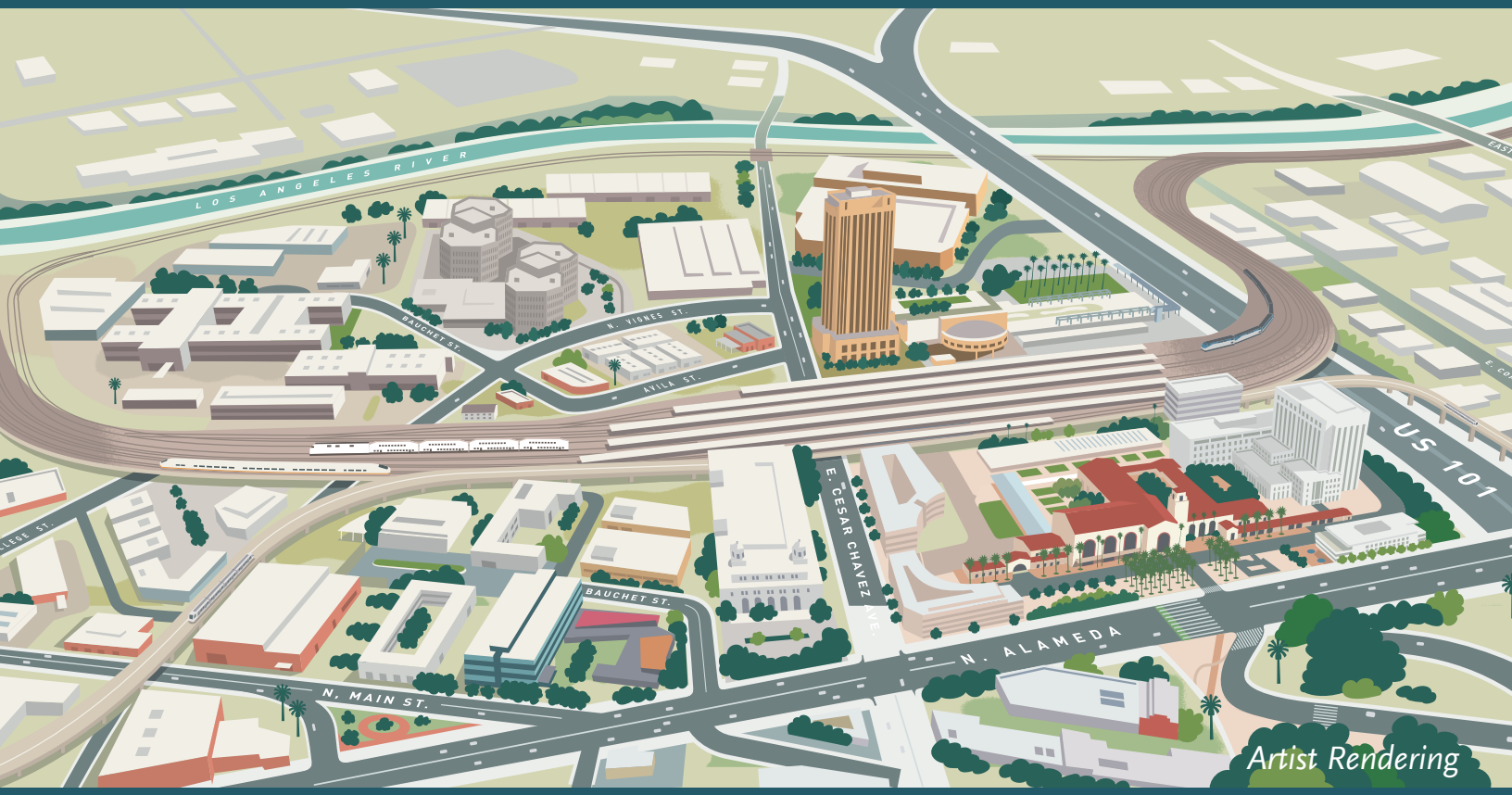
Link Union Station

Draft Air Quality/Climate Change Assessment and Health Risk Assessment

June 2024



The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

Metro

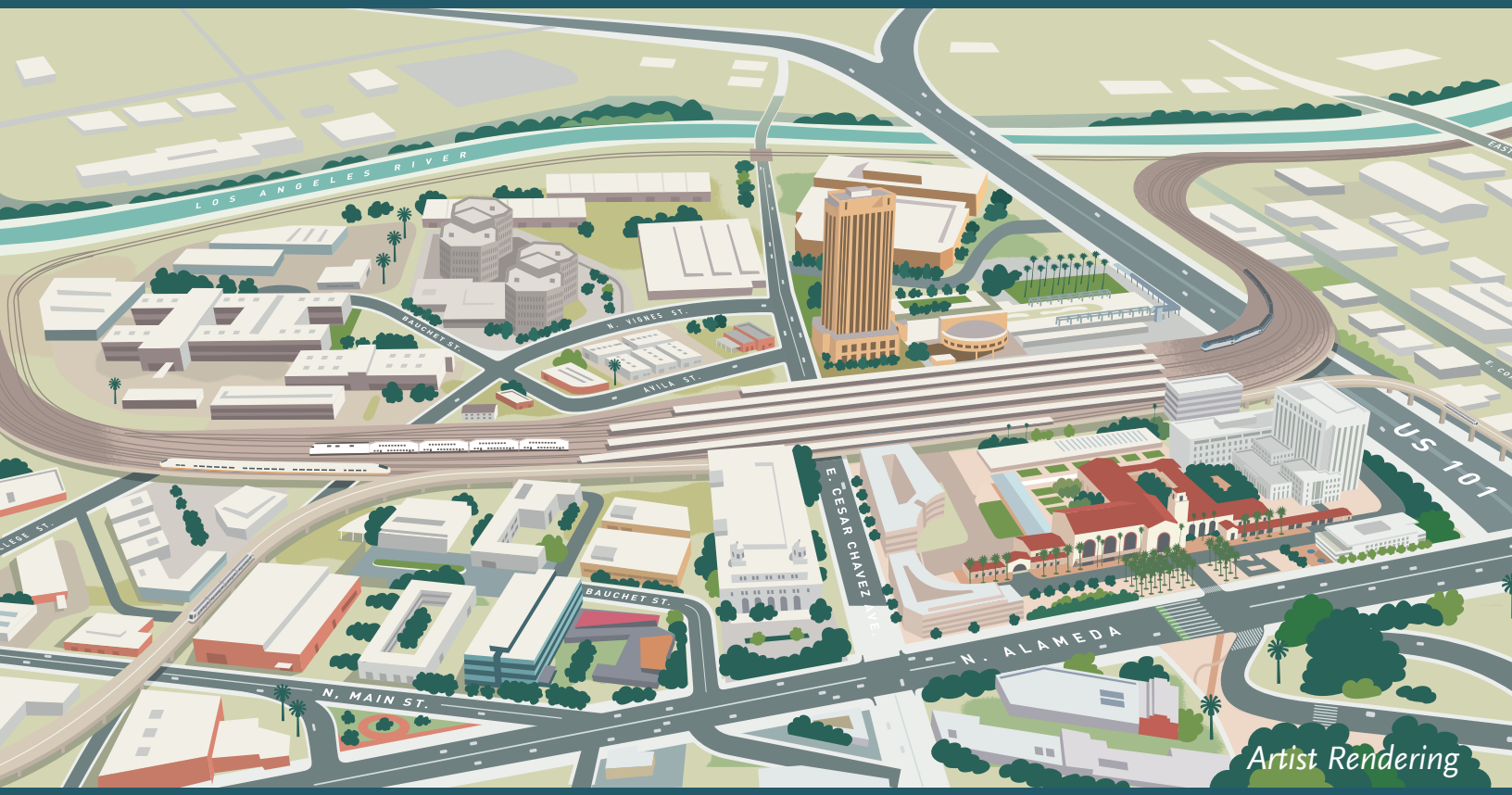
CALIFORNIA High-Speed Rail Authority

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Link Union Station

Draft Air Quality and Global Climate Change Assessment

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Metro

CALIFORNIA High-Speed Rail Authority

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Appendix B: Construction Emission Calculations
Appendix C: Operational Emission Calculations

ACRONYMS

$\mu g/m^3$	micrograms per cubic meter
Bio-CO_2	biogenic carbon dioxide
CAFE	Corporate Average Fuel Standards
CARB	California Air Resources Board
CFR	Code of Federal Regulations
CH_4	methane
CHSRA	California High-Speed Rail Authority
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
EIS	environmental impact statement
EO	Executive Summary
EPA	Environmental Protection Agency
FCAA	Federal Clean Air Act
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
GHG	greenhouse gas
GWP	global warming potential
HSR	high-speed rail
LAUS	Los Angeles Union Station
Metro	Los Angeles County Metropolitan Transportation Authority
MSAT	mobile source air toxic
MT	metric tons
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NBio-CO_2	nonbiogenic carbon dioxide
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NOx	nitrogen oxides
O_3	ozone
Pb	lead
PM_{10}	particles of 10 micrometers and smaller
$PM_{2.5}$	particles of 2.5 micrometers and smaller
ppb	parts per billion
ppm	parts per million
Project	Link Union Station Project
ROG	reactive organic gas
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SCORE	Southern California Optimized Rail Expansion
SCRRA	Southern California Regional Rail Authority
SIP	state implementation plan

SO_2	sulfur dioxide
SO_X	sulfur oxide
U.S.	United States
US-101	United States Highway 101
VMT	vehicle miles traveled
VOC	volatile organic compound

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ES.0 Executive Summary

This report identifies the physical setting of the Los Angeles Union Station (LAUS) Link Union Station Project (Project or proposed action) study area and regulatory framework relative to air quality and greenhouse gas (GHG) emissions, provides data on existing air quality, and includes an analysis of potential air quality effects associated with construction and operation of the Build Alternative.

ES.1 Construction

Construction of the Build Alternative and Malabar Yard railroad improvements would result in emissions of criteria air pollutants (pollutant concentrations) that exceed the federal General Conformity *de minimis* level for nitrogen oxides (NOx).

Mitigation Measure AQ-2 and Malabar Yard Mitigation Measure AQ-2 would require all off-road equipment greater than 50 horsepower to meet or exceed United States (U.S.) Environmental Protection Agency's (EPA) Tier 4 Final emission standards and to be fueled using 100 percent renewable diesel. Mitigation Measure AQ-1 is a requirement of the Link US Final EIR and Malabar Yard Mitigation Measure AQ-1 is a requirement of SCAQMD to reduce daily fugitive dust emissions and associated air quality impacts. Although not required as mitigation to reduce adverse effects under NEPA, Mitigation Measure AQ-1 and Malabar Yard Mitigation Measure AQ-1 are presented in this report to provide a transparent and comprehensive disclosure of the measures that would be implemented during construction.

For further description of the localized analysis, refer to the quantitative health risk assessment in Appendix H, *Air Quality/Climate Change and Health Risk Assessment*, of the Link Union Station Project Final EIR (Metro 2019) and Appendix Q of the EIS/SEIR.

ES.2 Operations

For operations, the proposed capacity enhancements associated with the Build Alternative would facilitate a future increase in train movements through LAUS within the Project study area. Although significant investments in non-Project-related infrastructure outside of the Project study area are required to realize substantial increases in service and associated train movements through LAUS, this report includes a conservative evaluation of localized air quality effects and GHG emissions associated with stationary sources and mobile sources that may occur as a result of proposed capacity enhancements.

The long-term on-road, stationary source, and rail emissions criteria air pollutants associated with the Build Alternative and Malabar Yard railroad improvements, combined, would exceed the federal General Conformity *de minimis* level for NOx in the unmitigated scenario in years 2026 and 2031. The net increase in annual emissions associated with operation of the Build Alternative in 2040 would be offset by the reduction in emissions from the Malabar Yard railroad improvements and would not exceed the *de minimis* level for any criteria pollutant.

Mitigation Measure AQ-3 would require implementation of emerging technologies to reduce the carbon monoxide (CO), NOx, reactive organic gases (ROG), particles of 10 micrometers and smaller (PM_{10}), and particles of 2.5 micrometers and smaller ($PM_{2.5}$) exhaust emissions. Mitigation Measure AQ-3 also requires an adaptive air quality mitigation plan to be implemented, in conjunction with replacement of the rail fleet with zero- or low-emission locomotives consistent with the *2018 California State Rail Plan,* to achieve a reduction of pollutant concentrations below *de minimis* levels and to a level that would not exceed SCAQMD's 10 in 1 million cancer risk threshold at any of the residential uses in the Project study area. For further description of the localized analysis, refer to the quantitative health risk assessment in Appendix H, *Air Quality/Climate Change and Health Risk Assessment*, of the Link Union Station Project Final EIR (Metro 2019) and Appendix Q of the EIS/SEIR.

ES.3 Greenhouse Gas Emissions

The GHG emissions from the Build Alternative would not exceed the U.S. EPA-required mandatory reporting threshold of 25,000 metric tons (MT) of carbon dioxide equivalents (CO_2e) emissions per year. Although interim guidance was issued by CEQ in 2023, this environmental document was initiated prior to the effective date and is not subject to the new regulations; therefore, the analysis relies on the Mandatory Reporting of GHGs Rule (40 CFR Part 98).

1.0 Introduction

The Los Angeles County Metropolitan Transportation Authority (Metro), as the owner of Los Angeles Union Station (LAUS), is proposing the infrastructure improvements associated with the Link Union Station (Link US) Project (Project or proposed action) to address existing capacity constraints at LAUS. For the purposes of the National Environmental Policy Act (NEPA), Metro is serving as the local Project sponsor and joint lead agency.

Pursuant to 23 United States Code (USC) Section 327 and a memorandum of understanding (MOU) between the Federal Railroad Administration (FRA) and the State of California, effective July 23, 2019, under a program known as NEPA Assignment, the California High-Speed Rail Authority (CHSRA) is responsible for the federal review and approval of environmental documents for projects on the high-speed rail (HSR) system and other passenger rail projects that directly connect to the HSR system, including the Link US Project. For the purposes of the environmental impact statement (EIS) being prepared, CHSRA is serving as the federal lead agency with NEPA responsibilities pursuant to the requirements of the NEPA Assignment MOU. CHSRA and Metro are preparing the EIS in compliance with NEPA (42 USC Section 4321 et seq.), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508), FRA's Procedures for Considering Environmental Impacts (FRA's Environmental Procedures) (*Federal Register* [FR] 64(101), 28545-28556, May 26, 1999), 23 USC Section 139, and the NEPA Assignment MOU.[1, 2]

Pursuant to the MOU requirements between FRA and the State of California, FRA's Environmental Procedures are being used to determine environmental effects of the No Action Alternative and the Build Alternative.

Below is an overview of the purpose and need, the Project study area, the No Action Alternative, and the major components associated with the on-site infrastructure improvements proposed at and within the vicinity of LAUS that are associated with the Build Alternative considered in the EIS.

[1] While this environmental document was being prepared, FRA adopted new NEPA compliance regulations (23 CFR 771). Those regulations only apply to actions initiated after November 28, 2018. See 23 CFR 771.109(a)(4). Because this environmental document was initiated prior to that date, it remains subject to FRA's Environmental Procedures rather than the Part 771 regulations.

[2] The CEQ issued new regulations, effective April 20, 2022, updating the NEPA implementing procedures at 40 CFR Parts 1500–1508. However, because this environmental document was initiated prior to the effective date, it is not subject to the new regulations and CHSRA is relying on the regulations as they existed on the date of the initial Notice of Intent, May 31, 2016. Therefore, all citations to CEQ regulations in this environmental document refer to the 1978 regulations and the 1986 amendment, 51 *Federal Register* 15618 (April 25, 1986).

1.1 Purpose

The purpose of the proposed action is to increase the regional and intercity rail service capacity of LAUS and to improve schedule reliability at LAUS through the implementation of a run-through tracks configuration and elimination of the current stub end tracks configuration while preserving current levels of freight rail operations, accommodating the planned HSR system in Southern California, increasing the passenger/pedestrian capacity and enhancing the safety of LAUS through the implementation of a new passenger concourse, meeting the multi-modal transportation demands at LAUS.

1.2 Need

The need for the proposed action is generated by the forecasted increase in regional population and employment; implementation of federal, state, and regional transportation plans (RTP) that provide for increased operational frequency for regional and intercity trains; and introduction of the planned HSR system in Southern California. Localized operational, safety, and accessibility upgrades in and around LAUS will be required to meet existing demand and future growth.

1.3 Project Location and Study Area

The Build Alternative consists of infrastructure improvements in Downtown Los Angeles in the vicinity of LAUS (Figure 1-1). LAUS is located at 800 Alameda Street in the City of Los Angeles, California. LAUS is bounded by United States Highway 101 (US-101) to the south, Alameda Street to the west, Cesar Chavez Avenue to the north, and Vignes Street to the east. The northern Project limit is at North Main Street (Mile Post 1.18) and the southern Project limit is in the vicinity of Control Point (CP) Olympic, south of Interstate 10 and Olympic Boulevard (Mile Post 142.70).

Figure 1-2 depicts the Project study area, which is generally used to characterize the affected environment, unless otherwise specified, and provide a geographic context for the existing and proposed infrastructure at and within the vicinity of LAUS. The Project study area includes three main segments (Segment 1: Throat Segment, Segment 2: Concourse Segment, and Segment 3: Run-Through Segment). The existing conditions within each segment are summarized north to south below:

- **Segment 1: Throat Segment** – This segment, known as the LAUS throat, includes the area north of the platforms at the LAUS rail yard, from Main Street at the north to Cesar Chavez Avenue at the south. In the throat segment, all arriving and departing trains are required to traverse through the LAUS throat, which includes a complex network of lead tracks, switches, and crossovers. Five lead tracks provide access into and out of the rail yard, except for one location near the Vignes Street Bridge, where it reduces to four lead tracks. Currently, special track work consisting of multiple turnouts and double-slip switches are used in the throat to direct trains into and out of the appropriate assigned terminal platform tracks. The Garden Tracks (stub-end tracks where private train cars are currently stored)

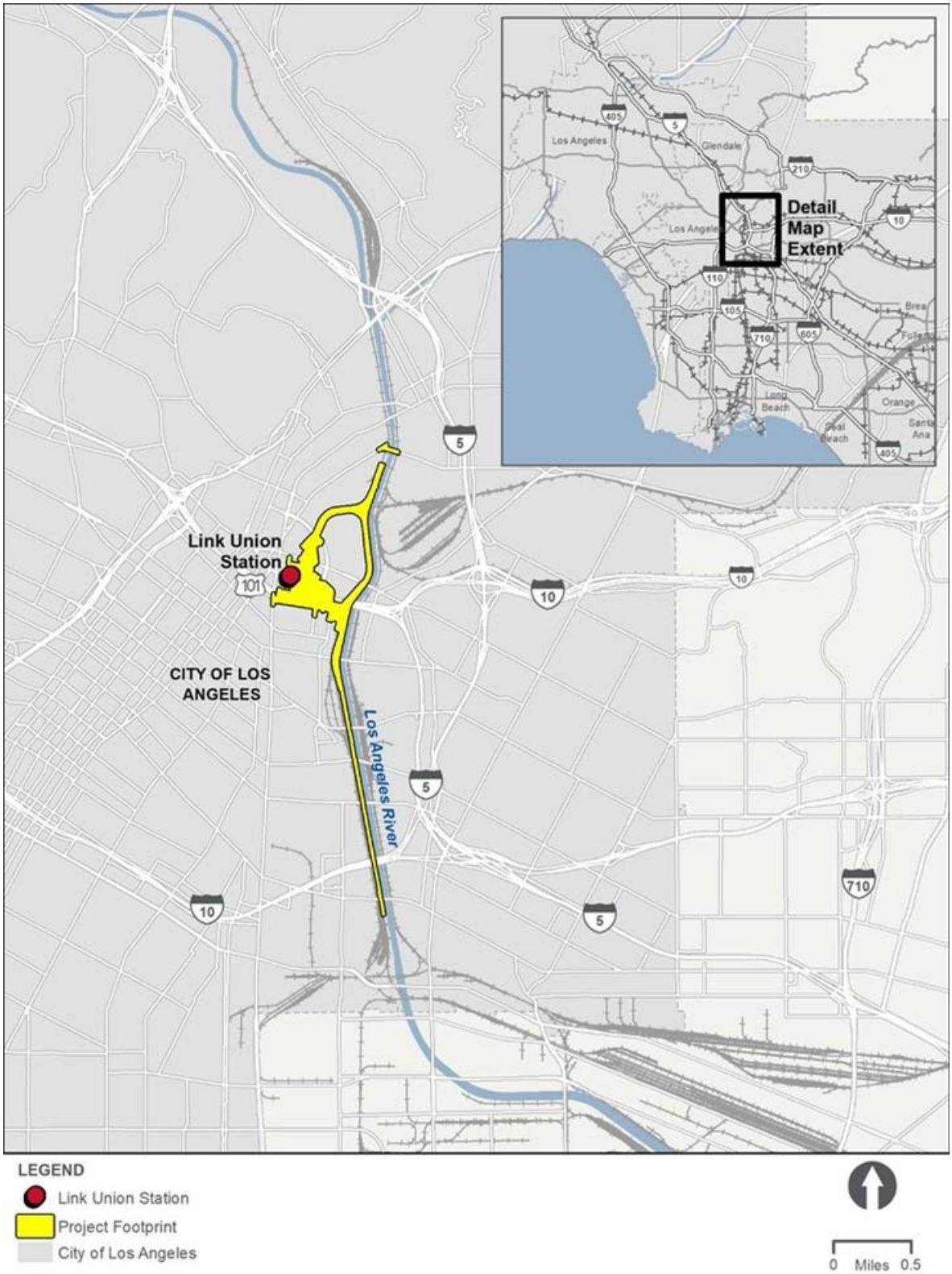
are also located just north of the platforms. Land uses in the vicinity of the throat segment are residential, industrial, and institutional.

- **Segment 2: Concourse Segment** – This segment is between Cesar Chavez Avenue and US-101 and includes LAUS, the rail yard, the East Portal Building, the baggage handling building with associated parking areas and access roads, the ticketing/waiting halls, and the 28-foot-wide pedestrian passageway with connecting ramps and stairways below the rail yard. Land uses in the vicinity of the concourse segment are residential, commercial, and public.
- **Segment 3: Run-Through Segment** – This segment is south of LAUS and extends east to west from Alameda Street to the west bank of the Los Angeles River and north to south from Keller Yard to CP Olympic. This segment includes US-101, the Commercial Street/Ducommun Street corridor, Metro Red and Purple Lines Maintenance Yard (Division 20 Rail Yard), BNSF Railway (BNSF) West Bank Yard, Keller Yard, the main line tracks on the west bank of the Los Angeles River from Keller Yard to CP Olympic, and the Amtrak lead track connecting the main line tracks with Amtrak's Los Angeles Maintenance Facility in the vicinity of 8th Street. Land uses in the vicinity of the run-through segment are primarily industrial and manufacturing.

The Project study area has a dense street network ranging from major highways to local city streets. The roadways within the Project study area include the El Monte Busway, US-101, Bolero Lane, Leroy Street, Bloom Street, Cesar Chavez Avenue, Commercial Street, Ducommun Street, Jackson Street, East Temple Street, Banning Street, First Street, Alameda Street, Garey Street, Vignes Street, Main Street, Aliso Street, Avila Street, Bauchet Street, and Center Street.

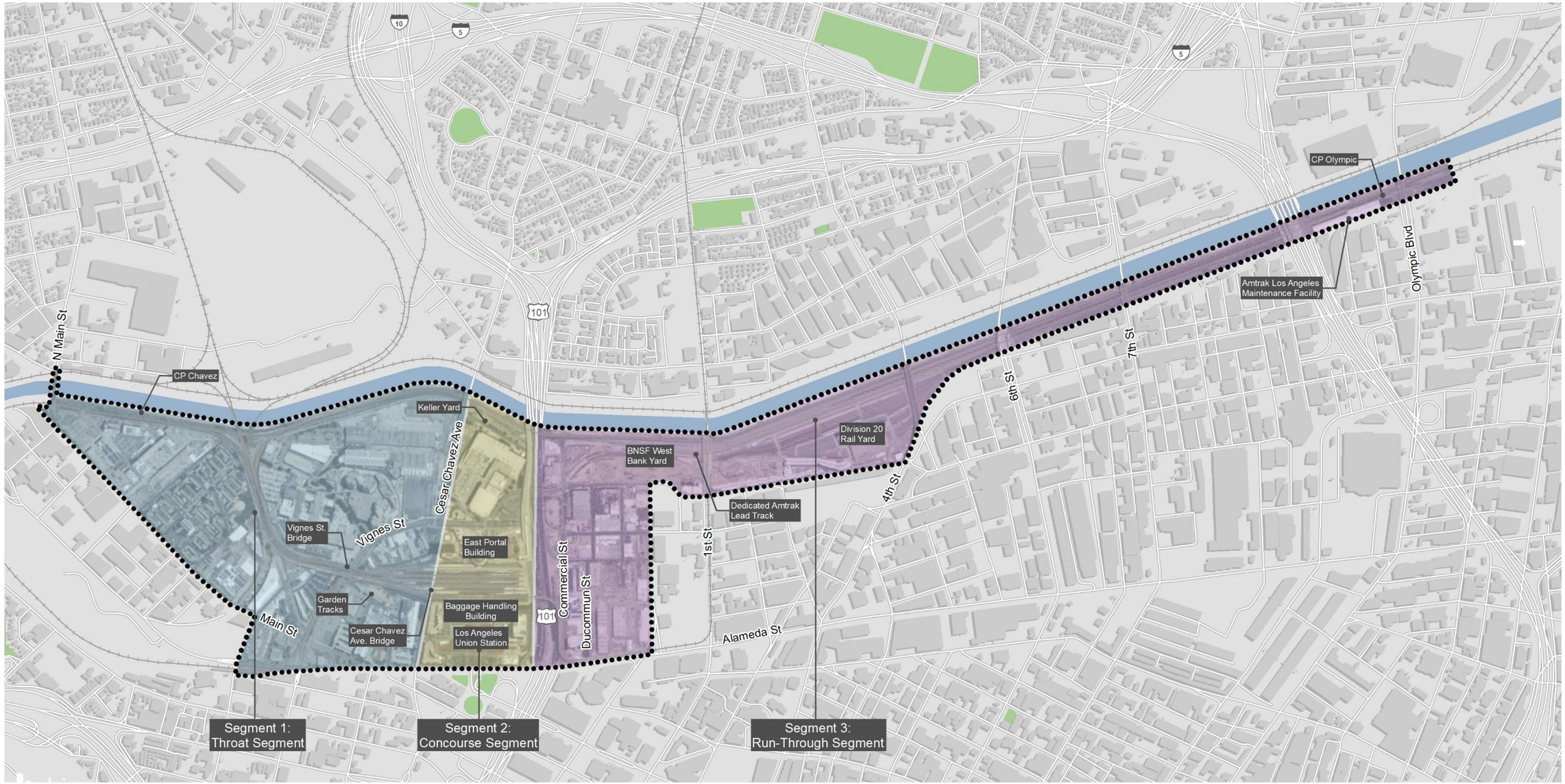
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Figure 1-1. Project Location and Regional Vicinity



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Figure 1-2. Project Study Area



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1.4 Project Alternatives

The EIS includes an evaluation of the No Action Alternative and one build alternative (Build Alternative). The Build Alternative would include, but not be limited to, new lead tracks north of LAUS (Segment 1: Throat Segment), an elevated throat and rail yard with concourse-related improvements at LAUS (Segment 2: Concourse Segment), and 10 run-through tracks south of LAUS (Segment 3: Run-Through Segment).

1.4.1 No Action Alternative

NEPA (40 CFR 1502.14(d)) requires federal agencies to include an analysis of "the alternative of no action." For NEPA purposes, the No Action Alternative is the baseline against which the effects of implementing the Build Alternative is evaluated against to determine the extent of environmental and community effects. For the No Action Alternative, the baseline year is 2016, and the horizon year is 2040.

The No Action Alternative represents the future conditions that would occur if the proposed infrastructure improvements and the operational capacity enhancements at LAUS were not implemented. The No Action Alternative reflects the foreseeable effects of growth planned for the area in conjunction with other existing, planned, and reasonably foreseeable projects and infrastructure improvements in the Los Angeles area. As identified in planning documents prepared by Southern California Association of Governments (SCAG), Metro, and/or Metrolink, including the *2023 Federal Transportation Improvement Program* (FTIP) (SCAG 2023), *Final 2008 Regional Comprehensive Plan* (SCAG 2008), and the *2020 RTP/Sustainable Communities Strategy (SCS): Connect SoCal* (SCAG 2020).

Conditions in the Project study area would remain similar to the existing condition, as described below:

- **Segment 1: Throat Segment** – Trains would continue to operate on five lead tracks that do not currently accommodate the planned HSR system. The tracks north of LAUS would remain at the current elevation, and the Vignes Street Bridge and Cesar Chavez Avenue Bridge would remain in place.
- **Segment 2: Concourse Segment** – LAUS would not be transformed from a stub-end tracks station into a run-through tracks station, and the 28-foot-wide pedestrian passageway would be retained in its current configuration. No modifications to the existing passenger circulation routes or addition of vertical circulation elements (VCE; escalators and elevators) at LAUS would occur.
- **Segment 3: Run-Through Segment** – Commercial Street would remain in its existing configuration, and implementation of active transportation improvements would likely be implemented along Center Street in concert with the *Connect US Action Plan* (Metro 2015). No modifications to the BNSF West Bank Yard would occur.

1.4.2 Build Alternative

The key components associated with the Build Alternative are summarized north to south below:

- **Segment 1: Throat Segment (lead tracks and throat track reconstruction)** – The Build Alternative includes subgrade and structural improvements in Segment 1 of the Project study area (throat segment) to increase the elevation of the tracks leading to the rail yard. The Build Alternative includes the addition of one new lead track in the throat segment for a total of six lead tracks to facilitate enhanced operations for regional/intercity rail trains (Metrolink/Amtrak) and future operations for HSR trains within a shared track alignment. Regional/intercity and HSR trains would share the two western lead tracks in the throat segment. The existing railroad bridges in the throat segment at Vignes Street and Cesar Chavez Avenue would also be reconstructed. North of CP Chavez on the west bank of the Los Angeles River, the Build Alternative also includes safety improvements at the Main Street public at-grade railroad crossing (medians, restriping, signals, and pedestrian and vehicular gate systems) to facilitate future implementation of a quiet zone by the City of Los Angeles.
- **Segment 2: Concourse Segment (elevated rail yard and expanded passageway)** – The Build Alternative includes an elevated rail yard and expansion of the existing 28-foot-wide pedestrian passageway in Segment 2 of the Project study area (concourse segment). The rail yard would be elevated approximately 15 feet. New passenger platforms would be constructed on the elevated rail yard with associated VCEs (stairs, escalators, and elevators) to enhance safety elements and improve Americans with Disabilities Act accessibility. Platform 1, serving the Gold Line, would be lengthened, and elevated to optimize east to west passenger circulation. The pedestrian passageway would be expanded at the current grade to a 140-foot width to accommodate a substantial increase in passenger capacity with new functionally modern passenger amenities while providing points of safety to meet applicable California Building Code (CBC) and National Fire Protection Association (NFPA) 130 Standards for Fixed Guideway Transit Systems. The expanded passageway and associated concourse improvements would facilitate enhanced passenger circulation and provide space for ancillary support functions (back-of-house uses, baggage handling, etc.), transit-serving retail, and office/commercial uses while creating an opportunity for an outdoor, community-oriented space with new plazas east and west of the elevated rail yard (East and West Plazas). Amtrak ticketing and baggage check-in services would be enhanced, and new baggage carousels would be constructed in a centralized location under the rail yard. A canopy would be constructed over the West Plaza up to 70 feet in height, and two design options are considered for canopies that would extend over the rail yard (Section 1.4.3).
- **Segment 3: Run-Through Segment (10 run-through tracks)** – The Build Alternative includes 10 new run-through tracks south of LAUS in Segment 3 of the Project study area (run-through segment). The Build Alternative includes common rail infrastructure from LAUS to the west bank of the Los Angeles River (vicinity of First Street Bridge) to support run-through tracks for both regional/intercity rail trains and future HSR trains. At the BNSF

West Bank Yard, dedicated lead tracks for Amtrak trains and BNSF trains, in combination with implementation of common rail infrastructure would result in permanent loss of freight rail storage track capacity at the north end of BNSF West Bank Yard (5,500 track feet).

The Build Alternative would also require modifications to US-101 and local streets (including potential street closures and geometric modifications); improvements to railroad signal, positive train control (PTC), and communication systems; modifications to the Gold Line light rail platform and tracks; modifications to the main line tracks on the west bank of the Los Angeles River; modifications to the Amtrak lead track; addition of access roadways to the railroad right-of-way (ROW); land acquisitions; addition of utilities; utility relocations, replacements, and abandonments; and addition of drainage facilities/water quality improvements.

1.4.3 Rail Yard Canopy Design Options

Two design options for canopies over the elevated platforms in the rail yard are considered in conjunction with the concourse-related improvements as part of the Build Alternative.

- **Rail Yard Canopy Design Option 1 (individual canopies)** – This design option would include replacing the existing historic butterfly canopies with individual canopies above each platform. New individual canopies would extend up to 25 feet above each platform and would be similar in form to the existing butterfly canopies but sized to fit the widened and lengthened platforms. Platform lengths would vary between 450 and 1,445 feet. Platforms would be up to 30 feet wide.
- **Rail Yard Canopy Design Option 2 (grand canopy)** – This design option would include replacing the existing historic butterfly canopies with a large grand canopy that would extend up to 75 feet above the elevated rail yard platforms. The grand canopy would be up to 1,500 feet long and wide enough to provide cover over all elevated platforms in the rail yard.

1.5 Project Implementation Approach

The implementation of infrastructure improvements would generally occur in three main phases that are evaluated as scenario years in the EIS: the interim condition, the full build-out condition and the full build-out with HSR condition. The infrastructure improvements for each of these scenarios are described below.

1.5.1 Interim Condition

The interim condition is when the run-through track infrastructure south of LAUS and the associated signal modifications, property acquisitions, and civil/structural improvements to facilitate new run-through service would be implemented. The interim condition does not include new lead tracks north of LAUS, or the elevated rail yard and new concourse-related improvements at LAUS. The interim condition aligns with a construction completion date as early as 2026.

A summary of the proposed activities associated with the interim condition is provided below.

- Acquire properties south of LAUS within the Project footprint.
- Relocate utilities north and south of LAUS.
- Acquire a portion of the BNSF West Bank Yard (majority north of First Street) and remove 5,500 feet of existing storage tracks at BNSF West Bank Yard.
- Construct special track work and modify signal/communication infrastructure north of LAUS.
- Construct a run-through track ramp on the southern extent of Platform 4 at LAUS.
- Construct a common viaduct/deck over US-101,
- Construct a common embankment from Vignes Street to Center Street south of LAUS.
- Construct common Center Street Bridge south of LAUS.
- Construct common embankment or new common bridge from Center Street to Amtrak Bridge south of LAUS.
- Construct common Amtrak Bridge south of LAUS.
- Construct Division 20 access road.
- Construct common rail embankment on the west bank of the Los Angeles River (from Amtrak Bridge to First Street Bridge).
- Construct new dedicated lead tracks for BNSF freight trains and Amtrak trains.
- Construct two run-through tracks from Platform 4 at LAUS to the main line tracks along the west bank of the Los Angeles River.

Some embankments and/or bridges south of LAUS could be constructed in a phased manner.

1.5.2 Full Build-Out Condition

The full build-out condition is when new lead tracks and the elevated throat north of LAUS, along with the elevated rail yard and concourse-related improvements at LAUS, would be implemented. The full build-out condition aligns with a construction completion date as early as 2031.

A summary of the proposed activities associated with the full build-out condition is provided below.

- Construct new compatible lead tracks and reconstruct throat north of LAUS.
- Construct new bridges over Vignes Street and Cesar Chavez Avenue north of LAUS.
- Construct elevated rail yard, concourse-related improvements, and East/West Plazas at LAUS.
- Construct remaining run-through tracks for regional/intercity rail operations on previously constructed structures south of LAUS.

1.5.3 Full Build-Out with High-Speed Rail Condition

The full build-out with HSR condition is when HSR tracks and catenaries would be implemented through the Project limits to facilitate operation of the planned HSR system. CHSRA is responsible for construction and operation of the planned HSR system, and the EIS identifies where future HSR tracks, catenaries, and related infrastructure would be located throughout the Link US Project limits. Operation of HSR trains would occur on two of the lead tracks north of LAUS, Platforms 2 and 3 and associated Tracks 3 through 6 at LAUS, and common rail bridges and embankments south of LAUS. The full build-out with HSR condition corresponds to an HSR opening year consistent with CHSRA's 2022 Business Plan (as early as 2033).

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2.0 Purpose and Approach

The purpose of this report is to:

A. Describe the physical setting of the Project study area, the regulatory framework for air quality, and existing air quality conditions.
B. Determine the short-term construction and long-term operational air quality and global climate change effects based on applied thresholds.
C. Identify feasible mitigation measures to be implemented to reduce effects, where identified.

To address the purpose, the following approach was taken:

- Establish the federal regulatory guidelines that govern air quality emissions in the Project study area.
- Establish the affected environment, including the existing climate conditions, meteorology, and air pollution concentrations.
- Identify the thresholds to which effects would be compared.
- Calculate the air quality and GHG emissions resulting from the Build Alternative and Malabar Yard railroad improvements in comparison to applied thresholds.
- Identify feasible mitigation and minimization measures to reduce effects that may result from the Build Alternative and Malabar Yard railroad improvements, where identified.

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3.0 Regulatory Setting

3.1 Federal Clean Air Act

The Federal Clean Air Act (FCAA), as amended, is the primary federal law that governs air quality. These laws, and related regulations by the U.S. EPA and California Air Resources Board (ARB), set standards for the concentration of pollutants in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS have been established for six transportation-related criteria pollutants that have been linked to potential health concerns:

- Carbon Monoxide (CO);
- Nitrogen dioxide (NO_2);
- Ozone (O_3);
- Particulate matter, which is broken down for regulatory purposes into PM_{10} or less and $PM_{2.5}$ or less;
- Sulfur dioxide (SO_2); and
- Lead (Pb).

The NAAQS standards are set at levels that protect public health with a margin of safety and are subject to periodic review and revision. Toxic air contaminants are covered, as well. Federal air quality standards and regulations provide the basic scheme for project-level air quality analysis under NEPA. In addition to this environmental analysis, a parallel conformity requirement under the FCAA also applies.

The FCAA requires U.S. EPA to designate areas as attainment, nonattainment, or maintenance (previously nonattainment and currently attainment) for each criteria pollutant based on whether the NAAQS have been achieved. Table 3-1 lists the federal and state air pollutant standards, the principal health and atmospheric effects, the typical sources, and the current attainment status of the criteria pollutant emissions. The U.S. EPA has classified all or portions of the South Coast Air Basin (SCAB) as attainment for SO_2, attainment/maintenance for CO, PM_{10}, and NO_2, and nonattainment for O_3, $PM_{2.5}$, and Pb. Table 3-1 also lists the California Ambient Air Quality Standards and attainment designations for the six criteria pollutants and four other pollutants.

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Table 3-1. Federal and State Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[a]	Federal Standard[b]	Principal Health and Atmospheric Effects	Typical Sources	SCAB Attainment Status
O_3[c]	1 hour 8 hours	0.09 parts per million (ppm) 0.070 ppm	— 0.070 ppm (4th highest in 3 years)	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage and cancer. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include many known toxic air contaminants. Biogenic VOC may also contribute.	Low-altitude O_3 is almost entirely formed from ROG or VOC and NOx in the presence of sunlight and heat. Major sources include motor vehicles and other mobile sources, solvent evaporation, and industrial and other combustion processes.	Federal: Extreme Nonattainment (8-hour) State: Nonattainment (1-hour and 8-hour)
CO	1 hour 8 hours 8 hours (Lake Tahoe)	20 ppm 9.0 ppm 6 ppm	35 ppm 9 ppm —	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO also is a minor precursor for photochemical O_3.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.	Federal: Attainment/ Maintenance State: Attainment
Respirable Particulate Matter (PM_{10})[d]	24 hours Annual	50 µg/m^3 20 µg/m^3	150 µg/m^3 — (expected number of days above standard < or equal to 1)	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many aerosol and solid compounds are part of PM_{10}.	Dust- and fume-producing industrial and agricultural operations; combustion smoke and vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.	Federal: Attainment/ Maintenance State: Nonattainment
Fine Particulate Matter ($PM_{2.5}$)[d]	24 hours Annual Secondary Standard (annual)	— 12 µg/m^3 ---	35 µg/m^3 12.0 µg/m^3 15 µg/m^3 (98th percentile over 3 years)	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel particulate matter – a toxic air contaminant – is in the $PM_{2.5}$ size range. Many toxic and other aerosol	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical (including photochemical) reactions involving other pollutants	Federal: Serious Nonattainment State: Nonattainment

Table 3-1. Federal and State Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[a]	Federal Standard[b]	Principal Health and Atmospheric Effects	Typical Sources	SCAB Attainment Status
				and solid compounds are part of $PM_{2.5}$.	including NOx, SO_X, ammonia, and ROG.	
NO_2[e]	1 hour Annual	0.18 ppm 0.030 ppm	100 ppb (98th percentile over 3 years) 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain. Part of the NOx group of O_3 precursors.	Motor vehicles and other mobile sources; refineries; industrial operations.	Federal: Attainment/ Maintenance State: Attainment
SO_2[f]	1 hour 3 hours 24 hours Annual Arithmetic Mean	0.25 ppm — 0.04 ppm —	75 ppb (99th percentile over 3 years) 0.5 ppm 0.14 ppm 0.03 ppm	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.	Federal: Attainment/ Unclassified State: Attainment/ Unclassified
Pb[g,h]	Monthly Calendar Quarter Rolling 3-month average	1.5 µg/m^3 — —	— 1.5 µg/m^3 0.15 µg/m^3	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also, a toxic air contaminant and water pollutant.	Pb-based industrial processes like battery production and smelters. Pb paint, leaded gasoline. Aerially deposited Pb from gasoline may exist in soils along major roads.	Federal: Nonattainment (Los Angeles County only) State: Attainment

Table 3-1. Federal and State Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[a]	Federal Standard[b]	Principal Health and Atmospheric Effects	Typical Sources	SCAB Attainment Status
Sulfate	24 hours	25 µg/m^3	—	Premature mortality and respiratory effects. Contributes to acid rain. Some toxic air contaminants attach to sulfate aerosol particles.	Industrial processes, refineries, and oil fields, mines, natural sources like volcanic areas, salt-covered dry lakes, and large sulfide rock areas.	Federal: — State: Attainment/ Unclassified
Hydrogen Sulfide	1 hour	0.03 ppm	—	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea.	Industrial processes such as: refineries and oil fields, asphalt plants, livestock operations, sewage treatment plants, and mines. Some natural sources like volcanic areas and hot springs.	Federal: — State: Attainment/ Unclassified
Visibility Reducing Particles[i]	8 hours	Visibility of 10 miles or more (Tahoe: 30 miles) at relative humidity less than 70 percent	—	Reduces visibility. Produces haze. Note: not related to the Regional Haze program under the FCAA, which is oriented primarily toward visibility issues in National Parks and other Class I areas.	See particulate matter above.	Federal: — State: Attainment/ Unclassified
Vinyl Chloride[g]	24 hours	0.01 ppm	—	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes	Federal: — State: Attainment/ Unclassified

Notes:

[a] California standards for O_3, CO (except 8-hour Lake Tahoe), SO_2 (1 and 24 hour), NO_2, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California Ambient Air Quality Standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than O_3, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

Table 3-1. Federal and State Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[a]	Federal Standard[b]	Principal Health and Atmospheric Effects	Typical Sources	SCAB Attainment Status

[c] *On October 1, 2015, the national 8-hour O_3 primary and secondary standards were lowered from 0.075 to 0.070 ppm.*

[d] *On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m^3 were also retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.*

[e] *To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of ppb. California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards, the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.*

[f] *On June 2, 2010, a new 1-hour SO_2 standard was established, and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.*
Note that the 1-hour national standard is in units of ppb. California standards are in units of ppm. To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

[g] *The CARB has identified Pb and vinyl chloride as toxic air contaminant with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.*

[h] *The national standard for Pb was revised on October 15, 2008, to a rolling 3-month average. The 1978 Pb standard (1.5 µg/m^3 as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.*

[i] *In 1989, the CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are extinction of 0.23 per kilometer and extinction of 0.07 per kilometer for the statewide and Lake Tahoe Air Basin standards, respectively.*

µg/m^3= micrograms per cubic meter; CARB=California Air Resources Board; CO=carbon monoxide; EPA=Environmental Protection Agency; FCAA=Federal Clean Air Act; NAAQS=National Ambient Air Quality Standards; NO_2=nitrogen dioxide; NOx=nitrogen oxides; O_3=ozone; Pb=lead; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ppb=parts per billion; ppm = parts per million; ROG=reactive organic gas; SCAB=South Coast Air Basin; SIP=state implementation plan; SO_2=sulfur dioxide; SO_X=sulfur oxide; U.S.=United States; VOC=volatile organic compound

3.2 General Conformity Rule

The U.S. EPA General Conformity Rule (40 CFR Part 93 Subpart B) applies to federal actions, other than those related to highway and transit planning and projects, that result in emissions of criteria pollutants, or their precursors, in federally designated nonattainment or maintenance areas. The U.S. EPA General Conformity Rule establishes a process to demonstrate that federal actions would be consistent with applicable state implementation plans (SIP) and would not cause or contribute to new violations of the NAAQS, increase the frequency or severity of existing violations of the NAAQS, or delay the timely attainment of the NAAQS.

The emissions levels that trigger requirements of the General Conformity Rule for federal actions emitting nonattainment or maintenance pollutants, or their precursors, are called *de minimis* levels. The General Conformity *de minimis* levels are defined in 40 CFR Part 93.153(b) and are shown in Section 5.1.1. The Federal General Conformity Rule does not apply to federal actions in areas designated as nonattainment for only the California Ambient Air Quality Standards. The General Conformity determinations are made by U.S. EPA prior to the first time a nonexempt federal project is adopted, accepted, approved, or funded.

3.3 Federal Railroad Administration, Procedures for Considering Environmental Impacts Sec. 14(n)(1), 64 FR 28545-28556

The FRA's Environmental Procedures require the draft and final Environmental Impact Statement to include an assessment of the consistency of the alternatives with federal and state plans for the attainment and maintenance of air quality standards.

3.4 Corporate Average Fuel Standards

The latest Corporate Average Fuel Standards (CAFE) standards require an industry-wide fleet average of approximately 49 miles per gallon for passenger cars and light trucks in model year 2026. The new standards will increase fuel efficiency 8 percent annually for model years 2024–2025 and 10 percent annually for model year 2026. They will also increase the estimated fleetwide average by nearly 10 miles per gallon for model year 2026, relative to model year 2021. These standards for 2024–2026 will reduce fuel use by more than 200 billion gallons through 2050 as compared to the old standards.

3.5 California State Implementation Plan

The 1990 amendments to the FCAA set new deadlines for attainment based on the severity of the pollution problem and launched a comprehensive planning process for attaining the NAAQS. The promulgation of the national 8-hour O_3 standard and the fine particulate matter ($PM_{2.5}$) standards in 1997 resulted in additional statewide air quality planning efforts. In response to new federal regulations, SIPs also began to address ways to improve visibility in national parks and

wilderness areas. SIPs are not single documents, but rather a compilation of new and previously submitted plans, programs, district rules, state regulations, and federal controls.

Many of California's SIPs rely on the same core set of control strategies, including emission standards for cars and heavy trucks, fuel regulations, and limits on emissions from consumer products. State law makes the California Air Resources Board (CARB) the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to CARB for review and approval. CARB then forwards SIP revisions to U.S. EPA for approval and publication in the *Federal Register*. CFR, Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items which are included in the California SIP.

3.6 South Coast Air Quality Management District Rule 403

Fugitive dust is particulate matter that is suspended in the air by direct or indirect human activities. SCAQMD Rule 403 requires implementation of the best available dust control measures during active operations capable of generating fugitive dust in order to reduce the amount of particulate matter entrained in the ambient air. Control measures may include watering, sweeping, soil stabilizers, wheel washing, and/or limiting vehicle speed and access in construction areas.

3.7 Climate Change

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to GHG emissions, particularly those generated from the production and use of fossil fuels.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change by the United Nations and World Meteorological Organization in 1988 has led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs generated by human activity, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, fluoroform, 1,1,1,2-tetrafluoroethane, and 1,1-difluoroethane.

In the U.S. in 2021, the main source of GHG emissions was transportation, followed by electricity generation. Similarly, in California, transportation sources (including passenger cars, light-duty trucks, other trucks, buses, and motorcycles) make up the largest source of GHG-emitting sources. The dominant GHG emitted is CO_2, mostly from fossil fuel combustion.

There are typically two terms used when discussing the effects of climate change: GHG mitigation and adaptation. GHG mitigation is a term for reducing GHG emissions to reduce or mitigate the effects of climate change. Adaptation refers to the effort of planning for and adapting to effects resulting from climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels).

There are four primary strategies for reducing GHG emissions from transportation sources: 1) improving the transportation system and operational efficiencies, 2) reducing travel activity, 3) transitioning to lower GHG-emitting fuels, and 4) improving vehicle technologies/efficiency. To be most effective, all four strategies should be pursued cooperatively.

GHGs vary considerably in terms of global warming potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere (atmospheric lifetime). The GWP of each gas is estimated in terms of its expected effects at a particular time horizon (e.g., 100 years from present) relative to CO_2, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by 1 unit mass of the GHG to the ratio of heat trapped by 1 unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of pounds or tons of CO_2e. Table 3-2 shows the GWPs for each type of GHG. For example, sulfur hexafluoride is 23,500 times more potent at contributing to global warming than CO_2.

Table 3-2. Global Warming Potential of Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	GWP (100-year Time Horizon)
CO_2	50–200	1
CH_4	12	28
N_2O	114	265
Fluoroform	270	12,400
1,1,1, 2-tetrafluoroethane	14	1,300
1,1-difluoroethane	1.4	138
Perfluorocarbon Tetrafluoromethane	50,000	6,630
Perfluorocarbon Hexafluoromethane	10,000	11,100
Sulfur hexafluoride	3,200	23,500

Source: Intergovernmental Panel on Climate Change 2014
Notes:
CH_4=methane; CO_2=carbon dioxide; GWP=global warming potential; N_2O=nitrous oxide

3.7.1 Federal Regulations

National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change

The Council on Environmental Quality (CEQ) issued an interim guidance on January 9, 2023, to assist agencies in analyzing GHG and climate change effects of their proposed actions under

NEPA. This guidance aligns the depth of analysis proportional with the project's impacts, clarifies best practices for analysis, incorporates environmental justice considerations, introduces the social cost of GHGs, and encourages agencies to mitigate GHG impacts. This guidance is consistent with Executive Order (EO) 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*.

Executive Order 13990 – Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

Executive Order 13990, of January 20, 2021, directs federal agencies to immediately review, and take action to address, federal regulations promulgated and other actions taken during the previous four years that conflict with national objectives to improve public health and the environment; ensure access to clean air and water; limit exposure to dangerous chemicals and pesticides; hold polluters accountable, including those who disproportionately harm communities of color and low-income communities; reduce greenhouse gas emissions; bolster resilience to the impacts of climate change; restore and expand our national treasures and monuments; and prioritize both environmental justice and employment.

Mandatory Reporting of Greenhouse Gases Rule

Pursuant to 40 CFR Part 98 (the Mandatory Reporting of GHGs Rule), U.S. EPA requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 MT of CO_2e emissions per year.

Executive Order 14008 (86 *Federal Register* 7619) (2021) – Tackling the Climate Crisis at Home and Abroad

EO 14008 was signed by President Biden on January 27, 2021. The EO 14008 establishes a "government-wide approach that reduces climate pollution in every sector of the economy; increases resilience to the impacts of climate change; protects public health; conserves our lands, waters, and biodiversity; delivers environmental justice; and spurs well-paying union jobs and economic growth, especially through innovation, commercialization, and deployment of clean energy technologies and infrastructure."

U.S. Department of Transportation – Fiscal Year 2022-26 U.S. Department of Transportation Strategic Plan

The FY 2022-26 U.S. Department of Transportation Strategic Plan is aligned with multiple EOs with a range of priorities including: protecting worker and traveler health and safety; providing economic relief to address effects of the COVID-19 pandemic; enhancing supply chain resilience, promoting economic competition, strengthening American leadership in clean cars and trucks, and spurring domestic manufacturing and innovation; restoring scientific integrity and tackling the climate crisis; improving cybersecurity and protecting privacy and civil liberties; affirmatively advancing equity, civil rights, racial justice, and equal opportunity; and supporting diversity, equity, inclusion, and accessibility in the Federal workforce. The strategic goals include safety, economic

strength and global competitiveness, equity, climate and sustainability, transformation, and organizational excellence.

