water-bearing levels and, as applicable, to determine health risks to construction workers. • A HASP shall be required to address any exposure to hazardous materials. The HASP shall include proper PPE work requirements, soil and air space monitoring requirements, documentation and reporting requirements, and action levels.

TABLE 3-1
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact (All section cross-references are to the DEIS)	Mitigation Measures/Avoidance and Minimization Measures/BMPs
	• Prior to construction, areas within the proposed Project corridor where soil may be disturbed shall be tested for ADL. If ADL levels meet or exceed the action level set forth by the Hazardous Waste Management Plan for the Project, ADL-contaminated soils would be removed in accordance with federal, state, and local regulations. • To minimize cross-contamination of the water-bearing zones, construction techniques to minimize the need for dewatering shall be used. • Groundwater displaced or extracted by construction activities shall be contained and tested to guide appropriate storage, discharge, or disposal. Laboratory analyses would include petroleum hydrocarbons (full carbon chain range), Title 22 metals, VOC, SVOC, polycyclic aromatic hydrocarbons (PAH), pesticides, and PCB. • An Unanticipated Discoveries Plan will be developed and implemented during construction to address specific actions that would be taken if unexpected hazardous materials, potentially contaminated soil, or groundwater is discovered during construction. If encountered, work shall stop in the affected area. Sampling and analysis of the materials, soil, or groundwater shall be conducted to confirm the conditions and, if warranted, to determine proper handling and disposal methods. • In all buildings subject to demolition, a survey to screen for ACM shall be conducted. ACM shall be removed prior to demolition to mitigate ACM hazards. • Lead and other heavy metals, such as chromium, may be present within yellow thermoplastic paint markings on the pavement. A Lead Compliance Plan shall be prepared in accordance with CCR Title 8 Section 1532.1. The Lead Compliance Plan shall be approved by an industrial hygienist certified in comprehensive practice by the American Board of Industrial Hygiene. • An environmental monitoring program during construction shall include soil testing to identify and monitor soils affected by petroleum hydrocarbons or other hazardous constituents, such as metals. The extent of the testing and monitoring shall be based on the final disposition of the excavated soil. Laboratory analyses shall include petroleum hydrocarbons (full carbon chain range), Title 22 metals, VOC, SVOC, PAH, pesticides, and PCB. Shallow surface soils within the railroad ROW may contain arsenic from historical weed control practices and shall be tested for arsenic. • Railroad ties shall be managed as TWW. Railroad ties designated for reuse shall be managed in accordance with Alternative Management Standards provided in CCR Title 22 Section 67386. Railroad-tie materials designated for disposal shall be considered potentially hazardous TWW and would be managed and disposed of in accordance with Title 22 Section 67386.
Socioeconomics and Environmental Justice (Section 3.11)	***Mitigation Measures:*** AQ-1, AQ-2, AQ-3, AQ-4, AQ-5, and AQ-6.
Utilities, Service Systems, and Energy Conservation (Section 3.12)	No mitigation is required.

TABLE 3-1
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

<table>
<tr><th>Potential Impact
(All section cross-references are to the DEIS)</th><th>Mitigation Measures/Avoidance and Minimization Measures/BMPs</th></tr>
<tr><td>Cultural Resources (Section 3.13)</td><td>The transit shed at Berths D52–54 would experience a significant impact under the Proposed Action. Measures to address the significant impact under NEPA (and the adverse effect under Section 106) would be developed in consultation with the SHPO and incorporated into a memorandum of agreement.
The following measures to minimize harm are proposed and are subject to change, pending consultation with the SHPO:
• Historic Property Treatment Plan for Transit Shed at Berths D52–54. Prior to beginning demolition and construction activities related to the transit shed and areas immediately surrounding it, the Port shall develop a Historic Property Treatment Plan (HPTP) for the transit shed at Berths D52–D54. The HPTP will guide the transit shed's partial demolition and construction with the goal of minimizing physical and visual effects on the historic property to the greatest extent possible. The Port shall revise the HPTP until MARAD accepts it. No demolition or construction work on the transit shed and the areas immediately surrounding it may begin until the HPTP is approved by MARAD and consulting parties have had an opportunity to comment on the HPTP.
The HPTP shall include:
○ Description of the transit shed's physical condition, including photo-documentation of the areas of the building subject to demolition and the areas immediately surrounding it.
○ Demolition and construction plans related to the transit shed.
• Post-Construction Report for Transit Shed at Berths D52–D54. Within thirty (30) calendar days following construction of the transit shed, the Port shall produce a Post-Construction Report (P-C Report) for the transit shed at Berths D52–D54 illustrating the partial demolition and construction. The Port shall revise the P-C Report until MARAD accepts it.
The P-C Report shall include:
○ Before-and-after photographs of ten (10) different views of the transit shed, of which seven (7) will focus on the primary elevation.
○ Before-and-after photographs of the setting adjacent to the transit shed, along Pico Avenue.
○ Narrative description of work conducted, describing how and why the construction adheres to the HPTP.
• Survey of Pre-Containerization POLB. Prior to beginning demolition and construction activities for the transit shed and areas immediately surrounding it, the Port shall produce a Pre-Containerization Resources Technical Report (Survey Report) memorializing a historic resources survey of pre-1969 resources within the Port. The historic resources survey will assess buildings, structures, and objects constructed prior to 1969 for their significance under the theme of pre-containerization Port activity. The Port shall revise the Survey Report until MARAD accepts it. No demolition or construction work on the transit shed and the areas immediately surrounding it may begin until the</td></tr>
</table>

TABLE 3-1
SUMMARY OF MITIGATION MEASURES/AVOIDANCE AND MINIMIZATION MEASURES/BMPS

Potential Impact (All section cross-references are to the DEIS)	Mitigation Measures/Avoidance and Minimization Measures/BMPs
	HPTP is approved by MARAD and consulting parties have had an opportunity to comment. This Survey Report shall include: ○ Historic context of Port rail and shipment operations prior to the advent of containerization. ○ Survey of the Port related to the above context and identification buildings, structures, and objects within this context. ○ Evaluation of significance of all the pre-1969 resources using NRHP and California Register of Historical Resources (CRHR) criteria, including consideration of historic district potential. If a historic district is discovered, contributors and non-contributors shall be identified.
Aesthetics and Visual Resources (Section 3.14)	***Best Management Practices:*** BMPs include implementing a standard measure to reduce potential night illumination beyond the proposed Project boundaries and to avoid the use of structural surfaces capable of reflecting daylight glare.

3.10 AGENCY FINDINGS AND DETERMINATIONS

The following identifies the various specific federal agency findings and determinations that support the Federal Actions for the proposed Pier B On-Dock Rail Support Facility Project.

- MARAD has given the Project the independent and objective evaluation required by the CEQ (40 CFR 1506.5): As documented in the FEIS and in this ROD, MARAD has objectively evaluated all reasonable alternatives for meeting the Project's Purpose and Need (see 40 CFR 1502.1.4(a)). The process included MARAD's selection of a third-party EIS contractor to assist in conducting the environmental review. The environmental review included identifying the Purpose and Need, identifying reasonable alternatives, fully analyzing and disclosing potential environmental impacts, and developing appropriate mitigation measures. MARAD directed the technical analysis provided in the DEIS and FEIS. MARAD furnished guidance and participated in preparation of the EIS by providing input, advice, and expertise throughout the planning and technical analysis, along with administrative direction and legal review of the Project. From its inception, MARAD has taken a strong leadership role in the environmental evaluation of the proposed rail facility expansion and has maintained its objectivity. In addition, MARAD has on file a disclosure statement from the environmental consultant that satisfies the requirement of 40 CFR 1506.3(c).

3.10.1 Compliance with Laws, Regulations, and Executive Orders

This section addresses compliance with laws, regulations, and Executive Orders not specific to MARAD regulatory authority.

- **Clean Air Act of 1970, as amended (42 U.S.C. §7401 et seq.):** Implementation of the proposed Project would cause an increase in air emissions above the applicable federal de minimis for nitrogen oxides (NO_X) during nine calendar years (2022, and 2024 through 2031); however, the General Conformity Determination has demonstrated that NO_X emissions can be accounted for in the State implementation Plan (SIP) budget and will not result in a delay regarding the attainment of National Ambient Air Quality Standards (NAAQS). In addition, implementation of a proposed action must comply with California Air Resources Board (CARB) requirements as implemented through the South Coast Air Quality Management District. Implementation would not create any new violation of the NAAQS, delay the attainment of any NAAQS, or increase the frequency or severity of any existing violations of the NAAQS. As a result, no adverse impact on local or regional air quality is expected by construction of the proposed Project. In addition, the Proposed Action would not exceed relevant Clean Air Act General Conformity de minimis levels for any criteria air pollutant and would comply with the Final Clean Air Plan, the SIP applicable to the area, including DVO.
- **Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.):** In accordance with Section 7 of the Endangered Species Act (ESA), MARAD consulted with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to evaluate the proposed Project for potential effects on threatened or endangered fish, wildlife, or plant species or designated critical habitat for such species. MARAD determined that no designated critical habitat occurs in the proposed Project Action Area and that the Proposed Action may affect but is unlikely to adversely affect one endangered species, California least tern (*Sternula antillarum browni*). While formal consultation under Section 7 of the ESA is not required with a determination of *not likely to adversely affect*, MARAD consulted informally with the USFWS and NMFS to ensure that the proposed Project would not jeopardize the continued existence of threatened or endangered fish, wildlife, or plant species, or result in the destruction or adverse modification of designated critical habitat.

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- **Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712):** The FEIS documents MARAD's consideration of the potential for impacts on migratory birds.
- **Department of Transportation Act, Section 4(f) (49 U.S.C. 303(c)):** Implementation of the Proposed Action would result in the constructive use of a Section 4(f) resource. Under the proposed Project, the current design requires that Pico Avenue, a presently narrow corridor, be realigned slightly to the west beginning at the I-710 ramps at the 9th Street/Pier B Street/Pico Avenue intersection and continue south to approximately Pier D Street, a portion of which runs along the subject property. This realignment would accommodate the construction of four additional tracks. The current design of the Pico Avenue realignment impinges on 555 N. Pico Avenue's historic property boundary. In order to accomplish the design, engineers would need to demolish approximately 16,400 square feet of the transit shed's eastern corner. Because a portion of the property would be demolished, the proposed Project would result in an adverse effect under Section 106, and thus would result in a Section 4(f) use of the property. In addition, the 10th Street Alternative and 9th Street Alternative would also require demolition of the transit shed, resulting in a Section 4(f) use of the property. Additional alternatives were considered as part of the Section 4(f) analysis in the EIS. Under the Pier B Intermodal Transfer Yard Alternative, and Reconfigured Yard with Additional Pinwheel Ladder Storage Tracks Alternative, the transit shed would require demolition, resulting in a Section 4(f) use of the property. Under the No Action Alternative, Alternative Site A, Alternative Site B, Alternative Site C, Reconfigured Yard with Additional Storage Tracks and Reconfigured Mead Yard Alternative, and Mead Yard Alternative, the transit shed at D52–D54 (555 N. Pico Avenue) would not be demolished, and no Section 4(f) use would result. However, all of the avoidance alternatives are considered not prudent and Alternative Site A is also considered not feasible. The DEIS includes all possible planning to minimize harm to the Section 4(f) area.
- **National Historic Preservation Act of 1966 (16 U.S.C. 470):** Pursuant to Section 106 of the National Historic Preservation Act, MARAD, in consultation with the California State Historic Preservation Officer (SHPO), determined that the Proposed Action would result in a significant impact on the transit shed at Berths D52–54. Measures to address the significant impact under NEPA (and the adverse effect under Section 106) have been developed in consultation with the California SHPO and incorporated into a memorandum of agreement.
- **Executive Order 11990, Protection of Wetlands, and Department of Transportation Order 5660.1A, Preservation of the Nation's Wetlands:** Implementation of the Proposed Action would meet the requirements of Executive Order 11990, Protection of Wetlands and USDOT Order 5660.1A, Preservation of the Nation's Wetlands.
- **Executive Order 11988, Floodplain Management, and Department of Transportation Order 5650.2, Floodplain Management and Protection:** The Project area is not within designated floodplains, nor would it increase the risk of flooding.

3.11 PUBLIC OUTREACH AND OPPORTUNITIES TO COMMENT

Throughout the EIS process, MARAD coordinated with federal, state, and local agencies including the California SHPO, USFWS, U.S. Army Corps of Engineers, EPA, and NMFS.

The NEPA process involves several steps, including multiple opportunities for public and agency involvement. Each key step is described below.

3.11.1 Notice of Intent

A Notice of Intent (NOI) was published in the *Federal Register* on June 26, 2019 (Vol. 84, No. 123), which requested public participation in the scoping process, provided information on how to participate, and announced an informational open house and public meeting in the COLB on July 10, 2019. The notices, supporting materials, and comments may be viewed at the Federal Docket Management Facility website (http://www.regulations.gov) under docket number MARAD-2019-0109.

3.11.2 Dear Interested Party Letters

Dear Interested Party Letters (DIP Letters) providing information on the public meeting and the Project—including the NOI, a Proposed Action fact sheet, and a Project area map—were sent to all interested parties after publication of the NOI.

3.11.3 Newspaper Notices

A public notice of the informational open house and public scoping meeting was published in the *Long Beach Press-Telegram* on July 1, 2019. Additionally, the same public notice was published concurrently in Spanish in both the Los Angeles and Orange County *Excelsior* publications.

3.11.4 Informational Open House

A public open house was scheduled at the POLB Administration Building on July 10, 2019, from 4:00 p.m. to 6:00 p.m. The purpose of the open house was to provide information to members of the public and any agencies that attended. The target audience was the general public, and the presentation materials focused on informing the public of the proposed Project, the application process, and the NEPA process. The Port, as the applicant, participated in the open house by providing static displays, video, informational brochures, and expert personnel to assist visitors in understanding the proposed Project. MARAD personnel were also on-hand to discuss MARAD's role and the NEPA process. Attendees signed in to the open house upon arrival, and a court reporter and language interpreters were available.

3.11.5 Scoping Meeting

A scoping meeting took place immediately following the informational open house from 6:00 p.m. to 8:00 p.m. on July 10 at the POLB Administration Building. Representatives from MARAD provided opening remarks and a brief overview to the audience. The overview described the Project and explained the NEPA process that will be followed. Following the introductions, an open forum was held to allow the public to provide feedback on the scope of the Project. Attendees registered upon arrival, and speakers completed a registration card. Additionally, comment cards and a comment repository were available for the public to give written comments regarding the proposed Project. A court reporter and language interpreters were available. One attendee provided oral remarks during the meeting, and no additional comments were received.

3.11.6 Notice of Availability of the Draft EIS

The EPA published the Notice of Availability (NOA) for the Pier B On-Dock Rail Support Facility Project's DEIS in the *Federal Register* on July 8, 2020, which began the formal 45-day public review and comment period. The review and comment period ended on August 31, 2020.

3.11.7 Distribution of DEIS

The following sections present information on public outreach and agency coordination conducted since the release of the DEIS.

Dear Interested Party Letters

MARAD sent DIP Letters to the interested party mailing list, which consisted of 357 recipients, including local, federal, and state agencies; stakeholders; tribal governments; interested and affected parties; and affected property owners. The DIP Letters contained information on the public comment and review period, including where, how, and by when comments should be made on the DEIS, and how to access the full DEIS and its supporting appendices. The DIP Letters also contained information on the virtual public hearing and open house.

Newspaper Notices

The NOA was published in three local newspapers: the *Long Beach Press-Telegram* (an English publication) on July 18 and 19, and *Excelsior LA* and *Excelsior OC* (Spanish publications) on July 17 and July 18, respectively. the *Long Beach Press-Telegram* information on the virtual public hearing and open house was also provided.

3.11.8 Public Hearing and Open House

MARAD held a virtual public hearing and open house on July 28, 2020, from 4:00 p.m. to 8:00 p.m. to present the DEIS and obtain comments on the DEIS. A Spanish interpreter and American Sign Language (ASL) interpreter were made available. In addition, the Open House and Public Hearing were recorded in their entirety, and were fully transcribed for the record.

The meeting opened with the Open House from 4:00 p.m. to 6:00 p.m. The Open House was led by the Port, as the applicant. The Port gave a presentation of the overall Project in English and Spanish. Following each presentation, participants were invited to ask questions.

The second half of the meeting was the public hearing from 6:00 p.m. to 8:00 p.m. MARAD provided an overview of the proposed Project, information on the public review and comment period, and instructions on how to leave public comments on the DEIS. No comments were received at the public hearing.

3.11.9 Agency Coordination

CFR Part 1501.6 emphasizes early and continuous agency cooperation in the NEPA process. Other federal agencies that have jurisdiction by law will be cooperating agencies. In addition, any other federal agency that has special expertise with respect to any environmental issue that should be addressed in the EIS may be a cooperating agency upon request of the lead agency. The DEIS went through interagency review with the cooperating agencies that were established early on in the NEPA process. The cooperating agencies were:

- USDOT FRA
- EPA, Region 9
- Caltrans, District 7

The cooperating agencies worked with MARAD on the DEIS to provide review and comment throughout the development of the DEIS.

Air Quality General Conformity

The Air Quality General Conformity Determination is being noticed and publicly circulated separately from the FEIS.

3.11.10 DEIS Comments Received and Response to Comments

Five public comments were received on the DEIS during the public comment period. The comments were sent via email to the *Federal Register.* Commenters included three public agencies and two private companies. The commenters were:

- California Air Resources Board (CARB)
- Southern California Air Quality Management District (SCAQMD)
- U.S. Environmental Protection Agency (EPA)
- Pacific Pipeline Systems LLC (PPS)
- Plains West Coast Terminals (PWCT)

The five public letters have been annotated into separate comments, and MARAD has provided responses to the comments included in each letter in the FEIS.

CHAPTER 4
REFERENCES

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APPENDIX A
APPENDIX TO PORT OF LONG BEACH PIER B RAIL SUPPORT PROJECT GENERAL CONFORMITY ANALYSIS

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Construction Emissions Methodology Memorandum

Memorandum

To:	File
From:	Keith Cooper, Principal, ERP, Inc Elliott Wezerek, Air Quality and Climate Change Specialist, ICF
Date:	February 24, 2021
Re:	**Updates to Air Quality Construction Criteria Pollutant Emissions Analysis Methodology for Port of Long Beach Pier B On-Dock Rail Support Facility Project**

Introduction

In December 2016, the Port of Long Beach (POLB) prepared the Draft Environmental Impact Report (EIR) for the Pier B On-Dock Rail Support Facility Project (proposed project) as part of the California Environmental Quality Act (CEQA) review process (POLB 2016). To support the air quality analysis of the EIS, Appendix A was prepared, which includes the following appendix relevant to criteria pollutant construction emissions.

- **Appendix A1, *Criteria Pollutant and GHG Emission Calculations.*** This appendix describes methods and assumptions used to estimate criteria pollutant and greenhouse gas (GHG) emissions associated with the proposed project; defines the pollutants, analysis years, and emission sources included in the emission calculations; describes the methodology for the emission calculations; and presents source activity and emission calculation tables as an attachment to this memo.

The air quality analysis in the Environmental Impact Statement (EIS) for the proposed project is largely based on the results of Appendices A1 through A3 of the Draft EIR. However, this memorandum is limited to discussion of the several key revisions relevant to the 2016 EIR Appendix, which pertains to project criteria pollutant emissions during construction.

1. **Final EIR Revisions.** In January 2018, the POLB released the Final EIR for the proposed project. In response to comments received during the public review period, the Final EIR includes revisions to the approach for the construction mass emissions, among other things. In an effort to use the latest and most accurate emission estimation techniques available, adjustments have been made to the concentration and health risk analysis of the EIS, as feasible.

2. **Changes to Project Schedule.** Since preparation of the analysis in the EIR, the project construction schedule has been delayed four years. In an effort to use the latest and most accurate emission estimation techniques available, adjustments have been made to the emission inventory methodology in the EIS, as feasible.

3. **Updated Regulatory Setting.** Since preparation of the analysis in the EIR, there has been new legislation, regulations, and regional plans relevant to the air quality construction analysis of the proposed project.

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This memorandum describes how the EIS air quality analysis methodology differs from that which is presented in the EIR. For each difference, a *Recalculation Methodology* section is included, which presents updated emissions, as feasible. Any information in the EIR not explicitly updated by this memorandum was assumed in the EIS to be the same as originally presented in the EIR or otherwise unrelated to the scope of the EIS analysis.

1. Final EIR Revisions

The Draft EIR for the proposed project was completed in December 2016. In January 2018, the POLB released the Final EIR for the proposed project. In response to comments received during the public review period, the Final EIR includes revisions to the approach for the constructions mass emissions analysis, among other things. In an effort to use the latest and most accurate emission estimation techniques available, adjustments have been made to the construction mass emissions analysis, as feasible.

The revisions in the Final EIR relevant to the updated construction analysis in the EIS are summarized as follows.

- **Refined Paved Road Dust Emission Factors.** The paved road dust emission factors for automobiles and trucks were updated using California-specific and, where available, Los Angeles County-specific roadway silt loading data.

Recalculation Methodology

This section describes the updates to the air quality methodology based on the Final EIR revisions.

Criteria Pollutants

The 2016 EIR Appendix (attached) presents annual emissions of all build alternatives for construction in the odd-numbered tables in Table A1.1-33 through Table A1.1-79.

The EIS does not quantify the effect of the revisions made in the Final EIR on the emission inventories of the Draft EIR. Emissions would likely be lower than as presented in the Draft EIR given that, among other things, the paved road dust emission factors were lower in the Final EIR. Therefore, the presentation of emissions in the EIS is conservatively higher than what would likely occur.

2. Changes to Project Schedule

Construction

Since preparation of the EIR, the construction schedule for the proposed project has been delayed approximately four years. The EIR analysis assumed that construction would occur over an eight-year period from 2016 to 2023. As of February 2021, construction is anticipated to occur from 2021 to 2028. Table 1 presents the original and revised construction years.

Table 1. Revised Construction Schedule

Analysis	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
EIR	2016	2017	2018	2019	2020	2021	2022	2023
EIS	2021	2022	2023	2024	2025	2026	2027	2028

Besides the change in construction schedule, all other construction details (e.g., number and type of offroad equipment and onroad vehicles, days of construction per phase, intensity and frequency of construction activity) were assumed to be the same in the updated analysis as originally presented in the EIR.

Recalculation Methodology

This section describes the updates to the air methodology based on the changes to the project schedule.

Criteria Pollutants

Appendix to the 2016 EIR (attached) presents annual emissions of all build alternatives for construction in the odd-numbered tables in Table A1.1-33 through Table A1.1-79. Emissions from these tables were recalculated in the annual emission tables in the EIS as follows.

Due to the change in project schedule, criteria pollutant emissions from construction of the proposed project are generally lower than what was originally presented in the 2016 EIR Appendix. Year after year, technologies improve and environmental regulations strengthen. Accordingly, the engines and fuels that power offroad equipment and onroad vehicles are projected to become cleaner and more efficient in future years. Project construction equipment would be gradually replaced with newer equipment that meet the already adopted and future state and federal emission standards. Because the construction activity rates are the same as what was presented in the 2016 EIR Appendix and the emission factors of the offroad equipment and onroad vehicles are reduced, project emissions are also reduced.

Emissions were recalculated based on an "adjustment factor." The adjustment factor accounts for any change between a source's emission factor in the EIR analysis year and its emission factor in the updated analysis year. For example, if the VOC emission factor of a crawler crane was 1 gram per mile in 2016 and 0.75 gram per mile in 2020, the unweighted adjustment factor would be 75 percent (see below equation).

$$Adjustment\ factor = 100\% - [(EF_{original} - EF_{updated})/EF_{original}]$$

Next, the discrepancy between how adjustment factors are derived and how the emission totals were presented in the 2016 EIR Appendix was corrected for. The emission summary tables in the 2016 EIR Appendix (e.g., Table A1.1-51) present annual emissions by source (e.g., construction equipment on-site) instead of by equipment type (e.g., crawler crane). Because the adjustment factors were derived by equipment type per year, they had to be converted from equipment type per year to emission source per year using a weighted average formula. The emission source per year weighted total was calculated based on the emission source's activity rate (e.g., horsepower-hour per year) (see below calculation in Table 2). The activity rates used to create the weighted adjustment factors were based on the limited activity data available in 2016 EIR Appendix.

Table 2. Example Calculation of Weighted Adjustment Factor Based on Activity Rate

Construction equipment on-site in Year 1	Activity Rate (Horsepower-hour per year)	Percent of total Horsepower-hour per year	Pollutant (e.g., VOC)	
			Unweighted Adjustment Factor	Weighted Adjustment Factor
Crawler crane	5	17%	50%	8%
Excavator	10	33%	75%	25%
Motor grader	15	50%	100%	50%
Total	30			83%

Lastly, each source's original annual emissions estimate was multiplied by the weighted adjustment factor to determine the updated emissions estimate. For example, if construction equipment on-site emits 1 ton of VOC per year, and the weighted VOC adjustment factor for construction equipment on-site in the first year is 83 percent (see Table 2), then the updated emissions estimate for construction equipment on-site in the first year would be 0.83 ton of VOC per year. Once the weighted adjustment factor was calculated for all emission sources of the same year, the annual project total was summed for each pollutant. Additional details of the emission calculation approach (e.g., emission factor model, activity rate used for weighted adjustment factor) for each construction source category are provided below.

Construction Equipment On-Site

Off-road equipment would be used during all construction activities. The construction schedule sequence and off-road equipment activity data are the same as presented in the 2016 EIR Appendix.

In the original analysis, emission factors for VOC, NO_X, PM10, and PM2.5 from diesel-powered construction were generated by the CARB 2011 Inventory Model for In-Use Off-Road Equipment for an average equipment fleet in the SCAB. Because the 2011 Inventory Model did not calculate CO or SO_X emissions, per CARB's guidance, OFFROAD 2007 was used to calculate CO emissions, whereas SO_X emissions were calculated using brake specific fuel consumption (BSFC) from the 2011 Inventory Model and the sulfur content of diesel fuel. Emissions were generated based on equipment type, equipment power rating, and the corresponding annual equipment activity levels.

In the updated analysis, all criteria pollutant emission factors from diesel-powered construction were generated by OFFROAD2017, the emission factor model most recently approved by the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) (Buss pers. comm and CARB 2019a). The unweighted adjustment factors for each year and each pollutant were converted to weighted adjustment factors based on the horsepower-hour per year activity data of each type of equipment (see Table A1.1-11 and Table A1.1-13 of 2016 EIR Appendix). Adjustment factors were not calculated for certain pollutants that did not require them; for example, the fugitive dust emissions from this equipment activity are calculated separately based on disturbed acreage from grading, bulldozing, etc. Lastly, because OFFROAD2017 does not provide emission factors for DPM, the adjustment factor for PM10 exhaust was used as a proxy for the adjustment factor for DPM.

On-Road Vehicles On-Site

On-site vehicles would generate running and idling emissions. Heavy-duty diesel trucks, medium-duty trucks, light trucks, and construction worker vehicles would be used during all construction activities. The construction schedule sequence and on-road vehicle activity data are the same as presented in the 2016 EIR Appendix.

In the original analysis, VOC, NO_X, PM10, PM2.5, SO_X, and CO emission factors associated with fuel combustion were generated by the EMFAC2014 on-road mobile source emission factor model for truck and passenger vehicle fleets representative of the Los Angeles region. In addition to criteria pollutant exhaust emissions, these sources would also generate PM10 and PM2.5 emissions in the form of tire wear and brake wear. Emission factors for tire wear and brake wear were also generated by the EMFAC2014 model.

In the updated analysis, all criteria pollutant emission factors from fuel combustion, tire wear, and brake wear were generated by EMFAC2017 (v1.0.2), the emission factor model most recently approved by the U.S. Environmental Protection Agency (EPA) for use in California at the time this analysis was conducted (CARB 2019b). Running emission factors were calculated with a 5-mile per hour (mph) speed bin. While EMFAC2017 does not directly calculate idling emission factors for light-duty vehicles, it does provide a conservative methodology for indirectly calculating them. The running emission rates (gram per mile) from the 5-mph speed bin were multiplied by 2.5 (mph per hour) to produce the approximate idle emission rates in grams per hour (CARB 2018).

For idling emissions, the unweighted adjustment factors for each year and each pollutant were converted to weighted adjustment factors based on the idling hours per year activity data for each vehicle type. For running emissions, the unweighted adjustment factors were converted to weighted adjustment factors based on the annual vehicles miles traveled (VMT) data (see Table A1.1-17 and Table A1.1-19 of the 2016 EIR Appendix). Adjustment factors were not calculated for certain pollutants that did not require them; PM tire wear, brake wear, and fugitive dust emissions are unaffected by the difference in analysis years. Accordingly, the unweighted adjustment factor for these pollutants was set to 100 percent (i.e., no change). Lastly, because EMFAC2017 does not provide any emission factor for DPM, the adjustment factor for PM10 exhaust was used as a proxy for the adjustment factor for DPM.

To create one weighted adjustment factor for on-road vehicles on-site that represented both running and idling emissions, another weighted average formula was used. The annual VMT data for running emissions was converted to the same unit as idling emissions, hours per year. This conversion was done by multiplying the annual VMT by the average on-site travel speed of 15 mph (see Table A1.1-17 and Table A1.1-19 of the 2016 EIR Appendix).

On-Road Vehicles Off-Site

Off-site vehicles would generate running emissions. Heavy-duty diesel trucks, medium-duty trucks, light trucks, and construction worker vehicles would be used during all construction activities. The construction schedule sequence and on-road vehicle activity data are the same as presented in the 2016 EIR Appendix.

The original analysis methodology for on-road vehicles off-site was the same as discussed above for on-road vehicles on-site.

In the updated analysis, all criteria pollutant emission factors from fuel combustion, tire wear, and brake wear were generated by EMFAC2017. Emission factors were calculated with an aggregated speed bin. The unweighted adjustment factors were converted to weighted adjustment factors based on the annual VMT data (see Table A1.1-17 and Table A1.1-19 of 2016 EIR Appendix). Adjustment factors were not calculated for certain pollutants that did not require them; PM tire wear, brake wear, and fugitive dust emissions would not change based on the difference in analysis years. Accordingly, the unweighted adjustment factor for these pollutants was set to 100 percent (i.e., no change). Lastly, because EMFAC2017 does not provide any emission factor for DPM, the adjustment factor for PM10 exhaust was used as a proxy for the adjustment factor for DPM.

Fugitive Dust On-Site

In the original analysis, PM10 and PM2.5 fugitive dust emissions from construction activities, such as grading, bulldozing, material and debris loading and handling, and demolition dust, were generated using emission factors from EPA's AP-42 emission factor handbook and default parameters for soil and wind conditions from CalEEMod. PM10 and PM2.5 5 emissions from on- and off-site paved road dust were calculated using AP-42 emission factors. This original emission estimates for fugitive dust is consistent with U.S. EPA guidance and generally conservative, and therefore does not need to be updated. Accordingly, the weighted adjustment factor for this source was set to 100 percent (i.e., no change).[1]

3. Updated Regulatory Setting

Table A1-2 of the 2016 EIR Appendix summarizes the regulations that were incorporated into the unmitigated emission calculations for project construction. This table have been reproduced as Table 3 below for ease of reference for this discussion.

[1] See Section 1. *Final EIR Revisions*, which discusses the changes between the Draft EIR and the Final EIR with regards to the paved road dust emission factor and how this was applied to the emission inventory in the EIS.

Table 3. Regulations Incorporated into the Emission Calculations for Unmitigated Project Construction by Alternative

Source/Assumption	12th Street Alternative	10th Street Alternative	9th Street Alternative
Construction Equipment			
Emission Standards for Nonroad Diesel Engines – Tier 1, 2, 3, and 4 standards gradually phased in over all years due to normal equipment fleet turnover	X	X	X
California Diesel Fuel Regulations – ULSD fuel	X	X	X
On-Road Vehicles			
Heavy-Duty Diesel Truck Idling Regulation – Assumed 5 minutes idling per truck trip	X	X	X
Emission Standards for Onroad Trucks – Tiered standards gradually phased in over all years due to normal truck fleet turnover	X	X	X
California Diesel Fuel Regulations – ULSD fuel	X	X	X
GHG State Standards Addressing Vehicular Emissions (Pavley and Low Carbon Fuel Standard [LCFS])	X	X	X
Fugitive Dust			
SCAQMD Rule 403 Compliance – 61 percent reduction in fugitive dust due to 3 to 4 times per day watering interval and preparation of a Rule 403 dust control plan	X	X	X

Source: POLB 2016.

Notes:

1. ULSD = ultra-low sulfur diesel
2. The regulations listed in this table are further described in EIR Section 3.22, Regulatory Setting.

The EIR describes how the existing regulations applicable to off-road equipment, on-road vehicles, and fugitive dust generation associated with construction activities were incorporated into the unmitigated emissions through a combination of direct calculations and the use of CARB emission factors that account for the effects of the regulations on the equipment and on-road vehicle fleets.

Since preparation of the EIR, the regulatory Setting for the air quality analysis has evolved. All applicable regulations are summarized in Section 3.3.2, *Regulatory Setting.*

Recalculation Methodology

As footnoted in Table 3, some regulations applicable to the proposed project will be phased in over time, resulting in progressively lower emission factors for the project sources corresponding with them. As discussed in *2. Changes to Project Schedule*, the emission factors in the EIS were adjusted based on the latest approved modeling techniques (e.g., EMFAC2017, OFFROAD 2017) and the delayed project years. To the extent that these emission factor modeling programs take into consideration the regulations implemented since preparation of the 2016 EIR, these regulations are indirectly accounted for in the EIS analysis. However, no direct adjustments to the emissions, pollutant concentrations, and health risks were made to factor in the new regulatory setting, such as the GHG emission reduction targets in the 2017 CAAP Update. Therefore, the emissions presented in the EIS are conservatively higher than what would likely occur during the construction and years analyzed.

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Adjusted 2016 EIR Construction Emissions Inventory

Original Year to New Year	Source Category	Updated Emissions (ton/yr)										
		VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx
2016 to 2021	Construction Equipment On-Site	0.31	3.33	1.02	0.07	0.00	0.00	0.00	0.07	0.07	0.07	0.01
	On-Road Vehicles On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.05	0.42	0.10	0.00	0.00	0.00	0.10	0.10	0.00	0.00	0.00
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.00	0.00	0.00
	Year 1 Total	0.36	3.75	1.13	0.07	0.00	0.00	0.20	0.27	0.07	0.07	0.01
2017 to 2022	Construction Equipment On-Site	3.31	35.93	13.58	0.35	0.00	0.00	0.00	0.35	0.35	0.35	0.06
	On-Road Vehicles On-Site	0.00	0.19	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.48	4.92	1.58	0.00	0.10	0.40	1.30	1.80	0.50	0.00	0.04
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	1.70	1.70	0.50	0.00	0.00
	Year 2 Total	3.79	41.04	15.28	0.35	0.10	0.40	3.10	3.85	1.35	0.35	0.10
2018 to 2022	Construction Equipment On-Site	1.37	15.97	4.24	0.13	0.00	0.00	0.00	0.13	0.13	0.13	0.03
	On-Road Vehicles On-Site	0.00	0.19	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.43	4.64	2.14	0.00	0.10	0.60	1.60	2.30	0.70	0.00	0.05
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	1.70	1.70	0.50	0.00	0.00
	Year 3 Total	1.80	20.80	6.55	0.13	0.10	0.60	3.40	4.13	1.33	0.13	0.08
2019 to 2023	Construction Equipment On-Site	0.42	4.77	1.14	0.06	0.00	0.00	0.00	0.06	0.06	0.06	0.01
	On-Road Vehicles On-Site	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.13	1.34	0.80	0.00	0.00	0.20	0.70	0.90	0.30	0.00	0.02
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0.20	0.00	0.00
	Year 4 Total	0.55	6.18	2.00	0.06	0.00	0.20	1.40	1.66	0.56	0.06	0.03
2020 to 2024	Construction Equipment On-Site	0.68	7.11	2.00	0.06	0.00	0.00	0.00	0.06	0.06	0.06	0.02
	On-Road Vehicles On-Site	0.00	0.06	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.09	1.04	1.03	0.00	0.00	0.30	0.70	1.00	0.30	0.00	0.02
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0.20	0.00	0.00
	Year 5 Total	0.77	8.21	3.16	0.06	0.00	0.30	1.40	1.76	0.56	0.06	0.04
2021 to 2025	Construction Equipment On-Site	0.32	3.06	1.01	0.06	0.00	0.00	0.00	0.06	0.06	0.06	0.01
	On-Road Vehicles On-Site	0.00	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.16	1.94	1.08	0.00	0.00	0.30	0.90	1.20	0.40	0.00	0.02
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.80	0.20	0.00	0.00
	Year 6 Total	0.48	5.07	2.16	0.06	0.00	0.30	1.70	2.06	0.66	0.06	0.03
2022 to 2026	Construction Equipment On-Site	0.26	2.52	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	On-Road Vehicles On-Site	0.00	0.07	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.11	1.34	1.42	0.00	0.00	0.30	0.70	1.00	0.30	0.00	0.02
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0.20	0.00	0.00
	Year 7 Total	0.37	3.92	2.33	0.00	0.00	0.30	1.40	1.70	0.50	0.00	0.03
2023 to 2027	Construction Equipment On-Site	0.19	1.39	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles On-Site	0.00	0.09	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.17	1.12	1.23	0.00	0.00	0.20	0.40	0.60	0.20	0.00	0.02
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.10	0.00	0.00
	Year 8 Total	0.35	2.60	1.75	0.00	0.00	0.20	0.80	1.00	0.30	0.00	0.02

Original Year to New Year	Source Category	Original Emissions (ton/r)										
		VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx
2016 to 2021	Construction Equipment On-Site	0.40	3.80	1.50	0.10	0.00	0.00	0.00	0.10	0.10	0.10	0.01
	On-Road Vehicles On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.10	0.70	0.20	0.00	0.00	0.00	0.10	0.10	0.00	0.00	0.00
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.00	0.00	0.00
	Year 1 Total	0.50	4.50	1.70	0.10	0.00	0.00	0.20	0.30	0.10	0.10	0.01
2017 to 2022	Construction Equipment On-Site	4.20	40.10	19.70	0.50	0.00	0.00	0.00	0.50	0.50	0.50	0.06
	On-Road Vehicles On-Site	0.00	0.30	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	1.00	8.10	2.90	0.00	0.10	0.40	1.30	1.80	0.50	0.00	0.04
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	1.70	1.70	0.50	0.00	0.00
	Year 2 Total	5.20	48.50	22.80	0.50	0.10	0.40	3.10	4.10	1.60	0.50	0.10
2018 to 2022	Construction Equipment On-Site	1.80	17.40	6.60	0.20	0.00	0.00	0.00	0.20	0.20	0.20	0.03
	On-Road Vehicles On-Site	0.00	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	1.00	8.30	4.10	0.00	0.10	0.60	1.60	2.30	0.70	0.00	0.05
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	1.70	1.70	0.50	0.00	0.00
	Year 3 Total	2.80	26.00	11.00	0.30	0.10	0.60	3.40	4.30	1.40	0.30	0.08
2019 to 2023	Construction Equipment On-Site	0.60	5.50	2.00	0.10	0.00	0.00	0.00	0.10	0.10	0.10	0.01
	On-Road Vehicles On-Site	0.00	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.40	3.00	1.70	0.00	0.00	0.20	0.70	0.90	0.30	0.00	0.02
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0.20	0.00	0.00
	Year 4 Total	0.90	8.60	3.80	0.10	0.00	0.20	1.40	1.70	0.50	0.10	0.03
2020 to 2024	Construction Equipment On-Site	0.90	7.90	3.60	0.10	0.00	0.00	0.00	0.10	0.10	0.10	0.02
	On-Road Vehicles On-Site	0.00	0.10	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.30	2.40	2.10	0.00	0.00	0.30	0.70	1.00	0.30	0.00	0.02
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0.20	0.00	0.00
	Year 5 Total	1.20	10.50	5.80	0.20	0.00	0.30	1.40	1.80	0.60	0.20	0.04
2021 to 2025	Construction Equipment On-Site	0.40	3.40	1.70	0.10	0.00	0.00	0.00	0.10	0.10	0.10	0.01
	On-Road Vehicles On-Site	0.00	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.40	3.50	1.90	0.00	0.00	0.30	0.90	1.20	0.40	0.00	0.02
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.80	0.20	0.00	0.00
	Year 6 Total	0.80	7.00	3.70	0.10	0.00	0.30	1.70	2.10	0.60	0.10	0.03
2022 to 2026	Construction Equipment On-Site	0.30	2.60	1.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	On-Road Vehicles On-Site	0.00	0.10	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.30	2.50	2.20	0.00	0.00	0.30	0.70	1.10	0.30	0.00	0.02
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0.20	0.00	0.00
	Year 7 Total	0.60	5.20	3.50	0.10	0.00	0.30	1.40	1.80	0.50	0.10	0.03
2023 to 2027	Construction Equipment On-Site	0.20	1.40	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles On-Site	0.00	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Vehicles Off-Site	0.20	1.20	1.40	0.00	0.00	0.20	0.40	0.60	0.20	0.00	0.02
	Fugitive Dust On-Site	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.10	0.00	0.00
	Year 8 Total	0.30	2.70	2.10	0.00	0.00	0.20	0.80	1.10	0.30	0.00	0.02

Original Year to New Year	Source Category	Weighted Adjustment Factors										
		VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx
2016 to 2021	Construction Equipment On-Site	77%	88%	68%	68%	0%	0%	100%		68%	68%	100%
	On-Road Vehicles On-Site	50%	62%	56%	87%	100%	100%	100%		100%	87%	92%
	On-Road Vehicles Off-Site	46%	60%	52%	88%	100%	100%	100%		100%	88%	91%
	Fugitive Dust On-Site	100%	100%	100%	100%	100%	100%	100%		100%	100%	100%
	Year 1 Total											
2017 to 2022	Construction Equipment On-Site	79%	90%	69%	69%	0%	0%	100%		69%	69%	100%
	On-Road Vehicles On-Site	49%	63%	57%	84%	100%	100%	100%		100%	84%	92%
	On-Road Vehicles Off-Site	48%	61%	54%	80%	100%	100%	100%		100%	80%	91%
	Fugitive Dust On-Site	100%	100%	100%	100%	100%	100%	100%		100%	100%	100%
	Year 2 Total											
2018 to 2022	Construction Equipment On-Site	76%	92%	64%	64%	0%	0%	100%		64%	64%	100%
	On-Road Vehicles On-Site	47%	63%	58%	73%	100%	100%	100%		100%	73%	92%
	On-Road Vehicles Off-Site	43%	56%	52%	68%	100%	100%	100%		100%	68%	91%
	Fugitive Dust On-Site	100%	100%	100%	100%	100%	100%	100%		100%	100%	100%
	Year 3 Total											
2019 to 2023	Construction Equipment On-Site	71%	87%	57%	56%	0%	0%	100%		56%	56%	100%
	On-Road Vehicles On-Site	46%	63%	59%	69%	100%	100%	100%		100%	69%	91%
	On-Road Vehicles Off-Site	32%	45%	47%	49%	100%	100%	100%		100%	49%	90%
	Fugitive Dust On-Site	100%	100%	100%	100%	100%	100%	100%		100%	100%	100%
	Year 4 Total											
2020 to 2024	Construction Equipment On-Site	76%	90%	56%	56%	0%	0%	100%		56%	56%	100%
	On-Road Vehicles On-Site	42%	61%	63%	60%	100%	100%	100%		100%	60%	91%
	On-Road Vehicles Off-Site	30%	43%	49%	44%	100%	100%	100%		100%	44%	90%
	Fugitive Dust On-Site	100%	100%	100%	100%	100%	100%	100%		100%	100%	100%
	Year 5 Total											
2021 to 2025	Construction Equipment On-Site	80%	90%	60%	59%	0%	0%	100%		59%	59%	100%
	On-Road Vehicles On-Site	49%	69%	65%	70%	100%	100%	100%		100%	70%	90%
	On-Road Vehicles Off-Site	39%	55%	57%	58%	100%	100%	100%		100%	58%	90%
	Fugitive Dust On-Site	100%	100%	100%	100%	100%	100%	100%		100%	100%	100%
	Year 6 Total											
2022 to 2026	Construction Equipment On-Site	88%	97%	69%	68%	0%	0%	100%		68%	68%	100%
	On-Road Vehicles On-Site	47%	70%	72%	65%	100%	100%	100%		100%	65%	90%
	On-Road Vehicles Off-Site	36%	54%	65%	52%	100%	100%	100%		100%	52%	90%
	Fugitive Dust On-Site	100%	100%	100%	100%	100%	100%	100%		100%	100%	100%
	Year 7 Total											
2023 to 2027	Construction Equipment On-Site	93%	99%	73%	71%	0%	0%	100%		71%	71%	100%
	On-Road Vehicles On-Site	76%	88%	81%	89%	100%	100%	100%		100%	89%	91%
	On-Road Vehicles Off-Site	84%	93%	88%	95%	100%	100%	100%		100%	95%	92%
	Fugitive Dust On-Site	100%	100%	100%	100%	100%	100%	100%		100%	100%	100%
	Year 8 Total											

2016 EIR Construction Emissions Analysis Appendix

Criteria Pollutant and Greenhouse Gas Emission Calculations

(as prepared for the Port of Long Beach 2016 Pier B Draft EIR)

APPENDIX A1
CRITERIA POLLUTANT AND GHG EMISSION CALCULATIONS

A1.1 INTRODUCTION

This appendix describes the methods and assumptions used to estimate criteria pollutant and greenhouse gas (GHG) emissions generated from construction and operation of the Pier B On-Dock Rail Support Facility Project. Section 2 defines the pollutants, analysis years, emission sources, and geographical boundaries included in the emission calculations. Section 3 describes the methodology for the construction emission calculations. Section 4 describes the methodology for the operational emission calculations.

Detailed source activity and emission calculation tables are included as attachments at the end of this appendix. The tables have been organized under two major subheadings, Construction and Operation, and they include criteria pollutants and GHGs. All of the Project alternatives and California Environmental Quality Act (CEQA) baseline are represented in the tables. The attachments to Appendix A1 are:

- Attachment A1.1 – Construction Activity, Emission Factors, and Emission Calculation Tables
- Attachment A1.2 – Operational Activity, Emission Factors, and Emission Calculation Tables

Each attachment includes a table of contents that lists the title of each table presented in the attachment.

Air pollutant emissions from the proposed construction and operational activities were calculated using the most current emission factors and methods available at the time the calculations were performed. Emissions were then compared to the thresholds identified in Sections 3.2.3.1 and 3.14.3.1 of the Environmental Impact Report (EIR) to determine their significance. For impacts that would exceed a significance criterion, mitigation measures, where feasible, were applied to Project activities to determine their ability to reduce impacts to below the level of significance.

A1.2 EMISSION PARAMETERS

Pollutants

The air quality analysis quantified emissions of the following "criteria pollutants": volatile organic compounds (VOC)[1], carbon monoxide (CO), nitrogen oxides (NO_X), particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), and sulfur oxides (SO_X). Emissions of diesel particulate matter (DPM), a subset of PM_{10}, were also quantified because DPM is a dominant toxic air contaminant in the health risk assessment conducted for this EIR. Some of the emission factors in the tables of this appendix are expressed as hydrocarbons (HC) instead of VOC. HC emissions were converted to VOC using conversion factors published by the United States (U.S.) Environmental Protection Agency (EPA) (EPA, 2008; EPA, 2010).

The air quality analysis also quantified emissions of the following GHGs: carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4), which are generally combustion products; and two types of hydrofluorocarbons (R-404a and HFC-134a), which in this analysis were assumed to be associated with normal refrigerant leakage from onsite rail transport refrigeration units (TRU). GHG have varying amounts of global warming potential (GWP). The GWP is the

[1] VOC is a precursor to the criteria pollutant, ozone.

ability of a gas or aerosol to trap heat in the atmosphere. By convention, CO_2 is assigned a GWP of 1. In comparison, CH_4, for example, has a GWP of 25, which means that it has a global warming effect 25 times greater than CO_2 on an equal-mass basis. To account for their GWP, GHG emissions are reported in the emission tables as carbon dioxide equivalent (CO_2e). CO_2e was calculated by multiplying each GHG emission by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs. The GWPs shown in Table A1-1 were used in the emission calculations.

TABLE A1-1.
GHG GLOBAL WARMING POTENTIALS

Pollutant	Global Warming Potential
CO_2	1
N_2O	298
CH_4	25
R-404a	3,922
HFC-134a	1,430

Note: The GWPs used in this analysis are from the Intergovernmental Panel on Climate Change (IPCC) *Fourth Assessment Report* (AR4) (IPCC, 2007). More recent GWPs exist, but the AR4 values are used by international convention and in mandatory and voluntary reporting programs in the U.S.

Source: TCR, 2015.

Averaging Times

For criteria pollutants, peak daily (24-hour) emissions were calculated for comparison against the South Coast Air Quality Management District (SCAQMD) daily significance thresholds (SCAQMD, 2015), as demonstrated in Impacts AQ-1 and AQ-3 of Section 3.2 of the EIR. Annual, peak 8-hour (for CO) and peak 1-hour criteria pollutant emissions were calculated to support the dispersion modeling analysis discussed in Impacts AQ-2 and AQ-4 of Section 3.2. Annual and peak 1-hour emissions of VOC and PM_{10} were also used in the Health Risk Assessment (HRA), as discussed in Impact AQ-6 of Section 3.2.

For GHG, annual operational emissions were calculated for comparison against the SCAQMD CO_2e annualized significant emissions threshold for industrial projects (SCAQMD, 2015). Section 3.14.3.1 of this EIR provides the rationale for the Port's use of this threshold. Per SCAQMD guidance (SCAQMD, 2008), total construction emissions were amortized over a 30-year period and added to annual operational emissions to address their contribution over the lifetime of the Project.

Analysis Years

Project construction emissions were based on detailed estimates of equipment and manpower usage across a projected set of construction activities. The following construction durations were used in accordance with the proposed Project construction schedule:

- Construction Years 1 through 4 correspond to Phases 1 and 2 of construction, which are common to all of the build alternatives. These phases would build the rail yard to the 9th

Street configuration and represent an intermediate configuration for the proposed Project and 10th Street Alternative, and the final configuration for the 9th Street Alternative.

- Construction Years 5 through 8 correspond to Phase 3 of construction, which is applicable only to the proposed Project and 10th Street Alternative. This phase would build the rail yard to its final 12th Street or 10th Street configuration. This phase has slightly different activities and emissions for the proposed Project and 10th Street Alternative.

The exact dates of construction are not currently certain. For the purposes of the emission calculations, Construction Years 1 through 4 were assumed to be 2016 through 2019, and Construction Years 5 through 8 were assumed to be 2020 through 2023. Should construction be delayed beyond these assumed dates, the emissions would be lower due to the gradual replacement of older construction equipment with newer equipment meeting the already adopted future State and federal off-road engine emission standards.

Operational emissions for the proposed Project and alternatives were estimated for future development milestone years of:

- 2020 – Represents an intermediate physical configuration for the proposed Project and 10th Street Alternative (temporarily built to the 9th Street configuration), and the final physical configuration and operation at full capacity for the 9th Street Alternative.
- 2025 – Represents the final physical configuration for the proposed Project (although not yet operating at full capacity), the final physical configuration and operation at full capacity for the 10th Street Alternative, and continued operation at full capacity for the 9th Street Alternative.
- 2035 – Represents operation at full capacity for the proposed Project, and continued operation at full capacity for the 10th and 9th Street alternatives.

The No Project Alternative, which is assumed to continue operating at the same activity level as the CEQA baseline, was also evaluated for the 2020, 2025, and 2035 analysis years.

In addition, operational emissions for the proposed Project and build alternatives were also evaluated for year 2017, the first full calendar year of construction. In this year, the Pier B Rail Yard was assumed to operate in its pre-expanded state, with the same throughput as the CEQA Baseline, while Phase 1 and 2 construction would occur concurrently[2]. The overlapping construction and operational emissions were used in the combined construction plus operational emissions analysis as part of construction Impact AQ-1 in Chapter 3.2 of the EIR. To be conservative, the operational emissions from year 2017 were used because they would occur near the beginning of the construction period when emission factors are the highest.

Any unforeseen delay in the milestone years described above would result in lower emissions due to the gradual replacement of older locomotives, vehicles, and equipment with newer, cleaner equipment that meets the already adopted future State and federal engine emission standards.

[2] For the purpose of quantifying impacts, the air quality study evaluated only those trains that originate or depart from the Pier B rail yard. From that perspective, the Pier B rail yard was considered to be operating at capacity in the baseline year of 2012 and therefore was assumed to continue operating at that same level (i.e., no growth) under future No Project conditions. By contrast, the ground transportation study (Section 3.5 of the EIR) evaluated on-road traffic on a port-wide basis and, as a result, assumed some growth in traffic under future No Project conditions.

As described in greater detail in the Project Description, Section 1.4.2 of the EIR, the CEQA baseline year is 2012. However, since 2012, the line haul locomotive fleet serving the Pier B Rail Yard has gradually become cleaner due to the normal retirement of older, more emissive locomotives and their replacement with newer, less emissive locomotives in the national fleet. Similarly, emission factors for other diesel yard equipment have also generally declined since 2012. To account for this reduction in emission factors since 2012, the baseline emissions were calculated using 2012 activity levels and 2014 emission factors (2014 being the most recent complete year at the time the emission calculations were performed). This adjustment to the baseline emissions is conservative because it results in lower baseline emissions, which in turn results in higher incremental emissions and ambient pollutant concentrations for the proposed Project and alternatives.

Emission Sources

Criteria pollutant and GHG emission sources associated with Project construction activities would include off-road construction equipment, on-road vehicles, and asphalt paving activities. Earth-disturbance activities, such as grading, bulldozing, material handling, and driving over paved and unpaved surfaces, would also generate particulate matter (PM) emissions in the form of fugitive dust.

Criteria pollutant and GHG emission sources associated with Project operation would include switch locomotives, line haul locomotives, yard equipment, and on-road vehicles. Yard equipment includes rail yard maintenance equipment, railcar repair equipment (only for the build alternatives because railcar repair does not occur at the existing yard), and transport refrigeration units (TRU) on railcars while stored in the yard. Road dust emissions from on-road vehicles driving over paved surfaces would also generate PM emissions in the form of fugitive dust. Electricity consumption from yard lighting and onsite buildings at the Pier B Rail Yard would also represent an indirect source of GHG emissions. The emission calculation approach for each source category is described in Sections 3 and 4 of this appendix.

Geographical Boundaries

Criteria pollutant construction and operational emissions were calculated within the South Coast Air Basin (SCAB) to align with the SCAQMD daily emission significance thresholds. For CEQA purposes, GHG emissions were calculated within California borders. For informational purposes only, Project-related GHG emissions outside California borders were also calculated, based on the Port's Out-Of-Basin GHG Emissions Methodology (POLB, 2009). The emissions outside California are associated with Project-generated train trips.

A1.3 METHODOLOGY FOR CONSTRUCTION EMISSION CALCULATIONS

To estimate peak daily construction emissions, emissions were first calculated for the individual construction activities and then summed for overlapping construction activities, per the proposed construction schedule. The combination of construction activities producing the highest daily emissions was then selected as the peak day and compared to the SCAQMD emission thresholds for construction.

The start year of each construction activity was conservatively used to select emission factors for that construction activity. For example, for a construction activity that begins in Construction Year 3 and continues through Year 4, emission factors corresponding to Year 3 were used throughout the life of that construction activity. This represents a conservative assumption because emission factors generally decline in future years as older equipment is replaced with newer, cleaner equipment that meets the already adopted future State and federal off-road engine emission standards. The specific emission calculation approach for each construction source category is described below.

Off-Road Construction Equipment. Off-road equipment would be used during all construction activities. The construction schedule and off-road equipment activity data were provided by the Port.

Emission factors for VOC, NO_X, PM_{10}, and $PM_{2.5}$ from diesel-powered construction equipment were generated by the CARB 2011 Inventory Model for In-Use Off-Road Equipment (CARB, 2012a) for an average equipment fleet in the SCAB. Because the 2011 Inventory Model does not calculate CO or SO_X emissions, per CARB's guidance, OFFROAD 2007 (CARB, 2006) was used to calculate CO emissions, whereas SO_X emissions were calculated using brake specific fuel consumption (BSFC) from the 2011 Inventory Model and the sulfur content of diesel fuel. Emissions were generated based on equipment type, equipment power rating, and the corresponding peak daily and annual equipment activity levels provided by the Port.

VOC evaporative emissions associated with hot asphalt paving were calculated using default emission factors from the California Air Pollution Control Officers Association (CAPCOA) California Emissions Estimator Model (CalEEMod) (CAPCOA, 2013).

GHG emissions associated with off-road construction equipment were calculated based on methodologies provided in The Climate Registry (TCR) – General Reporting Protocol 2.0 (TCR, 2013). The parameters involved in the emission calculations included equipment type, equipment power rating, BSFC generated by 2011 Inventory Model for In-Use Off-Road Equipment, diesel fuel density, and emission factors from the *2015 Climate Registry Default Emission Factors* (TCR, 2015). TCR emission factors for transportation fuels were used to generate CO_2 emissions; TCR emission factors for highway vehicles were used to generate CH_4 and N_2O emission factors.

On-Road Vehicles. Heavy-duty diesel trucks, medium-duty trucks, light trucks, and construction worker vehicles would be used during construction activities. The construction schedule and on-road vehicle activity data were provided by the Port.

VOC, NO_X, PM_{10}, $PM_{2.5}$, SO_X, and CO emission factors associated with fuel combustion were generated by the EMFAC2014 on-road mobile source emission factor model for truck and passenger vehicle fleets representative of the Los Angeles region (CARB, 2015). In addition to criteria pollutant exhaust emissions, these sources would also generate PM_{10} and $PM_{2.5}$ emissions in the form of tire wear and brake wear. Emission factors for tire wear and brake wear were also generated by the EMFAC2014 model.

For GHG emission calculations, CO_2 and CH_4 emission factors were generated by EMFAC2014. Emission factors for N_2O are not calculated by EMFAC2014; they were obtained from the *2015 Climate Registry Default Emission Factors* (TCR, 2015).

Fugitive Dust. PM_{10} and $PM_{2.5}$ fugitive dust emissions from construction activities, such as grading, bulldozing, material and debris loading and handling, and demolition dust, were generated using emission factors from EPA's AP-42 emission factor handbook (EPA, 1995) and default parameters for soil and wind conditions from CalEEMod. PM_{10} and $PM_{2.5}$ emissions from on- and off-site paved road dust were calculated using AP-42 emission factors (EPA, 2011).

Quantified Regulations for Construction

Table A1-2 identifies the regulations that were incorporated into the unmitigated emission calculations for Project construction. These regulations are further described in Section 3.2.2, Regulatory Setting, of the EIR.

**TABLE A1-2.
REGULATIONS INCORPORATED INTO THE EMISSION CALCULATIONS
FOR UNMITIGATED PROJECT CONSTRUCTION**

Source/Assumption	Project Alternative		
	12th Street Alternative (Proposed Project)	10th Street Alternative	9th Street Alternative
Construction Equipment			
Emission Standards for Nonroad Diesel Engines – Tier 1, 2, 3, and 4 standards gradually phased in over all years due to normal equipment fleet turnover	X	X	X
California Diesel Fuel Regulations – ULSD fuel	X	X	X
On-Road Vehicles			
Heavy-Duty Diesel Truck Idling Regulation – Assumed 5 minutes idling per truck trip	X	X	X
Emission Standards for Onroad Trucks – Tiered standards gradually phased in over all years due to normal truck fleet turnover	X	X	X
California Diesel Fuel Regulations – ULSD fuel	X	X	X
GHG State Standards Addressing Vehicular Emissions (Pavley and Low Carbon Fuel Standard [LCFS])	X	X	X
Fugitive Dust			
SCAQMD Rule 403 Compliance – 61 percent reduction in fugitive dust due to 3 to 4 times per day watering interval and preparation of a Rule 403 dust control plan	X	X	X

Notes:
1. ULSD = ultra low sulfur diesel
2. The regulations listed in this table are further described in EIR Section 3.22, Regulatory Setting.

Quantified Mitigation Measures for Construction

Impact AQ-1 in Section 3.2 of the EIR identifies five mitigation measures to reduce project construction emissions. The following three measures were quantified in the mitigated emission calculations for the proposed Project and 10th Street and 9th Street alternatives. The remaining mitigation measures were assessed qualitatively in the EIR.

Mitigation Measure AQ-1: On-Road Construction Trucks. All on-road heavy-duty trucks with a fifth-wheel tractor/trailer and a gross vehicle weighting (GVWR) of 19,500 pounds or more transporting materials to and from the construction site shall meet EPA 2010 on-road heavy-duty diesel engine emission standards.

Mitigation Measure AQ-2: **Tier 4 Construction Equipment.** All self-propelled, diesel-fueled off-road construction equipment 25 horsepower (hp) or greater shall meet EPA/CARB Tier 4 off-road engine emission standards.

Mitigation Measure AQ-4: Increased Watering Frequency for Fugitive Dust Control. Construction site watering, which would be required by SCAQMD Rule 403, shall be increased such that the watering interval is no greater than 2.1 hours. This measure would increase the fugitive dust emissions control from 61 to 74 percent (WGA, 2006).

A1.5 REFERENCES

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Attachment A1.1
Construction Activity and Emission Calculation Tables

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Table A1.1-1
Construction Equipment Characteristics

Type of Equipment	HP	OFFROAD2011 Load Factor
Air Compressor (Trailer-Mounted)	65	0.415
Asphalt distributor truck	362	0.355
Asphalt Paver	224	0.415
Asphalt Reclaimer	575	0.355
Backhoe (Large crawler-type)	413	0.369
Backhoe (Small, rubber-tired)	101	0.369
Ballast Compactor	185	0.415
Ballast Regulator	185	0.415
Boom truck (flatbed semi)	330	0.382
Boom trucks	325	0.382
Bucket Truck (Electrical)	330	0.382
Bulldozer	252	0.395
Compaction machinery	156	0.415
Concrete pumper truck	345	0.382
Crawler crane	340	0.536
Crawler Loader	205	0.369
Drum Roller	33	0.375
Dump truck	330	0.382
Electric Flash-Butt Welder	190	0.415
End dump truck	330	0.382
Excavator	413	0.382
Flatbed truck	330	0.382
Haul truck	330	0.382
Loader	286	0.362
Motor Grader	199	0.409
Pavement breaker	101	0.415
Pavement Sweeper	75	0.456
Pile driver	340	0.415
Production Tamper	240	0.415
Rubber-Tired Loader (Large)	330	0.362
Rubber-Tired Loader (Small)	124	0.362
Scraper	359	0.482
Sheepsfoot Roller	156	0.375
Speed Swing	139	0.415
Truck Mounted Welder	190	0.415
Truck-mounted crane	130	0.536
Utility truck	360	0.382
Vibration roller	156	0.375
Welding truck	330	0.382
Water truck	330	0.382

Notes:

1. Equipment and hp provided by POLB Engineering Consultant, HDR.
2. Load factors provided by OFFROAD2011.

Table A1.1-2
Construction Schedule - Phases 1 and 2, Common to All Build Alternatives

		Construction activity	Est. Duration, work days	2016			2017												2018												2019											
		9TH STREET ALTERNATIVE - DWG NO. CS-1		O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
PHASE 1	A.	Property acquisition and Demolition	189																																							
	B.	Shift Toyota operations to new lease perimeter	105																																							
	C.	Remove and Relocate utilities in Pier B Street and Pico corridor	252																																							
	D.	Remove & relocate utilities in proj. footprint to new utility corridors	252																																							
	E.	Relocate LA-04 pump station	378																																							
	F.	Reconstruct Pier B Street on new alignment	315																																							
	G.	Reconstruct Anaheim Way on new alignment	126																																							
	H.	Reconstruct Pico Avenue on new alignment	315																																							
	J.	Close 9th Street at-grade crossing	126																																							
		TOTAL PHASE 1	**761**																																							
PHASE 2		**9TH STREET ALTERNATIVE - DWG NO. CS-2**																																								
	A.	Property Acquisition and Demolition	189																																							
	B.	Remove and relocate utilities in yard expansion area	378																																							
	C.	Construct crash walls under Terminal Island Freeway	126																																							
	D.	Construct new tracks north and west of existing yard	378																																							
	E.	Remove and re-construct existing tracks in south yard	252																																							
	F.	Remove/reconstruct existing tracks and construct add'l 2 tracks along Pico corridor	189																																							
	G.	Cut over service from existing yard onto new tracks	126																																							
	H.	Construct new yard support facilities	252																																							
		TOTAL PHASE 2	**761**																																							

Table A1.1-3
Construction Schedule - Phase 3, 10th Street Alternative

		Construction activity	Est. Duration, work days	2020												2021												2022												2023											
		10TH STREET W/OUT GRADE SEPARATION ALTERNATIVE - DWG NO. CS-8		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
PHASE 3	A.	Property acquisition and Demolition	189																																																
	B.	Vacate 9th Street and other streets (north-south streets) within project footprint	252																																																
	C.	Remove Shoemaker Ramps	126																																																
	D.	Remove and Relocate utilities in yard expansion area	378																																																
	E.	Construct new 11th Street/Canal Avenue street connection	126																																																
	F.	Widen Dominguez Channel Bridge	252																																																
	G.	Construct new tracks north and west of 9th Street Yard area	252																																																
	H.	Construct west yard locomotive layover/fueling facility	126																																																
		TOTAL PHASE 3	**1461**																																																

Table A1.1-4
Construction Schedule - Phase 3, 12th Street Alternative

		Construction activity	Est. Duration, work days	2020												2021												2022												2023											
		12TH STREET ALTERNATIVE - DWG NO. CS-11		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
PHASE 3	A.	Property acquisition and Demolition	189																																																
	B.	Vacate existing 9th St. and other streets (N-S streets) within project footprint	252																																																
	C.	Remove Shoemaker Ramps	126																																																
	D.	Remove and Relocate utilities in yard expansion area	504																																																
	E.	Construct north yard perimeter road	189																																																
	F.	Construct Tie-back retaining wall along Pico/I-710	189																																																
	G.	Widen Dominguez Channel Bridge	252																																																
	H.	Construct new tracks north and west of 9th Street Yard area	378																																																
	I.	Remove/reconstruct existing tracks and construct additional tracks in Pico corridor	252																																																
	J.	Construct west yard locomotive layover/fueling facility	126																																																
		TOTAL PHASE 3	**1461**																																																

Table A1.1-5
Construction Equipment - Activity by Phase - Phases 1 and 2, Common to All Build Alternatives

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
1A.	**Property acquisition and Demolition**	**156**																														
	Air compressor (trailer-mounted)	189	122	65	10	0.4154	122	8	8	8	108	976	976	650	5,200	5,200	5,200	70,489	634,400	634,400												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	189	15	575	1	0.3551	15	8	8	8	13	120	120	575	4,600	4,600	4,600	7,667	69,000	69,000												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	189	122	101	7	0.3685	122	8	8	8	108	976	976	657	5,252	5,252	5,252	71,194	640,744	640,744												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	189	122	252	7	0.3953	122	8	8	8	108	976	976	1,764	14,112	14,112	14,112	191,296	1,721,664	1,721,664												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	189	30	330	5	0.3819	30	8	8	8	27	240	240	1,650	13,200	13,200	13,200	44,000	396,000	396,000												
	Excavator	189	105	413	7	0.3819	105	8	8	8	93	840	840	2,685	21,476	21,476	21,476	250,553	2,254,980	2,254,980												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	189	30	101	1	0.4154	30	8	8	8	27	240	240	101	808	808	808	2,693	24,240	24,240												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	189	122	286	6	0.3618	122	8	8	8	108	976	976	1,573	12,584	12,584	12,584	170,583	1,535,248	1,535,248												
	Rubber-Tired Loader (Small)	189	122	124	6	0.3618	122	8	8	8	108	976	976	682	5,456	5,456	5,456	73,959	665,632	665,632												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	189	4	130	1	0.5360	4	8	8	8	4	32	32	130	1,040	1,040	1,040	462	4,160	4,160												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	777	777	330	2	0.3819	777	8	8	8	168	6,216	6,216	660	5,280	5,280	5,280	110,880	4,102,560	4,102,560												
	Asphalt Paving	0	0																													
	Demolition	189	34																				252	67								
	Debris Loading	189	9																						406	397						
	Grading VMT																															
	Bulldozing	189	122																										108	8		
	Truck Loading	189	15																												3,527	240
1B.	**Shift Toyota operations to new lease perimeter**	**64**																														
	Air compressor (trailer-mounted)	0	0	65	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	105	15	575	1	0.3551	15	8	8	8	24	120	120	575	4,600	4,600	4,600	13,800	69,000	69,000												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	105	44	101	1	0.3685	44	8	8	8	70	352	352	101	808	808	808	7,110	35,552	35,552												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	105	10	252	1	0.3953	10	8	8	8	16	80	80	252	2,016	2,016	2,016	4,032	20,160	20,160												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	105	10	330	5	0.3819	10	8	8	8	16	80	80	1,650	13,200	13,200	13,200	26,400	132,000	132,000												
	Excavator	105	10	413	0	0.3819	10	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	105	10	101	1	0.4154	10	8	8	8	16	80	80	101	808	808	808	1,616	8,080	8,080												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	105	10	286	1	0.3618	10	8	8	8	16	80	80	286	2,288	2,288	2,288	4,576	22,880	22,880												
	Rubber-Tired Loader (Small)	0	0	124	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	105	10	130	1	0.5360	10	8	8	8	16	80	80	130	1,040	1,040	1,040	2,080	10,400	10,400												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0																													
	Asphalt Paving	0	0																													
	Demolition	105	64																				0	0								
	Debris Loading	105	1																						90	397						
	Grading VMT																															
	Bulldozing	105	10																										16	8		
	Truck Loading		0																													

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-5
Construction Equipment - Activity by Phase - Phases 1 and 2, Common to All Build Alternatives

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
1C.	**Remove and Relocate utilities in Pier B Street and Pico corridor**	**252**																														
	Air compressor (trailer-mounted)	252	280	65	20	0.4154	280	8	8	8	187	2,240	2,240	1,300	10,400	10,400	10,400	242,667	2,912,000	2,912,000												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	575	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	252	280	101	6	0.3685	280	8	8	8	187	2,240	2,240	556	4,444	4,444	4,444	103,693	1,244,320	1,244,320												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	252	280	252	6	0.3953	280	8	8	8	187	2,240	2,240	1,512	12,096	12,096	12,096	282,240	3,386,880	3,386,880												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	330	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	252	280	413	6	0.3819	280	8	8	8	187	2,240	2,240	2,272	18,172	18,172	18,172	424,013	5,088,160	5,088,160												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	101	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	252	280	286	5	0.3618	280	8	8	8	187	2,240	2,240	1,430	11,440	11,440	11,440	266,933	3,203,200	3,203,200												
	Rubber-Tired Loader (Small)	252	280	124	5	0.3618	280	8	8	8	187	2,240	2,240	620	4,960	4,960	4,960	115,733	1,388,800	1,388,800												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	130	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	252	9																						311	397						
	Grading VMT																															
	Bulldozing	252	280																										187	8		
	Truck Loading	252	74																												13,366	180
1D.	**Remove & relocate utilities in proj. footprint to new utility corridors**	**55**																														
	Air compressor (trailer-mounted)	252	55	65	20	0.4154	55	8	8	8	37	440	440	1,300	10,400	10,400	10,400	47,667	572,000	572,000												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	575	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	252	55	101	6	0.3685	55	8	8	8	37	440	440	556	4,444	4,444	4,444	20,368	244,420	244,420												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	252	55	252	6	0.3953	55	8	8	8	37	440	440	1,512	12,096	12,096	12,096	55,440	665,280	665,280												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	330	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	252	27	413	6	0.3819	27	8	8	8	18	216	216	2,272	18,172	18,172	18,172	40,887	490,644	490,644												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	101	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	252	55	286	5	0.3618	55	8	8	8	37	440	440	1,430	11,440	11,440	11,440	52,433	629,200	629,200												
	Rubber-Tired Loader (Small)	252	55	124	5	0.3618	55	8	8	8	37	440	440	620	4,960	4,960	4,960	22,733	272,800	272,800												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	130	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	252	2																						75	397						
	Grading VMT																															
	Bulldozing	252	55																										37	8		
	Truck Loading	252	11																												2,011	191

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-5
Construction Equipment - Activity by Phase - Phases 1 and 2, Common to All Build Alternatives

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
1E.	**Relocate LA-04 pump station**	320																														
	Air compressor (trailer-mounted)	0	0	65	10	0.4154	0	8	8	8	0	0	0	650	5,200	5,200	5,200	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	575	1	0.3551	0	8	8	8	0	0	0	575	4,600	4,600	4,600	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	101	7	0.3685	0	8	8	8	0	0	0	657	5,252	5,252	5,252	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	7	0.3953	0	8	8	8	0	0	0	1,764	14,112	14,112	14,112	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	330	5	0.3819	0	8	8	8	0	0	0	1,650	13,200	13,200	13,200	0	0	0												
	Excavator	0	0	413	7	0.3819	0	8	8	8	0	0	0	2,685	21,476	21,476	21,476	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	101	1	0.4154	0	8	8	8	0	0	0	101	808	808	808	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	286	6	0.3618	0	8	8	8	0	0	0	1,573	12,584	12,584	12,584	0	0	0												
	Rubber-Tired Loader (Small)	0	0	124	6	0.3618	0	8	8	8	0	0	0	682	5,456	5,456	5,456	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	130	1	0.5360	0	8	8	8	0	0	0	130	1,040	1,040	1,040	0	0	0												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	378	34																				0	0								
	Debris Loading		0																													
	Grading VMT																															
	Bulldozing																															
	Truck Loading		0																													
1F.	**Reconstruct Pier B Street on new alignment**	110																														
	Air compressor (trailer-mounted)	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	315	24	362	1	0.3551	24	2	2	2	3	48	48	362	724	724	724	1,158	17,376	17,376												
	Asphalt Paver	315	24	224	1	0.4154	24	8	8	8	13	192	192	224	1,792	1,792	1,792	2,867	43,008	43,008												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	101	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	205	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	315	25	33	2	0.3752	25	8	8	8	13	200	200	66	528	528	528	880	13,200	13,200												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	315	25	199	2	0.4087	25	8	8	8	13	200	200	398	3,184	3,184	3,184	5,307	79,600	79,600												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	315	2	75	1	0.4556	2	8	8	8	1	16	16	75	600	600	600	80	1,200	1,200												
	Rubber-Tired Loader (Large)	0	0	286	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	315	24	124	1	0.3618	24	8	8	8	13	192	192	124	992	992	992	1,587	23,808	23,808												
	Scraper	315	25	359	2	0.4824	25	8	8	8	13	200	200	718	5,744	5,744	5,744	9,573	143,600	143,600												
	Sheepsfoot Roller	315	25	156	1	0.3752	25	8	8	8	13	200	200	156	1,248	1,248	1,248	2,080	31,200	31,200												
	Truck-mounted crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	315	25	360	1	0.3819	25	2	2	2	3	50	50	360	720	720	720	1,200	18,000	18,000												
	Vibration roller	315	25	156	2	0.3752	25	8	8	8	13	200	200	312	2,496	2,496	2,496	4,160	62,400	62,400												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	315	24																		0.8	0.5										
	Demolition	0	0																													
	Debris Loading		0																													
	Grading VMT	315	25																								1	0.5				
	Bulldozing	0	0																													
	Truck Loading	315	64																												5,569	87

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-5
Construction Equipment - Activity by Phase - Phases 1 and 2, Common to All Build Alternatives

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
1G.	**Reconstruct Anaheim Way on new alignment**	**6**																														
	Air compressor (trailer-mounted)	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	126	2	362	1	0.3551	2	2	2	2	1	4	4	362	724	724	724	241	1,448	1,448												
	Asphalt Paver	126	2	224	1	0.4154	2	8	8	8	3	16	16	224	1,792	1,792	1,792	597	3,584	3,584												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	101	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	205	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	126	2	33	2	0.3752	2	8	8	8	3	16	16	66	528	528	528	176	1,056	1,056												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	126	2	199	2	0.4087	2	8	8	8	3	16	16	398	3,184	3,184	3,184	1,061	6,368	6,368												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	126	1	75	1	0.4556	1	8	8	8	1	8	8	75	600	600	600	100	600	600												
	Rubber-Tired Loader (Large)	0	0	286	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	126	2	124	1	0.3618	2	8	8	8	3	16	16	124	992	992	992	331	1,984	1,984												
	Scraper	0	0	359	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	156	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	126	5	360	1	0.3819	5	2	2	2	2	10	10	360	720	720	720	600	3,600	3,600												
	Vibration roller	126	2	156	2	0.3752	2	8	8	8	3	16	16	312	2,496	2,496	2,496	832	4,992	4,992												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	126	2																		0.2	0.5										
	Demolition	0	0																													
	Debris Loading		0																													
	Grading VMT	126	2																								0.17	0.50				
	Bulldozing	0	0																													
	Truck Loading	126	5																												1,106	218
1H.	**Reconstruct Pico Avenue on new alignment**	**45**																														
	Air compressor (trailer-mounted)	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	315	2	362	1	0.3551	2	2	2	2	0	4	4	362	724	724	724	97	1,448	1,448												
	Asphalt Paver	315	2	224	1	0.4154	2	8	8	8	1	16	16	224	1,792	1,792	1,792	239	3,584	3,584												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	101	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	205	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	315	2	33	2	0.3752	2	8	8	8	1	16	16	66	528	528	528	70	1,056	1,056												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	315	11	199	2	0.4087	11	8	8	8	6	88	88	398	3,184	3,184	3,184	2,335	35,024	35,024												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	315	1	75	1	0.4556	1	8	8	8	1	8	8	75	600	600	600	40	600	600												
	Rubber-Tired Loader (Large)	0	0	286	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	315	2	124	1	0.3618	2	8	8	8	1	16	16	124	992	992	992	132	1,984	1,984												
	Scraper	0	0	359	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	156	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	315	5	360	1	0.3819	5	2	2	2	1	10	10	360	720	720	720	240	3,600	3,600												
	Vibration roller	315	2	156	2	0.3752	2	8	8	8	1	16	16	312	2,496	2,496	2,496	333	4,992	4,992												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	315	11																		0.4	0.5										
	Demolition	0	0																													
	Debris Loading		0																													
	Grading VMT	315	11																								0.35	0.50				
	Bulldozing	0	0																													
	Truck Loading	315	17																												2,653	157

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-5
Construction Equipment - Activity by Phase - Phases 1 and 2, Common to All Build Alternatives

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
1J.	**Close 9th Street at-grade crossing**	**5**																													
	Air compressor (trailer-mounted)	0	0	65	10	0.4154	0	0	0	0	0	0	0	650	0	0	0	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	575	1	0.3551	0	0	0	0	0	0	0	575	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	101	7	0.3685	0	0	0	0	0	0	0	657	0	0	0	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	7	0.3953	0	0	0	0	0	0	0	1,764	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	413	7	0.3819	0	0	0	0	0	0	0	2,685	0	0	0	0	0	0												
	Flatbed truck	21	2	330	5	0.3819	2	8	8	8	16	16	16	1,650	13,200	13,200	13,200	26,400	26,400	26,400												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	101	1	0.4154	0	0	0	0	0	0	0	101	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	286	6	0.3618	0	0	0	0	0	0	0	1,573	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	0	0	124	6	0.3618	0	0	0	0	0	0	0	682	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	21	2	130	1	0.5360	2	8	8	8	16	16	16	130	1,040	1,040	1,040	2,080	2,080	2,080												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving																															
	Demolition	0	0																													
	Debris Loading		0																													
	Grading VMT																															
	Bulldozing	0	0																													
	Truck Loading		0																													
2A.	**Property Acquisition and Demolition**	**189**																													
	Air compressor (trailer-mounted)	189	105	65	10	0.4154	105	8	8	8	93	840	840	650	5,200	5,200	5,200	60,667	546,000	546,000												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	189	10	575	1	0.3551	10	8	8	8	9	80	80	575	4,600	4,600	4,600	5,111	46,000	46,000												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	189	105	101	7	0.3685	105	8	8	8	93	840	840	657	5,252	5,252	5,252	61,273	551,460	551,460												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	189	105	252	7	0.3953	105	8	8	8	93	840	840	1,764	14,112	14,112	14,112	164,640	1,481,760	1,481,760												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	189	10	330	5	0.3819	10	8	8	8	9	80	80	1,650	13,200	13,200	13,200	14,667	132,000	132,000												
	Excavator	189	105	413	7	0.3819	105	8	8	8	93	840	840	2,685	21,476	21,476	21,476	250,553	2,254,980	2,254,980												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	189	10	101	1	0.4154	10	8	8	8	9	80	80	101	808	808	808	898	8,080	8,080												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	189	105	286	6	0.3618	105	8	8	8	93	840	840	1,573	12,584	12,584	12,584	146,813	1,321,320	1,321,320												
	Rubber-Tired Loader (Small)	189	105	124	6	0.3618	105	8	8	8	93	840	840	682	5,456	5,456	5,456	63,653	572,880	572,880												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	189	8	130	1	0.5360	8	8	8	8	7	64	64	130	1,040	1,040	1,040	924	8,320	8,320												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	189	78																				5,103	589								
	Debris Loading	189	35																						1,561	397						
	Grading VMT																															
	Bulldozing	189	105																										93	8		
	Truck Loading	189	28																												6,887	243

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-5

Construction Equipment - Activity by Phase - Phases 1 and 2, Common to All Build Alternatives

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
2B.	**Remove and relocate utilities in yard expansion area**	**378**																														
	Air compressor (trailer-mounted)	378	150	65	10	0.4154	150	8	8	8	67	1,200	1,200	650	5,200	5,200	5,200	43,333	780,000	780,000												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	575	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	378	150	101	5	0.3685	150	8	8	8	67	1,200	1,200	505	4,040	4,040	4,040	33,667	606,000	606,000												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	378	150	252	6	0.3953	150	8	8	8	67	1,200	1,200	1,512	12,096	12,096	12,096	100,800	1,814,400	1,814,400												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	330	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	378	150	413	5	0.3819	150	8	8	8	67	1,200	1,200	2,065	16,520	16,520	16,520	137,667	2,478,000	2,478,000												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	101	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	378	150	286	5	0.3618	150	8	8	8	67	1,200	1,200	1,430	11,440	11,440	11,440	95,333	1,716,000	1,716,000												
	Rubber-Tired Loader (Small)	378	150	124	5	0.3618	150	8	8	8	67	1,200	1,200	620	4,960	4,960	4,960	41,333	744,000	744,000												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	378	150	130	8	0.5360	150	8	8	8	67	1,200	1,200	1,040	8,320	8,320	8,320	69,333	1,248,000	1,248,000												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	378	19																						427	397						
	Grading VMT																															
	Bulldozing	378	150																										67	8		
	Truck Loading	378	124																												14,894	120
2C.	**Construct crash walls under Terminal Island Freeway**	**126**																														
	Air compressor (trailer-mounted)	0	0	65	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	101	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	340	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	205	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	126	37	330	1	0.3819	37	8	8	8	49	296	296	330	2,640	2,640	2,640	16,280	97,680	97,680												
	Excavator	0	0	413	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	126	8	330	1	0.3819	8	5	5	5	7	40	40	330	1,650	1,650	1,650	2,200	13,200	13,200												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	286	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	126	37	130	1	0.5360	37	8	8	8	49	296	296	130	1,040	1,040	1,040	6,413	38,480	38,480												
	Utility truck	0	0	360	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading		0																													
	Grading VMT																															
	Bulldozing																															
	Truck Loading	126	1																												25	25

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-5
Construction Equipment - Activity by Phase - Phases 1 and 2, Common to All Build Alternatives

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
2D-G.	**Track construction**	**399**																														
	Air compressor (trailer-mounted)	0	0	65	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	399	60	101	3	0.3685	60	8	8	8	25	480	480	303	2,424	2,424	2,424	7,655	145,440	145,440												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	399	60	252	1	0.3953	60	8	8	8	25	480	480	252	2,016	2,016	2,016	6,366	120,960	120,960												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	33	1	0.3752	0	8	8	8	0	0	0	33	264	264	264	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	399	60	199	1	0.4087	60	8	8	8	25	480	480	199	1,592	1,592	1,592	5,027	95,520	95,520												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	399	80	360	1	0.3819	80	4	4	4	17	320	320	360	1,440	1,440	1,440	6,063	115,200	115,200												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	399	5																						107	397						
	Grading VMT	399	60																								2.21	0.71				
	Bulldozing	399	60																										25	8		
	Truck Loading	399	166																												6,767	41
2H.	**Construct new yard support facilities**	**252**																														
	Air compressor (trailer-mounted)	252	120	65	1	0.4154	120	8	8	8	80	960	960	65	520	520	520	5,200	62,400	62,400												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	252	150	101	1	0.3685	150	8	8	8	100	1,200	1,200	101	808	808	808	10,100	121,200	121,200												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	340	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	205	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	330	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	252	30	413	1	0.3819	30	8	8	8	20	240	240	413	3,304	3,304	3,304	8,260	99,120	99,120												
	Flatbed truck	252	30	330	1	0.3819	30	4	4	4	10	120	120	330	1,320	1,320	1,320	3,300	39,600	39,600												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	252	60	286	1	0.3618	60	8	8	8	40	480	480	286	2,288	2,288	2,288	11,440	137,280	137,280												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	252	120	130	1	0.5360	120	8	8	8	80	960	960	130	1,040	1,040	1,040	10,400	124,800	124,800												
	Utility truck	252	150	360	1	0.3819	150	2	2	2	25	300	300	360	720	720	720	9,000	108,000	108,000												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading		0																													
	Grading VMT																										0	0				
	Bulldozing		0																													
	Truck Loading		0																													

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-6
Construction Equipment - Activity by Phase - Phase 3, 10th Street Alternative

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
3A.	**Property acquisition and Demolition**	**189**																														
	Air compressor (trailer-mounted)	0	0	65	5	0.4154	0	8	8	8	0	0	0	325	2,600	2,600	2,600	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	189	30	575	1	0.3551	30	9	9	8	30	270	270	575	5,175	5,175	4,600	17,250	155,250	155,250												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	189	160	101	3	0.3685	160	8	8	8	142	1,280	1,280	303	2,424	2,424	2,424	43,093	387,840	387,840												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	189	30	252	1	0.3953	30	8	8	8	27	240	240	252	2,016	2,016	2,016	6,720	60,480	60,480												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	340	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	205	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	189	160	330	5	0.3819	160	2	2	2	36	320	320	1,650	3,300	3,300	3,300	58,667	528,000	528,000												
	Excavator	189	160	413	5	0.3819	160	4	4	4	71	640	640	2,065	8,260	8,260	8,260	146,844	1,321,600	1,321,600												
	Flatbed truck	189	30	330	1	0.3819	30	8	8	8	27	240	240	330	2,640	2,640	2,640	8,800	79,200	79,200												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	189	30	101	1	0.4154	30	9	9	8	30	270	270	101	909	909	808	3,030	27,270	27,270												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	189	160	286	6	0.3618	160	9	9	8	160	1,440	1,440	1,716	15,444	15,444	13,728	274,560	2,471,040	2,471,040												
	Rubber-Tired Loader (Small)	189	160	124	5	0.3618	160	8	8	8	142	1,280	1,280	620	4,960	4,960	4,960	88,178	793,600	793,600												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	189	160	130	3	0.5360	160	8	8	8	142	1,280	1,280	390	3,120	3,120	3,120	55,467	499,200	499,200												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	1008	1,008	330	2	0.3819	1,008	8	8	8	168	8,064	8,064	660	5,280	5,280	5,280	110,880	5,322,240	5,322,240												
	Asphalt Paving	0	0																													
	Demolition	189	74																				4,858	591								
	Debris Loading	189	36																						1,587	397						
	Grading VMT		0																													
	Bulldozing	189	30																										27	8		
	Truck Loading	189	3																												4,418	1,342
3B.	**Vacate 9th Street and other streets (north-south streets) within project footprint**	**0**																														
	Air compressor (trailer-mounted)	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	0	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0			0.3819								0																		
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	0	0																													
	Grading VMT		0																													
	Bulldozing	0	0																										0	0		
	Truck Loading	0	0																													

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-6
Construction Equipment - Activity by Phase - Phase 3, 10th Street Alternative

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
3C.	**Remove Shoemaker Ramps**	**80**																														
	Air compressor (trailer-mounted)	0	0	65	5	0.4154	0	8	8	8	0	0	0	325	2,600	2,600	2,600	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	575	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	101	1	0.3685	0	8	8	8	0	0	0	101	808	808	808	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	126	60	252	1	0.3953	60	8	8	8	80	480	480	252	2,016	2,016	2,016	20,160	120,960	120,960												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	340	1	0.5360	0	0	0	0	0	0	0	340	0	0	0	0	0	0												
	Crawler Loader	0	0	205	1	0.3685	0	0	0	0	0	0	0	205	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	126	80	330	2	0.3819	80	2	2	2	27	160	160	660	1,320	1,320	1,320	17,600	105,600	105,600												
	Excavator	126	60	413	1	0.3819	60	4	4	4	40	240	240	413	1,652	1,652	1,652	16,520	99,120	99,120												
	Flatbed truck	126	30	330	1	0.3819	30	8	8	8	40	240	240	330	2,640	2,640	2,640	13,200	79,200	79,200												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	101	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	286	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	0	0	124	1	0.3618	0	8	8	8	0	0	0	124	992	992	992	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	126	60	130	1	0.5360	60	8	8	8	80	480	480	130	1,040	1,040	1,040	10,400	62,400	62,400												
	Utility truck	0	0	360	1	0.3819	0	0	0	0	0	0	0	360	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	126	80																				794	60								
	Debris Loading	126	80																						5,291	397						
	Grading VMT		0																													
	Bulldozing	126	60																										80	8		
	Truck Loading	0	0																													
3D.	**Remove and Relocate utilities in yard expansion area**	**208**																														
	Air compressor (trailer-mounted)	378	180	65	1	0.4154	180	8	8	8	80	1,440	1,440	65	520	520	520	5,200	93,600	93,600												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	378	200	413	4	0.3685	200	8	8	8	89	1,600	1,600	1,652	13,216	13,216	13,216	146,844	2,643,200	2,643,200												
	Backhoe (Small, rubber-tired)	378	200	101	3	0.3685	200	8	8	8	89	1,600	1,600	303	2,424	2,424	2,424	26,933	484,800	484,800												
	Bucket Truck (Electrical)	0	0	330	1	0.3819	0	8	8	8	0	0	0	330	2,640	2,640	2,640	0	0	0												
	Bulldozer	0	0	0	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	378	200	156	5	0.4154	200	8	8	8	89	1,600	1,600	780	6,240	6,240	6,240	69,333	1,248,000	1,248,000												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	378	200	330	5	0.3819	200	8	8	8	89	1,600	1,600	1,650	13,200	13,200	13,200	146,667	2,640,000	2,640,000												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	413	5	0.3819	0	8	8	8	0	0	0	2,065	16,520	16,520	16,520	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	378	200	286	4	0.3618	200	8	8	8	89	1,600	1,600	1,144	9,152	9,152	9,152	101,689	1,830,400	1,830,400												
	Rubber-Tired Loader (Small)	378	200	124	4	0.3618	200	8	8	8	89	1,600	1,600	496	3,968	3,968	3,968	44,089	793,600	793,600												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	378	200	130	3	0.5360	200	8	8	8	89	1,600	1,600	390	3,120	3,120	3,120	34,667	624,000	624,000												
	Utility truck	378	200	360	1	0.3819	200	0	0	0	0	0	0	360	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	378	60	330	1	0.3819	60	8	8	8	27	480	480	330	2,640	2,640	2,640	8,800	158,400	158,400												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	378	9																						204	397						
	Grading VMT		0																													
	Bulldozing	0	0																										0	0		
	Truck Loading	378	76																												9,140	120

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-6
Construction Equipment - Activity by Phase - Phase 3, 10th Street Alternative

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
3E.	**Construct new 11th Street/Canal Avenue street connection**	**21**																														
	Air compressor (trailer-mounted)	126	120	65	1	0.4154	120	8	8	8	160	960	960	65	520	520	520	10,400	62,400	62,400												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	340	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	205	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	330	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	126	30	413	1	0.3819	30	8	8	8	40	240	240	413	3,304	3,304	3,304	16,520	99,120	99,120												
	Flatbed truck	126	30	330	1	0.3819	30	4	4	4	20	120	120	330	1,320	1,320	1,320	6,600	39,600	39,600												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	126	60	286	1	0.3618	60	8	8	8	80	480	480	286	2,288	2,288	2,288	22,880	137,280	137,280												
	Rubber-Tired Loader (Small)	126	150	101	1	0.3618	150	8	8	8	200	1,200	1,200	101	808	808	808	20,200	121,200	121,200												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	126	120	130	1	0.5360	120	8	8	8	160	960	960	130	1,040	1,040	1,040	20,800	124,800	124,800												
	Utility truck	126	150	360	1	0.3819	150	2	2	2	50	300	300	360	720	720	720	18,000	108,000	108,000												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	126	3																		0.1	0.2										
	Demolition	0	0																													
	Debris Loading	0	0																													
	Grading VMT	126	30																								0.07	0.5				
	Bulldozing	0	0																													
	Truck Loading	126	3																												714	220
3F.	**Widen Dominguez Channel Bridge**	**234**																														
	Air compressor (trailer-mounted)	252	120	65	1	0.4154	120	8	8	8	168	960	960	65	520	520	520	10,920	62,400	62,400												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	252	150	101	1	0.3685	150	8	8	8	100	1,200	1,200	101	808	808	808	10,100	121,200	121,200												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	340	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	205	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	330	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	252	30	413	1	0.3819	30	8	8	8	20	240	240	413	3,304	3,304	3,304	8,260	99,120	99,120												
	Flatbed truck	252	30	330	1	0.3819	30	4	4	4	10	120	120	330	1,320	1,320	1,320	3,300	39,600	39,600												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	252	60	286	1	0.3618	60	8	8	8	40	480	480	286	2,288	2,288	2,288	11,440	137,280	137,280												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	252	120	130	1	0.5360	120	8	8	8	80	960	960	130	1,040	1,040	1,040	10,400	124,800	124,800												
	Utility truck	252	150	360	1	0.3819	150	2	2	2	25	300	300	360	720	720	720	9,000	108,000	108,000												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	0	0																													
	Grading VMT		0																													
	Bulldozing	0	0																													
	Truck Loading	0	0																													

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-6
Construction Equipment - Activity by Phase - Phase 3, 10th Street Alternative

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
3G.	**Construct new tracks north and west of 9th Street Yard area**	**238**																														
	Air compressor (trailer-mounted)	315	30	65	0	0.4154	30	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	315	120	101	3	0.3685	120	8	8	8	64	960	960	303	2,424	2,424	2,424	19,392	290,880	290,880												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	315	120	252	1	0.3953	120	8	8	8	64	960	960	252	2,016	2,016	2,016	16,128	241,920	241,920												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	315	120	33	1	0.3752	120	8	8	8	64	960	960	33	264	264	264	2,112	31,680	31,680												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	315	60	199	1	0.4087	60	8	8	8	32	480	480	199	1,592	1,592	1,592	6,368	95,520	95,520												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	315	80	360	1	0.3819	80	4	4	4	21	320	320	360	1,440	1,440	1,440	7,680	115,200	115,200												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	315	19																						512	397						
	Grading VMT	315	60																								0.92	0.7				
	Bulldozing	315	120																										64	8		
	Truck Loading	315	124																												17,873	144
3H.	**Construct west yard locomotive layover/fueling facility**	**0**																														
	Air compressor (trailer-mounted)	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	0	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	0		0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	0	0																													
	Grading VMT		0																													
	Bulldozing	0	0																													
	Truck Loading	0	0																													

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-7
Construction Equipment - Activity by Phase - Phase 3, 12th Street Alternative

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
3A.	**Property acquisition and Demolition**	**189**																														
	Air compressor (trailer-mounted)	189	150	65	2	0.4154	150	8	8	8	133	1,200	1,200	130	1,040	1,040	1,040	17,333	156,000	156,000												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	189	10	575	1	0.3551	10	8	8	8	9	80	80	575	4,600	4,600	4,600	5,111	46,000	46,000												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	189	150	101	3	0.3685	150	8	8	8	133	1,200	1,200	303	2,424	2,424	2,424	40,400	363,600	363,600												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	189	30	252	2	0.3953	30	8	8	8	27	240	240	504	4,032	4,032	4,032	13,440	120,960	120,960												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	340	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	189	50	205	2	0.3685	50	8	8	8	44	400	400	410	3,280	3,280	3,280	18,222	164,000	164,000												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	189	60	330	5	0.3819	60	8	8	8	53	480	480	1,650	13,200	13,200	13,200	88,000	792,000	792,000												
	Excavator	189	120	413	7	0.3819	120	8	8	8	107	960	960	2,891	23,128	23,128	23,128	308,373	2,775,360	2,775,360												
	Flatbed truck	189	60	330	1	0.3819	60	8	8	8	53	480	480	330	2,640	2,640	2,640	17,600	158,400	158,400												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	189	10	101	1	0.4154	10	8	8	8	9	80	80	101	808	808	808	898	8,080	8,080												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	189	120	330	3	0.3618	120	8	8	8	107	960	960	990	7,920	7,920	7,920	105,600	950,400	950,400												
	Rubber-Tired Loader (Small)	189	120	124	1	0.3618	120	8	8	8	107	960	960	124	992	992	992	13,227	119,040	119,040												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	189	120	130	1	0.5360	120	8	8	8	107	960	960	130	1,040	1,040	1,040	13,867	124,800	124,800												
	Utility truck	189	150	360	2	0.3819	150	2	2	2	33	300	300	720	1,440	1,440	1,440	24,000	216,000	216,000												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	1008	1,008	330	2	0.3819	1,008	8	8	8	168	8,064	8,064	660	5,280	5,280	5,280	110,880	5,322,240	5,322,240												
	Asphalt Paving	0	0																													
	Demolition	189	64																				8,993	1,265								
	Debris Loading	189	64																						2,822	397						
	Grading VMT		0																													
	Bulldozing	189	30																										27	8		
	Truck Loading	189	74																												18,025	243
3B.	**Vacate 9th Street and other streets (north-south streets) within project footprint**	**0**																														
	Air compressor (trailer-mounted)	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	0	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0			0.3819																										
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	0	0																													
	Grading VMT		0																													
	Bulldozing	0	0																										0	0		
	Truck Loading	0	0																													

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-7
Construction Equipment - Activity by Phase - Phase 3, 12th Street Alternative

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
3C.	**Remove Shoemaker Ramps**	**68**																														
	Air compressor (trailer-mounted)	126	60	65	4	0.4154	60	8	8	8	80	480	480	260	2,080	2,080	2,080	20,800	124,800	124,800												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	101	1	0.3685	0	8	8	8	0	0	0	101	808	808	808	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	126	50	340	1	0.5360	50	8	8	8	67	400	400	340	2,720	2,720	2,720	22,667	136,000	136,000												
	Crawler Loader	0	0	205	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	126	2	330	10	0.3819	2	10	10	8	3	20	20	3,300	33,000	33,000	26,400	11,000	66,000	66,000												
	Excavator	126	60	413	2	0.3819	60	8	8	8	80	480	480	826	6,608	6,608	6,608	66,080	396,480	396,480												
	Flatbed truck	0	0	330	1	0.3819	0	0	0	0	0	0	0	330	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	330	1	0.3618	0	8	8	8	0	0	0	330	2,640	2,640	2,640	0	0	0												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	126	50	130	1	0.5360	50	8	8	8	67	400	400	130	1,040	1,040	1,040	8,667	52,000	52,000												
	Utility truck	0	0	360	1	0.3819	0	0	0	0	0	0	0	360	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	126	68																				90	8								
	Debris Loading	126	1																						93	397						
	Grading VMT		0																													
	Bulldozing	0	0																										0	0		
	Truck Loading	0	0																													
3D.	**Remove and Relocate utilities in yard expansion area**	**340**																														
	Air compressor (trailer-mounted)	504	120	65	6	0.4154	120	8	8	8	40	960	960	390	3,120	3,120	3,120	15,600	374,400	374,400												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	504	120	413	3	0.3685	120	8	8	8	40	960	960	1,239	9,912	9,912	9,912	49,560	1,189,440	1,189,440												
	Backhoe (Small, rubber-tired)	0	0	101	3	0.3685	0	8	8	8	0	0	0	303	2,424	2,424	2,424	0	0	0												
	Bucket Truck (Electrical)	0	0	330	1	0.3819	0	8	8	8	0	0	0	330	2,640	2,640	2,640	0	0	0												
	Bulldozer	0	0	0	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	156	2	0.4154	0	8	8	8	0	0	0	312	2,496	2,496	2,496	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	504	150	330	5	0.3819	150	2	2	2	13	300	300	1,650	3,300	3,300	3,300	20,625	495,000	495,000												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	413	5	0.3819	0	8	8	8	0	0	0	2,065	16,520	16,520	16,520	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	504	30	330	5	0.3618	30	4	4	4	5	120	120	1,650	6,600	6,600	6,600	8,250	198,000	198,000												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	130	2	0.5360	0	8	8	8	0	0	0	260	2,080	2,080	2,080	0	0	0												
	Utility truck	0	0	360	1	0.3819	0	0	0	0	0	0	0	360	0	0	0	0	0	0												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	504	30	330	1	0.3819	30	8	8	8	10	240	240	330	2,640	2,640	2,640	3,300	79,200	79,200												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	504	19																						316	397						
	Grading VMT		0																													
	Bulldozing	0	0																										0	0		
	Truck Loading	504	200																												18,075	90

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-7
Construction Equipment - Activity by Phase - Phase 3, 12th Street Alternative

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
3E.	**Construct North Yard Perimeter Road**	**34**																														
	Air compressor (trailer-mounted)	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	0	0	362	1	0.3551	0	8	8	8	0	0	0	362	2,896	2,896	2,896	0	0	0												
	Asphalt Paver	0	0	224	1	0.4154	0	8	8	8	0	0	0	224	1,792	1,792	1,792	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	0	0	101	1	0.3685	0	8	8	8	0	0	0	101	808	808	808	0	0	0												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	1	0.3953	0	8	8	8	0	0	0	252	2,016	2,016	2,016	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	205	1	0.3685	0	8	8	8	0	0	0	205	1,640	1,640	1,640	0	0	0												
	Drum Roller	0	0	33	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	189	6	199	2	0.4087	6	8	8	8	5	48	48	398	3,184	3,184	3,184	2,123	19,104	19,104												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	75	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	330	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	0	0	124	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	156	1	0.3752	0	4	4	4	0	0	0	156	624	624	624	0	0	0												
	Truck-mounted crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	0	0	360	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Vibration roller	0	0	156	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	189	5																		0.3	0.5										
	Demolition	0	0																													
	Debris Loading	0	0																													
	Grading VMT		6		2									0	0	0	0	0	0	0							0.36	0.5				
	Bulldozing	0	0																													
	Truck Loading	189	14																												2,011	145
3F.	**Construct Tie-back retaining wall along Pico/I-710**	**187**																														
	Air compressor (trailer-mounted)	189	16	65	1	0.4154	16	8	8	8	128	128	128	65	520	520	520	8,320	8,320	8,320												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	189	100	101	1	0.3685	100	8	8	8	89	800	800	101	808	808	808	8,978	80,800	80,800												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	205	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	330	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	189	80	413	1	0.3819	80	8	8	8	71	640	640	413	3,304	3,304	3,304	29,369	264,320	264,320												
	Flatbed truck	189	20	330	1	0.3819	20	4	4	4	9	80	80	330	1,320	1,320	1,320	2,933	26,400	26,400												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	330	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	189	20	130	1	0.5360	20	8	8	8	18	160	160	130	1,040	1,040	1,040	2,311	20,800	20,800												
	Utility truck	189	150	360	1	0.3819	150	2	2	2	33	300	300	360	720	720	720	12,000	108,000	108,000												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	0	0																													
	Grading VMT		0																													
	Bulldozing	0	0																													
	Truck Loading	0	0																													

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

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Table A1.1-7
Construction Equipment - Activity by Phase - Phase 3, 12th Street Alternative

Phase	Construction activity	Est. Duration (days)	Total Work Days	Power Rating (hp)	Equipment Quantity	Load Factor	Est. Total Activity (days)	Peak Day (hr/day)	Average Day (hr/day)	8-Hr Day (hr/8 hrs)	Average Month (hr/month)	Average Year (hr/yr)	Total (hr)	Peak Hourly Work (hp-hr/hr)	Peak Daily Work (hp-hr/day)	Average Daily Work (hp-hr/day)	Peak 8-hr Day (hp-8hr/day)	Average Monthly Work (hp-hr/month)	Year Work (hp-hr/yr)	Total Work (hp-hr)	Asphalt Paving (acre/month)	Asphalt Paving (acre/day)	Demolition (ton debris/month)	Demolition (ton debris/day)	Debris Loading (ton debris/month)	Debris Loading (ton debris/day)	Grading VMT/month	Grading VMT/day	Bulldozing (hr/month)	Bulldozing (hr/day)	Truck Loading (ton/month)	Truck Loading (ton/day)
3G.	**Widen Dominguez Channel Bridge**	**234**																														
	Air compressor (trailer-mounted)	252	60	65	1	0.4154	60	8	8	8	168	480	480	65	520	520	520	10,920	31,200	31,200												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	252	60	101	1	0.3685	60	8	8	8	40	480	480	101	808	808	808	4,040	48,480	48,480												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	0	0	252	0	0.3953	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	205	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	330	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	252	30	413	1	0.3819	30	8	8	8	20	240	240	413	3,304	3,304	3,304	8,260	99,120	99,120												
	Flatbed truck	252	40	330	1	0.3819	40	4	4	4	13	160	160	330	1,320	1,320	1,320	4,400	52,800	52,800												
	Motor Grader	0	0	0	0	0.4087	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	252	60	330	1	0.3618	60	8	8	8	40	480	480	330	2,640	2,640	2,640	13,200	158,400	158,400												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	252	190	130	1	0.5360	190	8	8	8	127	1,520	1,520	130	1,040	1,040	1,040	16,467	197,600	197,600												
	Utility truck	252	200	360	1	0.3819	200	2	2	2	33	400	400	360	720	720	720	12,000	144,000	144,000												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	0	0																													
	Grading VMT		0																													
	Bulldozing	0	0																										0	0		
	Truck Loading	0	0																													
3H-J.	**Construct new tracks north and west of 9th Street Yard area**	**189**																														
	Air compressor (trailer-mounted)	0	0	65	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt distributor truck	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paver	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Asphalt Reclaimer	0	0	0	0	0.3551	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Large crawler-type)	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Backhoe (Small, rubber-tired)	504	88	101	3	0.3685	88	8	8	8	29	705	705	303	2,424	2,424	2,424	8,905	213,716	213,716												
	Bucket Truck (Electrical)	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Bulldozer	504	88	252	1	0.3953	88	8	8	8	29	705	705	252	2,016	2,016	2,016	7,406	177,744	177,744												
	Compaction machinery	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Crawler Loader	0	0	0	0	0.3685	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Drum Roller	504	88	33	1	0.3752	88	8	8	8	29	705	705	33	264	264	264	970	23,276	23,276												
	Dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	End dump truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Excavator	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Flatbed truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Motor Grader	504	88	199	1	0.4087	88	8	8	8	29	705	705	199	1,592	1,592	1,592	5,848	140,361	140,361												
	Pavement breaker	0	0	0	0	0.4154	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Pavement Sweeper	0	0	0	0	0.4556	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Large)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Rubber-Tired Loader (Small)	0	0	0	0	0.3618	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Scraper	0	0	0	0	0.4824	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Sheepsfoot Roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Truck-mounted crane	0	0	0	0	0.5360	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Utility truck	504	80	360	1	0.3819	80	4	4	4	13	320	320	360	1,440	1,440	1,440	4,800	115,200	115,200												
	Vibration roller	0	0	0	0	0.3752	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Welding truck	0	0	0	0	0.3819	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
	Water truck	0	0	330		0.3819	0	8	8	8	0	0	0	0	0	0	0	0	0	0												
	Asphalt Paving	0	0																													
	Demolition	0	0																													
	Debris Loading	0	0																													
	Grading VMT	504	88																								1.06	0.7				
	Bulldozing	504	88																													
	Truck Loading	504	173																												8,988	52

Note: All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

Table A1.1-8
Construction Vehicles - Activity by Phase - Phases 1 and 2, Common to All Build Alternatives

Phase		Construction activity	Total Haul Quantity							One-Way Trips - Peak Day (trips/day)							One-Way Trips - Average Month (trips/month)							No. On-Site Workers
			Debris (CY)	Paving Recycle (CY)	Pipe (LF)	Sand/ gravel (CY)	Asphalt (CY)	Concrete (CY)	Contaminated Soil (CY)	Debris	Paving Recycle	Pipe	Sand/ gravel	Asphalt	Concrete	Contaminated Soil	Debris	Paving Recycle	Pipe	Sand/ gravel	Asphalt	Concrete	Contaminated Soil	
PHASE 1	A.	Property acquisition and Demolition	4,600	13,200	0	9,800	0	0	7,500	100	240	0	300	0	0	60	102	419	0	136	0	0	71	74
	B.	Shift Toyota operations to new lease perimeter	570	5,500	0	0	13,200	0	0	100	240	0	0	80	0	0	23	314	0	0	352	0	0	12
	C.	Remove and Relocate utilities in Pier B Street and Pico corridor	4,700		61,400	49,200	0	0	37,900	100	0	80	300	0	0	60	78	0	51	513	0	0	268	62
	D.	Remove & relocate utilities in proj. footprint to new utility corridors	1,140		8,000	7,000	0	0	5,400	100	0	80	300	0	0	60	19	0	7	73	0	0	38	62
	E.	Relocate LA-04 pump station	1,000		500	1,000	0	800	0	100	0	5	125	0	80	0	11	0	0	7	0	8	0	74
	F.	Reconstruct Pier B Street on new alignment	0		0	85,200	17,000	2,100	20,050	0	0	0	300	80	80	60	0	0	0	710	151	25	113	36
	G.	Reconstruct Anaheim Way on new alignment	0		0	6,770	1,360	130	1,590	0	0	0	300	80	24	60	0	0	0	141	30	4	22	36
	H.	Reconstruct Pico Avenue on new alignment	0		0	40,600	8,120	750	9,550	0	0	0	300	80	80	60	0	0	0	338	72	9	54	36
	J.	Close 9th Street at-grade crossing	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
PHASE 2	A.	Property Acquisition and Demolition	17,700		0	14,300	0	0	15,800	100	0	0	300	0	0	60	393	0	0	199	0	0	149	74
	B.	Remove and relocate utilities in yard expansion area	9,680		113,200	82,400	0	0	63,400	100	0	80	300	0	0	60	108	0	63	572	0	0	299	72
	C.	Construct crash walls under Terminal Island Freeway	0		0	0	0	360	190	0	0	0	0	0	65	16	0	0	0	0	0	11	3	10
	D-G.	Track construction	2,570		52,900	62,900	0	0	99,100	100	0	80	300	0	0	60	27	0	28	414	0	0	443	52
	H.	Construct new yard support facilities	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51

Table A1.1-9
Construction Vehicles - Activity by Phase - Phase 3, 10th Street Alternative

Phase		Construction activity	Total Haul Quantity							One-Way Trips - Peak Day (trips/day)							One-Way Trips - Average Month (trips/month)							No. On-Site Workers
			Debris (CY)	Paving Recycle (CY)	Pipe (LF)	Sand/ gravel (CY)	Asphalt (CY)	Concrete (CY)	Contaminated Soil (CY)	Debris	Paving Recycle	Pipe	Sand/ gravel	Asphalt	Concrete	Contaminated Soil	Debris	Paving Recycle	Pipe	Sand/ gravel	Asphalt	Concrete	Contaminated Soil	
PHASE 3	A.	Property acquisition and Demolition	18,000		0	7,900	0	0	0	100	0	0	300	0	0	0	400	0	0	110	0	0	0	74
	B.	Vacate 9th Street and other streets (north-south streets) within project footprint	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C.	Remove Shoemaker Ramps	40,000		0	0	0	0	0	100	0	0	0	0	0	0	1,333	0	0	0	0	0	0	36
	D.	Remove and Relocate utilities in yard expansion area	4,620		53,000	50,500	0	0	38,800	100	0	80	300	0	0	60	51	0	29	351	0	0	183	72
	E.	Construct new 11th Street/Canal Avenue street connection	0		0	4,400	900	200	1,000	0	0	0	300	80	36	60	0	0	0	92	20	6	14	62
	F.	Widen Dominguez Channel Bridge	0		0	0	0	530	0	0	0	0	0	0	80	0	0	0	0	0	0	8	0	51
	G-H.	Track construction	0		0	54,700	0	0	31,600	0	0	0	300	0	0	60	0	0	0	456	0	0	179	51

Table A1.1-10
Construction Vehicles - Activity by Phase - Phase 3, 12th Street Alternative

Phase		Construction activity	Total Haul Quantity							One-Way Trips - Peak Day (trips/day)							One-Way Trips - Average Month (trips/month)							No. On-Site Workers
			Debris (CY)	Paving Recycle (CY)	Pipe (LF)	Sand/ gravel (CY)	Asphalt (CY)	Concrete (CY)	Contaminated Soil (CY)	Debris	Paving Recycle	Pipe	Sand/ gravel	Asphalt	Concrete	Contaminated Soil	Debris	Paving Recycle	Pipe	Sand/ gravel	Asphalt	Concrete	Contaminated Soil	
PHASE 3	A.	Property acquisition and Demolition	32,000		0	36,500	0	0	41,600	100	0	0	300	0	0	60	711	0	0	507	0	0	392	74
	B.	Vacate existing 9th street and other streets (north-south streets) within project footprint	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C.	Remove Shoemaker Ramps	700		0	0	0	0	0	100	0	0	0	0	0	0	23	0	0	0	0	0	0	12
	D.	Remove and Relocate utilities in yard expansion area	9,570		84,400	133,200	0	0	102,400	100	0	80	300	0	0	60	80	0	35	694	0	0	362	72
	E.	Construct north yard perimeter road	0		0	18,460	3,690	920	4,340	0	0	0	300	80	80	60	0	0	0	256	55	19	41	36
	F.	Construct Tie-back retaining wall along Pico/I-710	0		0	0	0	270	0	0	0	0	0	0	49	0	0	0	0	0	0	5	0	51
	G.	Widen Dominguez Channel Bridge	0		0	0	0	1,770	0	0	0	0	0	0	80	0	0	0	0	0	0	27	0	51
	H-J.	Track construction	0		0	211,600	0	0	60,200	0	0	0	300	0	0	60	0	0	0	1,102	0	0	213	52

Table A1.1-11

Construction Equipment - Annual Activity by Year - Phases 1 and 2, Common to All Build Alternatives

Construction Equipment	Units	Year 1	Year 2	Year 3	Year 4
Air compressor (trailer-mounted)	(hp-hr/yr)	211,467	4,036,933	989,733	268,667
Asphalt distributor truck	(hp-hr/yr)	0	7,433	12,839	0
Asphalt Paver	(hp-hr/yr)	0	18,398	31,778	0
Asphalt Reclaimer	(hp-hr/yr)	23,000	130,333	30,667	0
Backhoe (Large crawler-type)	(hp-hr/yr)	0	0	0	0
Backhoe (Small, rubber-tired)	(hp-hr/yr)	213,581	2,128,205	901,469	345,881
Bucket Truck (Electrical)	(hp-hr/yr)	0	0	0	0
Bulldozer	(hp-hr/yr)	573,888	5,703,936	2,365,617	567,663
Compaction machinery	(hp-hr/yr)	0	0	0	0
Crawler crane	(hp-hr/yr)	0	0	0	0
Crawler Loader	(hp-hr/yr)	0	0	0	0
Drum Roller	(hp-hr/yr)	0	5,632	9,680	0
Dump truck	(hp-hr/yr)	0	0	0	0
End dump truck	(hp-hr/yr)	132,000	440,000	185,680	0
Excavator	(hp-hr/yr)	751,660	7,889,677	3,253,614	770,933
Flatbed truck	(hp-hr/yr)	0	0	46,200	33,000
Motor Grader	(hp-hr/yr)	0	43,515	122,724	50,274
Pavement breaker	(hp-hr/yr)	8,080	26,933	5,387	0
Pavement Sweeper	(hp-hr/yr)	0	680	1,720	0
Rubber-Tired Loader (Large)	(hp-hr/yr)	511,749	5,309,685	2,152,627	591,067
Rubber-Tired Loader (Small)	(hp-hr/yr)	221,877	2,302,366	940,978	206,667
Scraper	(hp-hr/yr)	0	57,440	86,160	0
Sheepsfoot Roller	(hp-hr/yr)	0	12,480	18,720	0
Truck-mounted crane	(hp-hr/yr)	1,387	85,280	898,907	450,667
Utility truck	(hp-hr/yr)	0	8,400	89,368	150,632
Vibration roller	(hp-hr/yr)	0	26,624	45,760	0
Welding truck	(hp-hr/yr)	0	0	0	0
Water truck	(hp-hr/yr)	332,640	1,330,560	1,330,560	1,108,800
Asphalt Paving	(acre/yr)	0	7	12	0
Demolition	(ton/yr)	757	16,823	30,620	0
Debris Loading	(ton/yr)	1,217	12,480	15,604	3,208
Grading VMT	(VMT/yr)	0	7	32	22
Bulldozing	(hr/yr)	325	3,684	1,661	586
Truck Loading	(ton/yr)	10,582	283,902	368,415	142,140