Executive Order 14057 – Catalyzing Clean Energy Industries and Jobs through Federal Sustainability

As signed on December 8, 2021, EO 14057 requires agencies to:

- Achieve 100 percent carbon pollution-free electricity by 2030, including 50 percent on a 24/7 basis;
- Reach 100 percent zero-emission vehicle acquisition by 2035, including 100 percent light-duty acquisitions by 2027;
- Achieve net-zero building emissions by 2045, including a 50 percent reduction by 2032;
- Reduce Scope 1 and 2 greenhouse gas emissions by 65 percent from 2008 levels by 2030;
- Establish targets to reduce energy and potable water use intensity by 2030;
- Reduce procurement emissions to net-zero by 2050;
- Have climate resilient infrastructure and operations;
- Develop a climate- and sustainability-focused workforce;
- Advance environmental justice and equity-focused operations; and
- Accelerate progress through domestic and international partnerships.

Final Endangerment and Cause or Contribute Findings for Greenhouse Gases

As a result of *Massachusetts v. EPA*, 549 U.S. 497 (2007), the Supreme Court found that greenhouse gases are air pollutants covered by the Clean Air Act. Therefore, U.S. EPA must determine whether or not emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare. On April 17, 2009, the U.S. EPA Administrator signed proposed endangerment and cause or contribute findings for greenhouse gases under Section 202(a) of the Clean Air Act. The final Findings were published on December 7, 2009, by U.S. EPA.

3.8 Final Rule for Control of Hazardous Air Pollutants from Mobile Sources

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments of 1990, whereby Congress mandated that U.S. EPA regulate 188 air toxics, also known as hazardous air pollutants. U.S. EPA has assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register 72(37), 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of U.S. EPA's Integrated Risk Information System (U.S. EPA 2021). In addition, U.S. EPA identified nine compounds with significant contributions from mobile sources that are among the

national and regional-scale cancer risk drivers or contributors and non-hazard contributors from the 2011 National Air Toxics Assessment (U.S. EPA 2018). These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While the Federal Highway Administration (FHWA) considers these the priority mobile source air toxics (MSAT), the list is subject to change and may be adjusted in consideration of future U.S. EPA rules.

The 2007 U.S. EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using U.S. EPA's MOVES3 model, even if vehicle activity (vehicle miles traveled [VMT]) increases by 31 percent from 2020 to 2060 as forecast, a combined reduction of 76 percent in the total annual emission rate for the priority MSATs is projected for the same time period, as Figure 3-1 shows (FHWA 2023).

3.9 Updated Interim Guidance on Air Toxic Analysis in NEPA Documents

FHWA released guidance in October 2016 and most recently in January 2023 (FHWA 2023) for determining when and how to address MSAT impacts in the NEPA process for transportation projects. FHWA identified three levels of analysis:

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

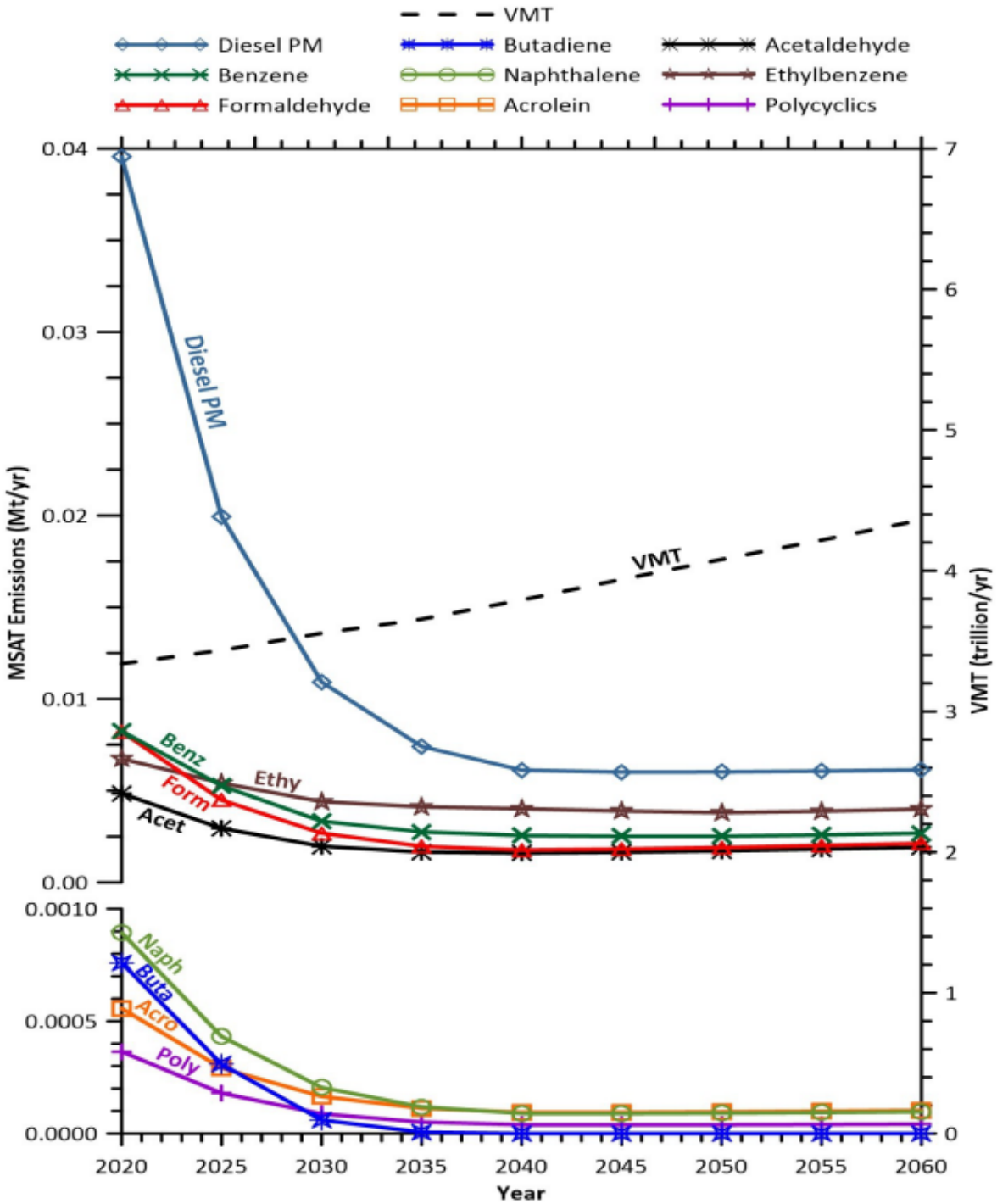
Projects with no impacts generally include those that qualify as a categorical exclusion under 23 CFR 771.117, qualify as exempt under the FCAA conformity rule under 40 CFR 93.126, and are not exempt, but have no meaningful impacts on traffic volumes or vehicle mix.

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

Projects with high potential MSAT effects include those that:

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

Figure 3-1. Projected National Mobile Source Air Toxic Trends, 2020–2060



Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.
Source: EPA MOVES3 model runs conducted by FHWA, March 2021.

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4.0 Existing Conditions

4.1 Climate

The Build Alternative is located in Los Angeles County, an area within the SCAB, which includes Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. Air quality regulation in the SCAB is administered by SCAQMD, a regional agency created for the SCAB.

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

The annual average temperature varies little throughout the SCAB, ranging from the low to middle 60s, measured in degrees Fahrenheit. With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The annual average maximum temperature recorded at the Los Angeles Downtown University of Southern California Campus Station, the closest climatological station to the Project study area, is 74.0 degrees Fahrenheit and the annual average minimum is 55.8 degrees Fahrenheit. January is typically the coldest month in this area of the SCAB (Western Regional Climate Center 2018).

The majority of annual rainfall in the SCAB occurs between November and April. Summer rainfall is minimal and generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern part of the SCAB along the coastal side of the mountains. Average monthly rainfall measured at the Los Angeles Downtown University of Southern California Campus Station varies from 3.38 inches in February to 0.27 inch or less between May and September, with an average annual total of 14.77 inches (Western Regional Climate Center 2018).

The SCAB experiences a persistent temperature inversion (increasing temperature with increasing altitude) as a result of the Pacific high. This inversion limits the vertical dispersion of air contaminants, holding them relatively near the ground. As the sun warms the ground and the lower air layer, the temperature of the lower air layer approaches the temperature of the base of the inversion (upper) layer until the inversion layer finally breaks, allowing vertical mixing with the lower layer. This phenomenon is observed from midafternoon to late afternoon on hot summer days when the smog appears to clear up suddenly. Winter inversions frequently break by midmorning.

Inversion layers are essential in determining O_3 formation. O_3 and its precursors would mix and react to produce higher concentrations under an inversion. The inversion would also trap and hold directly emitted pollutants such as CO. PM_{10} is both directly emitted and created indirectly in the

atmosphere as a result of chemical reactions. Concentration levels are directly related to inversion layers because of the limitation of mixing space.

Surface or radiation inversions are formed when the ground surface becomes cooler than the air above it during the night. The earth's surface goes through a radiative process on clear nights when heat energy is transferred from the ground to a cooler night sky. As the earth's surface cools during the evening hours, the air directly above it also cools, while air higher up remains relatively warm. The inversion is destroyed when heat from the sun warms the ground, which in turn heats the lower layers of air; this heating stimulates the ground level air to float up through the inversion layer.

The combination of stagnant wind conditions and low inversions produces the greatest concentration of pollutants. On days of no inversion or high wind speeds, ambient air pollutant concentrations are the lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore and east into Riverside and San Bernardino Counties. In the winter, the greatest pollution problems are from CO and NOx because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NOx to form photochemical smog.

4.2 Monitored Air Quality Pollutants

SCAQMD monitors air quality conditions at 37 locations throughout the SCAB. The closest monitoring station to the Project study area is the Los Angeles North Main Street Station. This station monitors all criteria pollutants (O_3, CO, PM_{10}, $PM_{2.5}$, SO_2, and NO_2). Table 4-1 shows pollutant levels, the state and federal standards, and the number of exceedances recorded at this station from 2017 to 2019.[3]

4.2.1 Carbon Monoxide

CO is a colorless and odorless gas formed by the incomplete combustion of fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. CO is a nonreactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions; primarily wind speed, topography, and atmospheric stability. As identified in Table 4-1, the CO concentrations in the Project study area have not exceeded the federal or state standards between 2017 and 2019.

[3] This 3-year period was the most recent monitoring data available at the time of report preparation.

Table 4-1. Ambient Air Quality Monitoring Concentrations

Pollutant	Pollutant Concentration and Standard	Maximum Concentration		
		2017	2018	2019
CO	Maximum 1-hour concentration (ppm)	2.0	2.0	2.0
	Days> 20 ppm (state 1-hour standard)	0	0	0
	Days> 35 ppm (federal 1-hour standard)	0	0	0
	Maximum 8-hour concentration (ppm)	1.8	1.7	1.6
	Days> 9 ppm (state 8-hour standard)	0	0	0
	Days> 9 ppm (federal 8-hour standard)	0	0	0
O_3	Maximum 1-hour concentration (ppm)	0.116	0.098	0.093
	Days> 0.09 ppm (state 1-hour standard)	6	2	0
	Maximum 8-hour concentration (ppm)	0.086	0.073	0.080
	Days> 0.070 ppm (state 8-hour standard)	14	4	2
	Days> 0.070 ppm (federal 8-hour standard)	14	4	2
NO_2	Maximum 1-hour concentration (ppm)	0.081	0.070	0.070
	Days> 0.18 ppm (state 1-hour standard)	0	0	0
	Days> 0.10 ppm (federal 1-hour standard)	0	0	0
	Annual arithmetic mean (ppm)	0.021	0.019	0.018
	Exceed 0.030 ppm? (state annual standard)	No	No	No
	Exceed 0.053 ppm? (federal annual standard)	No	No	No
SO_2	Maximum 1-hour concentration (ppb)	5.7	17.8	10.0
	Days> 250 ppb (state 1-hour standard)	0	0	0
	Days> 75 ppb (federal 1-hour standard)	0	0	0
	Maximum 24-hour concentration (ppb)	—	—	—
	Days> 40 ppb (state 24-hour standard)	—	—	—

Table 4-1. Ambient Air Quality Monitoring Concentrations

Pollutant	Pollutant Concentration and Standard	Maximum Concentration		
		2017	2018	2019
Coarse Particulate Matter (PM_{10})	Maximum 24-hour concentration (µg/m^3)	64.6	68.2	62.4
	Days> 50 µg/m^3 (state 24-hour standard)	40	31	15
	Days> 150 µg/m^3 (federal 24-hour standard)	0	0	0
	Annual arithmetic mean (µg/m^3)	25.7	30.2	23.0
	Exceed 20 µg/m^3? (state annual standard)	Yes	Yes	Yes
Fine Particulate Matter ($PM_{2.5}$)	Maximum 24-hour concentration (µg/m^3)	54.9	61.4	43.5
	Days> 35 µg/m^3 (federal 24-hour standard)	6	6	1
	Annual arithmetic mean (µg/m^3)	12.0	12.8	10.8
	Exceed 12 µg/m^3? (state annual standard)	No	Yes	No
	Exceed 12 µg/m^3? (federal annual standard)	No	Yes	No

Source: SCAQMD 2021
Notes:
µg/m^3=micrograms per cubic meter; CO=carbon monoxide; NO_2=nitrogen dioxide; O_3=ozone; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ppb=parts per billion; ppm=parts per million; SO_2=sulfur dioxide

4.2.2 Ozone

O_3 is a colorless gas that is formed in the atmosphere when ROGs, which include volatile organic compounds (VOC), and NOx react in the presence of ultraviolet sunlight. O_3 is not a primary pollutant; it is a secondary pollutant formed by complex interactions of two pollutants directly emitted into the atmosphere. The primary sources of ROG and NOx, the components of O_3, are automobile exhaust and industrial sources. Meteorology and terrain play major roles in O_3 formation. Ideal conditions occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies.

The greatest source of smog-producing gases is the automobile. Short-term exposure (lasting for a few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. As identified in Table 4-1, the state 1-hour O_3 standard was exceeded six times in 2017, two times in 2018, but none in 2019. The state and federal 8-hour O_3 standards were exceeded 14 times in 2017, 4 times in 2018, and 2 times in 2019.

4.2.3 Nitrogen Dioxide

NO_2, like O_3, is not directly emitted into the atmosphere but is formed by an atmospheric chemical reaction between nitric oxide and atmospheric oxygen. Nitric oxide and NO_2 are collectively referred to as NOx and are major contributors to O_3 formation. NO_2 also contributes to the formation of PM_{10}. High concentrations of NO_2 can result in a brownish-red cast to the atmosphere, causing reduced visibility and breathing difficulties. As identified in Table 4-1, the NO_2 concentrations in the Project study area have not exceeded the federal or state standards between 2017 and 2019.

4.2.4 Sulfur Oxides

SO_2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Main sources of SO_2 are coal and oil used in power plants and industries. Generally, the highest levels of SO_2 are found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits on the sulfur content of fuels. SO_2 is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. As identified in Table 4-1, the SO_2 concentrations in the Project study area have not exceeded the federal or state standards between 2017 and 2019.

4.2.5 Coarse Particulate Matter

Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. Inhalable particulate matter, or PM_{10}, is about 1/7 the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. When inhaled, PM_{10} particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. As identified in Table 4-1, the state PM_{10} standards were exceeded in each of the past 3 years of available data. The federal standards were not exceeded between 2017 and 2019.

4.2.6 Fine Particulate Matter

Fine particulate matter, or $PM_{2.5}$, is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as SO_2, NOx, and VOC. Very small particles of substances, such as Pb, sulfates, and nitrates, can cause lung damage directly. These substances can be absorbed into the blood stream and

cause damage elsewhere in the body. These substances can transport absorbed gases, such as chlorides or ammonium, into the lungs and cause injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle and produce haze and reduce regional visibility. As identified in Table 4-1, the federal 24-hour $PM_{2.5}$ standard was exceeded between 2017 and 2019. The state and federal annual $PM_{2.5}$ standards were exceeded in 2018.

4.2.7 Volatile Organic Compounds or Reactive Organic Gases

VOCs are carbon-containing compounds that evaporate into the air. VOCs contribute to the formation of smog and/or may be toxic. VOCs often have an odor, and examples include gasoline, alcohol, and the solvents used in paints. The SCAQMD does not directly monitor VOCs. There are no specific state or federal VOC thresholds, as they are regulated by individual air districts as O_3 precursors.

4.3 Sensitive Receptors

Sensitive populations (sensitive receptors) are more susceptible to the effects of air pollution than the general population. Sensitive receptors that are in proximity to localized sources of toxics, particulate matter, and CO are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes (SCAQMD 2021). SCAQMD considers a sensitive receptor to be a receptor where it is possible that an individual could remain for 24 hours. Commercial and industrial facilities are not included in the definition of sensitive receptor because employees do not typically remain onsite for a full 24 hours, but are present for shorter periods of time, such as eight hours (SCAQMD 2008). The majority of the sensitive receptors within one quarter mile of the Project footprint are residential uses, but there are also childcare facilities, hospitals/clinics, jails/correctional facilities, parks/recreational areas, and schools.

The sensitive receptors within one quarter mile of the Project footprint that were considered for the localized air quality analysis are summarized below and depicted on Figure 4-1:

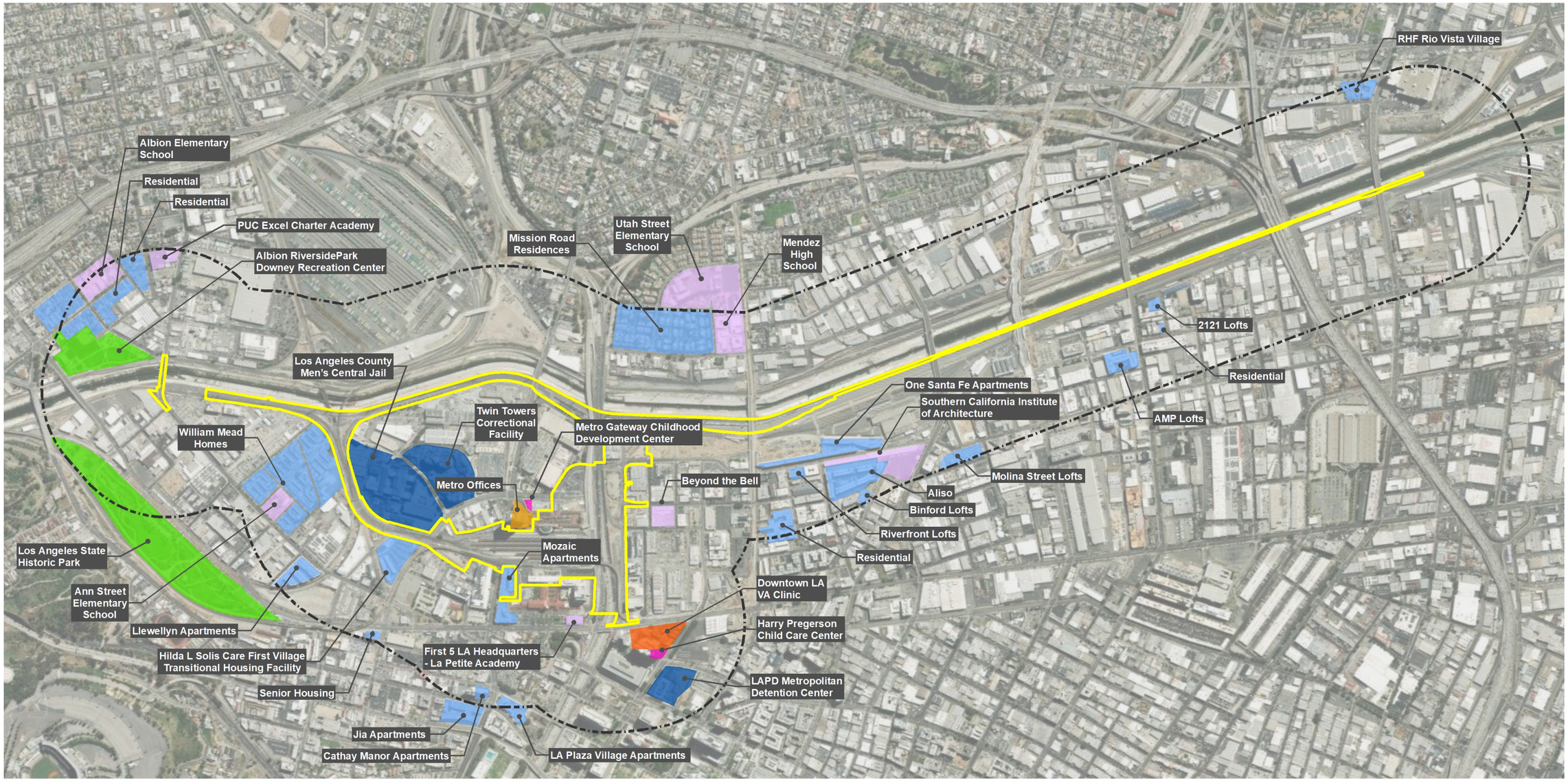
- William Mead Homes;
- Mozaic Apartments;
- Utah Street Elementary School;
- Twin Towers Correctional Facility;
- Los Angeles County Men's Central Jail;
- One Santa Fe Apartments;
- Metro Offices;
- Ann Street Elementary School;

- Mission Road Residences;
- Mendez High School;
- First 5 LA Headquarters (La Petite Academy);
- Hilda L. Solis Care First Village Transitional Housing Facility;
- Harry Pregerson Child Care Center;
- LAPD Metropolitan Detention Center;
- Albion Elementary School;
- PUC Excel Charter Academy;
- Beyond the Bell School;
- Metro Gateway Childhood Development Center;
- Southern California Institute of Architecture;
- Riverfront Lofts;
- Binford Lofts;
- Aliso residences;
- Llewellyn Apartments;
- Molina Street Lofts;
- AMP Lofts;
- 2121 Lofts;
- RHF Rio Vista Village;
- Senior housing (N. Alameda St. & Alpine St.);
- Jia Apartments;
- Cathay Manor Apartments;
- LA Plaza Village Apartments;
- City of LA Medical Services Division;
- Downtown LA VA Clinic;
- Los Angeles State Historic Park; and
- Albion Riverside Park/Downey Recreation Center.

The health risk assessment completed for the Project included sensitive receptors beyond one quarter mile of the Project footprint. The health risk assessment included sensitive receptors within a 2-kilometer (approximately 1.25 miles) buffer of the Project footprint.

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Figure 4-1. Sensitive Receptors



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5.0 Methods and Effect Criteria

The following provides a summary of the methodology and criteria used to determine potential effects on air quality and global climate change as a result of the No Action Alternative and the Build Alternative. Railroad improvements to the BNSF Malabar Yard in the City of Vernon are required as mitigation for the Build Alternative to restore and offset the loss of storage track capacity at the BNSF West Bank Yard. To account for the entirety of all Project-related emissions, the construction and operational emissions from the Malabar Yard railroad improvements as presented in Appendix Q of this EIS/SEIR are included in the analysis, as discussed below:

- **No Action Alternative.** Based on the future emission rates included in U.S. EPA's *Emission Factors for Locomotives* (U.S. EPA 2009), by 2040 all of the trains operating at LAUS are assumed to meet Tier 4 emission standards; therefore, a large reduction in emissions between 2016 and 2040 is anticipated to occur under the No Action Alternative. The reduction in criteria pollutant emissions between the existing (2016) and future years 2026, 2031, and 2040 is incorporated into this assessment methodology. In addition to meeting Tier 4 emission standards by 2040, both Metrolink and Amtrak have converted to using renewable diesel as of 2023. These emission reductions have been included in the analysis of the No Action Alternative and the Build Alternative for future years 2026, 2031, and 2040. Under the No Action Alternative, the Malabar Yard railroad improvements would not be implemented.
- **Build Alternative**
  - **Construction.** The air quality and GHG construction emissions reflect the additional haul truck trips, earth movement, and material handling required for the Build Alternative with a new expanded passageway approximately four times the width of the existing 28-foot-wide pedestrian passageway. Construction of the Malabar Yard railroad improvements would overlap the construction of the Build Alternative, so the emissions have therefore been combined in the emissions analysis.
  - **Operations.** Capacity enhancements associated with the Build Alternative would facilitate a future increase in train movements through LAUS within the Project study area. Although substantial investments in non-Project-related infrastructure outside of the Project study area are required to realize substantial increases in service and associated train movements through LAUS, this report includes a conservative evaluation of localized air quality effects and GHG emissions resulting from increased train movements through LAUS that could occur as a result of proposed capacity enhancements. It should be noted that other non-Project related capacity enhancements are required as part of SCRRA's SCORE Program to realize the maximum train movements through LAUS considered in this evaluation. The operational emissions from the Build Alternative are combined with projected operational regional benefits from the Malabar Yard railroad improvements starting in 2031. Malabar Yard regional benefits were calculated for Year 1, Year 20, and Year 30. Benefits from operation of Malabar Yard railroad improvements include reduced

intermodal railcar miles of travel resulting in reduced fuel consumption by rail and associated rail emissions. In addition, the Malabar Yard railroad improvements would improve mainline rail network capacity to support regional freight rail growth, thereby avoiding the diversion of rail served demand to long-haul trucking. The reduction in truck VMT results in reduced fuel consumption by truck and associated truck emissions.

Within the limits of the Project study area, a localized air quality effect analysis was conducted based on proposed capacity enhancements and associated increases in train movements through LAUS for 2026 (interim condition), 2031 (full build-out condition), and the 2040 horizon year. Effects of the Build Alternative are presented without taking into consideration reductions in regional VMT because any reductions in VMT and associated GHG emissions are considered cumulative benefits.

The Build Alternative accommodates the planned HSR system within the limits of the Project footprint. Indirect emissions associated with the operation of the planned HSR system are not included in this analysis and are addressed separately in the environmental document(s) prepared by CHSRA for the Burbank to Los Angeles and Los Angeles to Anaheim Project Sections.

Cumulative Effects. Increases in service that occur regionally are considered cumulative effects, and for the purposes of this report, are evaluated for the 2040 horizon year. Future service scenarios would depend on ongoing negotiations among the railroad operators, available infrastructure (corridors, maintenance facilities, etc.) throughout the Metrolink system and beyond, and available operating funding from the Metrolink Joint Powers Authority member agencies, including, but not limited to, Amtrak, the Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency, and Metro. Implementation of off-site infrastructure to implement future increases in service is the responsibility of the service operators or Joint Powers Authority member agencies, including the evaluation of related air quality effects that may occur from off-site rail infrastructure improvements.

Criteria Air Pollutants. Emissions of criteria air pollutants were estimated using existing conditions information, detailed construction scenarios prepared for the Build Alternative and Malabar Yard railroad improvements, estimates for future train movements through LAUS, identified in Appendix A, as well as a combination of emission factors from the following sources:[4]

- CARB modeling software EMFAC2017[5] and SCAQMD's Off-Road Mobile Source Emission Factors[6] for estimating exhaust emissions from off-road construction equipment and on-road motor vehicles.
- U.S. EPA re-entrained paved road dust methodology.
- U.S. EPA locomotive emission factors for locomotives and associated methodology.
- CalEEMod (Version 2016.3.2)[7] emission calculation methodologies for calculating the long-term mobile, energy, and area source emissions.

USEPA's AERMOD version 23132 (released October 23, 2023) was used to conduct dispersion modeling where exhaust PM_{10} emissions served as a proxy for diesel particulate matter. For further description of the methodology used for the localized analysis, refer to the quantitative health risk assessment in Appendix H, *Air Quality/Climate Change and Health Risk Assessment,* of the Link Union Station Project Final EIR (Metro 2019) and Appendix G of the EIS/SEIR.

Quantification of GHGs. For the purposes of determining whether GHG emissions from affected projects are adverse, the construction emissions were amortized over the life of the Project (defined as 30 years), added to the operational emissions, and compared to the federal reporting threshold.

[4] The following models were appropriate at the time the Notice of Intent (NOI) for the Project was issued. Since then, regulatory agencies have updated air quality models to newer versions with updated emission factors. As the baseline was established at the time of the NOI (and Notice of Preparation for the CEQA analysis per CEQA Guidelines Section 15125), this NEPA analysis maintains the same emission calculations and methodology for consistency purposes. As the CEQA analysis was completed and the Final EIR was published in 2019, this baseline has not changed. The updates to the air quality models generally lower the emission factors in the long term, resulting in fewer emissions, so the analysis presented in this Air Quality and Climate Change Assessment still represent a conservative analysis in the long term.

[5] The latest version of EMFAC at the time of the analysis was EMFAC2017. Since then, EMFAC2021 has been approved by U.S. EPA.

[6] While SCAQMD's Off-Road Mobile Source Emission Factors was used for the analysis, off-road emission factors have been updated to more recent versions from CARB including OFFROAD2017 and OFFROAD2021.

[7] The latest version of CalEEMod at the time of the analysis was Version 2016.3.2. Since then, Version 2020.4.0 has been released and a newer, web-based Version 2022.1 has been launched. Construction emissions for Malabar Yard were re-calculated using CalEEMod Version 2020.4.0 for this EIS to reflect the revised construction years of 2028 to 2030.

5.1 Federal Thresholds

5.1.1 General Conformity Rule

As discussed in Section 3.2, the emissions levels that trigger requirements of the General Conformity Rule for federal actions emitting nonattainment or maintenance pollutants, or their precursors, are called *de minimis* levels. The General Conformity *de minimis* levels are defined in 40 CFR Part 93.153(b). The Federal General Conformity Rule does not apply to federal actions in areas designated as nonattainment for only the California Ambient Air Quality Standards.

Based on the attainment statuses listed in Table 3-1, the General Conformity *de minimis* levels that apply to the SCAB Project area are listed in Table 5-1.[8] These levels apply to all direct and indirect emissions generated during construction and operation of a project.

Table 5-1. *De Minimis* Levels for the South Coast Air Basin

Pollutant	Tons/year
NOx	10
VOC	10
PM_{10}	100
$PM_{2.5}$	70
CO	100
SO_2	N/A

Source: U.S. EPA 2016
Notes:
***SO_2 is in attainment for the South Coast Air Basin so there is no applicable de minimis* level.**
CO=carbon monoxide; NOx=nitrogen oxides; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; VOC=volatile organic compound; SO_2= sulfur dioxide; U.S. EPA= United States Environmental Protection Agency

General Conformity Evaluation

Although CHSRA is the lead NEPA agency, consistent with 23 USC 327 and the July 23, 2019, NEPA Assignment Memorandum of Understanding executed between FRA and the State of California, FRA retains its obligations to make general conformity determinations under the Clean Air Act.

[8] *De minimis* levels are lower for pollutants that have design values farther from the ambient air quality standard. For SCAB, ozone (VOC and NOx) is in an extreme nonattainment area, PM_{10} is in an attainment/maintenance area, $PM_{2.5}$ is in a serious nonattainment area, and CO is in a maintenance area.

CHSRA and FRA have agreed to collaborate on the approach for achieving general conformity and development of general conformity determinations, as needed. Based on the quantitative analysis of emissions, the annual construction emissions and annual net change in operational emissions for all analysis years generated by the Build Alternative, as compared to the No Action Alternative, are below the general conformity *de minimis* levels with implementation of mitigation. As a result, FRA is expected to conclude that implementing the Build Alternative would not exceed the *de minimis* levels for applicable criteria pollutants in the Basin and a formal general conformity determination is not required. A Record of Non-Applicability has been completed to demonstrate compliance with the General Conformity rule. The General Conformity rule ensures that actions taken by FRA do not interfere with a state's plans to attain and maintain NAAQS and plays an important role in helping those states and tribes improve air quality in their areas that do not meet the NAAQS.

5.1.2 Greenhouse Gas Emission Threshold

Pursuant to 40 CFR Part 98 (the Mandatory Reporting of GHGs Rule), U.S. EPA requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 MT of CO_2e emissions per year. Although CEQ issued interim guidance 2023, this environmental document was initiated prior to the effective date, is not subject to the new regulations, and relies on the Mandatory Reporting of GHGs Rule (40 CFR Part 98).

5.2 Mobile Source Air Toxics

The 2023 guidance on air toxic analysis provides a tiered approach for analyzing MSAT in NEPA documents (FHWA 2023). As described in Section 3.6, depending on the specific project circumstances, FHWA has identified three levels of analysis: No analysis for projects with no potential for meaningful MSAT effects; Qualitative analysis for projects with low potential MSAT effects; or Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

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6.0 Environmental Consequences

For the purposes of this air quality analysis, the Build Alternative would have an adverse effect on air quality or global climate change if it would:

A. Exceed the General Conformity *de minimis* levels for the SCAB.
B. Generate annual GHG emissions in excess of 25,000 MT of CO_2e.

6.1 Air Quality

6.1.1 Construction

Construction activities associated with implementation of the Build Alternative and Malabar Yard railroad improvements have the potential to create air quality effects through heavy-duty construction equipment use, construction worker vehicle trips, material delivery trips, and heavy-duty haul truck trips generated from construction activities. In addition, earthwork activities would result in fugitive dust emissions and paving operations would also release ROGs from off-gassing. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and, for dust, the prevailing weather conditions. The assessment of construction air quality effects considers each of these potential sources.

Construction activities produce combustion emissions from various sources, such as utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, and motor vehicles transporting the construction crew. Exhaust emissions from these sources would vary daily as construction progresses. The use of construction equipment on site would result in localized exhaust emissions. Construction-related effects can also occur because of relocated emissions from traffic on temporarily relocated or diverted tracks. While the actual amount of emissions may not increase if traffic volumes and operating conditions do not change, the effect of emissions may increase if they are moved closer to sensitive receptors or if traffic temporarily increases in the vicinity of sensitive receptor locations.

This air quality evaluation is conservative and adequately addresses potential effects in the interim condition because it assumes all major Project elements would be constructed concurrently (lead tracks, elevated rail yard, run-through tracks, and concourse-related improvements). If run-through track infrastructure south of LAUS is constructed prior to the elevated rail yard and concourse-related improvements, fewer construction-related air quality and GHG effects (based on fewer truck trips) are anticipated to occur at the same time than reported herein because fewer emissions would be generated at once. The greatest potential for effects is addressed within this air quality analysis for both construction and operational scenarios.

Equipment Exhaust and Related Construction Activities

The construction equipment hours, haul truck trips, and employee commute trips required to construct the infrastructure as part of the Build Alternative and Malabar Yard railroad

improvements were estimated. For the Build Alternative, the construction phasing approach used for the environmental evaluation is based on a conservative estimate of typical construction activities because it assumes all major Project elements would be constructed concurrently (lead tracks, elevated rail yard, run-through tracks, and concourse-related improvements) over a 6-year timeframe. The total construction emissions were calculated using the equipment list and U.S. EPA and SCAQMD emission rates and divided evenly by year across the 6-year construction schedule. As construction activities would be occurring in all segments of the Project study area throughout the 6-year duration with no one year having substantially greater or less intensity of construction activity, the estimated construction emissions for the average year are used as the total annual emissions and then combined with the construction emissions estimated for the Malabar Yard railroad improvements for comparison to *de minimis* levels. Consistent with 40 CFR Part 93.153(b) Applicability, "a conformity determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by a Federal action would equal or exceed any of the rates in paragraphs (b)(1) or (2) of this section." As the major components of the Build Alternative would be constructed concurrently with major construction activity rotating throughout the site and overlapping in time, the total construction emissions split across the 6-year timeframe would be representative of the total annual construction emissions in any year during construction. As construction of the Malabar Yard railroad improvements would overlap this 6-year timeframe for the Build Alternative, construction emissions for both activities were combined.

The total annual construction emissions generated during the average construction year for the Build Alternative and maximum year for the Malabar Yard railroad improvements are listed in Table 6-1. The average year emissions listed in Table 6-1 are based on a 6-year construction schedule. Table 6-1 indicates that the total annual construction emissions associated with the Build Alternative and Malabar Yard railroad improvements combined would exceed the *de minimis* levels for NOx thereby resulting in an adverse effect. Mitigation Measure AQ-2 and Malabar Yard Mitigation Measure AQ-2 requires all on-site construction equipment greater than 50 horsepower to meet or exceed U.S. EPA's Tier 4 Final emission standards and for all off-road construction equipment to be fueled using 100 percent renewable diesel. This measure would reduce the on-site exhaust emissions, including NOx by up to 95 percent when compared with the average construction fleet for the Basin. The construction emission estimates are also detailed in Appendix B.

Table 6-1. Annual Construction Emissions – Unmitigated (tons/year)

Source	Pollutant Emissions (tons)					
	CO	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2e
Build Alternative						
Off-road equipment	119.9	16.8	106.9	8.3	6.0	34,026.0
On-road equipment	8.6	0.7	32.1	3.5	1.4	13,876.5

Table 6-1. Annual Construction Emissions – Unmitigated (tons/year)

Source	Pollutant Emissions (tons)					
	CO	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2e
Fugitive dust	—	—	—	225.0	47.3	—
Total	128.5	17.5	138.9	236.8	54.6	47,902.5
Average year	21.4	2.9	23.2	39.5	9.1	7,983.8
Malabar Yard Railroad Improvements						
Year - 2028	1.5	0.1	1.2	<0.1	<0.1	276
Year - 2029	5.2	0.5	4.0	0.3	0.2	946
Year - 2030	7.1	0.5	1.9	0.2	<0.1	1,385
Maximum Year	7.1	0.5	4.0	0.3	0.2	1,385
Combined Build Alternative and Malabar Yard	28.5	3.4	27.2	39.8	9.3	9,369
De minimis level	100.0	10.0	10.0	100.0	70.0	—
Exceedance	No	No	Yes	No	No	—

Notes:
CO=carbon monoxide; CO_2e=carbon dioxide equivalents; NOx=nitrogen oxides; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ROG=reactive organic gas

Fugitive Dust

Fugitive dust emissions are generally associated with land clearing, exposure, and cut-and-fill operations. Dust generated daily during construction would vary substantially, depending on the level of activity, the specific operations, and weather conditions. Nearby sensitive receptors and on-site workers may be exposed to blowing dust, depending upon prevailing wind conditions. Fugitive dust would also be generated as construction equipment or trucks travel on unpaved areas of the construction site.

$PM_{2.5}$ and PM_{10} emissions from construction activities were calculated using the total acreage that would be disturbed during each construction phase and are included in the emissions listed in Table 6-1. As shown in Table 6-1, the Build Alternative or Malabar Yard railroad improvements would not exceed the *de minimis* levels for $PM_{2.5}$ and PM_{10}; therefore, no direct adverse effect would occur. SCAQMD has established Rule 403 for reducing fugitive dust emissions through the use of best available control measures. Although applicable levels are not exceeded for PM, Mitigation Measure AQ-1 would still be implemented as a requirement of the Link US Final EIR and Malabar Yard Mitigation Measure AQ-1 would also be implemented pursuant to SCAQMD requirements to reduce daily fugitive dust emissions and associated air quality impacts.

Construction Emissions after Mitigation

Table 6-2 identifies the annual mitigated construction emission levels for the Build Alternative and Malabar Yard railroad improvements. As shown in Table 6-2, after implementation of Mitigation Measure AQ-2, the annual NOx emissions would be below the *de minimis* level for the Build Alternative and Malabar Yard railroad improvements combined. The construction emission estimates are detailed in Appendix B.

Table 6-2. Annual Construction Emissions - After Mitigation (tons/year)

Source	Pollutant Emissions (tons)					
	CO	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2e
Build Alternative						
Off-road equipment	31.2	6.5	18.0	3.0	1.4	21,402.3
On-road equipment	8.6	0.7	32.1	3.5	1.4	13,876.5
Fugitive dust	—	—	—	112.5	23.6	—
Total	39.8	7.2	50.1	118.9	26.4	35,278.8
Average year	6.6	1.2	8.3	19.8	4.4	5,879.8
Malabar Yard Railroad Improvements						
Year - 2028	1.9	<0.1	0.2	<0.1	<0.1	276
Year - 2029	6.5	0.1	0.6	<0.1	<0.1	946
Year - 2030	8.5	0.2	0.8	0.1	<0.1	1,385
Maximum Year	8.5	0.2	0.8	0.1	<0.1	1,385
Combined Build Alternative and Malabar Yard	15.1	1.4	9.1	19.9	4.4	7,265
De minimis level	100.0	10.0	10.0	100.0	70.0	—
Exceedance	No	No	No	No	No	—

Notes:
SO_2 is in attainment and does not have an applicable de minimis level in the South Coast Air Basin.
CO=carbon monoxide; CO_2e=carbon dioxide equivalent; NOx=nitrogen oxides; $PM_{2.5}$= particles of 2.5 microns or less; PM_{10}=particles of 10 microns or less; ROG=reactive organic gas

Construction emissions for the Build Alternative and Malabar Yard railroad improvements would be mitigated to a level that does not exceed the federal *de minimis* level for NOx, and no direct adverse effect would result under NEPA.

Health Risk

The 2019 Final EIR included an analysis of the potential for cancer risk and chronic hazard index to nearby sensitive receptors. As discussed in the Final EIR, after implementation of Mitigation Measure AQ-1 and AQ-2, the impacts associated with exposure of Project-related TAC emissions on sensitive receptors during construction were reduced to a level less than significant under CEQA. Mitigation Measure AQ-1 and AQ-2 would reduce the magnitude of air quality impacts from both the Build Alternative and Malabar Yard Railroad Improvements to sensitive receptors during construction and contribute to a reduction of emissions below *de minimis* levels. The *de minimis* levels are used to evaluate criteria air pollutant impacts on a regional level. On a local level, PM_{10} exhaust was used as a proxy for diesel particulate matter (DPM) to evaluate cancer risk at nearby receptors for the Build Alternative. Despite overlapping construction periods, Malabar Yard was considered separately for health risk as health risk considers more local impacts and the two project areas are miles apart. At Malabar Yard, on-site construction emissions were compared to local screening thresholds from SCAQMD and were found to be below the thresholds for all criteria air pollutants (NOx, CO, PM_{10}, $PM_{2.5}$). Therefore, no modeling was required to evaluate health risk for Malabar Yard. For further description of the localized analysis, refer to the quantitative health risk assessment in Appendix H, *Air Quality/Climate Change and Health Risk Assessment,* of the Link Union Station Project Final EIR (Metro 2019) and the updated health risk assessment in Chapter 7 of the EIS/SEIR.

6.1.2 Operations

Long-term air pollutant emission effects are those associated with stationary sources and mobile sources that may occur from increased train activity, mobile source emissions associated with vehicular trips in the Project study area, and stationary source emissions from on-site energy consumption.

On-Road, Energy, and Area Source Emissions

According to the *Link US Traffic Impact Assessment*, there would be 1,428 daily trips associated with the proposed office and retail land use square footage associated with the concourse-related improvements for the Build Alternative (Metro 2024). CalEEMod (version 2016.3.2) was used to calculate the operational emissions associated with the concourse-related improvements as part of the Build Alternative.

- Table 6-3 identifies the 2031 annual emissions from operation of the Build Alternative.
- Table 6-4 identifies the 2040 annual emissions from operation of the Build Alternative.

Table 6-3 and Table 6-4 identify the area source (architectural coatings, consumer products, and landscaping), energy source (electricity and natural gas), and mobile source (increased traffic) emissions associated with the proposed concourse-related improvements.

The proposed retail areas (up to 160,000 square feet) are anticipated to use a small amount of consumer products (cleaning supplies, hair spray, perfume, etc.), would require minimal

landscaping, and would require minor amounts of architectural coating after construction. Utilizing these assumptions, the area source emissions associated with the concourse-related improvements are negligible. The CalEEMod emission calculations are included in Appendix C.

Table 6-3. Annual Operational Emissions (2031)

Source	Pollutant Emissions (tons/year)					
	CO	NOx	ROG	SO_X	PM_{10}	$PM_{2.5}$
Area	0.0	0.0	2.4	0.0	0.0	0.0
Energy	0.1	0.1	0.0	0.0	0.0	0.0
Mobile	2.1	1.1	0.2	0.0	1.0	0.3
Total	2.1	1.2	2.6	0.0	1.0	0.3

Notes:
Columns may not add up because of rounding.
CO=carbon monoxide; NOx=nitrogen oxides; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ROG=reactive organic gas; SO_X=sulfur oxide

Table 6-4. Annual Operational Emissions (2040)

Source	Pollutant Emissions (tons/year)					
	CO	NOx	ROG	SO_X	PM_{10}	$PM_{2.5}$
Area	0.0	0.0	2.4	0.0	0.0	0.0
Energy	0.0	0.1	0.0	0.0	0.0	0.0
Mobile	1.6	1.1	0.1	0.0	1.0	0.3
Total	1.7	1.1	2.6	0.0	1.0	0.3

Notes:
Columns may not add up because of rounding.
CO=carbon monoxide; NOx=nitrogen oxides; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ROG=reactive organic gas; SO_X=sulfur oxide

Local Rail Emissions

Operational Benefits from Project-Related Capacity Enhancements

Concurrent with the planning and development of the proposed action, SCRRA is initiating the SCORE Program, a $10-billion plan that identifies the need for substantial investments in rail infrastructure in the Southern California region to upgrade the Metrolink system and meet the current and future needs of the traveling public. The Build Alternative is a critical component of the SCORE Program because it provides the capacity enhancements for Metro to accommodate the increase in train movements and associated passenger volumes forecast by existing (SCRRA,

Amtrak, Los Angeles – San Diego – San Luis Obispo Rail Corridor Agency) and future (CHSRA) operators at LAUS.

The Build Alternative would increase the capacity of LAUS by adding new run-though tracks over US-101. This additional capacity would reduce the time it takes trains to clear track segments in the throat. Additionally, the run-through tracks could reduce train dwell times by eliminating the need for crews to change operating ends before departing the station. With the addition of the run-through tracks, train operators could offer one seat through train services along certain routes, potentially attracting additional customers through new service offerings throughout the region.

Tier 4 Equipment and Renewable Diesel Assumptions - No Action

As discussed in Section 5.0, Methods and Effect Criteria, by 2040, all of the trains operating at LAUS are anticipated to meet Tier 4 emission standards; therefore, a gradual reduction in emissions between the existing condition (2016) and future conditions without the Build Alternative is assumed in this analysis, and presented accordingly to correspond to the reduction in emissions between 2016 and 2040 resulting from continued implementation of Tier 4 technology. In addition to meeting Tier 4 emission standards by 2040, both Metrolink and Amtrak have converted to using renewable diesel as of 2023. These emission reductions have been included in the evaluation of the No Action Alternative and the Build Alternative for future years 2026, 2031, and 2040.

Localized Air Quality Analysis

Adverse effects resulting from Project-related infrastructure improvements and the forecast increase in train movements at LAUS are evaluated in this air quality analysis. The operational scenarios for 2026, 2031, and 2040, as presented in Appendix A, would apply to the Build Alternative, and are influenced by statewide and regional plans for service increases and other required off-site infrastructure (i.e., SCORE Program). The operational scenarios represent a conservative estimate of the greatest potential effects based on forecast increases in regional/intercity rail train movements and HSR train movements that could occur through LAUS and are, therefore, appropriate for this evaluation.

The emissions from train operations were calculated by multiplying the 2016, 2026, 2031, and 2040 emission factors listed in U.S. EPA's *Emission Factors for Locomotives* (U.S. EPA 2009) to the distance in the project area. Emission reductions for renewable diesel were considered in the evaluation of the No Action Alternative and the Build Alternative for future years 2026, 2031, and 2040. Table 6-5 lists annual rail emissions generated within the Project study area for 2016 (existing condition), 2026, 2031, and 2040, respectively. The data is presented for the "With Project" condition (representative of the Build Alternative), relative to the "No Project" condition.

The increase in train emissions that may occur in 2026, 2031, and 2040 is due to the Project-related capacity enhancements at LAUS and within the Project study area. The train emission calculations are included in Appendix C. It should be noted that to avoid double counting any benefits that may be claimed by other transit projects, the increase in emissions listed in Table 6-5

for 2026, 2031, and 2040 do not take into consideration the associated regional VMT reductions anticipated from increased ridership.

Table 6-5. Annual Rail Emissions within the Project Study Area – Unmitigated

Year	Pollutant Emissions (tons/year)					
	CO	NOx	ROG	SO_X	PM_{10}	$PM_{2.5}$
Existing (2016)	10.3	46.1	2.1	0.0	1.2	1.2
2026 No Project	9.3	22.3	0.7	0.0	0.3	0.3
Change from Existing	-1.0	-23.8	-1.4	0.0	-0.9	-0.9
2026 (with Project)	16.6	40.0	1.3	0.1	0.6	0.6
Change from Existing	6.3	-6.2	-0.9	0.0	-0.6	-0.6
Change from No Project	7.3	17.6	0.6	0.0	0.3	0.3
2031 No Project	9.3	16.0	0.4	0.0	0.2	0.2
Change from Existing	-1.0	-30.1	-1.7	0.0	-1.0	-1.0
2031 with Project	22.1	38.3	1.0	0.0	0.5	0.4
Change from Existing	11.8	-7.8	-1.1	0.0	-0.8	-0.7
Change from No Project	12.9	22.2	0.6	0.0	0.3	0.3
2040 No Project	9.3	8.0	0.2	0.0	0.1	0.1
Change from Existing	-1.0	-38.1	-1.9	0.0	-1.1	-1.1
2040 with Project	24.6	21.3	0.5	0.1	0.2	0.2
Change from Existing	14.3	-24.8	-1.6	0.1	-1.0	-1.0
Change from No Project	15.4	13.3	0.3	0.1	0.1	0.1

Notes:
CO=carbon monoxide; NOx=nitrogen oxides; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ROG=reactive organic gas; SO_X=sulfur oxide

Total Combined Emissions

An indicator of the regional operational effect for the Build Alternative and Malabar Yard railroad improvements is the net influence on emissions for a future year, relative to the emissions for the same year if the Build Alternative and Malabar Yard railroad improvements were not implemented. The annual emissions are presented in Table 6-6, Table 6-7, and Table 6-8 for the 2026, 2031, and 2040 conditions, respectively. As shown in Table 6-6, the annual rail emissions in 2026 and

2031 increase with the implementation of the Build Alternative due to the increase in rail operations and increase in total idling hours.[9]

Table 6-6. Annual Operational Emissions (2026) – Unmitigated

Source	Pollutant Emissions (tons)					
	CO	NOx	ROG	SO_X	PM_{10}	$PM_{2.5}$
Rail emissions – No Project	9.3	22.3	0.7	0.0	0.3	0.3
Rail emissions with Project	16.6	40.0	1.3	0.1	0.6	0.6
Total Project emissions	16.6	40.0	1.3	0.1	0.6	0.6
Net Change	7.3	17.6	0.6	0.0	0.3	0.3
De minimis level	100.0	10.0	10.0	—	100.0	70.0
Exceedance	No	Yes	No	—	No	No

Notes:
The expanded passageway would not be constructed by 2026; therefore, no operational emissions generated by on-site uses and vehicle trips are included.
CO=carbon monoxide; NOx=nitrogen oxides; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ROG=reactive organic gas; SO_X=sulfur oxide

Table 6-7. Annual Operational Emissions (2031) – Unmitigated

Source	Pollutant Emissions (tons)					
	CO	NOx	ROG	SO_X	PM_{10}	$PM_{2.5}$
Build Alternative						
Rail emissions – No Project	9.3	16.0	0.4	0.0	0.2	0.2
Rail emissions with Project	22.1	38.3	1.0	0.0	0.5	0.4
Operational emissions with Project	2.1	1.2	2.6	0.0	1.0	0.3
Total Project emissions	24.3	39.4	3.7	0.1	1.4	0.7
Net Change	15.0	23.4	3.2	0.1	1.2	0.5
Malabar Yard Railroad Improvements						
Year 1	0.00	-7.87	0.00	—	-0.12	0.00

[9] Operation of the Build Alternative would reduce dwell times for Metrolink and Amtrak Surfliner thru trains, but this decrease in idling time per train trip would be outweighed by the growth of rail operations.

Table 6-7. Annual Operational Emissions (2031) – Unmitigated

Source	Pollutant Emissions (tons)					
	CO	NOx	ROG	SO_X	PM_{10}	$PM_{2.5}$
Combined Build Alternative and Malabar Yard Railroad Improvements	15.0	15.5	3.2	—	1.1	0.5
De minimis level	100.0	10.0	10.0	—	100.0	70.0
Exceedance	No	Yes	No	—	No	No

Notes:
CO=carbon monoxide; NOx=nitrogen oxides; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ROG=reactive organic gas; SO_X=sulfur oxide

Table 6-8. Annual Operational Emissions (2040) – Unmitigated

Source	Pollutant Emissions (tons)					
	CO	NOx	ROG	SO_X	PM_{10}	$PM_{2.5}$
Build Alternative						
Rail emissions – No Project	9.3	8.0	0.2	0.0	0.1	0.1
Rail emissions with Project	24.6	21.3	0.5	0.1	0.2	0.2
Operational emissions with Project	1.7	1.1	2.6	0.0	1.0	0.3
Total Project emissions	26.3	22.5	3.1	0.1	1.2	0.5
Net Change	17.1	14.4	2.9	0.1	1.1	0.4
Malabar Yard Railroad Improvements						
Year 20	-1.54	-33.31	-0.19	—	-0.57	-0.2
Combined Build Alternative and Malabar Yard Railroad Improvements	15.56	-18.91	2.71	—	0.53	0.2
De minimis level	100.0	10.0	10.0	—	100.0	70.0
Exceedance	No	No	No	—	No	No

Notes:
CO=carbon monoxide; NOx=nitrogen oxides; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ROG=reactive organic gas; SO_X=sulfur oxide

As identified in Table 6-6 and Table 6-7, operation of the Build Alternative in years 2026 and 2031, including emission reductions from Malabar Yard as applicable, would exceed the *de minimis* level for NOx in the unmitigated scenario. As identified in Table 6-8, the net increase in annual emissions associated with operation of the Build Alternative in year 2040 would be offset by the

reduction in emissions from the Malabar Yard railroad improvements and would not exceed the *de minimis* level for any criteria pollutant. Mitigation Measure AQ-3 (described in Section 7.2) is proposed to reduce the rail exhaust emissions, particularly for NOx.