Notes:

1. For the purposes of the emission calculations, Construction Years 1 through 4 were assumed to be 2016 through 2019. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

2. All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

3. All equipment activity was provided by POLB engineering consultant, HDR.

Table A1.1-12

Construction Equipment - Peak Daily Activity by Year - Phases 1 and 2, Common to All Build Alternatives

Construction Equipment	Units	Year 1	Year 2	Year 3	Year 4
Air compressor (trailer-mounted)	(hp-hr/day)	5,200	15,600	10,400	5,720
Asphalt distributor truck	(hp-hr/day)	0	724	724	0
Asphalt Paver	(hp-hr/day)	0	1,792	1,792	0
Asphalt Reclaimer	(hp-hr/day)	4,600	4,600	4,600	0
Backhoe (Large crawler-type)	(hp-hr/day)	0	0	0	0
Backhoe (Small, rubber-tired)	(hp-hr/day)	5,252	9,696	11,716	7,272
Bucket Truck (Electrical)	(hp-hr/day)	0	0	0	0
Bulldozer	(hp-hr/day)	14,112	26,208	28,224	14,112
Compaction machinery	(hp-hr/day)	0	0	0	0
Crawler crane	(hp-hr/day)	0	0	0	0
Crawler Loader	(hp-hr/day)	0	0	0	0
Drum Roller	(hp-hr/day)	0	528	528	0
Dump truck	(hp-hr/day)	0	0	0	0
End dump truck	(hp-hr/day)	13,200	13,200	15,840	0
Excavator	(hp-hr/day)	21,476	39,648	37,996	19,824
Flatbed truck	(hp-hr/day)	0	0	1,650	1,320
Motor Grader	(hp-hr/day)	0	3,184	4,776	1,592
Pavement breaker	(hp-hr/day)	808	808	808	0
Pavement Sweeper	(hp-hr/day)	0	600	600	0
Rubber-Tired Loader (Large)	(hp-hr/day)	12,584	24,024	24,024	13,728
Rubber-Tired Loader (Small)	(hp-hr/day)	5,456	11,408	11,408	4,960
Scraper	(hp-hr/day)	0	5,744	5,744	0
Sheepsfoot Roller	(hp-hr/day)	0	1,248	1,248	0
Truck-mounted crane	(hp-hr/day)	1,040	9,360	10,400	9,360
Utility truck	(hp-hr/day)	0	720	2,160	2,160
Vibration roller	(hp-hr/day)	0	2,496	2,496	0
Welding truck	(hp-hr/day)	0	0	0	0
Water truck	(hp-hr/day)	5,280	5,280	5,280	5,280
Asphalt Paving	(acre/day)	0	1	1	0
Demolition	(ton/day)	67	589	589	0
Debris Loading	(ton/day)	397	1,190	1,190	794
Grading VMT	(VMT/day)	0	0	1	1
Bulldozing	(hr/day)	8	24	24	16
Truck Loading	(ton/day)	240	591	647	161

Notes:

1. For the purposes of the emission calculations, Construction Years 1 through 4 were assumed to be 2016 through 2019. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

2. All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

3. All equipment activity was provided by POLB engineering consultant, HDR.

Table A1.1-13

Construction Equipment - Annual Activity by Year - 12th Street Alternative - Phase 3

Construction Equipment	Units	Year 5	Year 6	Year 7	Year 8
Air compressor (trailer-mounted)	(hp-hr/yr)	374,400	327,600	159,120	0
Asphalt distributor truck	(hp-hr/yr)	0	0	0	0
Asphalt Paver	(hp-hr/yr)	0	0	0	0
Asphalt Reclaimer	(hp-hr/yr)	46,000	0	0	0
Backhoe (Large crawler-type)	(hp-hr/yr)	297,360	594,720	297,360	0
Backhoe (Small, rubber-tired)	(hp-hr/yr)	363,600	105,040	131,098	106,858
Bucket Truck (Electrical)	(hp-hr/yr)	0	0	0	0
Bulldozer	(hp-hr/yr)	120,960	0	88,872	88,872
Compaction machinery	(hp-hr/yr)	0	0	0	0
Crawler crane	(hp-hr/yr)	136,000	0	0	0
Crawler Loader	(hp-hr/yr)	164,000	0	0	0
Drum Roller	(hp-hr/yr)	0	0	11,638	11,638
Dump truck	(hp-hr/yr)	123,750	247,500	123,750	0
End dump truck	(hp-hr/yr)	858,000	0	0	0
Excavator	(hp-hr/yr)	3,171,840	313,880	49,560	0
Flatbed truck	(hp-hr/yr)	158,400	52,800	26,400	0
Motor Grader	(hp-hr/yr)	0	19,104	70,181	70,181
Pavement breaker	(hp-hr/yr)	8,080	0	0	0
Pavement Sweeper	(hp-hr/yr)	0	0	0	0
Rubber-Tired Loader (Large)	(hp-hr/yr)	999,900	178,200	128,700	0
Rubber-Tired Loader (Small)	(hp-hr/yr)	119,040	0	0	0
Scraper	(hp-hr/yr)	0	0	0	0
Sheepsfoot Roller	(hp-hr/yr)	0	0	0	0
Truck-mounted crane	(hp-hr/yr)	176,800	119,600	98,800	0
Utility truck	(hp-hr/yr)	216,000	180,000	129,600	57,600
Vibration roller	(hp-hr/yr)	0	0	0	0
Welding truck	(hp-hr/yr)	19,800	39,600	19,800	0
Water truck	(hp-hr/yr)	1,330,560	1,330,560	1,330,560	1,330,560
Asphalt Paving	(acre/yr)	0	3	0	0
Demolition	(ton/yr)	81,478	0	0	0
Debris Loading	(ton/yr)	27,851	3,798	1,899	0
Grading VMT	(VMT/yr)	0	3	13	13
Bulldozing	(hr/yr)	240	0	0	0
Truck Loading	(ton/yr)	270,675	235,000	216,310	107,857

Notes:

1. For the purposes of the emission calculations, Construction Years 5 through 8 were assumed to be 2020 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

2. All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

3. All equipment activity was provided by POLB engineering consultant, HDR.

Table A1.1-14

Construction Equipment - Peak Daily Activity by Year - 12th Street Alternative - Phase 3

Construction Equipment	Units	Year 5	Year 6	Year 7	Year 8
Air compressor (trailer-mounted)	(hp-hr/day)	6,240	3,640	3,640	0
Asphalt distributor truck	(hp-hr/day)	0	0	0	0
Asphalt Paver	(hp-hr/day)	0	0	0	0
Asphalt Reclaimer	(hp-hr/day)	4,600	0	0	0
Backhoe (Large crawler-type)	(hp-hr/day)	9,912	9,912	9,912	0
Backhoe (Small, rubber-tired)	(hp-hr/day)	2,424	808	3,232	2,424
Bucket Truck (Electrical)	(hp-hr/day)	0	0	0	0
Bulldozer	(hp-hr/day)	4,032	0	2,016	2,016
Compaction machinery	(hp-hr/day)	0	0	0	0
Crawler crane	(hp-hr/day)	2,720	0	0	0
Crawler Loader	(hp-hr/day)	3,280	0	0	0
Drum Roller	(hp-hr/day)	0	0	264	264
Dump truck	(hp-hr/day)	3,300	3,300	3,300	0
End dump truck	(hp-hr/day)	46,200	0	0	0
Excavator	(hp-hr/day)	29,736	3,304	3,304	0
Flatbed truck	(hp-hr/day)	2,640	1,320	1,320	0
Motor Grader	(hp-hr/day)	0	3,184	1,592	1,592
Pavement breaker	(hp-hr/day)	808	0	0	0
Pavement Sweeper	(hp-hr/day)	0	0	0	0
Rubber-Tired Loader (Large)	(hp-hr/day)	14,520	9,240	9,240	0
Rubber-Tired Loader (Small)	(hp-hr/day)	992	0	0	0
Scraper	(hp-hr/day)	0	0	0	0
Sheepsfoot Roller	(hp-hr/day)	0	0	0	0
Truck-mounted crane	(hp-hr/day)	2,080	1,040	1,040	0
Utility truck	(hp-hr/day)	1,440	720	2,160	1,440
Vibration roller	(hp-hr/day)	0	0	0	0
Welding truck	(hp-hr/day)	2,640	2,640	2,640	0
Water truck	(hp-hr/day)	5,280	5,280	5,280	5,280
Asphalt Paving	(acre/day)	0	1	0	0
Demolition	(ton/day)	1,273	0	0	0
Debris Loading	(ton/day)	1,190	397	397	0
Grading VMT	(VMT/day)	0	0	1	1
Bulldozing	(hr/day)	8	0	0	0
Truck Loading	(ton/day)	334	236	142	52

Notes:

1. For the purposes of the emission calculations, Construction Years 5 through 8 were assumed to be 2020 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

2. All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

3. All equipment activity was provided by POLB engineering consultant, HDR.

Table A1.1-15

Construction Equipment - Annual Activity by Year - 10th Street Alternative - Phase 3

Construction Equipment	Units	Year 5	Year 6	Year 7	Year 8
Air compressor (trailer-mounted)	(hp-hr/yr)	31,200	93,600	162,240	0
Asphalt distributor truck	(hp-hr/yr)	0	0	0	0
Asphalt Paver	(hp-hr/yr)	0	0	0	0
Asphalt Reclaimer	(hp-hr/yr)	155,250	0	0	0
Backhoe (Large crawler-type)	(hp-hr/yr)	881,067	1,762,133	0	0
Backhoe (Small, rubber-tired)	(hp-hr/yr)	549,440	323,200	179,376	232,704
Bucket Truck (Electrical)	(hp-hr/yr)	0	0	0	0
Bulldozer	(hp-hr/yr)	181,440	0	48,384	193,536
Compaction machinery	(hp-hr/yr)	416,000	832,000	0	0
Crawler crane	(hp-hr/yr)	0	0	0	0
Crawler Loader	(hp-hr/yr)	0	0	0	0
Drum Roller	(hp-hr/yr)	0	0	6,336	25,344
Dump truck	(hp-hr/yr)	880,000	1,760,000	0	0
End dump truck	(hp-hr/yr)	633,600	0	0	0
Excavator	(hp-hr/yr)	1,420,720	49,560	148,680	0
Flatbed truck	(hp-hr/yr)	158,400	19,800	59,400	0
Motor Grader	(hp-hr/yr)	0	0	19,104	76,416
Pavement breaker	(hp-hr/yr)	27,270	0	0	0
Pavement Sweeper	(hp-hr/yr)	0	0	0	0
Rubber-Tired Loader (Large)	(hp-hr/yr)	3,081,173	1,288,907	205,920	0
Rubber-Tired Loader (Small)	(hp-hr/yr)	1,058,133	589,667	60,600	0
Scraper	(hp-hr/yr)	0	0	0	0
Sheepsfoot Roller	(hp-hr/yr)	0	0	0	0
Truck-mounted crane	(hp-hr/yr)	769,600	478,400	187,200	0
Utility truck	(hp-hr/yr)	0	54,000	185,040	92,160
Vibration roller	(hp-hr/yr)	0	0	0	0
Welding truck	(hp-hr/yr)	52,800	105,600	0	0
Water truck	(hp-hr/yr)	1,330,560	1,330,560	1,330,560	1,330,560
Asphalt Paving	(acre/yr)	0	0	0	0
Demolition	(ton/yr)	48,481	0	0	0
Debris Loading	(ton/yr)	47,254	2,444	1,537	6,146
Grading VMT	(VMT/yr)	0	0	3	11
Bulldozing	(hr/yr)	720	0	192	768
Truck Loading	(ton/yr)	94,603	111,825	55,762	214,476

Notes:

1. For the purposes of the emission calculations, Construction Years 5 through 8 were assumed to be 2020 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

2. All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

3. All equipment activity was provided by POLB engineering consultant, HDR.

Table A1.1-16

Construction Equipment - Peak Daily Activity by Year - 10th Street Alternative - Phase 3

Construction Equipment	Units	Year 5	Year 6	Year 7	Year 8
Air compressor (trailer-mounted)	(hp-hr/day)	520	1,040	1,040	0
Asphalt distributor truck	(hp-hr/day)	0	0	0	0
Asphalt Paver	(hp-hr/day)	0	0	0	0
Asphalt Reclaimer	(hp-hr/day)	5,175	0	0	0
Backhoe (Large crawler-type)	(hp-hr/day)	13,216	13,216	0	0
Backhoe (Small, rubber-tired)	(hp-hr/day)	4,848	2,424	808	2,424
Bucket Truck (Electrical)	(hp-hr/day)	0	0	0	0
Bulldozer	(hp-hr/day)	4,032	0	0	2,016
Compaction machinery	(hp-hr/day)	6,240	6,240	0	0
Crawler crane	(hp-hr/day)	0	0	0	0
Crawler Loader	(hp-hr/day)	0	0	0	0
Drum Roller	(hp-hr/day)	0	0	0	264
Dump truck	(hp-hr/day)	13,200	13,200	0	0
End dump truck	(hp-hr/day)	4,620	0	0	0
Excavator	(hp-hr/day)	9,912	3,304	6,608	0
Flatbed truck	(hp-hr/day)	5,280	1,320	2,640	0
Motor Grader	(hp-hr/day)	0	0	0	1,592
Pavement breaker	(hp-hr/day)	909	0	0	0
Pavement Sweeper	(hp-hr/day)	0	0	0	0
Rubber-Tired Loader (Large)	(hp-hr/day)	24,596	11,440	4,576	0
Rubber-Tired Loader (Small)	(hp-hr/day)	8,928	4,776	808	0
Scraper	(hp-hr/day)	0	0	0	0
Sheepsfoot Roller	(hp-hr/day)	0	0	0	0
Truck-mounted crane	(hp-hr/day)	7,280	4,160	2,080	0
Utility truck	(hp-hr/day)	0	720	1,440	1,440
Vibration roller	(hp-hr/day)	0	0	0	0
Welding truck	(hp-hr/day)	2,640	2,640	0	0
Water truck	(hp-hr/day)	5,280	5,280	5,280	5,280
Asphalt Paving	(acre/day)	0	0	0	0
Demolition	(ton/day)	650	0	0	0
Debris Loading	(ton/day)	1,190	397	397	397
Grading VMT	(VMT/day)	0	0	1	1
Bulldozing	(hr/day)	16	0	8	8
Truck Loading	(ton/day)	1,463	340	220	144

Notes:

1. For the purposes of the emission calculations, Construction Years 5 through 8 were assumed to be 2020 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

2. All "hp-hr" values in this table represent the equipment's rated horsepower × operating hours. The load factor has not been applied because it is applied to the emission factors.

3. All equipment activity was provided by POLB engineering consultant, HDR.

Table A1.1-17
Onroad Construction Vehicles - Annual Activity by Year - Phases 1 and 2, Common to All Build Alternatives

						Offsite Transit (within SCAB) (miles/year)				Onsite Transit (miles/year)				Onsite Idling (hr/year)				Offsite Transit (within CA borders) (mi/yr)			
Construction Vehicle	Off-Site One-Way Trip Length (mi/trip)	Average On-Site Travel Speed (mph)	Fleet Size (No. Vehicles)	On-Site Trip Length (mi/trip)	On-Site Idling Time (hr/trip)	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
Debris haul truck	35	15	10	0.5	0.083	10,733	113,571	141,125	28,291	153	1,622	2,016	404	26	270	336	67	10,733	113,571	141,125	28,291
Haul Truck - Paving Recycle	5	15	5	0.5	0.083	6,286	20,429	0	0	629	2,043	0	0	105	340	0	0	6,286	20,429	0	0
Haul Truck - Pipe	60	15	10	0.5	0.083	0	44,763	61,265	35,572	0	373	511	296	0	62	85	49	0	44,763	61,265	35,572
Haul Truck - Sand/gravel	50	15	25	0.5	0.083	20,417	743,903	1,130,530	349,963	204	7,439	11,305	3,500	34	1,240	1,884	583	20,417	743,903	1,130,530	349,963
Haul Truck - Asphalt	0	15	10	0.5	0.083	0	0	0	0	0	1,514	1,132	0	0	252	189	0	0	0	0	0
Haul Truck - Concrete	6	15	10	0.5	0.083	0	1,625	2,891	0	0	135	241	0	0	23	40	0	0	1,625	2,891	0
Haul Truck - Contaminated Soil	93	15	30	0.5	0.083	19,729	531,840	953,467	550,597	106	2,859	5,126	2,960	18	477	854	493	46,671	1,258,117	2,255,514	1,302,488
Owner observation	15	15	5	0.5	0.083	9,450	37,800	37,800	31,500	315	1,260	1,260	1,050	53	210	210	175	9,450	37,800	37,800	31,500
Regulatory oversight	15	15	1	0.5	0.083	1,890	7,560	7,560	6,300	63	252	252	210	11	42	42	35	1,890	7,560	7,560	6,300
Contractor supervisory	15	15	8	0.5	0.083	15,120	60,480	60,480	50,400	504	2,016	2,016	1,680	84	336	336	280	15,120	60,480	60,480	50,400
Light-duty utility trucks	15	15	10	0.5	0.083	18,900	75,600	75,600	63,000	630	2,520	2,520	2,100	105	420	420	350	18,900	75,600	75,600	63,000
Fuel truck	10	15	1	0.5	0.083	1,260	5,040	5,040	4,200	63	252	252	210	11	42	42	35	1,260	5,040	5,040	4,200
Maintenance truck	15	15	2	0.5	0.083	3,780	15,120	15,120	12,600	126	504	504	420	21	84	84	70	3,780	15,120	15,120	12,600
Water truck	0	5	2	0.5	0.083	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction Employees	35	15	Variable	0.5	0.083	326,340	4,739,280	5,368,440	2,043,300	4,662	67,704	76,692	29,190	777	11,284	12,782	4,865	326,340	4,739,280	5,368,440	2,043,300

Notes:
All vehicle activity provided by POLB engineering consultant, HDR.
For the purposes of the emission calculations, Construction Years 1 through 4 were assumed to be 2016 through 2019. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

Table A1.1-18
Onroad Construction Vehicles - Peak Daily Activity by Year - Phases 1 and 2, Common to All Build Alternatives

						Offsite Transit (within SCAB) (miles/day)				Onsite Transit (miles/day)				Onsite Idling (hr/day)			
Construction Vehicle	Off-Site One-Way Trip Length (mi/trip)	Average On-Site Travel Speed (mph)	Fleet Size (No. Vehicles)	On-Site Trip Length (mi/trip)	On-Site Idling Time (hr/trip)	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
Debris haul truck	35	15	10	0.5	0.083	3,500	3,500	3,500	3,500	50	50	50	50	8	8	8	8
Haul Truck - Paving Recycle	5	15	5	0.5	0.083	1,200	1,200	0	0	120	120	0	0	20	20	0	0
Haul Truck - Pipe	60	15	10	0.5	0.083	0	4,800	4,800	4,800	0	40	40	40	0	7	7	7
Haul Truck - Sand/gravel	50	15	25	0.5	0.083	15,000	15,000	15,000	15,000	150	150	150	150	25	25	25	25
Haul Truck - Asphalt	0	15	10	0.5	0.083	0	0	0	0	0	40	40	0	0	7	7	0
Haul Truck - Concrete	6	15	10	0.5	0.083	0	480	480	0	0	40	40	0	0	7	7	0
Haul Truck - Contaminated Soil	93	15	30	0.5	0.083	5,580	5,580	5,580	5,580	30	30	30	30	5	5	5	5
Owner observation	15	15	5	0.5	0.083	150	150	150	150	5	5	5	5	1	1	1	1
Regulatory oversight	15	15	1	0.5	0.083	30	30	30	30	1	1	1	1	0	0	0	0
Contractor supervisory	15	15	8	0.5	0.083	240	240	240	240	8	8	8	8	1	1	1	1
Light-duty utility trucks	15	15	10	0.5	0.083	300	300	300	300	10	10	10	10	2	2	2	2
Fuel truck	10	15	1	0.5	0.083	20	20	20	20	1	1	1	1	0	0	0	0
Maintenance truck	15	15	2	0.5	0.083	60	60	60	60	2	2	2	2	0	0	0	0
Water truck	0	5	2	0.5	0.083	0	0	0	0	0	0	0	0	0	0	0	0
Construction Employees	35	15	Variable	0.5	0.083	5,180	29,120	27,580	12,250	74	416	394	175	12	69	66	29

Notes:
For the purposes of the emission calculations, Construction Years 1 through 4 were assumed to be 2016 through 2019. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.
All vehicle activity provided by POLB engineering consultant, HDR.

Table A1.1-19
Onroad Construction Vehicles - Annual Activity by Year - 12th Street Alternative - Phase 3

						Offsite Transit (within SCAB) (miles/year)				Onsite Transit (miles/year)				Onsite Idling (hr/year)				Offsite Transit (within CA borders) (mi/yr)			
Construction Vehicle	Off-Site One-Way Trip Length (mi/trip)	Average On-Site Travel Speed (mph)	Fleet Size (No. Vehicles)	On-Site Trip Length (mi/trip)	On-Site Idling Time (hr/trip)	Year 5	Year 6	Year 7	Year 8	Year 5	Year 6	Year 7	Year 8	Year 5	Year 6	Year 7	Year 8	Year 5	Year 6	Year 7	Year 8
Debris haul truck	35	15	10	0.5	0.083	245,648	33,495	16,748	0	3,509	479	239	0	585	80	40	0	245,648	33,495	16,748	0
Haul Truck - Paving Recycle	5	15	5	0.5	0.083	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haul Truck - Pipe	60	15	10	0.5	0.083	12,660	25,320	12,660	0	106	211	106	0	18	35	18	0	12,660	25,320	12,660	0
Haul Truck - Sand/gravel	50	15	25	0.5	0.083	436,250	531,625	869,375	661,250	4,363	5,316	8,694	6,613	727	886	1,449	1,102	436,250	531,625	869,375	661,250
Haul Truck - Asphalt	0	15	10	0.5	0.083	0	0	0	0	0	246	0	0	0	41	0	0	0	0	0	0
Haul Truck - Concrete	6	15	10	0.5	0.083	0	2,264	965	0	0	189	80	0	0	31	13	0	0	2,264	965	0
Haul Truck - Contaminated Soil	93	15	30	0.5	0.083	530,323	438,306	439,568	237,541	2,851	2,356	2,363	1,277	475	393	394	213	1,254,528	1,036,852	1,039,839	561,924
Owner observation	15	15	5	0.5	0.083	37,800	37,800	37,800	37,800	1,260	1,260	1,260	1,260	210	210	210	210	37,800	37,800	37,800	37,800
Regulatory oversight	15	15	1	0.5	0.083	7,560	7,560	7,560	7,560	252	252	252	252	42	42	42	42	7,560	7,560	7,560	7,560
Contractor supervisory	15	15	8	0.5	0.083	60,480	60,480	60,480	60,480	2,016	2,016	2,016	2,016	336	336	336	336	60,480	60,480	60,480	60,480
Light-duty utility trucks	15	15	10	0.5	0.083	75,600	75,600	75,600	75,600	2,520	2,520	2,520	2,520	420	420	420	420	75,600	75,600	75,600	75,600
Fuel truck	10	15	1	0.5	0.083	5,040	5,040	5,040	5,040	252	252	252	252	42	42	42	42	5,040	5,040	5,040	5,040
Maintenance truck	15	15	2	0.5	0.083	15,120	15,120	15,120	15,120	504	504	504	504	84	84	84	84	15,120	15,120	15,120	15,120
Water truck	0	5	2	0.5	0.083	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction Employees	35	15	Variable	0.5	0.083	1,719,900	2,870,910	2,002,140	917,280	24,570	41,013	28,602	13,104	4,095	6,836	4,767	2,184	1,719,900	2,870,910	2,002,140	917,280

Notes:

For the purposes of the emission calculations, Construction Years 5 through 8 were assumed to be 2020 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.
All vehicle activity provided by POLB engineering consultant, HDR.

Table A1.1-20
Onroad Construction Vehicles - Peak Daily Activity by Year - 12th Street Alternative - Phase 3

						Offsite Transit (within SCAB) (miles/day)				Onsite Transit (miles/day)				Onsite Idling (hr/day)			
Construction Vehicle	Off-Site One-Way Trip Length (mi/trip)	Average On-Site Travel Speed (mph)	Fleet Size (No. Vehicles)	On-Site Trip Length (mi/trip)	On-Site Idling Time (hr/trip)	Year 5	Year 6	Year 7	Year 8	Year 5	Year 6	Year 7	Year 8	Year 5	Year 6	Year 7	Year 8
Debris haul truck	35	15	10	0.5	0.083	3,500	3,500	3,500	0	0	0	0	0	8	8	8	0
Haul Truck - Paving Recycle	5	15	5	0.5	0.083	0	0	0	0	0	0	0	0	0	0	0	0
Haul Truck - Pipe	60	15	10	0.5	0.083	4,800	4,800	4,800	0	40	40	40	0	7	7	7	0
Haul Truck - Sand/gravel	50	15	25	0.5	0.083	15,000	15,000	15,000	15,000	150	150	150	150	25	25	25	25
Haul Truck - Asphalt	0	15	10	0.5	0.083	0	0	0	0	0	40	0	0	0	7	0	0
Haul Truck - Concrete	6	15	10	0.5	0.083	0	480	480	0	0	40	40	0	0	7	7	0
Haul Truck - Contaminated Soil	93	15	30	0.5	0.083	5,580	5,580	5,580	5,580	30	30	30	30	5	5	5	5
Owner observation	15	15	5	0.5	0.083	150	150	150	150	5	5	5	5	1	1	1	1
Regulatory oversight	15	15	1	0.5	0.083	30	30	30	30	1	1	1	1	0	0	0	0
Contractor supervisory	15	15	8	0.5	0.083	240	240	240	240	8	8	8	8	1	1	1	1
Light-duty utility trucks	15	15	10	0.5	0.083	300	300	300	300	10	10	10	10	2	2	2	2
Fuel truck	10	15	1	0.5	0.083	20	20	20	20	1	1	1	1	0	0	0	0
Maintenance truck	15	15	2	0.5	0.083	60	60	60	60	2	2	2	2	0	0	0	0
Water truck	0	5	2	0.5	0.083	0	0	0	0	0	0	0	0	0	0	0	0
Construction Employees	35	15	Variable	0.5	0.083	11,060	14,700	12,250	3,640	158	210	175	52	26	35	29	9

Notes:

For the purposes of the emission calculations, Construction Years 5 through 8 were assumed to be 2020 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.
All vehicle activity provided by POLB engineering consultant, HDR.

Table A1.1-21
Onroad Construction Vehicles - Annual Activity by Year - 10th Street Alternative - Phase 3

						Offsite Transit (within SCAB) (miles/year)				Onsite Transit (miles/year)				Onsite Idling (hr/year)				Offsite Transit (within CA borders) (mi/yr)			
Construction Vehicle	Off-Site One-Way Trip Length (mi/trip)	Average On-Site Travel Speed (mph)	Fleet Size (No. Vehicles)	On-Site Trip Length (mi/trip)	On-Site Idling Time (hr/trip)	Year 5	Year 6	Year 7	Year 8	Year 5	Year 6	Year 7	Year 8	Year 5	Year 6	Year 7	Year 8	Year 5	Year 6	Year 7	Year 8
Debris haul truck	35	15	10	0.5	0.083	416,780	21,560	0	0	5,954	308	0	0	992	51	0	0	416,780	21,560	0	0
Haul Truck - Paving Recycle	5	15	5	0.5	0.083	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haul Truck - Pipe	60	15	10	0.5	0.083	10,600	21,200	0	0	88	177	0	0	15	29	0	0	10,600	21,200	0	0
Haul Truck - Sand/gravel	50	15	25	0.5	0.083	154,583	224,167	82,125	273,500	1,546	2,242	821	2,735	258	374	137	456	154,583	224,167	82,125	273,500
Haul Truck - Asphalt	0	15	10	0.5	0.083	0	0	0	0	0	30	30	0	0	5	5	0	0	0	0	0
Haul Truck - Concrete	6	15	10	0.5	0.083	0	109	687	0	0	9	57	0	0	2	10	0	0	109	687	0
Haul Truck - Contaminated Soil	93	15	30	0.5	0.083	102,066	208,078	53,821	199,503	549	1,119	289	1,073	91	186	48	179	241,447	492,228	127,320	471,941
Owner observation	15	15	5	0.5	0.083	37,800	37,800	37,800	37,800	1,260	1,260	1,260	1,260	210	210	210	210	37,800	37,800	37,800	37,800
Regulatory oversight	15	15	1	0.5	0.083	7,560	7,560	7,560	7,560	252	252	252	252	42	42	42	42	7,560	7,560	7,560	7,560
Contractor supervisory	15	15	8	0.5	0.083	60,480	60,480	60,480	60,480	2,016	2,016	2,016	2,016	336	336	336	336	60,480	60,480	60,480	60,480
Light-duty utility trucks	15	15	10	0.5	0.083	75,600	75,600	75,600	75,600	2,520	2,520	2,520	2,520	420	420	420	420	75,600	75,600	75,600	75,600
Fuel truck	10	15	1	0.5	0.083	5,040	5,040	5,040	5,040	252	252	252	252	42	42	42	42	5,040	5,040	5,040	5,040
Maintenance truck	15	15	2	0.5	0.083	15,120	15,120	15,120	15,120	504	504	504	504	84	84	84	84	15,120	15,120	15,120	15,120
Water truck	0	5	2	0.5	0.083	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction Employees	35	15	Variable	0.5	0.083	1,931,580	1,543,500	1,397,970	899,640	27,594	22,050	19,971	12,852	4,599	3,675	3,329	2,142	1,931,580	1,543,500	1,397,970	899,640

Notes:
For the purposes of the emission calculations, Construction Years 5 through 8 were assumed to be 2020 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.
All vehicle activity provided by POLB engineering consultant, HDR.

Table A1.1-22
Onroad Construction Vehicles - Peak Daily Activity by Year - 10th Street Alternative - Phase 3

						Offsite Transit (within SCAB) (miles/day)				Onsite Transit (miles/day)				Onsite Idling (hr/day)			
Construction Vehicle	Off-Site One-Way Trip Length (mi/trip)	Average On-Site Travel Speed (mph)	Fleet Size (No. Vehicles)	On-Site Trip Length (mi/trip)	On-Site Idling Time (hr/trip)	Year 5	Year 6	Year 7	Year 8	Year 5	Year 6	Year 7	Year 8	Year 5	Year 6	Year 7	Year 8
Debris haul truck	35	15	10	0.5	0.083	3,500	3,500	0	0	0	0	0	0	8	8	0	0
Haul Truck - Paving Recycle	5	15	5	0.5	0.083	0	0	0	0	0	0	0	0	0	0	0	0
Haul Truck - Pipe	60	15	10	0.5	0.083	4,800	4,800	0	0	40	40	0	0	7	7	0	0
Haul Truck - Sand/gravel	50	15	25	0.5	0.083	15,000	15,000	15,000	15,000	150	150	150	150	25	25	25	25
Haul Truck - Asphalt	0	15	10	0.5	0.083	0	0	0	0	0	40	40	0	0	7	7	0
Haul Truck - Concrete	6	15	10	0.5	0.083	0	218	480	0	0	18	40	0	0	3	7	0
Haul Truck - Contaminated Soil	93	15	30	0.5	0.083	5,580	5,580	5,580	5,580	30	30	30	30	5	5	5	5
Owner observation	15	15	5	0.5	0.083	150	150	150	150	5	5	5	5	1	1	1	1
Regulatory oversight	15	15	1	0.5	0.083	30	30	30	30	1	1	1	1	0	0	0	0
Contractor supervisory	15	15	8	0.5	0.083	240	240	240	240	8	8	8	8	1	1	1	1
Light-duty utility trucks	15	15	10	0.5	0.083	300	300	300	300	10	10	10	10	2	2	2	2
Fuel truck	10	15	1	0.5	0.083	20	20	20	20	1	1	1	1	0	0	0	0
Maintenance truck	15	15	2	0.5	0.083	60	60	60	60	2	2	2	2	0	0	0	0
Water truck	0	5	2	0.5	0.083	0	0	0	0	0	0	0	0	0	0	0	0
Construction Employees	35	15	Variable	0.5	0.083	12,740	9,380	7,910	3,570	182	134	113	51	30	22	19	9

Notes:
For the purposes of the emission calculations, Construction Years 5 through 8 were assumed to be 2020 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.
All vehicle activity provided by POLB engineering consultant, HDR.

Table A1.1-23
Construction Equipment - Unmitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2016	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.306	2.252	2.628	0.206	0.189	0.002	220.674	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.113	0.814	1.550	0.055	0.051	0.002	187.692	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.110	0.814	1.572	0.052	0.048	0.002	188.957	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.085	2.133	1.383	0.033	0.031	0.002	189.007	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.109	0.631	1.395	0.048	0.044	0.002	195.728	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.208	2.090	1.895	0.146	0.134	0.002	198.082	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.140	0.690	1.546	0.058	0.054	0.002	204.688	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.285	1.484	3.048	0.142	0.130	0.002	213.304	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.228	1.939	2.417	0.127	0.117	0.002	220.069	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.134	0.602	1.627	0.067	0.062	0.001	153.272	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.120	0.643	1.631	0.053	0.049	0.002	195.392	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.495	3.276	1.964	0.172	0.159	0.002	222.440	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	1.546	0.058	0.054	0.002	204.688	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	1.546	0.058	0.054	0.002	204.688	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.085	0.672	1.075	0.035	0.032	0.002	202.452	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	1.546	0.058	0.054	0.002	204.688	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.170	0.793	2.314	0.075	0.069	0.002	219.841	0.006	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.306	2.252	2.628	0.206	0.189	0.002	220.674	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.373	2.587	2.940	0.260	0.239	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.148	0.725	1.674	0.063	0.058	0.002	190.329	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.214	1.801	2.072	0.116	0.106	0.002	192.117	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.228	1.289	2.777	0.112	0.103	0.002	256.774	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.133	1.810	1.590	0.074	0.068	0.002	199.537	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.228	1.939	2.417	0.127	0.117	0.002	220.069	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	1.546	0.058	0.054	0.002	204.688	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.133	1.810	1.590	0.074	0.068	0.002	199.537	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	1.546	0.058	0.054	0.002	204.688	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	1.546	0.058	0.054	0.002	204.688	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.008	0.001				
	Grading VMT		lb/VMT				0.602	0.065				
	Bulldozing		lb/hr				0.294	0.161				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-23
Construction Equipment - Unmitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2017	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.294	2.241	2.521	0.197	0.181	0.002	220.625	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.106	0.784	1.416	0.051	0.047	0.002	187.565	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.107	0.784	1.463	0.050	0.046	0.002	189.110	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.077	2.118	1.192	0.029	0.026	0.002	189.010	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.105	0.622	1.286	0.045	0.041	0.002	195.609	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.193	2.079	1.772	0.133	0.123	0.002	197.845	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.130	0.675	1.401	0.052	0.048	0.002	204.485	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.274	1.394	2.899	0.135	0.124	0.002	213.523	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.218	1.939	2.282	0.121	0.111	0.002	219.980	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.124	0.576	1.507	0.061	0.056	0.001	153.339	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.112	0.638	1.489	0.049	0.045	0.002	195.503	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.470	3.192	1.913	0.163	0.150	0.002	222.366	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	1.401	0.052	0.048	0.002	204.485	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	1.401	0.052	0.048	0.002	204.485	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.080	0.660	0.957	0.031	0.028	0.002	202.598	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	1.401	0.052	0.048	0.002	204.485	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.169	0.775	2.258	0.074	0.068	0.002	219.867	0.006	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.294	2.241	2.521	0.197	0.181	0.002	220.625	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.344	2.577	2.743	0.237	0.218	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.140	0.701	1.539	0.058	0.053	0.002	190.184	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.197	1.799	1.880	0.105	0.096	0.002	192.145	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.215	1.225	2.576	0.103	0.095	0.002	256.762	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.123	1.806	1.453	0.068	0.062	0.002	199.484	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.218	1.939	2.282	0.121	0.111	0.002	219.980	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	1.401	0.052	0.048	0.002	204.485	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.123	1.806	1.453	0.068	0.062	0.002	199.484	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	1.401	0.052	0.048	0.002	204.485	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	1.401	0.052	0.048	0.002	204.485	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.008	0.001				
	Grading VMT		lb/VMT				0.602	0.065				
	Bulldozing		lb/hr				0.294	0.161				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-23
Construction Equipment - Unmitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2018	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.260	2.230	2.260	0.173	0.159	0.002	220.845	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.089	0.756	1.134	0.041	0.038	0.002	187.600	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.096	0.756	1.274	0.044	0.040	0.002	189.043	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.079	2.104	1.197	0.029	0.027	0.002	189.012	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.086	0.614	0.983	0.034	0.031	0.002	194.422	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.162	2.070	1.531	0.108	0.100	0.002	197.552	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.115	0.664	1.180	0.043	0.040	0.002	204.480	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.247	1.313	2.570	0.119	0.109	0.002	213.662	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.190	1.939	1.975	0.104	0.096	0.002	219.929	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.111	0.555	1.335	0.054	0.050	0.001	153.439	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.100	0.634	1.275	0.041	0.038	0.002	195.686	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.418	3.114	1.817	0.145	0.133	0.002	222.379	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	1.180	0.043	0.040	0.002	204.480	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	1.180	0.043	0.040	0.002	204.480	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.070	0.650	0.783	0.025	0.023	0.002	202.655	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	1.180	0.043	0.040	0.002	204.480	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.164	0.761	2.154	0.070	0.064	0.002	219.683	0.006	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.260	2.230	2.260	0.173	0.159	0.002	220.845	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.286	2.571	2.340	0.195	0.180	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.126	0.681	1.348	0.050	0.046	0.002	190.210	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.170	1.797	1.580	0.088	0.081	0.002	192.150	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.186	1.169	2.203	0.087	0.080	0.002	256.860	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.104	1.803	1.194	0.055	0.051	0.002	199.539	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.190	1.939	1.975	0.104	0.096	0.002	219.929	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	1.180	0.043	0.040	0.002	204.480	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.104	1.803	1.194	0.055	0.051	0.002	199.539	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	1.180	0.043	0.040	0.002	204.480	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	1.180	0.043	0.040	0.002	204.480	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.008	0.001				
	Grading VMT		lb/VMT				0.602	0.065				
	Bulldozing		lb/hr				0.294	0.161				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-23
Construction Equipment - Unmitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2019	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.239	2.220	2.097	0.157	0.145	0.002	220.872	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.085	0.733	1.057	0.038	0.035	0.002	187.594	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.089	0.733	1.154	0.040	0.036	0.002	188.977	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.082	2.090	1.202	0.030	0.027	0.002	189.015	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.079	0.608	0.864	0.030	0.028	0.002	194.661	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.142	2.063	1.361	0.091	0.084	0.002	197.413	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.105	0.655	1.019	0.037	0.034	0.002	204.393	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.237	1.240	2.428	0.112	0.103	0.002	213.744	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.179	1.938	1.841	0.097	0.089	0.002	220.064	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.105	0.537	1.238	0.050	0.046	0.001	153.479	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.094	0.630	1.160	0.038	0.035	0.002	195.611	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.382	3.044	1.743	0.131	0.121	0.002	222.388	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	1.019	0.037	0.034	0.002	204.393	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	1.019	0.037	0.034	0.002	204.393	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.065	0.642	0.680	0.022	0.020	0.002	202.647	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	1.019	0.037	0.034	0.002	204.393	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.154	0.751	1.989	0.064	0.059	0.002	219.163	0.005	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.239	2.220	2.097	0.157	0.145	0.002	220.872	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.262	2.566	2.174	0.176	0.162	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.116	0.664	1.189	0.044	0.041	0.002	190.308	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.153	1.795	1.396	0.077	0.071	0.002	192.181	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.173	1.120	2.005	0.079	0.072	0.002	256.771	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.091	1.801	1.013	0.046	0.043	0.002	199.595	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.179	1.938	1.841	0.097	0.089	0.002	220.064	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	1.019	0.037	0.034	0.002	204.393	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.091	1.801	1.013	0.046	0.043	0.002	199.595	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	1.019	0.037	0.034	0.002	204.393	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	1.019	0.037	0.034	0.002	204.393	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.008	0.001				
	Grading VMT		lb/VMT				0.602	0.065				
	Bulldozing		lb/hr				0.294	0.161				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-23
Construction Equipment - Unmitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2020	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.226	2.214	1.982	0.147	0.135	0.002	221.098	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.080	0.713	0.968	0.035	0.032	0.002	187.586	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.090	0.713	1.143	0.039	0.036	0.002	188.977	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.070	2.078	0.971	0.023	0.021	0.002	189.017	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.075	0.602	0.766	0.027	0.025	0.002	194.486	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.128	2.056	1.226	0.077	0.071	0.002	197.356	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.896	0.033	0.030	0.002	204.284	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.221	1.177	2.230	0.102	0.094	0.002	213.759	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.169	1.938	1.708	0.090	0.083	0.002	220.053	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.097	0.521	1.113	0.045	0.041	0.001	153.453	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.087	0.627	1.009	0.033	0.030	0.002	195.422	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.364	2.980	1.701	0.123	0.114	0.002	222.396	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.896	0.033	0.030	0.002	204.284	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.896	0.033	0.030	0.002	204.284	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.061	0.636	0.600	0.020	0.018	0.002	202.441	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.896	0.033	0.030	0.002	204.284	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.151	0.742	1.912	0.061	0.056	0.002	243.470	0.006	0.014
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.226	2.214	1.982	0.147	0.135	0.002	221.098	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.248	2.559	2.042	0.164	0.151	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.109	0.650	1.091	0.041	0.037	0.002	190.354	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.143	1.794	1.273	0.070	0.064	0.002	192.160	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.161	1.078	1.825	0.071	0.065	0.002	256.736	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.085	1.799	0.920	0.042	0.039	0.002	199.575	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.169	1.938	1.708	0.090	0.083	0.002	220.053	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.896	0.033	0.030	0.002	204.284	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.085	1.799	0.920	0.042	0.039	0.002	199.575	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.896	0.033	0.030	0.002	204.284	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.896	0.033	0.030	0.002	204.284	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.008	0.001				
	Grading VMT		lb/VMT				0.602	0.065				
	Bulldozing		lb/hr				0.294	0.161				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-23
Construction Equipment - Unmitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2021	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.209	2.209	1.851	0.134	0.124	0.002	221.125	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.077	0.697	0.878	0.032	0.029	0.002	187.635	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.078	0.697	0.917	0.033	0.030	0.002	188.977	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.065	2.067	0.843	0.019	0.018	0.002	189.370	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.069	0.598	0.654	0.024	0.022	0.002	194.925	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.114	2.051	1.104	0.065	0.060	0.002	197.442	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.746	0.027	0.025	0.002	204.269	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.204	1.120	2.009	0.092	0.084	0.002	213.416	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.143	1.938	1.428	0.075	0.069	0.002	219.950	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.089	0.509	0.992	0.040	0.037	0.001	153.420	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.081	0.624	0.873	0.029	0.027	0.002	195.452	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.333	2.924	1.632	0.110	0.101	0.002	222.358	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.746	0.027	0.025	0.002	204.269	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.746	0.027	0.025	0.002	204.269	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.057	0.632	0.509	0.017	0.016	0.002	202.148	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.746	0.027	0.025	0.002	204.269	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.143	0.735	1.791	0.057	0.052	0.002	218.602	0.005	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.209	2.209	1.851	0.134	0.124	0.002	221.125	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.210	2.544	1.805	0.133	0.122	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.100	0.637	0.944	0.035	0.032	0.002	190.820	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.131	1.793	1.128	0.062	0.057	0.002	192.106	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.151	1.041	1.662	0.065	0.059	0.002	256.893	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.076	1.797	0.794	0.037	0.034	0.002	199.601	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.143	1.938	1.428	0.075	0.069	0.002	219.950	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.746	0.027	0.025	0.002	204.269	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.076	1.797	0.794	0.037	0.034	0.002	199.601	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.746	0.027	0.025	0.002	204.269	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.746	0.027	0.025	0.002	204.269	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.008	0.001				
	Grading VMT		lb/VMT				0.602	0.065				
	Bulldozing		lb/hr				0.294	0.161				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-23
Construction Equipment - Unmitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2022	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.191	2.205	1.702	0.120	0.110	0.002	221.145	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.066	0.683	0.664	0.026	0.024	0.002	187.697	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.073	0.683	0.791	0.029	0.027	0.002	188.984	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.055	2.056	0.626	0.014	0.013	0.002	189.380	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.062	0.595	0.530	0.020	0.018	0.002	194.906	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.100	2.048	0.975	0.052	0.048	0.002	197.664	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.569	0.021	0.019	0.002	204.342	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.196	1.069	1.900	0.087	0.080	0.002	213.561	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.128	1.938	1.244	0.065	0.060	0.002	219.879	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.079	0.498	0.834	0.034	0.031	0.001	153.331	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.072	0.622	0.716	0.025	0.023	0.002	195.266	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.290	2.874	1.549	0.094	0.086	0.002	222.316	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.569	0.021	0.019	0.002	204.342	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.569	0.021	0.019	0.002	204.342	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.051	0.629	0.397	0.013	0.012	0.002	202.189	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.569	0.021	0.019	0.002	204.342	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.131	0.729	1.589	0.051	0.046	0.002	218.464	0.005	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.191	2.205	1.702	0.120	0.110	0.002	221.145	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.178	2.537	1.582	0.106	0.097	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.090	0.627	0.787	0.029	0.027	0.002	190.902	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.112	1.792	0.911	0.049	0.045	0.002	192.044	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.133	1.009	1.389	0.054	0.050	0.002	257.310	0.006	0.015
	Sheepsfoot Roller	Rollers	g/hp-hr	0.065	1.796	0.643	0.030	0.027	0.002	199.588	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.128	1.938	1.244	0.065	0.060	0.002	219.879	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.569	0.021	0.019	0.002	204.342	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.065	1.796	0.643	0.030	0.027	0.002	199.588	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.569	0.021	0.019	0.002	204.342	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.569	0.021	0.019	0.002	204.342	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.008	0.001				
	Grading VMT		lb/VMT				0.602	0.065				
	Bulldozing		lb/hr				0.294	0.161				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-23
Construction Equipment - Unmitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2023	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.176	2.202	1.574	0.108	0.099	0.002	220.992	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.058	0.671	0.555	0.020	0.019	0.002	187.721	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.065	0.671	0.669	0.025	0.023	0.002	188.984	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.047	2.046	0.456	0.013	0.012	0.002	188.684	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.059	0.593	0.460	0.017	0.016	0.002	194.993	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.092	2.045	0.894	0.044	0.041	0.002	197.886	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.506	0.018	0.017	0.002	204.487	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.185	1.024	1.743	0.080	0.073	0.002	213.631	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.119	1.938	1.121	0.058	0.054	0.002	219.853	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.071	0.490	0.723	0.029	0.027	0.001	153.367	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.065	0.620	0.585	0.021	0.020	0.002	195.112	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.259	2.831	1.471	0.079	0.073	0.002	222.388	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.506	0.018	0.017	0.002	204.487	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.506	0.018	0.017	0.002	204.487	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.049	0.627	0.341	0.012	0.011	0.002	202.266	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.506	0.018	0.017	0.002	204.487	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.121	0.723	1.406	0.046	0.042	0.002	218.319	0.005	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.176	2.202	1.574	0.108	0.099	0.002	220.992	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.167	2.531	1.497	0.095	0.088	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.082	0.617	0.675	0.025	0.023	0.002	191.040	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.102	1.791	0.794	0.043	0.039	0.002	191.935	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.128	0.981	1.286	0.050	0.046	0.002	257.281	0.006	0.015
	Sheepsfoot Roller	Rollers	g/hp-hr	0.059	1.795	0.557	0.025	0.023	0.002	199.582	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.119	1.938	1.121	0.058	0.054	0.002	219.853	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.506	0.018	0.017	0.002	204.487	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.059	1.795	0.557	0.025	0.023	0.002	199.582	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.506	0.018	0.017	0.002	204.487	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.506	0.018	0.017	0.002	204.487	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.008	0.001				
	Grading VMT		lb/VMT				0.602	0.065				
	Bulldozing		lb/hr				0.294	0.161				
	Truck Loading		lb/ton				0.000	0.000				

Notes:
1. Construction equipment exhaust emission factors for VOC, NOx, PM10, and PM2.5 are from CARB's Offroad 2011.
2. Construction equipment exhaust emission factors for CO are from CARB's Offroad 2007 because Offroad 2011 does not provide CO calculations.
3. Construction exhaust emission factors for SOx are calculated based on brake specific fuel consumption (BSFC) and 15 ppm sulfur content of fuel.
4. Construction exhaust emission factors for CO2, CH4, and N2O are based on BSFC and The Climate Registry protocol.
5. Each "g/hp-hr" emission factor in the table has been pre-multiplied by the equipment's load factor. This means that the emission factors are in units of grams per rated hp-hr, where "rated hp-hr" represents the equipment's rated horsepower × operating hours.
6. Asphalt paving, demolition, and debris loading emission factors, are from SCAQMD's CalEEMod supporting tables.
7. Grading and bulldozing emission factors are from AP42 11.9 and CalEEMod supporting tables.
8. Truck loading emission factors are from AP42 13.2 and CalEEMod supporting tables.
9. Fugitive dust control assumes watering 3-4 times per day, resulting in 61% control.

Table A1.1-24
Construction Equipment - Mitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2016	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.175	2.252	2.628	0.022	0.022	0.002	220.674	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.113	0.814	0.300	0.015	0.015	0.002	187.692	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.110	0.814	0.300	0.015	0.015	0.002	188.957	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.085	2.133	0.300	0.015	0.015	0.002	189.007	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.109	0.631	0.300	0.015	0.015	0.002	195.728	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.140	2.090	0.300	0.015	0.015	0.002	198.082	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.140	0.690	0.300	0.015	0.015	0.002	204.688	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.140	1.484	0.300	0.015	0.015	0.002	213.304	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.140	1.939	0.300	0.015	0.015	0.002	220.069	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.134	0.602	0.300	0.015	0.015	0.001	153.272	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.120	0.643	0.300	0.015	0.015	0.002	195.392	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.175	3.276	1.964	0.022	0.022	0.002	222.440	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	0.300	0.015	0.015	0.002	204.688	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	0.300	0.015	0.015	0.002	204.688	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.085	0.672	0.300	0.015	0.015	0.002	202.452	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	0.300	0.015	0.015	0.002	204.688	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.140	0.793	0.300	0.015	0.015	0.002	219.841	0.006	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.140	2.252	0.300	0.015	0.015	0.002	220.674	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.175	2.587	2.940	0.022	0.022	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.140	0.725	0.300	0.015	0.015	0.002	190.329	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.140	1.801	0.300	0.015	0.015	0.002	192.117	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.140	1.289	0.300	0.015	0.015	0.002	256.774	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.133	1.810	0.300	0.015	0.015	0.002	199.537	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.140	1.939	0.300	0.015	0.015	0.002	220.069	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	0.300	0.015	0.015	0.002	204.688	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.133	1.810	0.300	0.015	0.015	0.002	199.537	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	0.300	0.015	0.015	0.002	204.688	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.140	0.690	0.300	0.015	0.015	0.002	204.688	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.005	0.001				
	Grading VMT		lb/VMT				0.401	0.043				
	Bulldozing		lb/hr				0.196	0.108				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-24
Construction Equipment - Mitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2017	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.175	2.241	2.521	0.022	0.022	0.002	220.625	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.106	0.784	0.300	0.015	0.015	0.002	187.565	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.107	0.784	0.300	0.015	0.015	0.002	189.110	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.077	2.118	0.300	0.015	0.015	0.002	189.010	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.105	0.622	0.300	0.015	0.015	0.002	195.609	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.140	2.079	0.300	0.015	0.015	0.002	197.845	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.130	0.675	0.300	0.015	0.015	0.002	204.485	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.140	1.394	0.300	0.015	0.015	0.002	213.523	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.140	1.939	0.300	0.015	0.015	0.002	219.980	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.124	0.576	0.300	0.015	0.015	0.001	153.339	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.112	0.638	0.300	0.015	0.015	0.002	195.503	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.175	3.192	1.913	0.022	0.022	0.002	222.366	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	0.300	0.015	0.015	0.002	204.485	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	0.300	0.015	0.015	0.002	204.485	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.080	0.660	0.300	0.015	0.015	0.002	202.598	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	0.300	0.015	0.015	0.002	204.485	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.140	0.775	0.300	0.015	0.015	0.002	219.867	0.006	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.140	2.241	0.300	0.015	0.015	0.002	220.625	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.175	2.577	2.743	0.022	0.022	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.140	0.701	0.300	0.015	0.015	0.002	190.184	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.140	1.799	0.300	0.015	0.015	0.002	192.145	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.140	1.225	0.300	0.015	0.015	0.002	256.762	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.123	1.806	0.300	0.015	0.015	0.002	199.484	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.140	1.939	0.300	0.015	0.015	0.002	219.980	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	0.300	0.015	0.015	0.002	204.485	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.123	1.806	0.300	0.015	0.015	0.002	199.484	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	0.300	0.015	0.015	0.002	204.485	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.130	0.675	0.300	0.015	0.015	0.002	204.485	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.005	0.001				
	Grading VMT		lb/VMT				0.401	0.043				
	Bulldozing		lb/hr				0.196	0.108				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-24
Construction Equipment - Mitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2018	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.175	2.230	2.260	0.022	0.022	0.002	220.845	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.089	0.756	0.300	0.015	0.015	0.002	187.600	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.096	0.756	0.300	0.015	0.015	0.002	189.043	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.079	2.104	0.300	0.015	0.015	0.002	189.012	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.086	0.614	0.300	0.015	0.015	0.002	194.422	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.140	2.070	0.300	0.015	0.015	0.002	197.552	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.115	0.664	0.300	0.015	0.015	0.002	204.480	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.140	1.313	0.300	0.015	0.015	0.002	213.662	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.140	1.939	0.300	0.015	0.015	0.002	219.929	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.111	0.555	0.300	0.015	0.015	0.001	153.439	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.100	0.634	0.300	0.015	0.015	0.002	195.686	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.175	3.114	1.817	0.022	0.022	0.002	222.379	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	0.300	0.015	0.015	0.002	204.480	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	0.300	0.015	0.015	0.002	204.480	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.070	0.650	0.300	0.015	0.015	0.002	202.655	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	0.300	0.015	0.015	0.002	204.480	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.140	0.761	0.300	0.015	0.015	0.002	219.683	0.006	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.140	2.230	0.300	0.015	0.015	0.002	220.845	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.175	2.571	2.340	0.022	0.022	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.126	0.681	0.300	0.015	0.015	0.002	190.210	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.140	1.797	0.300	0.015	0.015	0.002	192.150	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.140	1.169	0.300	0.015	0.015	0.002	256.860	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.104	1.803	0.300	0.015	0.015	0.002	199.539	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.140	1.939	0.300	0.015	0.015	0.002	219.929	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	0.300	0.015	0.015	0.002	204.480	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.104	1.803	0.300	0.015	0.015	0.002	199.539	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	0.300	0.015	0.015	0.002	204.480	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.115	0.664	0.300	0.015	0.015	0.002	204.480	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.005	0.001				
	Grading VMT		lb/VMT				0.401	0.043				
	Bulldozing		lb/hr				0.196	0.108				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-24
Construction Equipment - Mitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2019	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.175	2.220	2.097	0.022	0.022	0.002	220.872	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.085	0.733	0.300	0.015	0.015	0.002	187.594	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.089	0.733	0.300	0.015	0.015	0.002	188.977	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.082	2.090	0.300	0.015	0.015	0.002	189.015	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.079	0.608	0.300	0.015	0.015	0.002	194.661	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.140	2.063	0.300	0.015	0.015	0.002	197.413	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.105	0.655	0.300	0.015	0.015	0.002	204.393	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.140	1.240	0.300	0.015	0.015	0.002	213.744	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.140	1.938	0.300	0.015	0.015	0.002	220.064	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.105	0.537	0.300	0.015	0.015	0.001	153.479	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.094	0.630	0.300	0.015	0.015	0.002	195.611	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.175	3.044	1.743	0.022	0.022	0.002	222.388	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	0.300	0.015	0.015	0.002	204.393	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	0.300	0.015	0.015	0.002	204.393	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.065	0.642	0.300	0.015	0.015	0.002	202.647	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	0.300	0.015	0.015	0.002	204.393	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.140	0.751	0.300	0.015	0.015	0.002	219.163	0.005	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.140	2.220	0.300	0.015	0.015	0.002	220.872	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.175	2.566	2.174	0.022	0.022	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.116	0.664	0.300	0.015	0.015	0.002	190.308	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.140	1.795	0.300	0.015	0.015	0.002	192.181	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.140	1.120	0.300	0.015	0.015	0.002	256.771	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.091	1.801	0.300	0.015	0.015	0.002	199.595	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.140	1.938	0.300	0.015	0.015	0.002	220.064	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	0.300	0.015	0.015	0.002	204.393	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.091	1.801	0.300	0.015	0.015	0.002	199.595	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	0.300	0.015	0.015	0.002	204.393	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.105	0.655	0.300	0.015	0.015	0.002	204.393	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.005	0.001				
	Grading VMT		lb/VMT				0.401	0.043				
	Bulldozing		lb/hr				0.196	0.108				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-24
Construction Equipment - Mitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2020	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.175	2.214	1.982	0.022	0.022	0.002	221.098	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.080	0.713	0.300	0.015	0.015	0.002	187.586	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.090	0.713	0.300	0.015	0.015	0.002	188.977	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.070	2.078	0.300	0.015	0.015	0.002	189.017	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.075	0.602	0.300	0.015	0.015	0.002	194.486	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.128	2.056	0.300	0.015	0.015	0.002	197.356	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.300	0.015	0.015	0.002	204.284	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.140	1.177	0.300	0.015	0.015	0.002	213.759	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.140	1.938	0.300	0.015	0.015	0.002	220.053	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.097	0.521	0.300	0.015	0.015	0.001	153.453	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.087	0.627	0.300	0.015	0.015	0.002	195.422	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.175	2.980	1.701	0.022	0.022	0.002	222.396	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.300	0.015	0.015	0.002	204.284	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.300	0.015	0.015	0.002	204.284	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.061	0.636	0.300	0.015	0.015	0.002	202.441	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.300	0.015	0.015	0.002	204.284	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.140	0.742	0.300	0.015	0.015	0.002	243.470	0.006	0.014
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.140	2.214	0.300	0.015	0.015	0.002	221.098	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.175	2.559	2.042	0.022	0.022	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.109	0.650	0.300	0.015	0.015	0.002	190.354	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.140	1.794	0.300	0.015	0.015	0.002	192.160	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.140	1.078	0.300	0.015	0.015	0.002	256.736	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.085	1.799	0.300	0.015	0.015	0.002	199.575	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.140	1.938	0.300	0.015	0.015	0.002	220.053	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.300	0.015	0.015	0.002	204.284	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.085	1.799	0.300	0.015	0.015	0.002	199.575	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.300	0.015	0.015	0.002	204.284	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.098	0.648	0.300	0.015	0.015	0.002	204.284	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.005	0.001				
	Grading VMT		lb/VMT				0.401	0.043				
	Bulldozing		lb/hr				0.196	0.108				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-24
Construction Equipment - Mitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2021	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.175	2.209	1.851	0.022	0.022	0.002	221.125	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.077	0.697	0.300	0.015	0.015	0.002	187.635	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.078	0.697	0.300	0.015	0.015	0.002	188.977	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.065	2.067	0.300	0.015	0.015	0.002	189.370	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.069	0.598	0.300	0.015	0.015	0.002	194.925	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.114	2.051	0.300	0.015	0.015	0.002	197.442	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.300	0.015	0.015	0.002	204.269	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.140	1.120	0.300	0.015	0.015	0.002	213.416	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.140	1.938	0.300	0.015	0.015	0.002	219.950	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.089	0.509	0.300	0.015	0.015	0.001	153.420	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.081	0.624	0.300	0.015	0.015	0.002	195.452	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.175	2.924	1.632	0.022	0.022	0.002	222.358	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.300	0.015	0.015	0.002	204.269	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.300	0.015	0.015	0.002	204.269	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.057	0.632	0.300	0.015	0.015	0.002	202.148	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.300	0.015	0.015	0.002	204.269	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.140	0.735	0.300	0.015	0.015	0.002	218.602	0.005	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.140	2.209	0.300	0.015	0.015	0.002	221.125	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.175	2.544	1.805	0.022	0.022	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.100	0.637	0.300	0.015	0.015	0.002	190.820	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.131	1.793	0.300	0.015	0.015	0.002	192.106	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.140	1.041	0.300	0.015	0.015	0.002	256.893	0.006	0.014
	Sheepsfoot Roller	Rollers	g/hp-hr	0.076	1.797	0.300	0.015	0.015	0.002	199.601	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.140	1.938	0.300	0.015	0.015	0.002	219.950	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.300	0.015	0.015	0.002	204.269	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.076	1.797	0.300	0.015	0.015	0.002	199.601	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.300	0.015	0.015	0.002	204.269	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.090	0.643	0.300	0.015	0.015	0.002	204.269	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.005	0.001				
	Grading VMT		lb/VMT				0.401	0.043				
	Bulldozing		lb/hr				0.196	0.108				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-24
Construction Equipment - Mitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2022	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.175	2.205	1.702	0.022	0.022	0.002	221.145	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.066	0.683	0.300	0.015	0.015	0.002	187.697	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.073	0.683	0.300	0.015	0.015	0.002	188.984	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.055	2.056	0.300	0.014	0.013	0.002	189.380	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.062	0.595	0.300	0.015	0.015	0.002	194.906	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.100	2.048	0.300	0.015	0.015	0.002	197.664	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.300	0.015	0.015	0.002	204.342	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.140	1.069	0.300	0.015	0.015	0.002	213.561	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.128	1.938	0.300	0.015	0.015	0.002	219.879	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.079	0.498	0.300	0.015	0.015	0.001	153.331	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.072	0.622	0.300	0.015	0.015	0.002	195.266	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.175	2.874	1.549	0.022	0.022	0.002	222.316	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.300	0.015	0.015	0.002	204.342	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.300	0.015	0.015	0.002	204.342	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.051	0.629	0.300	0.013	0.012	0.002	202.189	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.300	0.015	0.015	0.002	204.342	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.131	0.729	0.300	0.015	0.015	0.002	218.464	0.005	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.140	2.205	0.300	0.015	0.015	0.002	221.145	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.175	2.537	1.582	0.022	0.022	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.090	0.627	0.300	0.015	0.015	0.002	190.902	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.112	1.792	0.300	0.015	0.015	0.002	192.044	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.133	1.009	0.300	0.015	0.015	0.002	257.310	0.006	0.015
	Sheepsfoot Roller	Rollers	g/hp-hr	0.065	1.796	0.300	0.015	0.015	0.002	199.588	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.128	1.938	0.300	0.015	0.015	0.002	219.879	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.300	0.015	0.015	0.002	204.342	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.065	1.796	0.300	0.015	0.015	0.002	199.588	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.300	0.015	0.015	0.002	204.342	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.078	0.640	0.300	0.015	0.015	0.002	204.342	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.005	0.001				
	Grading VMT		lb/VMT				0.401	0.043				
	Bulldozing		lb/hr				0.196	0.108				
	Truck Loading		lb/ton				0.000	0.000				