Operational Emissions after Mitigation

Based on the results of the operational air quality analysis, operation of the Build Alternative would result in an adverse effect from the increase in NOx for years 2026 and 2031, thereby requiring Mitigation Measure AQ-3. Mitigation Measure AQ-3 (described in Section 7.2) requires implementation of emerging technologies such as electric or alternative fuel technology to reduce the CO, NOx, ROG, PM_{10}, and $PM_{2.5}$ exhaust emissions. Specifically, Mitigation Measure AQ-3 requires an adaptive air quality mitigation plan to be implemented, in conjunction with replacement of the rail fleet with zero- or low-emission locomotives consistent with the *2018 California State Rail Plan.* Mitigation Measure AQ-3 allows for a range of emission reduction strategies to reduce operational emissions below SCAQMD thresholds. The mitigated emissions calculated herein demonstrate a potential route to achieving these emission reductions using recent public documents from Metrolink and Amtrak including Metrolink's *2021 Climate Action Plan*, Metrolink's *2023 Zero Emission Report*, Metrolink's *Rail Fleet Management Plan Update FY2020-FY2040*, and Amtrak's *FY22 Sustainability Report*. Both the unmitigated and mitigated scenarios account for renewable diesel for Metrolink and Amtrak trains as that has already been implemented by the operators. This analysis assumes that Metrolink will operate a fully Tier 4 locomotive fleet by 2026 in the mitigated scenario. Metrolink has already been transitioning their locomotive fleet to Tier 4 as of 2017 and will continue to reduce their locomotive emissions with a goal of 100 percent zero emissions by 2028 for their revenue fleet and 27.5 percent electric trains for the non-revenue light duty fleet emissions in the next 7-10 years (Metrolink 2021; Metrolink 2023). Amtrak trains were assumed to incorporate 15 percent Tier 4 locomotives by 2026, 40 percent by 2031, and 80 percent by 2040 (Amtrak 2022). Based on the state of the technology and climate and sustainability goals set by Metrolink and Amtrak, pollutant concentrations are assumed to further decrease by 30 percent in 2026 and 50 percent in 2031 and 2040 with implementation of emerging rail technologies beyond Tier 4. The mitigated annual emissions are presented in Table 6-9, Table 6-10, and Table 6-11 for the 2026, 2031, and 2040 conditions, respectively. As identified in Table 6-9, Table 6-10, and Table 6-11, the annual emissions would be below the *de minimis* levels after mitigation. While Malabar Yard operational Year 20 would be 2050 and would not directly align with 2040 annual operational emissions of the Build Alternative at LAUS, no mitigation to reduce operational emissions is required because the downward trend in emissions between Year 1 and Year 20 would still result in enough reduced emissions so that *de minimis* levels for any criteria pollutant are not exceeded. Therefore, the Build Alternative and Malabar Yard railroad improvements would result in no direct adverse effect to air quality during operations.

Table 6-9. Annual Operational Emissions (2026) – Mitigated

Source	Pollutant Emissions (tons)					
	CO	NOx	ROG	SO_X	PM_{10}	$PM_{2.5}$
Rail emissions – No Project	9.3	22.3	0.7	0.0	0.3	0.3
Rail emissions with Project	11.6	11.4	0.1	0.1	0.1	0.1
Total Project emissions	11.6	11.4	0.1	0.1	0.1	0.1
Net Change	2.4	-11.0	-0.6	0.0	-0.2	-0.2
De minimis level	100.0	10.0	10.0	—	100.0	70.0
Exceedance	No	No	No	—	No	No

Notes:
The expanded passageway would not be constructed by 2026; therefore, no operational emissions generated by on-site uses and vehicle trips are included.
CO=carbon monoxide; NOx=nitrogen oxides; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ROG=reactive organic gas; SO_X=sulfur oxide

Table 6-10. Annual Operational Emissions (2031) – Mitigated

Source	Pollutant Emissions (tons)					
	CO	NOx	ROG	SO_X	PM_{10}	$PM_{2.5}$
Build Alternative						
Rail emissions – No Project	9.3	16.0	0.4	0.0	0.2	0.2
Rail emissions with Project	11.1	9.3	0.1	0.0	0.1	0.1
Operational emissions with Project	2.1	1.2	2.6	0.0	1.0	0.3
Total Project emissions	13.2	10.5	2.7	0.1	1.1	0.4
Net Change	3.9	-5.6	2.3	0.0	0.9	0.2
Malabar Yard Railroad Improvements						
Year 1	0.0	-7.9	0.0	—	-0.1	0.0
Combined Build Alternative and Malabar Yard Railroad Improvements	3.9	-13.5	2.3	—	0.8	0.2
De minimis level	100.0	10.0	10.0	—	100.0	70.0
Exceedance	No	No	No	—	No	No

Notes:
CO=carbon monoxide; NOx=nitrogen oxide; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ROG=reactive organic gas; SO_X=sulfur oxide

Table 6-11. Annual Operational Emissions (2040) – Mitigated

Source	Pollutant Emissions (tons)					
	CO	NOx	ROG	SO_X	PM_{10}	$PM_{2.5}$
Build Alternative						
Rail emissions – No Project	9.3	8.0	0.2	0.0	0.1	0.1
Rail emissions with Project	12.3	9.7	0.0	0.1	0.1	0.1
Operational emissions with Project	1.7	1.1	2.6	0.0	1.0	0.3
Total Project emissions	14.0	10.8	2.6	0.1	1.1	0.4
Net Change	4.8	2.8	2.4	0.0	1.0	0.3
Malabar Yard Railroad Improvements						
Year 20	-1.5	-33.3	-0.2	—	-0.6	-0.2
Combined Build Alternative and Malabar Yard Railroad Improvements	3.3	-30.5	2.2	—	0.4	0.1
De minimis level	100.0	10.0	10.0	—	100.0	70.0
Exceedance	No	No	No	—	No	No

Notes:
CO=carbon monoxide; NOx=nitrogen oxides; $PM_{2.5}$=particles of 2.5 micrometers and smaller; PM_{10}=particles of 10 micrometers and smaller; ROG=reactive organic gas; SO_X=sulfur oxide

Health Risk

Emission reductions from use of Tier 4 locomotives, renewable diesel, and implementation of Mitigation Measure AQ-3 (described in Section 7.2) would achieve a reduction of pollutant concentrations to below SCAQMD's threshold of 10 in 1 million for cancer risk for the identified sensitive receptors. Criteria air pollutant emission reductions were carried through for the health risk modeling. Similar to construction, Malabar Yard was considered separately for health risk as health risk considers more local impacts and the two project areas are miles apart. At Malabar Yard, on site operational emissions were compared to local screening thresholds from SCAQMD and were found to be below the thresholds for all criteria air pollutants (NOx, CO, PM_{10}, $PM_{2.5}$). Therefore, no modeling was required to evaluate health risk for Malabar Yard. For further description of the localized analysis, refer to the quantitative health risk assessment in Appendix H, *Air Quality/Climate Change and Health Risk Assessment,* of the Link Union Station Project Final EIR (Metro 2019) and Appendix Q of the EIS/SEIR.

6.2 Mobile Source Air Toxics Analysis

The Build Alternative was evaluated to determine if an MSAT analysis would be required or if an exemption is applicable. As shown in Table 6-9, Table 6-10, Table 6-11, the annual PM_{10} rail emissions would decrease between 2026 and 2040. Diesel PM (a component of PM_{10}) is the dominant MSAT of concern for highway projects. The Project is not a highway project and would decrease regional VMT, which would therefore also decrease regional MSATs. As a result, the Build Alternative would have no effect on the regional MSAT emissions. Consequently, based on the FHWA's 2023 MSAT guidance, the Build Alternative is considered to have low potential MSAT effects, and a quantitative analysis of MSAT emissions is not warranted (FHWA 2023).

6.3 Climate Change

GHG emissions for transportation projects can be divided into those generated during construction and those generated during operations. Construction GHG emissions include emissions generated as a result of material processing, emissions produced by on-site construction equipment, and emissions arising from traffic delays because of construction. These emissions would be generated at different levels throughout the construction phase; their frequency and occurrence can be reduced through contractor means and methods, and implementation of innovations in plans and specifications for better traffic management during construction phases.

Table 6-12 lists the annual GHG emissions that would be generated during construction of the Build Alternative.

Up to 47,900 tons of CO_2e would be generated during the 6-year construction period for the Build Alternative; this is equivalent to 43,454 MT of CO_2e. Amortized over a 30-year period, the approximate life of the Project, the yearly contribution to GHG from construction of the Build Alternative would be 1,448.5 MT of CO_2e per year. Demolition, construction, and clearing activities for Malabar Yard railroad improvements would generate approximately 2,608 metric tons of CO_2e. Amortized over a 30-year period, the approximate life of the Malabar Yard railroad improvements, the yearly contribution to GHG from construction would be 87 MT of CO_2e for a combined total of 1,535 MT of CO_2e.

The following activities associated with operation of the Build Alternative could directly or indirectly contribute to the generation of GHG emissions:

- **Gas, Electricity, and Water Use** – Natural gas use results in the emissions of two GHGs: CH_4 (the major component of natural gas) and CO_2 from the combustion of natural gas. Electricity use can result in GHG production if the electricity is generated by combusting fossil fuel.
- **Solid Waste Disposal** – Solid waste generated could contribute to GHG emissions in a variety of ways. Landfilling and other methods of disposal use energy for transporting and managing the waste, and they produce additional GHGs to varying degrees. Landfilling,

the most common waste management practice, results in the release of CH_4 from the anaerobic decomposition of organic materials. CH_4 is 21 times more potent a GHG than CO_2. However, landfill CH_4 can also be a source of energy. In addition, many materials in landfills do not decompose fully, and the carbon that remains is sequestered in the landfill and not released into the atmosphere.

- **Motor Vehicle Use** – Vehicular traffic would result in GHG emissions from the combustion of fossil fuels. According to the traffic analysis conducted (*Link US Traffic Impact Assessment,* Appendix E of the Link Union Station EIS/SEIR), 1,428 trips per day are estimated to occur from the on-site office and retail land uses.
- **Train Emissions** – As discussed above and in Appendix A, Metro estimates the proposed capacity enhancements will reduce dwell time at LAUS and contribute to other cumulative benefits for the region, including a regional reduction of GHG emissions and VMT. Future service scenarios would depend on ongoing negotiations between the railroad operators, available infrastructure (corridor, maintenance facility, etc.) throughout the Metrolink system and beyond, and available operating funding. The Build Alternative, by itself, does not enable regional/intercity rail providers to meet the objectives of the SCORE Program, nor does it enable CHSRA to meet their service goals, primarily because other infrastructure improvements on the entire system are required to meet the forecast service levels by 2040. Therefore, the GHG emissions analysis provided herein only considers the change in localized idling emissions and not the system-wide change in rail emissions. It should be noted the Build Alternative is a key to facilitating regional GHG emission reductions. Operation of the Malabar Yard railroad improvements would reduce truck VMT, which would be required to make up for the loss of mainline rail network capacity and diversion of rail served demand to long haul trucking. The reduction in truck VMT means reduced fuel consumption by truck, which in turn means reduced GHG emissions.

The projected GHG emissions for the Build Alternative and Malabar Yard railroad improvements would be the summation of the individual sources identified above and the amortized construction emissions.

As identified in Table 6-12, for the Build Alternative and Malabar Yard railroad improvements, the total annual GHG emissions from construction and operation would be approximately 9,524 MT of CO_2e per year, which is less than the federal reporting threshold of 25,000 MT of CO_2e per year. The analysis conservatively assumes the first year of operations for Malabar Yard. The amount of avoided emissions from Malabar Yard railroad improvements would increase substantially by Year 20 and Year 30.

Table 6-12. Annual Greenhouse Gas Emissions – Build Alternative and Malabar Yard railroad improvements (2040)

Source	Pollutant Emissions (MT/year)					
	Biogenic-CO_2	Nonbiogenic-CO_2	CO_2	CH_4	N_2O	CO_2e
Construction emissions for Build Alternative amortized over 30 years	0.0	1,447.3	1,447.3	0.1	0.0	1,448.5
Construction Emissions for Malabar Yard Amortized over 30 Years	0.0	86.4	86.4	0.0	0.0	86.9
Combined Construction Emissions Amortized over 30 Years	0.0	1533.7	1533.7	0.1	0.0	1535.4
Operational Emissions for Build Alternative						
Area sources	0.0	0.0	0.0	0.0	0.0	0.0
Energy sources	0.0	4,272.0	4,272.0	0.1	0.0	4,281.7
Mobile sources	0.0	843.2	843.2	0.0	0.0	844.0
Waste sources	127.2	0.0	127.2	7.5	0.0	315.0
Water usage	15.1	485.5	500.6	1.6	0.0	551.3
Total operational emissions	142.3	5,600.6	5,742.9	9.2	0.1	5,992.0
Operational Emissions for Malabar Yard						
Year 1	—	—	-2,587	—	—	-2,857
Rail Emissions						
No Project	0.0	2,979.1	2,979.1	0.0	0.0	2,979.1
Project	0.0	7,832.7	7,832.7	0.0	0.0	7,832.7
Net Change	0.0	4,853.6	4,853.6	0.0	0.0	4,853.6
Total Operational emissions	—	—	7,739.5	—	—	7,988.6

Table 6-12. Annual Greenhouse Gas Emissions – Build Alternative and Malabar Yard railroad improvements (2040)

Source	Pollutant Emissions (MT/year)					
	Biogenic-CO_2	Nonbiogenic-CO_2	CO_2	CH_4	N_2O	CO_2e
Total Emissions with construction	—	—	9,274.9	—	—	9,524.0

Notes:
Bio-CO_2=biogenic carbon dioxide; CH_4=methane; CO_2=carbon dioxide; CO_2e=carbon dioxide equivalents; MT=metric tons; N_2O=nitrous oxide; NBio-CO_2=nonbiogenic carbon dioxide

6.3.1 Climate Change after Mitigation

Similar to the analysis methodology applied for pollutant emissions, the GHG emission reductions are based on calculations using information from recent public documents from Metrolink and Amtrak including Metrolink's *2021 Climate Action Plan*, Metrolink's *2023 Zero Emission Report, Metrolink's Rail Fleet Management Plan Update FY2020-FY2040*, and Amtrak's *FY22 Sustainability Report*. Although not required to avoid adverse effects related to GHG emissions, Mitigation Measure AQ-3 (described in Section 7.2) would reduce the operational GHG emissions from the Build Alternative. Mitigation Measure AQ-3 is estimated to reduce the locomotive emissions by 30 percent in 2026 and by 50 percent in 2031 and 2040 described in Section 6.1.2. Mitigation Measure AQ-3 allows for a range of potential technologies that are still under development, so these percentages are assumed based on the projected integration of electric trains. Based on the Amtrak *FY22 Sustainability Report*, Amtrak has set a path to net zero by 2045. Metrolink's *2021 Climate Action Plan* sets a moon-shot goal for 100 percent zero emissions by 2028 for the revenue fleet emissions and 27.5 percent electric trains for the non-revenue light duty fleet emissions in the next 7-10 years. As the majority of the trains assumed to operate through LAUS are in the Metrolink revenue fleet, integration of zero emission trains is conservatively assumed as 30 percent by 2026 and 50 percent by 2031 and 2040. This assumption is also consistent with Amtrak's net zero goal by 2045. Table 6-13 identifies the mitigated GHG emissions for the Build Alternative and Malabar Yard railroad improvements.

In comparison to the 2016 train movements (baseline year), the Build Alternative would result in 245 additional train movements as early as 2026, 537 additional train movements as early as 2031, and 597 additional train movements as early as 2040. Despite this increase in trips from a localized perspective, GHG emissions would still decrease overall with the implementation of Mitigation Measure AQ-3, which requires implementation of rail fleet emerging technologies.

Table 6-13. Cumulative Greenhouse Gas Emissions – Build Alternative and Malabar Yard Railroad Improvements (2040) - Mitigated

Source	Pollutant Emissions (MT/year)					
	Biogenic-CO_2	Nonbiogenic-CO_2	CO_2	CH_4	N_2O	CO_2e
Construction emissions for Build Alternative amortized over 30 years	0.0	1,065.6	1,065.6	0.1	0.0	1,066.8
Construction Emissions for Malabar Yard Amortized over 30 Years	0.0	86.4	86.4	0.0	0.0	86.9
Combined Construction Emissions Amortized over 30 Years	0.0	1,152.0	1,152.0	0.1	0.0	1,153.7
Operational Emissions for Build Alternative						
Area sources	0.0	0.0	0.0	0.0	0.0	0.0
Energy sources	0.0	4,272.0	4,272.0	0.1	0.0	4,281.7
Mobile sources	0.0	843.2	843.2	0.0	0.0	844.0
Waste sources	127.2	0.0	127.2	7.5	0.0	315.0
Water usage	15.1	485.5	500.6	1.6	0.0	551.3
Total operational emissions	142.3	5,600.6	5,742.9	9.2	0.1	5,992.0
Operational Emissions for Malabar Yard						
Year 1	—	—	-2,857	—	—	-2,857
Rail Emissions						
No Project	0.0	2,979.1	2,979.1	0.0	0.0	2,979.1
Project	0.0	3,916.4	3,916.4	0.0	0.0	3,916.4
Net Change	0.0	937.3	937.3	0.0	0.0	937.3
Total Operational emissions	—	—	4,072.2	—	—	4,072.2

Table 6-13. Cumulative Greenhouse Gas Emissions – Build Alternative and Malabar Yard Railroad Improvements (2040) - Mitigated

Source	Pollutant Emissions (MT/year)					
	Biogenic-CO_2	Nonbiogenic-CO_2	CO_2	CH_4	N_2O	CO_2e
Total emissions with Construction	—	—	5,225.9	—	—	5,225.9

Notes:
Bio-CO_2=biogenic carbon dioxide; CH_4=methane; CO_2=carbon dioxide; CO_2e=carbon dioxide equivalents; MT=metric tons; N_2O=nitrous oxide; NBio-CO_2=nonbiogenic carbon dioxide

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7.0 Mitigation Measures

Implementation of the following mitigation measures would minimize potential for adverse effects on air quality and global climate change. As discussed above, Mitigation Measure AQ-1 is a requirement of the Link US Final EIR and Malabar Yard Mitigation Measure AQ-1 is a requirement of SCAQMD to reduce daily fugitive dust emissions and associated air quality impacts. Although not required as mitigation to reduce adverse effects under NEPA, Mitigation Measure AQ-1 and Malabar Yard Mitigation Measure AQ-1 are presented here to provide a transparent and comprehensive disclosure of the measures that would be implemented during construction.

7.1 Construction

Implementation of the following mitigation measures would minimize potential for adverse effects on air quality during construction:

AQ-1 **Fugitive Dust Control:** In compliance with SCAQMD Rule 403, during clearing, grading, earthmoving, or excavation operations, fugitive dust emissions shall be controlled by regular watering or other dust preventive measures using the following procedures, as specified in SCAQMD Rule 403:

- Minimize land disturbed by clearing, grading, and earthmoving, or excavation operations to prevent excessive amounts of dust.
- Provide an operational water truck on-site at all times; use watering trucks to minimize dust; watering should be sufficient to confine dust plumes to the Project work areas; watering shall occur at least twice daily with complete coverage, preferably in the late morning and after work is done.
- Suspend grading and earthmoving when wind gusts exceed 25 miles per hour unless the soil is wet enough to prevent dust plumes.
- Securely cover trucks when hauling materials on or off site.
- Stabilize the surface of dirt piles if not removed immediately.
- Limit vehicular paths and limit speeds to 15 miles per hour on unpaved surfaces and stabilize any temporary roads.
- Minimize unnecessary vehicular and machinery activities.
- Sweep paved streets at least once per day where there is evidence of dirt that has been carried on to the roadway.
- Revegetate or stabilize disturbed land, including vehicular paths created during construction to avoid future off-road vehicular activities.

The following measures shall also be implemented to reduce construction emissions:

- The construction contractor shall prepare and update on a monthly basis a comprehensive inventory list of all heavy-duty off-road (portable and mobile)

equipment (50 horsepower and greater) (i.e., make, model, engine year, horsepower, emission rates) that could be used an aggregate of 40 or more hours throughout the duration of construction to demonstrate how the construction fleet is consistent with the requirements of Metro's Green Construction Policy.

- Ensure that all construction equipment is properly tuned and maintained.
- Minimize idling time to 5 minutes, whenever feasible, which saves fuel and reduces emissions.
- Utilize existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators, whenever feasible.
- The construction contractor shall arrange for appropriate consultations with the CARB or the SCAQMD to determine registration and permitting requirements prior to equipment operation at the site and obtain CARB Portable Equipment Registration with the state or a local district permit for portable engines and portable engine-driven equipment units used at the Project worksite, with the exception of on-road and off-road motor vehicles, as applicable.

These control techniques shall be included in Project specifications and shall be implemented by the construction contractor.

AQ-2 **Compliance with U.S. EPA's Tier 4 Final Exhaust Emission Standards and Renewable Diesel Fuel for Off-Road Equipment:** In compliance with Metro's Green Construction Policy, all off-road diesel powered construction equipment greater than 50 horsepower shall comply with U.S. EPA's Tier 4 Final exhaust emission standards (40 CFR Part 1039). In addition, if not already supplied with a factory-equipped diesel particulate filter, all construction equipment shall be outfitted with Best Available Control Technology devices certified by the CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.

In addition to the use of Tier 4 equipment, all off-road construction equipment shall be fueled using 100 percent renewable diesel.

MY AQ-1 **(same as Mitigation Measure AQ-1)**

MY AQ-2 **(same as Mitigation Measure AQ-2)**

7.2 Operations

Implementation of the following mitigation measures would minimize potential for adverse effects on air quality during operations:

AQ-3 **Adaptive Air Quality Mitigation Plan:** Prior to implementation of regional/intercity rail run-through service, an Adaptive Air Quality Mitigation Plan shall be prepared by Metro, in coordination with SCRRA, as the operator of the commuter rail service in Southern California and the program manager and grant recipient of the SCORE Program, Amtrak, and the Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency. The Plan shall identify the methodology and requirements for annual emission inventories to be prepared by Metro, based on actual/current train movements and corresponding pollutant concentrations through the year 2040.

Mitigation Plan Requirements: Upon implementation of regional/intercity run-through service, and on an annual basis, Metro shall compile and summarize the current Metrolink, Pacific Surfliner, and Amtrak long-distance train schedules to determine the actual level of daily and peak-period train movements (including non-revenue train movements) that operate through LAUS.

On an annual basis, Metro shall retain the services of an air quality specialist to conduct an annual emissions inventory to determine if actual train movements through LAUS are forecast to increase criteria pollutant emissions to a level that would exceed the SCAQMD significance thresholds or diesel pollutant concentrations to a level that would exceed the SCAQMD's 10 in 1 million threshold at any residential land use in the Project study area. An annual report shall be prepared by Metro that summarizes the quantitative results of pollutant emissions and diesel pollutant concentrations in the Project study area. If pollutant emissions or diesel pollutant concentrations are projected to exceed the SCAQMD thresholds, the regional and intercity rail operators, in coordination with Metro, who has authority as the owner of Union Station, and California State Transportation Agency, shall either implement rail fleet emerging technologies consistent with *2018 California State Rail Plan* Goal 6: *Practice Environmental Stewardship*, Policy 4: *Transform to a Clean and Energy Efficient Transportation System* (California Department of Transportation 2018: pg. 10 and 110), or reduce the train movements through LAUS to lower the criteria pollutant emissions below the SCAQMD significance thresholds and the diesel pollutant concentrations below the SCAQMD thresholds in the Project study area.

After implementation of emerging technologies, Metro shall continue to prepare an emissions inventory in coordination with SCRRA, Amtrak, and the Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency annually to report the quantitative results of criteria pollutant emissions and diesel pollutant concentrations in the Project study area. The annual report shall include an analysis of the actual (current) and proposed changes in train schedules relative to criteria pollutant emissions and diesel pollutant

concentration levels in the Project study area. The report shall be prepared annually by December 31 of each year, beginning the calendar year after implementation of regional/intercity rail run-through service through 2040 and shall include results of the emissions inventory and effectiveness of the measures implemented.

Rail Fleet Emerging Technologies: To achieve a reduction of criteria pollutant emissions below the SCAQMD thresholds and diesel pollutant concentrations below a level that would not exceed SCAQMD thresholds, the regional and intercity rail operators may replace, retrofit, or supplement some or all of their existing fleet with zero- or low-emission features. The types of emerging technologies that can be implemented, include, but are not limited to the following:

- Electric multiple unit systems.
- Diesel multiple units.
- Battery-hybrid multiple units.
- Renewable diesel and other alternative fuels.

Metro shall coordinate with regional rail/intercity rail operators to incorporate these emerging technologies into existing and/or future funding and/or operating agreements to reduce locomotive exhaust emissions in the Project study area.

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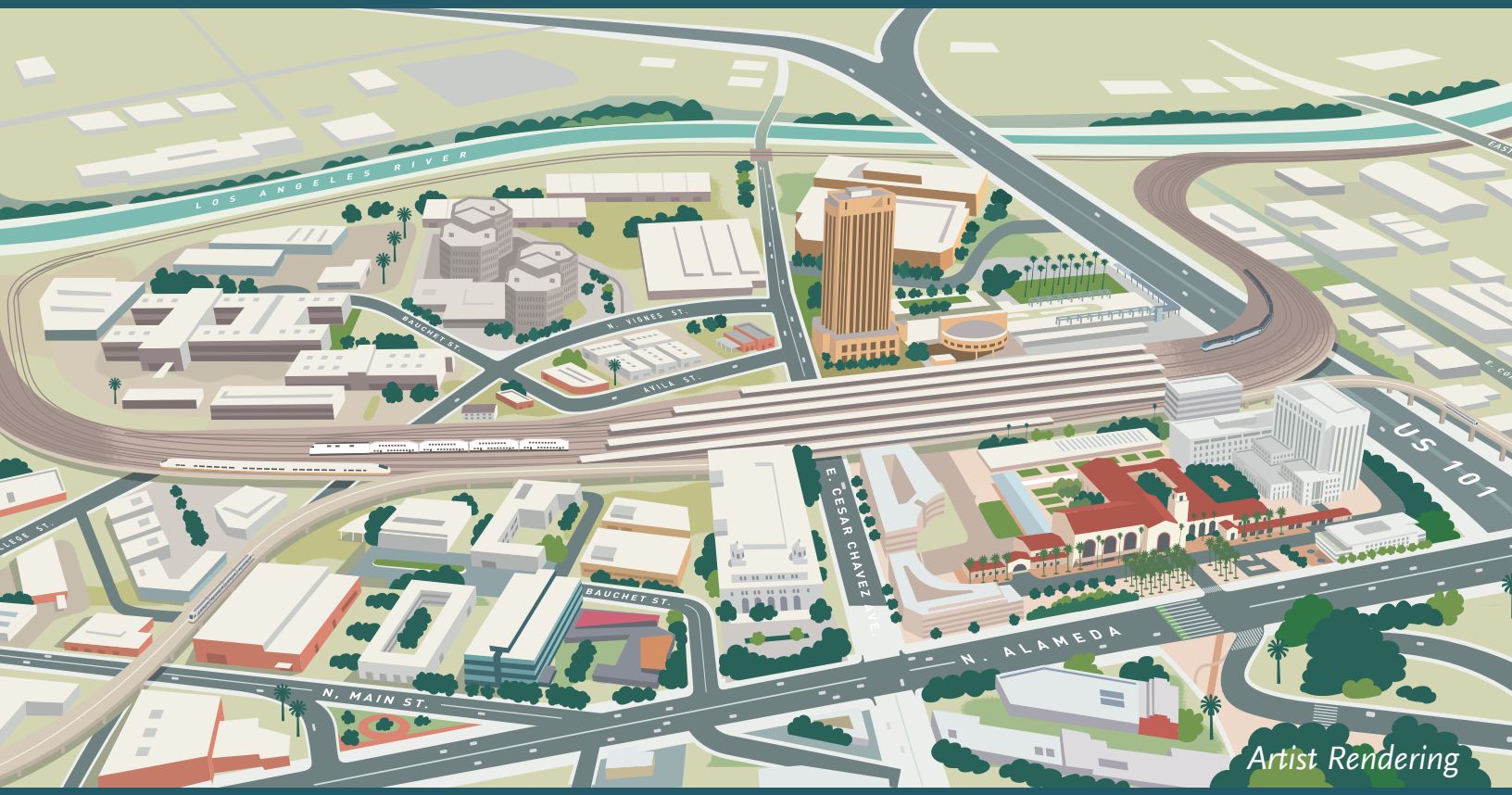
Appendix A:
Rail Planning Technical Memorandum

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Link Union Station

Draft Rail Planning Technical Memorandum

June 2024



The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

Metro

CALIFORNIA High-Speed Rail Authority

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Appendix A: Existing Metrolink and Amtrak Train Schedules

Appendix B: Metrolink and Amtrak Forecast – Daily and for 6-Hour AM/PM Peak for 2026, 2031, and 2040

ACRONYMS

Caltrans	California Department of Transportation
CHSRA	California High-Speed Rail Authority
FTIP	Federal Transportation Improvement Program
GHG	Greenhouse gas
HSR	High-Speed Rail
LAUS	Los Angeles Union Station
Link US	Link Union Station
LOSSAN	Los Angeles-San Diego-San Luis Obispo
Metro	Los Angeles County Metropolitan Transportation Authority
Project	Link Union Station Project
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SCORE	Southern California Optimized Rail Expansion

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1.0 Introduction

The California High-Speed Rail Authority (CHSRA) and the Los Angeles County Metropolitan Transportation Authority (Metro) are proposing the Link Union Station (Link US) Project (Project) to transform Los Angeles Union Station (LAUS) from a "stub-end tracks station" into a "run-through tracks station" with a new passenger concourse that would increase rail service capacity of the station and accommodate forecasted increases in passenger and transportation demands in the region.

The purpose of this memorandum is to provide an estimate of daily train movements (i.e., train counts) for all Metrolink, Pacific Surfliner, Amtrak, and High-Speed Rail (HSR) trains that pass through LAUS in 2016 (baseline year of analysis), the years 2026[1] and 2031 that correspond to the two major phases of project implementation (interim condition and full build-out condition), and the horizon year considered in this Environmental Impact Statement/Supplemental Environmental Impact Report (2040)[2]. Improvements to the Gold Line and/or Regional Connector Transit Corridor and associated service levels/train movements through LAUS are not considered in this memorandum. Although both Gold Line and the Regional Connector light rail trains use LAUS[3], all operational aspects and train movements through LAUS for these two Metro system lines are addressed through separate Metro documentation (Metro 2012). The information contained within this memorandum was prepared solely to provide a conservative estimate of the number of trains projected to pass through LAUS to facilitate an environmental evaluation of potential localized traffic, air quality, and noise and vibration effects that may result from Project-related capacity enhancements.

The information contained within this memorandum represents an estimate of future train movements through LAUS to provide a basis for the environmental evaluation only and is not intended in any way to indicate future rail operational scenarios or stakeholder consensus on future service levels for shared train operations at LAUS.

[1] The 2026 implementation year was added to reflect Metrolink's growth plans under Phase 1 of the Transit and Intercity Rail Capital Program; although the ability of LAUS to accommodate increased off-peak services during construction has not been tested.

[2] As discussed in the Environmental Impact Statement/Supplemental Environmental Impact Report (EIS/SEIR) Chapter 2 (Section 2.4, Project Implementation Approach), the infrastructure improvements as part of the interim and full build-out conditions would be implemented as early as 2026 and 2031, respectively. The year 2040 corresponds to the horizon year with corresponding service goals and objectives of multiple statewide plans and mandates.

[3] With the renaming of the Metro system lines which occurred in 2019 and operation of the Regional Connector commencing on June 16, 2023, the Red, Purple, and Gold Lines were renamed in the Metro system. The stretch of the Gold Line from LAUS to Azusa is now part of the A Line, while the portion from LAUS to East Los Angeles has been added to the E Line. The Red Line is now the B Line stretching from North Hollywood to LAUS, and the Purple Line is now the D Line stretching from Wilshire/Western to LAUS.

1.1 Project Background and Concurrent Operational Analysis

1.1.1 Project Background

In parallel with Project implementation, the Southern California Regional Rail Authority is currently developing the Southern California Optimized Rail Expansion (SCORE) Program, a $10 billion plan that identifies the need for substantial investments in rail infrastructure in Southern California to upgrade the Metrolink system and meet the current and future needs of the traveling public. The Project is a critical component of the SCORE Program, providing capacity enhancements to fulfill the program objectives.

Localized environmental effects resulting from Project-related infrastructure improvements and forecasted increases in train movements at LAUS are evaluated in the environmental documentation for the Project. The operational scenarios for 2026, 2031, and 2040 are influenced by statewide and regional plans for service increases and other required off-site infrastructure (i.e., SCORE program). The operational scenarios represent a conservative estimate of the forecasted increases in regional/intercity rail trips and new HSR train trips that could occur through LAUS.

Infrastructure improvements outside of the Project study area that are required to implement system-wide efficiencies and changes in regional/intercity operations from implementation of the SCORE Program are not part of the Project and are the responsibility of the Southern California Regional Rail Authority and other agency partners. Furthermore, the operational aspects of the planned HSR system and the associated environmental effects are not evaluated in the environmental documentation for the Project because operation of the planned HSR system and the associated effects are addressed separately in the environmental documentation prepared by CHSRA for the Burbank to Los Angeles and Los Angeles to Anaheim Project Sections.

1.1.2 Concurrent Operational Analysis

Although general operational planning information and background data are presented in this memorandum, this document is not intended to be a detailed rail operations technical memorandum. The reader should note that there are ongoing rail operations modeling activities concurrently underway by CHSRA.

In addition to CHSRA's work, Metrolink is currently in the process of creating a comprehensive operations plan to help independently analyze the optimal infrastructure design and service plan for the LAUS terminal, which is necessary for the successful implementation of the SCORE Program. Lastly, Metro's Project team will continue to perform operational analyses of LAUS infrastructure and service alternatives.

1.2 Project Location and Study Area

The Build Alternative consists of infrastructure improvements in Downtown Los Angeles in the vicinity of LAUS (Figure 1-1). LAUS is located at 800 Alameda Street in the City of Los Angeles, California. LAUS is bounded by United States Highway 101 (US-101) to the south, Alameda Street to the west, Cesar Chavez Avenue to the north, and Vignes Street to the east. The northern Project limit is at North Main Street (Mile Post 1.18) and the southern Project limit is in the vicinity of Control Point (CP) Olympic, south of Interstate 10 and Olympic Boulevard (Mile Post 142.70).

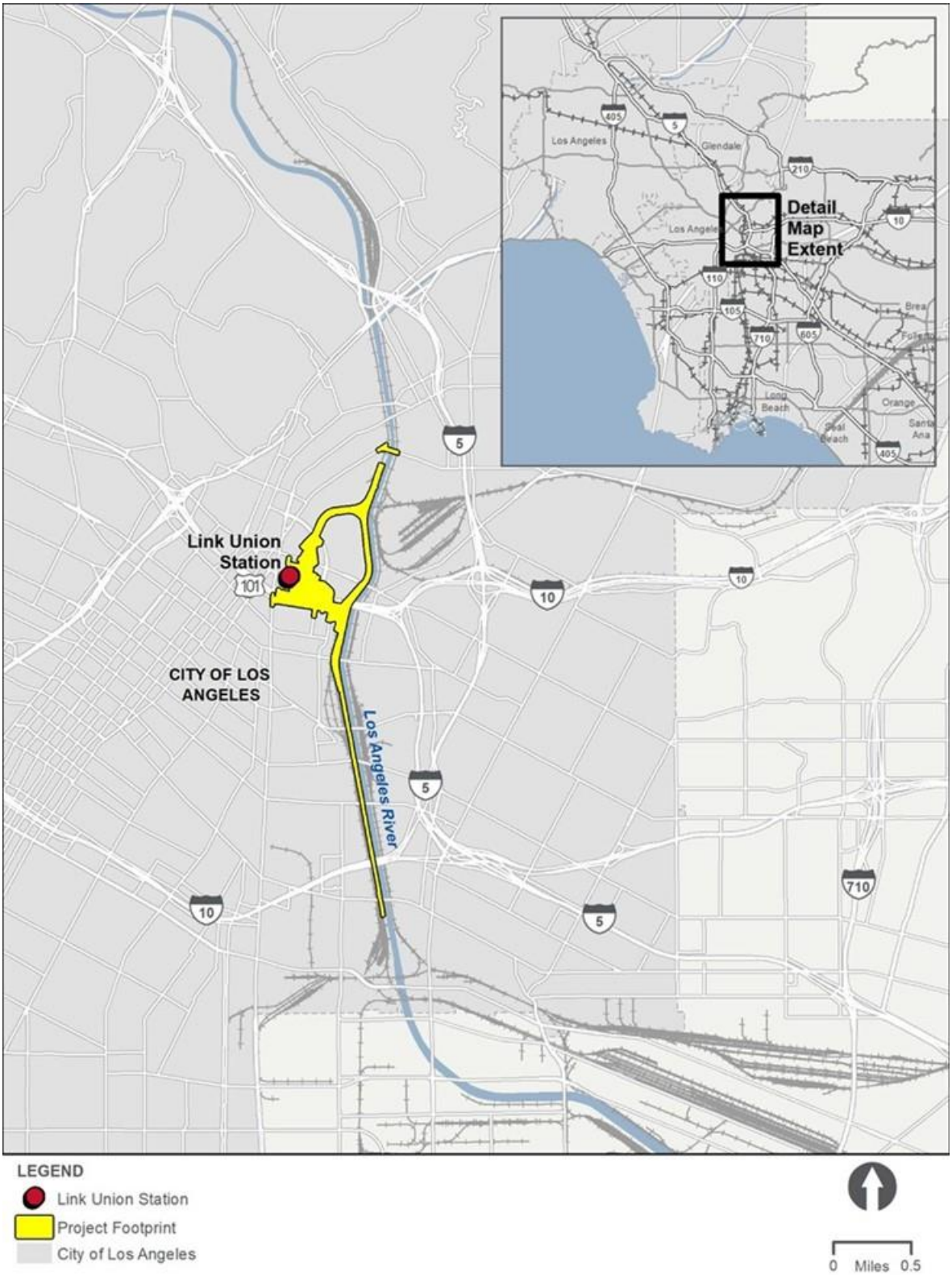
Figure 1-2 depicts the Project study area, which is generally used to characterize the affected environment, unless otherwise specified, and provide a geographic context for the existing and proposed infrastructure improvements at and within the vicinity of LAUS. The Project study area includes three main segments (Segment 1: Throat Segment, Segment 2: Concourse Segment, and Segment 3: Run-Through Segment). The existing conditions within each segment are summarized north to south below:

- **Segment 1: Throat Segment** – This segment, known as the LAUS throat, includes CP Chavez and the area north of the platforms at the LAUS rail yard, from North Main Street at the north to Cesar Chavez Avenue at the south. In the throat segment, all arriving and departing trains are required to traverse through a complex network of lead tracks, switches, and crossovers. Five lead tracks provide access into and out of the rail yard, except for one location near the Vignes Street Bridge, where it reduces to four lead tracks. Currently, special track work consisting of multiple turnouts and double-slip switches are used in the throat to direct trains into and out of the appropriate assigned terminal platform tracks. The Garden Tracks (stub-end tracks where private train cars are currently stored) are also located just north of the platforms. Land uses in the vicinity of the throat segment are residential, industrial, and institutional.
- **Segment 2: Concourse Segment** – This segment is between Cesar Chavez Avenue and US-101 and includes LAUS, the rail yard, the East Portal Building, the baggage handling building with associated parking areas and access roads, the ticketing/waiting halls, and the 28-foot-wide pedestrian passageway with connecting ramps and stairways below the rail yard. Land uses in the vicinity of the concourse segment are residential, commercial, and public.
- **Segment 3: Run-Through Segment** – This segment is south of LAUS and extends east to west from Alameda Street to the west bank of the Los Angeles River and north to south from Keller Yard to CP Olympic. This segment includes US-101, the Commercial Street/Ducommun Street corridor, Metro Red and Purple Lines Maintenance Yard (Division 20 Rail Yard), BNSF Railway (BNSF) West Bank Yard, Keller Yard, the main line tracks on the west bank of the Los Angeles River from Keller Yard to CP Olympic, and the Amtrak lead track connecting the main line tracks with Amtrak's Los Angeles Maintenance Facility in the vicinity of 8th Street. Land uses in the vicinity of the run-through segment are primarily industrial and manufacturing.

The Project study area has a dense street network ranging from major highways to local city streets. The roadways within the Project study area include the El Monte Busway, US-101, Bolero Lane, Leroy Street, Bloom Street, Cesar Chavez Avenue, Commercial Street, Ducommun Street, Jackson Street, East Temple Street, Banning Street, First Street, Alameda Street, Garey Street, Vignes Street, Main Street, Aliso Street, Avila Street, Bauchet Street, and Center Street.

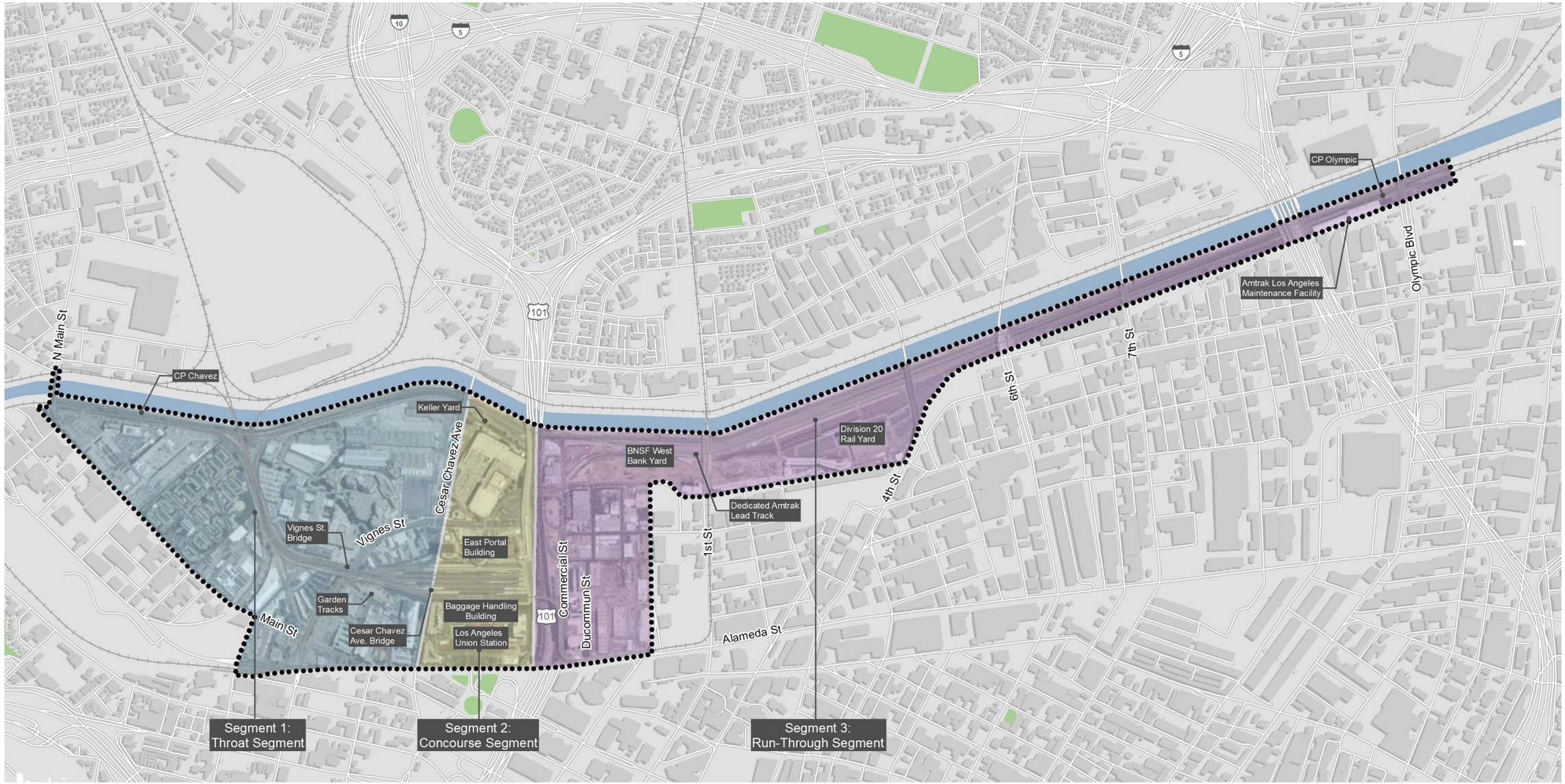
Figure 1-3 depicts the existing LAUS track and platform layout as well as other key facilities in and around LAUS.

Figure 1-1. Project Location and Regional Vicinity



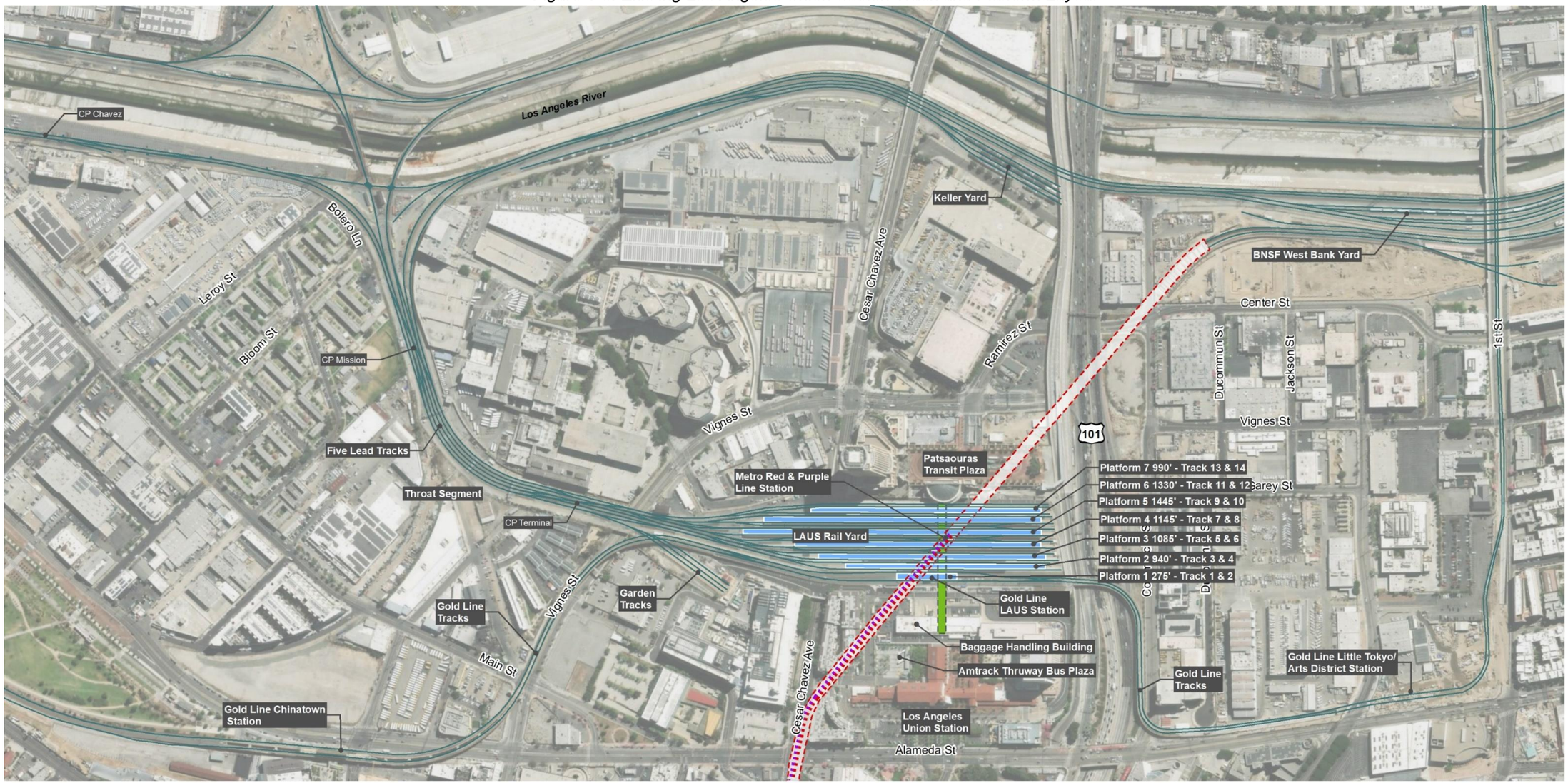
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Figure 1-2. Project Study Area



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Figure 1-3. Existing Los Angeles Union Station Track and Platform Layout



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2.0 Objective of the Memorandum

The objective of this memorandum is to document the existing rail operating conditions and characteristics at LAUS (2016 baseline condition) and provide an estimate of future train movements through LAUS for the years 2026, 2031, and 2040 with appropriate service planning assumptions to facilitate the environmental evaluation of the Project-related effects of capacity enhancements in the environmental documentation for the Project. The 2026 and 2031 years correspond to the two major phases of Project implementation (interim condition and full build-out condition). The Year 2040 corresponds to the horizon years and corresponding service goals and objectives of multiple statewide plans and mandates:

- 2026 – Two new regional/intercity rail run-through tracks from Platform 4 at LAUS (interim condition)
- 2031 – Construction of all regional/intercity rail improvements at LAUS including the reconstructed throat, elevated rail yard and concourse-related improvements (full build-out condition)
- 2040 – Full operation of HSR service at LAUS

Available estimates and projections from applicable agencies and stakeholders were used to estimate the future train movements. This memorandum will be utilized to prepare applicable environmental technical studies (i.e., traffic, air quality, noise, and vibration) in support of the environmental documentation for the Project.

The service planning and operating characteristics considered in this memorandum include the following components:

- Total number of train movements into and out of LAUS per day, revenue, and deadhead (2016, 2026, 2031, and 2040). Each inbound and outbound train movement counts as a separate movement. A run-though train, for example, would count as two train movements: one inbound and one outbound movement.
- Total number of train movements during the two 3-hour AM and PM peak operating periods (2016, 2026, 2031, and 2040).
- Train “consist” size, frequency of service, types of locomotives and dwell time for each carrier.

The Project-related capacity enhancements are required to enable Metrolink and Amtrak to meet regional/intercity rail growth projections and to facilitate the CHSRA’s implementation of the planned HSR system at LAUS.

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3.0 Existing Rail Operating Conditions and Characteristics

LAUS is the focal point of passenger rail travel in Southern California, serving Metrolink commuter trains; Amtrak Pacific Surfliner intercity and long-distance trains; and Metro Red, Purple, and Gold Line trains[4]. In addition to revenue trains, there are numerous non-revenue train movements at the LAUS terminal to service passenger train equipment and position equipment at the station platforms for revenue service. For Metrolink, non-revenue train movements occur between LAUS and the Central Maintenance Facility. For Amtrak, through trains and non-revenue train movements occur for Pacific Surfliner and Amtrak Long-Distance trains (Southwest Chief, Sunset Limited/Texas Eagle, Coast Starlight) between LAUS and Amtrak's Los Angeles Maintenance Facility.

Consistent with the baseline year used for the environmental documentation for the Project, available 2016 schedules for Metrolink and Amtrak Pacific Surfliner and long-distance trains and the existing rail operating characteristics at LAUS were determined by counting the total number of existing train movements per day and number of train movements at LAUS during the two 3-hour AM and PM peak operating periods (6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM). For both Metrolink and Amtrak, a comparison between the 2016 and 2018 schedules showed no substantial addition to train movements at LAUS. The comparison revealed 1 additional round trip Pacific Surfliner train between LAUS and San Diego, as well as 1 additional Metrolink round trip between LAUS and Burbank Airport.

The following schedules were reviewed to determine the existing rail operating characteristics and are provided as Appendix A:

- Metrolink All Lines Timetable, dated June 6, 2016
- Amtrak Pacific Surfliner Schedules, effective June 6, 2016
- Amtrak Coast Starlight Schedule, effective June 6, 2016
- Amtrak Southwest Chief Schedule, effective June 9, 2014
- Amtrak Sunset Limited Schedule, effective June 9, 2014

3.1 Existing Metrolink Trains

LAUS is the hub for Metrolink operations and provides connections between the following Metrolink lines:

- 91/Perris Valley Line
- Antelope Valley Line

4 For the purpose of this memorandum, Metro trains are not considered because Metro's light rail and heavy rail operations are not anticipated to substantially affect other regional/intercity operations or operation of the planned HSR system.