Table A1.1-24
Construction Equipment - Mitigated Emission Factors

Analysis Year	Construction activity	OFFROAD Designation	Units	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	N2O	CH4
2023	Air compressor (trailer-mounted)	Other Construction Equipment	g/hp-hr	0.175	2.202	1.574	0.022	0.022	0.002	220.992	0.006	0.012
	Asphalt distributor truck	Paving Equipment	g/hp-hr	0.058	0.671	0.300	0.015	0.015	0.002	187.721	0.005	0.011
	Asphalt Paver	Paving Equipment	g/hp-hr	0.065	0.671	0.300	0.015	0.015	0.002	188.984	0.005	0.011
	Asphalt Reclaimer	Paving Equipment	g/hp-hr	0.047	2.046	0.300	0.013	0.012	0.002	188.684	0.005	0.011
	Backhoe (Large crawler-type)	Tractors/Loaders/Backhoes	g/hp-hr	0.059	0.593	0.300	0.015	0.015	0.002	194.993	0.005	0.011
	Backhoe (Small, rubber-tired)	Tractors/Loaders/Backhoes	g/hp-hr	0.092	2.045	0.300	0.015	0.015	0.002	197.886	0.005	0.011
	Bucket Truck (Electrical)	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.300	0.015	0.015	0.002	204.487	0.005	0.012
	Bulldozer	Rubber Tired Dozers	g/hp-hr	0.140	1.024	0.300	0.015	0.015	0.002	213.631	0.005	0.012
	Compaction machinery	Other Construction Equipment	g/hp-hr	0.119	1.938	0.300	0.015	0.015	0.002	219.853	0.006	0.012
	Crawler crane	Cranes	g/hp-hr	0.071	0.490	0.300	0.015	0.015	0.001	153.367	0.004	0.009
	Crawler Loader	Tractors/Loaders/Backhoes	g/hp-hr	0.065	0.620	0.300	0.015	0.015	0.002	195.112	0.005	0.011
	Drum Roller	Rollers	g/hp-hr	0.175	2.831	1.471	0.022	0.022	0.002	222.388	0.006	0.013
	Dump truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.300	0.015	0.015	0.002	204.487	0.005	0.012
	End dump truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.300	0.015	0.015	0.002	204.487	0.005	0.012
	Excavator	Excavators	g/hp-hr	0.049	0.627	0.300	0.012	0.011	0.002	202.266	0.005	0.011
	Flatbed truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.300	0.015	0.015	0.002	204.487	0.005	0.012
	Motor Grader	Graders	g/hp-hr	0.121	0.723	0.300	0.015	0.015	0.002	218.319	0.005	0.012
	Pavement breaker	Other Construction Equipment	g/hp-hr	0.140	2.202	0.300	0.015	0.015	0.002	220.992	0.006	0.012
	Pavement Sweeper	Sweepers/Scrubbers	g/hp-hr	0.167	2.531	1.497	0.022	0.022	0.002	243.470	0.006	0.014
	Rubber-Tired Loader (Large)	Rubber Tired Loaders	g/hp-hr	0.082	0.617	0.300	0.015	0.015	0.002	191.040	0.005	0.011
	Rubber-Tired Loader (Small)	Rubber Tired Loaders	g/hp-hr	0.102	1.791	0.300	0.015	0.015	0.002	191.935	0.005	0.011
	Scraper	Scrapers	g/hp-hr	0.128	0.981	0.300	0.015	0.015	0.002	257.281	0.006	0.015
	Sheepsfoot Roller	Rollers	g/hp-hr	0.059	1.795	0.300	0.015	0.015	0.002	199.582	0.005	0.011
	Truck-mounted crane	Other Construction Equipment	g/hp-hr	0.119	1.938	0.300	0.015	0.015	0.002	219.853	0.006	0.012
	Utility truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.300	0.015	0.015	0.002	204.487	0.005	0.012
	Vibration roller	Rollers	g/hp-hr	0.059	1.795	0.300	0.015	0.015	0.002	199.582	0.005	0.011
	Welding truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.300	0.015	0.015	0.002	204.487	0.005	0.012
	Water truck	Off-Highway Trucks	g/hp-hr	0.075	0.637	0.300	0.015	0.015	0.002	204.487	0.005	0.012
	Asphalt Paving		g/acre	1188.432								
	Demolition		lb/ton				0.000	0.000				
	Debris Loading		lb/ton				0.005	0.001				
	Grading VMT		lb/VMT				0.401	0.043				
	Bulldozing		lb/hr				0.196	0.108				
	Truck Loading		lb/ton				0.000	0.000				

Notes:
1. Construction equipment exhaust emission factors for VOC, CO, NOx, PM10, and PM2.5 are based on Tier 4 standards except where the unmitigated emission factor is lower in which case the unmitigated factor was retained.
3. Construction exhaust emission factors for SOx are calculated based on brake specific fuel consumption (BSFC) and 15 ppm sulfur content of fuel.
4. Construction exhaust emission factors for CO2, CH4, and N2O are based on BSFC and The Climate Registry protocol.
6. Asphalt paving, demolition, and debris loading emission factors, are from SCAQMD's CalEEMod supporting tables.
7. Grading and bulldozing emission factors are from AP42 11.9 and CalEEMod supporting tables.
8. Truck loading emission factors are from AP42 13.2 and CalEEMod supporting tables.
10. Fugitive dust mitigation assumes 2.1-hr watering interval resulting in 74% reduction from unmitigated levels.

Table A1.1-25
Construction Equipment - Fugitive Dust Emission Factors

Grading Dust Emission Factors

PM10 (lb/VMT)	1.54
PM2.5 (lb/VMT)	0.167

E = k x 0.051 x $(S)^{2.0}$ for PM10 and k x 0.040 x $(S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 7.1 mph
Assumes VMT = 3 x hours in use

E = EF * VMT
VMT = Acres graded / Wb * 43560(sft/acre) / 5280(ft/mile)
Wb = blade width of grading equipment = 12 ft
Source: AP42 11.9 & CalEEMod

Bulldozing Dust Emission Factors

PM10 (lb/hr)	0.75
PM2.5 (lb/hr)	0.41

EF = k x 1*$(s)^{1.5}$ / $(M)^{1.4}$ For PM10 and k x 5.7 x $(s)^{1.2}$ / $(M)^{1.3}$ for PM2.5
EF = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content = 6.9% (CalEEMod)
M = Moisture Content = 7.9% (CalEEMod)
Source: AP-42 Section 11.9 for overburden & CalEEMod

Material Loading/Handling Dust Emision Factors

PM10 (lb/ton)	0.0000888
PM2.5 (lb/ton)	0.0000134

EF = (k)(0.0032)[$(U/5)^{1.3}$]/[$(M/2)^{1.4}$]
EF = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.053 for PM2.5)
U = average wind speed = 2.2 m/s (CalEEMod), 4.9 mph
M = moisture content = 12% (CalEEMod)
Source: AP-42, p. 13.2.4 & CalEEMod

Demolition Dust Emision Factors

PM10 (lb/ton)	0.0011
PM2.5 (lb/ton)	0.00017

EF = (k)(0.0032)[$(U/5)^{1.3}$]/[$(M/2)^{1.4}$]
EF = lb/ton of debris
k = Particle Size Constant (0.35 for PM10 and 0.053 for PM2.5)
U = average wind speed = 2.2 m/s (CalEEMod), 4.9 mph
M = moisture content = 2% (CalEEMod)
Source: CalEEMod

Debris Loading Dust Emision Factors

PM10 (lb/ton)	0.0203
PM2.5 (lb/ton)	0.0031

EF = k*0.058
EF = lb/ton of debris
k = Particle Size Constant (0.35 for PM10 and 0.053 for PM2.5)
Source: CalEEMod

Table A1.1-26
Onroad Construction Vehicles - Unmitigated Emission Factors - Offsite Transit (g/mile)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM10 tirewear	PM10 brakewear	PM2.5 exhaust	PM2.5 tirewear	PM2.5 brakewear	SOx	CO2	N2O	CH4
2016	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.227	0.701	5.984	0.11	0.01	0.13	0.11	0.00	0.06	0.011	1178.222	0.005	0.010
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.227	0.701	5.984	0.11	0.01	0.13	0.11	0.00	0.06	0.011	1178.222	0.005	0.010
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.227	0.701	5.984	0.11	0.01	0.13	0.11	0.00	0.06	0.011	1178.222	0.005	0.010
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.227	0.701	5.984	0.11	0.01	0.13	0.11	0.00	0.06	0.011	1178.222	0.005	0.010
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.227	0.701	5.984	0.11	0.01	0.13	0.11	0.00	0.06	0.011	1178.222	0.005	0.010
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.227	0.701	5.984	0.11	0.01	0.13	0.11	0.00	0.06	0.011	1178.222	0.005	0.010
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.227	0.701	5.984	0.11	0.01	0.13	0.11	0.00	0.06	0.011	1178.222	0.005	0.010
	Owner observation	Gasoline	LDT2	0.226	2.096	0.232	0.00	0.01	0.04	0.00	0.00	0.02	0.005	473.661	0.022	0.017
	Regulatory oversight	Gasoline	LDT2	0.226	2.096	0.232	0.00	0.01	0.04	0.00	0.00	0.02	0.005	473.661	0.022	0.017
	Contractor supervisory	Diesel	MDV	0.024	0.296	0.078	0.01	0.01	0.04	0.01	0.00	0.02	0.005	520.384	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.226	2.096	0.232	0.00	0.01	0.04	0.00	0.00	0.02	0.005	473.661	0.022	0.017
	Fuel truck	Diesel	T6 instate construction heavy	0.227	0.701	5.984	0.11	0.01	0.13	0.11	0.00	0.06	0.011	1178.222	0.005	0.010
	Maintenance truck	Diesel	T6 instate construction heavy	0.227	0.701	5.984	0.11	0.01	0.13	0.11	0.00	0.06	0.011	1178.222	0.005	0.010
	Construction Employees	Gasoline	LDA	0.188	1.635	0.135	0.00	0.01	0.04	0.00	0.00	0.02	0.004	354.866	0.022	0.013
2017	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.149	0.471	4.882	0.07	0.01	0.13	0.06	0.00	0.06	0.011	1180.863	0.005	0.007
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.149	0.471	4.882	0.07	0.01	0.13	0.06	0.00	0.06	0.011	1180.863	0.005	0.007
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.149	0.471	4.882	0.07	0.01	0.13	0.06	0.00	0.06	0.011	1180.863	0.005	0.007
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.149	0.471	4.882	0.07	0.01	0.13	0.06	0.00	0.06	0.011	1180.863	0.005	0.007
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.149	0.471	4.882	0.07	0.01	0.13	0.06	0.00	0.06	0.011	1180.863	0.005	0.007
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.149	0.471	4.882	0.07	0.01	0.13	0.06	0.00	0.06	0.011	1180.863	0.005	0.007
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.149	0.471	4.882	0.07	0.01	0.13	0.06	0.00	0.06	0.011	1180.863	0.005	0.007
	Owner observation	Gasoline	LDT2	0.199	1.825	0.197	0.00	0.01	0.04	0.00	0.00	0.02	0.005	461.517	0.022	0.015
	Regulatory oversight	Gasoline	LDT2	0.199	1.825	0.197	0.00	0.01	0.04	0.00	0.00	0.02	0.005	461.517	0.022	0.015
	Contractor supervisory	Diesel	MDV	0.023	0.296	0.070	0.01	0.01	0.04	0.01	0.00	0.02	0.005	508.461	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.199	1.825	0.197	0.00	0.01	0.04	0.00	0.00	0.02	0.005	461.517	0.022	0.015
	Fuel truck	Diesel	T6 instate construction heavy	0.149	0.471	4.882	0.07	0.01	0.13	0.06	0.00	0.06	0.011	1180.863	0.005	0.007
	Maintenance truck	Diesel	T6 instate construction heavy	0.149	0.471	4.882	0.07	0.01	0.13	0.06	0.00	0.06	0.011	1180.863	0.005	0.007
	Construction Employees	Gasoline	LDA	0.164	1.441	0.118	0.00	0.01	0.04	0.00	0.00	0.02	0.003	345.508	0.022	0.012
2018	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.090	0.299	3.960	0.03	0.01	0.13	0.03	0.00	0.06	0.011	1181.360	0.005	0.004
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.090	0.299	3.960	0.03	0.01	0.13	0.03	0.00	0.06	0.011	1181.360	0.005	0.004
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.090	0.299	3.960	0.03	0.01	0.13	0.03	0.00	0.06	0.011	1181.360	0.005	0.004
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.090	0.299	3.960	0.03	0.01	0.13	0.03	0.00	0.06	0.011	1181.360	0.005	0.004
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.090	0.299	3.960	0.03	0.01	0.13	0.03	0.00	0.06	0.011	1181.360	0.005	0.004
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.090	0.299	3.960	0.03	0.01	0.13	0.03	0.00	0.06	0.011	1181.360	0.005	0.004
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.090	0.299	3.960	0.03	0.01	0.13	0.03	0.00	0.06	0.011	1181.360	0.005	0.004
	Owner observation	Gasoline	LDT2	0.177	1.597	0.168	0.00	0.01	0.04	0.00	0.00	0.02	0.005	449.062	0.022	0.013
	Regulatory oversight	Gasoline	LDT2	0.177	1.597	0.168	0.00	0.01	0.04	0.00	0.00	0.02	0.005	449.062	0.022	0.013
	Contractor supervisory	Diesel	MDV	0.022	0.298	0.063	0.01	0.01	0.04	0.01	0.00	0.02	0.005	497.174	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.177	1.597	0.168	0.00	0.01	0.04	0.00	0.00	0.02	0.005	449.062	0.022	0.013
	Fuel truck	Diesel	T6 instate construction heavy	0.090	0.299	3.960	0.03	0.01	0.13	0.03	0.00	0.06	0.011	1181.360	0.005	0.004
	Maintenance truck	Diesel	T6 instate construction heavy	0.090	0.299	3.960	0.03	0.01	0.13	0.03	0.00	0.06	0.011	1181.360	0.005	0.004
	Construction Employees	Gasoline	LDA	0.145	1.280	0.104	0.00	0.01	0.04	0.00	0.00	0.02	0.003	336.448	0.022	0.010
2019	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.082	0.279	3.635	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1172.582	0.005	0.004
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.082	0.279	3.635	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1172.582	0.005	0.004
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.082	0.279	3.635	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1172.582	0.005	0.004
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.082	0.279	3.635	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1172.582	0.005	0.004
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.082	0.279	3.635	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1172.582	0.005	0.004
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.082	0.279	3.635	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1172.582	0.005	0.004
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.082	0.279	3.635	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1172.582	0.005	0.004
	Owner observation	Gasoline	LDT2	0.159	1.407	0.144	0.00	0.01	0.04	0.00	0.00	0.02	0.004	435.076	0.022	0.011
	Regulatory oversight	Gasoline	LDT2	0.159	1.407	0.144	0.00	0.01	0.04	0.00	0.00	0.02	0.004	435.076	0.022	0.011
	Contractor supervisory	Diesel	MDV	0.021	0.299	0.059	0.01	0.01	0.04	0.01	0.00	0.02	0.005	485.090	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.159	1.407	0.144	0.00	0.01	0.04	0.00	0.00	0.02	0.004	435.076	0.022	0.011
	Fuel truck	Diesel	T6 instate construction heavy	0.082	0.279	3.635	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1172.582	0.005	0.004
	Maintenance truck	Diesel	T6 instate construction heavy	0.082	0.279	3.635	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1172.582	0.005	0.004
	Construction Employees	Gasoline	LDA	0.130	1.147	0.092	0.00	0.01	0.04	0.00	0.00	0.02	0.003	326.126	0.022	0.009

Table A1.1-26
Onroad Construction Vehicles - Unmitigated Emission Factors - Offsite Transit (g/mile)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM10 tirewear	PM10 brakewear	PM2.5 exhaust	PM2.5 tirewear	PM2.5 brakewear	SOx	CO2	N2O	CH4
2020	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.069	0.243	3.272	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1170.614	0.005	0.003
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.069	0.243	3.272	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1170.614	0.005	0.003
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.069	0.243	3.272	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1170.614	0.005	0.003
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.069	0.243	3.272	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1170.614	0.005	0.003
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.069	0.243	3.272	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1170.614	0.005	0.003
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.069	0.243	3.272	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1170.614	0.005	0.003
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.069	0.243	3.272	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1170.614	0.005	0.003
	Owner observation	Gasoline	LDT2	0.146	1.265	0.126	0.00	0.01	0.04	0.00	0.00	0.02	0.004	422.775	0.022	0.010
	Regulatory oversight	Gasoline	LDT2	0.146	1.265	0.126	0.00	0.01	0.04	0.00	0.00	0.02	0.004	422.775	0.022	0.010
	Contractor supervisory	Diesel	MDV	0.020	0.303	0.055	0.01	0.01	0.04	0.01	0.00	0.02	0.005	474.887	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.146	1.265	0.126	0.00	0.01	0.04	0.00	0.00	0.02	0.004	422.775	0.022	0.010
	Fuel truck	Diesel	T6 instate construction heavy	0.069	0.243	3.272	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1170.614	0.005	0.003
	Maintenance truck	Diesel	T6 instate construction heavy	0.069	0.243	3.272	0.02	0.01	0.13	0.02	0.00	0.06	0.011	1170.614	0.005	0.003
	Construction Employees	Gasoline	LDA	0.121	1.054	0.083	0.00	0.01	0.04	0.00	0.00	0.02	0.003	317.238	0.022	0.008
2021	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.067	0.241	3.001	0.02	0.01	0.13	0.01	0.00	0.06	0.011	1168.008	0.005	0.003
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.067	0.241	3.001	0.02	0.01	0.13	0.01	0.00	0.06	0.011	1168.008	0.005	0.003
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.067	0.241	3.001	0.02	0.01	0.13	0.01	0.00	0.06	0.011	1168.008	0.005	0.003
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.067	0.241	3.001	0.02	0.01	0.13	0.01	0.00	0.06	0.011	1168.008	0.005	0.003
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.067	0.241	3.001	0.02	0.01	0.13	0.01	0.00	0.06	0.011	1168.008	0.005	0.003
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.067	0.241	3.001	0.02	0.01	0.13	0.01	0.00	0.06	0.011	1168.008	0.005	0.003
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.067	0.241	3.001	0.02	0.01	0.13	0.01	0.00	0.06	0.011	1168.008	0.005	0.003
	Owner observation	Gasoline	LDT2	0.136	1.162	0.111	0.00	0.01	0.04	0.00	0.00	0.02	0.004	409.826	0.022	0.009
	Regulatory oversight	Gasoline	LDT2	0.136	1.162	0.111	0.00	0.01	0.04	0.00	0.00	0.02	0.004	409.826	0.022	0.009
	Contractor supervisory	Diesel	MDV	0.019	0.298	0.049	0.01	0.01	0.04	0.01	0.00	0.02	0.004	463.192	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.136	1.162	0.111	0.00	0.01	0.04	0.00	0.00	0.02	0.004	409.826	0.022	0.009
	Fuel truck	Diesel	T6 instate construction heavy	0.067	0.241	3.001	0.02	0.01	0.13	0.01	0.00	0.06	0.011	1168.008	0.005	0.003
	Maintenance truck	Diesel	T6 instate construction heavy	0.067	0.241	3.001	0.02	0.01	0.13	0.01	0.00	0.06	0.011	1168.008	0.005	0.003
	Construction Employees	Gasoline	LDA	0.113	0.982	0.075	0.00	0.01	0.04	0.00	0.00	0.02	0.003	308.782	0.022	0.007
2022	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.064	0.237	2.723	0.01	0.01	0.13	0.01	0.00	0.06	0.011	1164.152	0.005	0.003
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.064	0.237	2.723	0.01	0.01	0.13	0.01	0.00	0.06	0.011	1164.152	0.005	0.003
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.064	0.237	2.723	0.01	0.01	0.13	0.01	0.00	0.06	0.011	1164.152	0.005	0.003
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.064	0.237	2.723	0.01	0.01	0.13	0.01	0.00	0.06	0.011	1164.152	0.005	0.003
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.064	0.237	2.723	0.01	0.01	0.13	0.01	0.00	0.06	0.011	1164.152	0.005	0.003
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.064	0.237	2.723	0.01	0.01	0.13	0.01	0.00	0.06	0.011	1164.152	0.005	0.003
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.064	0.237	2.723	0.01	0.01	0.13	0.01	0.00	0.06	0.011	1164.152	0.005	0.003
	Owner observation	Gasoline	LDT2	0.128	1.081	0.100	0.00	0.01	0.04	0.00	0.00	0.02	0.004	396.024	0.022	0.008
	Regulatory oversight	Gasoline	LDT2	0.128	1.081	0.100	0.00	0.01	0.04	0.00	0.00	0.02	0.004	396.024	0.022	0.008
	Contractor supervisory	Diesel	MDV	0.018	0.292	0.045	0.01	0.01	0.04	0.01	0.00	0.02	0.004	450.569	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.128	1.081	0.100	0.00	0.01	0.04	0.00	0.00	0.02	0.004	396.024	0.022	0.008
	Fuel truck	Diesel	T6 instate construction heavy	0.064	0.237	2.723	0.01	0.01	0.13	0.01	0.00	0.06	0.011	1164.152	0.005	0.003
	Maintenance truck	Diesel	T6 instate construction heavy	0.064	0.237	2.723	0.01	0.01	0.13	0.01	0.00	0.06	0.011	1164.152	0.005	0.003
	Construction Employees	Gasoline	LDA	0.106	0.921	0.069	0.00	0.01	0.04	0.00	0.00	0.02	0.003	299.854	0.022	0.007
2023	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.037	0.195	1.316	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.069	0.005	0.002
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.037	0.195	1.316	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.069	0.005	0.002
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.037	0.195	1.316	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.069	0.005	0.002
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.037	0.195	1.316	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.069	0.005	0.002
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.037	0.195	1.316	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.069	0.005	0.002
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.037	0.195	1.316	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.069	0.005	0.002
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.037	0.195	1.316	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.069	0.005	0.002
	Owner observation	Gasoline	LDT2	0.122	1.013	0.090	0.00	0.01	0.04	0.00	0.00	0.02	0.004	380.697	0.022	0.008
	Regulatory oversight	Gasoline	LDT2	0.122	1.013	0.090	0.00	0.01	0.04	0.00	0.00	0.02	0.004	380.697	0.022	0.008
	Contractor supervisory	Diesel	MDV	0.016	0.287	0.040	0.01	0.01	0.04	0.01	0.00	0.02	0.004	437.577	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.122	1.013	0.090	0.00	0.01	0.04	0.00	0.00	0.02	0.004	380.697	0.022	0.008
	Fuel truck	Diesel	T6 instate construction heavy	0.037	0.195	1.316	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.069	0.005	0.002
	Maintenance truck	Diesel	T6 instate construction heavy	0.037	0.195	1.316	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.069	0.005	0.002
	Construction Employees	Gasoline	LDA	0.101	0.865	0.063	0.00	0.01	0.04	0.00	0.00	0.02	0.003	291.075	0.022	0.006

Notes:
1. Construction vehicle emission factors are from CARB's EMFAC 2014.

Table A1.1-27
Onroad Construction Vehicles - Unmitigated Emission Factors - Onsite Transit (g/mile)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM10 tirewear	PM10 brakewear	PM2.5 exhaust	PM2.5 tirewear	PM2.5 brakewear	SOx	CO2	N2O	CH4
2016	Haul Truck - Debris	Diesel	T6 instate construction heavy	2.21	3.14	15.67	0.42	0.01	0.13	0.40	0.00	0.06	0.02	2333.86	0.005	0.10
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	2.21	3.14	15.67	0.42	0.01	0.13	0.40	0.00	0.06	0.02	2333.86	0.005	0.10
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	2.21	3.14	15.67	0.42	0.01	0.13	0.40	0.00	0.06	0.02	2333.86	0.005	0.10
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	2.21	3.14	15.67	0.42	0.01	0.13	0.40	0.00	0.06	0.02	2333.86	0.005	0.10
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	2.21	3.14	15.67	0.42	0.01	0.13	0.40	0.00	0.06	0.02	2333.86	0.005	0.10
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	2.21	3.14	15.67	0.42	0.01	0.13	0.40	0.00	0.06	0.02	2333.86	0.005	0.10
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	2.21	3.14	15.67	0.42	0.01	0.13	0.40	0.00	0.06	0.02	2333.86	0.005	0.10
	Owner observation	Gasoline	LDT2	0.21	2.82	0.29	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1330.47	0.022	0.07
	Regulatory oversight	Gasoline	LDT2	0.21	2.82	0.29	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1330.47	0.022	0.07
	Contractor supervisory	Diesel	MDV	0.21	3.24	0.17	0.03	0.01	0.04	0.03	0.00	0.02	0.01	1146.86	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.21	2.82	0.29	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1330.47	0.022	0.07
	Fuel truck	Diesel	T6 instate construction heavy	2.21	3.14	15.67	0.42	0.01	0.13	0.40	0.00	0.06	0.02	2333.86	0.005	0.10
	Maintenance truck	Diesel	T6 instate construction heavy	2.21	3.14	15.67	0.42	0.01	0.13	0.40	0.00	0.06	0.02	2333.86	0.005	0.10
	Construction Employees	Gasoline	LDA	0.16	2.13	0.16	0.01	0.01	0.04	0.01	0.00	0.02	0.01	993.99	0.022	0.06
2017	Haul Truck - Debris	Diesel	T6 instate construction heavy	1.36	2.29	13.53	0.23	0.01	0.13	0.22	0.00	0.06	0.02	2314.47	0.005	0.06
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	1.36	2.29	13.53	0.23	0.01	0.13	0.22	0.00	0.06	0.02	2314.47	0.005	0.06
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	1.36	2.29	13.53	0.23	0.01	0.13	0.22	0.00	0.06	0.02	2314.47	0.005	0.06
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	1.36	2.29	13.53	0.23	0.01	0.13	0.22	0.00	0.06	0.02	2314.47	0.005	0.06
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	1.36	2.29	13.53	0.23	0.01	0.13	0.22	0.00	0.06	0.02	2314.47	0.005	0.06
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	1.36	2.29	13.53	0.23	0.01	0.13	0.22	0.00	0.06	0.02	2314.47	0.005	0.06
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	1.36	2.29	13.53	0.23	0.01	0.13	0.22	0.00	0.06	0.02	2314.47	0.005	0.06
	Owner observation	Gasoline	LDT2	0.18	2.42	0.25	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1296.46	0.022	0.06
	Regulatory oversight	Gasoline	LDT2	0.18	2.42	0.25	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1296.46	0.022	0.06
	Contractor supervisory	Diesel	MDV	0.21	3.33	0.16	0.03	0.01	0.04	0.03	0.00	0.02	0.01	1120.59	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.18	2.42	0.25	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1296.46	0.022	0.06
	Fuel truck	Diesel	T6 instate construction heavy	1.36	2.29	13.53	0.23	0.01	0.13	0.22	0.00	0.06	0.02	2314.47	0.005	0.06
	Maintenance truck	Diesel	T6 instate construction heavy	1.36	2.29	13.53	0.23	0.01	0.13	0.22	0.00	0.06	0.02	2314.47	0.005	0.06
	Construction Employees	Gasoline	LDA	0.14	1.85	0.14	0.01	0.01	0.04	0.01	0.00	0.02	0.01	967.81	0.022	0.05
2018	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.73	1.67	11.88	0.09	0.01	0.13	0.09	0.00	0.06	0.02	2294.53	0.005	0.03
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.73	1.67	11.88	0.09	0.01	0.13	0.09	0.00	0.06	0.02	2294.53	0.005	0.03
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.73	1.67	11.88	0.09	0.01	0.13	0.09	0.00	0.06	0.02	2294.53	0.005	0.03
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.73	1.67	11.88	0.09	0.01	0.13	0.09	0.00	0.06	0.02	2294.53	0.005	0.03
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.73	1.67	11.88	0.09	0.01	0.13	0.09	0.00	0.06	0.02	2294.53	0.005	0.03
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.73	1.67	11.88	0.09	0.01	0.13	0.09	0.00	0.06	0.02	2294.53	0.005	0.03
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.73	1.67	11.88	0.09	0.01	0.13	0.09	0.00	0.06	0.02	2294.53	0.005	0.03
	Owner observation	Gasoline	LDT2	0.15	2.09	0.22	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1261.12	0.022	0.06
	Regulatory oversight	Gasoline	LDT2	0.15	2.09	0.22	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1261.12	0.022	0.06
	Contractor supervisory	Diesel	MDV	0.21	3.41	0.16	0.03	0.01	0.04	0.03	0.00	0.02	0.01	1095.71	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.15	2.09	0.22	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1261.12	0.022	0.06
	Fuel truck	Diesel	T6 instate construction heavy	0.73	1.67	11.88	0.09	0.01	0.13	0.09	0.00	0.06	0.02	2294.53	0.005	0.03
	Maintenance truck	Diesel	T6 instate construction heavy	0.73	1.67	11.88	0.09	0.01	0.13	0.09	0.00	0.06	0.02	2294.53	0.005	0.03
	Construction Employees	Gasoline	LDA	0.11	1.61	0.13	0.01	0.01	0.04	0.01	0.00	0.02	0.01	942.11	0.022	0.04
2019	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.66	1.64	11.56	0.07	0.01	0.13	0.07	0.00	0.06	0.02	2281.45	0.005	0.03
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.66	1.64	11.56	0.07	0.01	0.13	0.07	0.00	0.06	0.02	2281.45	0.005	0.03
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.66	1.64	11.56	0.07	0.01	0.13	0.07	0.00	0.06	0.02	2281.45	0.005	0.03
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.66	1.64	11.56	0.07	0.01	0.13	0.07	0.00	0.06	0.02	2281.45	0.005	0.03
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.66	1.64	11.56	0.07	0.01	0.13	0.07	0.00	0.06	0.02	2281.45	0.005	0.03
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.66	1.64	11.56	0.07	0.01	0.13	0.07	0.00	0.06	0.02	2281.45	0.005	0.03
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.66	1.64	11.56	0.07	0.01	0.13	0.07	0.00	0.06	0.02	2281.45	0.005	0.03
	Owner observation	Gasoline	LDT2	0.13	1.83	0.19	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1225.89	0.022	0.05
	Regulatory oversight	Gasoline	LDT2	0.13	1.83	0.19	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1225.89	0.022	0.05
	Contractor supervisory	Diesel	MDV	0.21	3.50	0.16	0.02	0.01	0.04	0.02	0.00	0.02	0.01	1072.75	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.13	1.83	0.19	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1225.89	0.022	0.05
	Fuel truck	Diesel	T6 instate construction heavy	0.66	1.64	11.56	0.07	0.01	0.13	0.07	0.00	0.06	0.02	2281.45	0.005	0.03
	Maintenance truck	Diesel	T6 instate construction heavy	0.66	1.64	11.56	0.07	0.01	0.13	0.07	0.00	0.06	0.02	2281.45	0.005	0.03
	Construction Employees	Gasoline	LDA	0.10	1.42	0.11	0.01	0.01	0.04	0.01	0.00	0.02	0.01	916.14	0.022	0.04

Table A1.1-27
Onroad Construction Vehicles - Unmitigated Emission Factors - Onsite Transit (g/mile)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM10 tirewear	PM10 brakewear	PM2.5 exhaust	PM2.5 tirewear	PM2.5 brakewear	SOx	CO2	N2O	CH4
2020	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.53	1.54	11.11	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2268.61	0.005	0.02
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.53	1.54	11.11	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2268.61	0.005	0.02
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.53	1.54	11.11	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2268.61	0.005	0.02
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.53	1.54	11.11	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2268.61	0.005	0.02
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.53	1.54	11.11	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2268.61	0.005	0.02
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.53	1.54	11.11	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2268.61	0.005	0.02
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.53	1.54	11.11	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2268.61	0.005	0.02
	Owner observation	Gasoline	LDT2	0.11	1.63	0.16	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1190.85	0.022	0.05
	Regulatory oversight	Gasoline	LDT2	0.11	1.63	0.16	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1190.85	0.022	0.05
	Contractor supervisory	Diesel	MDV	0.21	3.58	0.15	0.02	0.01	0.04	0.02	0.00	0.02	0.01	1050.19	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.11	1.63	0.16	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1190.85	0.022	0.05
	Fuel truck	Diesel	T6 instate construction heavy	0.53	1.54	11.11	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2268.61	0.005	0.02
	Maintenance truck	Diesel	T6 instate construction heavy	0.53	1.54	11.11	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2268.61	0.005	0.02
	Construction Employees	Gasoline	LDA	0.09	1.31	0.10	0.01	0.01	0.04	0.01	0.00	0.02	0.01	890.78	0.022	0.04
2021	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.50	1.54	10.90	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2255.50	0.005	0.02
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.50	1.54	10.90	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2255.50	0.005	0.02
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.50	1.54	10.90	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2255.50	0.005	0.02
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.50	1.54	10.90	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2255.50	0.005	0.02
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.50	1.54	10.90	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2255.50	0.005	0.02
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.50	1.54	10.90	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2255.50	0.005	0.02
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.50	1.54	10.90	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2255.50	0.005	0.02
	Owner observation	Gasoline	LDT2	0.10	1.49	0.15	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1151.74	0.022	0.04
	Regulatory oversight	Gasoline	LDT2	0.10	1.49	0.15	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1151.74	0.022	0.04
	Contractor supervisory	Diesel	MDV	0.20	3.52	0.14	0.02	0.01	0.04	0.02	0.00	0.02	0.01	1022.76	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.10	1.49	0.15	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1151.74	0.022	0.04
	Fuel truck	Diesel	T6 instate construction heavy	0.50	1.54	10.90	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2255.50	0.005	0.02
	Maintenance truck	Diesel	T6 instate construction heavy	0.50	1.54	10.90	0.04	0.01	0.13	0.04	0.00	0.06	0.02	2255.50	0.005	0.02
	Construction Employees	Gasoline	LDA	0.08	1.22	0.10	0.01	0.01	0.04	0.01	0.00	0.02	0.01	864.98	0.022	0.03
2022	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.47	1.54	10.70	0.03	0.01	0.13	0.03	0.00	0.06	0.02	2241.17	0.005	0.02
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.47	1.54	10.70	0.03	0.01	0.13	0.03	0.00	0.06	0.02	2241.17	0.005	0.02
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.47	1.54	10.70	0.03	0.01	0.13	0.03	0.00	0.06	0.02	2241.17	0.005	0.02
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.47	1.54	10.70	0.03	0.01	0.13	0.03	0.00	0.06	0.02	2241.17	0.005	0.02
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.47	1.54	10.70	0.03	0.01	0.13	0.03	0.00	0.06	0.02	2241.17	0.005	0.02
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.47	1.54	10.70	0.03	0.01	0.13	0.03	0.00	0.06	0.02	2241.17	0.005	0.02
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.47	1.54	10.70	0.03	0.01	0.13	0.03	0.00	0.06	0.02	2241.17	0.005	0.02
	Owner observation	Gasoline	LDT2	0.09	1.39	0.13	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1112.45	0.022	0.04
	Regulatory oversight	Gasoline	LDT2	0.09	1.39	0.13	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1112.45	0.022	0.04
	Contractor supervisory	Diesel	MDV	0.19	3.47	0.13	0.02	0.01	0.04	0.02	0.00	0.02	0.01	994.89	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.09	1.39	0.13	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1112.45	0.022	0.04
	Fuel truck	Diesel	T6 instate construction heavy	0.47	1.54	10.70	0.03	0.01	0.13	0.03	0.00	0.06	0.02	2241.17	0.005	0.02
	Maintenance truck	Diesel	T6 instate construction heavy	0.47	1.54	10.70	0.03	0.01	0.13	0.03	0.00	0.06	0.02	2241.17	0.005	0.02
	Construction Employees	Gasoline	LDA	0.07	1.14	0.09	0.01	0.01	0.04	0.01	0.00	0.02	0.01	839.52	0.022	0.03
2023	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.26	1.33	9.24	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2211.74	0.005	0.01
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.26	1.33	9.24	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2211.74	0.005	0.01
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.26	1.33	9.24	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2211.74	0.005	0.01
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.26	1.33	9.24	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2211.74	0.005	0.01
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.26	1.33	9.24	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2211.74	0.005	0.01
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.26	1.33	9.24	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2211.74	0.005	0.01
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.26	1.33	9.24	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2211.74	0.005	0.01
	Owner observation	Gasoline	LDT2	0.09	1.29	0.12	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1068.90	0.022	0.03
	Regulatory oversight	Gasoline	LDT2	0.09	1.29	0.12	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1068.90	0.022	0.03
	Contractor supervisory	Diesel	MDV	0.18	3.43	0.12	0.02	0.01	0.04	0.02	0.00	0.02	0.01	966.20	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.09	1.29	0.12	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1068.90	0.022	0.03
	Fuel truck	Diesel	T6 instate construction heavy	0.26	1.33	9.24	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2211.74	0.005	0.01
	Maintenance truck	Diesel	T6 instate construction heavy	0.26	1.33	9.24	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2211.74	0.005	0.01
	Construction Employees	Gasoline	LDA	0.07	1.07	0.08	0.01	0.01	0.04	0.01	0.00	0.02	0.01	814.54	0.022	0.03

Notes:
1. Construction vehicle emission factors are from CARB's EMFAC 2014.

Table A1.1-28
Onroad Construction Vehicles - Unmitigated Emission Factors - Onsite Idling (g/hr-vehicle)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM2.5 exhaust	SOx	CO2	N2O	CH4
2016	Haul Truck - Debris	Diesel	T6 instate construction heavy	1.805	15.119	92.833	0.56	0.54	0.069	7232.825	0.024	0.084
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	1.805	15.119	92.833	0.56	0.54	0.069	7232.825	0.024	0.084
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	1.805	15.119	92.833	0.56	0.54	0.069	7232.825	0.024	0.084
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	1.805	15.119	92.833	0.56	0.54	0.069	7232.825	0.024	0.084
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	1.805	15.119	92.833	0.56	0.54	0.069	7232.825	0.024	0.084
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	1.805	15.119	92.833	0.56	0.54	0.069	7232.825	0.024	0.084
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	1.805	15.119	92.833	0.56	0.54	0.069	7232.825	0.024	0.084
	Owner observation	Gasoline	LDT2	1.044	14.102	1.470	0.06	0.05	0.067	6652.373	0.110	0.363
	Regulatory oversight	Gasoline	LDT2	1.044	14.102	1.470	0.06	0.05	0.067	6652.373	0.110	0.363
	Contractor supervisory	Diesel	MDV	1.074	16.209	0.825	0.17	0.17	0.055	5734.321	0.024	0.050
	Light-duty utility trucks	Gasoline	LDT2	1.044	14.102	1.470	0.06	0.05	0.067	6652.373	0.110	0.363
	Fuel truck	Diesel	T6 instate construction heavy	1.805	15.119	92.833	0.56	0.54	0.069	7232.825	0.024	0.084
	Maintenance truck	Diesel	T6 instate construction heavy	1.805	15.119	92.833	0.56	0.54	0.069	7232.825	0.024	0.084
	Construction Employees	Gasoline	LDA	0.821	10.655	0.805	0.06	0.06	0.050	4969.950	0.110	0.276
2017	Haul Truck - Debris	Diesel	T6 instate construction heavy	1.414	11.716	83.629	0.41	0.40	0.069	7242.377	0.024	0.066
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	1.414	11.716	83.629	0.41	0.40	0.069	7242.377	0.024	0.066
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	1.414	11.716	83.629	0.41	0.40	0.069	7242.377	0.024	0.066
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	1.414	11.716	83.629	0.41	0.40	0.069	7242.377	0.024	0.066
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	1.414	11.716	83.629	0.41	0.40	0.069	7242.377	0.024	0.066
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	1.414	11.716	83.629	0.41	0.40	0.069	7242.377	0.024	0.066
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	1.414	11.716	83.629	0.41	0.40	0.069	7242.377	0.024	0.066
	Owner observation	Gasoline	LDT2	0.877	12.118	1.260	0.06	0.05	0.065	6482.284	0.110	0.319
	Regulatory oversight	Gasoline	LDT2	0.877	12.118	1.260	0.06	0.05	0.065	6482.284	0.110	0.319
	Contractor supervisory	Diesel	MDV	1.062	16.629	0.801	0.15	0.14	0.053	5602.938	0.024	0.049
	Light-duty utility trucks	Gasoline	LDT2	0.877	12.118	1.260	0.06	0.05	0.065	6482.284	0.110	0.319
	Fuel truck	Diesel	T6 instate construction heavy	1.414	11.716	83.629	0.41	0.40	0.069	7242.377	0.024	0.066
	Maintenance truck	Diesel	T6 instate construction heavy	1.414	11.716	83.629	0.41	0.40	0.069	7242.377	0.024	0.066
	Construction Employees	Gasoline	LDA	0.688	9.228	0.715	0.06	0.06	0.048	4839.061	0.110	0.245
2018	Haul Truck - Debris	Diesel	T6 instate construction heavy	1.058	8.539	73.511	0.28	0.26	0.069	7229.141	0.024	0.049
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	1.058	8.539	73.511	0.28	0.26	0.069	7229.141	0.024	0.049
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	1.058	8.539	73.511	0.28	0.26	0.069	7229.141	0.024	0.049
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	1.058	8.539	73.511	0.28	0.26	0.069	7229.141	0.024	0.049
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	1.058	8.539	73.511	0.28	0.26	0.069	7229.141	0.024	0.049
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	1.058	8.539	73.511	0.28	0.26	0.069	7229.141	0.024	0.049
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	1.058	8.539	73.511	0.28	0.26	0.069	7229.141	0.024	0.049
	Owner observation	Gasoline	LDT2	0.739	10.443	1.083	0.06	0.05	0.063	6305.613	0.110	0.282
	Regulatory oversight	Gasoline	LDT2	0.739	10.443	1.083	0.06	0.05	0.063	6305.613	0.110	0.282
	Contractor supervisory	Diesel	MDV	1.060	17.061	0.785	0.13	0.13	0.052	5478.565	0.024	0.049
	Light-duty utility trucks	Gasoline	LDT2	0.739	10.443	1.083	0.06	0.05	0.063	6305.613	0.110	0.282
	Fuel truck	Diesel	T6 instate construction heavy	1.058	8.539	73.511	0.28	0.26	0.069	7229.141	0.024	0.049
	Maintenance truck	Diesel	T6 instate construction heavy	1.058	8.539	73.511	0.28	0.26	0.069	7229.141	0.024	0.049
	Construction Employees	Gasoline	LDA	0.575	8.026	0.638	0.06	0.06	0.047	4710.571	0.110	0.218
2019	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.932	7.559	68.507	0.23	0.22	0.069	7202.361	0.024	0.043
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.932	7.559	68.507	0.23	0.22	0.069	7202.361	0.024	0.043
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.932	7.559	68.507	0.23	0.22	0.069	7202.361	0.024	0.043
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.932	7.559	68.507	0.23	0.22	0.069	7202.361	0.024	0.043
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.932	7.559	68.507	0.23	0.22	0.069	7202.361	0.024	0.043
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.932	7.559	68.507	0.23	0.22	0.069	7202.361	0.024	0.043
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.932	7.559	68.507	0.23	0.22	0.069	7202.361	0.024	0.043
	Owner observation	Gasoline	LDT2	0.631	9.125	0.937	0.06	0.05	0.061	6129.455	0.110	0.251
	Regulatory oversight	Gasoline	LDT2	0.631	9.125	0.937	0.06	0.05	0.061	6129.455	0.110	0.251
	Contractor supervisory	Diesel	MDV	1.062	17.489	0.775	0.12	0.11	0.051	5363.747	0.024	0.049
	Light-duty utility trucks	Gasoline	LDT2	0.631	9.125	0.937	0.06	0.05	0.061	6129.455	0.110	0.251
	Fuel truck	Diesel	T6 instate construction heavy	0.932	7.559	68.507	0.23	0.22	0.069	7202.361	0.024	0.043
	Maintenance truck	Diesel	T6 instate construction heavy	0.932	7.559	68.507	0.23	0.22	0.069	7202.361	0.024	0.043
	Construction Employees	Gasoline	LDA	0.488	7.104	0.574	0.06	0.06	0.046	4580.678	0.110	0.196

Table A1.1-28
Onroad Construction Vehicles - Unmitigated Emission Factors - Onsite Idling (g/hr-vehicle)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM2.5 exhaust	SOx	CO2	N2O	CH4
2020	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.366	3.053	52.826	0.03	0.03	0.068	7164.311	0.024	0.017
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.366	3.053	52.826	0.03	0.03	0.068	7164.311	0.024	0.017
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.366	3.053	52.826	0.03	0.03	0.068	7164.311	0.024	0.017
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.366	3.053	52.826	0.03	0.03	0.068	7164.311	0.024	0.017
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.366	3.053	52.826	0.03	0.03	0.068	7164.311	0.024	0.017
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.366	3.053	52.826	0.03	0.03	0.068	7164.311	0.024	0.017
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.366	3.053	52.826	0.03	0.03	0.068	7164.311	0.024	0.017
	Owner observation	Gasoline	LDT2	0.558	8.150	0.823	0.06	0.05	0.060	5954.274	0.110	0.225
	Regulatory oversight	Gasoline	LDT2	0.558	8.150	0.823	0.06	0.05	0.060	5954.274	0.110	0.225
	Contractor supervisory	Diesel	MDV	1.068	17.908	0.769	0.11	0.11	0.050	5250.929	0.024	0.050
	Light-duty utility trucks	Gasoline	LDT2	0.558	8.150	0.823	0.06	0.05	0.060	5954.274	0.110	0.225
	Fuel truck	Diesel	T6 instate construction heavy	0.366	3.053	52.826	0.03	0.03	0.068	7164.311	0.024	0.017
	Maintenance truck	Diesel	T6 instate construction heavy	0.366	3.053	52.826	0.03	0.03	0.068	7164.311	0.024	0.017
	Construction Employees	Gasoline	LDA	0.441	6.525	0.522	0.06	0.06	0.045	4453.921	0.110	0.177
2021	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.346	2.865	48.656	0.03	0.03	0.068	7111.652	0.024	0.016
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.346	2.865	48.656	0.03	0.03	0.068	7111.652	0.024	0.016
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.346	2.865	48.656	0.03	0.03	0.068	7111.652	0.024	0.016
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.346	2.865	48.656	0.03	0.03	0.068	7111.652	0.024	0.016
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.346	2.865	48.656	0.03	0.03	0.068	7111.652	0.024	0.016
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.346	2.865	48.656	0.03	0.03	0.068	7111.652	0.024	0.016
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.346	2.865	48.656	0.03	0.03	0.068	7111.652	0.024	0.016
	Owner observation	Gasoline	LDT2	0.510	7.471	0.733	0.06	0.05	0.058	5758.707	0.110	0.206
	Regulatory oversight	Gasoline	LDT2	0.510	7.471	0.733	0.06	0.05	0.058	5758.707	0.110	0.206
	Contractor supervisory	Diesel	MDV	0.996	17.588	0.694	0.10	0.10	0.049	5113.795	0.024	0.046
	Light-duty utility trucks	Gasoline	LDT2	0.510	7.471	0.733	0.06	0.05	0.058	5758.707	0.110	0.206
	Fuel truck	Diesel	T6 instate construction heavy	0.346	2.865	48.656	0.03	0.03	0.068	7111.652	0.024	0.016
	Maintenance truck	Diesel	T6 instate construction heavy	0.346	2.865	48.656	0.03	0.03	0.068	7111.652	0.024	0.016
	Construction Employees	Gasoline	LDA	0.402	6.078	0.477	0.06	0.05	0.043	4324.912	0.110	0.162
2022	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.326	2.680	44.383	0.02	0.02	0.067	7052.285	0.024	0.015
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.326	2.680	44.383	0.02	0.02	0.067	7052.285	0.024	0.015
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.326	2.680	44.383	0.02	0.02	0.067	7052.285	0.024	0.015
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.326	2.680	44.383	0.02	0.02	0.067	7052.285	0.024	0.015
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.326	2.680	44.383	0.02	0.02	0.067	7052.285	0.024	0.015
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.326	2.680	44.383	0.02	0.02	0.067	7052.285	0.024	0.015
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.326	2.680	44.383	0.02	0.02	0.067	7052.285	0.024	0.015
	Owner observation	Gasoline	LDT2	0.469	6.942	0.661	0.06	0.05	0.056	5562.268	0.110	0.189
	Regulatory oversight	Gasoline	LDT2	0.469	6.942	0.661	0.06	0.05	0.056	5562.268	0.110	0.189
	Contractor supervisory	Diesel	MDV	0.936	17.328	0.634	0.09	0.09	0.047	4974.434	0.024	0.043
	Light-duty utility trucks	Gasoline	LDT2	0.469	6.942	0.661	0.06	0.05	0.056	5562.268	0.110	0.189
	Fuel truck	Diesel	T6 instate construction heavy	0.326	2.680	44.383	0.02	0.02	0.067	7052.285	0.024	0.015
	Maintenance truck	Diesel	T6 instate construction heavy	0.326	2.680	44.383	0.02	0.02	0.067	7052.285	0.024	0.015
	Construction Employees	Gasoline	LDA	0.368	5.698	0.439	0.06	0.05	0.042	4197.616	0.110	0.148
2023	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.163	1.224	17.979	0.00	0.00	0.064	6718.297	0.024	0.008
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.163	1.224	17.979	0.00	0.00	0.064	6718.297	0.024	0.008
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.163	1.224	17.979	0.00	0.00	0.064	6718.297	0.024	0.008
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.163	1.224	17.979	0.00	0.00	0.064	6718.297	0.024	0.008
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.163	1.224	17.979	0.00	0.00	0.064	6718.297	0.024	0.008
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.163	1.224	17.979	0.00	0.00	0.064	6718.297	0.024	0.008
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.163	1.224	17.979	0.00	0.00	0.064	6718.297	0.024	0.008
	Owner observation	Gasoline	LDT2	0.432	6.473	0.600	0.06	0.05	0.053	5344.518	0.110	0.174
	Regulatory oversight	Gasoline	LDT2	0.432	6.473	0.600	0.06	0.05	0.053	5344.518	0.110	0.174
	Contractor supervisory	Diesel	MDV	0.881	17.127	0.583	0.08	0.08	0.046	4830.999	0.024	0.041
	Light-duty utility trucks	Gasoline	LDT2	0.432	6.473	0.600	0.06	0.05	0.053	5344.518	0.110	0.174
	Fuel truck	Diesel	T6 instate construction heavy	0.163	1.224	17.979	0.00	0.00	0.064	6718.297	0.024	0.008
	Maintenance truck	Diesel	T6 instate construction heavy	0.163	1.224	17.979	0.00	0.00	0.064	6718.297	0.024	0.008
	Construction Employees	Gasoline	LDA	0.338	5.336	0.407	0.06	0.05	0.041	4072.691	0.110	0.136

Notes:
1. Construction vehicle emission factors are from CARB's EMFAC 2014.
2. EMFAC calculates idling Efs for HDV. For others, idling emission factors were calculated by multiplying the appropriate emission factor at 5 mph by 5 to get the idling emission factor.

Table A1.1-29
Onroad Construction Vehicles - Mitigated Emission Factors - Offsite Transit (g/mile)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM10 tirewear	PM10 brakewear	PM2.5 exhaust	PM2.5 tirewear	PM2.5 brakewear	SOx	CO2	N2O	CH4
2016	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.040	0.179	1.428	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1197.279	0.005	0.002
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.040	0.179	1.428	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1197.279	0.005	0.002
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.040	0.179	1.428	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1197.279	0.005	0.002
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.040	0.179	1.428	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1197.279	0.005	0.002
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.040	0.179	1.428	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1197.279	0.005	0.002
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.040	0.179	1.428	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1197.279	0.005	0.002
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.040	0.179	1.428	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1197.279	0.005	0.002
	Owner observation	Gasoline	LDT2	0.226	2.096	0.232	0.00	0.01	0.04	0.00	0.00	0.02	0.005	473.661	0.022	0.017
	Regulatory oversight	Gasoline	LDT2	0.226	2.096	0.232	0.00	0.01	0.04	0.00	0.00	0.02	0.005	473.661	0.022	0.017
	Contractor supervisory	Diesel	MDV	0.024	0.296	0.078	0.01	0.01	0.04	0.01	0.00	0.02	0.005	520.384	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.226	2.096	0.232	0.00	0.01	0.04	0.00	0.00	0.02	0.005	473.661	0.022	0.017
	Fuel truck	Diesel	T6 instate construction heavy	0.040	0.179	1.428	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1197.279	0.005	0.002
	Maintenance truck	Diesel	T6 instate construction heavy	0.040	0.179	1.428	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1197.279	0.005	0.002
	Construction Employees	Gasoline	LDA	0.188	1.635	0.135	0.00	0.01	0.04	0.00	0.00	0.02	0.004	354.866	0.022	0.013
2017	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.040	0.182	1.388	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1189.348	0.005	0.002
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.040	0.182	1.388	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1189.348	0.005	0.002
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.040	0.182	1.388	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1189.348	0.005	0.002
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.040	0.182	1.388	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1189.348	0.005	0.002
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.040	0.182	1.388	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1189.348	0.005	0.002
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.040	0.182	1.388	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1189.348	0.005	0.002
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.040	0.182	1.388	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1189.348	0.005	0.002
	Owner observation	Gasoline	LDT2	0.199	1.825	0.197	0.00	0.01	0.04	0.00	0.00	0.02	0.005	461.517	0.022	0.015
	Regulatory oversight	Gasoline	LDT2	0.199	1.825	0.197	0.00	0.01	0.04	0.00	0.00	0.02	0.005	461.517	0.022	0.015
	Contractor supervisory	Diesel	MDV	0.023	0.296	0.070	0.01	0.01	0.04	0.01	0.00	0.02	0.005	508.461	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.199	1.825	0.197	0.00	0.01	0.04	0.00	0.00	0.02	0.005	461.517	0.022	0.015
	Fuel truck	Diesel	T6 instate construction heavy	0.040	0.182	1.388	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1189.348	0.005	0.002
	Maintenance truck	Diesel	T6 instate construction heavy	0.040	0.182	1.388	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1189.348	0.005	0.002
	Construction Employees	Gasoline	LDA	0.164	1.441	0.118	0.00	0.01	0.04	0.00	0.00	0.02	0.003	345.508	0.022	0.012
2018	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.041	0.187	1.371	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1182.804	0.005	0.002
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.041	0.187	1.371	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1182.804	0.005	0.002
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.041	0.187	1.371	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1182.804	0.005	0.002
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.041	0.187	1.371	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1182.804	0.005	0.002
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.041	0.187	1.371	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1182.804	0.005	0.002
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.041	0.187	1.371	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1182.804	0.005	0.002
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.041	0.187	1.371	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1182.804	0.005	0.002
	Owner observation	Gasoline	LDT2	0.177	1.597	0.168	0.00	0.01	0.04	0.00	0.00	0.02	0.005	449.062	0.022	0.013
	Regulatory oversight	Gasoline	LDT2	0.177	1.597	0.168	0.00	0.01	0.04	0.00	0.00	0.02	0.005	449.062	0.022	0.013
	Contractor supervisory	Diesel	MDV	0.022	0.298	0.063	0.01	0.01	0.04	0.01	0.00	0.02	0.005	497.174	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.177	1.597	0.168	0.00	0.01	0.04	0.00	0.00	0.02	0.005	449.062	0.022	0.013
	Fuel truck	Diesel	T6 instate construction heavy	0.041	0.187	1.371	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1182.804	0.005	0.002
	Maintenance truck	Diesel	T6 instate construction heavy	0.041	0.187	1.371	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1182.804	0.005	0.002
	Construction Employees	Gasoline	LDA	0.145	1.280	0.104	0.00	0.01	0.04	0.00	0.00	0.02	0.003	336.448	0.022	0.010
2019	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.040	0.185	1.356	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1172.041	0.005	0.002
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.040	0.185	1.356	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1172.041	0.005	0.002
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.040	0.185	1.356	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1172.041	0.005	0.002
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.040	0.185	1.356	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1172.041	0.005	0.002
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.040	0.185	1.356	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1172.041	0.005	0.002
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.040	0.185	1.356	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1172.041	0.005	0.002
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.040	0.185	1.356	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1172.041	0.005	0.002
	Owner observation	Gasoline	LDT2	0.159	1.407	0.144	0.00	0.01	0.04	0.00	0.00	0.02	0.004	435.076	0.022	0.011
	Regulatory oversight	Gasoline	LDT2	0.159	1.407	0.144	0.00	0.01	0.04	0.00	0.00	0.02	0.004	435.076	0.022	0.011
	Contractor supervisory	Diesel	MDV	0.021	0.299	0.059	0.01	0.01	0.04	0.01	0.00	0.02	0.005	485.090	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.159	1.407	0.144	0.00	0.01	0.04	0.00	0.00	0.02	0.004	435.076	0.022	0.011
	Fuel truck	Diesel	T6 instate construction heavy	0.040	0.185	1.356	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1172.041	0.005	0.002
	Maintenance truck	Diesel	T6 instate construction heavy	0.040	0.185	1.356	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1172.041	0.005	0.002
	Construction Employees	Gasoline	LDA	0.130	1.147	0.092	0.00	0.01	0.04	0.00	0.00	0.02	0.003	326.126	0.022	0.009

Table A1.1-29
Onroad Construction Vehicles - Mitigated Emission Factors - Offsite Transit (g/mile)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM10 tirewear	PM10 brakewear	PM2.5 exhaust	PM2.5 tirewear	PM2.5 brakewear	SOx	CO2	N2O	CH4
2020	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.040	0.189	1.411	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1168.580	0.005	0.002
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.040	0.189	1.411	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1168.580	0.005	0.002
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.040	0.189	1.411	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1168.580	0.005	0.002
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.040	0.189	1.411	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1168.580	0.005	0.002
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.040	0.189	1.411	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1168.580	0.005	0.002
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.040	0.189	1.411	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1168.580	0.005	0.002
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.040	0.189	1.411	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1168.580	0.005	0.002
	Owner observation	Gasoline	LDT2	0.146	1.265	0.126	0.00	0.01	0.04	0.00	0.00	0.02	0.004	422.775	0.022	0.010
	Regulatory oversight	Gasoline	LDT2	0.146	1.265	0.126	0.00	0.01	0.04	0.00	0.00	0.02	0.004	422.775	0.022	0.010
	Contractor supervisory	Diesel	MDV	0.020	0.303	0.055	0.01	0.01	0.04	0.01	0.00	0.02	0.005	474.887	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.146	1.265	0.126	0.00	0.01	0.04	0.00	0.00	0.02	0.004	422.775	0.022	0.010
	Fuel truck	Diesel	T6 instate construction heavy	0.040	0.189	1.411	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1168.580	0.005	0.002
	Maintenance truck	Diesel	T6 instate construction heavy	0.040	0.189	1.411	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1168.580	0.005	0.002
	Construction Employees	Gasoline	LDA	0.121	1.054	0.083	0.00	0.01	0.04	0.00	0.00	0.02	0.003	317.238	0.022	0.008
2021	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.040	0.192	1.403	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1164.868	0.005	0.002
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.040	0.192	1.403	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1164.868	0.005	0.002
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.040	0.192	1.403	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1164.868	0.005	0.002
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.040	0.192	1.403	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1164.868	0.005	0.002
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.040	0.192	1.403	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1164.868	0.005	0.002
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.040	0.192	1.403	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1164.868	0.005	0.002
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.040	0.192	1.403	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1164.868	0.005	0.002
	Owner observation	Gasoline	LDT2	0.136	1.162	0.111	0.00	0.01	0.04	0.00	0.00	0.02	0.004	409.826	0.022	0.009
	Regulatory oversight	Gasoline	LDT2	0.136	1.162	0.111	0.00	0.01	0.04	0.00	0.00	0.02	0.004	409.826	0.022	0.009
	Contractor supervisory	Diesel	MDV	0.019	0.298	0.049	0.01	0.01	0.04	0.01	0.00	0.02	0.004	463.192	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.136	1.162	0.111	0.00	0.01	0.04	0.00	0.00	0.02	0.004	409.826	0.022	0.009
	Fuel truck	Diesel	T6 instate construction heavy	0.040	0.192	1.403	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1164.868	0.005	0.002
	Maintenance truck	Diesel	T6 instate construction heavy	0.040	0.192	1.403	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1164.868	0.005	0.002
	Construction Employees	Gasoline	LDA	0.113	0.982	0.075	0.00	0.01	0.04	0.00	0.00	0.02	0.003	308.782	0.022	0.007
2022	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.040	0.194	1.381	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1160.246	0.005	0.002
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.040	0.194	1.381	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1160.246	0.005	0.002
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.040	0.194	1.381	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1160.246	0.005	0.002
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.040	0.194	1.381	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1160.246	0.005	0.002
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.040	0.194	1.381	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1160.246	0.005	0.002
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.040	0.194	1.381	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1160.246	0.005	0.002
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.040	0.194	1.381	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1160.246	0.005	0.002
	Owner observation	Gasoline	LDT2	0.128	1.081	0.100	0.00	0.01	0.04	0.00	0.00	0.02	0.004	396.024	0.022	0.008
	Regulatory oversight	Gasoline	LDT2	0.128	1.081	0.100	0.00	0.01	0.04	0.00	0.00	0.02	0.004	396.024	0.022	0.008
	Contractor supervisory	Diesel	MDV	0.018	0.292	0.045	0.01	0.01	0.04	0.01	0.00	0.02	0.004	450.569	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.128	1.081	0.100	0.00	0.01	0.04	0.00	0.00	0.02	0.004	396.024	0.022	0.008
	Fuel truck	Diesel	T6 instate construction heavy	0.040	0.194	1.381	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1160.246	0.005	0.002
	Maintenance truck	Diesel	T6 instate construction heavy	0.040	0.194	1.381	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1160.246	0.005	0.002
	Construction Employees	Gasoline	LDA	0.106	0.921	0.069	0.00	0.01	0.04	0.00	0.00	0.02	0.003	299.854	0.022	0.007
2023	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.037	0.194	1.280	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.072	0.005	0.002
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.037	0.194	1.280	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.072	0.005	0.002
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.037	0.194	1.280	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.072	0.005	0.002
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.037	0.194	1.280	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.072	0.005	0.002
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.037	0.194	1.280	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.072	0.005	0.002
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.037	0.194	1.280	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.072	0.005	0.002
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.037	0.194	1.280	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.072	0.005	0.002
	Owner observation	Gasoline	LDT2	0.122	1.013	0.090	0.00	0.01	0.04	0.00	0.00	0.02	0.004	380.697	0.022	0.008
	Regulatory oversight	Gasoline	LDT2	0.122	1.013	0.090	0.00	0.01	0.04	0.00	0.00	0.02	0.004	380.697	0.022	0.008
	Contractor supervisory	Diesel	MDV	0.016	0.287	0.040	0.01	0.01	0.04	0.01	0.00	0.02	0.004	437.577	0.005	0.001
	Light-duty utility trucks	Gasoline	LDT2	0.122	1.013	0.090	0.00	0.01	0.04	0.00	0.00	0.02	0.004	380.697	0.022	0.008
	Fuel truck	Diesel	T6 instate construction heavy	0.037	0.194	1.280	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.072	0.005	0.002
	Maintenance truck	Diesel	T6 instate construction heavy	0.037	0.194	1.280	0.00	0.01	0.13	0.00	0.00	0.06	0.011	1165.072	0.005	0.002
	Construction Employees	Gasoline	LDA	0.101	0.865	0.063	0.00	0.01	0.04	0.00	0.00	0.02	0.003	291.075	0.022	0.006

Notes:
1. Construction vehicle emission factors are from CARB's EMFAC 2014.
2. Mitigated emission factors for onroad vehicles used during construction assume EPA 2010 emission standards for all phases of construction.

Table A1.1-30
Onroad Construction Vehicles - Mitigated Emission Factors - Onsite Transit (g/mile)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM10 tirewear	PM10 brakewear	PM2.5 exhaust	PM2.5 tirewear	PM2.5 brakewear	SOx	CO2	N2O	CH4
2016	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.28	1.19	7.01	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2260.31	0.005	0.01
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.28	1.19	7.01	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2260.31	0.005	0.01
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.28	1.19	7.01	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2260.31	0.005	0.01
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.28	1.19	7.01	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2260.31	0.005	0.01
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.28	1.19	7.01	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2260.31	0.005	0.01
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.28	1.19	7.01	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2260.31	0.005	0.01
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.28	1.19	7.01	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2260.31	0.005	0.01
	Owner observation	Gasoline	LDT2	0.21	2.82	0.29	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1330.47	0.022	0.07
	Regulatory oversight	Gasoline	LDT2	0.21	2.82	0.29	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1330.47	0.022	0.07
	Contractor supervisory	Diesel	MDV	0.21	3.24	0.17	0.03	0.01	0.04	0.03	0.00	0.02	0.01	1146.86	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.21	2.82	0.29	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1330.47	0.022	0.07
	Fuel truck	Diesel	T6 instate construction heavy	0.28	1.19	7.01	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2260.31	0.005	0.01
	Maintenance truck	Diesel	T6 instate construction heavy	0.28	1.19	7.01	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2260.31	0.005	0.01
	Construction Employees	Gasoline	LDA	0.16	2.13	0.16	0.01	0.01	0.04	0.01	0.00	0.02	0.01	993.99	0.022	0.06
2017	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.28	1.21	7.31	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2243.43	0.005	0.01
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.28	1.21	7.31	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2243.43	0.005	0.01
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.28	1.21	7.31	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2243.43	0.005	0.01
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.28	1.21	7.31	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2243.43	0.005	0.01
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.28	1.21	7.31	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2243.43	0.005	0.01
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.28	1.21	7.31	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2243.43	0.005	0.01
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.28	1.21	7.31	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2243.43	0.005	0.01
	Owner observation	Gasoline	LDT2	0.18	2.42	0.25	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1296.46	0.022	0.06
	Regulatory oversight	Gasoline	LDT2	0.18	2.42	0.25	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1296.46	0.022	0.06
	Contractor supervisory	Diesel	MDV	0.21	3.33	0.16	0.03	0.01	0.04	0.03	0.00	0.02	0.01	1120.59	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.18	2.42	0.25	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1296.46	0.022	0.06
	Fuel truck	Diesel	T6 instate construction heavy	0.28	1.21	7.31	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2243.43	0.005	0.01
	Maintenance truck	Diesel	T6 instate construction heavy	0.28	1.21	7.31	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2243.43	0.005	0.01
	Construction Employees	Gasoline	LDA	0.14	1.85	0.14	0.01	0.01	0.04	0.01	0.00	0.02	0.01	967.81	0.022	0.05
2018	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.28	1.23	7.59	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2229.93	0.005	0.01
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.28	1.23	7.59	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2229.93	0.005	0.01
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.28	1.23	7.59	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2229.93	0.005	0.01
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.28	1.23	7.59	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2229.93	0.005	0.01
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.28	1.23	7.59	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2229.93	0.005	0.01
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.28	1.23	7.59	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2229.93	0.005	0.01
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.28	1.23	7.59	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2229.93	0.005	0.01
	Owner observation	Gasoline	LDT2	0.15	2.09	0.22	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1261.12	0.022	0.06
	Regulatory oversight	Gasoline	LDT2	0.15	2.09	0.22	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1261.12	0.022	0.06
	Contractor supervisory	Diesel	MDV	0.21	3.41	0.16	0.03	0.01	0.04	0.03	0.00	0.02	0.01	1095.71	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.15	2.09	0.22	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1261.12	0.022	0.06
	Fuel truck	Diesel	T6 instate construction heavy	0.28	1.23	7.59	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2229.93	0.005	0.01
	Maintenance truck	Diesel	T6 instate construction heavy	0.28	1.23	7.59	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2229.93	0.005	0.01
	Construction Employees	Gasoline	LDA	0.11	1.61	0.13	0.01	0.01	0.04	0.01	0.00	0.02	0.01	942.11	0.022	0.04
2019	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.28	1.25	7.86	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2218.89	0.005	0.01
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.28	1.25	7.86	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2218.89	0.005	0.01
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.28	1.25	7.86	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2218.89	0.005	0.01
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.28	1.25	7.86	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2218.89	0.005	0.01
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.28	1.25	7.86	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2218.89	0.005	0.01
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.28	1.25	7.86	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2218.89	0.005	0.01
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.28	1.25	7.86	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2218.89	0.005	0.01
	Owner observation	Gasoline	LDT2	0.13	1.83	0.19	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1225.89	0.022	0.05
	Regulatory oversight	Gasoline	LDT2	0.13	1.83	0.19	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1225.89	0.022	0.05
	Contractor supervisory	Diesel	MDV	0.21	3.50	0.16	0.02	0.01	0.04	0.02	0.00	0.02	0.01	1072.75	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.13	1.83	0.19	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1225.89	0.022	0.05
	Fuel truck	Diesel	T6 instate construction heavy	0.28	1.25	7.86	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2218.89	0.005	0.01
	Maintenance truck	Diesel	T6 instate construction heavy	0.28	1.25	7.86	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2218.89	0.005	0.01
	Construction Employees	Gasoline	LDA	0.10	1.42	0.11	0.01	0.01	0.04	0.01	0.00	0.02	0.01	916.14	0.022	0.04

Table A1.1-30
Onroad Construction Vehicles - Mitigated Emission Factors - Onsite Transit (g/mile)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM10 tirewear	PM10 brakewear	PM2.5 exhaust	PM2.5 tirewear	PM2.5 brakewear	SOx	CO2	N2O	CH4
2020	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.29	1.27	8.12	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2209.68	0.005	0.01
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.29	1.27	8.12	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2209.68	0.005	0.01
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.29	1.27	8.12	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2209.68	0.005	0.01
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.29	1.27	8.12	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2209.68	0.005	0.01
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.29	1.27	8.12	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2209.68	0.005	0.01
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.29	1.27	8.12	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2209.68	0.005	0.01
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.29	1.27	8.12	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2209.68	0.005	0.01
	Owner observation	Gasoline	LDT2	0.11	1.63	0.16	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1190.85	0.022	0.05
	Regulatory oversight	Gasoline	LDT2	0.11	1.63	0.16	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1190.85	0.022	0.05
	Contractor supervisory	Diesel	MDV	0.21	3.58	0.15	0.02	0.01	0.04	0.02	0.00	0.02	0.01	1050.19	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.11	1.63	0.16	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1190.85	0.022	0.05
	Fuel truck	Diesel	T6 instate construction heavy	0.29	1.27	8.12	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2209.68	0.005	0.01
	Maintenance truck	Diesel	T6 instate construction heavy	0.29	1.27	8.12	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2209.68	0.005	0.01
	Construction Employees	Gasoline	LDA	0.09	1.31	0.10	0.01	0.01	0.04	0.01	0.00	0.02	0.01	890.78	0.022	0.04
2021	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.29	1.29	8.36	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2201.89	0.005	0.01
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.29	1.29	8.36	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2201.89	0.005	0.01
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.29	1.29	8.36	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2201.89	0.005	0.01
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.29	1.29	8.36	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2201.89	0.005	0.01
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.29	1.29	8.36	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2201.89	0.005	0.01
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.29	1.29	8.36	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2201.89	0.005	0.01
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.29	1.29	8.36	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2201.89	0.005	0.01
	Owner observation	Gasoline	LDT2	0.10	1.49	0.15	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1151.74	0.022	0.04
	Regulatory oversight	Gasoline	LDT2	0.10	1.49	0.15	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1151.74	0.022	0.04
	Contractor supervisory	Diesel	MDV	0.20	3.52	0.14	0.02	0.01	0.04	0.02	0.00	0.02	0.01	1022.76	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.10	1.49	0.15	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1151.74	0.022	0.04
	Fuel truck	Diesel	T6 instate construction heavy	0.29	1.29	8.36	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2201.89	0.005	0.01
	Maintenance truck	Diesel	T6 instate construction heavy	0.29	1.29	8.36	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2201.89	0.005	0.01
	Construction Employees	Gasoline	LDA	0.08	1.22	0.10	0.01	0.01	0.04	0.01	0.00	0.02	0.01	864.98	0.022	0.03
2022	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.29	1.31	8.60	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2195.22	0.005	0.01
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.29	1.31	8.60	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2195.22	0.005	0.01
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.29	1.31	8.60	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2195.22	0.005	0.01
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.29	1.31	8.60	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2195.22	0.005	0.01
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.29	1.31	8.60	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2195.22	0.005	0.01
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.29	1.31	8.60	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2195.22	0.005	0.01
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.29	1.31	8.60	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2195.22	0.005	0.01
	Owner observation	Gasoline	LDT2	0.09	1.39	0.13	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1112.45	0.022	0.04
	Regulatory oversight	Gasoline	LDT2	0.09	1.39	0.13	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1112.45	0.022	0.04
	Contractor supervisory	Diesel	MDV	0.19	3.47	0.13	0.02	0.01	0.04	0.02	0.00	0.02	0.01	994.89	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.09	1.39	0.13	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1112.45	0.022	0.04
	Fuel truck	Diesel	T6 instate construction heavy	0.29	1.31	8.60	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2195.22	0.005	0.01
	Maintenance truck	Diesel	T6 instate construction heavy	0.29	1.31	8.60	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2195.22	0.005	0.01
	Construction Employees	Gasoline	LDA	0.07	1.14	0.09	0.01	0.01	0.04	0.01	0.00	0.02	0.01	839.52	0.022	0.03
2023	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.29	1.32	8.83	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2189.43	0.005	0.01
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.29	1.32	8.83	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2189.43	0.005	0.01
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.29	1.32	8.83	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2189.43	0.005	0.01
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.29	1.32	8.83	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2189.43	0.005	0.01
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.29	1.32	8.83	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2189.43	0.005	0.01
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.29	1.32	8.83	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2189.43	0.005	0.01
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.29	1.32	8.83	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2189.43	0.005	0.01
	Owner observation	Gasoline	LDT2	0.09	1.29	0.12	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1068.90	0.022	0.03
	Regulatory oversight	Gasoline	LDT2	0.09	1.29	0.12	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1068.90	0.022	0.03
	Contractor supervisory	Diesel	MDV	0.18	3.43	0.12	0.02	0.01	0.04	0.02	0.00	0.02	0.01	966.20	0.005	0.01
	Light-duty utility trucks	Gasoline	LDT2	0.09	1.29	0.12	0.01	0.01	0.04	0.01	0.00	0.02	0.01	1068.90	0.022	0.03
	Fuel truck	Diesel	T6 instate construction heavy	0.29	1.32	8.83	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2189.43	0.005	0.01
	Maintenance truck	Diesel	T6 instate construction heavy	0.29	1.32	8.83	0.01	0.01	0.13	0.01	0.00	0.06	0.02	2189.43	0.005	0.01
	Construction Employees	Gasoline	LDA	0.07	1.07	0.08	0.01	0.01	0.04	0.01	0.00	0.02	0.01	814.54	0.022	0.03

Notes:
1. Construction vehicle emission factors are from CARB's EMFAC 2014.
2. Mitigated emission factors for onroad vehicles used during construction assume EPA 2010 emission standards for all phases of construction.

Table A1.1-31
Onroad Construction Vehicles - Mitigated Emission Factors - Onsite Idling (g/hr-vehicle)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM2.5 exhaust	SOx	CO2	N2O	CH4
2016	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.237	1.835	21.957	0.00	0.00	0.066	6896.695	0.024	0.001
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.237	1.835	21.957	0.00	0.00	0.066	6896.695	0.024	0.001
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.237	1.835	21.957	0.00	0.00	0.066	6896.695	0.024	0.001
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.237	1.835	21.957	0.00	0.00	0.066	6896.695	0.024	0.001
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.237	1.835	21.957	0.00	0.00	0.066	6896.695	0.024	0.001
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.237	1.835	21.957	0.00	0.00	0.066	6896.695	0.024	0.001
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.237	1.835	21.957	0.00	0.00	0.066	6896.695	0.024	0.001
	Owner observation	Gasoline	LDT2	1.044	14.102	1.470	0.06	0.05	0.067	6652.373	0.110	0.363
	Regulatory oversight	Gasoline	LDT2	1.044	14.102	1.470	0.06	0.05	0.067	6652.373	0.110	0.363
	Contractor supervisory	Diesel	MDV	1.074	16.209	0.825	0.17	0.17	0.055	5734.321	0.024	0.050
	Light-duty utility trucks	Gasoline	LDT2	1.044	14.102	1.470	0.06	0.05	0.067	6652.373	0.110	0.363
	Fuel truck	Diesel	T6 instate construction heavy	0.237	1.835	21.957	0.00	0.00	0.066	6896.695	0.024	0.001
	Maintenance truck	Diesel	T6 instate construction heavy	0.237	1.835	21.957	0.00	0.00	0.066	6896.695	0.024	0.001
	Construction Employees	Gasoline	LDA	0.821	10.655	0.805	0.06	0.06	0.050	4969.950	0.110	0.276
2017	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.229	1.765	21.476	0.00	0.00	0.065	6840.067	0.024	0.001
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.229	1.765	21.476	0.00	0.00	0.065	6840.067	0.024	0.001
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.229	1.765	21.476	0.00	0.00	0.065	6840.067	0.024	0.001
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.229	1.765	21.476	0.00	0.00	0.065	6840.067	0.024	0.001
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.229	1.765	21.476	0.00	0.00	0.065	6840.067	0.024	0.001
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.229	1.765	21.476	0.00	0.00	0.065	6840.067	0.024	0.001
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.229	1.765	21.476	0.00	0.00	0.065	6840.067	0.024	0.001
	Owner observation	Gasoline	LDT2	0.877	12.118	1.260	0.06	0.05	0.065	6482.284	0.110	0.319
	Regulatory oversight	Gasoline	LDT2	0.877	12.118	1.260	0.06	0.05	0.065	6482.284	0.110	0.319
	Contractor supervisory	Diesel	MDV	1.062	16.629	0.801	0.15	0.14	0.053	5602.938	0.024	0.049
	Light-duty utility trucks	Gasoline	LDT2	0.877	12.118	1.260	0.06	0.05	0.065	6482.284	0.110	0.319
	Fuel truck	Diesel	T6 instate construction heavy	0.229	1.765	21.476	0.00	0.00	0.065	6840.067	0.024	0.001
	Maintenance truck	Diesel	T6 instate construction heavy	0.229	1.765	21.476	0.00	0.00	0.065	6840.067	0.024	0.001
	Construction Employees	Gasoline	LDA	0.688	9.228	0.715	0.06	0.06	0.048	4839.061	0.110	0.245
2018	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.222	1.710	21.091	0.00	0.00	0.065	6794.764	0.024	0.001
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.222	1.710	21.091	0.00	0.00	0.065	6794.764	0.024	0.001
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.222	1.710	21.091	0.00	0.00	0.065	6794.764	0.024	0.001
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.222	1.710	21.091	0.00	0.00	0.065	6794.764	0.024	0.001
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.222	1.710	21.091	0.00	0.00	0.065	6794.764	0.024	0.001
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.222	1.710	21.091	0.00	0.00	0.065	6794.764	0.024	0.001
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.222	1.710	21.091	0.00	0.00	0.065	6794.764	0.024	0.001
	Owner observation	Gasoline	LDT2	0.739	10.443	1.083	0.06	0.05	0.063	6305.613	0.110	0.282
	Regulatory oversight	Gasoline	LDT2	0.739	10.443	1.083	0.06	0.05	0.063	6305.613	0.110	0.282
	Contractor supervisory	Diesel	MDV	1.060	17.061	0.785	0.13	0.13	0.052	5478.565	0.024	0.049
	Light-duty utility trucks	Gasoline	LDT2	0.739	10.443	1.083	0.06	0.05	0.063	6305.613	0.110	0.282
	Fuel truck	Diesel	T6 instate construction heavy	0.222	1.710	21.091	0.00	0.00	0.065	6794.764	0.024	0.001
	Maintenance truck	Diesel	T6 instate construction heavy	0.222	1.710	21.091	0.00	0.00	0.065	6794.764	0.024	0.001
	Construction Employees	Gasoline	LDA	0.575	8.026	0.638	0.06	0.06	0.047	4710.571	0.110	0.218
2019	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.217	1.664	20.776	0.00	0.00	0.064	6757.699	0.024	0.001
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.217	1.664	20.776	0.00	0.00	0.064	6757.699	0.024	0.001
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.217	1.664	20.776	0.00	0.00	0.064	6757.699	0.024	0.001
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.217	1.664	20.776	0.00	0.00	0.064	6757.699	0.024	0.001
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.217	1.664	20.776	0.00	0.00	0.064	6757.699	0.024	0.001
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.217	1.664	20.776	0.00	0.00	0.064	6757.699	0.024	0.001
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.217	1.664	20.776	0.00	0.00	0.064	6757.699	0.024	0.001
	Owner observation	Gasoline	LDT2	0.631	9.125	0.937	0.06	0.05	0.061	6129.455	0.110	0.251
	Regulatory oversight	Gasoline	LDT2	0.631	9.125	0.937	0.06	0.05	0.061	6129.455	0.110	0.251
	Contractor supervisory	Diesel	MDV	1.062	17.489	0.775	0.12	0.11	0.051	5363.747	0.024	0.049
	Light-duty utility trucks	Gasoline	LDT2	0.631	9.125	0.937	0.06	0.05	0.061	6129.455	0.110	0.251
	Fuel truck	Diesel	T6 instate construction heavy	0.217	1.664	20.776	0.00	0.00	0.064	6757.699	0.024	0.001
	Maintenance truck	Diesel	T6 instate construction heavy	0.217	1.664	20.776	0.00	0.00	0.064	6757.699	0.024	0.001
	Construction Employees	Gasoline	LDA	0.488	7.104	0.574	0.06	0.06	0.046	4580.678	0.110	0.196

Table A1.1-31
Onroad Construction Vehicles - Mitigated Emission Factors - Onsite Idling (g/hr-vehicle)

Analysis Year	Construction activity	Fuel	EMFAC Designation	VOC	CO	NOx	PM10 exhaust	PM2.5 exhaust	SOx	CO2	N2O	CH4
2020	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.212	1.626	20.514	0.00	0.00	0.064	6726.811	0.024	0.001
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.212	1.626	20.514	0.00	0.00	0.064	6726.811	0.024	0.001
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.212	1.626	20.514	0.00	0.00	0.064	6726.811	0.024	0.001
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.212	1.626	20.514	0.00	0.00	0.064	6726.811	0.024	0.001
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.212	1.626	20.514	0.00	0.00	0.064	6726.811	0.024	0.001
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.212	1.626	20.514	0.00	0.00	0.064	6726.811	0.024	0.001
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.212	1.626	20.514	0.00	0.00	0.064	6726.811	0.024	0.001
	Owner observation	Gasoline	LDT2	0.558	8.150	0.823	0.06	0.05	0.060	5954.274	0.110	0.225
	Regulatory oversight	Gasoline	LDT2	0.558	8.150	0.823	0.06	0.05	0.060	5954.274	0.110	0.225
	Contractor supervisory	Diesel	MDV	1.068	17.908	0.769	0.11	0.11	0.050	5250.929	0.024	0.050
	Light-duty utility trucks	Gasoline	LDT2	0.558	8.150	0.823	0.06	0.05	0.060	5954.274	0.110	0.225
	Fuel truck	Diesel	T6 instate construction heavy	0.212	1.626	20.514	0.00	0.00	0.064	6726.811	0.024	0.001
	Maintenance truck	Diesel	T6 instate construction heavy	0.212	1.626	20.514	0.00	0.00	0.064	6726.811	0.024	0.001
	Construction Employees	Gasoline	LDA	0.441	6.525	0.522	0.06	0.06	0.045	4453.921	0.110	0.177
2021	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.208	1.594	20.292	0.00	0.00	0.064	6700.675	0.024	0.001
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.208	1.594	20.292	0.00	0.00	0.064	6700.675	0.024	0.001
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.208	1.594	20.292	0.00	0.00	0.064	6700.675	0.024	0.001
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.208	1.594	20.292	0.00	0.00	0.064	6700.675	0.024	0.001
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.208	1.594	20.292	0.00	0.00	0.064	6700.675	0.024	0.001
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.208	1.594	20.292	0.00	0.00	0.064	6700.675	0.024	0.001
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.208	1.594	20.292	0.00	0.00	0.064	6700.675	0.024	0.001
	Owner observation	Gasoline	LDT2	0.510	7.471	0.733	0.06	0.05	0.058	5758.707	0.110	0.206
	Regulatory oversight	Gasoline	LDT2	0.510	7.471	0.733	0.06	0.05	0.058	5758.707	0.110	0.206
	Contractor supervisory	Diesel	MDV	0.996	17.588	0.694	0.10	0.10	0.049	5113.795	0.024	0.046
	Light-duty utility trucks	Gasoline	LDT2	0.510	7.471	0.733	0.06	0.05	0.058	5758.707	0.110	0.206
	Fuel truck	Diesel	T6 instate construction heavy	0.208	1.594	20.292	0.00	0.00	0.064	6700.675	0.024	0.001
	Maintenance truck	Diesel	T6 instate construction heavy	0.208	1.594	20.292	0.00	0.00	0.064	6700.675	0.024	0.001
	Construction Employees	Gasoline	LDA	0.402	6.078	0.477	0.06	0.05	0.043	4324.912	0.110	0.162
2022	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.205	1.567	20.102	0.00	0.00	0.064	6678.272	0.024	0.001
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.205	1.567	20.102	0.00	0.00	0.064	6678.272	0.024	0.001
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.205	1.567	20.102	0.00	0.00	0.064	6678.272	0.024	0.001
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.205	1.567	20.102	0.00	0.00	0.064	6678.272	0.024	0.001
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.205	1.567	20.102	0.00	0.00	0.064	6678.272	0.024	0.001
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.205	1.567	20.102	0.00	0.00	0.064	6678.272	0.024	0.001
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.205	1.567	20.102	0.00	0.00	0.064	6678.272	0.024	0.001
	Owner observation	Gasoline	LDT2	0.469	6.942	0.661	0.06	0.05	0.056	5562.268	0.110	0.189
	Regulatory oversight	Gasoline	LDT2	0.469	6.942	0.661	0.06	0.05	0.056	5562.268	0.110	0.189
	Contractor supervisory	Diesel	MDV	0.936	17.328	0.634	0.09	0.09	0.047	4974.434	0.024	0.043
	Light-duty utility trucks	Gasoline	LDT2	0.469	6.942	0.661	0.06	0.05	0.056	5562.268	0.110	0.189
	Fuel truck	Diesel	T6 instate construction heavy	0.205	1.567	20.102	0.00	0.00	0.064	6678.272	0.024	0.001
	Maintenance truck	Diesel	T6 instate construction heavy	0.205	1.567	20.102	0.00	0.00	0.064	6678.272	0.024	0.001
	Construction Employees	Gasoline	LDA	0.368	5.698	0.439	0.06	0.05	0.042	4197.616	0.110	0.148
2023	Haul Truck - Debris	Diesel	T6 instate construction heavy	0.202	1.543	19.937	0.00	0.00	0.064	6658.857	0.024	0.001
	Haul Truck - Paving Recycle	Diesel	T6 instate construction heavy	0.202	1.543	19.937	0.00	0.00	0.064	6658.857	0.024	0.001
	Haul Truck - Pipe	Diesel	T6 instate construction heavy	0.202	1.543	19.937	0.00	0.00	0.064	6658.857	0.024	0.001
	Haul Truck - Sand/gravel	Diesel	T6 instate construction heavy	0.202	1.543	19.937	0.00	0.00	0.064	6658.857	0.024	0.001
	Haul Truck - Asphalt	Diesel	T6 instate construction heavy	0.202	1.543	19.937	0.00	0.00	0.064	6658.857	0.024	0.001
	Haul Truck - Concrete	Diesel	T6 instate construction heavy	0.202	1.543	19.937	0.00	0.00	0.064	6658.857	0.024	0.001
	Haul Truck - Contaminated Soil	Diesel	T6 instate construction heavy	0.202	1.543	19.937	0.00	0.00	0.064	6658.857	0.024	0.001
	Owner observation	Gasoline	LDT2	0.432	6.473	0.600	0.06	0.05	0.053	5344.518	0.110	0.174
	Regulatory oversight	Gasoline	LDT2	0.432	6.473	0.600	0.06	0.05	0.053	5344.518	0.110	0.174
	Contractor supervisory	Diesel	MDV	0.881	17.127	0.583	0.08	0.08	0.046	4830.999	0.024	0.041
	Light-duty utility trucks	Gasoline	LDT2	0.432	6.473	0.600	0.06	0.05	0.053	5344.518	0.110	0.174
	Fuel truck	Diesel	T6 instate construction heavy	0.202	1.543	19.937	0.00	0.00	0.064	6658.857	0.024	0.001
	Maintenance truck	Diesel	T6 instate construction heavy	0.202	1.543	19.937	0.00	0.00	0.064	6658.857	0.024	0.001
	Construction Employees	Gasoline	LDA	0.338	5.336	0.407	0.06	0.05	0.041	4072.691	0.110	0.136

Notes:
1. Construction vehicle emission factors are from CARB's EMFAC 2014.
2. Mitigated emission factors for onroad vehicles used during construction assume EPA 2010 emission standards for all phases of construction.
3. EMFAC calculates idling Efs for HDV. For others, idling emission factors were calculated by multiplying the appropriate emission factor at 5 mph by 5 to get the idling emission factor.

Table A1.1-32

Onroad Construction Vehicles - Emission Factors - Road Dust (g/mile)

Location	PM10	PM2.5
Offsite	0.189	0.047
Onsite	13.340	3.335

Notes:

1. Road dust emission factors are from AP-42 Section 13.2.1 (Jan 2011), with an onsite silt loading of 0.6 g/m2 (representative of roadways <500 ADT), offsite silt loading of 0.06 g/m2 (representative of roadways with 5,000-10,000 ADT), PM10 particle size multiplier of 1 (g/VMT), PM2.5 particle size multiplier of 0.25 (g/VMT), average vehicle weight of 2.4 tons for offsite transit (from CalEEMod User's Guide Appendix D, Table 4.1, Los Angeles County - South Coast), and average construction vehicle weight of 20 tons for onsite and nearsite transit.

Table A1.1-33
Construction Emissions by Source Category - All Build Alternatives without Mitigation - Year 1 (Phases 1 and 2) - Annual

	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
Source Category	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**CO2**	**N2O**	**CH4**	**R-404a**	**HFC-134a**		**CO2e**
Construction Equipment On-Site	0.6	3.8	6.2	0.3	0.0	0.0	0.0	0.3	0.3	0.3	0.01	605	0.0	0.0	0.0	0.0		611
On-Road Vehicles On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	17	0.0	0.0	0.0	0.0		17
On-Road Vehicles Off-Site	0.1	0.7	0.5	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.00	243	0.0	0.0	0.0	0.0		246
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.7**	**4.5**	**6.7**	**0.3**	**0.0**	**0.0**	**0.3**	**0.6**	**0.4**	**0.3**	**0.01**	**865**	**0.0**	**0.0**	**0.0**	**0.0**		**873**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. Construction in Year 1 is assumed to occur only during the final quarter in accordance with the project construction schedule.
3. For the purposes of the emission calculations, Construction Year 1 was assumed to be 2016. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-34
Construction Emissions by Source Category - All Build Alternatives without Mitigation - Year 1 (Phases 1 and 2) - Peak Short Term

	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											
Source Category	**VOC**	**CO**	**NOx**	**PM10**	**PM2.5**	**DPM**	**SOx**	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**Peak 8-Hour CO (lb/8-hr)**
Construction Equipment On-Site	33	228	356	17	15	17	0.4	4.1	28	45	2.1	0.00	0.00	0	2.1	1.9	2.1	0.05	228
On-Road Vehicles On-Site	2	5	24	1	0	0	0.0	0.3	1	3	0.1	0.00	0.01	0	0.1	0.1	0.1	0.00	5
On-Road Vehicles Off-Site	15	60	336	28	13	6	0.7	1.9	8	42	0.8	0.10	0.97	2	3.5	1.6	0.8	0.09	60
Fugitive Dust On-Site	0	0	0	19	5	0	0.0	0.0	0	0	0.0	0.00	0.00	2	2.3	0.6	0.0	0.00	0
Total Emissions	**50**	**294**	**717**	**64**	**34**	**23**	**1.1**	**6.3**	**37**	**90**	**2.9**	**0.10**	**0.98**	**4**	**8.0**	**4.2**	**2.9**	**0.14**	**294**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. Construction in Year 1 is assumed to occur only during the final quarter in accordance with the project construction schedule.
3. For the purposes of the emission calculations, Construction Year 1 was assumed to be 2016. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-35
Construction Emissions by Source Category - All Build Alternatives without Mitigation - Year 2 (Phases 1 and 2) - Annual

	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
Source Category	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**CO2**	**N2O**	**CH4**	**R-404a**	**HFC-134a**		**CO2e**
Construction Equipment On-Site	5.8	40.1	59.3	3.1	0.0	0.0	0.0	3.1	2.8	3.1	0.06	6,032	0.2	0.3	0.0	0.0		6,085
On-Road Vehicles On-Site	0.1	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	193	0.0	0.0	0.0	0.0		194
On-Road Vehicles Off-Site	1.1	8.6	8.6	0.1	0.1	0.4	1.3	1.9	0.6	0.1	0.04	4,325	0.1	0.1	0.0	0.0		4,362
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	1.9	1.9	0.6	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**7.0**	**49.1**	**68.4**	**3.2**	**0.1**	**0.4**	**3.3**	**6.9**	**4.1**	**3.2**	**0.10**	**10,550**	**0.3**	**0.4**	**0.0**	**0.0**		**10,641**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 2 was assumed to be 2017. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-36
Construction Emissions by Source Category - All Build Alternatives without Mitigation - Year 2 (Phases 1 and 2) - Peak Short Term

	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											
Source Category	**VOC**	**CO**	**NOx**	**PM10**	**PM2.5**	**DPM**	**SOx**	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**Peak 8-Hour CO (lb/8-hr)**
Construction Equipment On-Site	69	483	702	34	32	34	0.8	8.6	60	88	4.3	0.00	0.00	0	4.3	3.9	4.3	0.09	483
On-Road Vehicles On-Site	2	8	29	1	0	0	0.1	0.2	1	4	0.0	0.00	0.02	0	0.1	0.0	0.0	0.01	8
On-Road Vehicles Off-Site	21	126	338	42	16	5	1.0	2.6	16	42	0.6	0.17	1.40	3	5.3	2.0	0.6	0.12	126
Fugitive Dust On-Site	0	0	0	44	12	0	0.0	0.0	0	0	0.0	0.00	0.00	5	5.5	1.5	0.0	0.00	0
Total Emissions	**91**	**618**	**1,068**	**121**	**60**	**39**	**1.8**	**11.4**	**77**	**134**	**4.9**	**0.17**	**1.42**	**9**	**15.1**	**7.5**	**4.9**	**0.23**	**618**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 2 was assumed to be 2017. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-37
Construction Emissions by Source Category - All Build Alternatives without Mitigation - Year 3 (Phases 1 and 2) - Annual

	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
Source Category	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**CO2**	**N2O**	**CH4**	**R-404a**	**HFC-134a**		**CO2e**
Construction Equipment On-Site	2.3	17.4	23.2	1.1	0.0	0.0	0.0	1.1	1.0	1.1	0.03	2,767	0.1	0.2	0.0	0.0		2,792
On-Road Vehicles On-Site	0.0	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	220	0.0	0.0	0.0	0.0		221
On-Road Vehicles Off-Site	1.1	8.6	10.7	0.1	0.1	0.6	1.6	2.4	0.8	0.1	0.05	6,157	0.1	0.1	0.0	0.0		6,200
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	1.9	1.9	0.5	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**3.4**	**26.3**	**34.5**	**1.2**	**0.1**	**0.6**	**3.5**	**5.3**	**2.3**	**1.2**	**0.08**	**9,144**	**0.2**	**0.2**	**0.0**	**0.0**		**9,213**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 3 was assumed to be 2018. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-38
Construction Emissions by Source Category - All Build Alternatives without Mitigation - Year 3 (Phases 1 and 2) - Peak Short Term

	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											
Source Category	**VOC**	**CO**	**NOx**	**PM10**	**PM2.5**	**DPM**	**SOx**	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**Peak 8-Hour CO (lb/8-hr)**
Construction Equipment On-Site	62	477	627	29	27	29	0.8	7.8	60	78	3.7	0.00	0.00	0	3.7	3.4	3.7	0.10	477
On-Road Vehicles On-Site	1	5	19	0	0	0	0.0	0.1	1	2	0.0	0.00	0.02	0	0.0	0.0	0.0	0.01	5
On-Road Vehicles Off-Site	15	99	264	38	13	2	1.0	1.9	12	33	0.3	0.16	1.34	3	4.8	1.6	0.3	0.12	99
Fugitive Dust On-Site	0	0	0	40	11	0	0.0	0.0	0	0	0.0	0.00	0.00	5	5.0	1.4	0.0	0.00	0
Total Emissions	**78**	**581**	**909**	**108**	**51**	**32**	**1.8**	**9.7**	**73**	**114**	**4.0**	**0.16**	**1.36**	**8**	**13.5**	**6.4**	**4.0**	**0.22**	**581**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 3 was assumed to be 2018. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-39
Construction Emissions by Source Category - All Build Alternatives without Mitigation - Year 4 (Phases 1 and 2) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	0.7	5.5	6.8	0.3	0.0	0.0	0.0	0.3	0.3	0.3	0.01	932	0.0	0.1	0.0	0.0		940
On-Road Vehicles On-Site	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	87	0.0	0.0	0.0	0.0		87
On-Road Vehicles Off-Site	0.4	3.1	4.2	0.0	0.0	0.2	0.7	1.0	0.3	0.0	0.02	2,767	0.1	0.0	0.0	0.0		2,784
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.2	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**1.1**	**8.7**	**11.2**	**0.4**	**0.0**	**0.2**	**1.4**	**2.0**	**0.8**	**0.4**	**0.03**	**3,786**	**0.1**	**0.1**	**0.0**	**0.0**		**3,812**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 4 was assumed to be 2019. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-40
Construction Emissions by Source Category - All Build Alternatives without Mitigation - Year 4 (Phases 1 and 2) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	Peak 8-Hour CO (lb/8-hr)
Construction Equipment On-Site	27	223	269	13	12	13	0.4	3.4	28	34	1.6	0.00	0.00	0	1.6	1.5	1.6	0.05	223
On-Road Vehicles On-Site	1	3	14	0	0	0	0.0	0.1	0	2	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	3
On-Road Vehicles Off-Site	9	50	235	29	10	2	0.8	1.1	6	29	0.2	0.12	1.17	2	3.7	1.3	0.2	0.10	50
Fugitive Dust On-Site	0	0	0	25	7	0	0.0	0.0	0	0	0.0	0.00	0.00	3	3.2	0.9	0.0	0.00	0
Total Emissions	**36**	**276**	**518**	**68**	**29**	**15**	**1.2**	**4.6**	**35**	**65**	**1.8**	**0.13**	**1.18**	**5**	**8.5**	**3.7**	**1.8**	**0.15**	**276**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 4 was assumed to be 2019. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-41
Construction Emissions by Source Category - 12th Street Alternative without Mitigation - Year 5 (Phase 3) - Annual

	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
Source Category	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	0.9	7.9	8.7	0.4	0.0	0.0	0.0	0.4	0.3	0.4	0.02	1,749	0.0	0.1	0.0	0.0		1,764
On-Road Vehicles On-Site	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	93	0.0	0.0	0.0	0.0		93
On-Road Vehicles Off-Site	0.3	2.5	4.7	0.0	0.0	0.3	0.7	1.0	0.3	0.0	0.02	2,931	0.1	0.0	0.0	0.0		2,946
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.2	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**1.3**	**10.5**	**13.7**	**0.4**	**0.0**	**0.3**	**1.4**	**2.1**	**0.8**	**0.4**	**0.04**	**4,772**	**0.1**	**0.1**	**0.0**	**0.0**		**4,804**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 5 was assumed to be 2020. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-42
Construction Emissions by Source Category - 12th Street Alternative without Mitigation - Year 5 (Phase 3) - Peak Short Term

	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											
Source Category	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	Peak 8-Hour CO (lb/8-hr)
Construction Equipment On-Site	32	261	304	13	12	13	0.6	4.0	33	38	1.6	0.00	0.00	0	1.6	1.4	1.6	0.07	261
On-Road Vehicles On-Site	0	2	11	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	8	43	211	28	10	1	0.8	0.9	5	26	0.1	0.12	1.16	2	3.5	1.2	0.1	0.10	43
Fugitive Dust On-Site	0	0	0	24	6	0	0.0	0.0	0	0	0.0	0.00	0.00	3	3.0	0.7	0.0	0.00	0
Total Emissions	**40**	**306**	**526**	**65**	**27**	**14**	**1.4**	**4.9**	**38**	**66**	**1.7**	**0.12**	**1.17**	**5**	**8.2**	**3.4**	**1.7**	**0.18**	**306**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 5 was assumed to be 2020. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-43
Construction Emissions by Source Category - 12th Street Alternative without Mitigation - Year 6 (Phase 3) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	0.4	3.4	3.3	0.2	0.0	0.0	0.0	0.2	0.1	0.2	0.01	715	0.0	0.0	0.0	0.0		721
On-Road Vehicles On-Site	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	110	0.0	0.0	0.0	0.0		111
On-Road Vehicles Off-Site	0.5	3.6	3.7	0.0	0.0	0.3	0.9	1.2	0.4	0.0	0.02	2,891	0.1	0.0	0.0	0.0		2,914
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.2	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.8**	**7.1**	**7.3**	**0.2**	**0.0**	**0.3**	**1.7**	**2.2**	**0.7**	**0.2**	**0.03**	**3,716**	**0.1**	**0.1**	**0.0**	**0.0**		**3,746**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 6 was assumed to be 2021. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-44
Construction Emissions by Source Category - 12th Street Alternative without Mitigation - Year 6 (Phase 3) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	11	80	92	4	4	4	0.2	1.4	10	11	0.5	0.00	0.00	0	0.5	0.5	0.5	0.02	80
On-Road Vehicles On-Site	0	3	14	0	0	0	0.0	0.1	0	2	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	3
On-Road Vehicles Off-Site	8	49	197	31	10	1	0.8	1.0	6	25	0.1	0.13	1.21	2	3.8	1.3	0.1	0.10	49
Fugitive Dust On-Site	0	0	0	19	4	0	0.0	0.0	0	0	0.0	0.00	0.00	2	2.4	0.6	0.0	0.00	0
Total Emissions	**20**	**132**	**303**	**54**	**18**	**5**	**1.1**	**2.5**	**16**	**38**	**0.6**	**0.13**	**1.23**	**5**	**6.7**	**2.3**	**0.6**	**0.13**	**132**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 6 was assumed to be 2021. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-45
Construction Emissions by Source Category - 12th Street Alternative without Mitigation - Year 7 (Phase 3) - Annual

	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
Source Category	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**CO2**	**N2O**	**CH4**	**R-404a**	**HFC-134a**		**CO2e**
Construction Equipment On-Site	0.3	2.6	2.2	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.01	545	0.0	0.0	0.0	0.0		550
On-Road Vehicles On-Site	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	98	0.0	0.0	0.0	0.0		98
On-Road Vehicles Off-Site	0.3	2.6	4.2	0.0	0.0	0.3	0.7	1.1	0.3	0.0	0.02	2,957	0.1	0.0	0.0	0.0		2,974
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.2	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.6**	**5.2**	**6.7**	**0.1**	**0.0**	**0.3**	**1.4**	**1.9**	**0.6**	**0.1**	**0.03**	**3,600**	**0.1**	**0.1**	**0.0**	**0.0**		**3,623**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 7 was assumed to be 2022. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-46
Construction Emissions by Source Category - 12th Street Alternative without Mitigation - Year 7 (Phase 3) - Peak Short Term

	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											
Source Category	**VOC**	**CO**	**NOx**	**PM10**	**PM2.5**	**DPM**	**SOx**	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**Peak 8-Hour CO (lb/8-hr)**
Construction Equipment On-Site	10	97	87	4	4	4	0.2	1.3	12	11	0.5	0.00	0.00	0	0.5	0.4	0.5	0.03	97
On-Road Vehicles On-Site	0	2	11	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	7	42	179	29	10	1	0.8	0.9	5	22	0.1	0.13	1.19	2	3.6	1.2	0.1	0.10	42
Fugitive Dust On-Site	0	0	0	17	4	0	0.0	0.0	0	0	0.0	0.00	0.00	2	2.1	0.5	0.0	0.00	0
Total Emissions	**18**	**141**	**277**	**50**	**17**	**5**	**1.0**	**2.2**	**18**	**35**	**0.6**	**0.13**	**1.20**	**4**	**6.3**	**2.2**	**0.6**	**0.13**	**141**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 7 was assumed to be 2022. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-47
Construction Emissions by Source Category - 12th Street Alternative without Mitigation - Year 8 (Phase 3) - Annual

	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
Source Category	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**CO2**	**N2O**	**CH4**	**R-404a**	**HFC-134a**		**CO2e**
Construction Equipment On-Site	0.2	1.4	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	342	0.0	0.0	0.0	0.0		345
On-Road Vehicles On-Site	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	60	0.0	0.0	0.0	0.0		60
On-Road Vehicles Off-Site	0.2	1.2	1.4	0.0	0.0	0.2	0.4	0.6	0.2	0.0	0.02	1,788	0.0	0.0	0.0	0.0		1,797
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.1	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.3**	**2.7**	**2.7**	**0.1**	**0.0**	**0.2**	**0.8**	**1.1**	**0.3**	**0.1**	**0.02**	**2,190**	**0.0**	**0.0**	**0.0**	**0.0**		**2,202**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 8 was assumed to be 2023. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-48
Construction Emissions by Source Category - 12th Street Alternative without Mitigation - Year 8 (Phase 3) - Peak Short Term

	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											
Source Category	**VOC**	**CO**	**NOx**	**PM10**	**PM2.5**	**DPM**	**SOx**	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**Peak 8-Hour CO (lb/8-hr)**
Construction Equipment On-Site	3	29	26	1	1	1	0.1	0.4	4	3	0.1	0.00	0.00	0	0.1	0.1	0.1	0.01	29
On-Road Vehicles On-Site	0	1	5	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	1
On-Road Vehicles Off-Site	3	17	61	18	6	0	0.5	0.3	2	8	0.0	0.08	0.79	1	2.2	0.7	0.0	0.07	17
Fugitive Dust On-Site	0	0	0	8	2	0	0.0	0.0	0	0	0.0	0.00	0.00	1	1.0	0.2	0.0	0.00	0
Total Emissions	**6**	**47**	**91**	**27**	**9**	**1**	**0.6**	**0.7**	**6**	**11**	**0.2**	**0.08**	**0.79**	**2**	**3.3**	**1.1**	**0.2**	**0.08**	**47**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 8 was assumed to be 2023. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-49
Construction Emissions by Source Category - All Build Alternatives with Mitigation - Year 1 (Phases 1 and 2) - Annual

	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
Source Category	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**CO2**	**N2O**	**CH4**	**R-404a**	**HFC-134a**		**CO2e**
Construction Equipment On-Site	0.4	3.8	1.5	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.01	605	0.0	0.0	0.0	0.0		611
On-Road Vehicles On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	16	0.0	0.0	0.0	0.0		16
On-Road Vehicles Off-Site	0.1	0.7	0.2	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.00	212	0.0	0.0	0.0	0.0		215
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.5**	**4.5**	**1.7**	**0.1**	**0.0**	**0.0**	**0.2**	**0.3**	**0.1**	**0.1**	**0.01**	**834**	**0.0**	**0.0**	**0.0**	**0.0**		**842**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. Construction in Year 1 is assumed to occur only during the final quarter in accordance with the project construction schedule.
3. For the purposes of the emission calculations, Construction Year 1 was assumed to be 2016. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-50
Construction Emissions by Source Category - All Build Alternatives with Mitigation - Year 1 (Phases 1 and 2) - Peak Short Term

	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											
Source Category	**VOC**	**CO**	**NOx**	**PM10**	**PM2.5**	**DPM**	**SOx**	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**Peak 8-Hour CO (lb/8-hr)**
Construction Equipment On-Site	25	228	86	3	3	3	0.4	3.1	28	11	0.4	0.00	0.00	0	0.4	0.4	0.4	0.05	228
On-Road Vehicles On-Site	0	2	8	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	5	31	82	22	7	0	0.7	0.6	4	10	0.0	0.10	0.97	2	2.7	0.9	0.0	0.09	31
Fugitive Dust On-Site	0	0	0	17	4	0	0.0	0.0	0	0	0.0	0.00	0.00	2	2.1	0.6	0.0	0.00	0
Total Emissions	**30**	**261**	**176**	**42**	**15**	**3**	**1.1**	**3.7**	**33**	**22**	**0.4**	**0.10**	**0.98**	**4**	**5.2**	**1.8**	**0.4**	**0.14**	**261**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. Construction in Year 1 is assumed to occur only during the final quarter in accordance with the project construction schedule.
3. For the purposes of the emission calculations, Construction Year 1 was assumed to be 2016. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-51
Construction Emissions by Source Category - All Build Alternatives with Mitigation - Year 2 (Phases 1 and 2) - Annual

	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
Source Category	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**CO2**	**N2O**	**CH4**	**R-404a**	**HFC-134a**		**CO2e**
Construction Equipment On-Site	4.2	40.1	19.7	0.5	0.0	0.0	0.0	0.5	0.5	0.5	0.06	6,032	0.2	0.3	0.0	0.0		6,085
On-Road Vehicles On-Site	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	190	0.0	0.0	0.0	0.0		192
On-Road Vehicles Off-Site	1.0	8.1	2.9	0.0	0.1	0.4	1.3	1.8	0.5	0.0	0.04	3,480	0.1	0.1	0.0	0.0		3,515
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.7	0.5	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**5.2**	**48.5**	**22.8**	**0.5**	**0.1**	**0.4**	**3.1**	**4.1**	**1.6**	**0.5**	**0.10**	**9,702**	**0.3**	**0.4**	**0.0**	**0.0**		**9,792**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 2 was assumed to be 2017. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-52
Construction Emissions by Source Category - All Build Alternatives with Mitigation - Year 2 (Phases 1 and 2) - Peak Short Term