- Orange County Line
- Riverside Line
- San Bernardino Line
- Ventura County Line

As of April 2016, Metrolink operated 139 revenue trains per weekday into and out of LAUS on several train lines, including the Ventura County Line (31 trains per weekday), Antelope Valley Line (30), San Bernardino Line (38), Riverside Line (12), 91/Perris Valley Line (9), and Orange County Line (19). Metrolink also operated 46 non-revenue trains between LAUS and the Central Maintenance Facility. During the two 3-hour AM and PM peak operating periods (AM and PM combined), 80 Metrolink trains (39 in the AM and 41 in the PM) passed through LAUS.

3.2 Existing Amtrak Trains

As of April 2016, Amtrak operated 28 revenue trains per weekday into and out of LAUS, which includes 14 Pacific Surfliner trains originating or terminating at LAUS; 9 Pacific Surfliner "through trains" that travel the entire extent of the Pacific Surfliner route (Los Angeles-San Diego-San Luis Obispo [LOSSAN] corridor) north and south of LAUS (counted as 18 total trains in Table 5-1); and an average of 5 long-distance trains including the Coast Starlight (2 trains daily), the Southwest Chief (2 trains daily), and the Texas Eagle/Sunset Limited, which is a combined train that operated 3 times per week. Amtrak/LOSSAN also operated 11 non-revenue trains between LAUS and Amtrak's Los Angeles Maintenance Facility (6 Pacific Surfliner and 5 Amtrak long-distance trains). During the two 3-hour AM and PM peak operating periods (AM and PM combined), 13 (6 in the AM and 7 in the PM) Amtrak/LOSSAN revenue and non-revenue train movements passed through LAUS.

4.0 Future Service Planning Assumptions and Data Sources

The Project would accommodate a substantial increase in rail operational capacity for the region, reducing train idling (dwell) time and improving on-time performance for trains using LAUS. The estimate of train movements that could occur through LAUS aligns with the service goals, horizon years, and corresponding goals and objectives of multiple statewide plans and mandates as described below.

California Transportation Plan 2050

The *California Transportation Plan 2050* (California Department of Transportation [Caltrans] 2021) calls for a transportation system that is safe, sustainable, universally accessible, and globally competitive while meeting the state's greenhouse gas emission reduction goals. The vision of the *California Transportation Plan 2050* is a safe, resilient, and universally accessible transportation system that supports vibrant communities, advances racial and economic justice, and improves public and environmental health. The Project-related capacity enhancements would facilitate future train operations to address this vision.

2018 California State Rail Plan

For the purpose of this memorandum, future train movements for Metrolink and Amtrak trains are based on the *2018 California State Rail Plan* (Caltrans 2018):

- For Metrolink, in late 2017, future service plans were developed consistent with the *2018 California State Rail Plan* (Section 4.1).
- For Amtrak, the *2018 California State Rail Plan* (Caltrans 2018) was referenced to determine future train counts for Pacific Surfliner trains (Section 4.2).

The estimated train movements and resulting benefits correlate with the service goals and improvements for the Los Angeles Urban Mobility Corridor and coincide with the 2027 mid-term plan statewide goals. The *2018 California State Rail Plan* calls for the following service enhancements for Metrolink:

- By 2028:
  - Provide run-through service at LAUS as part of Link US;
  - Half-hourly all-day service on the San Bernardino Line between Los Angeles and San Bernardino, and
  - Half-hourly peak-rail service on the 91/Perris Valley Line.

- By 2040:
  - Very frequent service between LAUS and Burbank
  - On the Ventura County Line, half-hourly express service between LAUS and Oxnard, and half-hourly local service between LAUS and Chatsworth
  - Half-hourly local service between LAUS and Santa Clarita
  - Very frequent service between LAUS and Fullerton
  - Half-hourly express rail services connecting Riverside, San Bernardino, and Ontario with Los Angeles

2022 Business Plan

The objective of the *2022 Business Plan*, adopted April 27, 2022, is to initiate HSR passenger service as soon as possible.

2020 Regional Transportation Plan/Sustainable Communities Strategy: Connect SoCal

The 2020 RTP/SCS identifies the Project as part of the Metrolink SCORE Program and acknowledges the Project will greatly improve regional rail by providing through service at LAUS, reducing rail travel times in the region, and allowing one-seat ride opportunities to many more destinations. The Project is included in the 2023 Federal Transportation Improvement Program (FTIP), adopted as part of RTP/SCS Amendment #2, under FTIP Identification Number LA0G1051. The Project aligns with the benefits outlined in the 2020 RTP/SCS because it would reduce air pollution and greenhouse gas (GHG) emissions from idling locomotives.

4.1 Metrolink

In October 2018, Metrolink provided daily train counts for the 2031 and 2040 horizon years (full Metrolink SCORE Program operations consistent with the *2018 California State Rail Plan*) but not for the 2026 horizon year. In the absence of 2026 service plans that correlate to the SCORE Program, Metrolink's Transit and Intercity Rail Capital Program Funding Application was used to estimate the number of trains anticipated to pass through LAUS, including non-revenue train movements for the 2026 horizon year. A breakdown of the 2026, 2031, and 2040 forecasts of Metrolink trains by train line is provided in Appendix B, and information is summarized in Table 5-1.

4.1.1 Equipment Turn Time

An equipment turn is the act of changing the train's operating end and allowing the train to move in the reverse direction. Operational experience to date indicates that Metrolink crews can turn revenue trains at terminals, including changing of operating ends, checking the train consist for passengers and initialization of positive train control, within 15 minutes. Although it is possible that technology improvements may allow for a future reduction in equipment turn times, the rail operators agreed that for the purposes of this analysis a 15-minute turnaround is assumed for all Metrolink trains requiring a change of operating ends at LAUS.

4.1.2 Dwell Time

Dwell time is defined as the amount of time a particular train is scheduled to be stationary at a station platform to accommodate passenger entraining and detraining, baggage handling, train servicing, crew changes, etc. For purposes of this analysis, the following dwell times are assumed:

- Year: 2026: 7 minutes
- Years 2031 and 2040: 5 minutes

4.1.3 Service Hours by Train Line

Scheduling details of the proposed service hours for each train line serving LAUS were not included in the Metrolink Transit and Intercity Rail Capital Program application. In the absence of this information, existing service hours were used in the development of future operational scenarios at 30-minute frequencies throughout the day with service extended during evening hours to at least 10:00 PM.

4.2 Pacific Surfliner and Amtrak

The *2018 California State Rail Plan* (Caltrans 2018) was referenced to determine future train counts for Pacific Surfliner trains. The Federal Railroad Administration, Caltrans, and the Riverside County Transportation Commission are analyzing the feasibility of operating regional rail service between LAUS and the Coachella Valley. The study is ongoing but includes a concept of two daily round trips between LAUS and Indio or Coachella. This potential new service was added to the 2026, 2031, and 2040 Pacific Surfliner train counts. A breakdown of the 2026, 2031, and 2040 forecasts of Amtrak trains is provided in Appendix B, and information is summarized in Table 5-1.

Amtrak has no current plans to alter existing long-distance trains currently serving LAUS.

4.2.1 Equipment Turn Time and Dwell Time

Currently, the operating practice for a Pacific Surfliner through train involves a crew change at LAUS as well as a change in train operating ends. The amount of time in the schedule varies from 15 to 33 minutes. In addition, trains often arrive before their scheduled arrival time, extending the

amount of time the train dwells at a platform by as much as 15 minutes. With the construction of run-through tracks, it is anticipated that the time required to change operating ends will no longer be necessary, but that adequate time will still be needed for detraining and entraining passengers and baggage as well as the crew change. Based upon feedback from LOSSAN and participating agencies, a dwell time of 10 minutes will be used.

For Amtrak long-distance trains, entraining or detraining passengers, along with baggage handling, takes much longer than it does for a typical Pacific Surfliner train. In addition, Amtrak may keep the train at the station for as long as 3 hours, based more upon operational convenience (yard crew availability) than necessity. Amtrak recognizes that a significant reduction in long-distance station dwell time will be needed to facilitate platform capacity enhancements and service expansion at LAUS. For the purposes of this analysis, a dwell time of 30 minutes is used.

4.3 California High-Speed Rail Authority

4.3.1 Service Hours

HSR service would operate at LAUS from 6:00 AM though midnight, 7 days per week.

4.3.2 Equipment Turn Time and Dwell Time

Per CHSRA, dwell time for trains operating through LAUS is estimated to be 5 minutes. For train sets that are turning at LAUS, it is estimated that 20 minutes will be required for detraining, sweeping the train, changing operating ends, entraining, and departure. This time would be reduced to 5-minute dwells each upon arrival and departure if a proposed HSR turn facility south of LAUS is constructed.

4.4 Train Consists

Train consist (cars and locomotives) data was gathered from Metrolink and Amtrak and are presented in Table 4-1. A hypothetical HSR consist is also included in Table 4-1 but may be subject to change based upon final design of the planned HSR system.

Table 4-1. Train Consist by Operator

Operator	Number of Cars	Number of Locomotives	Locomotive Types Used Per Service (manufacturer)
Metrolink			
Metrolink 4-Car Set (18 in daily service)	4	1	F59 PH (EMD) F59 PHI (EMD) F40PH (EMD) MP36 PH-C (Motive Power Industries) All horizon year consists will use EMD F-125 Spirit locomotives, which started to enter service in 2018.
Metrolink 5-Car Set (9 in daily service)	5	1	
Metrolink 6-Car Set (6 in daily service)	6	1	
Amtrak – Pacific Surfliner			
6-Car Set (bi-level)	6	1	F59 PH (EMD) P42DC (General Electric) All horizon year consists will use Siemens Charger locomotives, which started entering service in 2017.
7-Car Set (single-level)	7	1	
Amtrak – Long Distance Trains			
Southwest Chief	10	2	P42DC (General Electric) P32-8BWH (General Electric) All horizon year consists will use Siemens Charger locomotives.
Sunset Limited	9	2	
Coast Starlight	11	2	
CHSRA – High Speed Train (2033)			
AGV High-Speed Trainset (France)*	6	2	Power cars in integrated trainset

Sources: Metrolink, Amtrak: Southern California Regional Rail Authority 2012
Notes:
****This is a hypothetical trainset. The actual train sets used for CHSRA service have not yet been procured.***
CHSRA=California High-Speed Rail Authority

4.4.1 Emerging Train Consist Technology

The 2040 Vision in the *2018 California State Rail Plan* calls for the use of "greener" technology for locomotives and train consists as the technology becomes commercially available, and includes a recommendation for electrifying/deploying zero-emission vehicle technologies on as much of the passenger rail network as possible, and specifically calls out electrified electric multiple unit systems, diesel multiple units, battery-hybrid multiple units, renewable diesel, and other alternative fuels:

- Goal 6: Practice Environmental Stewardship, Policy 1: Integrate Environmental Considerations in All Stages of Planning indicates – The Rail Plan provides a program-level platform from which more detailed service and environmental analysis must be conducted by the State and rail operators as the 2040 Vision is implemented.
- Goal 6: Practice Environmental Stewardship, Policy 4: Transform to a Clean and Energy Efficient Transportation System indicates – The intent of the 2040 Vision is to accommodate additional demand for trips, and grow the rail network in a manner that incorporates substantial electrification of the state network, with improvements possible on additional corridors where there is support to do so… These include more stringent standards for remanufactured locomotives; and a Tier 5 standard for new locomotives that would require capability for zero-emission operation in designated areas, such as disadvantaged and high-traffic regions, to better protect the health of those residents.

Although these emerging technologies exist today, for the purposes of this analysis which is to document train counts/movements, this memorandum focuses on the use of existing equipment/technology and the most currently known and available information relating to future equipment/technology.

5.0 Future Daily Train Movements at Los Angeles Union Station

Based upon available data, as well as valuable input from the rail operators, Table 5-1 summarizes the estimated total daily train movements (revenue and non-revenue) through LAUS and the total trips during the two 3-hour AM and PM peak operating periods for 2016 and future horizon years 2026, 2031, and 2040. Revenue trains operating through LAUS, such as existing Pacific Surfliner and future Metrolink run-through trains, count as two movements: one inbound and one outbound.

Table 5-1. Existing (2016) and Future Daily Train Movements

Transit Operator	Frequency	2016	As Early As 2026	As Early As 2031	As Early As 2040
Metrolink (regional rail)	**Total daily**	**185**	**410**	**690**	**690**
	Revenue trains	139	370	678	678
	Nonrevenue trains[a]	46	40	12	12
	6-hour peak	**80**	**144**	**250**	**250**
Amtrak/LOSSAN	**Total daily[b]**	**48**	**68**	**80**	**140**
	Pacific Surfliner	32	48	56	112
	Long-distance trains	5	5	5	5
	Nonrevenue trains[c]	11	15	19	23
	6-hour peak	**13**	**21**	**21**	**39**
CHSRA	**Total daily**	**—**	**—**	**—**	**272**
	Revenue trains	—	—	—	222
	Nonrevenue trains[d]	—	—	—	50
	6-hour peak	**—**	**—**	**—**	**132**

Source: Appendix A, Caltrans 2018 (Amtrak and Pacific Surfliner), Metrolink SCORE Application (Regional Rail), and CHSRA-provided data (HSR).
Notes:
[a] This includes all deadhead equipment movements between LAUS and the Central Maintenance Facility.
[b] This includes through trains on the LOSSAN corridor, as well as proposed Coachella Valley Service starting in 2026.
[c] This includes deadhead equipment movements for Pacific Surfliner and Amtrak Long Distance-trains (Southwest Chief, Sunset Limited/Texas Eagle, Coast Starlight) between LAUS and Amtrak Los Angeles Maintenance Facility.
[d] This includes deadhead equipment movements for HSR trains between LAUS and HSR Los Angeles Maintenance Facility.
CHSRA=California High-Speed Rail Authority; HSR=High-Speed Rail; LAUS=Los Angeles Union Station; LOSSAN=Los Angeles–San Diego–San Luis Obispo

While the Project would provide the largest possible "operating envelope" to increase capacity within the existing station footprint, considering the environmental and constructability constraints, actual operational scenarios and service levels at LAUS are dependent on future service plans, negotiations between the service operators, and available operating funding.

A summary of the projected train movements for the 2026, 2031, and 2040 horizon years is provided below by rail operator.

Metrolink

For 2026, it is estimated that Metrolink would operate 410 train movements per day (inclusive of 40 non-revenue train movements) between LAUS and the Central Maintenance Facility. During the two 3-hour AM and PM peak operating periods, 144 total train movements (72 each in the AM and PM) are anticipated to operate within LAUS. As stated earlier, the ability of LAUS to accommodate the higher Metrolink service levels during phases of construction has not been tested or validated. For 2031, Metrolink estimates that 690 train movements would occur per day. It is assumed that Metrolink's 2031 SCORE service plan would represent a full build-out of Metrolink services for the foreseeable future, so the train counts remain the same for 2040.

Amtrak and Los Angeles-San Diego-San Luis Obispo

For 2026, it is estimated that Amtrak/LOSSAN would operate 68 train movements per day within LAUS. During the two 3-hour AM and PM peak operating periods, 21 total train movements are anticipated to operate within LAUS. For 2031 and 2040, daily train movements would increase to 80 and 140 movements, respectively. Non-revenue movements for 2026, 2031, and 2040 are rough estimates, as future equipment cycles to support LOSSAN growth plans have not yet been developed.

CHSRA

CHSRA is anticipated to commence operation of the planned HSR system as early as 2033 and plan to operate 272 train movements per day at LAUS by 2040. Of these, 148 would originate from or terminate at LAUS, and 74 would operate through LAUS to-and-from Anaheim. There would also be 50 daily deadhead equipment movements. During the two 3-hour peak AM and PM operating periods, CHSRA would operate 132 train movements. Of these, 88 would originate from or terminate at LAUS, and 44 would operate through LAUS to-and-from Anaheim.

6.0 Conclusion

Metro estimates the Project-related capacity enhancements would reduce dwell time at LAUS and contribute to other cumulative benefits for the region, including a regional reduction of greenhouse gas emissions and vehicle miles traveled. Future service scenarios will depend on ongoing negotiations between the railroad operators, available infrastructure (corridor, maintenance facility, etc.), and available operating funding. The Project, by itself, does not enable regional/intercity rail providers to meet their service goals, primarily because other infrastructure improvements on the entire system are required to meet the forecasted service levels by 2040.

Based on the results of this memorandum, the environmental documentation for the Project will be prepared to include an analysis of potential environmental effects associated with implementation of the Project, in consideration of the existing and future train movements through LAUS that could occur as a result of the Project-related capacity enhancements.

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7.0 References

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——— 2018a. Metrolink Transit and Intercity Rail Capital Program 2018 Funding Application.

——— 2018b. Email exchange with HDR. October 2018.

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Appendix A:
Existing Metrolink and Amtrak Train Schedules

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ALL LINES

METROLINK®

TIMETABLE

EFFECTIVE JUNE 6 2016



VC AV SB RIV 91/PVL OC IEOC

metrolinktrains.com

METROLINK COMMUTER RAIL SYSTEM




PACIFIC OCEAN
LAX Airport
Redondo Beach
Long Beach
Commerce
Norwalk
Norwalk/Santa Fe Springs
Buena Park
Fullerton
Anaheim
Placentia
Future Station
Corona - West
Corona - North Main
Riverside-Downtown
Riverside-La Sierra
Riverside-Hunter Park/UCR
Moreno Valley/March Field
Perris - Downtown
Perris - South
Anaheim Canyon
Orange
Santa Ana
Tustin
Irvine
Laguna Niguel/Mission Viejo
John Wayne Airport (SNA)
San Juan Capistrano
San Clemente
San Clemente Pier
Limited Service
Oceanside
Solana Beach
San Diego
Escondido
RIVERSIDE CO.
ORANGE CO.
SAN DIEGO CO.
METROLINK
Antelope Valley Line
Inland Empire-Orange County Line
Orange County Line
Riverside Line
San Bernardino Line
Ventura County Line
91/Perris Valley Line
Future Station
Station Served by Multiple Lines
Amtrak Pacific Surfliner
Metro Rail/Metro Bus
LAX FlyAway Bus
Coaster
Oceanside to San Diego
Sprinter
Oceanside to Escondido
metrolinktrains.com
Effective June 6, 2016
MAP NOT TO SCALE

MONDAY THROUGH FRIDAY

Metrolink Service No.	100	900	102	104	106	902	108	MA A768	110	112	116	904	906	150	118	910
Ventura - East			5:25	6:03	6:42											
Oxnard ★			5:39	6:17	6:56			7:43								
Camarillo ★			5:49	6:27	7:06			7:54								
Moorpark ★	5:04		6:00	6:38	7:17			8:08	8:25		**2:18**				**4:57**	
Simi Valley ★	5:17		6:13	6:51	7:30			8:23	8:38		**2:31**				**5:10**	
Chatsworth ★	5:28		6:24	7:02	7:41		8:25	8:40	8:49	10:50	**2:42**			**4:40**	**5:27**	
Northridge	5:33		6:29	7:07	7:46		8:30	8:46	8:54	10:55	**2:47**			**4:45**	**5:32**	
Van Nuys ★	5:41		6:37	7:15	7:54		8:38	8:56	9:02	11:03	**2:55**			**4:53**	**5:45**	
Burbank/Bob Hope Airport ★	5:49	6:13	6:45	7:23	8:02	8:35	8:46	9:04	9:10	11:11	**3:03**	**3:37**	**4:15**	**5:05**	**5:53**	**8:30**
Burbank - Downtown	5:55	6:17	6:52	7:30	8:08	8:39	8:52	9:09	9:16	11:17	**3:09**	**3:41**	**4:19**	**5:10**	**5:59**	**8:35**
Glendale ★	6:02	6:23	6:59	7:37	8:15	8:45	8:59	9:16	9:23	11:26	**3:16**	**3:47**	**4:25**	**5:16**	**6:06**	**8:40**
L.A. Union Station ★	6:15	6:38	7:14	7:50	8:30	9:02	9:17	9:35	9:42	11:40	**3:33**	**4:00**	**4:40**	**5:30**	**6:20**	**8:55**

AM times **PM times**

NOTES: See page 3

MONDAY THROUGH FRIDAY

Metrolink Service No.	901	101	103	MA A761	903	905	907	107	109	909	155	115	117	119	121	123	911
L.A. Union Station ★	5:38	6:52	7:15	7:35	8:00	8:30	8:55	9:50	**12:43**	**2:50**	**3:15**	**3:35**	**4:33**	**5:10**	**5:55**	**6:40**	**7:45**
Glendale ★	5:48	7:01	7:25	7:48	8:10	8:40	9:05	10:00	**12:53**	**3:00**	**3:25**	**3:45**	**4:43**	**5:20**	**6:05**	**6:50**	**7:55**
Burbank - Downtown	5:54	7:07	7:31	↓	8:16	8:46	9:11	10:06	**12:59**	**3:06**	**3:31**	**3:51**	**4:49**	**5:26**	**6:11**	**6:56**	**8:01**
Burbank/Bob Hope Airport ★	6:01	7:12	7:36	8:00	8:25	8:55	9:20	10:11	**1:04**	**3:15**	**3:36**	**3:56**	**4:54**	**5:31**	**6:16**	**7:01**	**8:10**
Van Nuys ★		7:23	7:43	8:10				10:19	**1:11**		**3:43**	**4:03**	**5:01**	**5:38**	**6:23**	**7:08**	
Northridge		7:31	8:00	8:19				10:28	**1:19**		**3:51**	**4:11**	**5:09**	**5:46**	**6:31**	**7:16**	
Chatsworth ★		7:38	8:10	8:32				10:35	**1:26**		**4:05**	**4:18**	**5:16**	**5:53**	**6:38**	**7:23**	
Simi Valley ★		7:52		8:45					**1:38**			**4:30**	**5:28**	**6:05**	**6:50**	**7:35**	
Moorpark ★		8:10		8:57					**1:58**			**4:47**	**5:40**	**6:17**	**7:08**	**7:47**	
Camarillo ★				9:10									**5:51**	**6:28**		**7:58**	
Oxnard ★				9:21									**6:01**	**6:38**		**8:14**	
Ventura - East													**6:20**	**6:57**		**8:37**	

AM times **PM** times

NOTES: See page 3

VENTURA COUNTY LINE • AMTRAK SERVICE Oxnard to L.A.

All Metrolink ticket holders (including One-Way, Round-Trip, 7-Day or Monthly Pass) may, within the origin and destination of their ticket or pass, ride ANY Amtrak Pacific Surfliner train between Los Angeles and Burbank/Bob Hope Airport at no additional cost as part of the Rail 2 Rail® program. Holiday blackout dates may apply, and schedules subject to change. For details, please visit metrolinktrains.com/rail2rail

* A768 stops at Northridge and Burbank - Downtown Monday-Friday only.

DAILY

Amtrak Service No.	A768*	A774	A784	A790	A1790	A796
Ventura - East						
Oxnard ★	7:43	10:18	**2:57**	**5:07**	**5:35**	**7:51**
Camarillo ★	7:54	10:35	**3:08**	↓	↓	**8:02**
Moorpark ★	8:08	↓	**3:20**	**5:36**	**6:04**	↓
Simi Valley ★	8:23	11:02	**3:35**	**5:54**	**6:20**	**8:38**
Chatsworth ★	8:40	11:14	**3:52**	**6:12**	**6:33**	**8:50**
Northridge	8:46	↓	↓	↓	↓	↓
Van Nuys ★	8:56	11:28	**4:14**	**6:31**	**6:45**	**9:06**
Burbank/Bob Hope Airport ★	9:04	11:35	**4:22**	**6:39**	**6:53**	**9:13**
Burbank - Downtown	9:09	↓	↓	↓	↓	↓
Glendale ★	9:16	11:45	**4:32**	**6:50**	**7:04**	**9:23**
L.A. Union Station ★	9:35	**12:15**	**4:50**	**7:10**	**7:20**	**9:45**
AMTRAK TRAINS FOR MONTHLY PASS HOLDERS ONLY				M-F	Sa-Su	

L.A. to Oxnard

DAILY

Amtrak Service No.	A761	A1761	A763	A769	A777	A785
L.A. Union Station ★	7:35	7:50	9:20	**12:30**	**3:05**	**7:15**
Glendale ★	7:48	8:02	9:32	**12:42**	**3:17**	**7:27**
Burbank - Downtown	↓	↓	↓	↓	↓	↓
Burbank/Bob Hope Airport ★	8:00	8:12	9:42	**12:52**	**3:27**	**7:37**
Van Nuys ★	8:10	8:21	9:52	**1:02**	**3:37**	**7:47**
Northridge	8:19	↓	↓	↓	↓	↓
Chatsworth ★	8:32	8:33	10:04	**1:14**	**3:49**	**7:59**
Simi Valley ★	8:45	8:45	10:16	**1:26**	**4:01**	**8:11**
Moorpark ★	8:57	8:57	↓	**1:39**	↓	↓
Camarillo ★	9:10	9:10	10:40	**1:54**	**4:27**	**8:35**
Oxnard ★	9:21	9:21	10:53	**2:05**	**4:38**	**8:46**
Ventura - East						
AMTRAK TRAINS FOR MONTHLY PASS HOLDERS ONLY	M-F	Sa-Su				

AM times **PM** times

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ANTELOPE VALLEY LINE • 200 SERIES

Lancaster to L.A.

MONDAY THROUGH FRIDAY

Metrolink Service No.	200	202	204	282	206	208	🚌	210	212	🚌	214	216	218	220	🚌	222	🚌	224	226
Lancaster	3:58	4:55	5:20		6:10	6:52			9:00			11:35		**1:40**					**6:05**
Palmdale	4:07	5:04	5:29	6:07	6:19	7:01	7:50		9:09	10:30		11:44		**1:49**	**2:00**		**4:00**		**6:15**
Vincent Grade/Acton	4:18	5:15	5:40	↓	6:30	7:12	↓		9:20	↓		11:55		**2:00**	↓		↓		↓
Via Princessa	4:50	5:49	6:14	↓	7:04	7:46	↓	9:03	9:54	↓	11:25	**12:29**	**1:45**	**2:34**	↓	**3:15**	↓		**7:12**
Santa Clarita	4:56	5:55	6:20	6:53	7:10	7:52	↓	9:09	10:00	↓	11:31	**12:35**	**1:51**	**2:40**	↓	**3:21**	↓	**5:05**	**7:18**
Newhall	5:03	6:02	6:27	↓	7:17	7:59	8:40 ➤	9:16	10:08	11:20 ➤	11:38	**12:42**	**1:57**	**2:47**	**2:50** ➤	**3:28**	**4:50** ➤	**5:13**	**7:25**
Sylmar/San Fernando	5:16	6:16	6:41	7:12	7:32	8:13		9:30	10:23		11:57	**12:57**	**2:11**	**3:02**		**3:42**		**5:27**	**7:39**
Sun Valley	5:23	6:23	6:57	↓	7:40	8:20		9:37	10:31		**12:04**	**1:10**	**2:21**	**3:14**		**3:49**		**5:34**	**7:46**
Burbank - Downtown	5:30	6:31	7:03	7:25	7:48	8:27		9:45	10:38		**12:11**	**1:17**	**2:28**	**3:22**		**3:56**		**5:41**	**7:54**
Glendale ★	5:37	6:38	7:09	↓	7:55	8:33		9:54	10:44		**12:17**	**1:24**	**2:34**	**3:29**		**4:02**		**5:48**	**8:00**
L.A. Union Station ★	5:53	6:55	7:26	7:42	8:15	8:55		10:11	11:05		**12:40**	**1:45**	**2:50**	**3:50**		**4:20**		**6:10**	**8:25**

🚌 North County TRANSporter bus service.

AM times **PM** times

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MONDAY THROUGH FRIDAY

Metrolink Service No.	201	203	205	207	209	211	213	215	217	219	285	221	223	225	227
L.A. Union Station ★	6:30	7:30	8:25	9:40	11:15	**12:00**	**1:55**	**3:40**	**4:00**	**4:45**	**5:35**	**5:50**	**6:30**	**7:40**	**9:25**
Glendale ★	6:41	7:40	8:36	9:50	11:25	**12:11**	**2:05**	**3:50**	**4:10**	**4:55**	↓	**6:00**	**6:40**	**7:50**	**9:35**
Burbank - Downtown	6:47	7:46	8:42	9:56	11:31	**12:17**	**2:11**	**3:56**	**4:16**	**5:01**	**5:49**	**6:06**	**6:46**	**7:56**	**9:41**
Sun Valley	6:52	7:52	8:48	10:02	11:37	**12:23**	**2:17**	**4:02**	**4:22**	**5:07**	↓	**6:12**	**6:52**	**8:02**	**9:47**
Sylmar/San Fernando	6:59	8:00	8:56	10:10	11:45	**12:32**	**2:25**	**4:11**	**4:30**	**5:15**	**6:02**	**6:20**	**7:00**	**8:10**	**9:55**
Newhall	7:18	8:17 ➤ 8:50	9:10	10:23 ➤ 10:35	11:59	**12:45**	**2:38** ➤ **2:50**	**4:24**	**4:43** ➤ **5:00**	**5:34**	↓	**6:33**	**7:13**	**8:23**	**10:08**
Santa Clarita	7:25	8:24	9:18	10:31	**12:07**	**12:52**	**2:45**	**4:31**	**4:55**	**5:41**	**6:22**	**6:41**	**7:20**	**8:31**	**10:15**
Via Princessa	7:31	8:43	9:24	10:50	**12:14**	**1:06**	**3:00**	**4:37**		**5:48**		**6:47**	**7:26**	**8:37**	**10:21**
Vincent Grade/Acton	8:10		10:05		**12:52**			**5:14**		**6:25**		**7:21**	**8:03**	**9:12**	**10:58**
Palmdale	8:20		9:40	10:15	11:25	**1:02**		**3:40**	**5:25**		**5:50**	**6:35**	**7:08**	**7:32**	**8:13**	**9:21**	**11:08**
Lancaster	8:40			10:45		**1:20**			**5:50**			**6:55**		**8:00**	**8:32**	**9:40**	**11:25**

North County TRANSporter bus service.

Northbound TRANSporter bus stops at the Vincent Grade/Acton Metrolink station by request only.

AM times **PM** times

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ANTELOPE VALLEY LINE

Lancaster to L.A.

SATURDAY AND SUNDAY

Metrolink Service No.	260	262	264	266	268	270
Lancaster	6:25	8:55	11:10	**12:40**	**2:25**	**6:15**
Palmdale	6:34	9:05	11:19	**12:49**	**2:34**	**6:24**
Vincent Grade/Acton	6:45	9:16	11:30	**12:59**	**2:45**	**6:35**
Via Princessa	7:19	9:53	**12:04**	**1:32**	**3:19**	**7:12**
Santa Clarita	7:25	10:00	**12:10**	**1:38**	**3:25**	**7:18**
Newhall	7:32	10:07	**12:17**	**1:45**	**3:32**	**7:25**
Sylmar/San Fernando	7:46	10:21	**12:34**	**1:59**	**3:46**	**7:39**
Sun Valley	7:53	10:28	**12:41**	**2:06**	**3:53**	**7:46**
Burbank - Downtown	8:00	10:35	**12:48**	**2:13**	**3:59**	**7:53**
Glendale ★	8:07	10:42	**12:55**	**2:20**	**4:05**	**8:00**
L.A. Union Station ★	8:25	11:00	**1:15**	**2:40**	**4:30**	**8:20**

L.A. to Lancaster

SATURDAY AND SUNDAY

Metrolink Service No.	261	263	265	267	269	271
L.A. Union Station ★	8:45	11:40	**2:15**	**3:50**	**5:25**	**8:55**
Glendale ★	8:55	11:50	**2:25**	**4:00**	**5:35**	**9:05**
Burbank - Downtown	9:02	11:57	**2:32**	**4:07**	**5:42**	**9:12**
Sun Valley	9:08	**12:03**	**2:38**	**4:13**	**5:48**	**9:18**
Sylmar/San Fernando	9:16	**12:11**	**2:46**	**4:21**	**5:56**	**9:26**
Newhall	9:30	**12:25**	**3:00**	**4:35**	**6:10**	**9:40**
Santa Clarita	9:38	**12:33**	**3:08**	**4:43**	**6:18**	**9:48**
Via Princessa	9:44	**12:39**	**3:13**	**4:49**	**6:24**	**9:54**
Vincent Grade/Acton	10:25	**1:23**	**3:52**	**5:27**	**7:02**	**10:32**
Palmdale	10:36	**1:33**	**4:01**	**5:38**	**7:14**	**10:43**
Lancaster	10:55	**1:50**	**4:20**	**5:55**	**7:25**	**11:00**

AM times **PM times**

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MONDAY THROUGH FRIDAY

Metrolink Service No.	301	303	305	307	309	311	313	315	317	319	321	323	325	327	329	331	333	335	337
San Bernardino	3:48	4:21	4:40	5:12	5:38	6:00	6:28	6:53	7:59	8:49	9:59	11:33	**12:28**	**1:35**	**3:12**	**4:00**	**5:16**	**6:14**	**7:49**
Rialto	3:59	4:32	4:50	5:23	5:49	6:11	6:38	7:04	8:10	9:01	10:09	11:44	**12:38**	**1:45**	**3:22**	**4:10**	**5:27**	**6:25**	**8:00**
Fontana	4:06	4:38	4:57	5:30	5:56	6:17	6:45	7:11	8:17	9:06	10:16	11:53	**12:47**	**1:52**	**3:31**	**4:17**	**5:34**	**6:34**	**8:06**
Rancho Cucamonga	4:14	4:47	5:06	5:38	6:04	6:26	6:54	7:19	8:25	9:17	10:25	**12:02**	**12:56**	**2:01**	**3:40**	**4:26**	**5:43**	**6:54**	**8:15**
Upland	4:22	4:54	5:13	5:46	6:12	6:34	7:01	7:27	8:33	9:24	10:33	**12:09**	**1:03**	**2:09**	**3:47**	**4:33**	**5:51**	**7:02**	**8:23**
Montclair	4:28	5:00	5:19	5:52	6:18	6:39	7:07	7:33	8:39	9:30	10:39	**12:15**	**1:09**	**2:15**	**3:53**	**4:39**	**5:57**	**7:08**	**8:28**
Claremont	4:31	5:04	5:23	5:55	6:21	6:43	7:11	7:36	8:42	9:33	10:43	**12:18**	**1:13**	**2:19**	**3:56**	**4:42**	**6:01**	**7:11**	**8:32**
Pomona - North	4:36	5:09	5:28	6:00	6:26	6:48	7:15	7:41	8:47	9:38	10:47	**12:23**	**1:17**	**2:23**	**4:01**	**4:49**	**6:11**	**7:17**	**8:37**
Covina	4:47	5:20	5:39	6:11	6:37	6:59	7:27	7:52	8:58	9:49	10:58	**12:34**	**1:29**	**2:35**	**4:12**	**5:00**	**6:23**	**7:28**	**8:48**
Baldwin Park	4:54	5:27	5:46	6:18	6:44	7:06	7:34	7:59	9:05	9:56	11:05	**12:41**	**1:35**	**2:41**	**4:19**	**5:12**	**6:30**	**7:35**	**8:55**
El Monte	5:04	5:37	5:56	6:28	6:54	7:16	7:43	8:09	9:15	10:06	11:15	**12:51**	**1:45**	**2:51**	**4:32**	**5:22**	**6:48**	**7:52**	**9:05**
Cal State L.A.	5:15	5:48	6:08	6:39	7:05	7:27	7:56	8:20	9:28	10:17	11:28	**1:04**	**1:57**	**3:03**	**4:45**	**5:35**	**6:59**	**8:03**	**9:17**
L.A. Union Station ★	5:26	5:59	6:19	6:50	7:16	7:38	8:07	8:31	9:39	10:28	11:39	**1:15**	**2:07**	**3:13**	**4:55**	**5:47**	**7:10**	**8:14**	**9:27**

AM times **PM** times

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MONDAY THROUGH FRIDAY

Metrolink Service No.	300	302	304	306	308	310	312	314	316	318	320	322	324	326	328	330	332	334	336
L.A. Union Station ★	5:46	7:34	9:05	10:17	11:05	**12:41**	**1:55**	**3:01**	**3:33**	**3:55**	**4:22**	**4:58**	**5:12**	**5:35**	**6:05**	**6:24**	**7:28**	**8:39**	**9:46**
Cal State L.A.	5:59	7:48	9:18	10:30	11:19	**12:55**	**2:08**	**3:15**	**3:47**	**4:09**	**4:35**	**5:11**	**5:25**	**5:52**	**6:19**	**6:37**	**7:41**	**8:52**	**10:00**
El Monte	6:16	8:07	9:35	10:41	11:36	**1:11**	**2:20**	**3:26**	**3:58**	**4:20**	**4:52**	**5:22**	**5:42**	**6:03**	**6:30**	**6:48**	**7:52**	**9:04**	**10:11**
Baldwin Park	6:29	8:19	9:45	10:51	11:46	**1:22**	**2:30**	**3:36**	**4:08**	**4:30**	**5:02**	**5:32**	**5:52**	**6:13**	**6:40**	**6:58**	**8:02**	**9:14**	**10:21**
Covina	6:36	8:26	9:53	10:59	11:53	**1:29**	**2:37**	**3:43**	**4:15**	**4:37**	**5:10**	**5:40**	**6:00**	**6:22**	**6:48**	**7:06**	**8:10**	**9:21**	**10:28**
Pomona - North	6:50	8:40	10:06	11:12	**12:06**	**1:42**	**2:50**	**3:56**	**4:29**	**4:50**	**5:23**	**5:53**	**6:13**	**6:35**	**7:01**	**7:19**	**8:23**	**9:34**	**10:42**
Claremont	6:55	8:45	10:11	11:17	**12:11**	**1:47**	**2:55**	**4:01**	**4:34**	**4:56**	**5:28**	**5:58**	**6:18**	**6:40**	**7:06**	**7:24**	**8:28**	**9:39**	**10:47**
Montclair	7:06	8:49	10:15	11:21	**12:15**	**1:51**	**2:59**	**4:05**	**4:38**	**5:00**	**5:32**	**6:02**	**6:22**	**6:44**	**7:10**	**7:28**	**8:32**	**9:43**	**10:51**
Upland	7:12	8:54	10:21	11:27	**12:21**	**1:57**	**3:05**	**4:11**	**4:43**	**5:05**	**5:38**	**6:08**	**6:28**	**6:50**	**7:16**	**7:34**	**8:38**	**9:49**	**10:56**
Rancho Cucamonga	7:19	9:02	10:28	11:34	**12:28**	**2:04**	**3:12**	**4:25**	**4:51**	**5:12**	**5:45**	**6:15**	**6:35**	**6:57**	**7:23**	**7:41**	**8:45**	**9:56**	**11:04**
Fontana	7:31	9:17	10:39	11:45	**12:39**	**2:15**	**3:23**	**4:36**	**5:01**	**5:23**	**5:55**	**6:26**	**6:46**	**7:07**	**7:33**	**7:52**	**8:56**	**10:07**	**11:14**
Rialto	7:39	9:23	10:45	11:51	**12:45**	**2:21**	**3:29**	**4:42**	**5:07**	**5:34**	**6:02**	**6:32**	**6:52**	**7:14**	**7:40**	**8:05**	**9:02**	**10:13**	**11:21**
San Bernardino	7:48	9:32	10:54	**12:00**	**12:54**	**2:30**	**3:38**	**4:51**	**5:16**	**5:43**	**6:11**	**6:41**	**7:01**	**7:23**	**7:49**	**8:14**	**9:11**	**10:22**	**11:29**

AM times **PM** times

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SAN BERNARDINO LINE • 300 SERIES

San Bernardino to L.A.

SATURDAY

Metrolink Service No.	351	353	357	359	363	367	369	373	377	379
San Bernardino	7:00	8:25	9:50	11:30	**1:05**	**2:07**	**3:35**	**4:55**	**6:30**	**9:15**
Rialto	7:07	8:32	9:57	11:37	**1:12**	**2:14**	**3:42**	**5:02**	**6:37**	**9:22**
Fontana	7:12	8:37	10:02	11:42	**1:17**	**2:19**	**3:47**	**5:07**	**6:42**	**9:27**
Rancho Cucamonga	7:21	8:46	10:11	11:50	**1:26**	**2:28**	**3:56**	**5:16**	**6:51**	**9:36**
Upland	7:28	8:53	10:20	11:59	**1:35**	**2:36**	**4:04**	**5:25**	**7:00**	**9:45**
Montclair	7:34	8:59	10:26	**12:05**	**1:41**	**2:42**	**4:10**	**5:31**	**7:06**	**9:51**
Claremont	7:37	9:02	10:29	**12:08**	**1:44**	**2:45**	**4:13**	**5:34**	**7:09**	**9:56**
Pomona - North	7:41	9:06	10:34	**12:13**	**1:49**	**2:49**	**4:18**	**5:39**	**7:14**	**10:00**
Covina	7:51	9:16	10:44	**12:23**	**1:59**	**2:59**	**4:28**	**5:49**	**7:24**	**10:10**
Baldwin Park	7:57	9:21	10:50	**12:29**	**2:05**	**3:05**	**4:39**	**5:55**	**7:30**	**10:16**
El Monte	8:07	9:35	11:01	**12:43**	**2:19**	**3:14**	**4:49**	**6:09**	**7:44**	**10:30**
Cal State L.A.	8:19	9:48	11:14	**12:55**	**2:32**	**3:27**	**5:01**	**6:22**	**7:56**	**10:42**
L.A. Union Station ★	8:35	10:05	11:30	**1:15**	**2:50**	**3:40**	**5:15**	**6:40**	**8:15**	**10:55**

SUNDAY

351	357	359	361	367	369	377
7:00	9:50	11:30	**12:30**	**2:07**	**3:35**	**6:30**
7:07	9:57	11:37	**12:36**	**2:14**	**3:42**	**6:37**
7:12	10:02	11:42	**12:41**	**2:19**	**3:47**	**6:42**
7:21	10:11	11:50	**12:49**	**2:28**	**3:56**	**6:51**
7:28	10:20	11:59	**12:56**	**2:36**	**4:04**	**7:00**
7:34	10:26	**12:05**	**1:01**	**2:42**	**4:10**	**7:06**
7:37	10:29	**12:08**	**1:04**	**2:45**	**4:13**	**7:09**
7:41	10:34	**12:13**	**1:08**	**2:49**	**4:18**	**7:14**
7:51	10:44	**12:23**	**1:17**	**2:59**	**4:28**	**7:24**
7:57	10:50	**12:29**	**1:23**	**3:05**	**4:39**	**7:30**
8:07	11:01	**12:43**	**1:32**	**3:14**	**4:49**	**7:44**
8:19	11:14	**12:55**	**1:43**	**3:27**	**5:01**	**7:56**
8:35	11:30	**1:15**	**2:00**	**3:40**	**5:15**	**8:15**

AM times **PM** times

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SATURDAY

Metrolink Service No.	352	354	358	362	364	366	368	372	376	378
L.A. Union Station ★	6:15	9:00	10:35	**12:10**	**1:45**	**4:00**	**5:35**	**7:10**	**9:00**	**11:30**
Cal State L.A.	6:25	9:10	10:46	**12:21**	**1:56**	**4:11**	**5:46**	**7:21**	**9:10**	**11:40**
El Monte	6:35	9:20	10:57	**12:32**	**2:07**	**4:21**	**5:57**	**7:32**	**9:21**	**11:50**
Baldwin Park	6:43	9:30	11:07	**12:42**	**2:17**	**4:29**	**6:07**	**7:42**	**9:31**	**11:58**
Covina	6:51	9:38	11:15	**12:50**	**2:25**	**4:38**	**6:15**	**7:50**	**9:39**	12:05
Pomona - North	7:02	9:50	11:27	**1:02**	**2:36**	**4:49**	**6:27**	**8:02**	**9:50**	12:16
Claremont	7:06	9:54	11:31	**1:06**	**2:40**	**4:54**	**6:31**	**8:06**	**9:54**	12:20
Montclair	7:10	9:58	11:35	**1:10**	**2:44**	**4:58**	**6:35**	**8:10**	**9:58**	12:24
Upland	7:15	10:03	11:40	**1:15**	**2:50**	**5:04**	**6:40**	**8:16**	**10:04**	12:29
Rancho Cucamonga	7:24	10:14	11:51	**1:26**	**2:58**	**5:15**	**6:51**	**8:23**	**10:11**	12:36
Fontana	7:33	10:23	**12:00**	**1:35**	**3:07**	**5:24**	**7:00**	**8:32**	**10:20**	12:45
Rialto	7:39	10:29	**12:06**	**1:41**	**3:13**	**5:30**	**7:06**	**8:38**	**10:26**	12:51
San Bernardino	7:54	10:45	**12:22**	**2:00**	**3:30**	**5:45**	**7:22**	**8:54**	**10:40**	1:05

SUNDAY

354	356	362	364	366	368	376
9:00	10:10	**12:10**	**1:45**	**4:00**	**5:35**	**9:00**
9:10	10:21	**12:21**	**1:56**	**4:11**	**5:46**	**9:10**
9:20	10:31	**12:32**	**2:07**	**4:21**	**5:57**	**9:21**
9:30	10:40	**12:42**	**2:17**	**4:29**	**6:07**	**9:31**
9:38	10:48	**12:50**	**2:25**	**4:38**	**6:15**	**9:39**
9:50	10:59	**1:02**	**2:36**	**4:49**	**6:27**	**9:50**
9:54	11:03	**1:06**	**2:40**	**4:54**	**6:31**	**9:54**
9:58	11:07	**1:10**	**2:44**	**4:58**	**6:35**	**9:58**
10:03	11:12	**1:15**	**2:50**	**5:04**	**6:40**	**10:04**
10:14	11:19	**1:26**	**2:58**	**5:15**	**6:51**	**10:11**
10:23	11:28	**1:35**	**3:07**	**5:24**	**7:00**	**10:20**
10:29	11:40	**1:41**	**3:13**	**5:30**	**7:06**	**10:26**
10:45	11:52	**2:00**	**3:30**	**5:45**	**7:22**	**10:40**

AM times **PM** times

NOTES: See page 3

RIVERSIDE LINE

Riverside to L.A.

MONDAY THROUGH FRIDAY

Metrolink Service No.	401	403	405	407	409	411
Riverside - Downtown	4:47	5:42	6:15	6:50	8:10	**3:07**
Pedley	4:58	5:53	6:26	7:01	8:21	**3:18**
Ontario - East	5:08	6:03	6:36	7:11	8:31	**3:28**
Pomona - Downtown	5:20	6:15	6:48	7:23	8:43	**3:40**
Industry	5:29	6:24	6:57	7:32	8:52	**3:49**
Montebello/Commerce	5:47	6:42	7:15	7:50	9:10	**4:07**
L.A. Union Station ★	6:10	7:07	7:35	8:15	9:35	**4:35**

L.A. to Riverside

MONDAY THROUGH FRIDAY

Metrolink Service No.	402	404	406	408	410	412
L.A. Union Station ★	**1:20**	**4:15**	**5:00**	**5:30**	**6:00**	**6:30**
Montebello/Commerce	**1:37**	**4:32**	**5:17**	**5:47**	**6:17**	**6:47**
Industry	**1:55**	**4:50**	**5:35**	**6:05**	**6:35**	**7:05**
Pomona - Downtown	**2:04**	**4:59**	**5:44**	**6:14**	**6:44**	**7:14**
Ontario - East	**2:16**	**5:12**	**5:56**	**6:26**	**6:56**	**7:26**
Pedley	**2:28**	**5:24**	**6:08**	**6:38**	**7:08**	**7:38**
Riverside - Downtown	**2:48**	**5:42**	**6:27**	**6:58**	**7:25**	**7:57**

Check 91 Line schedule for additional trains to Riverside - Downtown via Fullerton.

AM times **PM times**

NOTES: See page 3

91/PERRIS VALLEY LINE

Perris to L.A.

L.A. to Perris

MONDAY THROUGH FRIDAY

Metrolink Service No.	701	703	705	731	733	735	707
Perris - South	4:37	5:06	5:42	7:45	11:30	**2:45**	
Perris - Downtown	4:45	5:13	5:50	7:51	11:36	**2:51**	
Moreno Valley/March Field	4:58	5:25	6:03	8:08	11:53	**3:08**	
Riverside - Hunter Park/UCR	5:09	5:36	6:14	8:23	**12:08**	**3:23**	
Riverside - Downtown	5:27	5:56	6:32	8:35	**12:20**	**3:35**	**6:07**
Riverside - La Sierra	5:37	6:04	6:42				**6:17**
Corona - North Main	5:45	6:12	6:50				**6:25**
Corona - West	5:51	6:18	6:56				**6:31**
Fullerton ★	6:16	6:43	7:21				**6:54**
Buena Park	6:23	6:50	7:29				**7:00**
Norwalk/Santa Fe Springs	6:31	6:58	7:36				**7:06**
L.A. Union Station ★	7:05	7:32	8:10				**7:45**

MONDAY THROUGH FRIDAY

Metrolink Service No.	700	732	734	736	702	704	706	708
L.A. Union Station ★	5:45				**3:35**	**4:20**	**5:30**	**6:50**
Norwalk/Santa Fe Springs	6:06				**3:56**	**4:41**	**5:51**	**7:11**
Buena Park	6:12				**4:03**	**4:47**	**5:57**	**7:17**
Fullerton ★	6:19				**4:09**	**4:54**	**6:04**	**7:24**
Corona - West	6:43				**4:35**	**5:18**	**6:28**	**7:48**
Corona - North Main	6:50				**4:41**	**5:25**	**6:35**	**7:55**
Riverside - La Sierra	6:59				**4:50**	**5:34**	**6:44**	**8:04**
Riverside - Downtown	7:15	9:10	**1:00**	**4:30**	**5:03**	**5:45**	**6:55**	**8:25**
Riverside - Hunter Park/UCR		9:23	**1:13**	**4:43**	**5:16**	**5:58**	**7:08**	
Moreno Valley/March Field		9:36	**1:26**	**4:57**	**5:29**	**6:11**	**7:16**	
Perris - Downtown		9:55	**1:45**	**5:16**	**5:48**	**6:30**	**7:35**	
Perris - South		10:05	**1:55**	**5:25**	**6:00**	**6:40**	**7:50**	

Check Orange County Line and Inland Empire-Orange County Line schedules for additional trains along this corridor.
Check Riverside Line schedule for additional trains to Riverside-Downtown.

AM times **PM** times

NOTES: See page 3

SATURDAY AND SUNDAY

Metrolink Service No.	751	753
Riverside - Downtown	7:50	9:00
Riverside - La Sierra	8:00	9:10
Corona - North Main	8:08	9:18
Corona - West	8:14	9:24
Fullerton ★	8:39	9:49
Buena Park	8:46	9:56
Norwalk/Santa Fe Springs	8:54	10:04
L.A. Union Station ★	9:30	10:40

SATURDAY AND SUNDAY

Metrolink Service No.	752	754
L.A. Union Station ★	**3:15**	**7:12**
Norwalk/Santa Fe Springs	**3:36**	**7:33**
Buena Park	**3:42**	**7:39**
Fullerton ★	**3:49**	**7:46**
Corona - West	**4:13**	**8:10**
Corona - North Main	**4:20**	**8:17**
Riverside - La Sierra	**4:29**	**8:26**
Riverside - Downtown	**4:52**	**8:52**

Check Orange County Line and Inland Empire-Orange County Line schedules for additional trains along this corridor.

AM times **PM** times

NOTES: See page 3

MONDAY THROUGH FRIDAY

Metrolink Service No.	681	601	603	605	683	607	685	687	633	635	641	609	689	643	707	645
Oceanside ★		4:43	5:16	5:42		6:34					**2:59**	**3:26**				
San Clemente Pier ★		↓	↓	↓		↓					↓	↓				
San Clemente		5:06	5:38	6:04		6:56					**3:21**	**3:48**				
San Juan Capistrano ★		5:15	5:47	6:13		7:05					**3:31**	**3:57**				
Laguna Niguel/Mission Viejo	4:05	5:22	5:53	6:19		7:11	8:03	8:43	8:58	11:30	**3:39**	**4:04**		**5:55**		**8:50**
Irvine ★	4:15	5:32	6:03	6:29	7:10	7:22	8:13	8:54	9:08	11:40	**3:50**	**4:15**	**5:17**	**6:05**		**9:00**
Tustin	4:21	5:38	6:09	6:36	7:16	7:28	8:19	9:00	9:14	11:46	**3:57**	**4:22**	**5:23**	**6:11**		**9:06**
Santa Ana ★	4:27	5:44	6:16	6:43	7:22	7:34	8:25	9:06	9:20	11:52	**4:04**	**4:29**	**5:29**	**6:17**		**9:12**
Orange	4:32	5:52	6:21	6:49	7:27	7:39	8:30	9:11	9:25	11:57	**4:09**	**4:34**	**5:34**	**6:22**		**9:17**
Anaheim ★	4:36	5:57	6:26	6:55	7:32	7:44	8:35	9:16	9:29	**12:01**	**4:14**	**4:39**	**5:39**	**6:27**		**9:22**
Fullerton ★	4:43	6:04	6:35	7:02	7:41	7:51	8:42	9:25	9:41	**12:15**	**4:24**	**4:46**	**5:46**	**6:40** ➤	**6:54**	**9:35**
Buena Park	4:49	6:10	6:41	7:08	7:47	7:57	8:48	9:30				**4:52**	**5:52**		**7:00**	
Norwalk/Santa Fe Springs	4:57	6:18	6:49	7:16	7:55	8:05	8:56	9:37				**5:00**	**6:00**		**7:06**	
Commerce	↓	↓	7:00	7:26	↓	8:19	9:08	↓				↓	↓		↓	
L.A. Union Station ★	5:25	6:45	7:20	7:45	8:19	8:40	9:26	10:04				**5:26**	**6:27**		**7:45**	

Check 91 Line and Inland Empire-Orange County Line schedules for additional trains along this corridor.

AM times **PM** times

NOTES: See page 3

MONDAY THROUGH FRIDAY

Metrolink Service No.	682	600	632	634	684	602	686	640	604	688	606	608	708	642	644
L.A. Union Station ★	6:50	7:58			2:11	3:19	3:47		4:30	4:50	5:46	6:40	6:50		
Commerce	↓	↓			↓	3:33	4:01		4:44	↓	6:00	↓	↓		
Norwalk/Santa Fe Springs	7:12	8:20			2:33	3:43	4:12		4:55	5:12	6:10	7:03	7:11		
Buena Park	7:19	8:27			2:40	3:50	4:19		5:03	5:19	6:17	7:10	7:17		
Fullerton ★	7:25	8:33	10:00	1:40	2:46	3:56	4:25	4:55	5:10	5:25	6:23	7:16	7:24	➤ 7:35	10:10
Anaheim ★	7:32	8:40	10:07	1:47	2:54	4:03	4:33	5:02	5:17	5:33	6:31	7:23		7:43	10:18
Orange	7:38	8:45	10:12	1:52	2:59	4:08	4:38	5:07	5:22	5:39	6:37	7:28		7:47	10:23
Santa Ana ★	7:44	8:50	10:17	1:57	3:05	4:13	4:43	5:12	5:27	5:45	6:42	7:33		7:52	10:27
Tustin	7:51	8:56	10:23	2:03	3:12	4:19	4:49	5:18	5:33	5:52	6:48	7:39		7:58	10:33
Irvine ★	8:00	9:04	10:31	2:11	3:21	4:27	5:02	5:26	5:41	6:01	6:56	7:47		8:05	10:41
Laguna Niguel/Mission Viejo	8:15	9:14	10:44	2:25	3:36	4:40		5:40	5:51	6:15	7:06	7:58		8:20	10:51
San Juan Capistrano ★		9:20				4:46			5:57		7:12	8:04			10:58
San Clemente		9:30				4:59			6:06		7:22	8:17			11:07
San Clemente Pier ★		↓				↓			↓		↓	↓			↓
Oceanside ★		10:01				5:28			6:37		7:54	8:46			11:35

Train 644 may be held for special events in Anaheim.
Please visit metrolinktrains.com for details.

Check 91 Line and Inland Empire-Orange County Line schedules for additional trains along this corridor.

AM times **PM** times

NOTES: See page 3

ORANGE COUNTY LINE L.A. to Oceanside

SATURDAY AND SUNDAY

Metrolink Service No.	660	662	664	666
L.A. Union Station ★	8:40	10:50	**2:00**	**4:40**
Commerce	↓	↓	↓	↓
Norwalk/Santa Fe Springs	9:02	11:12	**2:22**	**5:02**
Buena Park	9:09	11:19	**2:29**	**5:09**
Fullerton ★	9:15	11:25	**2:35**	**5:15**
Anaheim ★	9:22	11:32	**2:42**	**5:22**
Orange	9:27	11:37	**2:47**	**5:27**
Santa Ana ★	9:32	11:42	**2:52**	**5:32**
Tustin	9:38	11:48	**2:58**	**5:38**
Irvine ★	9:46	11:56	**3:06**	**5:46**
Laguna Niguel/Mission Viejo	9:56	**12:06**	**3:16**	**5:56**
San Juan Capistrano ★	10:01	**12:13**	**3:21**	**6:01**
San Clemente	10:12	**12:25**	**3:34**	**6:15**
San Clemente Pier ★	10:15	**12:28**	**3:36**	**6:18**
Oceanside ★	10:52	**1:00**	**4:15**	**6:55**

AM times **PM** times

Oceanside to L.A.

SATURDAY AND SUNDAY

Metrolink Service No.	661	663	665	667
Oceanside ★	8:15	11:24	**1:24**	**5:36**
San Clemente Pier ★	8:35	11:48	**1:43**	**5:55**
San Clemente	8:38	11:50	**1:46**	**5:58**
San Juan Capistrano ★	8:50	**12:00**	**2:00**	**6:11**
Laguna Niguel/Mission Viejo	8:58	**12:08**	**2:07**	**6:19**
Irvine ★	9:08	**12:19**	**2:17**	**6:29**
Tustin	9:14	**12:25**	**2:23**	**6:35**
Santa Ana ★	9:20	**12:31**	**2:29**	**6:41**
Orange	9:25	**12:36**	**2:34**	**6:46**
Anaheim ★	9:30	**12:41**	**2:39**	**6:51**
Fullerton ★	9:37	**12:48**	**2:46**	**6:58**
Buena Park	9:43	**12:54**	**2:52**	**7:04**
Norwalk/Santa Fe Springs	9:51	**1:02**	**3:00**	**7:12**
Commerce	↓	↓	↓	↓
L.A. Union Station ★	10:30	**1:37**	**3:39**	**7:56**

NOTES: See page 3

AMTRAK SCHEDULE - 2014/2016

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NRPC Form W31–50M–6/6/16 Stock#02-3313R. Schedules subject to change without notice.

PACIFIC SURFLINER-Southbound

Train Number ▸				5804	5818	562	564	1566	566	768	768
Normal Days of Operation ▸				Daily	Daily	Daily	Daily	SaSuHo	Mo-Fr	SaSu	Daily
Will Also Operate ▸								9/5,11/24, 12/26,1/2		*See Note	
Will Not Operate ▸									9/5,11/24, 12/26,1/2		*See Note
On Board Service ▸						B	B	B	B	B	B
	Mile	Symbol									
SAN LUIS OBISPO, CA –Cal Poly	0	○	Dp							2 30A	3 40A
–Amtrak Station		●♿QT								2 40A	3 50A
Grover Beach, CA	12	○♿QT								3 05A	4 15A
Santa Maria, CA–IHOP	24	○♿								3 30A	4 40A
Guadalupe-Santa Maria, CA	25	○♿QT									
Lompoc-Surf Station, CA	51	○									
Lompoc, CA–Visitors Center	67	○♿									
Solvang, CA	68	○♿								4 05A	5 15A
Buellton, CA–Opposite Burger King	72	○								4 10A	5 20A
Goleta, CA	110	○♿QT								5 27A	6 35A
SANTA BARBARA, CA	119	●♿QT	Ar							43 5 20A	43 6 30A
			Dp							5 41A	6 49A
Carpinteria, CA	129	○♿QT								5 56A	7 04A
Ventura, CA	145	○♿QT								6 21A	7 29A
Oxnard, CA	155	●♿QT					44		44	6 35A	7 43A
Camarillo, CA	165	○♿					44		44	6 46A	7 54A
Moorpark, CA	175	○♿					44		44	7 00A	8 08A
Simi Valley, CA	186	○♿					44		44	7 15A	8 23A
Chatsworth, CA	194	○♿					44		44	7 27A	8 40A
Van Nuys, CA–Amtrak Station	203	●♿QT					44		44	7 40A	8 56A
Burbank-Bob Hope Airport, CA ✈	209	○♿QT					44		44	7 48A	9 04A
Glendale, CA	216	○♿					44		44	7 58A	9 16A
LOS ANGELES, CA ✈	222	●♿QT	Ar				44		44	8 25A	9 35A
			Dp	90 R 12 55A	90 R 2 30A	6 08A	7 25A	8 19A	8 41A	8 54A	9 55A
Fullerton, CA	248	●♿QT		D1 30A	D3 05A	6 39A	7 56A	8 50A	9 12A	9 25A	10 26A
Anaheim, CA (Disneyland®)	253	●♿QT				6 48A	8 04A	8 58A	9 20A	9 40A	10 34A
Santa Ana, CA	258	●♿QT		1 45A	D3 20A	6 58A	8 13A	9 07A	9 29A	9 54A	10 43A
Irvine, CA	268	●♿QT			D3 40A	7 11A	8 26A	9 18A	9 40A	10 15A	10 54A
San Juan Capistrano, CA	280	●♿QT			D3 55A	7 26A	8 42A	9 31A	9 54A	10 35A	11 09A
San Clemente Pier, CA	288	○						9 48A	10 11A	10 54A	11 22A
Oceanside, CA (LEGOLAND) 55	309	●♿QT			D4 30A	8 05A	9 16A	10 19A	10 38A	11 26A	11 47A
Carlsbad (Village), CA	312	○									
Carlsbad (Poinsettia), CA	316	○									
Encinitas, CA	321	○									
Solana Beach, CA	325	●♿QT			D4 50A	8 21A	9 34A	10 38A	10 56A	11 55A	**12 08P**
Sorrento Valley, CA	332	○									
San Diego (Old Town), CA	347	○♿QT					D10 08A	D11 10A	D11 27A	**D12 31P**	**D12 41P**
SAN DIEGO, CA ✈ (Tijuana)	350	●♿QT	Ar		5 15A	8 58A	10 16A	11 18A	11 35A	**12 39P**	**12 49P**

*This train operates only on Saturdays and Sundays, July 16 through September 4, and September 5.

*This train does NOT operate on Saturdays or Sundays, July 16 through September 4, nor September 5.

PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16

Service on Pacific Surfliner®

Coaches: Unreserved.

R Reserved.

B **Pacific Business class:** Reserved seat service with complimentary beverages, light snacks and newspaper. Amtrak Metropolitan Lounge is available in Los Angeles for Pacific Business class passengers.

Café: Sandwiches, snacks and beverages.

Checked baggage at select stations; size restriction for carry on luggage is 28" x 22" x 11". Consult Amtrak.com for latest baggage policies.

Wi-Fi available.

37 Connection between Thruway bus and train at Los Angeles.

43 Connection between Thruway bus and train at Santa Barbara.

44 Metrolink commuter train connection available. Separate ticket required. Call Metrolink at (800) 371-LINK for exact departure times.

55 LEGOLAND is located 8 miles from Oceanside station. Transfers may be made by taxi at passenger's expense.

58 Checked baggage service at this location available on weekends only.

65 Thruway bus connection at San Luis Obispo Amtrak Station arrives Atascadero at 9:05 p.m. and Paso Robles at 9:25 p.m.

66 Connection between Thruway bus and train at San Luis Obispo Amtrak Station.

76 Thruway bus connects to San Joaquin trains at Bakersfield.

90 Travel on this bus is reserved and must be part of an itinerary involving a train trip in one direction or the other. Also, the Los Angeles ticket office is open 30 minutes ahead of departure for night buses 5804 and 5818.

91 Travel on this bus is reserved and must be part of an itinerary involving a train trip in one direction or the other. Since most stations are unstaffed at the hours the buses operate, advance reservations can be made and tickets purchased online at Amtrak.com, at Metrolink Ticket Vending Machines or Amtrak Quik-Trak kiosks located at most stations. Reserved, ticketed customers have priority seating. Unreserved, ticketed passengers are carried on a space-available basis. The ticket office is open at Los Angeles, San Diego and Oceanside 30 minutes before the departure of the bus.

Smoking is prohibited on trains and only permitted in designated areas at stations.

Bicycles: Most *Pacific Surfliner* trains have racks for seven bicycles located in the cab car, at the opposite end of the train from the locomotive. These slots are available by reservation only and are offered without charge. Passengers must properly secure their bicycles in the racks. For some train departures and on Thruway buses, reservations are not available and only a limited number of bicycles can be carried. When space is available, unboxed bicycles may be put in the baggage bin under connecting Thruway buses. Amtrak disclaims liability for loss or damage. Passengers connecting to Trains 2, 4 and 14 must send their bicycles as checked baggage. There is a $10 fee, and the bicycle must be boxed; if needed, a bicycle box can be purchased from Amtrak for $15.

SYMBOLS KEY

A Time Symbol for A.M.
P Time Symbol for P.M.
N Time Symbol for Noon.
D Stops only to discharge passengers; train may leave before time shown.
R Stops only to receive passengers.
M Meal stop
Thruway Bus stop
✈ Airport connection
QT Quik-Trak self-serve ticketing kiosk
○ Unstaffed station
● Staffed Station with ticket office; may or may not be open for all train departures.
♿ Station wheelchair accessible; no barriers between station and train.
♿ Station wheelchair accessible; not all station facilities accessible.

PACIFIC SURFLINER-Southbound

Train Number ▸				572	572	774	580	582	784	790	1790	796
Normal Days of Operation ▸				SaSu	Daily	Daily	Daily	Daily	Daily	Mo-Fr	SaSuHol	Daily
Will Also Operate ▸				*See Note							9/5,11/24, 12/26,1/2	
Will Not Operate ▸					*See Note					9/5,11/24, 12/26,1/2		
On Board Service ▸				B	B	B	B	B	B	B	B	B
	Mile	Symbol										
SAN LUIS OBISPO, CA												
–Cal Poly	0	○	Dp						10 10A	66 12 50P	66 1 10P	3 15P
–Amtrak Station		●♿QT				6 55A			10 30A	1 35P	2 00P	3 40P
Grover Beach, CA	12	○♿QT				7 15A			10 55A	1 55P	2 20P	4 10P
Santa Maria, CA–IHOP	24	○♿							R11 20A			4 35P
Guadalupe-Santa Maria, CA	25	○♿QT				7 31A				2 11P	2 36P	
Lompoc-Surf Station, CA	51	○				8 05A				2 51P	3 16P	
Lompoc, CA–Visitors Center	67	○♿							R12 05P			
Solvang, CA	68	○♿							R12 35P			5 10P
Buellton, CA–Opposite Burger King	72	○							R12 40P			5 15P
Goleta, CA	110	○♿QT				9 13A			1 50P	3 57P	4 22P	6 45P
SANTA BARBARA, CA	119	●♿QT	Ar			9 24A			43 1 45P	4 09P	4 37P	43 6 40P
			Dp			9 27A		90 R 12 55P	2 04P	4 12P	4 40P	6 59P
Carpinteria, CA	129	○♿QT				9 42A			2 19P	4 27P	4 55P	7 15P
Ventura, CA	145	○♿QT				10 04A		90 R 1 25P	2 41P	4 49P	5 21P	7 37P
Oxnard, CA	155	●♿QT				10 18A		90 R 1 50P	2 57P	5 07P	5 35P	7 51P
Camarillo, CA	165	○♿				10 35A			3 08P			8 02P
Moorpark, CA	175	○♿							3 20P	5 36P	6 04P	
Simi Valley, CA	186	○♿				11 02A			3 35P	5 54P	6 20P	8 38P
Chatsworth, CA	194	○♿				11 14A			3 52P	6 12P	6 33P	8 50P
Van Nuys, CA–Amtrak Station	203	●♿QT				11 28A			4 14P	6 31P	6 45P	9 06P
Burbank-Bob Hope Airport, CA ✈	209	○♿QT				11 35A			4 22P	6 39P	6 53P	9 13P
Glendale, CA	216	○♿				11 45A			4 32P	6 50P	7 04P	9 23P
LOS ANGELES, CA ✈	222	●♿QT	Ar			12 15P		37 3 35P	4 50P	7 10P	7 20P	9 45P
			Dp	11 03A	11 20A	12 33P	2 58P	4 08P	5 10P	7 31P	7 40P	10 10P
Fullerton, CA	248	●♿QT		11 36A	11 51A	1 04P	3 29P	4 39P	5 42P	8 02P	8 11P	10 41P
Anaheim, CA (Disneyland®)	253	●♿QT		11 50A	11 59A	1 12P	3 37P	4 47P	5 51P	8 10P	8 19P	10 49P
Santa Ana, CA	258	●♿QT		12 05P	12 08P	1 21P	3 46P	4 56P	6 00P	8 19P	8 28P	10 58P
Irvine, CA	268	●♿QT		12 23P	12 21P	1 34P	3 59P	5 09P	6 13P	8 32P	8 39P	11 09P
San Juan Capistrano, CA	280	●♿QT		12 46P	12 39P	1 49P	4 14P	5 24P	6 27P	8 47P	8 54P	11 24P
San Clemente Pier, CA	288	○										
Oceanside, CA (LEGOLAND) 55	309	●♿QT		1 24P	1 13P	2 24P	4 52P	6 01P	7 03P	9 20P	9 27P	11 57P
Carlsbad (Village), CA	312	○							7 08P	9 25P	9 32P	12 03A
Carlsbad (Poinsettia), CA	316	○							7 14P	9 32P	9 39P	12 12A
Encinitas, CA	321	○							7 23P	9 40P	9 48P	12 19A
Solana Beach, CA	325	●♿QT		1 50P	1 29P	2 43P	5 13P	6 20P	7 29P	9 47P	9 55P	12 26A
Sorrento Valley, CA	332	○							7 39P	9 57P	10 06P	12 36A
San Diego (Old Town), CA	347	○♿QT		D2 29P	D2 03P	D3 17P	D5 42P	D6 54P	D8 01P	D10 19P	D10 27P	D12 58A
SAN DIEGO, CA ✈ (Tijuana)	350	●♿QT	Ar	2 37P	2 11P	3 25P	5 50P	7 02P	8 09P	10 30P	10 39P	1 06A

*This train operates only on Saturdays and Sundays, July 16 through September 4, and September 5.

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PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16

Pacific Surfliner Thruway Bus Connections

Fullerton • Palm Springs • Indio

768/572/769	784/785		Connecting Train Number		769/572	785/784
4968	4984		Thruway Number		4969	4985
Daily	Daily		Days of Operation		Daily	Daily
12 05P	6 25P	Dp	Fullerton, CA–Trans. Ctr.	Ar	11 15A	5 25P
D12 55P	D7 10P		Riverside, CA–Metrolink Station		R10 20A	R4 25P
D1 35P	D7 50P		Cabazon, CA–Morongo Casino		R9 30A	R3 35P
D2 00P	D8 20P		Palm Springs, CA –Downtown SunLine Transit		R9 00A	R3 10P
2 10P	D8 25P		Palm Springs, CA–Airport ✈		R8 55A	3 05P
	D8 55P		Palm Desert, CA–SunLine Transit		R8 25A	
	D9 05P		La Quinta, CA–SunLine Transit		R8 10A	
	9 15P	Ar	Indio, CA–Hwy. 111 at Monroe	Dp	8 00A	

NOTE—All *Pacific Surfliner* Thruway Bus Connections above require reservations.

SHADING KEY

Daytime train	Connecting train	Thruway and connecting services

See page 4 for Connecting Transit Services, page 5 for Airport Connections, and page 8 for Route Map.

See in San Diego

How to get there from San Diego's Santa Fe Depot & Old Town Transit Center

Balboa Park and **San Diego Zoo:** MTS Rapid Bus Route 215 from Kettner Blvd. adjacent to Santa Fe Depot

SeaWorld San Diego: From Old Town take MTS Route 9 (west side of station); From Santa Fe Depot take Green Line to Old Town and transfer to MTS Bus Route 9

International Border at San Ysidro (for Tijuana): From Santa Fe Depot cross Kettner Blvd. to America Plaza Station to MTS Blue Line Trolley

Petco Park: MTS Green Line Trolley from Santa Fe Depot (or Old Town) to Gaslamp Quarter (headsign will read "Imperial")

Qualcomm Stadium: MTS Green Line Trolley from Old Town (or Santa Fe Depot) to Qualcomm Stadium (headsign may read "Santee")

San Diego Cruise Terminal/International Airport: MTS Route 992 bus runs from the Santa Fe Depot to the airport every 15 minutes during the weekday and every 30 minutes on the weekend. Board on the corner of Broadway and Kettner (near Starbucks). The trip to the airport takes only 10 minutes. Exact change one-way fare is $2.25. The Cruise Terminal is also served by Route 992, but is only a three block walk from Santa Fe Depot.

This Service is financed primarily through funds made available by the LOSSAN Agency through the California Department of Transportation

PACIFIC SURFLINER-Northbound

Train Number ▸				5801	5811	761	1761	763	565	1567	567	769	573
Normal Days of Operation ▸				Daily	Daily	Mo-Fr	SaSuHo	Daily	Daily	SaSuHo	Mo-Fr	Daily	Daily
Will Also Operate ▸							9/5,11/24, 12/26,1/2			9/5,11/24, 12/26,1/2			
Will Not Operate ▸						9/5,11/24, 12/26,1/2					9/5,11/24, 12/26,1/2		
On Board Service ▸				R	R	B	B	B	B	B	B	B	B
	Mile	Symbol											
SAN DIEGO, CA (Tijuana)	0	●♿QT	Dp					6 07A	6 56A	8 05A	8 23A	9 20A	10 41A
San Diego (Old Town), CA	3	○♿QT						R6 14A	R7 03A	R8 12A	R8 30A	R9 27A	R10 48A
Sorrento Valley, CA	19	○								8 34A	8 54A		11 11A
Solana Beach, CA	26	●♿QT						6 45A	7 36A	8 43A	9 03A	9 58A	11 22A
Encinitas, CA	30	○								8 50A	9 09A		11 30A
Carlsbad (Poinsettia), CA	34	○								8 57A	9 15A		11 36A
Carlsbad (Village), CA	38	○								9 04A	9 23A		11 42A
Oceanside, CA (LEGOLAND) 55	41	●♿QT						7 03A	7 55A	9 11A	9 29A	10 15A	11 50A
San Clemente Pier, CA	63	○											
San Juan Capistrano, CA	70	●♿QT						7 36A	8 27A	9 45A	10 07A	10 47A	**12 22P**
Irvine, CA	83	●♿QT						7 54A	8 42A	10 01A	10 22A	11 01A	**12 37P**
Santa Ana, CA	92	●♿QT		91 1 45A	91 3 45A	91 R 5 25A	91 R 5 25A	8 05A	8 54A	10 12A	10 33A	11 12A	**12 48P**
Anaheim, CA (Disneyland®)	97	●♿QT						8 14A	9 03A	10 21A	10 42A	11 22A	**12 57P**
Fullerton, CA	102	●♿QT		91 2 05A	91 4 05A	91 R 5 50A	91 R 5 50A	8 22A	9 11A	10 29A	10 50A	11 30A	**1 05P**
LOS ANGELES, CA	128	●♿QT	Ar	91 2 45A	91 4 45A	37 6 35A	37 6 35A	8 57A	9 46A	11 04A	11 25A	**12 05P**	**1 40P**
			Dp	91 2 55A	91 4 55A	7 35A	7 50A	9 20A				**12 30P**	
Glendale, CA	134	○♿		91 3 10A	91 5 10A	7 48A	8 02A	9 32A				**12 42P**	
Burbank-Bob Hope Airport, CA	142	○♿QT		76 91 3 25A	76 91 5 25A	8 00A	8 12A	9 42A				**12 52P**	
Van Nuys, CA–Amtrak Station	147	●♿QT				8 10A	8 21A	9 52A				**1 02P**	
Chatsworth, CA	157	○♿				8 32A	8 33A	10 04A				**1 14P**	
Simi Valley, CA	164	○♿				8 45A	8 45A	10 16A				**1 26P**	
Moorpark, CA	175	○♿				8 57A	8 57A					**1 39P**	
Camarillo, CA	186	○♿				9 10A	9 10A	10 40A				**1 54P**	
Oxnard, CA	195	●♿QT				9 21A	9 21A	10 53A				**2 05P**	
Ventura, CA	205	○♿QT				9 35A	9 35A	11 09A				**2 19P**	
Carpinteria, CA	221	○♿QT				10 06A	10 06A	11 31A				**2 47P**	
SANTA BARBARA, CA	232	●♿QT	Ar			10 19A	10 19A	D11 55A				D3 05P	
			Dp			10 22A	10 22A	43 R 12 05P				43 R 3 10P	
Goleta, CA	241	○♿QT				10 34A	10 34A	**12 08P**				**3 18P**	
Solvang, CA	267	○♿						**12 45P**				D4 00P	
Buellton, CA–Opposite Burger King	271	○						**12 50P**				D4 05P	
Lompoc, CA–Visitors Center	284	○♿										D4 30P	
Lompoc-Surf Station, CA	300	○				11 40A	11 40A						
Guadalupe-Santa Maria, CA	326	○♿QT				**12 16P**	**12 16P**					D5 05P	
Santa Maria, CA–IHOP	327	○♿						**1 30P**				4 35P	
Grover Beach, CA	338	○♿QT				**12 35P**	**12 35P**	**1 55P**				D5 30P	
SAN LUIS OBISPO, CA –Amtrak Station	350	●♿QT	Ar			**1 00P**	**1 00P**	2 25P				5 15P	
–Cal Poly		○	Ar			66 **1 15P**	66 **1 15P**	**2 35P**				**5 30P**	

PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16

Connecting Transit Services in Southern California

Metrolink provides commuter rail service radiating from Los Angeles Union Station to the Antelope Valley, downtown Burbank, Oxnard, Riverside, San Bernardino and Orange County. It supplements *Pacific Surfliner* service between Oxnard and Oceanside. (800) 371-5465; metrolinktrains.com. *Rail 2 Rail:* The Rail 2 Rail program offers *Pacific Surfliner* monthly pass holders access to Metrolink and COASTER commuter trains within the station limits of their pass.

Los Angeles County Metropolitan Transportation Authority provides bus, subway, and light rail services in the Los Angeles area; Metro's Red, Purple and Gold lines originate at Union Station and provide rail connections to Hollywood, Universal City and Pasadena. 323.GO.METRO; metro.net

North County Transit District operates the COASTER commuter rail service which supplements *Pacific Surfliner* service between San Diego and Oceanside including additional stops at Sorrento Valley, Solana Beach, Encinitas and Carlsbad. The Sprinter operates frequent rail service between Oceanside, Vista, San Marcos and Escondido. The Breeze also provides bus service at many *Pacific Surfliner* stations. (760) 966-6500; www.gonctd.com.

San Diego Metropolitan Transit System operates bus and the San Diego Trolley service. Direct service to San Diego's Santa Fe Depot and Old Town stations. (619) 233-3004; sdmts.com.

Orange County Transportation Authority provides bus transit service throughout Orange County including *Pacific Surfliner* stations in Fullerton, Anaheim, Santa Ana, Irvine, San Juan Capistrano and San Clemente. (714) 636-7433; www.octa.net.

Santa Barbara Metropolitan Transit District provides bus transit service in Santa Barbara County, including connections to the Downtown and Waterfront shuttles serving State Street, the Santa Barbara Zoo and Santa Barbara Harbor. (805) 963-3366; sbmtd.gov.

Anaheim Resort Transit provides convenient bus connections from the Anaheim station to the Disneyland Resort and Anaheim Convention Center. (888) 364-2787; www.rideart.org

For a complete list of connecting public transit providers, visit PacificSurfliner.com

NEW! Transit Transfer Program

The *Pacific Surfliner* Transit Transfer Program provides free transfers to connecting transit providers at most stations. Simply show your Amtrak *Pacific Surfliner* paper ticket or e-Ticket when you board the bus or shuttle. You can also purchase a discounted one-day transit pass for Metro (Los Angeles) and MTS (San Diego) in the Café car. Visit PacificSurfliner.com for details.

SHADING KEY

Daytime train	Connecting train
Thruway and connecting services	

See pages 2-3 for Services, Symbols and Reference Marks; and page 8 for Route Map.

Train Number ▸				777	579	583	583	785	591	591	595	5809
Normal Days of Operation ▸				Daily	Daily	Daily	SaSu	Daily	Daily	SaSu	Daily	Daily
Will Also Operate ▸							*See Note			*See Note		
Will Not Operate ▸						*See Note			*See Note			
On Board Service ▸				B	B	B	B	B	B	B	B	76
	Mile	Symbol										
SAN DIEGO, CA (Tijuana)	0		Dp	11 57A	1 36P	2 47P	3 05P	3 58P	6 50P	6 50P	8 59P	91 9 45P
San Diego (Old Town), CA	3					R2 54P	R3 12P	R4 05P	R6 57P	R6 57P	R9 06P	
Sorrento Valley, CA	19										9 28P	
Solana Beach, CA	26			12 32P	2 11P	3 28P	3 50P	4 36P	7 28P	7 33P	9 39P	91 10 15P
Encinitas, CA	30										9 45P	
Carlsbad (Poinsettia), CA	34										9 51P	
Carlsbad (Village), CA	38										9 57P	
Oceanside, CA (LEGOLAND) 55	41			12 47P	2 27P	3 45P	4 06P	4 53P	7 44P	7 49P	10 03P	91 10 45P
San Clemente Pier, CA	63					4 07P	4 30P	5 19P				
San Juan Capistrano, CA	70			1 19P	2 59P	4 22P	4 51P	5 34P	8 17P	8 22P	10 35P	91 11 20P
Irvine, CA	83			1 33P	3 14P	4 38P	5 09P	5 49P	8 32P	8 43P	10 49P	91 11 35P
Santa Ana, CA	92			1 44P	3 25P	4 51P	5 24P	6 00P	8 43P	8 54P	11 01P	91 11 55P
Anaheim, CA (Disneyland®)	97			1 53P	3 34P	5 01P	5 36P	6 10P	8 52P	9 03P	11 10P	
Fullerton, CA	102			2 01P	3 42P	5 10P	5 48P	6 20P	9 00P	9 13P	11 18P	91 12 15A
LOS ANGELES, CA	128		Ar	2 40P	4 17P	5 45P	6 28P	6 55P	9 35P	9 54P	11 52P	91 1 00A
			Dp	3 05P	44	44		7 15P	37 R 9 50P	37 R 10 10P		91 1 15A
Glendale, CA	134			3 17P	44	44		7 27P	10 05P	10 25P		1 30A
Burbank-Bob Hope Airport, CA	142			3 27P	44	44		7 37P				76 91 1 45A
Van Nuys, CA–Amtrak Station	147			3 37P	44	44		7 47P	10 30P	10 50P		
Chatsworth, CA	157			3 49P	44	44		7 59P	D10 50P	D11 10P		
Simi Valley, CA	164			4 01P	44	44		8 11P	D11 10P	D11 30P		
Moorpark, CA	175				44	44			D11 25P	D11 45P		
Camarillo, CA	186			4 27P	44			8 35P	D11 35P	D11 55P		
Oxnard, CA	195			4 38P	44			8 46P	D11 45P	D12 05A		
Ventura, CA	205			4 57P				9 00P	D11 59P	D12 20A		
Carpinteria, CA	221			5 21P				9 22P	D12 15A	D12 35A		
SANTA BARBARA, CA	232		Ar	5 40P				D9 50P	D12 35A	D12 55A		
			Dp	5 43P				43 R 9 55P				
Goleta, CA	241			5 55P				10 03P	12 50A	1 10A		
Solvang, CA	267							D10 40P				
Buellton, CA–Opposite Burger King	271							D10 45P				
Lompoc, CA–Visitors Center	284											
Lompoc-Surf Station, CA	300			7 01P								
Guadalupe-Santa Maria, CA	326			7 37P								
Santa Maria, CA–IHOP	327							D11 25P				
Grover Beach, CA	338			7 54P				11 50P				
SAN LUIS OBISPO, CA –Amtrak Station	350		Ar	8 35P				12 15A				
–Cal Poly			Ar	65 8 45P				12 30A				

*This train does NOT operate on Saturdays or Sundays, July 16 through September 4, nor September 5.

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PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16

Pacific Surfliner Thruway Bus Connections

Los Angeles • Long Beach • San Pedro

573/774	777	583/784	591/796/11	Connecting Train Number		566/761/1761	572/769	777	580/785
5702	5712	5714	5716	Thruway Number		5713	5715	5717	5703
Daily	Daily	Daily	Daily	Days of Operation		Daily	Daily	Daily	Daily
2 50P	4 35P	6 50P	10 00P	Dp Los Angeles, CA–Union Station	Ar	7 20A	10 25A	12 45P	2 45P
D3 45P	D5 30P	D7 45P	D10 55P	Ar Long Beach, CA–Transit Gallery	Dp	R6 00A	R9 20A	R11 45A	R1 45P
D4 00P	D5 45P	D8 00P	D11 10P	San Pedro, CA–Catalina Terminal		R5 45A	R9 05A	R11 30A	R1 30P
4 15P	6 00P	8 15P	11 25P	Ar –Library	Dp	5 35A	8 55A	11 20A	1 20P

NOTE—All *Pacific Surfliner* Thruway Bus Connections above require reservations.

Airport Connections

Los Angeles International Airport

FlyAway bus service operates directly from Los Angeles Union Station to all terminals of Los Angeles International Airport. Buses depart on the half-hour from 5:00 a.m.-1:00 a.m., then at 2:00 a.m., 3:00 a.m. and 4:00 a.m. Travel time is 40-45 minutes. Reservations are not required. Tickets are available on board buses departing throughout the day from berth 9 of the Patsaouras Transit Plaza on the east side of Union Station. Credit and debit cards only are accepted, no cash. For further information, including purchasing tickets online, limited service from Van Nuys and Westwood (UCLA), etc., go to lawa.org/flyaway or call (866) 435-9529.

Burbank-Bob Hope Airport

The Burbank-Bob Hope Airport train station/Thruway bus stop is one short block from the main air terminal. Shuttle service between the rail station and airport terminal is available on call from the courtesy telephone on the sidewalk by the Empire Avenue crosswalk. Rental car agencies are located between the rail station and airport.

Book Your Bike!

Bicycle reservations are required on all *Pacific Surfliner* trains. Reservations are complimentary and can be obtained on-line at Amtrak.com (click the "Add Bike to Trip" tab after selecting your departure and class of service), at Quik-Trak kiosks, from station ticket agents, or by calling 1-800-USA-RAIL. Bike reservations are required for each travel segment and must accompany a valid Amtrak ticket. Amtrak Multi-Ride Ticket holders (10-trip or Monthly Pass) may obtain bike reservations only through station ticket agents or by calling 1-800-USA-RAIL. Passengers are required to properly secure bicycles in bike racks. Book early, as bike space is limited and may not be available on all trains or departures.

CALIFORNIA COASTAL ROUTES-Southbound

Train Name ▸ 85 86 88				Capitol Corridor / Pacific Surfliner	Capitol Corridor / Pacific Surfliner	Pacific Surfliner	Capitol Corridor / Pacific Surfliner	Capitol Corridor / Pacific Surfliner	Coast Starlight / Pacific Surfliner	Capitol Corridor / Pacific Surfliner	Capitol Corridor / Pacific Surfliner	Capitol Corridor
Train Number ▸				549/768	749/768	784	523/790	723/1790	11/796	527/796	727/796	537/737
Normal Days of Operation ▸				Mo-Fr 74	SaSuHo 74	Daily	Mo-Fr	SaSuHo	Daily	Mo-Fr	SaSuHo	Daily
On Board Service ▸				B 🍴 🧳 🛄 🚲	B 🍴 🧳 🛄 🚲	B 🍴 🧳 🛄 🚲	B 🍴 🧳 🛄 🚲	B 🍴 🧳 🛄 🚲	R 🧳 ✕ 🍴 🚲	B 🍴 🧳 🛄 🚲	B 🍴 🧳 🛄 🚲	☕ 🍴 🚲
	Mile	Symbol										
SACRAMENTO, CA	0	●♿QT	Dp	6 55P	7 35P		5 30A	6 10A	6 35A	7 00A	8 10A	12 10P
Davis, CA	13	●♿QT		7 10P	7 50P		5 45A	6 25A	6 50A	7 15A	8 25A	12 25P
Suisun-Fairfield, CA	40	○♿QT		7 34P	8 14P		6 09A	6 49A		7 39A	8 49A	12 49P
Martinez, CA	57	●♿QT		7 54P	8 34P		6 29A	7 09A	7 34A	7 59A	9 09A	1 09P
Richmond, CA	76	○♿QT		8 20P	9 00P		6 55A	7 35A		8 25A	9 35A	1 35P
Berkeley, CA	82	○♿QT		8 28P	9 08P		7 03A	7 43A		8 33A	9 43A	1 43P
Emeryville, CA	84	●♿QT		8 35P	9 15P	R6 05A	7 10A	7 50A	8 20A	8 40A	9 50A	1 50P
OAKLAND, CA –Jack London Square	89	●♿QT	Ar	D8 51P	9 33P		89 7 21A	89 8 01A	8 35A	89 8 51A	89 10 01A	2 01P
			Dp	10 00P	10 00P	R5 55A	7 10A	7 40A	8 50A	9 55A	9 55A	2 03P
Oakland Coliseum, CA.	94	○♿QT					7 32A	8 12A		9 02A	10 12A	2 12P
San Francisco, CA–Transbay Term.		●♿QT		10 45P	10 45P	R6 35A	R7 40A	R8 10A		R10 30A	R10 30A	
Hayward, CA	102	○♿QT					7 43A	8 23A		9 13A	10 23A	2 23P
Fremont-Centerville, CA	114	○♿QT					7 59A	8 39A		9 29A	10 39A	2 39P
Santa Clara, CA-Great America	125	○♿QT					8 16A	8 56A		9 46A	10 56A	2 56P
Santa Clara, CA-University Station	128	○					8 24A	9 04A		9 54A	11 04A	3 04P
SAN JOSE, CA	132	●♿QT	Ar	11 55P	11 55P	7 30A	8 38A	9 18A	9 55A	10 13A	11 18A	3 18P
			Dp	11 59P	11 59P	7 35A	9 05A	9 25A	10 07A	11 35A	11 35A	3 25P
Salinas, CA	203	●♿		1 15A	1 15A	8 45A	10 10A	10 30A	11 48A	12 40P	12 40P	4 40P
King City, CA–McDonald's		○♿		M2 10A	M2 10A	M9 40A	M11 15A	M11 35A		M1 40P	M1 40P	MD5 35P
Paso Robles, CA	300	○♿		3 10A	3 10A	68 10 40A	12 15P	12 35P	1 38P	2 40P	2 40P	D6 20P
Atascadero, CA–Transit Center	310	○								2 55P	2 55P	
San Luis Obispo, CA–Cal Poly	334	○		3 40A	3 40A	R10 10A	12 50P	1 10P		3 15P	3 15P	D6 55P
SAN LUIS OBISPO, CA	335	●♿QT	Ar	3 50A	3 50A	10 25A	1 10P	1 30P	3 07P	3 30P	3 30P	7 00P
			Dp	3 50A	3 50A	10 30A	1 35P	2 00P	3 20P	3 40P	3 40P	7 10P
Grover Beach, CA	348	○♿QT		4 15A	4 15A	10 55A	1 55P	2 20P		4 10P	4 10P	D7 30P
Santa Maria, CA–IHOP	360	○♿		4 40A	4 40A	R11 20A				4 35P	4 35P	D7 55P
Guadalupe-Santa Maria, CA	361	○♿QT					2 11P	2 36P				
Lompoc-Surf Station, CA	388	○					2 51P	3 16P				
Lompoc, CA–Visitors Center	404	○♿				R12 05P						
Solvang, CA–Solvang Park	436	○♿		5 15A	5 15A	R12 35P				5 10P	5 10P	D8 30P
Buellton, CA–Opposite Burger King		○		5 20A	5 20A	R12 40P				5 15P	5 15P	D8 35P
Goleta, CA	447	○♿QT		6 35A	6 35A	1 50P	3 57P	4 22P		6 45P	6 45P	
SANTA BARBARA, CA	456	●♿QT	Ar	6 30A	6 30A	1 45P	4 09P	4 37P	5 55P	6 40P	6 40P	9 30P
			Dp	6 49A	6 49A	2 04P	4 12P	4 40P	6 02P	6 59P	6 59P	
Carpinteria, CA	466	○♿QT		7 04A	7 04A	2 19P	4 27P	4 55P		7 15P	7 15P	
Ventura, CA	482	○♿QT		7 29A	7 29A	2 41P	4 49P	5 21P		7 37P	7 37P	
Oxnard, CA	492	●♿QT		7 43A	7 43A	2 57P	5 07P	5 35P	D7 05P	7 51P	7 51P	
Camarillo, CA	502	○♿		7 54A	7 54A	3 08P				8 02P	8 02P	
Moorpark, CA	512	○♿		8 08A	8 08A	3 20P	5 36P	6 04P				
Simi Valley, CA	523	○♿		8 23A	8 23A	3 35P	5 54P	6 20P	D7 48P	8 38P	8 38P	
Chatsworth, CA	531	○♿		8 40A	8 40A	3 52P	6 12P	6 33P		8 50P	8 50P	
Van Nuys, CA–Amtrak Station	540	●♿QT		8 56A	8 56A	4 14P	6 31P	6 45P	D8 22P	9 06P	9 06P	
Burbank-Bob Hope Airport, CA ✈	546	○♿QT		9 04A	9 04A	4 22P	6 39P	6 53P	D8 31P	9 13P	9 13P	
Glendale, CA	553	○♿		9 16A	9 16A	4 32P	6 50P	7 04P		9 23P	9 23P	
LOS ANGELES, CA ✈	559	●♿QT	Ar	9 35A	9 35A	4 50P	7 10P	7 20P	9 00P	9 45P	9 45P	
			Dp	9 55A	9 55A	5 10P	7 31P	7 40P	10 10P	10 10P	10 10P	
Fullerton, CA	585	●♿QT		10 26A	10 26A	5 42P	8 02P	8 11P	10 41P	10 41P	10 41P	
Anaheim, CA (Disneyland®)	590	●♿		10 34A	10 34A	5 51P	8 10P	8 19P	10 49P	10 49P	10 49P	
Santa Ana, CA	595	●♿		10 43A	10 43A	6 00P	8 19P	8 28P	10 58P	10 58P	10 58P	
Irvine, CA	605	●♿		10 54A	10 54A	6 13P	8 32P	8 39P	11 09P	11 09P	11 09P	
San Juan Capistrano, CA	617	●♿		11 09A	11 09A	6 27P	8 47P	8 54P	11 24P	11 24P	11 24P	
San Clemente Pier, CA	625	○		11 22A	11 22A							
Oceanside, CA (LEGOLAND)	646	●♿QT		11 47A	11 47A	7 03P	9 20P	9 27P	11 57P	11 57P	11 57P	
Carlsbad (Village), CA	649	○				7 08P	9 25P	9 32P	12 03A	12 03A	12 03A	
Carlsbad (Poinsettia), CA	653	○				7 14P	9 32P	9 39P	12 12A	12 12A	12 12A	
Encinitas, CA	658	○				7 23P	9 40P	9 48P	12 19A	12 19A	12 19A	
Solana Beach, CA	662	●♿QT		12 08P	12 08P	7 29P	9 47P	9 55P	12 26A	12 26A	12 26A	
Sorrento Valley, CA	669	○				7 39P	9 57P	10 06P	12 36A	12 36A	12 36A	
San Diego (Old Town), CA	684	○♿QT		D12 41P	D12 41P	D8 01P	D10 19P	D10 27P	D12 58A	D12 58A	D12 58A	
SAN DIEGO, CA ✈	687	●♿QT	Ar	12 49P	12 49P	8 09P	10 30P	10 39P	1 06A	1 06A	1 06A	

CAPITOL CORRIDOR SCHEDULES EFFECTIVE 8/22/16. PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16.

74 Modified Summer Weekend Schedule for Overnight Coastal Service

74 The Amtrak Thruway buses for trains 749/768 and 549/768 operate 70 minutes earlier from Oakland to Santa Barbara on Friday and Saturday nights between July 15 and September 3, as well as Sunday night September 4. For Train 768 (*Pacific Surfliner*) schedule on those nights, see page 2. *Capitol Corridor* train schedule does not change.

See page 4 for Connecting Transit Services.
See page 5 for Airport Connections.
See page 8 for Route Map.

Train Name ▸ 85 86 88	Mile	Symbol		Capitol Corridor	Capitol Corridor	Pacific Surfliner Capitol Corridor	Pacific Surfliner Capitol Corridor	Pacific Surfliner Capitol Corridor	Pacific Surfliner Coast Starlight	Pacific Surfliner Capitol Corridor	Pacific Surfliner	Pacific Surfliner	Pacific Surfliner Capitol Corridor	Pacific Surfliner Capitol Corridor
Train Number ▸				732	538	761/546	1761/742	763/548	763/14	763/748	769	777	785/522	785/720
Normal Days of Operation ▸				SaSuHo	Mo-Fr	Mo-Fr	SaSuHo	Mo-Fr	Daily	SaSuHo	Daily	Daily	Mo-Fr	SaSuHo
On Board Service ▸						B	B	B	R	B	B	B	B	B
SAN DIEGO, CA ✈	0	●♿QT	Dp					6 07A	6 07A	6 07A	9 20A	11 57A	3 58P	3 58P
San Diego (Old Town), CA	3	○🚌QT						R6 14A	R6 14A	R6 14A	R9 27A		R4 05P	R4 05P
Solana Beach, CA	26	●♿QT						6 45A	6 45A	6 45A	9 58A	12 32P	4 36P	4 36P
Oceanside, CA (LEGOLAND)	41	●♿QT						7 03A	7 03A	7 03A	10 15A	12 47P	4 53P	4 53P
San Clemente Pier, CA	63	○											5 19P	5 19P
San Juan Capistrano, CA	70	●♿						7 36A	7 36A	7 36A	10 47A	1 19P	5 34P	5 34P
Irvine, CA	83	●♿						7 54A	7 54A	7 54A	11 01A	1 33P	5 49P	5 49P
Santa Ana, CA	92	●♿				5 25A	5 25A	8 05A	8 05A	8 05A	11 12A	1 44P	6 00P	6 00P
Anaheim, CA (Disneyland®)	97	●♿						8 14A	8 14A	8 14A	11 22A	1 53P	6 10P	6 10P
Fullerton, CA	102	●♿QT				5 50A	5 50A	8 22A	8 22A	8 22A	11 30A	2 01P	6 20P	6 20P
LOS ANGELES, CA ✈	128	●♿QT	Ar			6 35A	6 35A	8 57A	8 57A	8 57A	12 05P	2 40P	6 55P	6 55P
			Dp			7 35A	7 50A	9 20A	10 10A	9 20A	12 30P	3 05P	7 15P	7 15P
Glendale, CA	134	○♿				7 48A	8 02A	9 32A		9 32A	12 42P	3 17P	7 27P	7 27P
Burbank-Bob Hope Airport, CA ✈	142	○♿QT				8 00A	8 12A	9 42A	R10 29A	9 42A	12 52P	3 27P	7 37P	7 37P
Van Nuys, CA–Amtrak Station	147	●♿QT				8 10A	8 21A	9 52A	R10 40A	9 52A	1 02P	3 37P	7 47P	7 47P
Chatsworth, CA	157	○🚌				8 32A	8 33A	10 04A		10 04A	1 14P	3 49P	7 59P	7 59P
Simi Valley, CA	164	○🚌				8 45A	8 45A	10 16A	R11 11A	10 16A	1 26P	4 01P	8 11P	8 11P
Moorpark, CA	175	○🚌				8 57A	8 57A				1 39P			
Camarillo, CA	186	○♿				9 10A	9 10A	10 40A		10 40A	1 54P	4 27P	8 35P	8 35P
Oxnard, CA	195	●♿QT				9 21A	9 21A	10 53A	11 44A	10 53A	2 05P	4 38P	8 46P	8 46P
Ventura, CA	205	○♿QT				9 35A	9 35A	11 09A		11 09A	2 19P	4 57P	9 00P	9 00P
Carpinteria, CA	221	○♿QT				10 06A	10 06A	11 31A		11 31A	2 47P	5 21P	9 22P	9 22P
SANTA BARBARA, CA	232	●♿QT	Ar			10 19A	10 19A	D11 55A	12 33P	D11 55A	D3 05P	5 40P	D9 50P	D9 50P
			Dp	6 15A	8 10A	10 22A	10 22A	12 05P	12 40P	12 05P	3 10P	5 43P	9 55P	9 55P
Goleta, CA	241	○🚌QT				10 34A	10 34A	12 08P		12 08P	3 18P	5 55P	10 03P	10 03P
Solvang, CA–Solvang Park	279	○♿						12 45P		12 45P	D4 00P		D10 40P	D10 40P
Buellton, CA–Opp. Burger King		○						12 50P		12 50P	D4 05P		D10 45P	D10 45P
Lompoc, CA–Visitors Center	288	○♿									D4 30P			
Lompoc-Surf Station, CA	300	○				11 40A	11 40A					7 01P		
Guadalupe-Santa Maria, CA	326	○♿QT				12 16P	12 16P				D5 05P	7 37P		
Santa Maria, CA–IHOP	327	○♿		7 30A	9 25A			1 30P		1 30P	D4 35P		D11 25P	D11 25P
Grover Beach, CA	338	○♿QT		8 00A	9 55A	12 35P	12 35P	1 55P		1 55P	D5 30P	7 54P	11 50P	11 50P
SAN LUIS OBISPO, CA	350	●♿QT	Ar	8 20A	10 15A	1 00P	1 00P	2 20P	3 22P	2 20P	5 15P	8 35P	12 15A	12 15A
			Dp	8 25A	10 20A	1 05P	1 05P	2 25P	3 35P	2 25P	5 20P	8 36P	12 20A	12 20A
San Luis Obispo, CA–Cal Poly	351	○		8 30A	10 25A	1 15P	1 15P	2 35P		2 35P	5 30P	D8 45P	12 30A	12 30A
Atascadero, CA–Transit Center	375	○						2 50P		2 50P		D9 05P		
Paso Robles, CA	385	○♿		9 05A	11 00A	1 40P	1 40P	3 05P	4 37P	3 05P	5 55P	9 25P	12 55A	12 55A
King City, CA–McDonald's		○♿		M10 10A	M12 05P	M2 50P	M2 50P	M4 15P		M4 15P	M6 55P		M2 05A	M2 05A
Salinas, CA	483	●🚌		11 15A	1 10P	3 50P	3 50P	5 15P	6 28P	5 15P	7 55P		3 05A	3 05A
SAN JOSE, CA	554	●♿QT	Ar	12 50P	2 45P	D5 05P	D5 05P	D6 30P	8 11P	D6 30P	D9 10P			
			Dp	1 05P	3 10P	5 50P	5 10P	7 15P	8 23P	9 10P			4 20A	4 20A
Santa Clara, CA-University Station	561	○		1 11P	3 16P	5 56P	5 16P	7 21P		9 16P				
Santa Clara, CA-Great America	564	○🚌QT		1 19P	3 24P	6 04P	5 24P	7 29P		9 24P				
Fremont-Centerville, CA	573	○🚌QT		1 36P	3 43P	6 21P	5 41P	7 46P		9 41P				
Hayward, CA	585	○♿QT		1 51P	3 59P	6 36P	5 56P	8 01P		9 56P				
San Francisco, CA–Transbay Term.		●♿QT				D6 20P	D6 20P	D7 40P	D10 00P	D7 40P	D10 25P		D5 35A	D5 35A
Oakland Coliseum, CA	593	○♿QT		2 01P	4 09P	6 46P	6 06P	8 11P		10 06P				
OAKLAND, CA –Jack London Square	598	●🚌QT	Ar	2 08P	4 18P	6 45P	6 45P	D8 10P	9 24P	D8 10P	D10 45P		6 05A	6 05A
			Dp	2 10P	4 20P	6 55P	6 20P	8 20P	9 39P	10 15P			6 25A	8 15A
Emeryville, CA	603	●♿QT		2 20P	4 30P	7 05P	6 30P	8 30P	10 04P	10 25P	D10 55P		6 35A	8 23A
Berkeley, CA	604	○♿QT		2 24P	4 34P	7 09P	6 34P	8 34P		10 29P			6 39A	8 29A
Richmond, CA	610	○🚌QT		2 32P	4 42P	7 17P	6 42P	8 42P		10 37P			6 47A	8 37A
Martinez, CA	630	●♿QT		2 59P	5 09P	7 44P	7 09P	9 09P	10 46P	11 04P			7 14A	9 04A
Suisun-Fairfield, CA	647	○♿QT		3 18P	5 28P	8 03P	7 28P	9 28P		11 23P			7 33A	9 23A
Davis, CA	674	●♿QT		3 42P	5 52P	8 27P	7 52P	9 52P	11 25P	11 47P			7 57A	9 47A
SACRAMENTO, CA	687	●♿QT	Ar	4 13P	6 23P	8 58P	8 12P	10 28P	11 59P	12 18A			8 23A	10 13A

CAPITOL CORRIDOR SCHEDULES EFFECTIVE 8/22/16. PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16.

Service on California Coastal Routes

M Meal stop.

68 Bus 4784 operates express service to Santa Barbara via San Luis Obispo.

85 For detailed service information for the *Capitol Corridor* between Reno and San Jose, please refer to our corresponding timetable folder (W34).

86 For detailed service information for the *Pacific Surfliner* between San Luis Obispo and San Diego, please refer to pages 2-5.

88 For detailed service information for the *Coast Starlight* between Seattle and Los Angeles, please refer to our corresponding timetable folder (P11).

89 Train departs Oakland two minutes after arrival and makes connection with southbound coastal bus at San Jose.

Smoking is prohibited on trains and only permitted in designated areas at stations.

See pages 2-3 for Services, Symbols and Reference Marks.