	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											
Source Category	**VOC**	**CO**	**NOx**	**PM10**	**PM2.5**	**DPM**	**SOx**	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**Peak 8-Hour CO (lb/8-hr)**
Construction Equipment On-Site	51	483	198	6	6	6	0.8	6.3	60	25	0.8	0.00	0.00	0	0.8	0.8	0.8	0.09	483
On-Road Vehicles On-Site	1	5	12	0	0	0	0.1	0.1	1	1	0.0	0.00	0.02	0	0.0	0.0	0.0	0.01	5
On-Road Vehicles Off-Site	14	107	102	38	12	0	1.0	1.7	13	13	0.1	0.17	1.40	3	4.8	1.5	0.1	0.13	107
Fugitive Dust On-Site	0	0	0	38	10	0	0.0	0.0	0	0	0.0	0.00	0.00	5	4.8	1.3	0.0	0.00	0
Total Emissions	**65**	**595**	**312**	**83**	**28**	**7**	**1.8**	**8.1**	**74**	**39**	**0.8**	**0.17**	**1.42**	**8**	**10.3**	**3.5**	**0.8**	**0.23**	**595**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 2 was assumed to be 2017. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-53
Construction Emissions by Source Category - All Build Alternatives with Mitigation - Year 3 (Phases 1 and 2) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	1.8	17.4	6.6	0.2	0.0	0.0	0.0	0.2	0.2	0.2	0.03	2,767	0.1	0.2	0.0	0.0		2,792
On-Road Vehicles On-Site	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	217	0.0	0.0	0.0	0.0		218
On-Road Vehicles Off-Site	1.0	8.3	4.1	0.0	0.1	0.6	1.6	2.3	0.7	0.0	0.05	4,622	0.1	0.1	0.0	0.0		4,663
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.7	0.5	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**2.8**	**26.0**	**11.0**	**0.3**	**0.1**	**0.6**	**3.4**	**4.3**	**1.4**	**0.3**	**0.08**	**7,606**	**0.2**	**0.2**	**0.0**	**0.0**		**7,673**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 3 was assumed to be 2018. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-54
Construction Emissions by Source Category - All Build Alternatives with Mitigation - Year 3 (Phases 1 and 2) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	49	477	170	6	6	6	0.8	6.2	60	21	0.8	0.00	0.00	0	0.8	0.8	0.8	0.10	477
On-Road Vehicles On-Site	0	4	9	0	0	0	0.0	0.1	0	1	0.0	0.00	0.02	0	0.0	0.0	0.0	0.01	4
On-Road Vehicles Off-Site	12	92	96	36	11	0	0.9	1.5	11	12	0.1	0.16	1.34	3	4.6	1.4	0.1	0.12	92
Fugitive Dust On-Site	0	0	0	34	9	0	0.0	0.0	0	0	0.0	0.00	0.00	4	4.3	1.2	0.0	0.00	0
Total Emissions	**62**	**573**	**274**	**77**	**27**	**7**	**1.8**	**7.7**	**72**	**34**	**0.8**	**0.16**	**1.36**	**7**	**9.7**	**3.4**	**0.8**	**0.22**	**573**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 3 was assumed to be 2018. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-55
Construction Emissions by Source Category - All Build Alternatives with Mitigation - Year 4 (Phases 1 and 2) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	0.6	5.5	2.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.01	932	0.0	0.1	0.0	0.0		940
On-Road Vehicles On-Site	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	86	0.0	0.0	0.0	0.0		86
On-Road Vehicles Off-Site	0.4	3.0	1.7	0.0	0.0	0.2	0.7	0.9	0.3	0.0	0.02	1,885	0.1	0.0	0.0	0.0		1,901
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.2	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.9**	**8.6**	**3.8**	**0.1**	**0.0**	**0.2**	**1.4**	**1.7**	**0.5**	**0.1**	**0.03**	**2,902**	**0.1**	**0.1**	**0.0**	**0.0**		**2,927**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 4 was assumed to be 2019. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-56
Construction Emissions by Source Category - All Build Alternatives with Mitigation - Year 4 (Phases 1 and 2) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	22	223	79	3	3	3	0.4	2.8	28	10	0.4	0.00	0.00	0	0.4	0.4	0.4	0.05	223
On-Road Vehicles On-Site	0	2	7	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	6	44	89	28	9	0	0.8	0.8	6	11	0.0	0.12	1.17	2	3.5	1.1	0.0	0.10	44
Fugitive Dust On-Site	0	0	0	21	6	0	0.0	0.0	0	0	0.0	0.00	0.00	3	2.7	0.7	0.0	0.00	0
Total Emissions	**29**	**269**	**175**	**53**	**18**	**3**	**1.2**	**3.6**	**34**	**22**	**0.4**	**0.13**	**1.18**	**5**	**6.6**	**2.2**	**0.4**	**0.15**	**269**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 4 was assumed to be 2019. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-57
Construction Emissions by Source Category - 12th Street Alternative with Mitigation - Year 5 (Phase 3) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	0.9	7.9	3.6	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.02	1,749	0.0	0.1	0.0	0.0		1,764
On-Road Vehicles On-Site	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	91	0.0	0.0	0.0	0.0		92
On-Road Vehicles Off-Site	0.3	2.4	2.1	0.0	0.0	0.3	0.7	1.0	0.3	0.0	0.02	2,080	0.0	0.0	0.0	0.0		2,095
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.2	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**1.2**	**10.5**	**5.8**	**0.2**	**0.0**	**0.3**	**1.4**	**1.8**	**0.6**	**0.2**	**0.04**	**3,921**	**0.1**	**0.1**	**0.0**	**0.0**		**3,951**

Notes:

1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 5 was assumed to be 2020. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-58
Construction Emissions by Source Category - 12th Street Alternative with Mitigation - Year 5 (Phase 3) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	30	261	118	5	5	5	0.6	3.7	33	15	0.6	0.00	0.00	0	0.6	0.6	0.6	0.07	261
On-Road Vehicles On-Site	0	2	6	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	6	39	92	28	9	0	0.8	0.7	5	12	0.0	0.12	1.16	2	3.4	1.1	0.0	0.10	39
Fugitive Dust On-Site	0	0	0	20	5	0	0.0	0.0	0	0	0.0	0.00	0.00	3	2.5	0.6	0.0	0.00	0
Total Emissions	**36**	**302**	**216**	**53**	**18**	**5**	**1.4**	**4.5**	**38**	**27**	**0.6**	**0.12**	**1.17**	**5**	**6.6**	**2.3**	**0.6**	**0.18**	**302**

Notes:

1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 5 was assumed to be 2020. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-59
Construction Emissions by Source Category - 12th Street Alternative with Mitigation - Year 6 (Phase 3) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	0.4	3.4	1.7	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.01	715	0.0	0.0	0.0	0.0		721
On-Road Vehicles On-Site	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	109	0.0	0.0	0.0	0.0		110
On-Road Vehicles Off-Site	0.4	3.5	1.9	0.0	0.0	0.3	0.9	1.2	0.4	0.0	0.02	2,189	0.1	0.0	0.0	0.0		2,210
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.2	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.8**	**7.0**	**3.7**	**0.1**	**0.0**	**0.3**	**1.7**	**2.1**	**0.6**	**0.1**	**0.03**	**3,013**	**0.1**	**0.1**	**0.0**	**0.0**		**3,041**

Notes:

1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 6 was assumed to be 2021. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-60
Construction Emissions by Source Category - 12th Street Alternative with Mitigation - Year 6 (Phase 3) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	11	80	42	2	2	2	0.2	1.4	10	5	0.2	0.00	0.00	0	0.2	0.2	0.2	0.02	80
On-Road Vehicles On-Site	0	2	8	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	6	46	94	30	9	0	0.8	0.8	6	12	0.0	0.13	1.21	2	3.7	1.2	0.0	0.10	46
Fugitive Dust On-Site	0	0	0	18	4	0	0.0	0.0	0	0	0.0	0.00	0.00	2	2.3	0.5	0.0	0.00	0
Total Emissions	**18**	**128**	**144**	**50**	**15**	**2**	**1.0**	**2.2**	**16**	**18**	**0.2**	**0.13**	**1.23**	**5**	**6.2**	**1.9**	**0.2**	**0.13**	**128**

Notes:

1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 6 was assumed to be 2021. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-61
Construction Emissions by Source Category - 12th Street Alternative with Mitigation - Year 7 (Phase 3) - Annual

	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
Source Category	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**CO2**	**N2O**	**CH4**	**R-404a**	**HFC-134a**		**CO2e**
Construction Equipment On-Site	0.3	2.6	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	545	0.0	0.0	0.0	0.0		550
On-Road Vehicles On-Site	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	96	0.0	0.0	0.0	0.0		97
On-Road Vehicles Off-Site	0.3	2.5	2.2	0.0	0.0	0.3	0.7	1.1	0.3	0.0	0.02	2,253	0.1	0.0	0.0	0.0		2,269
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.2	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.6**	**5.2**	**3.5**	**0.1**	**0.0**	**0.3**	**1.4**	**1.8**	**0.5**	**0.1**	**0.03**	**2,895**	**0.1**	**0.0**	**0.0**	**0.0**		**2,916**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 7 was assumed to be 2022. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-62
Construction Emissions by Source Category - 12th Street Alternative with Mitigation - Year 7 (Phase 3) - Peak Short Term

	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											
Source Category	**VOC**	**CO**	**NOx**	**PM10**	**PM2.5**	**DPM**	**SOx**	**VOC**	**CO**	**NOx**	**PM10 exhaust**	**PM10 tire wear**	**PM10 brake wear**	**PM10 fug. dust**	**PM10 total**	**PM2.5**	**DPM**	**SOx**	**Peak 8-Hour CO (lb/8-hr)**
Construction Equipment On-Site	10	97	44	2	2	2	0.2	1.2	12	6	0.2	0.00	0.00	0	0.2	0.2	0.2	0.03	97
On-Road Vehicles On-Site	0	2	7	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	6	39	92	29	9	0	0.8	0.7	5	11	0.0	0.13	1.19	2	3.6	1.1	0.0	0.10	39
Fugitive Dust On-Site	0	0	0	16	4	0	0.0	0.0	0	0	0.0	0.00	0.00	2	2.0	0.5	0.0	0.00	0
Total Emissions	**16**	**138**	**143**	**46**	**15**	**2**	**1.0**	**1.9**	**17**	**18**	**0.3**	**0.13**	**1.20**	**4**	**5.8**	**1.8**	**0.3**	**0.13**	**138**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 7 was assumed to be 2022. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-63
Construction Emissions by Source Category - 12th Street Alternative with Mitigation - Year 8 (Phase 3) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	0.2	1.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	342	0.0	0.0	0.0	0.0		345
On-Road Vehicles On-Site	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	60	0.0	0.0	0.0	0.0		60
On-Road Vehicles Off-Site	0.2	1.2	1.4	0.0	0.0	0.2	0.4	0.6	0.2	0.0	0.02	1,410	0.0	0.0	0.0	0.0		1,419
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.1	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.3**	**2.7**	**2.1**	**0.0**	**0.0**	**0.2**	**0.8**	**1.1**	**0.3**	**0.0**	**0.02**	**1,812**	**0.0**	**0.0**	**0.0**	**0.0**		**1,823**

Notes:

1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 8 was assumed to be 2023. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-64
Construction Emissions by Source Category - 12th Street Alternative with Mitigation - Year 8 (Phase 3) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	3	29	9	0	0	0	0.1	0.3	4	1	0.1	0.00	0.00	0	0.1	0.1	0.1	0.01	29
On-Road Vehicles On-Site	0	1	5	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	1
On-Road Vehicles Off-Site	3	17	59	17	6	0	0.5	0.3	2	7	0.0	0.08	0.79	1	2.2	0.7	0.0	0.07	17
Fugitive Dust On-Site	0	0	0	8	2	0	0.0	0.0	0	0	0.0	0.00	0.00	1	1.0	0.2	0.0	0.00	0
Total Emissions	**6**	**47**	**73**	**26**	**8**	**1**	**0.6**	**0.7**	**6**	**9**	**0.1**	**0.08**	**0.79**	**2**	**3.2**	**1.0**	**0.1**	**0.08**	**47**

Notes:

1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 8 was assumed to be 2023. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-65
Construction Emissions by Source Category - 10th Street Alternative without Mitigation - Year 5 (Phase 3) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	1.4	12.6	13.6	0.6	0.0	0.0	0.0	0.6	0.5	0.6	0.02	2,323	0.1	0.1	0.0	0.0		2,344
On-Road Vehicles On-Site	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	89	0.0	0.0	0.0	0.0		89
On-Road Vehicles Off-Site	0.3	2.6	2.7	0.0	0.0	0.2	0.6	0.8	0.3	0.0	0.02	1,680	0.0	0.0	0.0	0.0		1,695
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.2	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**1.8**	**15.3**	**16.5**	**0.6**	**0.0**	**0.2**	**1.5**	**2.3**	**1.0**	**0.6**	**0.04**	**4,092**	**0.1**	**0.2**	**0.0**	**0.0**		**4,128**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 5 was assumed to be 2020. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-66
Construction Emissions by Source Category - 10th Street Alternative without Mitigation - Year 5 (Phase 3) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	29	267	282	12	11	12	0.5	3.6	33	35	1.5	0.00	0.00	0	1.5	1.4	1.5	0.06	267
On-Road Vehicles On-Site	0	2	11	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	8	47	211	29	10	1	0.8	1.0	6	26	0.1	0.13	1.18	2	3.7	1.2	0.1	0.10	47
Fugitive Dust On-Site	0	0	0	27	7	0	0.0	0.0	0	0	0.0	0.00	0.00	3	3.4	0.9	0.0	0.00	0
Total Emissions	**37**	**316**	**504**	**69**	**28**	**13**	**1.3**	**4.7**	**40**	**63**	**1.7**	**0.13**	**1.19**	**6**	**8.6**	**3.5**	**1.7**	**0.17**	**316**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 5 was assumed to be 2020. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-67
Construction Emissions by Source Category - 10th Street Alternative without Mitigation - Year 6 (Phase 3) - Annual

Source Category	Annual Emissions (ton/yr) VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	GHG Annual Emissions (metric ton/yr) CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	1.0	9.3	8.7	0.4	0.0	0.0	0.0	0.4	0.4	0.4	0.02	1,753	0.0	0.1	0.0	0.0		1,769
On-Road Vehicles On-Site	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	63	0.0	0.0	0.0	0.0		64
On-Road Vehicles Off-Site	0.2	2.0	1.8	0.0	0.0	0.1	0.5	0.6	0.2	0.0	0.01	1,465	0.0	0.0	0.0	0.0		1,477
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.1	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**1.2**	**11.4**	**10.6**	**0.4**	**0.0**	**0.1**	**1.0**	**1.5**	**0.7**	**0.4**	**0.03**	**3,281**	**0.1**	**0.1**	**0.0**	**0.0**		**3,310**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 6 was assumed to be 2021. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-68
Construction Emissions by Source Category - 10th Street Alternative without Mitigation - Year 6 (Phase 3) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day) VOC	CO	NOx	PM10	PM2.5	DPM	SOx	Peak Hourly Emissions (lb/hr) VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	Peak 8-Hour CO (lb/8-hr)
Construction Equipment On-Site	16	150	139	6	6	6	0.3	2.0	19	17	0.8	0.00	0.00	0	0.8	0.7	0.8	0.04	150
On-Road Vehicles On-Site	0	2	13	0	0	0	0.0	0.1	0	2	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	7	37	195	28	9	1	0.8	0.8	5	24	0.1	0.12	1.15	2	3.4	1.2	0.1	0.10	37
Fugitive Dust On-Site	0	0	0	16	4	0	0.0	0.0	0	0	0.0	0.00	0.00	2	2.0	0.5	0.0	0.00	0
Total Emissions	**23**	**190**	**347**	**50**	**19**	**7**	**1.1**	**2.9**	**24**	**43**	**0.9**	**0.12**	**1.16**	**4**	**6.3**	**2.3**	**0.9**	**0.14**	**190**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 6 was assumed to be 2021. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-69
Construction Emissions by Source Category - 10th Street Alternative without Mitigation - Year 7 (Phase 3) - Annual

	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
Source Category	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	0.3	2.8	2.2	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.01	531	0.0	0.0	0.0	0.0		536
On-Road Vehicles On-Site	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	49	0.0	0.0	0.0	0.0		50
On-Road Vehicles Off-Site	0.2	1.6	0.6	0.0	0.0	0.1	0.4	0.5	0.1	0.0	0.01	762	0.0	0.0	0.0	0.0		773
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.1	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.5**	**4.5**	**2.8**	**0.1**	**0.0**	**0.1**	**0.8**	**1.0**	**0.4**	**0.1**	**0.01**	**1,343**	**0.0**	**0.0**	**0.0**	**0.0**		**1,359**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 7 was assumed to be 2022. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-70
Construction Emissions by Source Category - 10th Street Alternative without Mitigation - Year 7 (Phase 3) - Peak Short Term

	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											
Source Category	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	Peak 8-Hour CO (lb/8-hr)
Construction Equipment On-Site	5	49	38	2	2	2	0.1	0.7	6	5	0.2	0.00	0.00	0	0.2	0.2	0.2	0.01	49
On-Road Vehicles On-Site	0	2	11	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	5	28	128	21	7	1	0.6	0.6	4	16	0.1	0.09	0.85	2	2.6	0.9	0.1	0.07	28
Fugitive Dust On-Site	0	0	0	18	5	0	0.0	0.0	0	0	0.0	0.00	0.00	2	2.2	0.6	0.0	0.00	0
Total Emissions	**11**	**80**	**177**	**40**	**13**	**2**	**0.7**	**1.3**	**10**	**22**	**0.3**	**0.09**	**0.86**	**4**	**5.0**	**1.6**	**0.3**	**0.09**	**80**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 7 was assumed to be 2022. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-71
Construction Emissions by Source Category - 10th Street Alternative without Mitigation - Year 8 (Phase 3) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	0.2	1.9	1.6	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.00	401	0.0	0.0	0.0	0.0		404
On-Road Vehicles On-Site	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	46	0.0	0.0	0.0	0.0		46
On-Road Vehicles Off-Site	0.1	1.1	0.8	0.0	0.0	0.1	0.3	0.5	0.1	0.0	0.01	1,226	0.0	0.0	0.0	0.0		1,234
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.2	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.3**	**3.1**	**2.4**	**0.1**	**0.0**	**0.1**	**0.8**	**1.0**	**0.4**	**0.1**	**0.01**	**1,673**	**0.0**	**0.0**	**0.0**	**0.0**		**1,685**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 8 was assumed to be 2023. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-72
Construction Emissions by Source Category - 10th Street Alternative without Mitigation - Year 8 (Phase 3) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	3	29	26	1	1	1	0.1	0.4	4	3	0.1	0.00	0.00	0	0.1	0.1	0.1	0.01	29
On-Road Vehicles On-Site	0	1	5	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	1
On-Road Vehicles Off-Site	3	17	61	17	6	0	0.5	0.3	2	8	0.0	0.08	0.79	1	2.2	0.7	0.0	0.07	17
Fugitive Dust On-Site	0	0	0	14	4	0	0.0	0.0	0	0	0.0	0.00	0.00	2	1.7	0.5	0.0	0.00	0
Total Emissions	**6**	**47**	**91**	**32**	**10**	**1**	**0.6**	**0.7**	**6**	**11**	**0.2**	**0.08**	**0.79**	**3**	**4.0**	**1.3**	**0.2**	**0.08**	**47**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 8 was assumed to be 2023. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-73
Construction Emissions by Source Category - 10th Street Alternative with Mitigation - Year 5 (Phase 3) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	1.3	12.6	3.9	0.2	0.0	0.0	0.0	0.2	0.2	0.2	0.02	2,323	0.1	0.1	0.0	0.0		2,344
On-Road Vehicles On-Site	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	87	0.0	0.0	0.0	0.0		88
On-Road Vehicles Off-Site	0.3	2.6	1.3	0.0	0.0	0.2	0.6	0.8	0.2	0.0	0.02	1,516	0.0	0.0	0.0	0.0		1,531
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.2	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**1.7**	**15.3**	**5.3**	**0.2**	**0.0**	**0.2**	**1.4**	**1.8**	**0.7**	**0.2**	**0.04**	**3,926**	**0.1**	**0.2**	**0.0**	**0.0**		**3,962**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 5 was assumed to be 2020. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-74
Construction Emissions by Source Category - 10th Street Alternative with Mitigation - Year 5 (Phase 3) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	27	267	79	4	4	4	0.5	3.4	33	10	0.5	0.00	0.00	0	0.5	0.5	0.5	0.06	267
On-Road Vehicles On-Site	0	2	6	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	6	43	93	28	9	0	0.8	0.8	5	12	0.0	0.13	1.18	2	3.6	1.1	0.0	0.10	43
Fugitive Dust On-Site	0	0	0	22	6	0	0.0	0.0	0	0	0.0	0.00	0.00	3	2.8	0.7	0.0	0.00	0
Total Emissions	**33**	**312**	**178**	**55**	**19**	**4**	**1.3**	**4.2**	**39**	**22**	**0.5**	**0.13**	**1.19**	**5**	**6.8**	**2.3**	**0.5**	**0.17**	**312**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 5 was assumed to be 2020. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-75
Construction Emissions by Source Category - 10th Street Alternative with Mitigation - Year 6 (Phase 3) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	1.0	9.3	3.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.02	1,753	0.0	0.1	0.0	0.0		1,769
On-Road Vehicles On-Site	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	63	0.0	0.0	0.0	0.0		63
On-Road Vehicles Off-Site	0.2	2.0	0.9	0.0	0.0	0.1	0.5	0.6	0.2	0.0	0.01	1,131	0.0	0.0	0.0	0.0		1,143
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.1	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**1.2**	**11.4**	**4.0**	**0.2**	**0.0**	**0.1**	**1.0**	**1.3**	**0.5**	**0.2**	**0.03**	**2,947**	**0.1**	**0.1**	**0.0**	**0.0**		**2,975**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 6 was assumed to be 2021. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-76
Construction Emissions by Source Category - 10th Street Alternative with Mitigation - Year 6 (Phase 3) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	16	150	50	2	2	2	0.3	2.0	19	6	0.3	0.00	0.00	0	0.3	0.3	0.3	0.04	150
On-Road Vehicles On-Site	0	2	8	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	5	34	92	27	9	0	0.8	0.6	4	11	0.0	0.12	1.15	2	3.4	1.1	0.0	0.10	34
Fugitive Dust On-Site	0	0	0	15	4	0	0.0	0.0	0	0	0.0	0.00	0.00	2	1.9	0.4	0.0	0.00	0
Total Emissions	**21**	**186**	**149**	**44**	**14**	**3**	**1.1**	**2.6**	**23**	**19**	**0.3**	**0.12**	**1.16**	**4**	**5.6**	**1.8**	**0.3**	**0.14**	**186**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 6 was assumed to be 2021. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-77
Construction Emissions by Source Category - 10th Street Alternative with Mitigation - Year 7 (Phase 3) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	0.3	2.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	531	0.0	0.0	0.0	0.0		536
On-Road Vehicles On-Site	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	49	0.0	0.0	0.0	0.0		49
On-Road Vehicles Off-Site	0.2	1.6	0.4	0.0	0.0	0.1	0.4	0.5	0.1	0.0	0.01	676	0.0	0.0	0.0	0.0		687
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.1	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.5**	**4.5**	**1.5**	**0.1**	**0.0**	**0.1**	**0.8**	**1.0**	**0.3**	**0.1**	**0.01**	**1,257**	**0.0**	**0.0**	**0.0**	**0.0**		**1,272**

Notes:

1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 7 was assumed to be 2022. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-78
Construction Emissions by Source Category - 10th Street Alternative with Mitigation - Year 7 (Phase 3) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	5	49	20	1	1	1	0.1	0.6	6	2	0.1	0.00	0.00	0	0.1	0.1	0.1	0.01	49
On-Road Vehicles On-Site	0	2	7	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	2
On-Road Vehicles Off-Site	4	26	66	20	6	0	0.6	0.5	3	8	0.0	0.09	0.85	2	2.5	0.8	0.0	0.07	26
Fugitive Dust On-Site	0	0	0	16	4	0	0.0	0.0	0	0	0.0	0.00	0.00	2	2.0	0.5	0.0	0.00	0
Total Emissions	**9**	**78**	**93**	**37**	**11**	**1**	**0.7**	**1.2**	**10**	**12**	**0.1**	**0.09**	**0.86**	**4**	**4.6**	**1.4**	**0.1**	**0.09**	**78**

Notes:

1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 7 was assumed to be 2022. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-79
Construction Emissions by Source Category - 10th Street Alternative with Mitigation - Year 8 (Phase 3) - Annual

Source Category	Annual Emissions (ton/yr)											GHG Annual Emissions (metric ton/yr)						
	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	CO2	N2O	CH4	R-404a	HFC-134a		CO2e
Construction Equipment On-Site	0.2	1.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	401	0.0	0.0	0.0	0.0		404
On-Road Vehicles On-Site	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	46	0.0	0.0	0.0	0.0		46
On-Road Vehicles Off-Site	0.1	1.1	0.8	0.0	0.0	0.1	0.3	0.5	0.1	0.0	0.01	909	0.0	0.0	0.0	0.0		917
Fugitive Dust On-Site	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.1	0.0	0.00	0	0.0	0.0	0.0	0.0		0
Total Emissions	**0.3**	**3.1**	**1.5**	**0.0**	**0.0**	**0.1**	**0.8**	**0.9**	**0.3**	**0.0**	**0.01**	**1,355**	**0.0**	**0.0**	**0.0**	**0.0**		**1,367**

Notes:
1. The emissions domain is the South Coast Air Basin for criteria pollutants and the state of California for GHGs.
2. For the purposes of the emission calculations, Construction Year 8 was assumed to be 2023. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-80
Construction Emissions by Source Category - 10th Street Alternative with Mitigation - Year 8 (Phase 3) - Peak Short Term

Source Category	Peak Daily Emissions (lb/day)							Peak Hourly Emissions (lb/hr)											Peak 8-Hour CO (lb/8-hr)
	VOC	CO	NOx	PM10	PM2.5	DPM	SOx	VOC	CO	NOx	PM10 exhaust	PM10 tire wear	PM10 brake wear	PM10 fug. dust	PM10 total	PM2.5	DPM	SOx	
Construction Equipment On-Site	3	29	9	0	0	0	0.1	0.3	4	1	0.1	0.00	0.00	0	0.1	0.1	0.1	0.01	29
On-Road Vehicles On-Site	0	1	5	0	0	0	0.0	0.0	0	1	0.0	0.00	0.01	0	0.0	0.0	0.0	0.00	1
On-Road Vehicles Off-Site	3	17	59	17	6	0	0.5	0.3	2	7	0.0	0.08	0.79	1	2.2	0.7	0.0	0.07	17
Fugitive Dust On-Site	0	0	0	12	3	0	0.0	0.0	0	0	0.0	0.00	0.00	1	1.4	0.4	0.0	0.00	0
Total Emissions	**6**	**47**	**73**	**30**	**9**	**1**	**0.6**	**0.7**	**6**	**9**	**0.1**	**0.08**	**0.79**	**3**	**3.7**	**1.1**	**0.1**	**0.08**	**47**

Notes:
1. The emissions domain is the South Coast Air Basin.
2. For the purposes of the emission calculations, Construction Year 8 was assumed to be 2023. A later construction start date would result in lower emissions than what was analyzed due to cleaner engines.

Table A1.1-81
GHG Construction Emissions Amortized Over 30 Years - 12th Street Alternative without Mitigation

Emission Source	*Annual Emissions (metric tons/year)*			
	CO_2	*N_2O*	*CH_4*	*CO_2e*
Construction Year 1 (Phase 1)				
Construction Equipment	605	0.0	0.0	611
On-Road Vehicles	260	0.0	0.0	262
Total - Year 1	*865*	*0.0*	*0.0*	*873*
Construction Year 2 (Phases 1 and 2)				
Construction Equipment	6,032	0.2	0.3	6,085
On-Road Vehicles	4,518	0.1	0.1	4,556
Total - Year 2	*10,550*	*0.3*	*0.4*	*10,641*
Construction Year 3 (Phases 1 and 2)				
Construction Equipment	2,767	0.1	0.2	2,792
On-Road Vehicles	6,377	0.1	0.1	6,421
Total - Year 3	*9,144*	*0.2*	*0.2*	*9,213*
Construction Year 4 (Phase 2)				
Construction Equipment	932	0.0	0.1	940
On-Road Vehicles	2,854	0.1	0.0	2,872
Total - Year 4	*3,786*	*0.1*	*0.1*	*3,812*
Construction Year 5 (Phase 3)				
Construction Equipment	1,749	0.0	0.1	1,764
On-Road Vehicles	3,024	0.1	0.0	3,040
Total - Year 5	*4,772*	*0.1*	*0.1*	*4,804*
Construction Year 6 (Phase 3)				
Construction Equipment	715	0.0	0.0	721
On-Road Vehicles	3,001	0.1	0.0	3,025
Total - Year 6	*3,716*	*0.1*	*0.1*	*3,746*
Construction Year 7 (Phase 3)				
Construction Equipment	545	0.0	0.0	550
On-Road Vehicles	3,055	0.1	0.0	3,072
Total - Year 7	*3,600*	*0.1*	*0.1*	*3,623*
Construction Year 8 (Phase 3)				
Construction Equipment	342	0.0	0.0	345
On-Road Vehicles	1,848	0.0	0.0	1,857
Total - Year 8	*2,190*	*0.0*	*0.0*	*2,202*
Total Construction Emissions				
Sum of All Years	38,622	0.9	1.1	38,913
Annual (30-Year Amortized)	**1,287**	**0.0**	**0.0**	**1,297**

Notes:
1. Emissions domain is the State of California.
2. Carbon dioxide equivalent (CO2e) emissions are calculated using the IPCC's Fourth Assessment Report (AR4) global warming potential (GWP) values as reported in the 2015 Climate Registry Default Emission Factors (April 2015).

For the purposes of the emission calculations, Construction Years 1 through 8 were assumed to be 2016 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

Table A1.1-82
GHG Construction Emissions Amortized Over 30 Years - 12th Street Alternative with Mitigation

Emission Source	Annual Emissions (metric tons/year)			
	CO_2	N_2O	CH_4	CO_2e
Construction Year 1 (Phase 1)				
Construction Equipment	605	0.0	0.0	611
On-Road Vehicles	229	0.0	0.0	232
Total - Year 1	*834*	*0.0*	*0.0*	*842*
Construction Year 2 (Phases 1 and 2)				
Construction Equipment	6,032	0.2	0.3	6,085
On-Road Vehicles	3,670	0.1	0.1	3,707
Total - Year 2	*9,702*	*0.3*	*0.4*	*9,792*
Construction Year 3 (Phases 1 and 2)				
Construction Equipment	2,767	0.1	0.2	2,792
On-Road Vehicles	4,839	0.1	0.1	4,881
Total - Year 3	*7,606*	*0.2*	*0.2*	*7,673*
Construction Year 4 (Phase 2)				
Construction Equipment	932	0.0	0.1	940
On-Road Vehicles	1,971	0.1	0.0	1,987
Total - Year 4	*2,902*	*0.1*	*0.1*	*2,927*
Construction Year 5 (Phase 3)				
Construction Equipment	1,749	0.0	0.1	1,764
On-Road Vehicles	2,172	0.0	0.0	2,187
Total - Year 5	*3,921*	*0.1*	*0.1*	*3,951*
Construction Year 6 (Phase 3)				
Construction Equipment	715	0.0	0.0	721
On-Road Vehicles	2,298	0.1	0.0	2,320
Total - Year 6	*3,013*	*0.1*	*0.1*	*3,041*
Construction Year 7 (Phase 3)				
Construction Equipment	545	0.0	0.0	550
On-Road Vehicles	2,349	0.1	0.0	2,366
Total - Year 7	*2,895*	*0.1*	*0.0*	*2,916*
Construction Year 8 (Phase 3)				
Construction Equipment	342	0.0	0.0	345
On-Road Vehicles	1,470	0.0	0.0	1,478
Total - Year 8	*1,812*	*0.0*	*0.0*	*1,823*
Total Construction Emissions				
Sum of All Years	32,684	0.9	1.0	32,966
Annual (30-Year Amortized)	**1,089**	**0.0**	**0.0**	**1,099**

Notes:
1. Emissions domain is the State of California.
2. Carbon dioxide equivalent (CO2e) emissions are calculated using the IPCC's Fourth Assessment Report (AR4) global warming potential (GWP) values as reported in the 2015 Climate Registry Default Emission Factors (April 2015).

For the purposes of the emission calculations, Construction Years 1 through 8 were assumed to be 2016 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

Table A1.1-83

GHG Construction Emissions Amortized Over 30 Years - 10th Street Alternative without Mitigation

Emission Source	*Annual Emissions (metric tons/year)*			
	CO_2	*N_2O*	*CH_4*	*CO_2e*
Construction Year 1 (Phase 1)				
Construction Equipment	605	0.0	0.0	611
On-Road Vehicles	260	0.0	0.0	262
Total - Year 1	*865*	*0.0*	*0.0*	*873*
Construction Year 2 (Phases 1 and 2)				
Construction Equipment	6,032	0.2	0.3	6,085
On-Road Vehicles	4,518	0.1	0.1	4,556
Total - Year 2	*10,550*	*0.3*	*0.4*	*10,641*
Construction Year 3 (Phases 1 and 2)				
Construction Equipment	2,767	0.1	0.2	2,792
On-Road Vehicles	6,377	0.1	0.1	6,421
Total - Year 3	*9,144*	*0.2*	*0.2*	*9,213*
Construction Year 4 (Phase 2)				
Construction Equipment	932	0.0	0.1	940
On-Road Vehicles	2,854	0.1	0.0	2,872
Total - Year 4	*3,786*	*0.1*	*0.1*	*3,812*
Construction Year 5 (Phase 3)				
Construction Equipment	2,323	0.1	0.1	2,344
On-Road Vehicles	1,769	0.1	0.0	1,784
Total - Year 5	*4,092*	*0.1*	*0.2*	*4,128*
Construction Year 6 (Phase 3)				
Construction Equipment	1,753	0.0	0.1	1,769
On-Road Vehicles	1,528	0.0	0.0	1,541
Total - Year 6	*3,281*	*0.1*	*0.1*	*3,310*
Construction Year 7 (Phase 3)				
Construction Equipment	531	0.0	0.0	536
On-Road Vehicles	812	0.0	0.0	823
Total - Year 7	*1,343*	*0.0*	*0.0*	*1,359*
Construction Year 8 (Phase 3)				
Construction Equipment	401	0.0	0.0	404
On-Road Vehicles	1,272	0.0	0.0	1,281
Total - Year 8	*1,673*	*0.0*	*0.0*	*1,685*
Total Construction Emissions				
Sum of All Years	34,733	0.9	1.1	35,020
Annual (30-Year Amortized)	**1,158**	**0.0**	**0.0**	**1,167**

Notes:

1. Emissions domain is the State of California.
2. Carbon dioxide equivalent (CO2e) emissions are calculated using the IPCC's Fourth Assessment Report (AR4) global warming potential (GWP) values as reported in the 2015 Climate Registry Default Emission Factors (April 2015).

For the purposes of the emission calculations, Construction Years 1 through 8 were assumed to be 2016 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

Table A1.1-84
GHG Construction Emissions Amortized Over 30 Years - 10th Street Alternative with Mitigation

Emission Source	*Annual Emissions (metric tons/year)*			
	CO_2	*N_2O*	*CH_4*	*CO_2e*
Construction Year 1 (Phase 1)				
Construction Equipment	605	0.0	0.0	611
On-Road Vehicles	229	0.0	0.0	232
Total - Year 1	*834*	*0.0*	*0.0*	*842*
Construction Year 2 (Phases 1 and 2)				
Construction Equipment	6,032	0.2	0.3	6,085
On-Road Vehicles	3,670	0.1	0.1	3,707
Total - Year 2	*9,702*	*0.3*	*0.4*	*9,792*
Construction Year 3 (Phases 1 and 2)				
Construction Equipment	2,767	0.1	0.2	2,792
On-Road Vehicles	4,839	0.1	0.1	4,881
Total - Year 3	*7,606*	*0.2*	*0.2*	*7,673*
Construction Year 4 (Phase 2)				
Construction Equipment	932	0.0	0.1	940
On-Road Vehicles	1,971	0.1	0.0	1,987
Total - Year 4	*2,902*	*0.1*	*0.1*	*2,927*
Construction Year 5 (Phase 3)				
Construction Equipment	2,323	0.1	0.1	2,344
On-Road Vehicles	1,603	0.1	0.0	1,618
Total - Year 5	*3,926*	*0.1*	*0.2*	*3,962*
Construction Year 6 (Phase 3)				
Construction Equipment	1,753	0.0	0.1	1,769
On-Road Vehicles	1,194	0.0	0.0	1,206
Total - Year 6	*2,947*	*0.1*	*0.1*	*2,975*
Construction Year 7 (Phase 3)				
Construction Equipment	531	0.0	0.0	536
On-Road Vehicles	725	0.0	0.0	736
Total - Year 7	*1,257*	*0.0*	*0.0*	*1,272*
Construction Year 8 (Phase 3)				
Construction Equipment	401	0.0	0.0	404
On-Road Vehicles	955	0.0	0.0	963
Total - Year 8	*1,355*	*0.0*	*0.0*	*1,367*
Total Construction Emissions				
Sum of All Years	30,530	0.9	1.1	30,811
Annual (30-Year Amortized)	**1,018**	**0.0**	**0.0**	**1,027**

Notes:
1. Emissions domain is the State of California.
2. Carbon dioxide equivalent (CO2e) emissions are calculated using the IPCC's Fourth Assessment Report (AR4) global warming potential (GWP) values as reported in the 2015 Climate Registry Default Emission Factors (April 2015).

For the purposes of the emission calculations, Construction Years 1 through 8 were assumed to be 2016 through 2023. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

Table A1.1-85

GHG Construction Emissions Amortized Over 30 Years - 9th Street Alternative without Mitigation

Emission Source	*Annual Emissions (metric tons/year)*			
	CO_2	*N_2O*	*CH_4*	*CO_2e*
Construction Year 1 (Phase 1)				
Construction Equipment	605	0.02	0.03	611
On-Road Vehicles	260	0.01	0.01	262
Total - Year 1	*865*	*0.02*	*0.04*	*873*
Construction Year 2 (Phases 1 and 2)				
Construction Equipment	6,032	0.15	0.34	6,085
On-Road Vehicles	4,518	0.12	0.08	4,556
Total - Year 2	*10,550*	*0.27*	*0.42*	*10,641*
Construction Year 3 (Phases 1 and 2)				
Construction Equipment	2,767	0.07	0.16	2,792
On-Road Vehicles	6,377	0.14	0.08	6,421
Total - Year 3	*9,144*	*0.21*	*0.24*	*9,213*
Construction Year 4 (Phase 2)				
Construction Equipment	932	0.02	0.05	940
On-Road Vehicles	2,854	0.06	0.03	2,872
Total - Year 4	*3,786*	*0.08*	*0.08*	*3,812*
Total Construction Emissions				
Sum of All Years	24,344	0.59	0.78	24,538
Annual (30-Year Amortized)	**811**	**0.02**	**0.03**	**818**

Notes:

1. Emissions domain is the State of California.
2. Carbon dioxide equivalent (CO2e) emissions are calculated using the IPCC's Fourth Assessment Report (AR4) global warming potential (GWP) values as reported in the 2015 Climate Registry Default Emission Factors (April 2015).

For the purposes of the emission calculations, Construction Years 1 through 4 were assumed to be 2016 through 2019. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

Table A1.1-86
GHG Construction Emissions Amortized Over 30 Years - 9th Street Alternative with Mitigation

Emission Source	*Annual Emissions (metric tons/year)*			
	CO_2	*N_2O*	*CH_4*	*CO_2e*
Construction Year 1 (Phase 1)				
Construction Equipment	605	0.0	0.0	611
On-Road Vehicles	229	0.0	0.0	232
Total - Year 1	*834*	*0.0*	*0.0*	*842*
Construction Year 2 (Phases 1 and 2)				
Construction Equipment	6,032	0.2	0.3	6,085
On-Road Vehicles	3,670	0.1	0.1	3,707
Total - Year 2	*9,702*	*0.3*	*0.4*	*9,792*
Construction Year 3 (Phases 1 and 2)				
Construction Equipment	2,767	0.1	0.2	2,792
On-Road Vehicles	4,839	0.1	0.1	4,881
Total - Year 3	*7,606*	*0.2*	*0.2*	*7,673*
Construction Year 4 (Phase 2)				
Construction Equipment	932	0.0	0.1	940
On-Road Vehicles	1,971	0.1	0.0	1,987
Total - Year 4	*2,902*	*0.1*	*0.1*	*2,927*
Total Construction Emissions				
Sum of All Years	21,045	0.6	0.7	21,234
Annual (30-Year Amortized)	**701**	**0.0**	**0.0**	**708**

Notes:

1. Emissions domain is the State of California.
2. Carbon dioxide equivalent (CO2e) emissions are calculated using the IPCC's Fourth Assessment Report (AR4) global warming potential (GWP) values as reported in the 2015 Climate Registry Default Emission Factors (April 2015).

For the purposes of the emission calculations, Construction Years 1 through 4 were assumed to be 2016 through 2019. A later construction start date would result in lower emissions than what was analyzed due to the gradual replacement of older construction equipment with newer, cleaner equipment that meets the already adopted future state and federal off-road engine emission standards.

Locomotive Emissions Inventory Development Memorandum

Locotive Emissions Inventory Development Methodology

To:	File
From:	Keith Cooper Principal
Date:	February 24, 2021
Re:	**Emissions Inventory Development for Port of Long Beach Pier B On-Dock Rail Locomotive Emissions**

This methodology memorandum has been developed based on South Coast Air Quality Management District (SCAQMD) comments received on previous Work Plans.

Background Information

There are three ways cargo containers can be moved out of the Port of Long Beach (POLB) to their final destination:

- Truck: A container is carried on a truck destined for a local distribution center or retail location.
- On Rail: A container is loaded onto rail for a destination outside of California.
- On Combination of Truck and Rail: A container is loaded onto truck for transport to a rail yard, then loaded onto rail for destinations outside of California.

Types of Rail Yards

Off-Dock Intermodal Yards: Off-dock intermodal rail yards are operated by the Class I rail lines and located in the vicinity of the Downtown Los Angeles, about 17 miles north and outside of the Port (BNSF Hobart and UPRR Commerce). A container destined for outside the region is placed onto an on-road drayage truck at the marine terminal for transport to one of the off-dock intermodal rail yards where cargo-handling equipment then places the container onto waiting rail cars or stacks for later placement onto trains to be transported out of the region.

Near-Dock Intermodal Rail Yards: As the name implies, near-dock rail yards are located outside of the marine terminals, closer to the Port. Containers from a marine terminal are trucked a short distance—generally less than 5 miles. Once the container arrives at the near-dock rail yard, cargo-

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handling equipment take the containers from the truck and places them on rail cars or stacks on the yard. The only available near-dock rail facility is the International Container Transport Facility (ICTF). A second near-dock rail facility has been proposed, the Southern California International Gateway (SCIG); however, the Environmental Impact Report for the SCIG project was challenged and invalidated.

On-Dock Rail Yards: On-Dock Rail Yards are located within marine terminals at the Port. A container is placed directly onto a rail car at the marine terminal for transport outside of the region. There is no on-road heavy-duty drayage truck move.

Pier B Rail Yard / On-Dock Rail Support Facility: With On-Dock Rail, containers are loaded directly onto small segments of multiple rail cars using tracks located within the marine terminals. However, due to the lack of track space and the mix of cargo intended for multiple destinations, it is not possible to build complete trains within the marine terminals. The on-dock rail yards within marine terminals need supporting rail yards to (1) store loaded and empty rail cars awaiting space in the marine terminals, (2) facilitate the staging and assembly of loaded cuts of rail cars from different terminals into complete trains, and (3) provide space for trains being staged for the Class I locomotives to be transported to their destination outside of the region.

Purpose and Need

The Pier B Rail Yard is the only existing POLB facility that provides support to the marine terminals' on-dock rail yards; however, it currently does not have the necessary storage tracks or sufficient track lengths to handle the longer trains. To facilitate more cargo handled at the on-dock rail yards located at the marine terminals, the Pier B On-Dock Rail Support Facility is necessary to store, sort, and assemble the smaller train segments into full trains up to 10,000 feet long that are ready to leave the Port complex via the Alameda Corridor to their final destination outside of the region. All cargo arrives at the facility on rail. No on-road heavy-duty drayage trucks are used to deliver containers to the facility, nor are there any cargo-handling equipment used to handle the containers.

As shown in the table on the following page, the Pier B On-Dock Rail Support Facility would promote a mode shift from transporting cargo by truck to near-dock rail facilities (such as the ICTF or SCIG) or off-dock rail facilities such as the BNSF Hobart/UPRR Commerce Rail Yards in Downtown Los Angeles to transporting cargo by rail directly from the on-dock rail yards located at marine terminals within the Port to their destination outside of the region.

Existing Pier B Rail Yard Operations

Approximately seven trains per day, averaging 8,000 feet in length are released to the external rail network from the existing Pier B Rail Yard. Due to track space limitations, trains greater than 8,000 feet in length must be assembled using either mainline tracks or other locations within the Port. The existing Pier B Rail Yard is considered operating at or near its practical limit for train that originate or terminate the yard.

Daily Activity at Build-out	No Project Condition	Proposed Project Condition
Trains leaving Pier B	7	17
Drayage truck VMT related to near-dock and off-dock container delivery for rail loading	47.4 million miles	0 miles
Trains leaving near-dock and off-dock yards	10	0
Number of trains being built within the SCAB	17	17
Total trains leaving region	17	17

Proposed Project Pier B On-Dock Rail Support Facility "Build Condition"

Under the Project Build condition, a higher percentage of cargo containers would be placed directly onto rail cars for transport to Pier B for assembly into complete trains up to 10,000 feet long for transport out of the Port complex via line-haul rail. The Pier B On-Dock Rail Yard would promote a mode-shift from drayage truck to rail car resulting in an increase in the number of trains departing Pier B from 7 trains per day to 17 trains per day for destinations outside the region. No on-road drayage trucks are used to deliver containers to the facility, nor are there any cargo-handling equipment used to handle the containers. The on-road drayage trucks vehicle miles traveled (VMT) that would be replaced by rail transport is estimated to be approximately 2.7 million miles at year 2024, growing to approximately 47.4 million miles at year 2035.[1]

It is important to reiterate that the proposed Pier B On-Dock Rail Support Project would have no effect on (1) the cargo volume that moves through the Port complex, nor (2) the number of line-haul train trips that enter and leave the South Coast Air Basin (Basin).

No Build Project Condition

Under the No-Build condition, no improvements would be made to the Pier B Rail Yard. Once the rail yard reaches the limit of its ability to handle train movements (i.e., 7 trains per day), the remaining cargo that is not accommodated by on-dock rail yards at the marine terminals would be transported by truck to either a near-dock rail yard (i.e., ICTF) or to an off-dock rail yard in Downtown Los Angeles (i.e., BNSF Hobart or UPRR Commerce). This results in an increase in truck trips from the terminals that are supported by the Pier B Rail Yard.

[1] Given that the proposed project is identified in the SCAG 2020-2045 RTP/SCS, emissions reductions related to displaced drayage trucking VMT may already be accounted for in the transportation conformity budget. For this reason, emissions reductions related to displaced drayage trucking VMT will be considered in this analysis.

Emissions Analysis Approach

For the reasons described above, the Project operations-period emissions inventory for general conformity will be developed to account for the following: Net increase of 10 daily line-haul train trips that would travel the approximately 21-mile distance between Pier B and the Downtown Los Angeles Off-Dock Rail Yards. Net new line-haul rail emissions will be based on the calculation methodology from the 2019 San Pedro Bay Ports Emissions Inventory Methodology Report (San Pedro Bay EIM).

Locomotive Estimates

Table 1 presents the San Pedro Bay EIM's gross train weight which included locomotives, railcars, and containers. Using the information in Table 1, the analysis would derive scaling factors (Table 2) that would be used to back-calculate the number of locomotives, railcars, and containers for the No Project and With Project scenarios as shown in Table 3. Detailed calculation formulas for values in Table 2 and Table 3 are provided further below.

Table 1: Gross Weight of San Pedro Bay Port Trains

Train Component	Weight (lbs)	Weight (short tons)	# per train	Total Weight (short tons)
Locomotive	420,000	210	4	840
Railcar (per double-stack platform)	40,000	20	130	2,600
Container		14	274	3,836
			Total	**7,276**

Source: San Pedro Bay Ports Emission Inventory Methodology, p.49

Table 2: Scaling Factors

Parameter	Value
Weight of Railcars + Containers (short tons)	6,436
Locomotive Cargo Capacity (short tons/locomotive)	1,609
Railcar Length (ft/railcar)[1]	60
Length of Railcars with Containers (ft)	7,800
Railcar + Container Weight per length (short tons/ft)	0.825

[1]Railcar length assumed to be length of 60-foot shipping container.

Table 3: Train Characteristics for No Project and With Project Scenarios

Parameter	Scenario: No Project	Scenario: With Project
Railcars + Containers Length (ft)	7,800	9,750
Railcars + Containers Weight (short tons)	6,436	8,045
# of Locomotives required[1]	4	5
# of Railcars	130	163
Total Weight of Railcars (short tons)	2,600	3,260
Total Weight of Containers (short tons)	3,836	4,785
# of Containers[3]	274	342
Total Train Weight (short tons)[4]	7,276	9,095

[1]Number of locomotives rounded up to nearest whole number
[2]Number of railcars rounded up to nearest whole number
[3]Number of containers rounded up to nearest whole number
[4]Total weight includes locomotives, railcars, and containers

Line-Haul Emissions Calculation Methods

Annual Emissions (tons/year) = Annual horsepower-hours (hp-hr/year) x Pollutant Emission Factor (grams/bhp-hr) x Conversion Factor (tons/gram)

Where:

Annual horsepower-hours (hp-hr/year) = Annual Fuel Consumption (gal/year) x Fuel Use Conversion Factor (bhp-hr/gal)

Annual Fuel Consumption (gal/year) = Daily Cargo Movement (ton-miles/day) x Annual Operations (days/year) x Fuel Consumption Factor (gal/ton-mile)

- Daily Cargo Movement (ton-miles/day) = Daily Trains (trains/day) x Train Weight (tons/train) x Distance Traveled (miles)
- Annual Operations (days/year) = 360 days of train operation
- Fuel Consumption Factor (gal/ton-mile) 0.000990 gal per ton-mile

Table 4: Emission Calculation Parameters

Parameter	No Project Scenario	With Project Scenario
# of Daily Trains	7	17
Train Length with Locomotives (feet)	8,000	10,000
Train Weight (tons)[1]	7,276	9,095
Distance Traveled (miles)[2]	17.4	17.4
Annual Days of Operation (days/year)[3]	360	360
Fuel Consumption Factor (gal/ ton-miles)[2]	0.000990	0.000990
Line Haul Fuel Consumption Rate (bhp-hr/gal)[2]	20.8	20.8
Emission Factors	See footnote 4	
Analysis Years	2024-2035	2024-2035

Notes:

[1]Based on information in Table 3.

[2]Pier B to Hobart Yard railroad distance.

[3]*POLB 2016 Pier B Draft EIR, Appendix A1, Table A1.2-45, Row 4.*

[4]Emission factors for VOCs, NOx, PM_{10}, and $PM_{2.5}$ were based on USEPA's *Emission Factors for Locomotives, April 2009*. Emission factors for CO, SOx, CO_2, CH_4, and N_2O were based on values in Table 5.9 of the San Pedro Bay Ports Emission Inventory Methodology Report.

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Scaling Factor Calculation Methods (Table 2)

- Weight of Railcars + Containers (short tons) = Total Train Weight* (short tons) – Total Locomotive Weight (short tons)
  - **6,436 short tons = 7,276 short tons – 840 short tons**
- Locomotive Cargo Capacity (short tons/locomotive) = Weight of Railcar + Containers (short tons) ÷ Number of locomotives
  - **1,609 short tons/locomotive = 6,436 short tons ÷ 4 locomotives**
- Total Length of Railcars (with Containers) (ft) = Number of Railcars x Length of Railcar (ft/railcar)
  - **7,800 ft = 130 Railcars x 60 feet/railcar**
- Railcar + Containers Weight per Train Length (short tons/ft) = [Weight of Railcars + Containers (short tons)] ÷ [Total Length of Railcars (with Containers) (ft)]
  - **0.825 short tons/ft = 6,436 short tons ÷ 7,800 ft**

**Train weight includes locomotives, railcars, and containers*

No Project Scenario Calculation Methods (the same formulas were used for the With Project Scenario (Table 3)

- Weight of Railcars + Containers (short tons) = [Total Length of Railcars (with Containers) (ft)] x [Railcar + Containers Weight per Train Length (short tons/ft)]
  - **6,601 short tons = 8,000 ft x 0.825 short tons/ft**
- Number of locomotives required = Train Weight (short tons) ÷ Locomotive Cargo Capacity (short tons/locomotive)
  - 4 locomotives = 6,436 short tons ÷ 1,609 short tons/locomotive
- Number of Railcars = [Total Length of Railcars (with Containers) (ft)] ÷ Length of Railcar (ft/railcar)
  - **130 Railcars = 7,800 ft ÷ 60 ft/railcar**
- Weight of Railcars (short tons) = Number of Railcars x Weight of Railcar (short tons/railcar)

- **2,600 short tons = 130 Railcars x 20 short tons/railcar**

- Weight of Containers (short tons) = Weight of Railcars + Containers (short tons) - Total Weight of Railcars (short tons)
  - **3,836 short tons = 6,436 short tons – 2,660 short tons**
- Number of Containers = Total Weight of Containers (short tons) ÷ Weight per Container (short tons/container)
  - **274 containers = 3,836 short tons ÷ 14 short tons/container**
- Total Train Weight (locomotive + railcars + containers) = [Weight of Railcars + Containers (short tons)] + [Number of locomotives x Weight of Locomotive (shorts tons)]
  - **7,276 short tons = 6,436 short tons + [4 locomotives x 210 short tons/locomotive]**

Locomotive Emissions Inventory

EMISSIONS SUMMARY

NO PROJECT BUILD SCE Train Length - Locomotives (ft/train)[1]

	Annual Emissions (tons/year)						Annual Emissions (MT/year)			
Year	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
2024	0.97	27.50	9.27	0.04	0.59	0.54	3,212.57	0.26	0.09	3,244.59
2025	0.91	25.76	9.27	0.04	0.56	0.51	3,212.57	0.26	0.09	3,244.59
2026	0.87	24.02	9.27	0.04	0.52	0.48	3,212.57	0.26	0.09	3,244.59
2027	0.80	22.63	9.27	0.04	0.49	0.45	3,212.57	0.26	0.09	3,244.59
2028	0.73	21.24	9.27	0.04	0.45	0.42	3,212.57	0.26	0.09	3,244.59
2029	0.70	19.85	9.27	0.04	0.38	0.35	3,212.57	0.26	0.09	3,244.59
2030	0.66	18.45	9.27	0.04	0.35	0.32	3,212.57	0.26	0.09	3,244.59
2031	0.59	17.06	9.27	0.04	0.35	0.32	3,212.57	0.26	0.09	3,244.59
2032	0.56	16.02	9.27	0.04	0.31	0.29	3,212.57	0.26	0.09	3,244.59
2033	0.52	14.97	9.27	0.04	0.28	0.26	3,212.57	0.26	0.09	3,244.59
2034	0.49	13.93	9.27	0.04	0.24	0.22	3,212.57	0.26	0.09	3,244.59
2035	0.45	12.88	9.27	0.04	0.24	0.22	3,212.57	0.26	0.09	3,244.59

WITH PROJECT BUILD SCENARIO-17 Daily Trains

	Annual Emissions (tons/year)						Annual Emissions (MT/year)			
Year	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
2024	2.96	83.50	28.14	0.11	1.80	1.65	9,752.45	0.80	0.26	9,849.65
2025	2.75	78.21	28.14	0.11	1.69	1.56	9,752.45	0.80	0.26	9,849.65
2026	2.64	72.93	28.14	0.11	1.59	1.46	9,752.45	0.80	0.26	9,849.65
2027	2.43	68.70	28.14	0.11	1.48	1.36	9,752.45	0.80	0.26	9,849.65
2028	2.22	64.47	28.14	0.11	1.37	1.26	9,752.45	0.80	0.26	9,849.65
2029	2.11	60.24	28.14	0.11	1.16	1.07	9,752.45	0.80	0.26	9,849.65
2030	2.01	56.02	28.14	0.11	1.06	0.97	9,752.45	0.80	0.26	9,849.65
2031	1.80	51.79	28.14	0.11	1.06	0.97	9,752.45	0.80	0.26	9,849.65
2032	1.69	48.62	28.14	0.11	0.95	0.88	9,752.45	0.80	0.26	9,849.65
2033	1.59	45.45	28.14	0.11	0.85	0.78	9,752.45	0.80	0.26	9,849.65
2034	1.48	42.28	28.14	0.11	0.74	0.68	9,752.45	0.80	0.26	9,849.65
2035	1.37	39.11	28.14	0.11	0.74	0.68	9,752.45	0.80	0.26	9,849.65

NET INCREASE-10 Daily Trains

	Annual Emissions (tons/year)						Annual Emissions (MT/year)			
Year	ROG	NO_X	CO	SOX	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
2024	1.98	55.99	18.87	0.07	1.20	1.11	6,539.88	0.53	0.17	6,605.06
2025	1.84	52.45	18.87	0.07	1.13	1.04	6,539.88	0.53	0.17	6,605.06
2026	1.77	48.90	18.87	0.07	1.06	0.98	6,539.88	0.53	0.17	6,605.06
2027	1.63	46.07	18.87	0.07	0.99	0.91	6,539.88	0.53	0.17	6,605.06
2028	1.49	43.23	18.87	0.07	0.92	0.85	6,539.88	0.53	0.17	6,605.06
2029	1.42	40.40	18.87	0.07	0.78	0.72	6,539.88	0.53	0.17	6,605.06
2030	1.35	37.56	18.87	0.07	0.71	0.65	6,539.88	0.53	0.17	6,605.06
2031	1.20	34.73	18.87	0.07	0.71	0.65	6,539.88	0.53	0.17	6,605.06
2032	1.13	32.60	18.87	0.07	0.64	0.59	6,539.88	0.53	0.17	6,605.06
2033	1.06	30.48	18.87	0.07	0.57	0.52	6,539.88	0.53	0.17	6,605.06
2034	0.99	28.35	18.87	0.07	0.50	0.46	6,539.88	0.53	0.17	6,605.06
2035	0.92	26.22	18.87	0.07	0.50	0.46	6,539.88	0.53	0.17	6,605.06

Table 5.5: Assumptions for Gross Weights of Trains

Train Component	Weight (lbs)	Train Length - Locomotives (ft/train)[1]	# per train	Weight (short tons)
Locomotive	420,000	210	4	840
Railcar (per double-stack platform)	40,000	20	130	2,600
Container		14	274	3,836
			Total	**7,276**

Parameter	Value
Weight of Railcars + Containers (short tons)	6,436
Locomotive Cargo Capacity (short tons/locomotive)	1,609
Railcar Length (ft/railcar)	60
Total Length of Railcars (with Containers) (ft)	7,800
Railcar + Container Weight per length (short tons/ ft)	0.825

Pier B Railyard Information

Parameter	Scenario	
	No Project	With Project
Railcars + Containers Length (ft)	7,800	9,750
Railcars + Containers Weight (short tons)	6,436	8,045
# of Locomotives required[1]	4	5
Railcars + Locomotive Length (ft)[2]	8,000	10,000
# of Railcars	130	163
Total Weight of Railcars (short tons)	2,600	3,260
Total Weight of Containers (short tons)	3,836	4,785
# of Containers[3]	274	342
Total Train Weight (short tons)[4]	7,276	9,095

Notes:

1 Number of locomotives rounded up to nearest whole number

2 50-foot locomotives

3 Number of containers rounded up to nearest whole number

4 Total weight includes locomotives, railcars, and containers

NO PROJECT LOCOMOTIVE EMISSIONS

Year	Daily Trains[1]	Train Length - Locomotives (ft/train)[1]	Train Weight (gross tons/train)[2]	Trip Distance (miles/train)[3]	Daily Ton-Miles	Operations Schedule (days/year)[4]	Ton-Miles per Year	Fuel Consumption Factor (gal/ton-mile)[3]	Annual Fuel Consumption (gallons/year)	Fuel Use Conversion Factor (hp-hr/gal)[3]	Total hp-hr/year
2024	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631
2025	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631
2026	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631
2027	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631
2028	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631
2029	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631
2030	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631
2031	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631
2032	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631
2033	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631
2034	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631
2035	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	20.8	6,569,631

Notes:

1 Pier B Conformity Analysis Work Plan
2 Based on San Pedro Bay Ports Emission Inventory Methodology Report, Version 1, April 2019
https://www.polb.com/environment/air/#emissions-inventory
3 Port of Long Beach Pier B EIR.
4 POLB 2016 Pier B Draft EIR, Appendix A1, Table A1.2-45, Row 3
5 Based on San Pedro Bay Ports Emission Inventory Methodology, p. 52
6 GWP based on values from IPCC AR4
7 VOC, NOX, PM_{10}, and $PM_{2.5}$ values from USEPA's, Emission Factors for Locomotives, April 2009.
8 $PM_{2.5}$ assumed to be 92 percent of PM_{10} value