SHADING KEY

Daytime train	Overnight train
Thruway and connecting services	

Effective JUNE 9, 2014

SOUTHWEST CHIEF®

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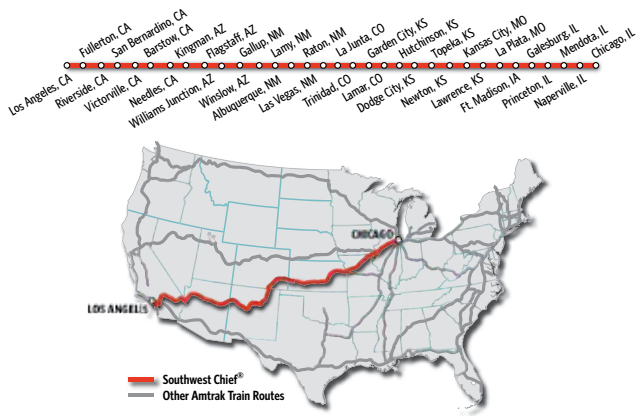
SOUTHWEST CHIEF

3	◂ Train Number ▸	4
Daily	◂ Normal Days of Operation ▸	Daily
R 🛏 ✕ ☕ 🧳	◂ On Board Service ▸	R 🛏 ✕ ☕ 🧳

Read Down	Mile			Symbol		Read Up
🧳3 00P	0	Dp	**Chicago, IL**–Union Station (CT) 🚌 Madison—see back	●♿QT	Ar	🧳3 15P
R3 35P	28		**Naperville, IL**	●♿QT		D2 42P
4 24P	83		**Mendota, IL**	○♿		1 19P
4 46P	104		**Princeton, IL**	○♿		12 58P
🧳5 38P	162		**Galesburg, IL**–S. Seminary St. 77	●♿QT		🧳12 08P
🧳6 42P	220		**Fort Madison, IA** (Keokuk)	●♿QT		🧳11 09A
7 51P	298		**La Plata, MO** (Kirksville)	○♿		9 55A
🧳10 11P 🧳10 45P	437	Ar Dp	**Kansas City, MO**	●♿QT	Dp Ar	🧳7 43A 🧳7 24A
11 52P	477		**Lawrence, KS**	○♿		5 47A
🧳12 29A	503		**Topeka, KS**	●♿		🧳5 18A
🧳2 45A	638		**Newton, KS** (Wichita)	●♿		🧳2 59A
3 20A	671		**Hutchinson, KS**	○♿		2 19A
5 25A	791		**Dodge City, KS**	◐♿		12 27A
6 21A	841		**Garden City, KS** (CT)	●♿		11 17P
6 59A	941		**Lamar, CO** (MT)	○♿		8 40P
🧳8 15A 🧳8 30A	993	Ar Dp	**La Junta, CO**	●♿	Dp Ar	🧳7 41P 🧳7 31P
9 50A	1074		**Trinidad, CO**	○♿		5 49P
10 56A	1098		**Raton, NM** 🚌 Denver—see back	○♿		4 50P
12 38P	1209		**Las Vegas, NM**	○♿QT		3 03P
🧳2 24P	1274		**Lamy, NM** 🚌 Santa Fe—see back	●♿		🧳1 17P
🧳3 55P 🧳4 45P	1341	Ar Dp	**Albuquerque, NM**	●♿QT	Dp Ar	🧳12 10P 🧳11 42A
7 08P	1514		**Gallup, NM** (MT)	○♿		8 21A
69 7 50P	1641		**Winslow, AZ** (MST)	○♿		69 5 39A
69 🧳8 51P 69 🧳8 57P	1699	Ar Dp	**Flagstaff, AZ** 🚌 Grand Canyon, Phoenix—see back	●♿QT	Dp Ar	69 🧳4 41A 69 🧳4 36A
53 69 9 33P	1730		**Williams Jct., AZ** (Grand Can. Ry.)	○♿53		53 69 3 50A
69 11 46P	1873		**Kingman, AZ** (MST) 🚌 Laughlin, Las Vegas—see back	○♿		69 1 33A
12 49A	1940		**Needles, CA** (PT)	○♿		12 23A
3 39A	2109		**Barstow, CA**	○♿		9 56P
4 18A	2146		**Victorville, CA**	○♿		9 10P
5 32A	2193		**San Bernardino, CA**	○♿		7 59P
5 53A	2203		**Riverside, CA**	○♿		7 33P
🧳D6 34A	2239		**Fullerton, CA**	●♿QT		🧳R6 50P
🧳8 15A	2265	Ar	**Los Angeles, CA** ✈ (PT) 🚌 Las Vegas—see back, below	●♿QT	Dp	🧳6 15P

77 Executive Transportation operates Thruway van service from Springfield, IL for connections from Train 22 to Trains 3 and 5 at Galesburg, IL and from Galesburg, IL for connections from Trains 4 and 6 to Train 21 at Springfield, IL. Passengers with disabilities must provide advance notification of needs. For additional information call (217) 523-5466.

SOUTHWEST CHIEF ROUTE MAP and SYMBOLS



A	Time Symbol for A.M.	✈	Airport connection
P	Time Symbol for P.M.	QT	Quik-Trak self-serve ticketing kiosk
D	Stops only to discharge passengers; train may leave before time shown.	○	Unstaffed station
R	Stops only to receive passengers.	◐	Attended station
CT	Central time	●	Staffed ticket office; may or may not be open for all train departures
MT	Mountain time	♿	Station wheelchair accessible; no barriers between station and train
MST	Mountain Standard time	♿	Station wheelchair accessible; not all stations facilities accessible
PT	Pacific time		
🚌	Bus stop		

Service on the Southwest Chief®

R **Coaches: Reservations required.**

🛏 **Sleeping cars:** Superliner sleeping accommodations.
- Amtrak Metropolitan Lounge available in Chicago and Los Angeles for Sleeping car passengers.

✕ **Dining:** Full meal service.

☕ **Sightseer Lounge:** Sandwiches, snacks and beverages.

🧳 Checked baggage at select stations.

53 Free shuttle service between Williams Grand Canyon Railway station and Williams Junction Amtrak station. Reservations required.

69 This location does not observe Daylight Saving Time. Schedule times at this station will be ONE HOUR LATER beginning with the Fall time change on November 2, 2014.

Smoking is prohibited.

Trails and Rails Program: In cooperation with the National Park Service, volunteer rangers from Bent's Old Fort National Historic Site provide narrative between La Junta and Albuquerque on Train 3 Friday and Sunday and on Train 4 Saturday and Monday, May 4 through September 1; volunteers from Texas A&M University provide narrative between Chicago and La Plata on Train 3 Tuesday and Thursday and Train 4 Wednesday and Friday, May 13 through September 15 and November 11 through January 1. Seasonal programs are subject to change. Visit nps.gov/trailsandrails and amtraktoparks.com.

Thruway Bus Connections

Flagstaff • Phoenix *(Arizona Shuttle)*

NOTE—In addition to the same-day train connections at Flagstaff shown on the next page, this service offers overnight connections for travel between Phoenix and the Grand Canyon or points east of Flagstaff.

8561	8563	8553	8557	8559	8565	8567	8581	8569	Thruway Number					8560	8554	8562	8576	8556	8558	8564	8566	8568
Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Mile		Days of Operation	Symbol		Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily
5 00A	7 00A	8 00A	9 00A	11 00A	1 00P	3 00P	5 00P	7 00P	0	Dp	**Flagstaff, AZ** (MST) –Amtrak Station	●	Ar	10 20A	12 20P	2 20P	3 20P	4 20P	6 20P	8 20P	10 20P	12 20A
6 00A	8 00A	9 00A	10 00A	12 00N	2 00P	4 00P	6 00P	8 00P	50	Dp	**Camp Verde, AZ**	○	Dp	9 00A	11 00A	1 00P	2 00P	3 00P	5 00P	7 00P	9 00P	11 00P
7 50A	9 50A	10 50A	11 50A	1 50P	3 50P	5 50P	7 50P	9 50P	143	Ar	**Phoenix, AZ** –Metro Center Transportation Ctr.	○	Dp	7 30A	9 30A	11 30A	12 30P	1 30P	3 30P	5 45P	7 30P	9 30P
8 10A	10 10A	11 10A	12 10P	2 10P	4 10P	6 10P	8 10P	10 00P	145	Ar	–Sky Harbor (MST) Airport	○	Dp	7 00A	9 00A	11 00A	12 00N	1 00P	3 00P	5 00P	7 00P	9 00P

NOTE—Additional service: Bus 8579 departs Flagstaff 2:00 p.m., arriving Camp Verde 3:00 p.m., Phoenix Metro Center 4:50 p.m. and Sky Harbor Airport 5:10 p.m. Bus 8580 departs Sky Harbor Airport 6:00 p.m., Metro Center 6:30 p.m. and Camp Verde 8:00 p.m., arriving Flagstaff 9:20 p.m.

Los Angeles • Las Vegas *(Greyhound Lines)* NOTE—Greyhound schedules subject to change.

8534	8536	Thruway Number				8535
Daily	Daily	Mile		Days of Operation	Symbol	Daily
10 45A	3 10P	0	Dp	**Los Angeles, CA** ✈ –Union Station (PT)	●♿QT	Ar 3 15P
4 55P	8 20P	271	Ar	**Las Vegas, NV**–Greyhound Station (PT)	○	Dp 9 05A

Shading Key
Long-distance train
Thruway and connecting services

Thruway Bus Connections

Madison • Rockford • Chicago

(Van Galder–en route transfers may be necessary)

8964	Mile		Thruway Number	Symbol		8965
			Madison, WI (CT)			
10 00A	0	Dp	–Univ. of Wisconsin/Chazen Museum	○	Ar	**8 35P**
10 15A	6		–Dutchmill Park & Ride	○		**8 20P**
11 00A	35		**Janesville, WI**	○		**7 30P**
11 25A	48		**South Beloit, IL**	○		**7 10P**
11 50A	65	Dp	**Rockford, IL**	○	Ar	**6 50P**
1 45P	140	Ar	**Chicago, IL**–Union Station (CT)	●	Dp	**5 00P**

Denver • Colorado Springs • Pueblo • Raton

(Greyhound Lines)

3	Connecting Train Number					4
8603	**Mile**		**Thruway Number**	**Symbol**		**8604**
5 30A		Dp	**Denver, CO**–Amtrak Station (MT)	●♿	Ar	**9 10P**
7 10A		Ar	**Colorado Springs, CO**	○	Dp	**7 40P**
8 10A		Ar	**Pueblo, CO**	○	Dp	**6 45P**
10 20A		Ar	**Raton, NM** –Amtrak Station (MT)	○	Dp	**5 05P**

Lamy • Santa Fe *(Lamy Shuttle)*

Lamy Shuttle Service van meets Trains 3 and 4 daily. From Lamy to Santa Fe, advance reservations required; call 1-800-USA-RAIL. From Santa Fe to Lamy, shuttle will pick up at your hotel; call (505) 982-8829 the day prior to departure to arrange pickup.

Grand Canyon • Williams *(Grand Canyon Railway)*

7903	Grand Canyon Railway Train Number					7904
Daily	**Mile**		**Days of Operation**	**Symbol**		**Daily**
3 30P	0	Dp	**Grand Canyon, AZ** (MST) –Grand Canyon Railway Station	○♿	Ar	11 45A
5 45P	64	Ar	**Williams, AZ** (MST) –Grand Canyon Railway Station	○♿	Dp	9 30A

NOTE—The Grand Canyon Railway station at the Grand Canyon is located near the Canyon rim, across the road from the El Tovar Hotel. Please visit www.thetrain.com/schedule for any updates to 2014 train schedule.

Williams • Williams Junction 53

(Shuttle service provided by Grand Canyon Railway)

3	Connecting Train Number					4
6903	**Thruway Number**					**6904**
Daily	**Mile**		**Days of Operation**	**Symbol**		**Daily**
69**9 10P**	0	Dp	**Williams, AZ** (MST) –Grand Canyon Railway Station	○♿	Ar	69 4 10A
69**9 20P**	3	Ar	**Williams Junction, AZ** (MST) –Amtrak Station	○♿	Dp	69 4 00A
6803			**Thruway Number**			**6804**
69**9 40P**	0	Dp	**Williams Junction, AZ** (MST) –Amtrak Station	○♿	Ar	69 3 40A
69**9 50P**	3	Ar	**Williams, AZ** (MST) –Grand Canyon Railway Station	○♿	Dp	69 3 30A

Kingman • Laughlin • Las Vegas *(Commuter Services)*

8003	Mile		Thruway Number	Symbol		8004
69**11 50P**	0	Dp	**Kingman, AZ**–Amtrak Station (MST)	○	Ar	69 1 00A
12 50A	33	Ar	**Laughlin, NV**–Tropicana Express (PT)	○	Dp	12 01A
3 10A	128	Ar	**Las Vegas, NV** (PT) –McCarran International Airport	○	Dp	**9 30P**

Flagstaff • Phoenix *(Greyhound Lines)*

3	Connecting Train Number					4
8703	**Thruway Number**					**8704**
Daily	**Mile**		**Days of Operation**	**Symbol**		**Daily**
69**10 10P**	0	Dp	**Flagstaff, AZ**–KP Transport. (MST)	○	Ar	69 2 20A
69 12 40A	145	Ar	**Phoenix, AZ**–Greyhound Sta. (MST)	○	Dp	69**11 40P**

Rail Runner Commuter Rail Service

Belen–Albuquerque–Santa Fe

For information call (866) 795-7245 or visit www.nmrailrunner.com.

See other side for Shading Key, Route Map and Symbols.

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1 [20]	◂ Train Number ▸					2 [20]
As indicated in column	◂ Normal Days of Operation ▸					As indicated in column
[R] 🛏 ✕ 🍷 🧳	◂ On Board Service ▸					[R] 🛏 ✕ 🍷 🧳
Read Down	**Mile**			**Symbol**		**Read Up**
9 00A MoWeSa	0	Dp	**New Orleans, LA** (CT) Baton Rouge—see below	●♿QT	Ar	**9 40P** TuFrSu
10 30A MoWeSa	56		**Schriever, LA** (Houma/Thibodaux)	○♿		**7 03P** TuFrSu
11 56A MoWeSa	127		**New Iberia, LA**	○♿		**5 41P** TuFrSu
12 24P MoWeSa	145		**Lafayette, LA**	○♿		**5 15P** TuFrSu
1 55P MoWeSa	219		**Lake Charles, LA**	○♿		**3 29P** TuFrSu
3 48P MoWeSa	281		**Beaumont, TX** (Port Arthur)	○♿		**2 05P** TuFrSu
6 18P MoWeSa	363	Ar	**Houston, TX**	●♿	Dp	**12 10P** TuFrSu
6 55P MoWeSa		Dp	Galveston—see below		Ar	11 10A TuFrSu
12 05A TuThSu	573	Ar	**San Antonio, TX**	●♿QT	Dp	6 25A TuFrSu
2 45A TuThSu		Dp			Ar	4 50A TuFrSu
5 49A TuThSu	742		**Del Rio, TX**	○♿		1 02A TuFrSu
8 24A TuThSu	868		**Sanderson, TX**	○		**10 36P** MoThSa
10 38A TuThSu	959		**Alpine, TX** (Big Bend Nat'l Park) (CT)	○♿		**8 45P** MoThSa
1 22P TuThSu	1178	Ar	**El Paso, TX** (MT)	●♿QT	Dp	**3 35P** MoThSa
1 47P TuThSu		Dp	(Ciudad Juarez, Mexico)		Ar	**3 10P** MoThSa
3 18P TuThSu	1264		**Deming, NM**	○♿		**1 10P** MoThSa
4 13P TuThSu	1325		**Lordsburg, NM** (MT)	○♿		**12 15P** MoThSa
[69] **5 18P** TuThSu	1443		**Benson, AZ** (MST)	○♿		[69] 9 15A MoThSa
[69] **6 45P** TuThSu	1493	Ar	**Tucson, AZ**	●♿QT	Dp	[69] 8 15A MoThSa
[69] **7 35P** TuThSu		Dp			Ar	[69] 7 28A MoThSa
[69] **8 52P** TuThSu	1579	Ar	**Maricopa, AZ** (Phoenix)	●♿	Dp	[69] 5 40A MoThSa
[69] **9 02P** TuThSu		Dp			Ar	[69] 5 30A MoThSa
[69] **11 49P** TuThSu	1744		**Yuma, AZ** (MST)	○♿		[69] 2 47A MoThSa
2 02A WeFrMo	1890		**Palm Springs, CA** (PT)	○♿		12 36A MoThSa
D3 54A WeFrMo	1957		**Ontario, CA**	○♿		**10 54P** SuWeFr
D4 04A WeFrMo	1964		**Pomona, CA**	○♿		**10 41P** SuWeFr
5 35A WeFrMo	1995	Ar	**Los Angeles, CA** ✈ (PT)	●♿QT	Dp	**10 00P** SuWeFr

SUNSET LIMITED
ROUTE MAP and SYMBOLS



A Time Symbol for A.M.
P Time Symbol for P.M.
D Stops only to discharge passengers; train may leave before time shown.
CT Central time
ET Eastern time
MT Mountain time
MST Mountain Standard time
PT Pacific time
Bus stop
Flag stop
Airport connection

QT Quik-Trak self-serve ticketing kiosk
○ Unstaffed station
● Staffed ticket office; may or may not be open for all train departures
♿ Station wheelchair accessible; no barriers between station and train
♿ Station wheelchair accessible; not all stations facilities accessible

Service on the Sunset Limited®

[R] **Coaches: Reservations required.**
🛏 **Sleeping cars:** Superliner sleeping accommodations.
- Magnolia Room is available in New Orleans and Amtrak Metropolitan Lounge in Los Angeles for Sleeping car passengers.
- Sleeping car passengers arriving at Los Angeles are welcome to occupy their accommodations until 6:30 a.m.

✕ **Dining:** Full meal service.
🍷 **Sightseer Lounge:** Sandwiches, snacks and beverages.
🧳 Checked baggage at select stations.
Train stops only when passengers are present, either on the train or station platform, and ticketed to and/or from this station. Reservations are required. Boarding passengers must reserve as far in advance as possible.
[69] This location does not observe Daylight Saving Time. Schedule times at this station will be ONE HOUR LATER beginning with the Fall time change on November 2, 2014.

Smoking is prohibited.

Trails and Rails Program: In cooperation with the National Park Service, volunteer rangers from the New Orleans Jazz National Historical Park provide a narrative on Train 1, Monday and Saturday, and Train 2, Tuesday and Sunday, between New Orleans and Beaumont, May 22 through September 2. Seasonal programs are subject to change. Visit nps.gov/trailsandrails and amtraktoparks.com.

Scenic Highlights

- Gulf Coast
- Bayou Country
- Mexican border
- Southwestern desert

Modified Amtrak Service for the *Sunset Limited*

[20] The *Sunset Limited* service between Orlando and New Orleans has been suspended. Future service has not been determined.

Shading Key	
Long-distance train	Thruway and connecting services

Thruway Bus Connections

Galveston • Houston *(Lone Star Coach)*

6022	Thruway Number					6021
Daily	**Mile**		**Days of Operation**	**Symbol**		**Daily**
11 30A	0	Dp	**Galveston, TX** (CT) –123 Rosenberg	○	Ar	**2 45P**
1 05P	47	Ar	**Houston, TX**–Amtrak Station (CT)	●♿	Dp	**1 15P**

New Orleans • Baton Rouge *(Greyhound Lines)*

8059	Thruway Number					8058
Daily	**Mile**		**Days of Operation**	**Symbol**		**Daily**
6 10P	0	Dp	**New Orleans, LA** (CT) –Union Passenger Terminal	●	Ar	7 00A
7 55P	80	Ar	**Baton Rouge, LA** (CT)	○	Dp	5 15A

Discover NEW HORIZONS.



For reservations and information **visit Amtrak.com** or call **1-800-USA-RAIL.**

Download the **Sunset Limited** podcast at **www.AmtrakRailGuide.com.**

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1 [20]	◂ Número de tren ▸	2 [20]
Como se indica en la columna	◂ Días de operación ▸	Como se indica en la columna
R 🛏 ✕ ☕ 🧳	◂ Servicio a bordo ▸	R 🛏 ✕ ☕ 🧳

Leer hacia abajo	Milla			Símbolo		Leer hacia arriba
9 00A LMiS	0	Dp	**New Orleans, LA** (CT) Baton Rouge—ver la derecha	●♿QT	Ar	**9 40P** MVD
10 30A LMiS	56		**Schriever, LA** (Houma/Thibodaux)	○♿		**7 03P** MVD
11 56A LMiS	127		**New Iberia, LA**	○♿		**5 41P** MVD
12 24P LMiS	145		**Lafayette, LA**	○♿		**5 15P** MVD
1 55P LMiS	219		**Lake Charles, LA**	○♿		**3 29P** MVD
3 48P LMiS	281		**Beaumont, TX** (Port Arthur)	○♿		**2 05P** MVD
6 18P LMiS	363	Ar	**Houston, TX**	●♿	Dp	**12 10P** MVD
6 55P LMiS		Dp	Galveston—ver la derecha		Ar	11 10A MVD
12 05A MJD	573	Ar	**San Antonio, TX**	●♿QT	Dp	6 25A MVD
2 45A MJD		Dp			Ar	4 50A MVD
5 49A MJD	742		**Del Rio, TX**	○♿		1 02A MVD
8 24A MJD	868		**Sanderson, TX**	○		**10 36P** LJS
10 38A MJD	959		**Alpine, TX** (Big Bend Nat'l Park) (CT)	○♿		**8 45P** LJS
1 22P MJD	1178	Ar	**El Paso, TX** (MT)	●♿QT	Dp	**3 35P** LJS
1 47P MJD		Dp	(Ciudad Juarez, Mexico)		Ar	**3 10P** LJS
3 18P MJD	1264		**Deming, NM**	○♿		**1 10P** LJS
4 13P MJD	1325		**Lordsburg, NM** (MT)	○♿		**12 15P** LJS
[69] **5 18P** MJD	1443		**Benson, AZ** (MST)	○♿		[69] 9 15A LJS
[69] **6 45P** MJD	1493	Ar	**Tucson, AZ**	●♿QT	Dp	[69] 8 15A LJS
[69] **7 35P** MJD		Dp			Ar	[69] 7 28A LJS
[69] **8 52P** MJD	1579	Ar	**Maricopa, AZ** (Phoenix)	●♿	Dp	[69] 5 40A LJS
[69] **9 02P** MJD		Dp			Ar	[69] 5 30A LJS
[69] **11 49P** MJD	1744		**Yuma, AZ** (MST)	○♿		[69] 2 47A LJS
2 02A MiVL	1890		**Palm Springs, CA** (PT)	○♿		12 36A LJS
D3 54A MiVL	1957		**Ontario, CA**	○♿		**10 54P** DMiV
D4 04A MiVL	1964		**Pomona, CA**	○♿		**10 41P** DMiV
5 35A MiVL	1995	Ar	**Los Angeles, CA** ✈ (PT)	●♿QT	Dp	**10 00P** DMiV

Servicio en el Sunset Limited®

- R **Clase económica: se requiere reservación.**
- 🛏 **Cabinas dormitorio:** Dormitorios en Superliner.
  - El Salón Magnolia está disponible en Nueva Orleans y el Salón Metropolitan en Los Ángeles para los pasajeros con servicio de coche-cama.
  - Los pasajeros con servicio de coche-cama que lleguen a Los Ángeles pueden ocupar sus lugares hasta las 6:30 a.m.
- ✕ **Comedor:** servicio de comida completo.
- ☕ **Lounge Sightseer:** sándwiches, refrigerios y bebidas.
- 🧳 Equipaje facturado en estaciones selectas.
- Él tren se detiene en una estación sólo cuando hay pasajeros en el tren con boleto hasta dicha estación o en la plataforma de la misma con boleto para salir desde allí. Es necesario hacer reservaciones. Los pasajeros que se van a embarcar deben reservar con la mayor anticipación posible.
- [69] Esta ubicación no respeta el horario de verano. Los horarios programados para esta estación se RETRASARÁN UNA HORA a partir del cambio de horario de otoño que comenzará a regir el 2 de noviembre de 2014.

Está prohibido fumar.

Programa Trails and Rails: en cooperación con el Servicio de Parques Nacionales, los guardaparques voluntarios del Parque Histórico Nacional de Jazz de Nueva Orleans realizarán una narración en el tren 1, los lunes y los sábados, y en el tren 2, los martes y los domingos, entre Nueva Orleans y Beaumont, desde el 22 de mayo hasta el 2 de septiembre. Los programas de temporada están sujetos a modificación. Visite nps.gov/trailsandrails y amtraktoparks.com.

Conexión de Thruway Bus

Galveston • Houston *(Lone Star Coach)*

6022	Número de Thruway					6021
Diariamente	Milla		Días de operación	Símbolo		Diariamente
11 30A	0	Dp	**Galveston, TX** (CT) –123 Rosenberg	○	Ar	**2 45P**
1 05P	47	Ar	**Houston, TX**–Estación de Amtrak(CT)	●♿	Dp	**1 15P**

New Orleans • Baton Rouge *(Greyhound Lines)*

8059	Número de Thruway					8058
Diariamente	Milla		Días de operación	Símbolo		Diariamente
6 10P	0	Dp	**New Orleans, LA** (CT) –Union Passenger Terminal	●	Ar	7 00A
7 55P	80	Ar	**Baton Rouge, LA** (CT)	○	Dp	5 15A

Convenciones del sombreado	
Tren de larga distancia	Thruway y servicios de conexión

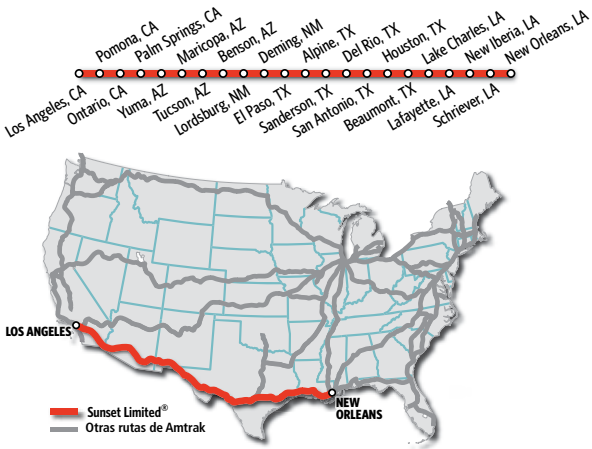
Servicio Amtrak modificado para *Sunset Limited*

[20] El servicio de *Sunset Limited* entre Orlando y New Orleans ha sido suspendido. No se ha determinado cuándo iniciará el servicio futuro.

Descubra **NUEVOS HORIZONTES.**

Descargue los podcast de **Sunset Limited** en www.AmtrakRailGuide.com <http://www.AmtrakRailGuide.com/>.

SUNSET LIMITED MAPA DE LA RUTA y SÍMBOLOS



- **A** Símbolo de tiempo para A.M.
- **N** Símbolo de tiempo para mediodía.
- **P** Símbolo de tiempo para P.M.
- **D** Sólo se detiene para bajar pasajeros; el tren puede partir antes de la hora que se muestra.
- **CT** Hora del Centro
- **ET** Hora del Este
- **MT** Hora de la Montaña
- **MST** Hora estándar de la Montaña
- **PT** Símbolo de tiempo para P.M.
- 🚌 Parada de autobús
- Parada a petición del pasajero
- ✈ Conexión al aeropuerto
- QT Quiosco Quik-Trak, venta de boletos autoservicio
- ○ Estación no provista de personal
- ● Oficina de boletos provista de personal; puede no estar abierta en todos los horarios de salida
- ♿ Estación con acceso para silla de ruedas; no hay obstáculos entre la estación y el tren.
- ♿ Estación con acceso para silla de ruedas; no todas las instalaciones de la estación son accesibles

Appendix B:
Metrolink and Amtrak Forecast – Daily and for 6-Hour AM/PM Peak for 2026, 2031, and 2040

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Table B-1. 2026 Metrolink Projection by Line

Breakdown by Metrolink Line		
Ventura County Line	Total daily[a]	70
	6-hour peak[b]	24
	LAUS Central Maintenance Facility	0
Orange County Line	Total daily[a]	74
	6-hour peak[b]	26
	LAUS Central Maintenance Facility	0
Antelope Valley Line	Total daily[a]	81
	6-hour peak[b]	32
	LAUS Central Maintenance Facility	10
San Bernardino Line	Total daily[a]	62
	6-hour peak[b]	28
	LAUS Central Maintenance Facility	10
Riverside Line	Total daily[a]	12
	6-hour peak[b]	9
	LAUS Central Maintenance Facility	10
91/Perris Valley Line	Total daily[a]	71
	6-hour peak[b]	25
	LAUS Central Maintenance Facility	10
Total Daily		410
# of Rev Trains		370
# of dead head equipment moves*		40
Total 6-hour Peak (AM and PM combined)		144

Source: Southern California Regional Rail Authority 2018a
Notes:
[a] Includes deadhead moves between LAUS and Central Maintenance Facility
[b] Inbound/Outbound 6:00-9:00 AM; 3:00-6:00 PM
Service frequencies assumed at 30-minutes based on direction from Metrolink
LAUS=Los Angeles Union Station

2026 15-Minute Peak:

AM: 6:00 – 6:15; 7:00 – 7:15; 7:30 – 7:45;

PM: 4:30 – 4:45; 5:00 – 5:15; 5:30 – 5:45;

Table B-2. 15-min peak breakdown – AM

Line	Time												Total
	6:00	6:15	6:30	6:45	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	
VCL	2	0	2	0	2	0	2	0	2	0	2	0	12
OCL	1	1	1	1	1	1	1	1	1	1	1	2	13
AVL	2	1	2	0	2	1	2	0	2	1	2	1	16
SBL	2	0	2	1	2	0	2	1	2	0	2	1	15
Riv	1	—	—	—	1	—	1	—	—	1	—	—	4
91/Perris	1	0	1	1	1	1	1	1	1	1	1	2	12
Total	9	2	8	3	9	3	9	3	8	4	8	6	72

Source: Southern California Regional Rail Authority 2018a

Table B-3. 15-min peak breakdown – PM

Line	Time												Total
	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	
VCL	2	0	2	0	2	0	2	0	2	0	2	0	12
OCL	1	1	1	1	1	1	1	1	1	1	1	2	13
AVL	2	1	2	0	2	1	2	0	2	1	2	1	16
SBL	1	0	2	1	1	0	2	1	2	0	2	1	13
Riv	—	—	—	—	—	1	1	—	1	—	1	1	5
91/Perris	1	1	1	1	1	1	1	1	1	1	1	2	13
Total	7	3	8	3	7	5	9	3	9	4	8	6	72

Source: Southern California Regional Rail Authority 2018a

Table B-4. 2031/2040 Metrolink Projection by Line		
Breakdown by Metrolink Line		
Ventura – Orange County Line	Total daily[a]	304
	VC-OC High Frequency Local[c]	288
	Ventura County Express	16
	6-hour peak[b]	112
	LAUS Central Maintenance Facility	0
Antelope Valley Line - Perris Valley Line	Total daily[a]	276
	Antelope Valley/91-Perris Valley Regional [c]	132
	Santa Clarita High-Frequency Local	144
	6-hour peak [b]	92
	LAUS Central Maintenance Facility	0
San Bernardino Line	Total daily[a]	86
	San Bernardino Regional	78
	San Bernardino Express	8
	6-hour peak[b]	34
	LAUS Central Maintenance Facility	0
Riverside Line	Total daily[a]	24
	6-hour peak[b]	12
	LAUS Central Maintenance Facility	12
Total daily		690
# of Rev Trains		678
# of dead head equipment moves *		12
Total 6-hour Peak (AM and PM combined)		250

Source: Southern California Regional Rail Authority 2018b
Notes:
[a] Includes deadhead moves between LAUS and Central Maintenance Facility
[b] Inbound/Outbound 6:00-9:00 AM; 3:00-6:00 PM
[c] Run-through trains are counted as separate moves and hence doubled
Calculations based off 2028 Service Levels – 2018 Transit and Intercity Rail Capital Program Application Assumptions.
LAUS=Los Angeles Union Station

2031/2040 15-Minute Peak:

AM: 7:00 – 6:15; 7:30 – 7:45; 8:00 – 8:15; 8:30 – 8:45

PM: 4:00 – 4:15; 4:30 – 4:45; 5:00 – 5:15; 5:30 – 5:45

Table B-5. 15-min peak breakdown – AM

Line	Time												Total
	6:00	6:15	6:30	6:45	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	
VCL/OCL	4	4	4	5	5	5	5	5	5	5	5	4	56
AVL/PVL	3	3	4	4	4	4	4	4	4	4	4	4	46
SBL	2	1	1	1	2	1	2	1	2	1	2	1	17
Riv	1	0	1	0	1	0	1	0	1	0	1	0	6
Total	10	8	10	10	12	10	12	10	12	10	12	9	125

Source: Southern California Regional Rail Authority 2018b

Table B-6. 15-min peak breakdown – PM

Line	Time												Total
	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	
VCL/OCL	4	4	4	5	5	5	5	5	5	5	5	4	56
AVL/PVL	3	3	4	4	4	4	4	4	4	4	4	4	46
SBL	2	1	1	1	2	1	2	1	2	1	2	1	17
Riv	1	0	1	0	1	0	1	0	1	0	1	0	6
Total	10	8	10	10	12	10	12	10	12	10	12	9	125

Source: Southern California Regional Rail Authority 2018b

Table B-7. 2026 Amtrak Projection (Pacific Surfliner and Amtrak Long Distance)

	6 hour peak			Daily Total		
	LOSSAN	Long Distance	Total	LOSSAN	Long Distance	Total
Revenue Trains	19	1	20	48	5	53
Non-Revenue Trains	0	1	1	10	5	15
Total	19	2	21	58	10	68

Source: Southern California Regional Rail Authority 2018a
Notes:
Assumptions:
7 LAUS to north of LAUS Round Trips
15 LAUS to San Diego Round Trips
2 LAUS to Coachella/Indio Round Trips
Equipment in LAUS: 4 Pacific Surfliner (LOSSAN), 1 Coachella
No Future Growth on Amtrak Long Distance
LOSSAN=Los Angeles–San Diego–San Luis Obispo

Table B-8. 2031 Amtrak Projection (Pacific Surfliner and Amtrak Long Distance)

	6 hour peak			Daily Total		
	LOSSAN	Long Distance	Total	LOSSAN	Long Distance	Total
Revenue Trains	19	1	20	56	5	61
Non-Revenue Trains	0	1	1	14	5	19
Total	19	2	21	70	10	80

Source: Southern California Regional Rail Authority 2018b
Notes:
Assumptions:
18-hour Service Day
8 LAUS to north of LAUS Round Trips
Hourly service between LAUS and San Diego
2 LAUS to Coachella/Indio Round Trips
Equipment in LAUS: 6 Pacific Surfliner (LOSSAN), 1 Coachella
No Future Growth on Amtrak Long Distance
LOSSAN=Los Angeles–San Diego–San Luis Obispo

Table B-9. 2040 Amtrak Projection (Pacific Surfliner and Amtrak Long Distance)						
	6 hour peak			Daily Total		
	LOSSAN	Long Distance	Total	LOSSAN	Long Distance	Total
Revenue Trains	37	1	38	112	5	117
Non-Revenue Trains	0	1	1	18	5	23
Total	37	2	39	130	10	140

Source: Southern California Regional Rail Authority 2018b
Notes:
Assumptions:
18-hour Service Day
Hourly service between LAUS and north of LAUS
30-minutes service between LAUS and San Diego
2 LAUS to Coachella/Indio Round Trips
Equipment in LAUS: 8 Pacific Surfliner (LOSSAN), 1 Coachella
No Future Growth on Amtrak Long Distance
LOSSAN=Los Angeles–San Diego–San Luis Obispo

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Appendix B:
Construction Emission Calculations

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Unmitigated Build Alternative

Off-Road Equipment	HP Rating	Hours	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM10	(lb/hr) PM2.5	(lb/hr) CO2	(lb/hr) CH4	Emissions (lbs) ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Asphalt Paver	224	83	0.096219	0.306812	0.823589	0.001376	0.029997	0.029098	122.2913	0.008682	8.0	25.5	68.4	0.1	2.5	2.4	10150.2	0.7	10165.3
Asphalt Paver	35	120	0.082099	0.269557	0.216492	0.000309	0.018532	0.017976	23.92655	0.007408	9.9	32.3	26.0	0.0	2.2	2.2	2871.2	0.9	2889.9
Backhoe	50	41	0.051274	0.364663	0.333077	0.000775	0.018901	0.018334	66.79721	0.004626	2.1	15.0	13.7	0.0	0.8	0.8	2738.7	0.2	2742.7
Crawler Backhoe	266	12	0.09137	0.348282	0.596387	0.001932	0.020044	0.019442	171.737	0.008244	1.1	4.2	7.2	0.0	0.2	0.2	2060.8	0.1	2062.9
Tractor Backhoe	62	2675	0.049709	0.283857	0.234245	0.000392	0.012081	0.011719	30.3471	0.004485	133.0	759.3	626.6	1.0	32.3	31.3	81178.5	12.0	81430.4
Tractor Backhoe	98	3240	0.043487	0.342622	0.29366	0.000607	0.018357	0.017807	51.72802	0.003924	140.9	1110.1	951.5	2.0	59.5	57.7	167598.8	12.7	167865.8
Excavator	120	1334	0.069294	0.501744	0.442525	0.000864	0.028931	0.028063	73.62307	0.006252	92.4	669.3	590.3	1.2	38.6	37.4	98213.2	8.3	98388.3
8T Crane	50	1838	0.064589	0.252711	0.201938	0.0003	0.01513	0.014676	23.1867	0.005828	118.7	464.5	371.2	0.6	27.8	27.0	42617.1	10.7	42842.1
10T Crane	120	0	0.063871	0.34863	0.38575	0.000588	0.030642	0.029722	50.14797	0.005763	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35T Crane	175	1093	0.075221	0.476621	0.502915	0.000904	0.028272	0.027424	80.3446	0.006787	82.2	520.9	549.7	1.0	30.9	30.0	87816.6	7.4	87972.4
50T Crane	250	170	0.07866	0.252136	0.616831	0.001262	0.021189	0.020553	112.1589	0.007097	13.4	42.9	104.9	0.2	3.6	3.5	19067.0	1.2	19092.4
100T Crane	400	2843	0.096129	0.326836	0.69988	0.001414	0.025385	0.024624	144.081	0.008674	273.3	929.2	1989.8	4.0	72.2	70.0	409622.3	24.7	410140.2
140T Crane	450	154	0.108145	0.36769	0.787364	0.001591	0.028559	0.027702	162.0911	0.009758	16.7	56.6	121.3	0.2	4.4	4.3	24962.0	1.5	24993.6
175T Crane	500	41	0.120161	0.408545	0.874849	0.001768	0.031732	0.03078	180.1013	0.010842	4.9	16.8	35.9	0.1	1.3	1.3	7384.2	0.4	7393.5
200T Crane	550	49679	0.132177	0.449399	0.962334	0.001945	0.034905	0.033858	198.1114	0.011926	6566.4	22325.7	47807.8	96.6	1734.0	1682.0	9841976.2	592.5	9854418.2
Air Compressor	49	760	0.051782	0.214174	0.184788	0.000288	0.013056	0.012664	22.27126	0.004672	39.4	162.8	140.4	0.2	9.9	9.6	16926.2	3.6	17000.7
Air Compressor	120	4935	0.058164	0.313021	0.393537	0.000711	0.024634	0.023895	63.60731	0.005248	287.0	1544.8	1942.1	3.5	121.6	117.9	313902.1	25.9	314446.0
Concrete Mixer	20	8232	0.008662	0.041629	0.053759	0.000109	0.002193	0.002127	7.248148	0.000782	71.3	342.7	442.5	0.9	18.1	17.5	59666.8	6.4	59801.9
Concrete Pump	30	6	0.045793	0.272172	0.330641	0.00059	0.018942	0.018374	49.60666	0.004132	0.3	1.6	2.0	0.0	0.1	0.1	297.6	0.0	298.2
Roller	120	880	0.068263	0.388482	0.448478	0.00077	0.029074	0.028202	67.04405	0.006159	60.1	341.9	394.7	0.7	25.6	24.8	58998.8	5.4	59112.6
Drill Rig	249	1790	0.053756	0.342582	0.249932	0.002116	0.006828	0.006624	188.1019	0.00485	96.2	613.2	447.4	3.8	12.2	11.9	336702.4	8.7	336884.7
Drill Rig	474	4561	0.088668	0.551156	0.403468	0.003056	0.011209	0.010873	311.3086	0.008	404.4	2513.8	1840.2	13.9	51.1	49.6	1419878.7	36.5	1420645.0
Drill Rig	580	16858	0.132064	0.820109	0.602858	0.00462	0.016706	0.016205	463.2009	0.011916	2226.3	13825.4	10163.0	77.9	281.6	273.2	7808640.1	200.9	7812858.6
Drill Rig	580	17575	0.132064	0.820109	0.602858	0.00462	0.016706	0.016205	463.2009	0.011916	2321.0	14413.4	10595.2	81.2	293.6	284.8	8140755.1	209.4	8145153.0
D6 Tractor	215	282	0.133304	0.417938	1.043014	0.001869	0.03855	0.037393	166.1315	0.012028	37.6	117.9	294.1	0.5	10.9	10.5	46849.1	3.4	46920.3
Boom Lift	65	445	0.064589	0.252711	0.201938	0.0003	0.01513	0.014676	23.1867	0.005828	28.7	112.5	89.9	0.1	6.7	6.5	10318.1	2.6	10372.5
Excavator CAT307	54	0	0.046808	0.252087	0.200215	0.000323	0.011054	0.010722	25.01754	0.004223	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavator CAT321	148	3754	0.069294	0.501744	0.442525	0.000864	0.028931	0.028063	73.62307	0.006252	260.1	1883.5	1661.2	3.2	108.6	105.3	276381.0	23.5	276873.9
Excavator CAT324	190	80	0.082387	0.664068	0.506902	0.001263	0.02643	0.025637	112.2216	0.007434	6.6	53.1	40.6	0.1	2.1	2.1	8977.7	0.6	8990.2
Excavator CAT330	235	0	0.09333	0.33234	0.598381	0.001785	0.020201	0.019595	158.6828	0.008421	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavator CAT336	266	14269	0.09333	0.33234	0.598381	0.001785	0.020201	0.019595	158.6828	0.008421	1331.7	4742.2	8538.3	25.5	288.2	279.6	2264244.7	120.2	2266768.0
Excavator CAT345	345	1495	0.113598	0.400618	0.693245	0.00204	0.024313	0.023584	196.2091	0.01025	169.8	598.9	1036.4	3.0	36.3	35.3	293332.6	15.3	293654.3
Forklift CAT TL-1055	125	23718	0.026472	0.211761	0.174533	0.000366	0.010802	0.010478	31.22492	0.002389	627.9	5022.5	4139.6	8.7	256.2	248.5	740592.6	56.7	741782.2
Generator 5kW	15	34037	0.012261	0.064385	0.085235	0.000159	0.00429	0.004162	10.20766	0.001106	417.3	2191.5	2901.1	5.4	146.0	141.6	347438.1	37.7	348228.9
Grader CAT14	180	3639	0.105909	0.729413	0.700188	0.001394	0.038491	0.037336	123.9215	0.009556	385.4	2654.3	2548.0	5.1	140.1	135.9	450950.4	34.8	451680.7
Loader Deere 210	78	1344	0.074242	0.319812	0.259094	0.000403	0.017448	0.016925	31.14967	0.006699	99.8	429.8	348.2	0.5	23.5	22.7	41865.2	9.0	42054.2
Loader CAT950	130	1225	0.065966	0.401558	0.412143	0.000691	0.030685	0.029765	58.91351	0.005952	80.8	491.9	504.9	0.8	37.6	36.5	72169.0	7.3	72322.2
Loader CAT963	150	2824	0.065966	0.401558	0.412143	0.000691	0.030685	0.029765	58.91351	0.005952	186.3	1134.0	1163.9	2.0	86.7	84.1	166371.7	16.8	166724.7
Loader CAT966	170	108169	0.088786	0.622687	0.590182	0.001196	0.032334	0.031364	106.3152	0.008011	9603.9	67355.4	63839.4	129.4	3497.5	3392.6	11500008.8	866.5	11518206.3
Loader CAT IT62	207	31758	0.091694	0.473199	0.652182	0.001436	0.028343	0.027492	127.646	0.008273	2912.0	15027.9	20712.0	45.6	900.1	873.1	4053780.1	262.7	4059297.8
Loader CAT980	355	825	0.094601	0.323711	0.714183	0.001676	0.024351	0.023621	148.9767	0.008536	78.0	267.1	589.2	1.4	20.1	19.5	122905.8	7.0	123053.7
Skid Steer Loader	50	488	0.025253	0.214562	0.179886	0.000375	0.00735	0.00713	30.27763	0.002279	12.3	104.7	87.8	0.2	3.6	3.5	14775.5	1.1	14798.8
Pavement Broom	74	12480	0.082099	0.269557	0.216492	0.000309	0.018532	0.017976	23.92655	0.007408	1024.6	3364.1	2701.8	3.9	231.3	224.3	298603.4	92.4	300544.8
Forktruck	74	2377	0.082099	0.269557	0.216492	0.000309	0.018532	0.017976	23.92655	0.007408	195.1	640.7	514.6	0.7	44.1	42.7	56873.4	17.6	57243.2
Manlift 40ft	50	12547	0.033638	0.150605	0.152478	0.000254	0.009254	0.008976	19.61275	0.003035	422.1	1889.6	1913.1	3.2	116.1	112.6	246081.2	38.1	246880.9
Manlift 80ft	74	345	0.033162	0.191258	0.204503	0.00035	0.013102	0.012709	28.84229	0.002992	11.4	66.0	70.6	0.1	4.5	4.4	9950.6	1.0	9972.3
Compactor CAT CB54	130	156	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268	12.6	59.4	76.0	0.1	6.2	6.1	8501.9	1.1	8525.7
Compactor CAT CB64	130	165	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268	13.3	62.8	80.3	0.1	6.6	6.4	8992.4	1.2	9017.6
Compactor CAT 433	100	4	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268	0.3	1.5	1.9	0.0	0.2	0.2	218.0	0.0	218.6

Compactor CAT CP56	145	972	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268		78.3	370.2	473.2	0.6	38.9	37.7	52973.4	7.1	53121.7
Compactor CAT PS360	130	202	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268		16.3	76.9	98.4	0.1	8.1	7.8	11008.9	1.5	11039.7
Compactor CAT CS423	80	4096	0.082099	0.269557	0.216492	0.000309	0.018532	0.017976	23.92655	0.007408		336.3	1104.1	886.7	1.3	75.9	73.6	98003.2	30.3	98640.3
Scraper CAT 615	250	50	0.170437	0.532359	1.355816	0.002357	0.05014	0.048636	209.4703	0.015378		8.5	26.6	67.8	0.1	2.5	2.4	10473.5	0.8	10489.7
Skid Steer CAT 226	58	35486	0.026321	0.203471	0.17869	0.00033	0.006505	0.00631	25.51916	0.002375		934.0	7220.4	6341.0	11.7	230.8	223.9	905573.1	84.3	907342.9
Skid Steer CAT 246	80	7721	0.012398	0.133999	0.098489	0.000251	0.004746	0.004604	21.38091	0.001119		95.7	1034.6	760.4	1.9	36.6	35.5	165082.0	8.6	165263.4
Rack Truck		12480	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		69.5	461.9	3489.9	12.6	284.6	115.4	1359892.1	40.7	1360746.7
Mechanics Truck		3120	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034		3.8	234.1	23.1	0.7	32.7	13.1	70256.6	1.1	70278.9
Oil dist Truck		177	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034		0.2	13.3	1.3	0.0	1.9	0.7	3985.7	0.1	3987.0
Pickup 1/2T		321189	0.002048	0.106169	0.010292	0.000211	0.010524	0.004261	20.93382	0.000522		657.9	34100.4	3305.7	67.7	3380.1	1368.4	6723713.4	167.5	6727231.7
Pickup 3/4T		299334	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034		360.4	22463.4	2213.2	67.6	3135.2	1261.6	6740443.0	101.8	6742580.0
Tractor 6x4		6260	0.013788	0.05546	0.419738	0.001278	0.023416	0.009838	133.9301	0.00064		86.3	347.2	2627.6	8.0	146.6	61.6	838402.7	4.0	838486.9
Water truck		44839	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034		54.0	3364.9	331.5	10.1	469.6	189.0	1009690.6	15.2	1010010.7
											total	33,588	239,821	213,704	711	16,641	11,924	67,983,704	3,250	68,051,949

On-Road		**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**		**Emissions (lbs)**								
Equipment	**Hours**	**ROG**	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**		**ROG**	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**	**CO2e**
Dump Truck	82	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		0.5	3.0	22.9	0.1	1.9	0.8	8935.2	0.3	8940.8
End Dump 10CY	24744	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		137.8	915.8	6919.5	24.9	564.2	228.9	2696247.6	80.7	2697942.0
End Dump 15CY	118513	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		660.1	4386.1	33141.2	119.4	2702.4	1096.3	12913853.7	386.4	12921969.1
Flatbed 10T	60887	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		339.2	2253.4	17026.5	61.4	1388.4	563.2	6634595.5	198.5	6638764.8
Flatbed 2T	120	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		0.7	4.4	33.6	0.1	2.7	1.1	13075.9	0.4	13084.1
Flatbed 20T	22859	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		127.3	846.0	6392.3	23.0	521.2	211.5	2490847.3	74.5	2492412.6
Employee Commutes	167310	0.000689	0.052913	0.003519	0.000178	0.010467	0.004209	17.80674	0.000209		115.3	8852.8	588.8	29.9	1751.2	704.1	2979239.6	35.0	2979974.4
										total	1,381	17,262	64,125	259	6,932	2,806	27,736,795	776	27,753,088

	Daily Acres	**lb/acre PM**	**Daily Emissions (lbs) PM10**	**PM2.5**
Fugitive Dust	15	20	300.0	63.0

	ROG	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**	**CO2e**
Total (lb)	34,969	257,083	277,829	970	473,573	109,230	95,720,499	4,026	95,805,037
Daily (lb)	23.3	171.4	185.2	0.6	315.7	72.8	63,813.7	2.7	63,870.0
Annual (T)	2.9	21.4	23.2	0.1	39.5	9.1	7,976.7	0.3	7,983.8

On-site Emissions

	ROG	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**	**CO2e**
Total (lb)	33657.1	240684.4	216910.6	724.3	466987.4	106564.8	69370543.6	3288.6	69439603.9
Daily (lb)	22.43808	160.4563	144.607	0.482889	311.3249	71.04317	46247.02906	2.19239	46293.1
Annual (T)	2.80476	20.05703	18.07588	0.060361	38.91562	8.880397	5780.878633	0.274049	5786.6

Total Emissions (tons)	**ROG**	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**	**CO2e**
Off-road	16.8	119.9	106.9	0.4	8.3	6.0	33,991.9	1.6	34,026.0
On-Road	0.7	8.6	32.1	0.1	3.5	1.4	13,868.4	0.4	13,876.5
Fugitive Dust					225.0	47.3			
Total	17.5	128.5	138.9	0.5	236.8	54.6	47,860.2	2.0	47,902.5
Annual	2.9	21.4	23.2	0.1	39.5	9.1	7,976.7	0.3	7,983.8

Mitigated Build Alternative

											RD reduction	0.95	0.9	0.9	1	0.7	0.7	0.8		
Off-Road			**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**					**Emissions (lbs)**					
Equipment	**HP Rating**	**Hours**	**ROG**	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**		**ROG**	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**	**CO2e**
Asphalt Paver	224	83	0.040774	0.028648	0.084842	0.00153	0.003483	0.003378	120.8164	0.008682		3.2	2.1	6.3	0.1	0.2	0.2	8,022.2	0.7	8037.3
Asphalt Paver	35	120	0.006189	0.004348	0.012878	0.000232	0.000529	0.000513	18.3382	0.007408		0.7	0.5	1.4	0.0	0.0	0.0	1,760.5	0.9	1779.1
Backhoe	50	41	0.006826	0.004796	0.014203	0.000256	0.000583	0.000566	20.22595	0.004626		0.3	0.2	0.5	0.0	0.0	0.0	663.4	0.2	667.4
Crawler Backhoe	266	12	0.036315	0.025515	0.075562	0.001363	0.003102	0.003009	107.6021	0.008244		0.4	0.3	0.8	0.0	0.0	0.0	1,033.0	0.1	1035.1
Tractor Backhoe	62	2675	0.008464	0.005947	0.017612	0.000318	0.000723	0.000701	25.08018	0.004485		21.5	14.3	42.4	0.8	1.4	1.3	53,671.6	12.0	53923.5
Tractor Backhoe	98	3240	0.013379	0.0094	0.027839	0.000502	0.001143	0.001109	39.64287	0.003924		41.2	27.4	81.2	1.6	2.6	2.5	102,754.3	12.7	103021.3
Excavator	120	1334	0.020434	0.012377	0.042519	0.000767	0.001745	0.001693	60.54737	0.006252		25.9	14.9	51.0	1.0	1.6	1.6	64,616.2	8.3	64791.3
8T Crane	50	1838	0.006312	0.004282	0.013134	0.000237	0.000539	0.000523	18.70357	0.005828		11.0	7.1	21.7	0.4	0.7	0.7	27,501.7	10.7	27726.7
10T Crane	120	0	0.015149	0.010277	0.031522	0.000569	0.001294	0.001255	44.88857	0.005763		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35T Crane	175	1093	0.022093	0.014987	0.04597	0.000829	0.001887	0.001831	65.46249	0.006787		22.9	14.7	45.2	0.9	1.4	1.4	57,240.4	7.4	57396.2
50T Crane	250	170	0.031561	0.02141	0.065672	0.001184	0.002696	0.002615	93.51784	0.007097		5.1	3.3	10.0	0.2	0.3	0.3	12,718.4	1.2	12743.8
100T Crane	400	2843	0.050498	0.034257	0.105075	0.001895	0.004314	0.004184	149.6286	0.008674		136.4	87.7	268.9	5.4	8.6	8.3	340,315.2	24.7	340833.0
140T Crane	450	154	0.05681	0.038539	0.118209	0.002132	0.004853	0.004707	168.3321	0.009758		8.3	5.3	16.4	0.3	0.5	0.5	20,738.5	1.5	20770.1
175T Crane	500	41	0.063123	0.042821	0.131343	0.002369	0.005392	0.00523	187.0357	0.010842		2.5	1.6	4.8	0.1	0.2	0.2	6,134.8	0.4	6144.1
200T Crane	550	49679	0.069435	0.047103	0.144478	0.002606	0.005931	0.005753	205.7393	0.011926		3,277.0	2,106.0	6,459.8	129.4	206.3	200.1	8,176,736.5	592.5	8189178.5
Air Compressor	49	760	0.006905	0.004852	0.014368	0.000259	0.00059	0.000572	20.46083	0.004672		5.0	3.3	9.8	0.2	0.3	0.3	12,440.2	3.6	12514.8
Air Compressor	120	4935	0.001691	0.001188	0.003519	6.35E-05	0.000144	0.00014	5.010817	0.005248		7.9	5.3	15.6	0.3	0.5	0.5	19,782.7	25.9	20326.6
Concrete Mixer	20	8232	0.002818	0.00198	0.005865	0.000106	0.000241	0.000234	8.351361	0.000782		22.0	14.7	43.4	0.9	1.4	1.3	54,998.7	6.4	55133.8
Concrete Pump	30	6	0.004228	0.00297	0.008797	0.000159	0.000361	0.00035	12.52704	0.004132		0.0	0.0	0.0	0.0	0.0	0.0	60.1	0.0	60.7
Roller	120	880	0.020258	0.014233	0.042152	0.00076	0.00173	0.001679	60.02541	0.006159		16.9	11.3	33.4	0.7	1.1	1.0	42,257.9	5.4	42371.7
Drill Rig	249	1790	0.031435	0.01904	0.065409	0.00118	0.002685	0.002605	93.14377	0.00485		53.5	30.7	105.4	2.1	3.4	3.3	133,381.9	8.7	133564.2
Drill Rig	474	4561	0.05984	0.036245	0.124514	0.002246	0.005112	0.004958	177.3098	0.008		259.3	148.8	511.1	10.2	16.3	15.8	646,968.1	36.5	647734.4
Drill Rig	580	16858	0.073222	0.04435	0.152358	0.002748	0.006255	0.006067	216.9614	0.011916		1,172.7	672.9	2,311.6	46.3	73.8	71.6	2,926,028.2	200.9	2930246.7
Drill Rig	580	17575	0.073222	0.04435	0.152358	0.002748	0.006255	0.006067	216.9614	0.011916		1,222.5	701.5	2,409.9	48.3	76.9	74.6	3,050,477.3	209.4	3054875.2
D6 Tractor	215	282	0.037242	0.025264	0.077493	0.001398	0.003181	0.003086	110.3511	0.012028		10.0	6.4	19.7	0.4	0.6	0.6	24,895.2	3.4	24966.4
Boom Lift	65	445	0.009065	0.006369	0.018862	0.00034	0.000774	0.000751	26.85919	0.005828		3.8	2.6	7.6	0.2	0.2	0.2	9,561.9	2.6	9616.3
Excavator CAT307	54	0	0.009195	0.00557	0.019133	0.000345	0.000785	0.000762	27.24632	0.004223		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavator CAT321	148	3754	0.025202	0.015265	0.05244	0.000946	0.002153	0.002088	74.67509	0.006252		89.9	51.6	177.2	3.6	5.7	5.5	224,264.2	23.5	224757.1
Excavator CAT324	190	80	0.032354	0.019597	0.067321	0.001214	0.002764	0.002681	95.86666	0.007434		2.5	1.4	4.8	0.1	0.2	0.2	6,135.5	0.6	6148.0
Excavator CAT330	235	0	0.040017	0.024238	0.083266	0.001502	0.003418	0.003316	158.6828	0.008421		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavator CAT336	266	14269	0.045296	0.027435	0.09425	0.0017	0.003869	0.003753	134.2133	0.008421		614.0	352.3	1,210.4	24.3	38.6	37.5	1,532,072.0	120.2	1534595.3
Excavator CAT345	345	1495	0.058748	0.035583	0.122241	0.002205	0.005018	0.004868	174.0737	0.01025		83.4	47.9	164.5	3.3	5.3	5.1	208,192.1	15.3	208513.9
Forklift CAT TL-1055	125	23718	0.017432	0.012248	0.036272	0.000654	0.001489	0.001444	51.6523	0.002389		392.8	261.4	774.3	15.5	24.7	24.0	980,071.4	56.7	981261.0
Generator 5kW	15	34037	0.003259	0.004027	0.073706	0.000122	0.000557	0.00054	9.656261	0.001106		105.4	123.4	2,257.9	4.2	13.3	12.9	262,936.1	37.7	263726.9
Grader CAT14	180	3639	0.030387	0.018405	0.063228	0.00114	0.002596	0.002518	90.03811	0.009556		105.0	60.3	207.1	4.1	6.6	6.4	262,118.9	34.8	262849.2
Loader Deere 210	78	1344	0.010649	0.007482	0.022157	0.0004	0.00091	0.000882	31.55249	0.006699		13.6	9.0	26.8	0.5	0.9	0.8	33,925.2	9.0	34114.3
Loader CAT950	130	1225	0.017748	0.01247	0.036929	0.000666	0.001516	0.001471	52.58748	0.005952		20.7	13.7	40.7	0.8	1.3	1.3	51,535.7	7.3	51688.8
Loader CAT963	150	2824	0.020478	0.014388	0.04261	0.000768	0.001749	0.001697	60.67786	0.005952		54.9	36.6	108.3	2.2	3.5	3.4	137,083.4	16.8	137436.4
Loader CAT966	170	108169	0.023209	0.016306	0.048292	0.000871	0.001982	0.001923	68.76824	0.008011		2,384.9	1,587.5	4,701.3	94.2	150.1	145.6	5,950,873.2	866.5	5969070.7
Loader CAT IT62	207	31758	0.02826	0.019855	0.058802	0.001061	0.002414	0.002342	83.73544	0.008273		852.6	567.5	1,680.7	33.7	53.7	52.1	2,127,416.2	262.7	2132933.8
Loader CAT980	355	825	0.048465	0.034052	0.100844	0.001819	0.00414	0.004016	143.6043	0.008536		38.0	25.3	74.9	1.5	2.4	2.3	94,778.8	7.0	94926.7
Skid Steer Loader	50	488	0.006826	0.004796	0.014203	0.000256	0.000583	0.000566	20.22595	0.002279		3.2	2.1	6.2	0.1	0.2	0.2	7,896.2	1.1	7919.6
Pavement Broom	74	12480	0.01032	0.007251	0.021473	0.000387	0.000882	0.000855	30.57816	0.007408		122.4	81.4	241.2	4.8	7.7	7.5	305,292.4	92.4	307233.8
Forktruck	74	2377	0.01032	0.007251	0.021473	0.000387	0.000882	0.000855	30.57816	0.007408		23.3	15.5	45.9	0.9	1.5	1.4	58,147.4	17.6	58517.2
Manlift 40ft	50	12547	0.006973	0.004899	0.014509	0.000262	0.000596	0.000578	20.66092	0.003035		83.1	55.3	163.8	3.3	5.2	5.1	207,386.0	38.1	208185.8
Manlift 80ft	74	345	0.01032	0.007251	0.021473	0.000387	0.000882	0.000855	30.57816	0.002992		3.4	2.3	6.7	0.1	0.2	0.2	8,439.6	1.0	8461.3
Compactor CAT CB54	130	156	0.021946	0.015419	0.045665	0.000824	0.001875	0.001818	65.02752	0.007268		3.3	2.2	6.4	0.1	0.2	0.2	8,115.4	1.1	8139.2
Compactor CAT CB64	130	165	0.021946	0.015419	0.045665	0.000824	0.001875	0.001818	65.02752	0.007268		3.4	2.3	6.8	0.1	0.2	0.2	8,583.6	1.2	8608.8
Compactor CAT 433	100	4	0.016882	0.011861	0.035127	0.000634	0.001442	0.001399	50.02117	0.007268		0.1	0.0	0.1	0.0	0.0	0.0	160.1	0.0	160.7

Compactor CAT CP56	145	972	0.024478	0.017199	0.050934	0.000919	0.002091	0.002028	72.5307	0.007268		22.6	15.0	44.6	0.9	1.4	1.4	56,399.9	7.1	56548.2
Compactor CAT PS360	130	202	0.021946	0.015419	0.045665	0.000824	0.001875	0.001818	65.02752	0.007268		4.2	2.8	8.3	0.2	0.3	0.3	10,508.4	1.5	10539.3
Compactor CAT CS423	80	4096	0.013505	0.009489	0.028101	0.000507	0.001154	0.001119	40.01694	0.007408		52.6	35.0	103.6	2.1	3.3	3.2	131,127.5	30.3	131764.7
Scraper CAT 615	250	50	0.042204	0.025563	0.087817	0.001584	0.003605	0.003497	125.0529	0.015378		2.0	1.2	4.0	0.1	0.1	0.1	5,002.1	0.8	5018.3
Skid Steer CAT 226	58	35486	0.007918	0.005563	0.016476	0.000297	0.000676	0.000656	23.4621	0.002375		266.9	177.7	526.2	10.5	16.8	16.3	666,061.0	84.3	667830.8
Skid Steer CAT 246	80	7721	0.010922	0.007674	0.022725	0.00041	0.000933	0.000905	32.36152	0.001119		80.1	53.3	157.9	3.2	5.0	4.9	199,890.7	8.6	200072.0
Rack Truck		12480	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		66.0	415.7	3,140.9	12.6	199.2	80.8	1,087,913.7	40.7	1088768.3
Mechanics Truck		3120	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034		3.6	210.7	20.8	0.7	22.9	9.2	56,205.3	1.1	56227.5
Oil dist Truck		177	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034		0.2	12.0	1.2	0.0	1.3	0.5	3,188.6	0.1	3189.8
Pickup 1/2T		321189	0.002048	0.106169	0.010292	0.000211	0.010524	0.004261	20.93382	0.000522		625.0	30,690.4	2,975.2	67.7	2,366.1	957.9	5,378,970.7	167.5	5382489.0
Pickup 3/4T		299334	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034		342.4	20,217.0	1,991.9	67.6	2,194.6	883.1	5,392,354.4	101.8	5394491.4
Tractor 6x4		6260	0.013788	0.05546	0.419738	0.001278	0.023416	0.009838	133.9301	0.00064		82.0	312.5	2,364.8	8.0	102.6	43.1	670,722.2	4.0	670806.3
Water truck		44839	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034		51.3	3,028.4	298.4	10.1	328.7	132.3	807,752.5	15.2	808072.6
											total	12,929	62,353	36,022	631	5,962	2,831	42,736,279	3,250	42,804,525

On-Road		**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**		**Emissions (lbs)**								
Equipment	**Hours**	**ROG**	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**		**ROG**	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**	**CO2e**
Dump Truck	82	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		0.5	3.0	22.9	0.1	1.9	0.8	8935.2	0.3	8940.8
End Dump 10CY	24744	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		137.8	915.8	6919.5	24.9	564.2	228.9	2696247.6	80.7	2697942.0
End Dump 15CY	118513	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		660.1	4386.1	33141.2	119.4	2702.4	1096.3	12913853.7	386.4	12921969.1
Flatbed 10T	60887	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		339.2	2253.4	17026.5	61.4	1388.4	563.2	6634595.5	198.5	6638764.8
Flatbed 2T	120	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		0.7	4.4	33.6	0.1	2.7	1.1	13075.9	0.4	13084.1
Flatbed 20T	22859	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261		127.3	846.0	6392.3	23.0	521.2	211.5	2490847.3	74.5	2492412.6
Employee Commutes	167310	0.000689	0.052913	0.003519	0.000178	0.010467	0.004209	17.80674	0.000209		115.3	8852.8	588.8	29.9	1751.2	704.1	2979239.6	35.0	2979974.4
										total	1,381	17,262	64,125	259	6,932	2,806	27,736,795	776	27,753,088

	Daily Acres	**lb/acre PM**	**Daily Emissions (lbs) PM10**	**PM2.5**
Fugitive Dust	15	10	150.0	31.5

	ROG	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**	**CO2e**
Total (lb)	14,310	79,615	100,146	890	237,894	52,887	70,473,074	4,026	70,557,613
Daily (lb)	9.5	53.1	66.8	0.6	158.6	35.3	46,982.0	2.7	47,038.4
Annual (T)	1.2	6.6	8.3	0.1	19.8	4.4	5,872.8	0.3	5,879.8

On-site Emissions

	ROG	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**	**CO2e**
Total (lb)	12997.8	63216.5	39227.9	644.1	231308.7	50221.6	44123119.0	3288.6	44192179.3
Daily (lb)	8.66519	42.14431	26.15197	0.429424	154.2058	33.48104	29415.41267	2.19239	29461.5
Annual (T)	1.083149	5.268039	3.268996	0.053678	19.27573	4.18513	3676.926583	0.274049	3682.7

Total Emissions (tons)	**ROG**	**CO**	**NOX**	**SOX**	**PM10**	**PM2.5**	**CO2**	**CH4**	**CO2e**
Off-road	6.5	31.2	18.0	0.3	3.0	1.4	21,368.1	1.6	21,402.3
On-Road	0.7	8.6	32.1	0.1	3.5	1.4	13,868.4	0.4	13,876.5
Fugitive Dust					112.5	23.6			
Total	7.2	39.8	50.1	0.4	118.9	26.4	35,236.5	2.0	35,278.8
Annual	1.2	6.6	8.3	0.1	19.8	4.4	5,872.8	0.3	5,879.8

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Malabar Yard Construction

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	4.00	Acre	4.00	174,240.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2031
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	691.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Updated run for construction years 2028-2030

Land Use -

Construction Phase - Phases and dates updated to 2028-2030

Off-road Equipment - equipment from project description

Off-road Equipment - Equipment list from project description

Off-road Equipment - equipment from project description

Off-road Equipment - Equipment list from project description

Off-road Equipment - equipment from project description

Off-road Equipment - equipment from project description

Off-road Equipment - equipment from project description

Off-road Equipment - Equipment list from project description

Off-road Equipment - Equipment list from project description

Malabar Yard Construction - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Off-road Equipment - equipment from project description

Off-road Equipment - equipment from project description

Off-road Equipment - equipment from project description

Trips and VMT - haul truck and employee trips from project description

Demolition -

Construction Off-road Equipment Mitigation - Per Metro requirements, all off-road equipment will meet Tier 4F standards

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	8.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	43.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	8.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	230.00	87.00
tblConstructionPhase	NumDays	230.00	23.00
tblConstructionPhase	NumDays	230.00	20.00
tblConstructionPhase	NumDays	20.00	65.00
tblConstructionPhase	NumDays	18.00	20.00
tblConstructionPhase	NumDays	18.00	20.00
tblConstructionPhase	NumDays	18.00	20.00
tblConstructionPhase	NumDays	18.00	132.00
tblConstructionPhase	NumDays	18.00	44.00
tblConstructionPhase	NumDays	18.00	45.00
tblConstructionPhase	PhaseEndDate	7/18/2029	9/2/2030
tblConstructionPhase	PhaseEndDate	6/5/2030	8/7/2030
tblConstructionPhase	PhaseEndDate	4/23/2031	9/30/2030
tblConstructionPhase	PhaseEndDate	8/30/2028	10/30/2028
tblConstructionPhase	PhaseEndDate	8/1/2031	12/2/2030
tblConstructionPhase	PhaseEndDate	8/27/2031	12/30/2030
tblConstructionPhase	PhaseEndDate	9/22/2031	12/30/2030
tblConstructionPhase	PhaseEndDate	5/19/2031	11/4/2030
tblConstructionPhase	PhaseEndDate	6/12/2031	7/3/2030
tblConstructionPhase	PhaseEndDate	7/8/2031	11/4/2030
tblConstructionPhase	PhaseEndDate	8/30/2028	5/2/2030

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	PhaseEndDate	8/30/2028	5/2/2030
tblConstructionPhase	PhaseStartDate	8/31/2028	5/3/2030
tblConstructionPhase	PhaseStartDate	7/19/2029	7/6/2030
tblConstructionPhase	PhaseStartDate	6/6/2030	9/3/2030
tblConstructionPhase	PhaseStartDate	8/3/2028	8/1/2028
tblConstructionPhase	PhaseStartDate	7/9/2031	11/5/2030
tblConstructionPhase	PhaseStartDate	8/2/2031	12/3/2030
tblConstructionPhase	PhaseStartDate	8/28/2031	12/3/2030
tblConstructionPhase	PhaseStartDate	4/24/2031	5/3/2030
tblConstructionPhase	PhaseStartDate	5/20/2031	5/3/2030
tblConstructionPhase	PhaseStartDate	6/13/2031	9/3/2030
tblConstructionPhase	PhaseStartDate	8/31/2028	10/31/2028
tblConstructionPhase	PhaseStartDate	8/31/2028	10/31/2028
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblTripsAndVMT	HaulingTripNumber	7,910.00	180.00
tblTripsAndVMT	HaulingTripNumber	0.00	60.00
tblTripsAndVMT	HaulingTripNumber	0.00	60.00
tblTripsAndVMT	HaulingTripNumber	0.00	60.00
tblTripsAndVMT	HaulingTripNumber	0.00	1,000.00
tblTripsAndVMT	HaulingTripNumber	0.00	1,000.00
tblTripsAndVMT	HaulingTripNumber	0.00	240.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblTripsAndVMT	HaulingTripNumber	0.00	360.00
tblTripsAndVMT	HaulingTripNumber	0.00	120.00
tblTripsAndVMT	HaulingTripNumber	0.00	60.00
tblTripsAndVMT	HaulingTripNumber	0.00	60.00
tblTripsAndVMT	HaulingTripNumber	0.00	120.00
tblTripsAndVMT	WorkerTripNumber	15.00	20.00
tblTripsAndVMT	WorkerTripNumber	3.00	10.00
tblTripsAndVMT	WorkerTripNumber	25.00	20.00
tblTripsAndVMT	WorkerTripNumber	18.00	20.00
tblTripsAndVMT	WorkerTripNumber	18.00	20.00
tblTripsAndVMT	WorkerTripNumber	73.00	20.00
tblTripsAndVMT	WorkerTripNumber	18.00	20.00
tblTripsAndVMT	WorkerTripNumber	25.00	20.00
tblTripsAndVMT	WorkerTripNumber	73.00	20.00
tblTripsAndVMT	WorkerTripNumber	73.00	10.00
tblTripsAndVMT	WorkerTripNumber	30.00	20.00

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2028	0.1329	1.1566	1.4940	3.1100e-003	0.0203	0.0525	0.0728	5.4100e-003	0.0486	0.0540	0.0000	273.8779	273.8779	0.0771	1.9200e-003	276.3770
2029	0.4596	4.0369	5.1639	0.0107	0.0687	0.1862	0.2549	0.0184	0.1717	0.1900	0.0000	937.1773	937.1773	0.2802	6.2000e-003	946.0299
2030	0.5080	1.8796	7.1032	0.0160	0.0878	0.0675	0.1552	0.0237	0.0674	0.0911	0.0000	1,380.6090	1,380.6090	0.0435	0.0115	1,385.1110
Maximum	**0.5080**	**4.0369**	**7.1032**	**0.0160**	**0.0878**	**0.1862**	**0.2549**	**0.0237**	**0.1717**	**0.1900**	**0.0000**	**1,380.6090**	**1,380.6090**	**0.2802**	**0.0115**	**1,385.1110**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2028	0.0387	0.1777	1.8924	3.1100e-003	0.0203	4.8900e-003	0.0252	5.4100e-003	4.8800e-003	0.0103	0.0000	273.8776	273.8776	0.0771	1.9200e-003	276.3767
2029	0.1328	0.6084	6.5450	0.0107	0.0687	0.0169	0.0856	0.0184	0.0168	0.0352	0.0000	937.1763	937.1763	0.2802	6.2000e-003	946.0288
2030	0.1623	0.8280	8.4938	0.0160	0.0878	0.0209	0.1087	0.0237	0.0209	0.0446	0.0000	1,380.6075	1,380.6075	0.0435	0.0115	1,385.1095
Maximum	**0.1623**	**0.8280**	**8.4938**	**0.0160**	**0.0878**	**0.0209**	**0.1087**	**0.0237**	**0.0209**	**0.0446**	**0.0000**	**1,380.6075**	**1,380.6075**	**0.2802**	**0.0115**	**1,385.1095**

Malabar Yard Construction - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**69.66**	**77.18**	**-23.04**	**0.00**	**0.00**	**86.07**	**54.58**	**0.00**	**85.22**	**73.15**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**8-3-2028**	**11-2-2028**	0.5560	0.0948
2	**11-3-2028**	**2-2-2029**	1.1326	0.1871
3	**2-3-2029**	**5-2-2029**	1.0949	0.1802
4	**5-3-2029**	**8-2-2029**	1.1310	0.1855
5	**8-3-2029**	**11-2-2029**	1.1314	0.1859
6	**11-3-2029**	**2-2-2030**	0.8721	0.1865
7	**2-3-2030**	**5-2-2030**	0.3934	0.1797
8	**5-3-2030**	**8-2-2030**	0.9740	0.4052
9	**8-3-2030**	**9-30-2030**	0.4769	0.1944
		Highest	1.1326	0.4052

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0137	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-004	1.0000e-004	0.0000	0.0000	1.1000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0137**	**0.0000**	**5.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.0000e-004**	**1.0000e-004**	**0.0000**	**0.0000**	**1.1000e-004**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0137	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-004	1.0000e-004	0.0000	0.0000	1.1000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0137**	**0.0000**	**5.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.0000e-004**	**1.0000e-004**	**0.0000**	**0.0000**	**1.1000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**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**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	46th St Building Demo	Demolition	8/1/2028	10/30/2028	5	65	
2	49th St Utility Relocations	Trenching	10/31/2028	5/2/2030	5	393	
3	46th St Utility Relocations	Trenching	10/31/2028	5/2/2030	5	393	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4	46th St Connector Track	Building Construction	5/3/2030	9/2/2030	5	87	
5	46th St Realigned Spur Track	Building Construction	7/6/2030	8/7/2030	5	23	
6	49th St Track Replacement	Building Construction	9/3/2030	9/30/2030	5	20	
7	49th St Road modifications	Paving	5/3/2030	11/4/2030	5	132	
8	46th St At Grade Crossing Enhancements	Paving	5/3/2030	7/3/2030	5	44	
9	46th St New At Grade Crossing	Paving	9/3/2030	11/4/2030	5	45	
10	49th St Bollard	Paving	11/5/2030	12/2/2030	5	20	
11	49th St Final Paving	Paving	12/3/2030	12/30/2030	5	20	
12	46th St Final Paving	Paving	12/3/2030	12/30/2030	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 4

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
49th St Utility Relocations	Cement and Mortar Mixers	1	8.00	9	0.56
49th St Utility Relocations	Other Construction Equipment	4	8.00	172	0.42
49th St Utility Relocations	Rubber Tired Dozers	0	8.00	247	0.40
49th St Utility Relocations	Rubber Tired Loaders	2	8.00	203	0.36
49th St Utility Relocations	Tractors/Loaders/Backhoes	0	8.00	97	0.37
46th St Utility Relocations	Cement and Mortar Mixers	1	8.00	9	0.56
46th St Utility Relocations	Other Construction Equipment	4	8.00	172	0.42
46th St Utility Relocations	Pavers	0	8.00	130	0.42
46th St Utility Relocations	Paving Equipment	0	6.00	132	0.36
46th St Utility Relocations	Rollers	0	6.00	80	0.38
46th St Utility Relocations	Rubber Tired Loaders	2	8.00	203	0.36

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

46th St Utility Relocations	Tractors/Loaders/Backhoes	0	8.00	97	0.37
46th St Connector Track	Cranes	0	7.00	231	0.29
46th St Connector Track	Crawler Tractors	1	8.00	212	0.43
46th St Connector Track	Excavators	2	8.00	158	0.38
46th St Connector Track	Forklifts	0	8.00	89	0.20
46th St Connector Track	Generator Sets	0	8.00	84	0.74
46th St Connector Track	Other Construction Equipment	6	8.00	172	0.42
46th St Connector Track	Other Material Handling Equipment	2	8.00	168	0.40
46th St Connector Track	Tractors/Loaders/Backhoes	0	7.00	97	0.37
46th St Connector Track	Welders	0	8.00	46	0.45
49th St Road modifications	Cement and Mortar Mixers	1	6.00	9	0.56
49th St Road modifications	Excavators	0	8.00	158	0.38
49th St Road modifications	Graders	0	8.00	187	0.41
49th St Road modifications	Other Construction Equipment	0	8.00	172	0.42
49th St Road modifications	Pavers	0	8.00	130	0.42
49th St Road modifications	Paving Equipment	2	6.00	132	0.36
49th St Road modifications	Rollers	2	6.00	80	0.38
49th St Road modifications	Rubber Tired Dozers	0	8.00	247	0.40
49th St Road modifications	Rubber Tired Loaders	1	8.00	203	0.36
49th St Road modifications	Tractors/Loaders/Backhoes	1	8.00	97	0.37
46th St At Grade Crossing Enhancements	Air Compressors	0	6.00	78	0.48
46th St At Grade Crossing Enhancements	Cement and Mortar Mixers	1	8.00	9	0.56
46th St At Grade Crossing Enhancements	Crawler Tractors	1	8.00	212	0.43
46th St At Grade Crossing Enhancements	Other Construction Equipment	6	8.00	172	0.42
46th St At Grade Crossing Enhancements	Other Material Handling Equipment	2	8.00	168	0.40
46th St At Grade Crossing Enhancements	Pavers	0	8.00	130	0.42
46th St At Grade Crossing Enhancements	Paving Equipment	0	6.00	132	0.36

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

46th St At Grade Crossing Enhancements	Rollers	0	6.00	80	0.38
46th St At Grade Crossing Enhancements	Tractors/Loaders/Backhoes	0	8.00	97	0.37
46th St New At Grade Crossing	Cement and Mortar Mixers	1	6.00	9	0.56
46th St New At Grade Crossing	Crawler Tractors	1	8.00	212	0.43
46th St New At Grade Crossing	Excavators	2	8.00	158	0.38
46th St New At Grade Crossing	Other Construction Equipment	6	8.00	172	0.42
46th St New At Grade Crossing	Other Material Handling Equipment	2	8.00	168	0.40
46th St New At Grade Crossing	Pavers	0	8.00	130	0.42
46th St New At Grade Crossing	Paving Equipment	0	6.00	132	0.36
46th St New At Grade Crossing	Rollers	0	6.00	80	0.38
46th St New At Grade Crossing	Tractors/Loaders/Backhoes	0	8.00	97	0.37
46th St Realigned Spur Track	Cement and Mortar Mixers	1	8.00	9	0.56
46th St Realigned Spur Track	Cranes	0	7.00	231	0.29
46th St Realigned Spur Track	Crawler Tractors	1	8.00	212	0.43
46th St Realigned Spur Track	Excavators	2	8.00	158	0.38
46th St Realigned Spur Track	Forklifts	0	8.00	89	0.20
46th St Realigned Spur Track	Generator Sets	0	8.00	84	0.74
46th St Realigned Spur Track	Other Construction Equipment	6	8.00	172	0.42
46th St Realigned Spur Track	Other Material Handling Equipment	2	8.00	168	0.40
46th St Realigned Spur Track	Tractors/Loaders/Backhoes	0	7.00	97	0.37
46th St Realigned Spur Track	Welders	1	8.00	46	0.45
49th St Track Replacement	Cranes	0	7.00	231	0.29
49th St Track Replacement	Forklifts	0	8.00	89	0.20
49th St Track Replacement	Generator Sets	0	8.00	84	0.74
49th St Track Replacement	Rubber Tired Loaders	2	8.00	203	0.36
49th St Track Replacement	Tractors/Loaders/Backhoes	1	8.00	97	0.37
49th St Track Replacement	Welders	1	8.00	46	0.45
49th St Bollard	Cement and Mortar Mixers	0	6.00	9	0.56

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

49th St Bollard	Pavers	0	8.00	130	0.42
49th St Bollard	Paving Equipment	0	6.00	132	0.36
49th St Bollard	Rollers	0	6.00	80	0.38
49th St Bollard	Tractors/Loaders/Backhoes	1	8.00	97	0.37
49th St Final Paving	Cement and Mortar Mixers	0	6.00	9	0.56
49th St Final Paving	Other Construction Equipment	4	8.00	172	0.42
49th St Final Paving	Pavers	0	8.00	130	0.42
49th St Final Paving	Paving Equipment	2	6.00	132	0.36
49th St Final Paving	Rollers	2	6.00	80	0.38
49th St Final Paving	Tractors/Loaders/Backhoes	0	8.00	97	0.37
46th St Building Demo	Concrete/Industrial Saws	1	8.00	81	0.73
46th St Building Demo	Excavators	0	8.00	158	0.38
46th St Building Demo	Other Construction Equipment	3	8.00	172	0.42
46th St Building Demo	Rubber Tired Dozers	0	8.00	247	0.40
46th St Building Demo	Rubber Tired Loaders	2	8.00	203	0.36
46th St Final Paving	Cement and Mortar Mixers	2	6.00	9	0.56
46th St Final Paving	Other Construction Equipment	4	8.00	172	0.42
46th St Final Paving	Pavers	0	8.00	130	0.42
46th St Final Paving	Paving Equipment	2	6.00	132	0.36
46th St Final Paving	Rollers	2	6.00	80	0.38
46th St Final Paving	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
49th St Utility Relocations	7	20.00	0.00	1,000.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
46th St Utility Relocations	7	20.00	0.00	1,000.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
46th St Connector Track	11	20.00	29.00	240.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

49th St Road modifications	7	20.00	0.00	360.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
46th St At Grade Crossing Enhanceme	10	20.00	0.00	120.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
46th St New At Grade Crossing	12	20.00	0.00	120.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
46th St Realigned Spur Track	13	20.00	29.00	60.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
49th St Track Replacement	4	10.00	29.00	60.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
49th St Bollard	1	10.00	0.00	60.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
49th St Final Paving	8	20.00	0.00	60.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
46th St Building Demo	6	20.00	0.00	180.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
46th St Final Paving	10	20.00	0.00	60.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 46th St Building Demo - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0536	0.4638	0.6037	1.2100e-003		0.0210	0.0210		0.0196	0.0196	0.0000	106.1343	106.1343	0.0294	0.0000	106.8703
Total	**0.0536**	**0.4638**	**0.6037**	**1.2100e-003**		**0.0210**	**0.0210**		**0.0196**	**0.0196**	**0.0000**	**106.1343**	**106.1343**	**0.0294**	**0.0000**	**106.8703**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 46th St Building Demo - 2028

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.8000e-004	0.0110	3.2300e-003	5.0000e-005	1.5500e-003	8.0000e-005	1.6300e-003	4.3000e-004	8.0000e-005	5.0000e-004	0.0000	4.6756	4.6756	2.9000e-004	7.4000e-004	4.9045
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4900e-003	9.6000e-004	0.0156	5.0000e-005	7.1300e-003	3.0000e-005	7.1600e-003	1.8900e-003	3.0000e-005	1.9200e-003	0.0000	4.8041	4.8041	9.0000e-005	1.1000e-004	4.8382
Total	**1.6700e-003**	**0.0120**	**0.0188**	**1.0000e-004**	**8.6800e-003**	**1.1000e-004**	**8.7900e-003**	**2.3200e-003**	**1.1000e-004**	**2.4200e-003**	**0.0000**	**9.4796**	**9.4796**	**3.8000e-004**	**8.5000e-004**	**9.7427**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0145	0.0629	0.7694	1.2100e-003		1.9400e-003	1.9400e-003		1.9400e-003	1.9400e-003	0.0000	106.1341	106.1341	0.0294	0.0000	106.8702
Total	**0.0145**	**0.0629**	**0.7694**	**1.2100e-003**		**1.9400e-003**	**1.9400e-003**		**1.9400e-003**	**1.9400e-003**	**0.0000**	**106.1341**	**106.1341**	**0.0294**	**0.0000**	**106.8702**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 46th St Building Demo - 2028

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.8000e-004	0.0110	3.2300e-003	5.0000e-005	1.5500e-003	8.0000e-005	1.6300e-003	4.3000e-004	8.0000e-005	5.0000e-004	0.0000	4.6756	4.6756	2.9000e-004	7.4000e-004	4.9045
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4900e-003	9.6000e-004	0.0156	5.0000e-005	7.1300e-003	3.0000e-005	7.1600e-003	1.8900e-003	3.0000e-005	1.9200e-003	0.0000	4.8041	4.8041	9.0000e-005	1.1000e-004	4.8382
Total	**1.6700e-003**	**0.0120**	**0.0188**	**1.0000e-004**	**8.6800e-003**	**1.1000e-004**	**8.7900e-003**	**2.3200e-003**	**1.1000e-004**	**2.4200e-003**	**0.0000**	**9.4796**	**9.4796**	**3.8000e-004**	**8.5000e-004**	**9.7427**

3.3 49th St Utility Relocations - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0377	0.3329	0.4232	8.4000e-004		0.0156	0.0156		0.0144	0.0144	0.0000	72.9719	72.9719	0.0234	0.0000	73.5563
Total	**0.0377**	**0.3329**	**0.4232**	**8.4000e-004**		**0.0156**	**0.0156**		**0.0144**	**0.0144**	**0.0000**	**72.9719**	**72.9719**	**0.0234**	**0.0000**	**73.5563**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 49th St Utility Relocations - 2028

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	6.8600e-003	2.0100e-003	3.0000e-005	9.6000e-004	5.0000e-005	1.0100e-003	2.6000e-004	5.0000e-005	3.1000e-004	0.0000	2.9082	2.9082	1.8000e-004	4.6000e-004	3.0506
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0100e-003	6.5000e-004	0.0105	4.0000e-005	4.8300e-003	2.0000e-005	4.8500e-003	1.2800e-003	2.0000e-005	1.3000e-003	0.0000	3.2520	3.2520	6.0000e-005	7.0000e-005	3.2751
Total	**1.1200e-003**	**7.5100e-003**	**0.0125**	**7.0000e-005**	**5.7900e-003**	**7.0000e-005**	**5.8600e-003**	**1.5400e-003**	**7.0000e-005**	**1.6100e-003**	**0.0000**	**6.1602**	**6.1602**	**2.4000e-004**	**5.3000e-004**	**6.3257**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0101	0.0439	0.5396	8.4000e-004		1.3500e-003	1.3500e-003		1.3500e-003	1.3500e-003	0.0000	72.9718	72.9718	0.0234	0.0000	73.5563
Total	**0.0101**	**0.0439**	**0.5396**	**8.4000e-004**		**1.3500e-003**	**1.3500e-003**		**1.3500e-003**	**1.3500e-003**	**0.0000**	**72.9718**	**72.9718**	**0.0234**	**0.0000**	**73.5563**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 49th St Utility Relocations - 2028

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	6.8600e-003	2.0100e-003	3.0000e-005	9.6000e-004	5.0000e-005	1.0100e-003	2.6000e-004	5.0000e-005	3.1000e-004	0.0000	2.9082	2.9082	1.8000e-004	4.6000e-004	3.0506
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0100e-003	6.5000e-004	0.0105	4.0000e-005	4.8300e-003	2.0000e-005	4.8500e-003	1.2800e-003	2.0000e-005	1.3000e-003	0.0000	3.2520	3.2520	6.0000e-005	7.0000e-005	3.2751
Total	**1.1200e-003**	**7.5100e-003**	**0.0125**	**7.0000e-005**	**5.7900e-003**	**7.0000e-005**	**5.8600e-003**	**1.5400e-003**	**7.0000e-005**	**1.6100e-003**	**0.0000**	**6.1602**	**6.1602**	**2.4000e-004**	**5.3000e-004**	**6.3257**

3.3 49th St Utility Relocations - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2235	1.9747	2.5103	4.9500e-003		0.0927	0.0927		0.0854	0.0854	0.0000	432.8558	432.8558	0.1387	0.0000	436.3229
Total	**0.2235**	**1.9747**	**2.5103**	**4.9500e-003**		**0.0927**	**0.0927**		**0.0854**	**0.0854**	**0.0000**	**432.8558**	**432.8558**	**0.1387**	**0.0000**	**436.3229**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 49th St Utility Relocations - 2029

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.6000e-004	0.0403	0.0120	1.7000e-004	5.7100e-003	3.0000e-004	6.0100e-003	1.5700e-003	2.8000e-004	1.8500e-003	0.0000	16.8935	16.8935	1.0800e-003	2.6900e-003	17.7216
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6600e-003	3.5500e-003	0.0597	2.1000e-004	0.0286	1.2000e-004	0.0288	7.6000e-003	1.1000e-004	7.7100e-003	0.0000	18.8394	18.8394	3.3000e-004	4.1000e-004	18.9705
Total	**6.3200e-003**	**0.0438**	**0.0716**	**3.8000e-004**	**0.0344**	**4.2000e-004**	**0.0348**	**9.1700e-003**	**3.9000e-004**	**9.5600e-003**	**0.0000**	**35.7329**	**35.7329**	**1.4100e-003**	**3.1000e-003**	**36.6921**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0601	0.2604	3.2009	4.9500e-003		8.0100e-003	8.0100e-003		8.0100e-003	8.0100e-003	0.0000	432.8553	432.8553	0.1387	0.0000	436.3223
Total	**0.0601**	**0.2604**	**3.2009**	**4.9500e-003**		**8.0100e-003**	**8.0100e-003**		**8.0100e-003**	**8.0100e-003**	**0.0000**	**432.8553**	**432.8553**	**0.1387**	**0.0000**	**436.3223**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 49th St Utility Relocations - 2029

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.6000e-004	0.0403	0.0120	1.7000e-004	5.7100e-003	3.0000e-004	6.0100e-003	1.5700e-003	2.8000e-004	1.8500e-003	0.0000	16.8935	16.8935	1.0800e-003	2.6900e-003	17.7216
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6600e-003	3.5500e-003	0.0597	2.1000e-004	0.0286	1.2000e-004	0.0288	7.6000e-003	1.1000e-004	7.7100e-003	0.0000	18.8394	18.8394	3.3000e-004	4.1000e-004	18.9705
Total	**6.3200e-003**	**0.0438**	**0.0716**	**3.8000e-004**	**0.0344**	**4.2000e-004**	**0.0348**	**9.1700e-003**	**3.9000e-004**	**9.5600e-003**	**0.0000**	**35.7329**	**35.7329**	**1.4100e-003**	**3.1000e-003**	**36.6921**

3.3 49th St Utility Relocations - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0625	0.1934	0.8439	2.0600e-003		7.3900e-003	7.3900e-003		7.3900e-003	7.3900e-003	0.0000	176.1003	176.1003	4.9100e-003	0.0000	176.2231
Total	**0.0625**	**0.1934**	**0.8439**	**2.0600e-003**		**7.3900e-003**	**7.3900e-003**		**7.3900e-003**	**7.3900e-003**	**0.0000**	**176.1003**	**176.1003**	**4.9100e-003**	**0.0000**	**176.2231**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 49th St Utility Relocations - 2030

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.2000e-004	0.0134	4.0700e-003	6.0000e-005	1.9300e-003	1.0000e-004	2.0300e-003	5.3000e-004	9.0000e-005	6.2000e-004	0.0000	5.5790	5.5790	3.6000e-004	8.9000e-004	5.8528
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8000e-003	1.1100e-003	0.0193	7.0000e-005	9.6500e-003	4.0000e-005	9.6900e-003	2.5600e-003	3.0000e-005	2.6000e-003	0.0000	6.2170	6.2170	1.0000e-004	1.3000e-004	6.2595
Total	**2.0200e-003**	**0.0145**	**0.0234**	**1.3000e-004**	**0.0116**	**1.4000e-004**	**0.0117**	**3.0900e-003**	**1.2000e-004**	**3.2200e-003**	**0.0000**	**11.7960**	**11.7960**	**4.6000e-004**	**1.0200e-003**	**12.1123**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0203	0.0878	1.0792	2.0600e-003		2.7000e-003	2.7000e-003		2.7000e-003	2.7000e-003	0.0000	176.1001	176.1001	4.9100e-003	0.0000	176.2228
Total	**0.0203**	**0.0878**	**1.0792**	**2.0600e-003**		**2.7000e-003**	**2.7000e-003**		**2.7000e-003**	**2.7000e-003**	**0.0000**	**176.1001**	**176.1001**	**4.9100e-003**	**0.0000**	**176.2228**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 49th St Utility Relocations - 2030

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.2000e-004	0.0134	4.0700e-003	6.0000e-005	1.9300e-003	1.0000e-004	2.0300e-003	5.3000e-004	9.0000e-005	6.2000e-004	0.0000	5.5790	5.5790	3.6000e-004	8.9000e-004	5.8528
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8000e-003	1.1100e-003	0.0193	7.0000e-005	9.6500e-003	4.0000e-005	9.6900e-003	2.5600e-003	3.0000e-005	2.6000e-003	0.0000	6.2170	6.2170	1.0000e-004	1.3000e-004	6.2595
Total	**2.0200e-003**	**0.0145**	**0.0234**	**1.3000e-004**	**0.0116**	**1.4000e-004**	**0.0117**	**3.0900e-003**	**1.2000e-004**	**3.2200e-003**	**0.0000**	**11.7960**	**11.7960**	**4.6000e-004**	**1.0200e-003**	**12.1123**

3.4 46th St Utility Relocations - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0377	0.3329	0.4232	8.4000e-004		0.0156	0.0156		0.0144	0.0144	0.0000	72.9719	72.9719	0.0234	0.0000	73.5563
Total	**0.0377**	**0.3329**	**0.4232**	**8.4000e-004**		**0.0156**	**0.0156**		**0.0144**	**0.0144**	**0.0000**	**72.9719**	**72.9719**	**0.0234**	**0.0000**	**73.5563**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 46th St Utility Relocations - 2028

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	6.8600e-003	2.0100e-003	3.0000e-005	9.6000e-004	5.0000e-005	1.0100e-003	2.6000e-004	5.0000e-005	3.1000e-004	0.0000	2.9082	2.9082	1.8000e-004	4.6000e-004	3.0506
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0100e-003	6.5000e-004	0.0105	4.0000e-005	4.8300e-003	2.0000e-005	4.8500e-003	1.2800e-003	2.0000e-005	1.3000e-003	0.0000	3.2520	3.2520	6.0000e-005	7.0000e-005	3.2751
Total	**1.1200e-003**	**7.5100e-003**	**0.0125**	**7.0000e-005**	**5.7900e-003**	**7.0000e-005**	**5.8600e-003**	**1.5400e-003**	**7.0000e-005**	**1.6100e-003**	**0.0000**	**6.1602**	**6.1602**	**2.4000e-004**	**5.3000e-004**	**6.3257**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0101	0.0439	0.5396	8.4000e-004		1.3500e-003	1.3500e-003		1.3500e-003	1.3500e-003	0.0000	72.9718	72.9718	0.0234	0.0000	73.5563
Total	**0.0101**	**0.0439**	**0.5396**	**8.4000e-004**		**1.3500e-003**	**1.3500e-003**		**1.3500e-003**	**1.3500e-003**	**0.0000**	**72.9718**	**72.9718**	**0.0234**	**0.0000**	**73.5563**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 46th St Utility Relocations - 2028

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	6.8600e-003	2.0100e-003	3.0000e-005	9.6000e-004	5.0000e-005	1.0100e-003	2.6000e-004	5.0000e-005	3.1000e-004	0.0000	2.9082	2.9082	1.8000e-004	4.6000e-004	3.0506
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0100e-003	6.5000e-004	0.0105	4.0000e-005	4.8300e-003	2.0000e-005	4.8500e-003	1.2800e-003	2.0000e-005	1.3000e-003	0.0000	3.2520	3.2520	6.0000e-005	7.0000e-005	3.2751
Total	**1.1200e-003**	**7.5100e-003**	**0.0125**	**7.0000e-005**	**5.7900e-003**	**7.0000e-005**	**5.8600e-003**	**1.5400e-003**	**7.0000e-005**	**1.6100e-003**	**0.0000**	**6.1602**	**6.1602**	**2.4000e-004**	**5.3000e-004**	**6.3257**

3.4 46th St Utility Relocations - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2235	1.9747	2.5103	4.9500e-003		0.0927	0.0927		0.0854	0.0854	0.0000	432.8558	432.8558	0.1387	0.0000	436.3229
Total	**0.2235**	**1.9747**	**2.5103**	**4.9500e-003**		**0.0927**	**0.0927**		**0.0854**	**0.0854**	**0.0000**	**432.8558**	**432.8558**	**0.1387**	**0.0000**	**436.3229**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 46th St Utility Relocations - 2029

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.6000e-004	0.0403	0.0120	1.7000e-004	5.7100e-003	3.0000e-004	6.0100e-003	1.5700e-003	2.8000e-004	1.8500e-003	0.0000	16.8935	16.8935	1.0800e-003	2.6900e-003	17.7216
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6600e-003	3.5500e-003	0.0597	2.1000e-004	0.0286	1.2000e-004	0.0288	7.6000e-003	1.1000e-004	7.7100e-003	0.0000	18.8394	18.8394	3.3000e-004	4.1000e-004	18.9705
Total	**6.3200e-003**	**0.0438**	**0.0716**	**3.8000e-004**	**0.0344**	**4.2000e-004**	**0.0348**	**9.1700e-003**	**3.9000e-004**	**9.5600e-003**	**0.0000**	**35.7329**	**35.7329**	**1.4100e-003**	**3.1000e-003**	**36.6921**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0601	0.2604	3.2009	4.9500e-003		8.0100e-003	8.0100e-003		8.0100e-003	8.0100e-003	0.0000	432.8553	432.8553	0.1387	0.0000	436.3223
Total	**0.0601**	**0.2604**	**3.2009**	**4.9500e-003**		**8.0100e-003**	**8.0100e-003**		**8.0100e-003**	**8.0100e-003**	**0.0000**	**432.8553**	**432.8553**	**0.1387**	**0.0000**	**436.3223**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 46th St Utility Relocations - 2029

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.6000e-004	0.0403	0.0120	1.7000e-004	5.7100e-003	3.0000e-004	6.0100e-003	1.5700e-003	2.8000e-004	1.8500e-003	0.0000	16.8935	16.8935	1.0800e-003	2.6900e-003	17.7216
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6600e-003	3.5500e-003	0.0597	2.1000e-004	0.0286	1.2000e-004	0.0288	7.6000e-003	1.1000e-004	7.7100e-003	0.0000	18.8394	18.8394	3.3000e-004	4.1000e-004	18.9705
Total	**6.3200e-003**	**0.0438**	**0.0716**	**3.8000e-004**	**0.0344**	**4.2000e-004**	**0.0348**	**9.1700e-003**	**3.9000e-004**	**9.5600e-003**	**0.0000**	**35.7329**	**35.7329**	**1.4100e-003**	**3.1000e-003**	**36.6921**

3.4 46th St Utility Relocations - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0625	0.1934	0.8439	2.0600e-003		7.3900e-003	7.3900e-003		7.3900e-003	7.3900e-003	0.0000	176.1003	176.1003	4.9100e-003	0.0000	176.2231
Total	**0.0625**	**0.1934**	**0.8439**	**2.0600e-003**		**7.3900e-003**	**7.3900e-003**		**7.3900e-003**	**7.3900e-003**	**0.0000**	**176.1003**	**176.1003**	**4.9100e-003**	**0.0000**	**176.2231**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 46th St Utility Relocations - 2030

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.2000e-004	0.0134	4.0700e-003	6.0000e-005	1.9300e-003	1.0000e-004	2.0300e-003	5.3000e-004	9.0000e-005	6.2000e-004	0.0000	5.5790	5.5790	3.6000e-004	8.9000e-004	5.8528
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8000e-003	1.1100e-003	0.0193	7.0000e-005	9.6500e-003	4.0000e-005	9.6900e-003	2.5600e-003	3.0000e-005	2.6000e-003	0.0000	6.2170	6.2170	1.0000e-004	1.3000e-004	6.2595
Total	**2.0200e-003**	**0.0145**	**0.0234**	**1.3000e-004**	**0.0116**	**1.4000e-004**	**0.0117**	**3.0900e-003**	**1.2000e-004**	**3.2200e-003**	**0.0000**	**11.7960**	**11.7960**	**4.6000e-004**	**1.0200e-003**	**12.1123**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0203	0.0878	1.0792	2.0600e-003		2.7000e-003	2.7000e-003		2.7000e-003	2.7000e-003	0.0000	176.1001	176.1001	4.9100e-003	0.0000	176.2228
Total	**0.0203**	**0.0878**	**1.0792**	**2.0600e-003**		**2.7000e-003**	**2.7000e-003**		**2.7000e-003**	**2.7000e-003**	**0.0000**	**176.1001**	**176.1001**	**4.9100e-003**	**0.0000**	**176.2228**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 46th St Utility Relocations - 2030

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.2000e-004	0.0134	4.0700e-003	6.0000e-005	1.9300e-003	1.0000e-004	2.0300e-003	5.3000e-004	9.0000e-005	6.2000e-004	0.0000	5.5790	5.5790	3.6000e-004	8.9000e-004	5.8528
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8000e-003	1.1100e-003	0.0193	7.0000e-005	9.6500e-003	4.0000e-005	9.6900e-003	2.5600e-003	3.0000e-005	2.6000e-003	0.0000	6.2170	6.2170	1.0000e-004	1.3000e-004	6.2595
Total	**2.0200e-003**	**0.0145**	**0.0234**	**1.3000e-004**	**0.0116**	**1.4000e-004**	**0.0117**	**3.0900e-003**	**1.2000e-004**	**3.2200e-003**	**0.0000**	**11.7960**	**11.7960**	**4.6000e-004**	**1.0200e-003**	**12.1123**

3.5 46th St Connector Track - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1142	0.3442	1.7785	3.5900e-003		0.0141	0.0141		0.0141	0.0141	0.0000	308.1543	308.1543	9.0500e-003	0.0000	308.3805
Total	**0.1142**	**0.3442**	**1.7785**	**3.5900e-003**		**0.0141**	**0.0141**		**0.0141**	**0.0141**	**0.0000**	**308.1543**	**308.1543**	**9.0500e-003**	**0.0000**	**308.3805**

Malabar Yard Construction - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 46th St Connector Track - 2030

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.4000e-004	0.0144	4.3600e-003	6.0000e-005	2.0700e-003	1.1000e-004	2.1700e-003	5.7000e-004	1.0000e-004	6.7000e-004	0.0000	5.9797	5.9797	3.9000e-004	9.5000e-004	6.2732
Vendor	1.2000e-003	0.0465	0.0170	2.0000e-004	7.9600e-003	2.6000e-004	8.2200e-003	2.3000e-003	2.5000e-004	2.5500e-003	0.0000	19.7300	19.7300	7.6000e-004	2.8800e-003	20.6065
Worker	1.7800e-003	1.1000e-003	0.0191	7.0000e-005	9.5500e-003	4.0000e-005	9.5800e-003	2.5300e-003	3.0000e-005	2.5700e-003	0.0000	6.1463	6.1463	1.0000e-004	1.3000e-004	6.1884
Total	**3.2200e-003**	**0.0620**	**0.0405**	**3.3000e-004**	**0.0196**	**4.1000e-004**	**0.0200**	**5.4000e-003**	**3.8000e-004**	**5.7900e-003**	**0.0000**	**31.8560**	**31.8560**	**1.2500e-003**	**3.9600e-003**	**33.0680**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0359	0.1554	2.1066	3.5900e-003		4.7800e-003	4.7800e-003		4.7800e-003	4.7800e-003	0.0000	308.1539	308.1539	9.0500e-003	0.0000	308.3801
Total	**0.0359**	**0.1554**	**2.1066**	**3.5900e-003**		**4.7800e-003**	**4.7800e-003**		**4.7800e-003**	**4.7800e-003**	**0.0000**	**308.1539**	**308.1539**	**9.0500e-003**	**0.0000**	**308.3801**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 46th St Connector Track - 2030