NO PROJECT LOCOMOTIVE EMISSIONS

										Emission Factors (g/bhp-hr)[5,7,8]								
Year	Daily Trains[1]	Train Length - Locomotives (ft/train)[1]	Train Weight (gross tons/train)[2]	Trip Distance (miles/train)[3]	Daily Ton-Miles	Operations Schedule (days/year)[4]	Ton-Miles per Year	Fuel Consumption Factor (gal/ton-mile)[3]	Annual Fuel Consumption (gallons/year)	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
2024	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.13	3.80	1.28	0.005	0.08	0.08	489.00	0.040	0.013
2025	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.13	3.56	1.28	0.005	0.08	0.07	489.00	0.040	0.013
2026	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.12	3.32	1.28	0.005	0.07	0.07	489.00	0.040	0.013
2027	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.11	3.13	1.28	0.005	0.07	0.06	489.00	0.040	0.013
2028	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.10	2.93	1.28	0.005	0.06	0.06	489.00	0.040	0.013
2029	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.10	2.74	1.28	0.005	0.05	0.05	489.00	0.040	0.013
2030	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.09	2.55	1.28	0.005	0.05	0.04	489.00	0.040	0.013
2031	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.08	2.36	1.28	0.005	0.05	0.04	489.00	0.040	0.013
2032	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.08	2.21	1.28	0.005	0.04	0.04	489.00	0.040	0.013
2033	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.07	2.07	1.28	0.005	0.04	0.04	489.00	0.040	0.013
2034	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.07	1.92	1.28	0.005	0.03	0.03	489.00	0.040	0.013
2035	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.06	1.78	1.28	0.005	0.03	0.03	489.00	0.040	0.013

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Port of Long Beach Pier B EIR.
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Based on San Pedro Bay Ports Emission Inventory Methodology, p. 52
GWP based on values from IPCC AR4
VOC, NOX, PM_{10}, and $PM_{2.5}$ values from USEPA's, Emission Factors for Locomotives, April 2009.
$PM_{2.5}$ assumed to be 92 percent of PM_{10} value

NO PROJECT LOCOMOTIVE EMISSIONS

										Annual Emissions (tons/year)						Annual Emissions (MT/year)[6]			
Year	Daily Trains[1]	Train Length - Locomotives (ft/train)[1]	Train Weight (gross tons/train)[2]	Trip Distance (miles/train)[3]	Daily Ton-Miles	Operations Schedule (days/year)[4]	Ton-Miles per Year	Fuel Consumption Factor (gal/ton-mile)[3]	Annual Fuel Consumption (gallons/year)	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
2024	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.97	27.50	9.27	0.04	0.59	0.54	3,212.57	0.26	0.09	3,244.59
2025	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.91	25.76	9.27	0.04	0.56	0.51	3,212.57	0.26	0.09	3,244.59
2026	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.87	24.02	9.27	0.04	0.52	0.48	3,212.57	0.26	0.09	3,244.59
2027	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.80	22.63	9.27	0.04	0.49	0.45	3,212.57	0.26	0.09	3,244.59
2028	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.73	21.24	9.27	0.04	0.45	0.42	3,212.57	0.26	0.09	3,244.59
2029	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.70	19.85	9.27	0.04	0.38	0.35	3,212.57	0.26	0.09	3,244.59
2030	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.66	18.45	9.27	0.04	0.35	0.32	3,212.57	0.26	0.09	3,244.59
2031	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.59	17.06	9.27	0.04	0.35	0.32	3,212.57	0.26	0.09	3,244.59
2032	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.56	16.02	9.27	0.04	0.31	0.29	3,212.57	0.26	0.09	3,244.59
2033	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.52	14.97	9.27	0.04	0.28	0.26	3,212.57	0.26	0.09	3,244.59
2034	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.49	13.93	9.27	0.04	0.24	0.22	3,212.57	0.26	0.09	3,244.59
2035	7	7,800	7,276	17.4	886,217	360	319,038,048	9.90E-04	315,848	0.45	12.88	9.27	0.04	0.24	0.22	3,212.57	0.26	0.09	3,244.59

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GWP based on values from IPCC AR4
VOC, NOX, PM_{10}, and $PM_{2.5}$ values from USEPA's, Emission Factors for Locomotives, April 2009.
$PM_{2.5}$ assumed to be 92 percent of PM_{10} value

WITH PROJECT LOCOMOTIVE EMISSIONS

Year	Daily Trains[1]	Train Length - Locomotives (ft/train)[1]	Train Weight (gross tons/train)[2]	Trip Distance (miles/train)[3]	Daily Ton-Miles	Operations Schedule (days/year)[4]	Ton-Miles per Year	Fuel Consumption Factor (gal/ton-mile)[3]	Annual Fuel Consumption (gallons/year)	Fuel Use Conversion Factor (hp-hr/gal)[3]	Total hp-hr/year
2024	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524
2025	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524
2026	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524
2027	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524
2028	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524
2029	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524
2030	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524
2031	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524
2032	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524
2033	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524
2034	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524
2035	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	20.8	19,943,524

Notes:

1 Pier B Conformity Analysis Work Plan
2 Based on San Pedro Bay Ports Emission Inventory Methodology Report, Version 1, April 2019
https://www.polb.com/environment/air/#emissions-inventory
3 Port of Long Beach Pier B EIR.
4 POLB 2016 Pier B Draft EIR, Appendix A1, Table A1.2-45, Row 3
5 Based on San Pedro Bay Ports Emission Inventory Methodology, p. 52
6 GWP based on values from IPCC AR4
7 VOC, NOX, PM_{10}, and $PM_{2.5}$ values from USEPA's, Emission Factors for Locomotives, April 2009.
8 $PM_{2.5}$ assumed to be 92 percent of PM_{10} value

WITH PROJECT LOCOMOTIVE EMISSIONS

										Emission Factors (g/bhp-hr)[5,7,8]								
Year	Daily Trains[1]	Train Length - Locomotives (ft/train)[1]	Train Weight (gross tons/train)[2]	Trip Distance (miles/train)[3]	Daily Ton-Miles	Operations Schedule (days/year)[4]	Ton-Miles per Year	Fuel Consumption Factor (gal/ton-mile)[3]	Annual Fuel Consumption (gallons/year)	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
2024	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.13	3.80	1.28	0.005	0.08	0.08	489.00	0.040	0.013
2025	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.13	3.56	1.28	0.005	0.08	0.07	489.00	0.040	0.013
2026	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.12	3.32	1.28	0.005	0.07	0.07	489.00	0.040	0.013
2027	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.11	3.13	1.28	0.005	0.07	0.06	489.00	0.040	0.013
2028	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.10	2.93	1.28	0.005	0.06	0.06	489.00	0.040	0.013
2029	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.10	2.74	1.28	0.005	0.05	0.05	489.00	0.040	0.013
2030	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.09	2.55	1.28	0.005	0.05	0.04	489.00	0.040	0.013
2031	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.08	2.36	1.28	0.005	0.05	0.04	489.00	0.040	0.013
2032	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.08	2.21	1.28	0.005	0.04	0.04	489.00	0.040	0.013
2033	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.07	2.07	1.28	0.005	0.04	0.04	489.00	0.040	0.013
2034	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.07	1.92	1.28	0.005	0.03	0.03	489.00	0.040	0.013
2035	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	0.06	1.78	1.28	0.005	0.03	0.03	489.00	0.040	0.013

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$PM_{2.5}$ assumed to be 92 percent of PM_{10} value

WITH PROJECT LOCOMOTIVE EMISSIONS

Year	Daily Trains[1]	Train Length - Locomotives (ft/train)[1]	Train Weight (gross tons/train)[2]	Trip Distance (miles/train)[3]	Daily Ton-Miles	Operations Schedule (days/year)[4]	Ton-Miles per Year	Fuel Consumption Factor (gal/ton-mile)[3]	Annual Fuel Consumption (gallons/year)	Annual Emissions (tons/year) VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	Annual Emissions (MT/year)[6] CO_2	CH_4	N_2O	CO_2e
2024	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	2.96	83.50	28.14	0.11	1.80	1.65	9,752.45	0.80	0.26	9,849.65
2025	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	2.75	78.21	28.14	0.11	1.69	1.56	9,752.45	0.80	0.26	9,849.65
2026	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	2.64	72.93	28.14	0.11	1.59	1.46	9,752.45	0.80	0.26	9,849.65
2027	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	2.43	68.70	28.14	0.11	1.48	1.36	9,752.45	0.80	0.26	9,849.65
2028	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	2.22	64.47	28.14	0.11	1.37	1.26	9,752.45	0.80	0.26	9,849.65
2029	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	2.11	60.24	28.14	0.11	1.16	1.07	9,752.45	0.80	0.26	9,849.65
2030	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	2.01	56.02	28.14	0.11	1.06	0.97	9,752.45	0.80	0.26	9,849.65
2031	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	1.80	51.79	28.14	0.11	1.06	0.97	9,752.45	0.80	0.26	9,849.65
2032	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	1.69	48.62	28.14	0.11	0.95	0.88	9,752.45	0.80	0.26	9,849.65
2033	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	1.59	45.45	28.14	0.11	0.85	0.78	9,752.45	0.80	0.26	9,849.65
2034	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	1.48	42.28	28.14	0.11	0.74	0.68	9,752.45	0.80	0.26	9,849.65
2035	17	9,750	9,095	17.4	2,690,301	360	968,508,360	9.90E-04	958,823	1.37	39.11	28.14	0.11	0.74	0.68	9,752.45	0.80	0.26	9,849.65

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$PM_{2.5}$ assumed to be 92 percent of PM_{10} value

APPENDIX B
MEMORANDUM OF AGREEMENT AMONG THE U.S. DEPARTMENT OF TRANSPORTATION MARITIME ADMINISTRATION, THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE PORT OF LONG BEACH REGARDING THE PORT OF LONG BEACH PIER B ON-DOCK RAIL SUPPORT FACILITY PROJECT, LONG BEACH, CALIFORNIA

MEMORANDUM OF AGREEMENT AMONG THE U.S. DEPARTMENT OF TRANSPORTATION MARITIME ADMINISTRATION, THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE PORT OF LONG BEACH REGARDING THE PORT OF LONG BEACH PIER B ON-DOCK RAIL SUPPORT FACILITY PROJECT, LONG BEACH, CALIFORNIA

WHEREAS, the Port of Long Beach (the Port) proposes to reconfigure and expand the Pier B On-Dock Rail Support Facility, located at the Port of Long Beach in Los Angeles County, California (Undertaking) (full project description is provided in Attachment A) with funding from the U.S. Department of Transportation (DOT); and

WHEREAS, the Maritime Administration (MARAD), having been identified by DOT as the lead federal agency responsible for complying with Section 106 of the National Historic Preservation Act (54 U.S.C. § 300101) (NHPA) for this Undertaking, consulted with the California State Historic Preservation Officer (SHPO); and

WHEREAS, MARAD, in consultation with the SHPO and in accordance with 36 CFR § 800.4(a)(1), established the Undertaking's Area of Potential Effects (APE) (full description of the APE, including maps, is provided in Attachment B); and

WHEREAS, MARAD determined the transit shed at Berths D52–D54 (transit shed), constructed from 1947 to 1954, meets the National Register of Historic Places (NRHP) eligibility requirements under Criteria A and C at the local level of significance for its association with a shipping system heavily reliant on dockworkers' manual labor and rail, prior to the advent of containerization at the Port of Long Beach circa 1969, with a period of significance defined as 1951–1969, and the SHPO concurred on March 26, 2020; and

WHEREAS, the Undertaking involves the demolition of approximately 11 percent of the transit shed's overall footprint, including the primary elevation facing Pico Avenue, which is an essential character-defining feature (see Attachment C for full architectural description); and

WHEREAS, pursuant to 36 CFR Part 800, MARAD determined that the Undertaking would adversely affect the transit shed and the SHPO concurred on July 23, 2020; and

WHEREAS, MARAD determined in consultation with the SHPO that the transit shed will no longer meet NRHP eligibility requirements upon the undertaking's completion; and

WHEREAS, MARAD invited the Federal Railroad Administration (FRA), National Oceanic and Atmospheric Administration (NOAA), U.S. Fish & Wildlife Service (USFWS), U.S. Army Corps of Engineers (USACE), and the U.S. Environmental Protection Agency (USEPA) to participate in consultation, pursuant to 36 C.F.R. Section 800.2(a); and

WHEREAS, FRA accepted consulting party status; USFWS, USACE, and USEPA declined consulting party status; and NOAA neither accepted nor declined consulting party status; and

WHEREAS, pursuant to Section 101(d)(6)(B) of the NHPA, and 36 CFR § 800.2(c)(2)(ii), MARAD is responsible for government-to-government consultation with federally recognized Tribes and consulted with the Soboba Band of Luiseno Indians and the Torres Martinez Desert Cahuilla Indians; and

WHEREAS, pursuant to 36 C.F.R. § 800.2(c), MARAD invited the City of Long Beach, the City of Los Angeles, the Historical Society of Long Beach, Long Beach Heritage, the Long Beach Heritage Museum, the Los Angeles Conservancy, the Willmore City Heritage Association, the Wilmington Historical Society, and Drum Barracks Civil War Museum to participate in consultation for the Undertaking, pursuant to 36 CFR § 800.2(c); and

WHEREAS, Long Beach Heritage, the Willmore City Heritage Association, and the Drum Barracks Civil War Museum accepted consulting party status; and

WHEREAS, in accordance with 36 C.F.R. § 800.6(a)(1), MARAD notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination with specified documentation, and the ACHP declined to participate in the consultation pursuant to 36 C.F.R. § 800.6(a)(1)(iii); and

WHEREAS, pursuant to 36 C.F.R. § 800.3(e), MARAD published a technical report on the effects on the transit shed resulting from its partial demolition, the report was circulated for public comment July 17, 2020 through August 31, 2020; and MARAD did not receive any public comments; and

NOW, THEREFORE, MARAD, SHPO, and the Port agree that the Undertaking shall be implemented in accordance with the following stipulations to take into account the effect of the Undertaking on historic properties.

STIPULATIONS

I. Professional Qualifications and Secretary of the Interior's Standards and Guidelines for Documentation

A. MARAD shall ensure that all work pursuant to this Memorandum of Agreement (MOA) will be developed by or under the supervision of a person or persons with experience in historic preservation and meeting the minimum professional qualifications for Historic Architect, Architectural Historian, or Historian included in “Secretary of the Interior’s Historic Preservation Professional Qualification Standards” (Federal Register Vol. 62, No.119, p. 33719).

B. MARAD shall ensure that all forms prepared pursuant to this MOA shall be consistent with the Department of Interior’s standards entitled, Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48 FR 44716-44742, September 29, 1983).

II. Mitigation Measures

MARAD shall ensure that the following measures are carried out prior to the expiration of this MOA. Stipulations II.A-C describe the Mitigation Reports that MARAD shall ensure are produced. MARAD shall ensure that the Port carries out the provisions of all Mitigation Reports, including partial demolition and construction of the transit shed, in conformance with the Historic Property Treatment Plan described in Stipulation II.A below.

A. Historic Property Treatment Plan for Transit Shed at Berths D52–D54

Prior to beginning demolition and construction activities related to the transit shed and areas immediately surrounding it, the Port shall develop a Historic Property Treatment Plan (HPTP) for the transit shed at Berths D52–D54. The HPTP will guide the transit shed’s partial demolition and construction with the goal of minimizing physical and visual effects on the historic property to the greatest extent possible. The Port shall revise the HPTP until MARAD accepts it. No demolition or construction work on the transit shed and the areas immediately surrounding it may begin until the HPTP is approved by MARAD and consulting parties have had an opportunity to comment on the HPTP.

The HPTP shall include:

a. Description of the transit shed’s physical condition, including photo-documentation of the areas of the building subject to demolition and the areas immediately surrounding it.

b. Demolition and construction plans related to the transit shed.

B. Post-Construction Report for Transit Shed at Berths D52–D54

Within thirty (30) calendar days following construction of the transit shed, the Port shall produce a Post-Construction Report (P-C Report) for the transit shed at Berths D52–D54 illustrating the partial demolition and construction. The Port shall revise the P-C Report until MARAD accepts it.

The P-C Report shall include:

a. Before-and-after photographs of ten (10) different views of the transit shed, of which seven (7) will focus on the primary elevation.

b. Before-and-after photographs of the setting adjacent to the transit shed, along Pico Avenue.

c. Narrative description of work conducted, describing how and why the construction adheres to the HPTP.

C. Survey of Pre-Containerization Port of Long Beach

Prior to beginning demolition and construction activities for the transit shed and areas immediately surrounding it, the Port shall produce a Pre-Containerization Resources Technical Report (Survey Report) memorializing a historic resources survey of pre-1969 resources within the Port. The historic resources survey will assess buildings, structures, and objects constructed prior to 1969 for their significance under the theme of pre-containerization Port activity. The Port shall revise the Survey Report until MARAD accepts it. No demolition or construction work on the transit shed and the areas immediately surrounding it may begin until the HPTP is approved by MARAD and consulting parties have had an opportunity to comment.

This Survey Report shall include:

a. Historic context of Port rail and shipment operations prior to the advent of containerization.

b. Survey of the Port related to the above context and identification buildings, structures, and objects within this context.

c. Evaluation of significance of all the pre-1969 resources using NRHP and California Register of Historical Resources (CRHR) criteria, including consideration of historic district potential. If a historic district is discovered, contributors and non-contributors shall be identified.

III. Mitigation Reports Review and Comment

A. Port Production

1. The Port shall produce the reports specified in Stipulation II (Historic Property Treatment Plan for Transit Shed at Berths D52–D54, Post-Construction Report for Transit Shed at Berths D52–D54, and Survey of Pre-Containerization Port of Long Beach, collectively Mitigation Reports) and provide them in Word format to MARAD for review.

B. MARAD Review and Comment

1. MARAD shall review and accept or provide comments on each Mitigation Report (including the Historic Property Treatment Plan for Transit Shed at Berths D52–

D54, Post-Construction Report for Transit Shed at Berths D52–D54, and Survey of Pre-Containerization Port of Long Beach) within twenty-one (21) calendar days of receipt.

2. Once accepted, MARAD shall transmit hard copy and electronic versions of each draft Mitigation Report (including the Historic Property Treatment Plan for Transit Shed at Berths D52–D54, Post-Construction Report for Transit Shed at Berths D52–D54, and Survey of Pre-Containerization Port of Long Beach) in Word format to SHPO and the other consulting parties consisting of FRA, Long Beach Heritage, the Willmore City Heritage Association, and the Drum Barracks Civil War Museum (Consulting Parties) within five (5) business days of acceptance.

C. SHPO Review and Concurrence or Comment

1. SHPO shall review and provide comments or concur with each Mitigation Report within forty-five (45) calendar days of receipt.

D. Consulting Parties Review and Comment

1. Consulting Parties shall review and provide comments or concur with each Mitigation Report within forty-five (45) calendar days of receipt. Consulting Party review shall occur concurrently with SHPO review.

E. Port Revisions

1. The Port shall revise Mitigation Reports based on MARAD, SHPO, and Consulting Party comments within thirty (30) calendar days of receipt. With MARAD's agreement, the Port may consolidate comments from several reviewers before revising the Mitigation Reports.

2. MARAD will approve each Mitigation Report in writing before it is distributed as specified in Section IV.

IV. Distribution of Mitigation Reports

Following written approval of each Mitigation Report by MARAD, the Port shall provide each final Mitigation Report to MARAD for distribution as follows:

1. One hard copy and one digital CD copy of each Mitigation Report to all parties to this MOA.

2. One hard copy and one digital CD copy in pdf format of the Survey Report to the South Central Coastal Information Center, the San Pedro Historical Society, and the Long Beach Public Library.

V. Unanticipated Discovery Plan

In the event that a previously unidentified resource is encountered during this undertaking, or if an unanticipated effect to a known historic property results from the undertaking, MARAD will halt activities in the vicinity of the resource. MARAD shall comply with 36 CFR 800.13(b) by notifying the SHPO and invite comment from signatories to the MOA/PA. MARAD's notifications will include a description of unanticipated effects, an eligibility recommendation or a proposed schedule for assessing eligibility, and if appropriate, a process to resolve potential adverse effects.

VI. Annual Reporting

Each year following the execution of this MOA until all work associated with the Undertaking is completed or upon the termination or expiration of this MOA, the Port shall produce an annual report detailing work undertaken pursuant to its terms and include any scheduling changes, any problems encountered, and any disputes and objections received in the efforts of MARAD and the Port to carry out the terms of this MOA. MARAD shall distribute the annual report to the parties to this MOA. MARAD shall submit the report each year from the date of execution.

VII. Dispute Resolution

Should any Signatory or Consulting Party to this MOA object at any time to any actions proposed or the manner in which the terms of the MOA are implemented, MARAD shall consult with such party to resolve the objection. If MARAD determines that such objection cannot be resolved, MARAD will:

A. Forward all documentation relevant to the dispute, including MARAD's proposed resolution and all documentation provided by an objecting party, to the ACHP. The ACHP shall provide MARAD with its advice on the resolution of the objection within thirty (30) calendar days of receiving adequate documentation. Prior to reaching a final decision on the dispute, MARAD shall prepare a written response that considers any timely advice or comments regarding the dispute from the ACHP and Signatories and provide them with a copy of this written response. MARAD will then proceed per its final decision.

B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) calendar day time period, MARAD may make a final decision on the dispute and proceed accordingly, unless ACHP has provided a reasonable request for an extension of time to provide its advice. Prior to reaching such a final decision, MARAD shall prepare a written response that considers any timely comments regarding the dispute from the Signatories to the MOA and provide them and the ACHP with a copy of such written response.

C. MARAD and the Port will assume responsibility for carrying out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

VIII. Amendments

A. This MOA may be amended when such an amendment is agreed to in writing by all Signatories. The amendment will be effective on the date a copy signed by all of the Signatories is filed with the ACHP.

B. In the event that a federal agency or other agency issues federal funding, other federal financial assistance, or approvals for undertakings associated with the Project as described herein, such funding or approving agency may comply with Section 106 by agreeing in writing to the terms of this MOA and notifying and consulting with the Signatories and Consulting Parties. Any necessary amendments will be considered in accordance with this stipulation.

IX. Termination

A. If any Signatory to the MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other Signatories to attempt to develop an amendment per Stipulation VIII above. If within thirty (30) calendar days (or another time period agreed to by all Signatories) an amendment cannot be reached, any Signatory may terminate the MOA upon written notification to the other Signatories.

B. Once the MOA is terminated, and prior to work continuing on the Undertaking, MARAD must either (a) execute a new MOA pursuant to 36 CFR § 800.6 or (b) request, consider, and respond to the comments of the ACHP under 36 CFR § 800.7. MARAD shall notify the Signatories as to the course of action it will pursue.

X. Duration

If the terms of this MOA are not carried out within five (5) years from the date of its execution by the Signatory Parties, MARAD will consult with the other parties to this MOA to reconsider its terms at least sixty (60) days prior to such time. Reconsideration may include the terms and duration of the MOA, and amendment in accordance with Stipulation VIII.

XI. Efficient Communication

In accordance with Executive Order 13563, "Improving Regulation and Regulatory Review," and Executive Order 13589, "Promoting Efficient Spending," communications between Signatories of this MOA and consulting parties discussed herein, except for the SHPO, shall be in electronic form whenever practicable, permitted by law, and consistent with applicable records retention requirements. The SHPO will receive a mail/hard copy of this MOA as they had specifically requested.

MARAD is responsible for maintaining an up-to-date list of email addresses of the consulting parties.

XII. No Obligation of MARAD Funds or Violations of the Anti-Deficiency Act

A. Nothing contained herein shall constitute an obligation or an undertaking to obligate funds appropriated to DOT.

B. MARAD's future efforts to execute requirements arising from the stipulations of this MOA are subject to the provisions of the Anti-Deficiency Act. If compliance with the Anti-Deficiency Act alters or impairs MARAD's ability to implement the stipulations of this MOA, MARAD shall consult in accordance with the Amendments and Termination procedures contained in Stipulations VIII and IX of this MOA. No provision of this MOA shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, Title 31 U.S.C. § 1341.

XIII. Execution

Execution of this MOA by MARAD and SHPO, and implementation of its terms, are evidence that MARAD has considered the effects of this Undertaking on historic properties, afforded the ACHP and all concerned parties an opportunity to comment, and satisfied the requirements of Section 106 of the NHPA (54 U.S.C. §300101) and its implementing regulations.

SIGNATORY

**MEMORANDUM OF AGREEMENT
AMONG
THE U.S. DEPARTMENT OF TRANSPORTATION MARITIME ADMINISTRATION,
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE
PORT OF LONG BEACH
REGARDING
THE PORT OF LONG BEACH PIER B ON-DOCK RAIL SUPPORT FACILITY
PROJECT, LONG BEACH, CALIFORNIA**

U.S. DEPARTMENT OF TRANSPORTATION MARITIME ADMINISTRATION

By: William Paape Date November 5, 2021

William K. Paape
Associate Administrator
for Ports & Waterways

SIGNATORY

**MEMORANDUM OF AGREEMENT
AMONG
THE U.S. DEPARTMENT OF TRANSPORTATION MARITIME ADMINISTRATION,
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE
PORT OF LONG BEACH
REGARDING
THE PORT OF LONG BEACH PIER B ON-DOCK RAIL SUPPORT FACILITY
PROJECT, LONG BEACH, CALIFORNIA**

CALIFORNIA STATE HISTORIC PRESERVATION OFFICER

By: ________________________________ Date 12/9/21 ____________________

Julianne Polanco
State Historic Preservation Officer

INVITED SIGNATORY

MEMORANDUM OF AGREEMENT
AMONG
THE U.S. DEPARTMENT OF TRANSPORTATION MARITIME ADMINISTRATION, THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE PORT OF LONG BEACH
REGARDING
THE PORT OF LONG BEACH PIER B ON-DOCK RAIL SUPPORT FACILITY PROJECT, LONG BEACH, CALIFORNIA

PORT OF LONG BEACH

By: ______________________________ Date 11/01/2021

Mario Cordero
Executive Director

Approved as to Form: David R. Albers

David R. Albers, Deputy City Attorney

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
AMONG
THE U.S. DEPARTMENT OF TRANSPORTATION MARITIME ADMINISTRATION, THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE PORT OF LONG BEACH
REGARDING
THE PORT OF LONG BEACH PIER B ON-DOCK RAIL SUPPORT FACILITY PROJECT, LONG BEACH, CALIFORNIA

CALIFORNIA DEPARTMENT OF TRANSPORTATION

By: ______________________ Date 11-15-2021

Tony Tavares
Caltrans, District 7 Director

MAR-400-220307-001

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
AMONG
THE U.S. DEPARTMENT OF TRANSPORTATION MARITIME ADMINISTRATION,
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE
PORT OF LONG BEACH
REGARDING
THE PORT OF LONG BEACH PIER B ON-DOCK RAIL SUPPORT FACILITY
PROJECT, LONG BEACH, CALIFORNIA

FEDERAL RAILROAD ADMINISTRATION

By: K D Zeringue Date: 30 November 2021

Katherine Zeringue
Federal Preservation Officer

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
AMONG
THE U.S. DEPARTMENT OF TRANSPORTATION MARITIME ADMINISTRATION,
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE
PORT OF LONG BEACH
REGARDING
THE PORT OF LONG BEACH PIER B ON-DOCK RAIL SUPPORT FACILITY
PROJECT, LONG BEACH, CALIFORNIA

LONG BEACH HERITAGE

By: ____Date ______________________

Printed Name
Title

CONCURRING PARTY

**MEMORANDUM OF AGREEMENT
AMONG
THE U.S. DEPARTMENT OF TRANSPORTATION MARITIME ADMINISTRATION,
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE
PORT OF LONG BEACH
REGARDING
THE PORT OF LONG BEACH PIER B ON-DOCK RAIL SUPPORT FACILITY
PROJECT, LONG BEACH, CALIFORNIA**

WILLMORE CITY HERITAGE ASSOCIATION

By: ____Date ______________________

Printed Name
Title

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
AMONG
THE U.S. DEPARTMENT OF TRANSPORTATION MARITIME ADMINISTRATION,
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE
PORT OF LONG BEACH
REGARDING
THE PORT OF LONG BEACH PIER B ON-DOCK RAIL SUPPORT FACILITY
PROJECT, LONG BEACH, CALIFORNIA

DRUM BARRACKS CIVIL WAR MUSEUM

By: ____Date ______________________

Printed Name
Title

APPENDIX C
AIR QUALITY ATTACHMENT TO DEIS APPENDIX F

Air Quality Attachment to DEIS Appendix F

- Ambient Air Pollutant Monitoring Data
- Regional Conformity Documentation
- Project-level Conformity Documentation
  - PM Interagency Consultation
  - CO Protocol Flowchart
- Construction Emissions Worksheets

Monitor Values Report

Geographic Area: Los Angeles County, CA
Pollutant: CO
Year: 2016
Exceptional Events: Excluded (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8427	1.2	1	0	1.3	1.3	0	None	1	060370002	803 N. Loren Ave., Azusa	Azusa	Los Angeles	CA	09
8308	1	0.7	0	1.1	1.1	0	None	2	060370016	840 Laurel, Glendora	Glendora	Los Angeles	CA	09
8105	1.1	1.1	0	2.2	1.7	0	None	1	060370113	Va Hospital, West Los Angeles	West Los Angeles	Los Angeles	CA	09
8079	1.4	1.3	0	1.9	1.8	0	None	1	060371103	1630 N Main St, Los Angeles	Los Angeles	Los Angeles	CA	09
7584	1.3	1.3	0	1.8	1.7	0	None	9	060371103	1630 N Main St, Los Angeles	Los Angeles	Los Angeles	CA	09
8287	1.9	1.8	0	2.4	2.3	0	None	1	060371201	18330 Gault St., Reseda	Reseda	Los Angeles	CA	09
8229	3.9	3.6	0	4.4	4.3	0	None	1	060371302	700 North Bullis Road	Compton	Los Angeles	CA	09
8346	1.7	1.7	0	2.8	2.2	0	None	1	060371602	4144 San Gabriel River Pkwy, Pico Rivera	Pico Rivera	Los Angeles	CA	09
8226	1.3	1.2	0	1.7	1.6	0	None	1	060371701	924 N. Garey Ave., Pomona	Pomona	Los Angeles	CA	09
8278	1	1	0	1.5	1.4	0	None	1	060372005	752 S. Wilson Ave., Pasadena	Pasadena	Los Angeles	CA	09
8152	2.2	2.2	0	3.3	3.3	0	None	1	060374006	2425 Webster St., Long Beach, Ca	Long Beach	Los Angeles	CA	09
8270	1.3	1.2	0	1.6	1.5	0	None	1	060375005	7201 W. Westchester Parkway	Los Angeles	Los Angeles	CA	09
8175	1.1	0.9	0	1.3	1.3	0	None	1	060376012	22224 Placerita Canyon Rd, Santa Clarita	Santa Clarita	Los Angeles	CA	09
8120	1.5	1	0	2.6	2.4	0	None	1	060379033	43301 Division St., Lancaster, Ca	Lancaster	Los Angeles	CA	09

Get detailed information about this report, including column descriptions, at https://www.epa.gov/outdoor-air-quality-data/about-air-data-reports#mon

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Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: June 25, 2020

MAR-400-220307-001

Monitor Values Report

Geographic Area: Los Angeles County, CA
Pollutant: CO
Year: 2017
Exceptional Events: Excluded (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8713	0.9	0.9	0	1.8	1.6	0	None	1	060370002	803 N. Loren Ave., Azusa	Azusa	Los Angeles	CA	09
8645	0.6	0.6	0	0.8	0.8	0	None	2	060370016	840 Laurel, Glendora	Glendora	Los Angeles	CA	09
5219	1.2	1.1	0	2	1.8	0	None	1	060370113	Va Hospital, West Los Angeles	West Los Angeles	Los Angeles	CA	09
8519	1.8	1.8	0	2	2	0	None	1	060371103	1630 N Main St, Los Angeles	Los Angeles	Los Angeles	CA	09
7843	1.6	1.6	0	1.8	1.8	0	None	9	060371103	1630 N Main St, Los Angeles	Los Angeles	Los Angeles	CA	09
8617	2.5	2.2	0	3	3	0	None	1	060371201	18330 Gault St., Reseda	Reseda	Los Angeles	CA	09
8609	4.6	3.5	0	6.1	5.6	0	None	1	060371302	700 North Bullis Road	Compton	Los Angeles	CA	09
8413	2.2	2	0	2.5	2.4	0	None	1	060371602	4144 San Gabriel River Pkwy, Pico Rivera	Pico Rivera	Los Angeles	CA	09
8660	1.6	1.5	0	2	2	0	None	1	060371701	924 N. Garey Ave., Pomona	Pomona	Los Angeles	CA	09
8584	1.7	1.4	0	2.2	2.1	0	None	1	060372005	752 S. Wilson Ave., Pasadena	Pasadena	Los Angeles	CA	09
8453	2.6	2.4	0	3.9	3.9	0	None	1	060374006	2425 Webster St., Long Beach, Ca	Long Beach	Los Angeles	CA	09
8322	1.6	1.5	0	2.1	1.8	0	None	1	060375005	7201 W. Westchester Parkway	Los Angeles	Los Angeles	CA	09
8409	0.8	0.8	0	1.3	1.1	0	None	1	060376012	22224 Placerita Canyon Rd, Santa Clarita	Santa Clarita	Los Angeles	CA	09
7978	0.9	0.8	0	1.3	1.3	0	None	1	060379033	43301 Division St., Lancaster, Ca	Lancaster	Los Angeles	CA	09

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: June 25, 2020

MAR-400-220307-001

Monitor Values Report

Geographic Area: Los Angeles County, CA
Pollutant: CO
Year: 2018
Exceptional Events: Excluded (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8657	1	1	0	1.4	1.4	0	None	1	060370002	803 N. Loren Ave., Azusa	Azusa	Los Angeles	CA	09
8652	0.8	0.8	0	1	0.9	0	None	2	060370016	840 Laurel, Glendora	Glendora	Los Angeles	CA	09
8532	1.3	1.3	0	1.6	1.5	0	None	1	060370113	Va Hospital, West Los Angeles	West Los Angeles	Los Angeles	CA	09
8645	1.7	1.7	0	2	2	0	None	1	060371103	1630 N Main St, Los Angeles	Los Angeles	Los Angeles	CA	09
5898	1.6	1.5	0	1.9	1.8	0	None	9	060371103	1630 N Main St, Los Angeles	Los Angeles	Los Angeles	CA	09
8541	2.1	2	0	3.4	2.5	0	None	1	060371201	18330 Gault St., Reseda	Reseda	Los Angeles	CA	09
8409	3.5	3.1	0	4.7	3.9	0	None	1	060371302	700 North Bullis Road	Compton	Los Angeles	CA	09
8139	1.8	1.6	0	2	1.9	0	None	1	060371602	4144 San Gabriel River Pkwy, Pico Rivera	Pico Rivera	Los Angeles	CA	09
8638	1.8	1.4	0	2.1	2.1	0	None	1	060371701	924 N. Garey Ave., Pomona	Pomona	Los Angeles	CA	09
8644	1.4	1.3	0	2	1.7	0	None	1	060372005	752 S. Wilson Ave., Pasadena	Pasadena	Los Angeles	CA	09
8601	2.1	2	0	4.7	4.4	0	None	1	060374006	2425 Webster St., Long Beach, Ca	Long Beach	Los Angeles	CA	09
7975	1.5	1.4	0	1.8	1.8	0	None	1	060375005	7201 W. Westchester Parkway	Los Angeles	Los Angeles	CA	09
8662	0.8	0.7	0	1	1	0	None	1	060376012	22224 Placerita Canyon Rd, Santa Clarita	Santa Clarita	Los Angeles	CA	09
8172	1	0.9	0	1.2	1.2	0	None	1	060379033	43301 Division St., Lancaster, Ca	Lancaster	Los Angeles	CA	09

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: June 25, 2020

MAR-400-220307-001

CALIFORNIA AIR RESOURCES BOARD

About Our Work Resources Business Assistance Rulemaking News

Top 4 Summary: Highest 4 Daily 24-Hour PM2.5 Averages

at Compton-700 North Bullis Road

iADAM

	2016		2017		2018	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
National:						
First High:	Dec 14	36.3	Dec 24	66.7	Jan 2	49.4
Second High:	Jan 1	28.0	Dec 27	57.6	Nov 19	43.0
Third High:	Mar 1	26.3	Jan 1	53.4	Jul 4	34.8
Fourth High:	Dec 5	26.3	Dec 30	41.3	Feb 4	34.2
California:						
First High:	Dec 14	36.3	Dec 24	66.7	Jan 2	49.4
Second High:	Jan 1	28.0	Dec 27	57.6	Nov 19	43.0
Third High:	Mar 1	26.3	Jan 1	53.4	Jul 4	34.8
Fourth High:	Dec 5	26.3	Dec 30	41.3	Feb 4	34.2
National:						
Estimated # Days > 24-Hour Std:		3.3		15.4		6.3
Measured # Days > 24-Hour Std:		1		5		2
24-Hour Standard Design Value:		33		39		38
24-Hour Standard 98th Percentile:		26.3		53.4		34.8
2006 Annual Std Design Value:		*		12.0		12.6
2013 Annual Std Design Value:		*		12.0		12.6
Annual Average:		11.0		13.2		13.2
California:						
Annual Std Designation Value:		*		13		13
Annual Average:		*		13.3		13.3
Year Coverage:		91		97		92

Notes:

Daily PM2.5 averages and related statistics are available at Compton-700 North Bullis Road between 2008 and 2018. Some years in this range may not be represented.

MAR-400-220307-001

All averages expressed in micrograms per cubic meter.
An exceedance of a standard is not necessarily related to a violation of the standard.
State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* means there was insufficient data available to determine the value.

MAR-400-220307-001

CALIFORNIA
AIR RESOURCES BOARD

About Our Work Resources Business Assistance Rulemaking News

Top 4 Summary: Highest 4 Daily 24-Hour PM10 Averages

iADAM

at Long Beach-2425 Webster Street

	2016 Date	2016 24-Hr Average	2017 Date	2017 24-Hr Average	2018 Date	2018 24-Hr Average
National:						
First High:	Dec 20	75.0	Dec 27	79.0	Feb 19	84.0
Second High:	Nov 8	58.0	Dec 15	73.0	Jan 2	67.0
Third High:	Sep 27	55.0	Apr 25	68.4	Feb 1	65.0
Fourth High:	Feb 12	54.0	Nov 21	65.0	Nov 10	58.4
California:						
First High:	Dec 20	75.3	Dec 27	79.0	Feb 19	83.0
Second High:	Nov 8	58.5	Dec 15	73.0	Jan 2	67.0
Third High:	Sep 27	55.6	Apr 25	68.4	Feb 1	65.0
Fourth High:	Feb 12	54.7	Nov 21	65.0	Nov 10	58.2
National:						
Estimated # Days > 24-Hour Std:		0.0		0.0		0.0
Measured # Days > 24-Hour Std:		0		0		0
3-Yr Avg Est # Days > 24-Hr Std:		0.0		0.0		0.0
Annual Average:		*31.9*		*33.5*		*32.7*
3-Year Average:		*31*		*32*		*33*
California:						
Estimated # Days > 24-Hour Std:		*		*		25.8
Measured # Days > 24-Hour Std:		8		10		4
Annual Average:		*		*		32.5
3-Year Maximum Annual Average:		31		31		33
Year Coverage:		97		87		93

Notes:

Daily PM10 averages and related statistics are available at Long Beach-2425 Webster Street between 2014 and 2018. Some years in this range may not be represented.

All averages expressed in micrograms per cubic meter.

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The national annual average PM10 standard was revoked in December 2006 and is no longer in effect. Statistics related to the revoked standard are shown in *italics* or *italics* .

An exceedance of a standard is not necessarily related to a violation of the standard.

All values listed above represent midnight-to-midnight 24-hour averages and may be related to an exceptional event.

State and national statistics may differ for the following reasons:

State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.

State statistics for 1998 and later are based on local conditions (except for sites in the South Coast Air Basin, where State statistics for 2002 and later are based on local conditions). National statistics are based on standard conditions.

State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

Measurements are usually collected every six days. Measured days counts the days that a measurement was greater than the level of the standard; Estimated days mathematically estimates how many days concentrations would have been greater than the level of the standard had each day been monitored.

3-Year statistics represent the listed year and the 2 years before the listed year.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

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CALIFORNIA AIR RESOURCES BOARD

About Our Work Resources Business Assistance Rulemaking News

Top 4 Summary: Highest 4 Daily Maximum 8-Hour Ozone Averages

at Long Beach-2425 Webster Street

iADAM

	2016		2017		2018	
	Date	8-Hr Average	Date	8-Hr Average	Date	8-Hr Average
National 2015 Std (0.070 ppm):						
First High:	Oct 9	0.059	May 20	0.068	Apr 14	0.063
Second High:	Sep 25	0.058	Sep 1	0.063	Apr 21	0.057
Third High:	Apr 17	0.057	Apr 29	0.062	Feb 3	0.054
Fourth High:	Jun 17	0.055	Apr 30	0.062	May 5	0.053
National 2008 Std (0.075 ppm):						
First High:	Oct 9	0.059	May 20	0.068	Apr 14	0.063
Second High:	Sep 25	0.058	Sep 1	0.063	Apr 21	0.057
Third High:	Apr 17	0.057	Apr 29	0.062	Feb 3	0.054
Fourth High:	Jun 17	0.055	Apr 30	0.062	May 5	0.053
National 2015 Std (0.070 ppm):						
# Days Above the Standard:		0		0		0
Nat'l Standard Design Value:		*		0.057		0.056
National Year Coverage:		100		96		96
National 2008 Std (0.075 ppm):						
# Days Above the Standard:		0		0		0
Nat'l Standard Design Value:		*		0.057		0.056
National Year Coverage:		96		95		96

Notes:

Eight-hour ozone averages and related statistics are available at Long Beach-2425 Webster Street between 2010 and 2018. Some years in this range may not be represented.

All averages expressed in parts per million.

An exceedance of a standard is not necessarily related to a violation of the standard.

Daily maximum 8-hour averages associated with the National 0.070 ppm standard exclude those 8-hour averages that have first hours between midnight and 6:00 am, Pacific Standard Time.

Daily maximum 8-hour averages associated with the National 0.070 ppm standard include only those 8-hour averages from days that have sufficient data for the day to be considered valid.

Daily maximum 8-hour averages associated with the National 0.075 ppm and 0.08 ppm standards may come from days that don't have sufficient data for the day to be considered valid, provided the daily maximum 8-

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hour average itself includes sufficient data to be considered valid.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

CALIFORNIA AIR RESOURCES BOARD

About Our Work Resources Business Assistance Rulemaking News

Top 4 Summary: Highest 4 Daily Maximum Hourly Nitrogen Dioxide Measurements

iADAM

at Long Beach-2425 Webster Street

	2016		2017		2018	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Feb 12	75.6	Nov 16	89.5	Jan 3	85.3
Second High:	Feb 8	73.5	Dec 27	88.0	Feb 8	82.0
Third High:	Nov 8	72.4	Dec 12	87.9	Feb 3	76.0
Fourth High:	Feb 11	72.0	Dec 28	85.2	Jan 17	73.9
California:						
First High:	Feb 12	75	Nov 16	89	Jan 3	85
Second High:	Feb 8	73	Dec 27	88	Feb 8	82
Third High:	Feb 11	72	Dec 12	87	Feb 3	76
Fourth High:	Nov 8	72	Dec 28	85	Jan 17	73
National:						
1-Hour Standard Design Value:		72		68		67
1-Hour Standard 98th Percentile:		66.3		72.9		62.7
# Days Above the Standard:		0		0		0
Annual Standard Design Value:		19		18		17
California:						
1-Hour Std Designation Value:		90		90		90
Expected Peak Day Concentration:		94		86		85
# Days Above the Standard:		0		0		0
Annual Std Designation Value:		20		20		18
Annual Average:		18		18		17
Year Coverage:		96		94		97

Notes:

Hourly nitrogen dioxide measurements and related statistics are available at Long Beach-2425 Webster Street between 2010 and 2018. Some years in this range may not be represented.

All concentrations expressed in parts per billion.

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An exceedance of a standard is not necessarily related to a violation of the standard.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

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CALIFORNIA AIR RESOURCES BOARD

About Our Work Resources Business Assistance Rulemaking News

Top 4 Summary: Highest 4 Daily Maximum Hourly Ozone Measurements

at Long Beach-2425 Webster Street

iADAM

	2016		2017		2018	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Oct 9	0.079	May 20	0.082	Apr 14	0.074
Second High:	Jun 17	0.075	Mar 12	0.079	Feb 3	0.070
Third High:	Sep 18	0.068	Oct 14	0.076	Oct 26	0.067
Fourth High:	Jun 4	0.065	Sep 28	0.074	May 4	0.066
California:						
# Days Above the Standard:		0		0		0
California Designation Value:		0.08		0.08		0.08
Expected Peak Day Concentration:		0.076		0.078		0.077
National:						
# Days Above the Standard:		*0*		*0*		*0*
3-Year Estimated Expected Number of Exceedance Days:		*0.0*		*0.0*		*0.0*
1-Year Estimated Expected Number of Exceedance Days:		*0.0*		*0.0*		*0.0*
Nat'l Standard Design Value:		*0.077*		*0.079*		*0.076*
Year Coverage:		97		93		95

Notes:

Hourly ozone measurements and related statistics are available at Long Beach-2425 Webster Street between 2010 and 2018. Some years in this range may not be represented.

All concentrations expressed in parts per million.

The national 1-hour ozone standard was revoked in June 2005. Statistics related to the national 1-hour ozone standard are shown in or .

An exceedance of a standard is not necessarily related to a violation of the standard.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

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U.S. Department of Transportation
Federal Highway Administration

California Division

650 Capitol Mall, Suite 4-100
Sacramento, CA 95814
(916) 498-5001
(916) 498-5008 (Fax)

June 5, 2020

In Reply Refer To:
HDA-CA

Mr. Bruce de Terra, Division Chief
Transportation Programming Federal Resources Office, M.S. 82
California Department of Transportation
1120 N Street
Sacramento, CA 95814

Mr. Kome Ajise, Executive Director
Southern California Association of Governments
900 Wilshire Blvd., Suite 1700
Los Angeles, CA 90017

SUBJECT: Southern California Association of Governments Connect SoCal Regional Transportation Plan/Sustainable Communities Strategy, 2019 Federal Transportation Improvement Program Amendment No. 19-12 and associated conformity determination.

Dear Messrs. de Terra and Ajise:

The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have completed our reviews of Amendment No. 19-12 to the Southern California Association of Governments (SCAG) Federal Transportation Improvement Program portion of the 2019 California Federal Statewide Transportation Improvement Program (FSTIP), Connect SoCal 2020-2045 RTP/SCS and associated regional conformity determination which was submitted by your letter dated May 14, 2020, and May 19, 2020, respectfully. As detailed in your letters, this amendment requests to add 26 new projects, modify 69 projects and remove six previously approved projects.

We find that the SCAG's FTIP, as amended, was developed through a continuing, cooperative, and comprehensive transportation planning process carried out in accordance with the metropolitan planning provisions of 23 U.S.C. 134, and 49 U.S.C. Chapter 53 as amended by Public Law 114-94, the Fixing America's Surface Transportation (FAST) Act.

SCAG's approved the Connect SoCal 2020-2045 RTP/SCS and 2019 FTIP, as amended, and the accompanying conformity analysis on May 7, 2020. The conformity analysis submitted indicates that all air quality conformity requirements have been met.

Pursuant to the February 14, 2018, Memorandum of Agreement (MOA) between the FHWA, California Division, and the FTA, Region 9, we accept the modifications to the 2019 Federal Statewide Transportation Improvement Program (FSTIP) for the SCAG region in accordance with the Final Rule on Statewide and Metropolitan Transportation Planning published in the May 27, 2016 Federal Register. We find that the Connect SoCal 2020-2045 RTP/SCS and 2019 FTIP, as amended, conform to the applicable state implementation plan (SIP) in accordance with the provisions of 40 CFR Parts 51 and 93.

As agreed in the MOA, FHWA's single signature constitutes the FHWA and the FTA's joint approval and air quality conformity determination for SCAG's Connect SoCal 2020-2045 RTP/SCS and 2019 FTIP as amended. Additionally, this approval was made after consultation with the Environmental Protection Agency (EPA), Region 9 Office, pursuant to the Transportation Conformity Rule.

Our approval is given with the understanding that an eligibility determination of individual projects for funding must be met, and the applicant must ensure satisfaction of all administrative and statutory requirements. If you have questions or would like additional information regarding our approval of Amendment No. 12 to the SCAG's portion of the FSTIP, contact Michael Morris of the FHWA California Division's Cal-South Office at (213) 894-4014 or michael.morris@dot.gov; or Mervin Acebo of the FTA's Los Angeles Office at (213) 202-3957 or mervin.acebo@dot.gov.

Sincerely,

/s/ Ray Tellis

Ray Tellis
Regional Administrator
FTA Region 9

Tashia J. Clemons
Director, Planning and Environment
FHWA California Division

TRANSPORTATION SYSTEM

PROJECT LIST

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

CONNECT SoCal

MAR-400-220307-001

TECHNICAL REPORT

ADOPTED ON SEPTEMBER 3, 2020

TRANSPORTATION SYSTEM

Project List

FRAMEWORK

The project list is divided into three sections, consistent with the framework in **FIGURE 1**. At the center is the Federal Transportation Improvement Program (FTIP), which forms the foundation of the RTP project investment strategy and represents the first six years of already-committed funding for projects requiring federal approval or those that are regionally significant. This RTP incorporates the adopted 2019 FTIP. The RTP contains an additional financially constrained set of transportation projects above and beyond the FTIP. Finally, the Strategic Plan represents an unconstrained list of potential projects that the region would pursue given additional funding and commitment.

As part of the 2019 FTIP, projects from the 2018 State Transportation Improvement Program (STIP) and any subsequent STIP are reviewed for consistency with the RTP before inclusion into the adopted 2019 FTIP and upcoming 2021 FTIP. The STIP is comprised of the Interregional Transportation Program (ITIP) and Regional Transportation Improvement Program (RTIP).

Please note that within the project list, the completion year for non-modeled projects that are exempt from conformity may be inconsistent with upcoming 2019 FTIP amendments or the 2021 FTIP. Since these projects are exempt from conformity, changes in completion years are granted. The project list will be made consistent with the latest FTIP during the next RTP amendment or adoption.

For more information on transportation conformity and the interrelation between the plans and the programs, please refer to Chapter 5 of Connect SoCal and the Transportation Conformity Analysis Technical Report.

FIGURE 1 RTP Framework

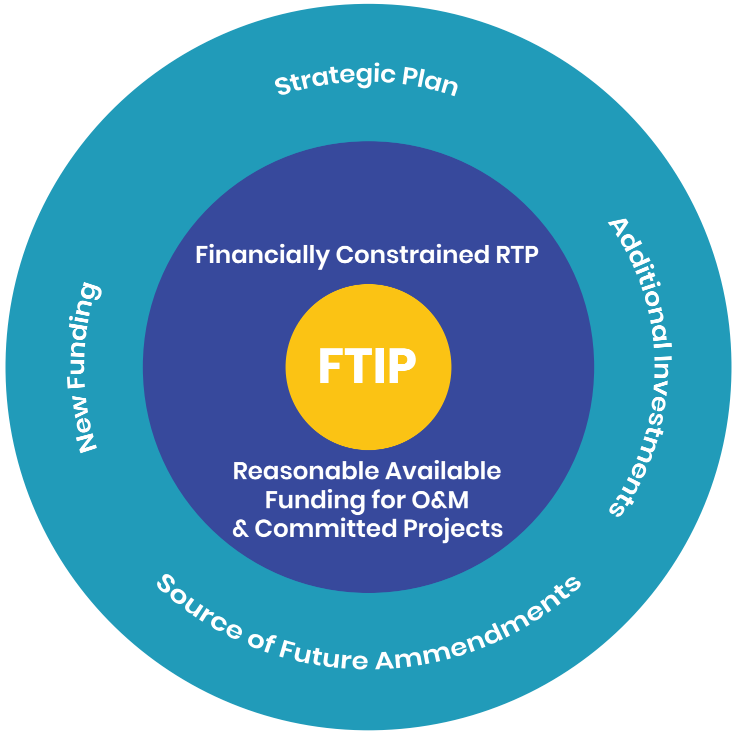

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TABLE 2 Financially-Constrained RTP/SCS Projects - Continued

System	Lead Agency	RTP ID	Route #	Route Name	From	To	Description	Completion Year	Project Cost ($1,000's)
County: Los Angeles									
LOCAL HIGHWAY	LONG BEACH	1AL04-LAF7204	0		PICO AVENUE	EDISON AVENUE	PIER B STREET FREIGHT CORRIDOR RECONSTRUCTION : (1) REALIGNS PIER B ST BETWEEN PICO AV AND PIER A WY AND WIDENS INTO 2 LANES IN EACH DIRECTION TO IMPROVE GOODS MOVEMENT MOBILITY AND ENHANCE PEDESTRIAN TRAVEL. (2) CONSTRUCTS NEW SIDEWALK ON THE SOUTH SIDE OF PIER B ST. 3) CLOSE THE AT-GRADE RAILROAD CROSSING AT 9TH STREET.	2026	$150,000
LOCAL HIGHWAY	LONG BEACH	1AL04-LATP17S013	0		WARDLOW RD	CARSON ST	CREATION OF 8-80 FACILITIES THROUGH THE CONSTRUCTION OF TWO BICYCLE BOULEVARDS (CLASS III) ALONG LOMA AVE. AND 20TH ST. (4 MILES), A ROAD DIET (0.9 MILE) ALONG PALO VERDE AVENUE WITH TRAFFIC CALMING, BUFFERED BIKE LANES (CLASS I) AND BRIDGE ADA UPGRADE, INTERSECTION SAFETY IMPROVEMENTS AND AN ENCOURAGEMENT PROGRAM TO REMOVE MENTAL BARRIERS TO WALKING/CYCLING FOR RESIDENTS, WORKERS, UNIVERSITY STUDENTS, SCHOOL CHILDREN, AND VISITORS TO LONG BEACH.	2022	$7,987
LOCAL HIGHWAY	LONG BEACH	1ITS04-LA0G173	0		PIER S AVENUE	FERRY STREET	RECONFIGURATION OF CONTROL POINT (CP) MOLE - THE NEW CONTROL POINT AT THE MOLE WILL ENABLE INCREASED TRAIN SPEEDS AND REDUCED TRAIN DELAYS CAUSED BY MANUAL SWITCH OPERATIONS.	2021	$27,610
LOCAL HIGHWAY	LONG BEACH	1ITS04-LAF7314	0		ANAHEIM ST.	WARDLOW RD.	SANTA FE AVENUE SYNCHRONIZATION ENHANCEMENT PROJECT : (1) UPGRADES TRAFFIC SIGNALS ALONG THE SANTA FE AV CORRIDOR AND REPLACES OBSOLETE EQUIPMENTS. (2) REPLACES EXISTING SIGNAL CONTROLLERS WITH ADVANCED TRAFFIC CONTROLLERS TO CONNECT WITH THE ADAPTIVE TRAFFIC CONTROL SYSTEM (ATCS). (3) INSTALLS CCTVS AND CLASS III BIKE ROUTE ALONG SANTA FE AV. (4) FURNISHES PEDESTRIAN PUSH BUTTONS AND LED COUNTDOWN PEDESTRIAN HEADS.	2020	$3,199
LOCAL HIGHWAY	LONG BEACH	1ITS04-LAF9314	0		SHORELINE DR	PARK AVE	THE PROJECT CONSISTS OF SIGNAL ENHANCEMENTS THAT WILL INCLUDE SYNCHRONIZATION AND COMMUNICATIONS. ALSO ARE INCLUDED ARE BICYCLE AND PEDESTRIAN IMPROVEMENTS AND INCLUSION OF THE CORRIDOR INTO AN ADAPTIVE TRAFFIC CONTROL SYSTEM	2022	$3,258
LOCAL HIGHWAY	LONG BEACH	1NL04-LAF1528	0		SAN GABRIEL RIVER BIKE PATH	STUDEBAKER RD.	SAN GABRIEL RIVER BIKE PATH GAP CLOSURE AT WILLOW STREET. CREATION OF OFF-STREET BICYCLE PATH TO ACHIEVE BICYCLE ROUTE GAP CLOSURE ON WILLOW STREET FROM THE SAN GABRIEL RIVER BIKE PATH WEST TO STUDEBAKER ROAD. BIKE PATH DISTANCE .5 MILES.	2019	$978
LOCAL HIGHWAY	LONG BEACH	1NL04-LAF1649	0		LOS ANGELES RIVER	ATLANTIC AVE.	WILLOW STREET PEDESTRIAN IMPROVEMENT PROJECT. THIS PROJECT PROVIDES PEDESTRIAN-ORIENTED IMPROVEMENTS TO WILLOW ST INCLUDING MEDIANS, PEDESTRIAN LIGHTING, LANDSCAPING, SIGNAGE, BUS SHELTER REPLACEMENTS, AND CROSSWALK TREATMENTS.	2019	$3,097

U.S. Department of Transportation
Federal Highway Administration

California Division

650 Capitol Mall, Suite 4-100
Sacramento, CA 95814
(916) 498-5001
(916) 498-5008 (FAX)

December 17, 2018

In Reply Refer To:
HDA-CA

Mr. Darin Chidsey
Interim Executive Director, Southern California Association of Governments
900 Wilshire Blvd., Ste. 1700
Los Angeles, CA 90017

Attention: Mr. Naresh Amatya

SUBJECT: Conformity Determination for SCAG's 2019 FTIP, 2019 FTIP Amendment No. 19-01, and SCAG's 2016-2040 RTP/SCS through Amendment No. 3

Dear Mr. Chidsey:

The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have completed our reviews of the conformity determination for the Southern California Association of Governments' (SCAG) 2019-22 Federal Transportation Improvement Program (FTIP), including FTIP Amendment No. 19-01, and 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Amendment No. 3. A FHWA/FTA air quality conformity determination is required for SCAG's new 2019-22 FTIP, including FTIP Amendment No. 19-01, and 2016-2040 RTP/SCS Amendment No. 3 pursuant the Environmental Protection Agency's (EPA) *Transportation Conformity Rule*, 40 Code of Federal Regulations (CFR) Parts 51 and 93, and the United States Department of Transportation's *Final Rule on Statewide and Metropolitan Planning*, 23 CFR Part 450.

On September 6, 2018 SCAG adopted the 2019-22 FTIP, including FTIP Amendment No. 19-01, and 2016-2040 RTP/SCS Amendment No. 3. SCAG made the corresponding conformity determinations via Resolutions No. 18-603-4 and 18-603-3, respectively. The conformity analysis submitted indicates that all air quality conformity requirements have been met. Based on our review and after consultation with the EPA Region 9 Office we find that SCAG's 2019-22 FTIP, including FTIP Amendment No. 19-01, and 2016-2040 RTP/SCS Amendment No. 3 conform to the applicable state implementation plan in accordance with the provisions of 40 CFR Parts 51 and 93. In correlation with the February 14, 2018 *Memorandum of Agreement (MOA) between the FHWA California Division and the FTA Region 9*, FTA has concurred with this conformity determination.

Also, as associated with the above MOA, the FHWA's single signature constitutes the FHWA and the FTA's joint air quality conformity determination for SCAG's 2019-22 FTIP, including FTIP Amendment No. 19-01, and 2016-2040 RTP/SCS Amendment No. 3.

If you have questions pertaining to this conformity finding, contact Michael Morris (michael.morris@dot.gov) of the FHWA California Division's Cal-South Office at (213) 894-4014.

Sincerely,

Tashia J. Clemons

Tashia J. Clemons
Director, Planning and Environment
Federal Highway Administration

2019 Federal Transportation Improvement Program
Los Angeles County
Local Highway - Project Listing
Including Amendments 1-11 and 13-19_21
(In $000`s)

FTIP ID	LAF7204	*FTIP Amendment*	LA County (METRO) 19-14	*Conform Category*	NON-EXEMPT	*Total Project Cost*	$150,000
Lead Agency	LONG BEACH			*Modeling*	YES		
County	Los Angeles	Primary Program Code	CART2 - HIGHWAY/ROAD IMP - LANE ADD'S - w/TCM : NRS	Air Basin	SCAB	RTP ID	1AL04
System	Local Hwy						
Project Limits	At Pier B Street Pico Avenue to Edison Avenue						
Description	PIER B STREET FREIGHT CORRIDOR RECONSTRUCTION : (1) Realigns Pier B St between Pico Av and Anaheim Way and widens into 2 lanes in each direction to improve goods movement mobility and enhance pedestrian travel. (2) Realigns Pico Ave to the west from Pier B St/I-710 Ramps to Pier D St. (3) Constructs new sidewalk on the south side of Pier B St and along the west side of Pico Ave. (4) Close the at-grade railroad crossing at 9th Street.						

Phase	Fund Source	(in $000s)	Prior	18/19	19/20	20/21	21/22	22/23	23/24	Future	Total
PE	MR20H - Measure R 20% Highway		-	-	$4,000	$4,000	$2,000	-	-	-	$10,000
PE	PORT - Port Funds		$4,142	$636	-	-	$6,000	$6,000	$1,232	-	$18,010
		Total Preliminary Engineering	$4,142	$636	$4,000	$4,000	$8,000	$6,000	$1,232	-	$28,010
CON	CMAQ - Congestion Mitigation Air Quality		-	-	-	-	$5,354	-	-	-	$5,354
CON	PORT - Port Funds		-	-	-	-	$8,782	-	$96,899	-	$105,681
CON	STPL-R - STP Local Regional		-	-	-	-	$10,955	-	-	-	$10,955
		Total Construction	-	-	-	-	$25,091	-	$96,899	-	$121,990
		Total Programmed	**$4,142**	**$636**	**$4,000**	**$4,000**	**$33,091**	**$6,000**	**$98,131**	**-**	**$150,000**

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RTIP ID# *(required)*: LAF7204

TCWG Consideration Date: February 25, 2020

Project Description *(clearly describe project)*:
The City of Long Beach is proposing to realign Pier B Street between Pico Avenue and Anaheim Way, and widen this roadway segment to two (2) lanes in each direction. In addition, the project would realign Pico Avenue to the west from Pier B Street/I-710 Ramps to Pier D Street; constructs new sidewalk on the south side of Pier B Street and along the west side of Pico Avenue; and close the at-grade railroad crossing at 9th Street. Regional location and project vicinity maps are provided in Figures 1 and 2, respectively (attached).

Type of Project *(use Table 1 on instruction sheet)*: Change to existing regionally significant street

County	**Narrative Location/Route & Postmiles:**
Los Angeles	**Narrative Location/Route & Postmiles:** Pier B Street, between Pico Avenue and Anaheim Way; Pico Avenue, between Pier B Street/I-710 Ramps and Pier B Street; all within the City of Long Beach. Regional location and project vicinity maps are provided in Figures 1 and 2, respectively (attached). **Caltrans Projects – EA#** N/A

Lead Agency: City of Long Beach

Contact Person	**Phone#**	**Fax#**	**Email**
Keith Cooper	213-312-1752	N/A	Keith.Cooper@icf.com

Hot Spot Pollutant of Concern *(check one or both)* **PM2.5** ✓ **PM10** ✓

Federal Action for which Project-Level PM Conformity is Needed *(check appropriate box)*

	Categorical Exclusion (NEPA)	✓	**EA or Draft EIS**		**FONSI or Final EIS**		**PS&E or Construction**		**Other**

Scheduled Date of Federal Action: 8/2020

NEPA Assignment – Project Type *(check appropriate box)*

	Exempt		**Section 326 –Categorical Exemption**	✓	**Section 327 – Non-Categorical Exemption**

Current Programming Dates *(as appropriate)*

	PE/Environmental	**ENG**	**ROW**	**CON**
Start	6/2012	6/2016	N/A	6/2022
End	8/2020	6/2022	N/A	6/2025

Project Purpose and Need (Summary): *(attach additional sheets as necessary)*:
Project purpose is to improve goods movement mobility and enhance pedestrian travel. The project will improve the geometric design of Pier B Street and Pico Avenue, thereby enhancing safety and traffic operations.

Surrounding Land Use/Traffic Generators *(especially effect on diesel traffic)*:
Project vicinity land uses are compatible for large volumes of heavy truck traffic. Land uses include the I-710 Freeway to the east, port/logistics land uses to the south and west, and logistics land uses to the north.

Opening Year: Build and No Build LOS, AADT, % and # trucks, truck AADT of proposed facility

Roadway Segment	No Build Alternative			Build Alternative		
	AADT	Truck AADT	Truck Percent	AADT	Truck AADT	Truck Percent
Pier B St.[a]	1,470	483	33%	6,121	1,580	26%
Pico Ave.	9,481	4,441	47%	7,737	4,153	54%

RTP Horizon Year / Design Year: Build and No Build LOS, AADT, % and # trucks, truck AADT of proposed facility

Roadway Segment	No Build Alternative			Build Alternative		
	AADT	Truck AADT	Truck Percent	AADT	Truck AADT	Truck Percent
Pier B St.[b]	1,414	465	33%	7,805	2,281	29%
Pico Ave.	13,870	6,786	49%	10,476	5,792	55%

[a] Under Opening Year (2025) Build Alternative conditions, traffic volumes on Pier B Street are anticipated to increase due to closure of the 9th Street at-grade rail crossing. Traffic will be redistributed from 9th Street to Pier B Street and other adjacent roadways; however, the traffic volumes on Pier B Street would still be well below the capacity for the four-lane roadway. Traffic volumes on Pico Avenue would be lower due to traffic redistribution with the closure of the 9th Street at-grade rail crossing.

[b] Under Horizon Year (2045) Build Alternative conditions, traffic volumes on Pier B Street are anticipated to be lower than under Opening Year (2025) Build Alternative conditions since the horizon year reflects cumulative conditions with related projects. In particular, the Port of Long Beach is implementing rail improvement projects, such as the Pier B On-Dock Rail Support Facility located to the north of Pier B Street, to facilitate moving more cargo by rail. As part of the Pier B On-Dock Rail Support Facility Project, various roadways will be removed within the area that will be acquired for the expanded railyard. With these changes, traffic volumes along Pier B Street is anticipated to be lower under horizon year conditions.

Opening Year: If facility is an interchange(s) or intersection(s), Build and No Build cross-street AADT, % and # trucks, truck AADT

See Attachment 1.

RTP Horizon Year / Design Year: If facility is an interchange (s) or intersection(s), Build and No Build cross-street AADT, % and # trucks, truck AADT

See Attachment 1.

Describe potential traffic redistribution effects of congestion relief *(impact on other facilities)*

The proposed improvements would relieve congestion and improve vehicle circulation. Given the project vicinity land uses that are compatible with high volumes of heavy-duty truck traffic, the projected increases in truck volume traffic would not be considered significant. The 9th Street at-grade railroad crossing closure would improve traffic operations and reduce delays at the intersection of 9th Street/I-710 ramps/Pier B Street/Pico Avenue. Traffic on 9th Street would be redistributed to adjacent roadways and accommodated by available capacity in the roadway system.

Comments/Explanation/Details *(attach additional sheets as necessary)*

Project construction would require less than 5 years. As such, construction emissions analysis for project-level conformity is not required.

Under 40 CFR 93.123(b)—PM10 and PM2.5 Hot Spots—the following criteria are utilized to determine the potential for the proposed project to qualify as a Project of Air Quality Concern (POAQC):

(i) New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles.

The project includes minor roadway widening along a 0.6-mile segment of Pier B Street. The project would not significantly increase the number of diesel vehicles operating within the project study area. Project vicinity land uses are compatible with high volumes of heavy-duty truck traffic.

(ii) Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those 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.

Previously noted, project vicinity land uses are compatible with high volumes of heavy-duty truck traffic, and in this context, the project would not result in significant increases in traffic volumes along project vicinity roadways. The project would not significantly increase the number of diesel vehicles operating within the project study area and would not adversely impact nearby intersections that are at LOS D, or worse, and that have a significant number of diesel vehicles.

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

The project is not a new or expanded bus or rail terminal, nor would the project adversely impact 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.

The project is not a new or expanded bus or rail terminal, nor would the project adversely impact transfer points that have a significant number of diesel vehicles congregating at a single location.

(v) Projects in or affecting locations, areas, or categories of sites which are identified in the PM10 or PM2.5 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The proposed project is not in or affecting locations, areas, or categories of sites that are identified in the PM2.5 and PM10 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

For the reasons noted above, the proposed project would not be considered a POAQC.

\\PDCCITRDSGIS1\Projects_1\POLB\00311_18_12thStreet\Figures\AQ\Fig01_Regional_Location.mxd Date: 2/12/2020 25119

ICF

MAR-400-220307-001

Figure 1
Regional Location

MAR-400-220307-001

Figure 2
Local Project Vicinity

ATTACHMENT 1

Opening Year 2025 - No Build Alternative Intersection LOS

Intersection 1 (Pico Avenue-Pier B Street & 9th Street-I-710 Ramps)

	Direction		Peak Hour Volume AM	Peak Hour Volume PM	LOS AM	LOS PM	V/C AM	V/C PM
Opening Year (2025) – No Build	NB I-710 Ramps	NB - L	24	85	D	C	0.890	0.734
		NB - T	11	13				
		NB - R	300	228				
	SB 9th Street	SB – L	410	144				
		SB – T	28	33				
		SB - R	21	23				
	EB Pier B Street	EB – L	17	81				
		EB – T	54	60				
		EB – R	33	139				
	WB Pico Avenue	WB – L	227	431				
		WB – T	86	69				
		WB – R	409	434				
Note: Volumes are in PCE's								

Intersection 2 (Pier B Street & Edison Street)

	Direction		Peak Hour Volume AM	Peak Hour Volume PM	LOS AM	LOS PM	Delay AM	Delay PM
Opening Year (2025) – No Build	Edison Ave.	NB - L	6	7	A	A	8.7	9.2
		NB - T	0	0				
		NB - R	18	30				
	N/A	SB – L	0	0				
		SB – T	0	0				
		SB - R	0	0				
	EB Pier B Street	EB – L	0	0				
		EB – T	48	206				
		EB – R	11	8				
	WB Pier B Street	WB – L	23	3				
		WB – T	89	155				
		WB – R	0	0				
Note: Volumes are in PCE's; Worst Approach Delay is reported (seconds per vehicle)								

Intersection 3 (Pier B Street & Anaheim Way)

	Direction		Peak Hour Volume		LOS		Delay	
			AM	PM	AM	PM	AM	PM
Opening Year (2025) – No Build	N/A	NB - L	0	0	A	A	7.7	8.0
		NB - T	0	0				
		NB - R	0	0				
	SB Anaheim Way	SB – L	29	24				
		SB – T	0	0				
		SB - R	47	34				
	EB Pier B Street	EB – L	48	55				
		EB – T	33	110				
		EB – R	0	0				
	WB Pier B Street	WB – L	0	0				
		WB – T	59	94				
		WB – R	40	37				
Note: Volumes are in PCE's; Average Delay is reported (seconds per vehicle)								

Opening Year 2025 – Build Alternative Intersection LOS

Intersection 1 (Pico Avenue-Pier B Street & 9th Street-I-710 Ramps)

	Direction		Peak Hour Volume		LOS		V/C	
			AM	PM	AM	PM	AM	PM
Opening Year (2025) – No Build	NB I-710 Ramps	NB - L	55	142	B	A	.647	.570
		NB - T	0	0				
		NB - R	513	204				
	SB 9th Street	SB – L	0	0				
		SB – T	0	0				
		SB - R	0	0				
	EB Pier B Street	EB – L	0	0				
		EB – T	164	190				
		EB – R	40	175				
	WB Pico Avenue	WB – L	303	490				
		WB – T	387	368				
		WB – R	0	0				
Note: Volumes are in PCE's								

Intersection 2 (Pier B Street & Edison Street)

	Direction		Peak Hour Volume		LOS		V/C	
			AM	PM	AM	PM	AM	PM
Opening Year (2025) – No Build	Edison Ave.	NB - L	7	32	A	B	9.6	13.0
		NB - T	0	0				
		NB - R	17	5				
	N/A	SB – L	0	0				
		SB – T	0	0				
		SB - R	0	0				
	EB Pier B Street	EB – L	0	0				
		EB – T	167	335				
		EB – R	11	11				
	WB Pier B Street	WB – L	23	0				
		WB – T	404	481				
		WB – R	0	0				
Note: Volumes are in PCE's; Worst Approach Delay is reported (seconds per vehicle)								

Intersection 3 (Pier B Street & Anaheim Way)

	Direction		Peak Hour Volume		LOS		V/C	
			AM	PM	AM	PM	AM	PM
Opening Year (2025) – No Build	N/A	NB - L	0	0	B	B	10.5	10.4
		NB - T	0	0				
		NB - R	0	0				
	Anaheim Way	SB – L	161	117				
		SB – T	0	0				
		SB - R	47	17				
	Pier B Street	EB – L	56	54				
		EB – T	25	118				
		EB – R	0	0				
	Pier B Street	WB – L	0	0				
		WB – T	60	105				
		WB – R	355	371				
Note: Volumes are in PCE's; Average Delay is reported (seconds per vehicle)								

Horizon Year 2045 - No Build Alternative Intersection LOS

Intersection 1 (Pico Avenue-Pier B Street & 9th Street-I-710 Ramps)

	Direction		Peak Hour Volume		LOS		V/C	
			AM	PM	AM	PM	AM	PM
Horizon Year (2045) - No Build	NB I-710 Ramps	NB - L	25	66	F	E	1.100	0.938
		NB - T	15	13				
		NB - R	438	254				
	SB 9th Street	SB – L	508	236				
		SB – T	36	39				
		SB - R	19	26				
	EB Pier B Street	EB – L	17	86				
		EB – T	57	71				
		EB – R	35	122				
	WB Pico Avenue	WB – L	311	520				
		WB – T	85	79				
		WB – R	509	636				
Note: Volumes are in PCE's								

Intersection 2 (Pier B Street & Edison Street)

	Direction		Peak Hour Volume		LOS		Delay	
			AM	PM	AM	PM	AM	PM
Horizon Year (2045) - No Build	NB Edison St	NB - L	5	7	A	A	2.0	0.9
		NB - T	0	0				
		NB - R	19	30				
	N/A	SB – L	0	0				
		SB – T	0	0				
		SB - R	0	0				
	EB Pier B Street	EB – L	0	0				
		EB – T	47	207				
		EB – R	10	8				
	WB Pier B Street	WB – L	24	3				
		WB – T	84	148				
		WB – R	0	0				
Note: Volumes are in PCE's; Worst Approach Delay is reported (seconds per vehicle)								

Intersection 3 (Pier B Street & Anaheim Way)

	Direction		Peak Hour Volume		LOS		Delay	
			AM	PM	AM	PM	AM	PM
Horizon Year (2045) - No Build	N/A	NB - L	0	0	A	A	7.7	8.1
		NB - T	0	0				
		NB - R	0	0				
	SB Anaheim Way	SB – L	26	29				
		SB – T	0	0				
		SB - R	47	57				
	EB Pier B Street	EB – L	49	59				
		EB – T	33	107				
		EB – R	0	0				
	WB Pier B Street	WB – L	0	0				
		WB – T	58	94				
		WB – R	36	30				
Note: Volumes are in PCE's; Average Delay is reported (seconds per vehicle)								

Horizon Year 2045 – Build Alternative Intersection LOS

Intersection 1 (Pico Avenue-Pier B Street & 9th Street-I-710 Ramps)

	Direction		Peak Hour Volume		LOS		V/C	
			AM	PM	AM	PM	AM	PM
Horizon Year (2045) - Build	NB I-710 Ramps	NB - L	61	168	C	B	0.743	0.626
		NB - T	0	0				
		NB - R	594	237				
	SB 9th Street	SB – L	0	0				
		SB – T	0	0				
		SB - R	0	0				
	EB Pier B Street	EB – L	0	0				
		EB – T	235	191				
		EB – R	60	187				
	WB Pico Avenue	WB – L	380	580				
		WB – T	450	421				
		WB – R	0	0				
Note: Volumes are in PCE's								

Intersection 2 (Pier B Street & Edison Street)

	Direction		Peak Hour Volume		LOS		Delay	
			AM	PM	AM	PM	AM	PM
Horizon Year (2045) - Build	NB Edison St	NB - L	7	31	B	B	0.5	0.5
		NB - T	0	0				
		NB - R	17	6				
	N/A	SB – L	0	0				
		SB – T	0	0				
		SB - R	0	0				
	EB Pier B Street	EB – L	0	0				
		EB – T	264	351				
		EB – R	13	11				
	WB Pier B Street	WB – L	21	0				
		WB – T	472	558				
		WB – R	0	0				
Note: Volumes are in PCE's; Worst Approach Delay is reported (seconds per vehicle)								

Intersection 3 (Pier B Street & Anaheim Way)

	Direction		Peak Hour Volume		LOS		Delay	
			AM	PM	AM	PM	AM	PM
Horizon Year (2045) - Build	N/A	NB - L	0	0	B	B	13.1	11.7
		NB - T	0	0				
		NB - R	0	0				
	SB Anaheim Way	SB – L	248	154				
		SB – T	0	0				
		SB - R	45	47				
	EB Pier B Street	EB – L	51	78				
		EB – T	31	95				
		EB – R	0	0				
	WB Pier B Street	WB – L	0	0				
		WB – T	61	136				
		WB – R	423	416				
Note: Volumes are in PCE's; Average Delay is reported (seconds per vehicle)								

TRANSPORTATION CONFORMITY WORKING GROUP
of the
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

February 25, 2020
Minutes

THE FOLLOWING MINUTES ARE A SUMMARY OF THE MEETING OF THE TRANSPORTATION CONFORMITY WORKING GROUP. A DIGITAL RECORDING OF THE ACTUAL MEETING IS AVAILABLE FOR LISTENING IN SCAG'S OFFICE.

The Meeting of the Transportation Conformity Working Group was held at the SCAG office in Los Angeles.

In Attendance

Huddleston, Lori	Metro

SCAG

Calderon, Karen
Gutierrez, Pablo
Lo, Nancy
Luo, Rongsheng
McAlpine, Shannon

Via Teleconference

Bade, Rabindra	Caltrans, District 12
Brugger, Ron	LSA Associates
Cooper, Keith	ICF
Kalandiyur, Nesamani	ARB
Landrum, Beth	Caltrans, District 11
Lay, Keith	HDR Engineering
Lee, David	Caltrans, District 8
Lugaro, Julie	Caltrans, District 12
Masters, Martha	RCTC
Mejia, James	SBCTA
Miranda, Jude	Caltrans, District 12
O'Connor, Karina	EPA Region 9
Sanchez, Lucas	Caltrans Headquarters
Vaughn, Joseph	Federal Highway Administration
Whiteaker, Warren	OCTA
Yoon, Andrew	Caltrans, District 7

TRANSPORTATION CONFORMITY WORKING GROUP
of the
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

February 25, 2020
Minutes

1.0 CALL TO ORDER AND SELF-INTRODUCTION

Martha Masters, TCWG Chair, called the meeting to order at 10:05 am.

2.0 PUBLIC COMMENT PERIOD

None.

3.0 CONSENT CALENDAR

3.1. January 28, 2020 TCWG Meeting Minutes
The meeting minutes were deferred to next TCWG meeting.

4.0 INFORMATION ITEMS

4.1 Review of PM Hot Spot Interagency Review Forms

1) LA0G1562rev
It was determined that this project is not a POAQC.

2) LAF7204rev
It was determined that this project is not a POAQC (TCWG concurrence was received via email after meeting).

4.2 RTP Update

Nancy Lo, SCAG, reported the following:

- Draft Connect SoCal was released for a 60-day comment period that began November 14, 2019 and ended January 24, 2020. SCAG received over 1,800 public comments.
- SCAG staff planned to bring a summary of comments and a plan revision approach to SCAG Policy Committees in March 2020.
- SCAG staff also planned to bring Proposed Final Connect SoCal and PEIR to SCAG's Joint Policy Committee Meeting for recommendation to SCAG's Regional Council for adoption in April 2020.

Rongsheng Luo, SCAG, provided a status update on Transportation Conformity Analysis for Proposed Final Connect SoCal:

- Transportation Conformity Analysis Technical Report was released as part of Draft Connect SoCal for 60-day comment period that ended January 24, 2020.
- Thirty-three comments were received. Most comments were minor technical clarifications or corrections. Comment areas included air pollutants, health risks,

TCMs, FTIP, toll roads, highway networks, SIPs, conformity budgets, and emission mitigations. There were also general comments on transportation and emission models' conformity requirements.

- Two recommendations were also received: 1) SCAG highlight potential sanctions on transportation funding in Connect SoCal and provide an estimate of potential impacts; and 2) Challenge of attaining federal air quality standards be presented in Connect SoCal as a regional priority calling for regional solution.
- In response to recommendations, SCAG staff planned to add a new challenge titled "Meeting Federal Air Quality Standards" in "Present and Future Challenges" section in Chapter 2 of the Plan.
- SCAG staff was in process of preparing Transportation Conformity Analysis Technical Report for Proposed Final Connect SoCal including minor revisions and corrections to texts and tables, updated modeling results, and updated regional emission analysis tables.
- SCAG staff planned to include two sets of regional emissions results, with and without ARB's off-model adjustment factors to account for potential impacts of SAFE Vehicles Rule Part 1. The set deemed appropriate by EPA would supersede the other.
- FHWA/FTA approval of final conformity determination would be needed by June 1, 2020.

4.3 FTIP Update

Pablo Gutierrez, SCAG, reported the following:

- 2019 FTIP Amendment #19-17 would be released for 10-day public review in week of February 24, 2020.
- Project submittals for 2019 FTIP Administrative Modification #19-18 were due to SCAG mid to late March 2020.
- 2019 FTIP Consistency Amendment #19-12 was scheduled for concurrent adoption by Regional Council in April with Connect SoCal.
- In regards to 2021 FTIP, SCAG staff was analyzing changes to modeling projects and would move on to analysis of exempt projects.

4.4 EPA Update

Karina O'Connor, EPA Region 9, reported the following:

- Comment period for Coachella Valley 2008 8-hour Ozone Standard SIP ended on February 18, 2020. Public comments were being reviewed and the SIP was expected to be finalized in April or May 2020.
- Signed on February 4, 2020, final approval of Imperial County 2008 8-hour ozone standard SIP would be published in Federal Register (FR) on February 27, 2020.

- Signed on February 5, 2020, final approval of Ventura County 2008 8-hour ozone standard SIP would also be published in FR on February 27, 2020.
- No new updates on sanction clocks or SAFE Vehicles Rule.

In response to questions, Ms. O'Conner stated the following:

- Three additional SIPs from SCAG region, including 1) Imperial County PM_{10} SIP, 2) Imperial County 2012 Annual $PM_{2.5}$ standard SIP, and 3) South Coast 2012 annual $PM_{2.5}$ Moderate SIP, were under EPA review but these SIP were not expected to be approved before June 1, 2020.
- With regard to SAFE Vehicles Rule, there was upper-level discussion between EPA and FHWA; There were no technical issues holding up the process; EPA had not receive formal submittal of adjustment factors to account for SAFE Vehicles Rule Part 1 from ARB; EPA could not act on these adjustment factors until EPA receive them; Final SAFE Vehicles Rule Part 2 had been at Office of Management and Budget (OMB) for about a month and OMB review can typically take up to 90 days; timeline of SAFE Rule Part 2 release was not known; SAFE Rule Part 2 would likely not have a comment period since it is a final rule; and Part 2 rule was anticipated to become effective 60 days after publication, same as Part 1 rule.

4.5 <u>ARB Update</u>

Nesamani Kalandiyur, ARB, reported the following:

- ARB staff was planning to take statewide SIP Base Year 2017 Emissions Inventory to ARB Board Meeting in June.
- For "Severe" and "Extreme" ozone nonattainment areas, VMT offset analysis would be conducted and presented to ARB Board as well.
- ARB staff developed off-model adjustment factors to account for SAFE Rule Part 1 but was unclear on process for Part 2. Typically, adjustments were included as part of SIP but it was different for SAFE Rule.
- ARB staff was unsure when SAFE Rule Part 2 would be released. Once it was released, ARB staff would look into it and develop adjustment factors as necessary.

In response to a question, Mr. Kalandiyur clarified that VMT offset analysis is required only for "Severe" and "Extreme" ozone nonattainment areas; In SCAG region, South Coast Air Basin, Coachella Valley, and Western Mojave Desert Air Basin are such areas; and ARB would be working with local air districts to conduct VMT offset analysis.

In response to a question, Mr. Kalandiyur stated that if ARB's off-model adjustment factors were a technical submittal to EPA, ARB would be able to submit within a couple of weeks; and if it had to be more formal and taken to ARB Board, it could take longer.

In response to a question, Karina O'Connor, EPA Region 9, stated that if ARB's off-model adjustment factors were submitted to EPA as a technical submittal, EPA could respond in a month or less since EPA staff and ARB staff had already discussed how the adjustment factors were developed.

4.6 Air Districts Update

Rongsheng Luo, SCAG, on behalf of Lijin Sun, SCAQMD, reported the following:

- Coachella Valley had been reclassified as an "Extreme" nonattainment area under 1997 8-hour Ozone Standard and new SIP was due to EPA February 2021. SCAQMD staff would work on new SIP this year and planned to release a draft by end of 2020.
- SCAQMD staff was beginning work on 2022 AQMP to primarily address 2015 8-hour ozone standard.
- An AQMP Advisory Group Meeting was planned for April to provide updates on Reasonably Available Control Technology (RACT) analysis, baseline emissions inventory, and VMT growth reporting requirements.

5.0 INFORMATION SHARING

None.

6.0 ADJOURNMENT

The meeting was adjourned at 10:44 am. The next Transportation Conformity Working Group meeting will be held on Tuesday, March 24, 2020, at the SCAG main office in downtown Los Angeles.

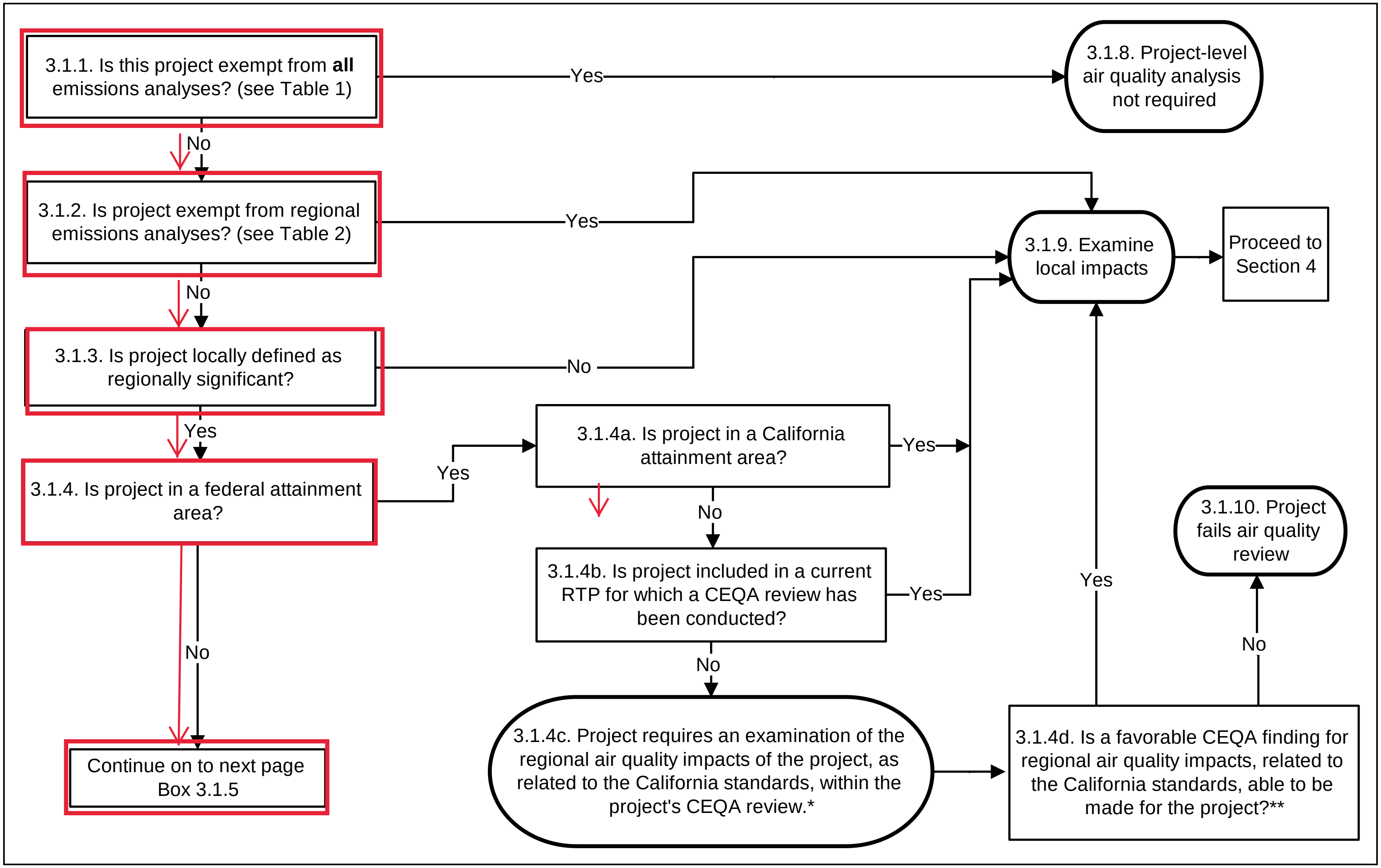

Figure 1. Requirements for New Projects

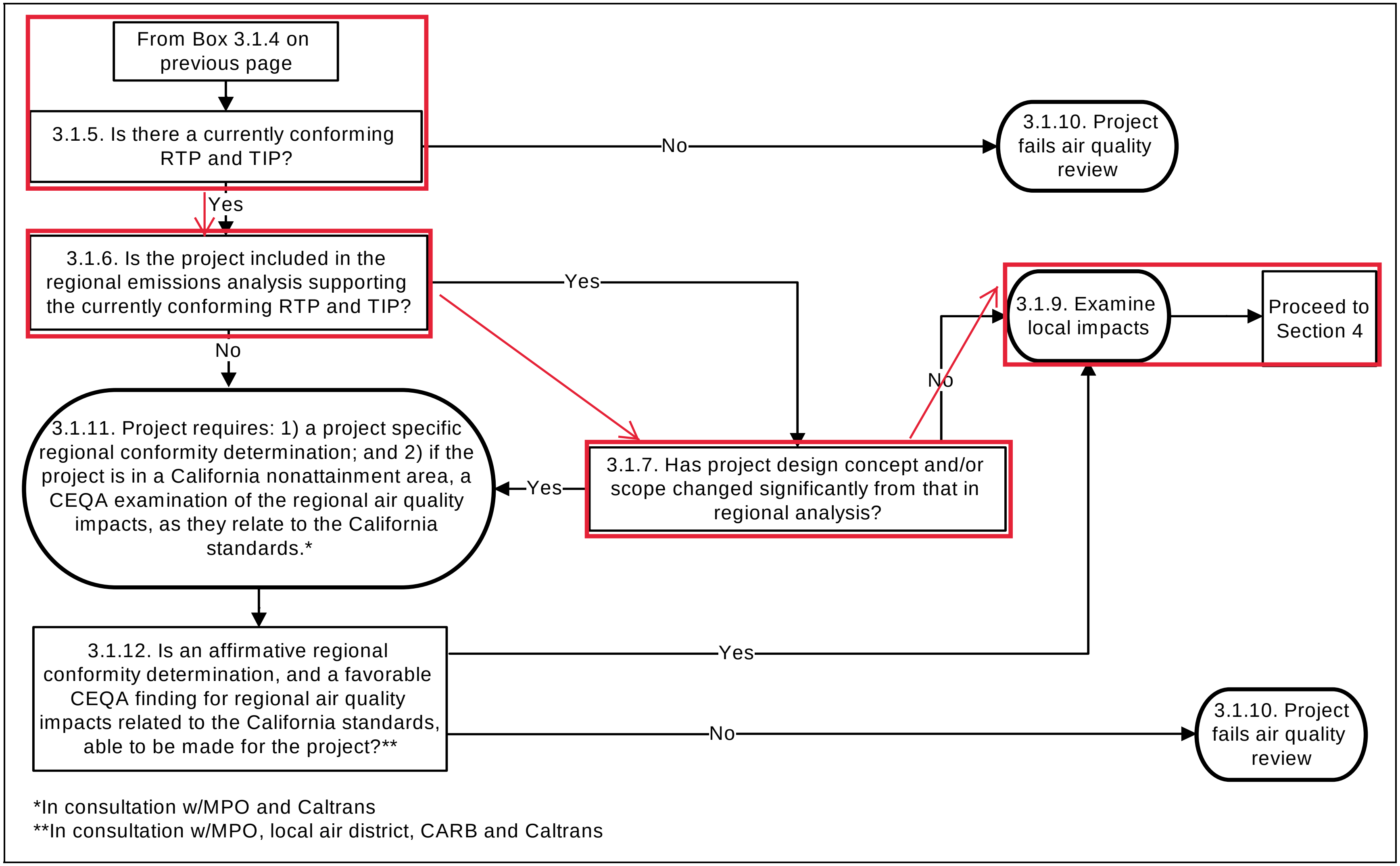

Figure 1 (cont.). Requirements for New Projects

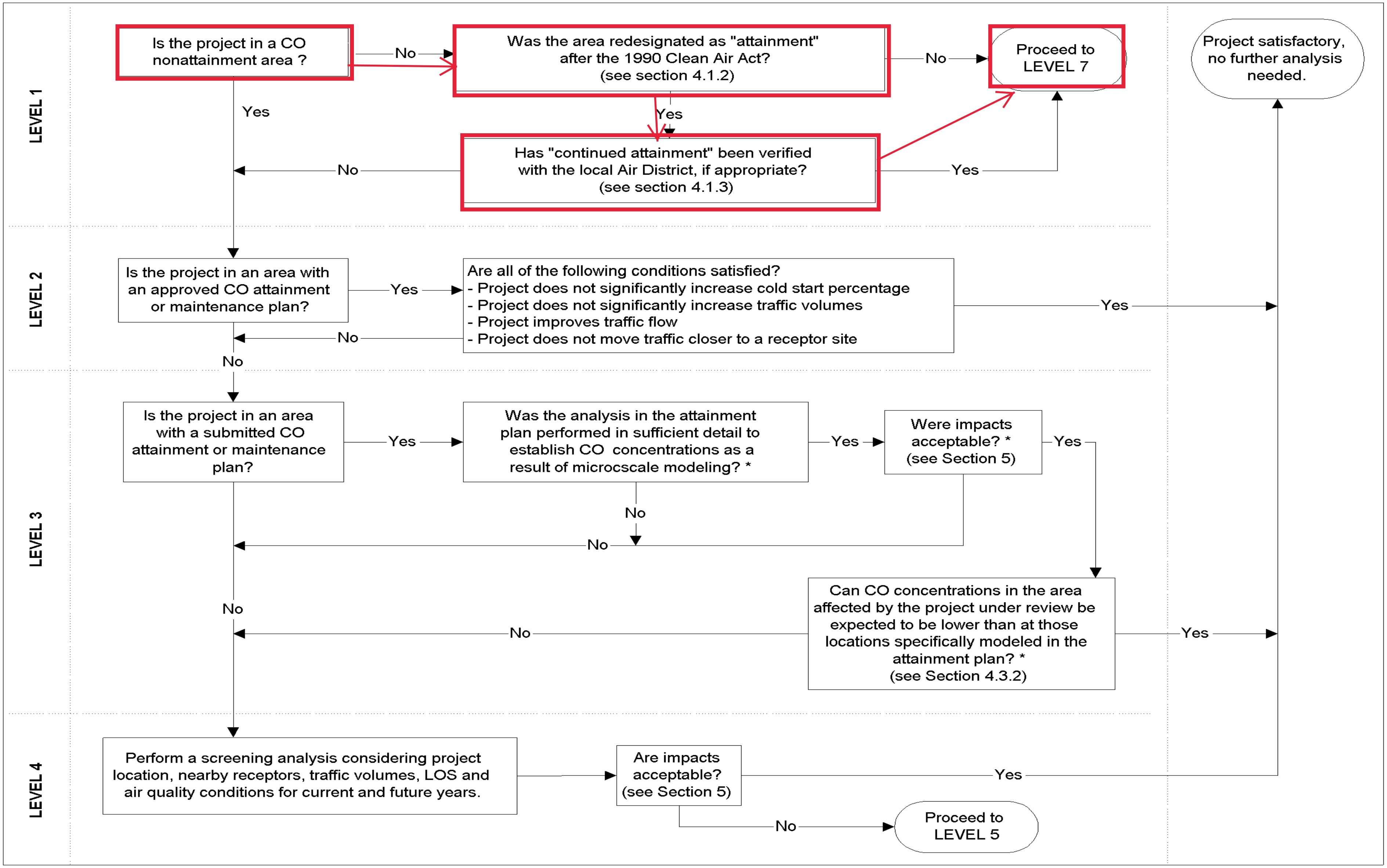

Figure 3. Local CO Analysis

MAR-400-220307-001

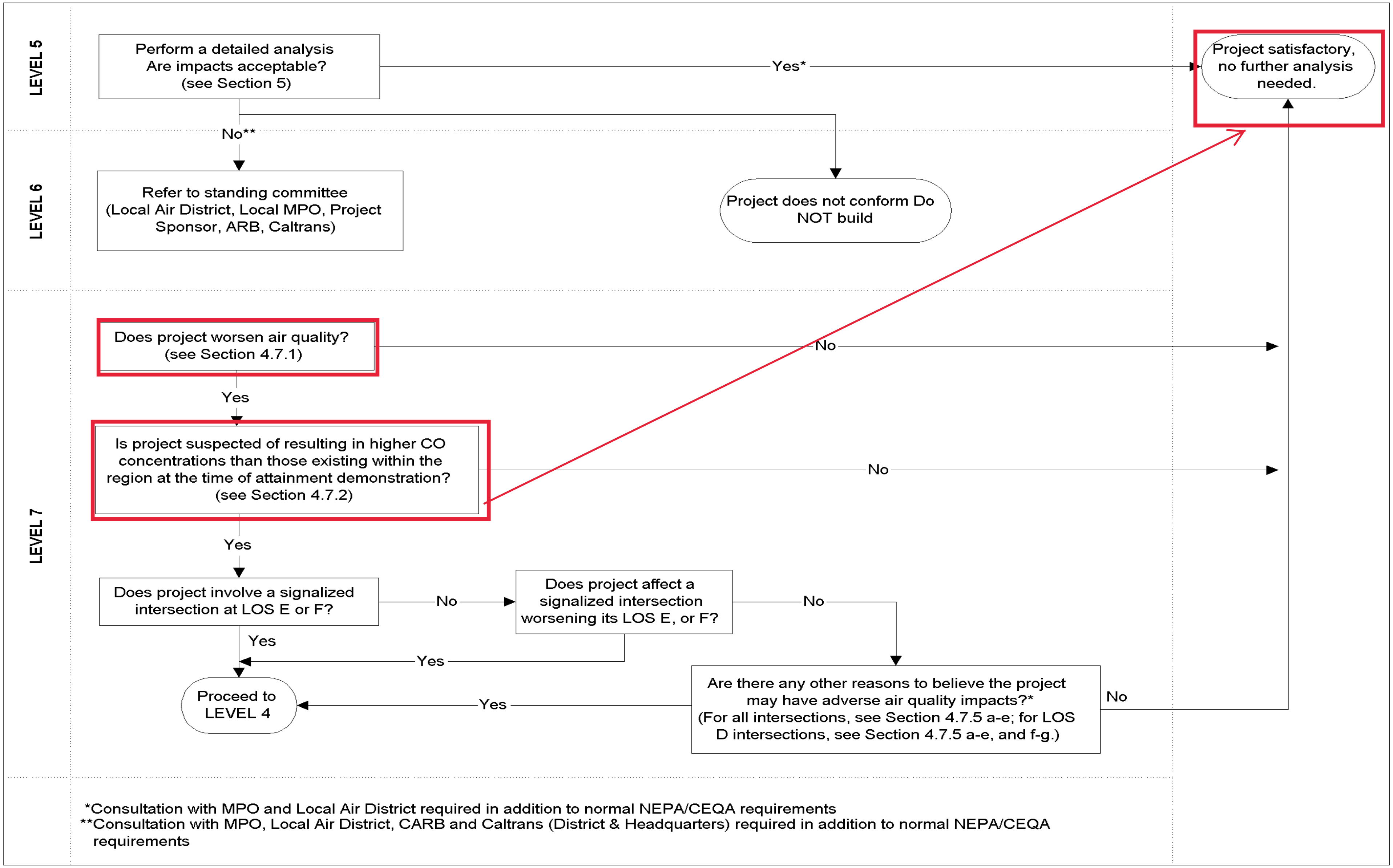

Figure 3 (cont.). Local CO Analysis

Road Construction Emissions Model, Version 9.0.0

Daily Emission Estimates for -> POLB Pier B Roadway Improvements

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	1.06	10.17	10.66	5.46	0.46	5.00	1.45	0.41	1.04	0.02	2,216.98	0.58	0.05	2,245.43
Grading/Excavation	4.96	44.98	52.01	7.21	2.21	5.00	3.02	1.98	1.04	0.10	9,915.47	2.87	0.16	10,033.98
Drainage/Utilities/Sub-Grade	2.78	28.72	26.81	6.16	1.16	5.00	2.09	1.05	1.04	0.06	5,894.28	1.18	0.11	5,957.37
Paving	1.29	18.02	15.52	0.73	0.73	0.00	0.58	0.58	0.00	0.05	4,855.13	0.75	0.37	4,983.98
Maximum (pounds/day)	4.96	44.98	52.01	7.21	2.21	5.00	3.02	1.98	1.04	0.10	9,915.47	2.87	0.37	10,033.98
Total (tons/construction project)	1.33	12.90	13.80	2.28	0.59	1.68	0.88	0.53	0.35	0.03	2,843.36	0.72	0.07	2,880.76

Notes:

Project Start Year ->	2022
Project Length (months) ->	36
Total Project Area (acres) ->	4
Maximum Area Disturbed/Day (acres) ->	1
Water Truck Used? ->	Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	280	40
Grading/Excavation	17	0	60	0	880	40
Drainage/Utilities/Sub-Grade	13	0	60	0	600	40
Paving	0	25	0	540	480	40

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

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Total Emission Estimates by Phase for -> POLB Pier B Roadway Improvements **Project Phases** **(Tons for all except CO2e. Metric tonnes for CO2e)**	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.04	0.40	0.42	0.22	0.02	0.20	0.06	0.02	0.04	0.00	87.79	0.02	0.00	80.67
Grading/Excavation	0.88	8.02	9.27	1.28	0.39	0.89	0.54	0.35	0.19	0.02	1,766.94	0.51	0.03	1,622.11
Drainage/Utilities/Sub-Grade	0.33	3.41	3.19	0.73	0.14	0.59	0.25	0.12	0.12	0.01	700.24	0.14	0.01	642.05
Paving	0.08	1.07	0.92	0.04	0.04	0.00	0.03	0.03	0.00	0.00	288.39	0.04	0.02	268.57
Maximum (tons/phase)	0.88	8.02	9.27	1.28	0.39	0.89	0.54	0.35	0.19	0.02	1766.94	0.51	0.03	1,622.11
Total (tons/construction project)	1.33	12.90	13.80	2.28	0.59	1.68	0.88	0.53	0.35	0.03	2843.36	0.72	0.07	2,613.41

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model **Version 9.0.0**

Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	POLB Pier B Roadway Improvements	
Construction Start Year	2022	Enter a Year between 2014 and 2040 (inclusive)
Project Type	2	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	36.00	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	1.00	mile
Total Project Area	3.60	acres
Maximum Area Disturbed/Day	0.50	acres
Water Trucks Used?	1	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E2 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing			
	Grading/Excavation	11.00		16.84
	Drainage/Utilities/Sub-Grade	11.00	12.63	
	Paving			
Asphalt	Grubbing/Land Clearing			
	Grading/Excavation			
	Drainage/Utilities/Sub-Grade			
	Paving	9.00	25.25	

Mitigation Options

On-road Fleet Emissions Mitigation		Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation		Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

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Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing		3.60		1/1/2022
Grading/Excavation		16.20		4/21/2022
Drainage/Utilities/Sub-Grade		10.80		8/27/2023
Paving		5.40		7/21/2024
Totals (Months)		36		

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values	Calculated
User Input	Miles/Round Trip	Miles/Round Trip	Round Trips/Day	Round Trips/Day	Daily VMT
Miles/round trip: Grubbing/Land Clearing		30.00		0	0.00
Miles/round trip: Grading/Excavation		30.00		2	60.00
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		2	60.00
Miles/round trip: Paving		30.00		0	0.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grading/Excavation (grams/mile)	0.03	0.41	3.03	0.11	0.05	0.02	1,732.30	0.00	0.27	1,813.48
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.01	0.11	0.05	0.02	1,701.78	0.00	0.27	1,781.52
Paving (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.40	0.00	0.27	1,772.75
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	4.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.05	0.42	0.01	0.01	0.00	229.14	0.00	0.04	239.88
Tons per const. Period - Grading/Excavation	0.00	0.01	0.07	0.00	0.00	0.00	40.83	0.00	0.01	42.75
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.05	0.42	0.01	0.01	0.00	225.11	0.00	0.04	235.66
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.01	0.05	0.00	0.00	0.00	26.74	0.00	0.00	28.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.02	0.12	0.00	0.00	0.00	67.58	0.00	0.01	70.74

Note: Asphalt Hauling emission default values can be overridden in cells D91 through D94, and F91 through F94.

Asphalt Hauling Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values	Calculated
User Input	Miles/Round Trip	Miles/Round Trip	Round Trips/Day	Round Trips/Day	Daily VMT
Miles/round trip: Grubbing/Land Clearing		30.00		0	0.00
Miles/round trip: Grading/Excavation		30.00		0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		0	0.00
Miles/round trip: Paving		30.00	18	3	540.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grading/Excavation (grams/mile)	0.03	0.41	3.03	0.11	0.05	0.02	1,732.30	0.00	0.27	1,813.48
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.01	0.11	0.05	0.02	1,701.78	0.00	0.27	1,781.52
Paving (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.40	0.00	0.27	1,772.75
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	4.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.03	0.49	3.78	0.13	0.06	0.02	2,015.98	0.00	0.32	2,110.46
Tons per const. Period - Paving	0.00	0.03	0.22	0.01	0.00	0.00	119.75	0.00	0.02	125.36
Total tons per construction project	0.00	0.03	0.22	0.01	0.00	0.00	119.75	0.00	0.02	125.36

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Note: Worker commute default values can be overridden in cells D121 through D126.

Worker Commute Emissions	User Override of Worker Commute Default Values	Default Values	Calculated Daily Trips	Calculated Daily VMT
User Input				
Miles/ one-way trip		20		
One-way trips/day		2		
No. of employees: Grubbing/Land Clearing		7	14	280.00
No. of employees: Grading/Excavation		22	44	880.00
No. of employees: Drainage/Utilities/Sub-Grade		15	30	600.00
No. of employees: Paving		12	24	480.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.02	1.00	0.08	0.05	0.02	0.00	328.72	0.00	0.01	330.96
Grading/Excavation (grams/mile)	0.02	0.96	0.08	0.05	0.02	0.00	323.36	0.00	0.01	325.49
Draining/Utilities/Sub-Grade (grams/mile)	0.01	0.87	0.07	0.05	0.02	0.00	310.90	0.00	0.01	312.81
Paving (grams/mile)	0.01	0.84	0.06	0.05	0.02	0.00	306.62	0.00	0.01	308.46
Grubbing/Land Clearing (grams/trip)	1.11	2.85	0.32	0.00	0.00	0.00	70.54	0.08	0.03	82.43
Grading/Excavation (grams/trip)	1.07	2.80	0.30	0.00	0.00	0.00	69.43	0.07	0.03	81.01
Draining/Utilities/Sub-Grade (grams/trip)	1.00	2.69	0.28	0.00	0.00	0.00	66.86	0.07	0.03	77.72
Paving (grams/trip)	0.98	2.66	0.27	0.00	0.00	0.00	65.97	0.07	0.03	76.59
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.05	0.71	0.06	0.03	0.01	0.00	205.09	0.00	0.01	206.84
Tons per const. Period - Grubbing/Land Clearing	0.00	0.03	0.00	0.00	0.00	0.00	8.12	0.00	0.00	8.19
Pounds per day - Grading/Excavation	0.14	2.13	0.18	0.09	0.04	0.01	634.08	0.01	0.02	639.34
Tons per const. Period - Grading/Excavation	0.02	0.38	0.03	0.02	0.01	0.00	112.99	0.00	0.00	113.93
Pounds per day - Drainage/Utilities/Sub-Grade	0.09	1.33	0.11	0.06	0.03	0.00	415.68	0.01	0.01	418.92
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.01	0.16	0.01	0.01	0.00	0.00	49.38	0.00	0.00	49.77
Pounds per day - Paving	0.07	1.03	0.08	0.05	0.02	0.00	327.96	0.01	0.01	330.47
Tons per const. Period - Paving	0.00	0.06	0.00	0.00	0.00	0.00	19.48	0.00	0.00	19.63
Total tons per construction project	0.04	0.63	0.05	0.03	0.01	0.00	189.98	0.00	0.00	191.52

Note: Water Truck default values can be overridden in cells D153 through D156, I153 through I156, and F153 through F156.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Round Trips/Vehicle/Day	Default Values Round Trips/Vehicle/Day	Calculated Trips/day	User Override of Miles/Round Trip	Default Values Miles/Round Trip	Calculated Daily VMT
User Input								
Grubbing/Land Clearing - Exhaust		1		5	5		8.00	40.00
Grading/Excavation - Exhaust		1		5	5		8.00	40.00
Drainage/Utilities/Subgrade		1		5	5		8.00	40.00
Paving		1		5	5		8.00	40.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grading/Excavation (grams/mile)	0.03	0.41	3.03	0.11	0.05	0.02	1,732.30	0.00	0.27	1,813.48
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.01	0.11	0.05	0.02	1,701.78	0.00	0.27	1,781.52
Paving (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.40	0.00	0.27	1,772.75
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	4.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.04	0.32	0.01	0.00	0.00	154.20	0.00	0.02	161.42
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.01	0.00	0.00	0.00	6.11	0.00	0.00	6.39
Pounds per day - Grading/Excavation	0.00	0.04	0.31	0.01	0.00	0.00	152.76	0.00	0.02	159.92
Tons per const. Period - Grading/Excavation	0.00	0.01	0.06	0.00	0.00	0.00	27.22	0.00	0.00	28.50
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.04	0.31	0.01	0.00	0.00	150.07	0.00	0.02	157.10
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.04	0.00	0.00	0.00	17.83	0.00	0.00	18.66
Pounds per day - Paving	0.00	0.04	0.32	0.01	0.00	0.00	149.33	0.00	0.02	156.33
Tons per const. Period - Paving	0.00	0.00	0.02	0.00	0.00	0.00	8.87	0.00	0.00	9.29
Total tons per construction project	0.00	0.01	0.12	0.00	0.00	0.00	60.03	0.00	0.01	62.84

Note: Fugitive dust default values can be overridden in cells D183 through D185.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		0.50	5.00	0.20	1.04	0.04
Fugitive Dust - Grading/Excavation		0.50	5.00	0.89	1.04	0.19
Fugitive Dust - Drainage/Utilities/Subgrade		0.50	5.00	0.59	1.04	0.12

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Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Crawler Tractors	0.49	2.31	6.01	0.23	0.21	0.01	759.03	0.25
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Excavators	0.40	6.51	3.55	0.17	0.16	0.01	1,000.03	0.32
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Signal Boards	0.11	0.60	0.72	0.03	0.03	0.00	98.63	0.01
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment

If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

			ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4
Grubbing/Land Clearing		pounds per day	1.01	9.43	10.28	0.43	0.39	0.02	1,857.69	0.58
Grubbing/Land Clearing		tons per phase	0.04	0.37	0.41	0.02	0.02	0.00	73.56	0.02

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N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.01	767.22
0.00	0.00
0.01	1,010.81
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	99.13
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

0.02	1,877.16
0.00	74.34

Grading/Excavation Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0		Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Crawler Tractors	0.47	2.28	5.58	0.21	0.20	0.01	758.66	0.25
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3		Model Default Tier	Excavators	0.59	9.77	5.00	0.24	0.22	0.02	1,500.18	0.49
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Graders	0.80	3.42	9.93	0.32	0.29	0.01	1,282.15	0.41
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Rollers	0.32	3.71	3.34	0.19	0.17	0.01	508.21	0.16
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Rubber Tired Loaders	0.28	1.52	2.85	0.10	0.09	0.01	605.61	0.20
	2		Model Default Tier	Scrapers	1.61	12.52	17.25	0.67	0.62	0.03	2,940.43	0.95
	2		Model Default Tier	Signal Boards	0.11	0.60	0.72	0.03	0.03	0.00	98.63	0.01
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		Model Default Tier	Tractors/Loaders/Backhoes	0.63	8.94	6.43	0.33	0.31	0.01	1,205.61	0.39
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment

If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4
Grading/Excavation	pounds per day	4.81	42.76	51.09	2.09	1.93	0.09	8,899.49	2.86
Grading/Excavation	tons per phase	0.86	7.62	9.10	0.37	0.34	0.02	1,585.89	0.51

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N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.01	766.85
0.00	0.00
0.01	1,516.35
0.00	0.00
0.00	0.00
0.01	1,295.96
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	513.69
0.00	0.00
0.00	0.00
0.01	612.15
0.03	2,972.12
0.00	99.13
0.00	0.00
0.00	0.00
0.00	0.00
0.01	1,218.58
0.00	0.00
0.00	0.00

N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

0.08	8,994.83
0.01	1,602.88

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Air Compressors	0.25	2.41	1.67	0.09	0.09	0.00	375.26	0.02
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Generator Sets	0.29	3.67	2.61	0.12	0.12	0.01	623.04	0.03
	1		Model Default Tier	Graders	0.37	1.67	4.35	0.14	0.13	0.01	640.64	0.21
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Plate Compactors	0.04	0.21	0.25	0.01	0.01	0.00	34.48	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Pumps	0.31	3.72	2.65	0.12	0.12	0.01	623.04	0.03
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Rough Terrain Forklifts	0.10	2.29	1.37	0.04	0.04	0.00	333.76	0.11
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Scrapers	0.77	6.03	7.92	0.31	0.29	0.02	1,469.49	0.48
	2		Model Default Tier	Signal Boards	0.11	0.60	0.72	0.03	0.03	0.00	98.63	0.01
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3		Model Default Tier	Tractors/Loaders/Backhoes	0.44	6.70	4.45	0.21	0.19	0.01	905.08	0.29
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment

If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4
Drainage/Utilities/Sub-Grade	pounds per day	2.69	27.31	25.98	1.07	1.01	0.05	5,103.42	1.17
Drainage/Utilities/Sub-Grade	tons per phase	0.32	3.24	3.09	0.13	0.12	0.01	606.29	0.14

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N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	376.65
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	625.08
0.01	647.54
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	34.65
0.00	0.00
0.00	625.13
0.00	0.00
0.00	337.36
0.00	0.00
0.00	0.00
0.01	1,485.33
0.00	99.13
0.00	0.00
0.00	0.00
0.00	0.00
0.01	914.82
0.00	0.00
0.00	0.00

N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

0.04	5,145.69
0.01	611.31

Paving Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Pavers	0.18	2.89	1.74	0.08	0.07	0.00	455.16	0.15
	1		Model Default Tier	Paving Equipment	0.16	2.57	1.49	0.07	0.07	0.00	394.46	0.13
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Rollers	0.29	3.70	3.05	0.16	0.15	0.01	508.29	0.16
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Signal Boards	0.11	0.60	0.72	0.03	0.03	0.00	98.63	0.01
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3		Model Default Tier	Tractors/Loaders/Backhoes	0.43	6.71	4.34	0.20	0.18	0.01	905.31	0.29
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

			ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4
	Paving	pounds per day	1.19	16.47	11.34	0.54	0.50	0.02	2,361.85	0.74
	Paving	tons per phase	0.07	0.98	0.67	0.03	0.03	0.00	140.29	0.04
Total Emissions all Phases (tons per construction period) =>			1.29	12.22	13.27	0.55	0.51	0.03	2,406.03	0.72

N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	460.07
0.00	398.72
0.00	0.00
0.00	0.00
0.00	0.00
0.00	513.77
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	99.13
0.00	0.00
0.00	0.00
0.00	0.00
0.01	915.05
0.00	0.00
0.00	0.00

N2O	CO2e
pounds/day	pounds/day
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.02	2,386.73
0.00	141.77
0.02	2,430.30

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Equipment default values for horsepower and hours/day can be overridden in cells D403 through D436 and F403 through F436.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		221		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		231		8
Crawler Tractors		212		8
Crushing/Proc. Equipment		85		8
Excavators		158		8
Forklifts		89		8
Generator Sets		84		8
Graders		187		8
Off-Highway Tractors		124		8
Off-Highway Trucks		402		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		168		8
Pavers		130		8
Paving Equipment		132		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		80		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		247		8
Rubber Tired Loaders		203		8
Scrapers		367		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		263		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		97		8
Trenchers		78		8
Welders		46		8

END OF DATA ENTRY SHEET