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.4000e-004	0.0144	4.3600e-003	6.0000e-005	2.0700e-003	1.1000e-004	2.1700e-003	5.7000e-004	1.0000e-004	6.7000e-004	0.0000	5.9797	5.9797	3.9000e-004	9.5000e-004	6.2732
Vendor	1.2000e-003	0.0465	0.0170	2.0000e-004	7.9600e-003	2.6000e-004	8.2200e-003	2.3000e-003	2.5000e-004	2.5500e-003	0.0000	19.7300	19.7300	7.6000e-004	2.8800e-003	20.6065
Worker	1.7800e-003	1.1000e-003	0.0191	7.0000e-005	9.5500e-003	4.0000e-005	9.5800e-003	2.5300e-003	3.0000e-005	2.5700e-003	0.0000	6.1463	6.1463	1.0000e-004	1.3000e-004	6.1884
Total	**3.2200e-003**	**0.0620**	**0.0405**	**3.3000e-004**	**0.0196**	**4.1000e-004**	**0.0200**	**5.4000e-003**	**3.8000e-004**	**5.7900e-003**	**0.0000**	**31.8560**	**31.8560**	**1.2500e-003**	**3.9600e-003**	**33.0680**

3.6 46th St Realigned Spur Track - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0327	0.1090	0.4921	9.9000e-004		4.0900e-003	4.0900e-003		4.0900e-003	4.0900e-003	0.0000	84.1576	84.1576	2.6000e-003	0.0000	84.2226
Total	**0.0327**	**0.1090**	**0.4921**	**9.9000e-004**		**4.0900e-003**	**4.0900e-003**		**4.0900e-003**	**4.0900e-003**	**0.0000**	**84.1576**	**84.1576**	**2.6000e-003**	**0.0000**	**84.2226**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 46th St Realigned Spur Track - 2030

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6000e-003	1.0900e-003	1.0000e-005	5.2000e-004	3.0000e-005	5.4000e-004	1.4000e-004	3.0000e-005	1.7000e-004	0.0000	1.4949	1.4949	1.0000e-004	2.4000e-004	1.5683
Vendor	3.2000e-004	0.0123	4.5000e-003	5.0000e-005	2.1000e-003	7.0000e-005	2.1700e-003	6.1000e-004	7.0000e-005	6.7000e-004	0.0000	5.2160	5.2160	2.0000e-004	7.6000e-004	5.4477
Worker	4.7000e-004	2.9000e-004	5.0400e-003	2.0000e-005	2.5200e-003	1.0000e-005	2.5300e-003	6.7000e-004	1.0000e-005	6.8000e-004	0.0000	1.6249	1.6249	3.0000e-005	3.0000e-005	1.6360
Total	**8.5000e-004**	**0.0162**	**0.0106**	**8.0000e-005**	**5.1400e-003**	**1.1000e-004**	**5.2400e-003**	**1.4200e-003**	**1.1000e-004**	**1.5200e-003**	**0.0000**	**8.3358**	**8.3358**	**3.3000e-004**	**1.0300e-003**	**8.6520**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.9800e-003	0.0526	0.5741	9.9000e-004		1.3000e-003	1.3000e-003		1.3000e-003	1.3000e-003	0.0000	84.1575	84.1575	2.6000e-003	0.0000	84.2225
Total	**9.9800e-003**	**0.0526**	**0.5741**	**9.9000e-004**		**1.3000e-003**	**1.3000e-003**		**1.3000e-003**	**1.3000e-003**	**0.0000**	**84.1575**	**84.1575**	**2.6000e-003**	**0.0000**	**84.2225**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 46th St Realigned Spur Track - 2030

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6000e-003	1.0900e-003	1.0000e-005	5.2000e-004	3.0000e-005	5.4000e-004	1.4000e-004	3.0000e-005	1.7000e-004	0.0000	1.4949	1.4949	1.0000e-004	2.4000e-004	1.5683
Vendor	3.2000e-004	0.0123	4.5000e-003	5.0000e-005	2.1000e-003	7.0000e-005	2.1700e-003	6.1000e-004	7.0000e-005	6.7000e-004	0.0000	5.2160	5.2160	2.0000e-004	7.6000e-004	5.4477
Worker	4.7000e-004	2.9000e-004	5.0400e-003	2.0000e-005	2.5200e-003	1.0000e-005	2.5300e-003	6.7000e-004	1.0000e-005	6.8000e-004	0.0000	1.6249	1.6249	3.0000e-005	3.0000e-005	1.6360
Total	**8.5000e-004**	**0.0162**	**0.0106**	**8.0000e-005**	**5.1400e-003**	**1.1000e-004**	**5.2400e-003**	**1.4200e-003**	**1.1000e-004**	**1.5200e-003**	**0.0000**	**8.3358**	**8.3358**	**3.3000e-004**	**1.0300e-003**	**8.6520**

3.7 49th St Track Replacement - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.7700e-003	0.0391	0.0688	2.2000e-004		9.2000e-004	9.2000e-004		9.2000e-004	9.2000e-004	0.0000	18.4356	18.4356	6.9000e-004	0.0000	18.4529
Total	**8.7700e-003**	**0.0391**	**0.0688**	**2.2000e-004**		**9.2000e-004**	**9.2000e-004**		**9.2000e-004**	**9.2000e-004**	**0.0000**	**18.4356**	**18.4356**	**6.9000e-004**	**0.0000**	**18.4529**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 49th St Track Replacement - 2030

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6000e-003	1.0900e-003	1.0000e-005	5.2000e-004	3.0000e-005	5.4000e-004	1.4000e-004	3.0000e-005	1.7000e-004	0.0000	1.4949	1.4949	1.0000e-004	2.4000e-004	1.5683
Vendor	2.8000e-004	0.0107	3.9100e-003	5.0000e-005	1.8300e-003	6.0000e-005	1.8900e-003	5.3000e-004	6.0000e-005	5.9000e-004	0.0000	4.5356	4.5356	1.7000e-004	6.6000e-004	4.7371
Worker	2.0000e-004	1.3000e-004	2.1900e-003	1.0000e-005	1.1000e-003	0.0000	1.1000e-003	2.9000e-004	0.0000	3.0000e-004	0.0000	0.7065	0.7065	1.0000e-005	2.0000e-005	0.7113
Total	**5.4000e-004**	**0.0144**	**7.1900e-003**	**7.0000e-005**	**3.4500e-003**	**9.0000e-005**	**3.5300e-003**	**9.6000e-004**	**9.0000e-005**	**1.0600e-003**	**0.0000**	**6.7370**	**6.7370**	**2.8000e-004**	**9.2000e-004**	**7.0167**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.3600e-003	0.0184	0.0951	2.2000e-004		2.9000e-004	2.9000e-004		2.9000e-004	2.9000e-004	0.0000	18.4356	18.4356	6.9000e-004	0.0000	18.4529
Total	**2.3600e-003**	**0.0184**	**0.0951**	**2.2000e-004**		**2.9000e-004**	**2.9000e-004**		**2.9000e-004**	**2.9000e-004**	**0.0000**	**18.4356**	**18.4356**	**6.9000e-004**	**0.0000**	**18.4529**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 49th St Track Replacement - 2030

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6000e-003	1.0900e-003	1.0000e-005	5.2000e-004	3.0000e-005	5.4000e-004	1.4000e-004	3.0000e-005	1.7000e-004	0.0000	1.4949	1.4949	1.0000e-004	2.4000e-004	1.5683
Vendor	2.8000e-004	0.0107	3.9100e-003	5.0000e-005	1.8300e-003	6.0000e-005	1.8900e-003	5.3000e-004	6.0000e-005	5.9000e-004	0.0000	4.5356	4.5356	1.7000e-004	6.6000e-004	4.7371
Worker	2.0000e-004	1.3000e-004	2.1900e-003	1.0000e-005	1.1000e-003	0.0000	1.1000e-003	2.9000e-004	0.0000	3.0000e-004	0.0000	0.7065	0.7065	1.0000e-005	2.0000e-005	0.7113
Total	**5.4000e-004**	**0.0144**	**7.1900e-003**	**7.0000e-005**	**3.4500e-003**	**9.0000e-005**	**3.5300e-003**	**9.6000e-004**	**9.0000e-005**	**1.0600e-003**	**0.0000**	**6.7370**	**6.7370**	**2.8000e-004**	**9.2000e-004**	**7.0167**

3.8 49th St Road modifications - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0721	0.3584	0.7343	1.6100e-003		0.0131	0.0131		0.0131	0.0131	0.0000	137.8064	137.8064	5.7900e-003	0.0000	137.9512
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0721**	**0.3584**	**0.7343**	**1.6100e-003**		**0.0131**	**0.0131**		**0.0131**	**0.0131**	**0.0000**	**137.8064**	**137.8064**	**5.7900e-003**	**0.0000**	**137.9512**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 49th St Road modifications - 2030

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.6000e-004	0.0216	6.5400e-003	9.0000e-005	3.1000e-003	1.6000e-004	3.2600e-003	8.5000e-004	1.5000e-004	1.0000e-003	0.0000	8.9696	8.9696	5.9000e-004	1.4300e-003	9.4098
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7000e-003	1.6700e-003	0.0289	1.0000e-004	0.0145	5.0000e-005	0.0145	3.8500e-003	5.0000e-005	3.9000e-003	0.0000	9.3255	9.3255	1.6000e-004	2.0000e-004	9.3892
Total	**3.0600e-003**	**0.0233**	**0.0355**	**1.9000e-004**	**0.0176**	**2.1000e-004**	**0.0178**	**4.7000e-003**	**2.0000e-004**	**4.9000e-003**	**0.0000**	**18.2951**	**18.2951**	**7.5000e-004**	**1.6300e-003**	**18.7990**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0158	0.0684	0.8451	1.6100e-003		2.1000e-003	2.1000e-003		2.1000e-003	2.1000e-003	0.0000	137.8063	137.8063	5.7900e-003	0.0000	137.9510
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0158**	**0.0684**	**0.8451**	**1.6100e-003**		**2.1000e-003**	**2.1000e-003**		**2.1000e-003**	**2.1000e-003**	**0.0000**	**137.8063**	**137.8063**	**5.7900e-003**	**0.0000**	**137.9510**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 49th St Road modifications - 2030

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.6000e-004	0.0216	6.5400e-003	9.0000e-005	3.1000e-003	1.6000e-004	3.2600e-003	8.5000e-004	1.5000e-004	1.0000e-003	0.0000	8.9696	8.9696	5.9000e-004	1.4300e-003	9.4098
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7000e-003	1.6700e-003	0.0289	1.0000e-004	0.0145	5.0000e-005	0.0145	3.8500e-003	5.0000e-005	3.9000e-003	0.0000	9.3255	9.3255	1.6000e-004	2.0000e-004	9.3892
Total	**3.0600e-003**	**0.0233**	**0.0355**	**1.9000e-004**	**0.0176**	**2.1000e-004**	**0.0178**	**4.7000e-003**	**2.0000e-004**	**4.9000e-003**	**0.0000**	**18.2951**	**18.2951**	**7.5000e-004**	**1.6300e-003**	**18.7990**

3.9 46th St At Grade Crossing Enhancements - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0491	0.1577	0.7496	1.5500e-003		6.3900e-003	6.3900e-003		6.3900e-003	6.3900e-003	0.0000	132.8354	132.8354	3.8800e-003	0.0000	132.9323
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0491**	**0.1577**	**0.7496**	**1.5500e-003**		**6.3900e-003**	**6.3900e-003**		**6.3900e-003**	**6.3900e-003**	**0.0000**	**132.8354**	**132.8354**	**3.8800e-003**	**0.0000**	**132.9323**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.9 46th St At Grade Crossing Enhancements - 2030

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	7.2000e-003	2.1800e-003	3.0000e-005	1.0300e-003	5.0000e-005	1.0900e-003	2.8000e-004	5.0000e-005	3.3000e-004	0.0000	2.9899	2.9899	2.0000e-004	4.8000e-004	3.1366
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-004	5.6000e-004	9.6500e-003	3.0000e-005	4.8300e-003	2.0000e-005	4.8500e-003	1.2800e-003	2.0000e-005	1.3000e-003	0.0000	3.1085	3.1085	5.0000e-005	7.0000e-005	3.1298
Total	**1.0200e-003**	**7.7600e-003**	**0.0118**	**6.0000e-005**	**5.8600e-003**	**7.0000e-005**	**5.9400e-003**	**1.5600e-003**	**7.0000e-005**	**1.6300e-003**	**0.0000**	**6.0984**	**6.0984**	**2.5000e-004**	**5.5000e-004**	**6.2663**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0153	0.0665	0.8930	1.5500e-003		2.0500e-003	2.0500e-003		2.0500e-003	2.0500e-003	0.0000	132.8352	132.8352	3.8800e-003	0.0000	132.9322
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0153**	**0.0665**	**0.8930**	**1.5500e-003**		**2.0500e-003**	**2.0500e-003**		**2.0500e-003**	**2.0500e-003**	**0.0000**	**132.8352**	**132.8352**	**3.8800e-003**	**0.0000**	**132.9322**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.9 46th St At Grade Crossing Enhancements - 2030

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	7.2000e-003	2.1800e-003	3.0000e-005	1.0300e-003	5.0000e-005	1.0900e-003	2.8000e-004	5.0000e-005	3.3000e-004	0.0000	2.9899	2.9899	2.0000e-004	4.8000e-004	3.1366
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-004	5.6000e-004	9.6500e-003	3.0000e-005	4.8300e-003	2.0000e-005	4.8500e-003	1.2800e-003	2.0000e-005	1.3000e-003	0.0000	3.1085	3.1085	5.0000e-005	7.0000e-005	3.1298
Total	**1.0200e-003**	**7.7600e-003**	**0.0118**	**6.0000e-005**	**5.8600e-003**	**7.0000e-005**	**5.9400e-003**	**1.5600e-003**	**7.0000e-005**	**1.6300e-003**	**0.0000**	**6.0984**	**6.0984**	**2.5000e-004**	**5.5000e-004**	**6.2663**

3.10 46th St New At Grade Crossing - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0601	0.1843	0.9251	1.8700e-003		7.5500e-003	7.5500e-003		7.5500e-003	7.5500e-003	0.0000	160.1635	160.1635	4.7600e-003	0.0000	160.2825
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0601**	**0.1843**	**0.9251**	**1.8700e-003**		**7.5500e-003**	**7.5500e-003**		**7.5500e-003**	**7.5500e-003**	**0.0000**	**160.1635**	**160.1635**	**4.7600e-003**	**0.0000**	**160.2825**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.10 46th St New At Grade Crossing - 2030

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	7.2000e-003	2.1800e-003	3.0000e-005	1.0300e-003	5.0000e-005	1.0900e-003	2.8000e-004	5.0000e-005	3.3000e-004	0.0000	2.9899	2.9899	2.0000e-004	4.8000e-004	3.1366
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.2000e-004	5.7000e-004	9.8700e-003	3.0000e-005	4.9400e-003	2.0000e-005	4.9600e-003	1.3100e-003	2.0000e-005	1.3300e-003	0.0000	3.1791	3.1791	5.0000e-005	7.0000e-005	3.2009
Total	**1.0400e-003**	**7.7700e-003**	**0.0121**	**6.0000e-005**	**5.9700e-003**	**7.0000e-005**	**6.0500e-003**	**1.5900e-003**	**7.0000e-005**	**1.6600e-003**	**0.0000**	**6.1690**	**6.1690**	**2.5000e-004**	**5.5000e-004**	**6.3375**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0186	0.0804	1.0896	1.8700e-003		2.4700e-003	2.4700e-003		2.4700e-003	2.4700e-003	0.0000	160.1633	160.1633	4.7600e-003	0.0000	160.2823
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0186**	**0.0804**	**1.0896**	**1.8700e-003**		**2.4700e-003**	**2.4700e-003**		**2.4700e-003**	**2.4700e-003**	**0.0000**	**160.1633**	**160.1633**	**4.7600e-003**	**0.0000**	**160.2823**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.10 46th St New At Grade Crossing - 2030

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	7.2000e-003	2.1800e-003	3.0000e-005	1.0300e-003	5.0000e-005	1.0900e-003	2.8000e-004	5.0000e-005	3.3000e-004	0.0000	2.9899	2.9899	2.0000e-004	4.8000e-004	3.1366
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.2000e-004	5.7000e-004	9.8700e-003	3.0000e-005	4.9400e-003	2.0000e-005	4.9600e-003	1.3100e-003	2.0000e-005	1.3300e-003	0.0000	3.1791	3.1791	5.0000e-005	7.0000e-005	3.2009
Total	**1.0400e-003**	**7.7700e-003**	**0.0121**	**6.0000e-005**	**5.9700e-003**	**7.0000e-005**	**6.0500e-003**	**1.5900e-003**	**7.0000e-005**	**1.6600e-003**	**0.0000**	**6.1690**	**6.1690**	**2.5000e-004**	**5.5000e-004**	**6.3375**

3.11 49th St Bollard - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.7200e-003	0.0103	0.0235	4.0000e-005		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004	0.0000	3.2634	3.2634	1.4000e-004	0.0000	3.2669
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.7200e-003**	**0.0103**	**0.0235**	**4.0000e-005**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**	**0.0000**	**3.2634**	**3.2634**	**1.4000e-004**	**0.0000**	**3.2669**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.11 49th St Bollard - 2030

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6000e-003	1.0900e-003	1.0000e-005	5.2000e-004	3.0000e-005	5.4000e-004	1.4000e-004	3.0000e-005	1.7000e-004	0.0000	1.4949	1.4949	1.0000e-004	2.4000e-004	1.5683
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.3000e-004	2.1900e-003	1.0000e-005	1.1000e-003	0.0000	1.1000e-003	2.9000e-004	0.0000	3.0000e-004	0.0000	0.7065	0.7065	1.0000e-005	2.0000e-005	0.7113
Total	**2.6000e-004**	**3.7300e-003**	**3.2800e-003**	**2.0000e-005**	**1.6200e-003**	**3.0000e-005**	**1.6400e-003**	**4.3000e-004**	**3.0000e-005**	**4.7000e-004**	**0.0000**	**2.2014**	**2.2014**	**1.1000e-004**	**2.6000e-004**	**2.2796**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.8000e-004	1.6500e-003	0.0234	4.0000e-005		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	3.2634	3.2634	1.4000e-004	0.0000	3.2668
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.8000e-004**	**1.6500e-003**	**0.0234**	**4.0000e-005**		**5.0000e-005**	**5.0000e-005**		**5.0000e-005**	**5.0000e-005**	**0.0000**	**3.2634**	**3.2634**	**1.4000e-004**	**0.0000**	**3.2668**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.11 49th St Bollard - 2030

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6000e-003	1.0900e-003	1.0000e-005	5.2000e-004	3.0000e-005	5.4000e-004	1.4000e-004	3.0000e-005	1.7000e-004	0.0000	1.4949	1.4949	1.0000e-004	2.4000e-004	1.5683
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.3000e-004	2.1900e-003	1.0000e-005	1.1000e-003	0.0000	1.1000e-003	2.9000e-004	0.0000	3.0000e-004	0.0000	0.7065	0.7065	1.0000e-005	2.0000e-005	0.7113
Total	**2.6000e-004**	**3.7300e-003**	**3.2800e-003**	**2.0000e-005**	**1.6200e-003**	**3.0000e-005**	**1.6400e-003**	**4.3000e-004**	**3.0000e-005**	**4.7000e-004**	**0.0000**	**2.2014**	**2.2014**	**1.1000e-004**	**2.6000e-004**	**2.2796**

3.12 49th St Final Paving - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0143	0.0562	0.2302	4.3000e-004		2.3800e-003	2.3800e-003		2.3800e-003	2.3800e-003	0.0000	36.9022	36.9022	1.1400e-003	0.0000	36.9307
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0143**	**0.0562**	**0.2302**	**4.3000e-004**		**2.3800e-003**	**2.3800e-003**		**2.3800e-003**	**2.3800e-003**	**0.0000**	**36.9022**	**36.9022**	**1.1400e-003**	**0.0000**	**36.9307**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.12 49th St Final Paving - 2030

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6000e-003	1.0900e-003	1.0000e-005	5.2000e-004	3.0000e-005	5.4000e-004	1.4000e-004	3.0000e-005	1.7000e-004	0.0000	1.4949	1.4949	1.0000e-004	2.4000e-004	1.5683
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1000e-004	2.5000e-004	4.3800e-003	2.0000e-005	2.1900e-003	1.0000e-005	2.2000e-003	5.8000e-004	1.0000e-005	5.9000e-004	0.0000	1.4130	1.4130	2.0000e-005	3.0000e-005	1.4226
Total	**4.7000e-004**	**3.8500e-003**	**5.4700e-003**	**3.0000e-005**	**2.7100e-003**	**4.0000e-005**	**2.7400e-003**	**7.2000e-004**	**4.0000e-005**	**7.6000e-004**	**0.0000**	**2.9079**	**2.9079**	**1.2000e-004**	**2.7000e-004**	**2.9909**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.2900e-003	0.0186	0.2648	4.3000e-004		5.7000e-004	5.7000e-004		5.7000e-004	5.7000e-004	0.0000	36.9021	36.9021	1.1400e-003	0.0000	36.9306
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.2900e-003**	**0.0186**	**0.2648**	**4.3000e-004**		**5.7000e-004**	**5.7000e-004**		**5.7000e-004**	**5.7000e-004**	**0.0000**	**36.9021**	**36.9021**	**1.1400e-003**	**0.0000**	**36.9306**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6000e-003	1.0900e-003	1.0000e-005	5.2000e-004	3.0000e-005	5.4000e-004	1.4000e-004	3.0000e-005	1.7000e-004	0.0000	1.4949	1.4949	1.0000e-004	2.4000e-004	1.5683
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1000e-004	2.5000e-004	4.3800e-003	2.0000e-005	2.1900e-003	1.0000e-005	2.2000e-003	5.8000e-004	1.0000e-005	5.9000e-004	0.0000	1.4130	1.4130	2.0000e-005	3.0000e-005	1.4226
Total	**4.7000e-004**	**3.8500e-003**	**5.4700e-003**	**3.0000e-005**	**2.7100e-003**	**4.0000e-005**	**2.7400e-003**	**7.2000e-004**	**4.0000e-005**	**7.6000e-004**	**0.0000**	**2.9079**	**2.9079**	**1.2000e-004**	**2.7000e-004**	**2.9909**

3.13 46th St Final Paving - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0151	0.0617	0.2348	4.4000e-004		2.5900e-003	2.5900e-003		2.5900e-003	2.5900e-003	0.0000	37.5896	37.5896	1.2100e-003	0.0000	37.6199
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0151**	**0.0617**	**0.2348**	**4.4000e-004**		**2.5900e-003**	**2.5900e-003**		**2.5900e-003**	**2.5900e-003**	**0.0000**	**37.5896**	**37.5896**	**1.2100e-003**	**0.0000**	**37.6199**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6000e-003	1.0900e-003	1.0000e-005	5.2000e-004	3.0000e-005	5.4000e-004	1.4000e-004	3.0000e-005	1.7000e-004	0.0000	1.4949	1.4949	1.0000e-004	2.4000e-004	1.5683
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1000e-004	2.5000e-004	4.3800e-003	2.0000e-005	2.1900e-003	1.0000e-005	2.2000e-003	5.8000e-004	1.0000e-005	5.9000e-004	0.0000	1.4130	1.4130	2.0000e-005	3.0000e-005	1.4226
Total	**4.7000e-004**	**3.8500e-003**	**5.4700e-003**	**3.0000e-005**	**2.7100e-003**	**4.0000e-005**	**2.7400e-003**	**7.2000e-004**	**4.0000e-005**	**7.6000e-004**	**0.0000**	**2.9079**	**2.9079**	**1.2000e-004**	**2.7000e-004**	**2.9909**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.2900e-003	0.0186	0.2648	4.4000e-004		5.7000e-004	5.7000e-004		5.7000e-004	5.7000e-004	0.0000	37.5895	37.5895	1.2100e-003	0.0000	37.6198
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.2900e-003**	**0.0186**	**0.2648**	**4.4000e-004**		**5.7000e-004**	**5.7000e-004**		**5.7000e-004**	**5.7000e-004**	**0.0000**	**37.5895**	**37.5895**	**1.2100e-003**	**0.0000**	**37.6198**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.13 46th St Final Paving - 2030

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6000e-003	1.0900e-003	1.0000e-005	5.2000e-004	3.0000e-005	5.4000e-004	1.4000e-004	3.0000e-005	1.7000e-004	0.0000	1.4949	1.4949	1.0000e-004	2.4000e-004	1.5683
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1000e-004	2.5000e-004	4.3800e-003	2.0000e-005	2.1900e-003	1.0000e-005	2.2000e-003	5.8000e-004	1.0000e-005	5.9000e-004	0.0000	1.4130	1.4130	2.0000e-005	3.0000e-005	1.4226
Total	**4.7000e-004**	**3.8500e-003**	**5.4700e-003**	**3.0000e-005**	**2.7100e-003**	**4.0000e-005**	**2.7400e-003**	**7.2000e-004**	**4.0000e-005**	**7.6000e-004**	**0.0000**	**2.9079**	**2.9079**	**1.2000e-004**	**2.7000e-004**	**2.9909**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.536554	0.065121	0.188839	0.125865	0.023954	0.006945	0.012855	0.008856	0.000818	0.000466	0.025582	0.000769	0.003378

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0137	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-004	1.0000e-004	0.0000	0.0000	1.1000e-004
Unmitigated	0.0137	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-004	1.0000e-004	0.0000	0.0000	1.1000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.4200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0113					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-004	1.0000e-004	0.0000	0.0000	1.1000e-004
Total	**0.0137**	**0.0000**	**5.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.0000e-004**	**1.0000e-004**	**0.0000**	**0.0000**	**1.1000e-004**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.4200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0113					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-004	1.0000e-004	0.0000	0.0000	1.1000e-004
Total	**0.0137**	**0.0000**	**5.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.0000e-004**	**1.0000e-004**	**0.0000**	**0.0000**	**1.1000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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Appendix C:
Operational Emission Calculations

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LinkUS Dwell Time by Train Type

	# Daily Moves				# Daily Trips				Dwell Times (minutes/day/trip)				Total Dwell Time (hr/day)			
Train Type/Year	2016	2026	2031	2040	2016	2026	2031	2040	2016	2026	2031	2040	2016	2026	2031	2040
Metrolink Revenue Trains (Turn)	139	300	98	98	70	150	49	49	15	15	15	15	17.5	37.5	12.3	12.3
Metrolink Revenue Trains (Thru)	0	70	580	580	0	35	290	290	NA	7	5	5	0.0	4.1	24.2	24.2
Metrolink Non-Revenue Trains	46	40	12	12	23	20	6	6	15	15	15	15	5.8	5.0	1.5	1.5
Amtrak Surfliner (Turn)	32	34	40	76	16	17	20	38	30	30	30	30	8.0	8.5	10.0	19.0
Amtrak Surfliner (Thru)	0	14	16	36	0	7	8	18	NA	10	10	10	0.0	1.2	1.3	3.0
Amtrak Long Distance Trains	5	5	5	5	3	3	3	3	30	30	30	30	1.5	1.5	1.5	1.5
Amtrak Non-Revenue Trains	11	15	19	23	5	7	9	11	30	30	30	30	2.5	3.5	4.5	5.5
Total	233	478	770	830	117	239	385	415					35.25	61.25	55.25	66.92

Source: Rail Planning Technical Memorandum, Nov 2023 and Andrew Mull's email dated 11/22/23

Note: Turn movements take longer than thru movements.

% Tier 4 (all Metrolink Trains by 2024, 15% of Amtrak by 2026, 40% of Amtrak by 2031, 80% of Amtrak by 2040)	88%	94%	97%

Train VMT - Unmitigated including renewable diesel for all no-build and build scenarios

Existing Conditions	Trips	Avg Length	VMT	VOC	CO	NOx	SOx	PM10	PM2.5	CO2
	233	1.7	403.1	8.5	41.1	184.0	0.1	4.79	4.6	15,798.0

2026 No Build Conditions	Trips	Avg Length	VMT	VOC	CO	NOx	SOx	PM10	PM2.5	CO2
	233	1.7	403.1	2.8	37.0	89.1	0.1	1.30	1.3	12,638.4

2026 Build Conditions	Trips	Avg Length	VMT	VOC	CO	NOx	SOx	PM10	PM2.5	CO2
	478	1.5	736.1	5.1	67.6	162.6	0.3	2.37	2.3	23,080.1

2031 No Build Conditions	Trips	Avg Length	VMT	VOC	CO	NOx	SOx	PM10	PM2.5	CO2
	233	1.7	403.1	1.7	37.0	64.0	0.1	0.76	0.7	12,638.4

2031 Build Conditions	Trips	Avg Length	VMT	VOC	CO	NOx	SOx	PM10	PM2.5	CO2
	770	1.5	1,185.8	5.0	108.9	188.3	0.4	2.23	2.2	37,179.3

2040 No Build Conditions	Trips	Avg Length	VMT	VOC	CO	NOx	SOx	PM10	PM2.5	CO2
	233	1.7	403.1	0.8	37.0	32.0	0.1	0.32	0.3	12,638.4

2040 Build Conditions	Trips	Avg Length	VMT	VOC	CO	NOx	SOx	PM10	PM2.5	CO2
	830	1.5	1,278.2	2.5	117.4	101.5	0.5	1.03	1.0	40,076.4

Train Idling - Unmitigated including renewable diesel for all no-build and build scenarios

							pounds per day			
Conditions	**Trips**	**Idle time (hr)**	**Idle Hours**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**
Existing	117	varies	35.3	5.8	27.9	125.0	0.1	3.26	3.2	11710.8
2026 No Build	117	varies	35.3	1.9	25.2	60.5	0.1	0.88	0.9	9,368.7
2026 Build	239	varies	61.3	3.3	43.7	105.2	0.2	1.53	1.5	16,278.9
2031 No Build	117	varies	35.3	1.2	25.2	43.5	0.1	0.51	0.5	9,368.7
2031 Build	385	varies	55.3	1.8	39.4	68.2	0.2	0.81	0.8	14,684.2
2040 No Build	117	varies	35.3	0.5	25.2	21.7	0.1	0.22	0.2	9,368.7
2040 Build	415	varies	66.9	1.0	47.8	41.3	0.2	0.42	0.4	17,785.0

Summary (lb/day) - Unmitigated

	VOC	CO	NOx	SOx	PM10	PM2.5	CO2
Existing	14.2	69.1	309.0	0.2	8.1	7.8	27,508.8
2026 No Build	4.7	62.2	149.6	0.2	2.2	2.1	22,007.1
Increase from Existing	*-9.5*	*-6.9*	*-159.5*	*0.0*	*-5.9*	*-5.7*	*-5,501.8*
2026 Build	8.4	111.3	267.8	0.4	3.9	3.8	39,359.0
Increase from Existing	*-5.8*	*42.2*	*-41.2*	*0.2*	*-4.1*	*-4.0*	*11,850.2*
Increase from No Build	*3.7*	*49.1*	*118.2*	*0.2*	*1.7*	*1.7*	*17,352.0*
2031 No Build	2.9	62.2	107.5	0.2	1.3	1.2	22,007.1
Increase from Existing	*-11.4*	*-6.9*	*-201.5*	*0.0*	*-6.8*	*-6.6*	*-5,501.8*
2031 Build	6.8	148.3	256.5	0.6	3.0	2.9	51,863.5
Increase from Existing	*-7.4*	*79.2*	*-52.5*	*0.3*	*-5.0*	*-4.9*	*24,354.7*
Increase from No Build	*4.0*	*86.2*	*149.0*	*0.3*	*1.8*	*1.7*	*29,856.5*
2040 No Build	1.3	62.2	53.8	0.2	0.5	0.5	22,007.1
Increase from Existing	*-12.9*	*-6.9*	*-255.3*	*0.0*	*-7.5*	*-7.3*	*-5,501.8*
2040 Build	3.5	165.1	142.8	0.6	1.4	1.4	57,861.4
Increase from Existing	*-10.8*	*96.1*	*-166.3*	*0.4*	*-6.6*	*-6.4*	*30,352.5*
Increase from No Build	*2.2*	*103.0*	*89.0*	*0.4*	*0.9*	*0.9*	*35,854.3*

Summary (tons/year) - Unmitigated

Metric Tons

	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CO2
Existing	2.12	10.31	46.11	0.04	1.20	1.17	4,104.87	3,723.88
2026 No Build	0.70	9.28	22.32	0.04	0.33	0.32	3,283.9	2,979.1
Increase from Existing	*-1.42*	*-1.03*	*-23.79*	*0.00*	*-0.88*	*-0.85*	*-820.97*	*-744.78*
2026 Build	1.25	16.61	39.96	0.07	0.58	0.57	5,873.2	5,328.0
Increase from Existing	*-0.87*	*6.30*	*-6.15*	*0.03*	*-0.62*	*-0.60*	*1,768.29*	*1,604.17*
Increase from No Build	*0.55*	*7.33*	*17.64*	*0.03*	*0.26*	*0.25*	*2,589.26*	*2,348.94*
2031 No Build	0.43	9.28	16.04	0.04	0.19	0.18	3,283.9	2,979.1
Increase from Existing	*-1.70*	*-1.03*	*-30.07*	*0.00*	*-1.01*	*-0.98*	*-821.0*	*-744.8*
2031 Build	1.02	22.13	38.27	0.09	0.45	0.44	7,739.1	7,020.8
Increase from Existing	*-1.10*	*11.82*	*-7.84*	*0.05*	*-0.75*	*-0.73*	*3,634.2*	*3,296.9*
Increase from No Build	*0.59*	*12.86*	*22.23*	*0.05*	*0.26*	*0.26*	*4,455.2*	*4,041.7*
2040 No Build	0.20	9.28	8.02	0.04	0.08	0.08	3,283.9	2,979.1
Increase from Existing	*-1.93*	*-1.03*	*-38.09*	*0.00*	*-1.12*	*-1.09*	*-821.0*	*-744.8*
2040 Build	0.52	24.64	21.31	0.10	0.22	0.21	8,634.1	7,832.7
Increase from Existing	*-1.61*	*14.33*	*-24.81*	*0.06*	*-0.99*	*-0.96*	*4,529.2*	*4,108.8*
Increase from No Build	*0.32*	*15.36*	*13.28*	*0.06*	*0.13*	*0.13*	*5,350.2*	*4,853.6*

Train VMT - Mitigated, including renewable diesel, Tier 4, and 30% reduction in 2026, 50% reduction in 2031 and in 2040 for build scenarios

0.7 0.63

Existing Conditions	Trips	Avg Length	VMT	VOC	CO	NOx	SOx	PM10	PM2.5	CO2
	233	1.7	403.1	8.5	41.1	184.0	0.1	4.79	4.6	15,798.0
2026 No Build Conditions	**Trips**	**Avg Length**	**VMT**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**
	233	1.7	403.1	2.8	37.0	89.1	0.1	1.30	1.3	12,638.4
2026 Mit Build Conditions	**Trips**	**Avg Length**	**VMT**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**
	478	1.5	736.1	0.5	47.4	46.3	0.2	0.58	0.6	16,156.1
2031 No Build Conditions	**Trips**	**Avg Length**	**VMT**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**
	233	1.7	403.1	1.7	37.0	64.0	0.1	0.76	0.7	12,638.4
2031 Mit Build Conditions	**Trips**	**Avg Length**	**VMT**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**
	770	1.5	1,185.8	0.2	54.5	45.8	0.2	0.54	0.5	18,589.6
2040 No Build Conditions	**Trips**	**Avg Length**	**VMT**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**
	233	1.7	403.1	0.8	37.0	32.0	0.1	0.32	0.3	12,638.4
2040 Mit Build Conditions	**Trips**	**Avg Length**	**VMT**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**
	830	1.5	1,278.2	0.1	58.7	46.1	0.2	0.53	0.5	20,038.2

Train Idling - Mitigated, including renewable diesel, Tier 4, and 30% reduction in 2026, 50% reduction in 2031 and in 2040 for build scenarios

						pounds per day				
Conditions	**Trips**	**Idle time (hr)**	**Idle Hours**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**
Existing	117	varies	35.3	5.8	27.9	125.0	0.1	3.26	3.2	11710.8
2026 No Build	117	varies	35.3	1.9	25.2	60.5	0.1	0.88	0.9	9,368.7
2026 Mit Build	239	varies	61.3	0.3	30.6	29.9	0.1	0.38	0.4	11,395.2
2031 No Build	117	varies	35.3	1.2	25.2	43.5	0.1	0.51	0.5	9,368.7
2031 Mit Build	385	varies	55.3	0.1	19.7	16.6	0.1	0.19	0.2	7,342.1
2040 No Build	117	varies	35.3	0.5	25.2	21.7	0.1	0.22	0.2	9,368.7
2040 Mit Build	415	varies	66.9	0.1	23.9	18.7	0.1	0.22	0.2	8,892.5

Summary (lb/day) - Mitigated

	VOC	CO	NOx	SOx	PM10	PM2.5	CO2
Existing	14.2	69.1	309.0	0.2	8.1	7.8	27,508.8
2026 No Build	4.7	62.2	149.6	0.2	2.2	2.1	22,007.1
Increase from Existing	*-9.5*	*-6.9*	*-159.5*	*0.0*	*-5.9*	*-5.7*	*-5,501.8*
2026 Build	0.8	78.0	76.2	0.3	1.0	0.9	27,551.3
Increase from Existing	*-13.4*	*8.9*	*-232.8*	*0.1*	*-7.1*	*-6.9*	*42.5*
Increase from No Build	*-3.9*	*15.8*	*-73.4*	*0.1*	*-1.2*	*-1.2*	*5,544.3*
2031 No Build	2.9	62.2	107.5	0.2	1.3	1.2	22,007.1
Increase from Existing	*-11.4*	*-6.9*	*-201.5*	*0.0*	*-6.8*	*-6.6*	*-5,501.8*
2031 Build	0.3	74.2	62.4	0.3	0.7	0.7	25,931.8
Increase from Existing	*-13.9*	*5.1*	*-246.7*	*0.0*	*-7.3*	*-7.1*	*-1,577.1*
Increase from No Build	*-2.5*	*12.1*	*-45.1*	*0.0*	*-0.5*	*-0.5*	*3,924.7*
2040 No Build	1.3	62.2	53.8	0.2	0.5	0.5	22,007.1
Increase from Existing	*-12.9*	*-6.9*	*-255.3*	*0.0*	*-7.5*	*-7.3*	*-5,501.8*
2040 Build	0.2	82.6	64.8	0.3	0.8	0.7	28,930.7
Increase from Existing	*-14.0*	*13.6*	*-244.2*	*0.1*	*-7.3*	*-7.1*	*1,421.8*
Increase from No Build	*-1.1*	*20.5*	*11.0*	*0.1*	*0.2*	*0.2*	*6,923.6*

Summary (tons/year) - Mitigated

Metric Tons

	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CO2
Existing	2.12	10.31	46.11	0.04	1.20	1.17	4,104.87	3,723.88
2026 No Build	0.70	9.28	22.32	0.04	0.33	0.32	3,283.9	2,979.1
Increase from Existing	*-1.42*	*-1.03*	*-23.79*	*0.00*	*-0.88*	*-0.85*	*-820.97*	*-744.78*
2026 Build	0.12	11.64	11.37	0.05	0.14	0.14	4,111.2	3,729.6
Increase from Existing	*-2.00*	*1.33*	*-34.74*	*0.01*	*-1.06*	*-1.03*	*6.34*	*5.75*
Increase from No Build	*-0.58*	*2.36*	*-10.95*	*0.01*	*-0.18*	*-0.18*	*827.31*	*750.53*
2031 No Build	0.43	9.28	16.04	0.04	0.19	0.18	3,283.9	2,979.1
Increase from Existing	*-1.70*	*-1.03*	*-30.07*	*0.00*	*-1.01*	*-0.98*	*-821.0*	*-744.8*
2031 Build	0.05	11.08	9.31	0.04	0.11	0.11	3,869.5	3,510.4
Increase from Existing	*-2.07*	*0.77*	*-36.81*	*0.01*	*-1.09*	*-1.06*	*-235.3*	*-213.5*
Increase from No Build	*-0.38*	*1.80*	*-6.74*	*0.01*	*-0.08*	*-0.08*	*585.6*	*531.3*
2040 No Build	0.20	9.28	8.02	0.04	0.08	0.08	3,283.9	2,979.1
Increase from Existing	*-1.93*	*-1.03*	*-38.09*	*0.00*	*-1.12*	*-1.09*	*-821.0*	*-744.8*
2040 Build	0.03	12.33	9.67	0.05	0.11	0.11	4,317.0	3,916.4
Increase from Existing	*-2.09*	*2.02*	*-36.45*	*0.01*	*-1.09*	*-1.06*	*212.2*	*192.5*
Increase from No Build	*-0.17*	*3.05*	*1.65*	*0.01*	*0.03*	*0.03*	*1,033.1*	*937.3*

Rail Emission Rates - 2016

Pollutant	g/gal	g/mile
VOC	5.48	9.5352
CO	26.6	46.284
NOx	119	207.06
SOx	0.094	0.16356
PM10	3.1	5.394
PM2.5	3.007	5.23218
CO2	10217	17777.58

Rail Emission Rates - 2026 Tier 4 EPA Locomotive EF

	blended	blended	88%			
Pollutant	**g/gal**	**g/mile**	**g/gal**	**g/mile**	**g/gal**	**g/mile**
VOC	0.266776	0.46419	0.04212	0.073289	1.9	3.306
CO	26.6211	46.32071	26.624	46.32576	26.6	46.284
NOx	26.02377	45.28135	20.8	36.192	64	111.36
SOx	0.094	0.16356	0.094	0.16356	0.094	0.16356
PM10	0.419377	0.729717	0.312	0.54288	1.2	2.088
PM2.5	0.406796	0.707825	0.30264	0.526594	1.164	2.02536
CO2	10217	17777.58	10217	17777.58	10217	17777.58

Rail Emission Rates - 2031 Tier 4 EPA Locomotive EF

	blended	blended	94%			
Pollutant	**g/gal**	**g/mile**	**g/gal**	**g/mile**	**g/gal**	**g/mile**
VOC	0.111806	0.194542	0.04212	0.073289	1.16	2.0184
CO	26.6225	46.32316	26.624	46.32576	26.6	46.284
NOx	22.37091	38.92538	20.8	36.192	46	80.04
SOx	0.094	0.16356	0.094	0.16356	0.094	0.16356
PM10	0.336187	0.584965	0.312	0.54288	0.7	1.218
PM2.5	0.326101	0.567416	0.30264	0.526594	0.679	1.18146
CO2	10217	17777.58	10217	17777.58	10217	17777.58

Rail Emission Rates - 2040 Tier 4 EPA Locomotive EF

	blended	blended	97%			
Pollutant	**g/gal**	**g/mile**	**g/gal**	**g/mile**	**g/gal**	**g/mile**
VOC	0.058579	0.101927	0.04212	0.073289	0.53	0.9222
CO	26.62319	46.32435	26.624	46.32576	26.6	46.284
NOx	20.87422	36.32114	20.8	36.192	23	40.02
SOx	0.094	0.16356	0.094	0.16356	0.094	0.16356
PM10	0.311595	0.542176	0.312	0.54288	0.3	0.522
PM2.5	0.302247	0.52591	0.30264	0.526594	0.291	0.50634
CO2	10217	17777.58	10217	17777.58	10217	17777.58

2016 Locomotive Idling Emissions - Per Train Per Hour

Description	CO (lb/day)	VOC (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	CO2 (lb/day)
Locomotive (idling)[a]	0.793	0.163	3.547	0.003	0.092	332.223

Locomotive Emission Factors[b]

Description	CO (g/hp-hr)	VOC (g/hp-hr)	NOx (g/hp-hr)	SOx (g/hp-hr)	PM10 (g/hp-hr)
2016 Fleet Average	1.28	0.2634615	5.7	0.00	0.1490385

Notes/Assumptions
g/hp-hr means grams per horsepower-hour

[a]Idling Emissions [lb/day] = (Emission Factor [g/hp-hr]) x (1/BSFC [hp-hr/lb]) x (Fuel Density [lb/gal]) x (Fuel Use [gal/hr]) x (Idling Time [hr/day]) x (1/453.6 [lb/g])

Locomotive rating:	3200	horsepower (hp)
Idling time:	1	hr/day
Fuel:	Diesel	
Fuel usage while idling:	15	gal/hr

[b] CO, VOC (HC), NOx, and PM10 (PM) emission factors from EPA's *Exhaust Emission Standards - 40CFR1033.101*

SOx emission factor calculated based on sulfur content of diesel fuel:
SCAQMD Rule 431.2 (Sulfur Content of Liquid Fuels) limits the sulfur content of liquid fuels sold in the District to 500 ppmw. Effective 1 Jan 2005, a refiner or importer shall not produce or supply any diesel fuel for any stationary or mobile source application in the District, unless the diesel fuel is low sulfur diesel for which the sulfur content shall not exceed 15 ppm by weight.

Diesel fuel sulfur content:	15	ppmw (as S)
Diesel fuel fuel density:	6.943	lb/gal
Higher Heating Value (HHV) of diesel fuel:	138000	Btu/gal
Brake Specific Fuel Consumption (BSFC):	0.37	lb/hp-hr
	7354	Btu/hp-hr

SOx as SO2 (lb/hp-hr) = (ppmw as S/1000000) x (Fuel Density [lb/gal]) x (1 gal/138000 Btu) x (1 lb-mol S/32 lb S) x (1 lb-mole SO2/1 lb-mole S) x (64 lb SO2/1 lb-mole SO2) x (BSFC [Btu/hp-hr])

SOx EF:	1.11E-05	lb/hp-hr
	0.01	g/hp-hr

CO2 emission factor calculated based on carbon content of fuel

CO2 = (fuel desity [g/gal]) x (44 g of CO2/12 g C) x (carbon content of diesel fuel)

CO2 EF:	10046	g/gal
@ 15 gal/hr:	332	lb/hr

2026 Locomotive Idling Emissions - Per Train Per Hour

Description	CO (lb/day)	VOC (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	CO2 (lb/day)
Locomotive (idling)[a]	0.793	0.057	1.908	0.003	0.036	332.223

Locomotive Emission Factors[b]

Description	CO (g/hp-hr)	VOC (g/hp-hr)	NOx (g/hp-hr)	SOx (g/hp-hr)	PM10 (g/hp-hr)
2026 Fleet Average	1.28	0.0913462	3.1	0.00	0.0576923

Notes/Assumptions
g/hp-hr means grams per horsepower-hour

[a]Idling Emissions [lb/day] = (Emission Factor [g/hp-hr]) x (1/BSFC [hp-hr/lb]) x (Fuel Density [lb/gal]) x (Fuel Use [gal/hr]) x (Idling Time [hr/day]) x (1/453.6 [lb/g])

Locomotive rating:	3200	horsepower (hp)
Idling time:	1	hr/day
Fuel:	Diesel	
Fuel usage while idling:	15	gal/hr

[b] CO, VOC (HC), NOx, and PM10 (PM) emission factors from EPA's
Exhaust Emission Standards - 40CFR1033.101

SOx emission factor calculated based on sulfur content of diesel fuel:
SCAQMD Rule 431.2 (Sulfur Content of Liquid Fuels) limits the sulfur content of liquid fuels sold in the District to 500 ppmw.
Effective 1 Jan 2005, a refiner or importer shall not produce or supply any diesel fuel for any stationary or mobile source application in the District, unless the diesel fuel is low sulfur diesel for which the sulfur content shall not exceed 15 ppm by weight.

Diesel fuel sulfur content:	15	ppmw (as S)
Diesel fuel fuel density:	6.943	lb/gal
Higher Heating Value (HHV) of diesel fuel:	138000	Btu/gal
Brake Specific Fuel Consumption (BSFC):	0.37	lb/hp-hr
	7354	Btu/hp-hr

SOx as SO2 (lb/hp-hr) = (ppmw as S/1000000) x (Fuel Density [lb/gal]) x (1 gal/138000 Btu) x
(1 lb-mol S/32 lb S) x (1 lb-mole SO2/1 lb-mole S) x (64 lb SO2/1 lb-mole SO2) x (BSFC [Btu/hp-hr])

SOx EF:	1.11E-05	lb/hp-hr
	0.01	g/hp-hr

CO2 emission factor calculated based on carbon content of fuel

CO2 = (fuel desity [g/gal]) x (44 g of CO2/12 g C) x (carbon content of diesel fuel)

CO2 EF:	10046	g/gal
@ 15 gal/hr:	332	lb/hr

2026 Mitigated Locomotive Idling Emissions - Per Train Per Hour

Description	CO (lb/day)	VOC (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	CO2 (lb/day)
Locomotive (idling)[a]	0.793	0.008	0.776	0.003	0.013	332.223

Locomotive Emission Factors[b]

Description	CO (g/hp-hr)	VOC (g/hp-hr)	NOx (g/hp-hr)	SOx (g/hp-hr)	PM10 (g/hp-hr)
2026 Fleet Average	1.28	0.0128258	1.3	0.00	0.0201624

Notes/Assumptions

g/hp-hr means grams per horsepower-hour

[a]Idling Emissions [lb/day] = (Emission Factor [g/hp-hr]) x (1/BSFC [hp-hr/lb]) x (Fuel Density [lb/gal]) x (Fuel Use [gal/hr]) x (Idling Time [hr/day]) x (1/453.6 [lb/g])

Locomotive rating:	3200	horsepower (hp)
Idling time:	1	hr/day
Fuel:	Diesel	
Fuel usage while idling:	15	gal/hr

[b] CO, VOC (HC), NOx, and PM10 (PM) emission factors from EPA's *Exhaust Emission Standards - 40CFR1033.101*

SOx emission factor calculated based on sulfur content of diesel fuel:
SCAQMD Rule 431.2 (Sulfur Content of Liquid Fuels) limits the sulfur content of liquid fuels sold in the District to 500 ppmw. Effective 1 Jan 2005, a refiner or importer shall not produce or supply any diesel fuel for any stationary or mobile source application in the District, unless the diesel fuel is low sulfur diesel for which the sulfur content shall not exceed 15 ppm by weight.

Diesel fuel sulfur content:	15	ppmw (as S)
Diesel fuel fuel density:	6.943	lb/gal
Higher Heating Value (HHV) of diesel fuel:	138000	Btu/gal
Brake Specific Fuel Consumption (BSFC):	0.37	lb/hp-hr
	7354	Btu/hp-hr

SOx as SO2 (lb/hp-hr) = (ppmw as S/1000000) x (Fuel Density [lb/gal]) x (1 gal/138000 Btu) x (1 lb-mol S/32 lb S) x (1 lb-mole SO2/1 lb-mole S) x (64 lb SO2/1 lb-mole SO2) x (BSFC [Btu/hp-hr])

SOx EF:	1.11E-05	lb/hp-hr
	0.01	g/hp-hr

CO2 emission factor calculated based on carbon content of fuel

CO2 = (fuel desity [g/gal]) x (44 g of CO2/12 g C) x (carbon content of diesel fuel)

CO2 EF:	10046	g/gal
@ 15 gal/hr:	332	lb/hr

2031 Locomotive Idling Emissions - Per Train Per Hour

Description	CO (lb/day)	VOC (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	CO2 (lb/day)
Locomotive (idling)[a]	0.793	0.035	1.371	0.003	0.021	332.223

Locomotive Emission Factors[b]

Description	CO (g/hp-hr)	VOC (g/hp-hr)	NOx (g/hp-hr)	SOx (g/hp-hr)	PM10 (g/hp-hr)
2031 Fleet Average	1.28	0.0557692	2.2	0.00	0.0336538

Notes/Assumptions
g/hp-hr means grams per horsepower-hour

[a]Idling Emissions [lb/day] = (Emission Factor [g/hp-hr]) x (1/BSFC [hp-hr/lb]) x (Fuel Density [lb/gal]) x (Fuel Use [gal/hr]) x (Idling Time [hr/day]) x (1/453.6 [lb/g])

Locomotive rating:	3200	horsepower (hp)
Idling time:	1	hr/day
Fuel:	Diesel	
Fuel usage while idling:	15	gal/hr

[b] CO, VOC (HC), NOx, and PM10 (PM) emission factors from EPA's
Exhaust Emission Standards - 40CFR1033.101

SOx emission factor calculated based on sulfur content of diesel fuel:
SCAQMD Rule 431.2 (Sulfur Content of Liquid Fuels) limits the sulfur content of liquid fuels sold in the District to 500 ppmw.
Effective 1 Jan 2005, a refiner or importer shall not produce or supply any diesel fuel for any stationary or mobile source application in the District, unless the diesel fuel is low sulfur diesel for which the sulfur content shall not exceed 15 ppm by weight.

Diesel fuel sulfur content:	15	ppmw (as S)
Diesel fuel fuel density:	6.943	lb/gal
Higher Heating Value (HHV) of diesel fuel:	138000	Btu/gal
Brake Specific Fuel Consumption (BSFC):	0.37	lb/hp-hr
	7354	Btu/hp-hr

SOx as SO2 (lb/hp-hr) = (ppmw as S/1000000) x (Fuel Density [lb/gal]) x (1 gal/138000 Btu) x
(1 lb-mol S/32 lb S) x (1 lb-mole SO2/1 lb-mole S) x (64 lb SO2/1 lb-mole SO2) x (BSFC [Btu/hp-hr])

SOx EF:	1.11E-05	lb/hp-hr
	0.01	g/hp-hr

CO2 emission factor calculated based on carbon content of fuel

CO2 = (fuel desity [g/gal]) x (44 g of CO2/12 g C) x (carbon content of diesel fuel)

CO2 EF:	10046	g/gal
@ 15 gal/hr:	332	lb/hr

2031 Mitigated Locomotive Idling Emissions - Per Train Per Hour

Description	CO (lb/day)	VOC (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	CO2 (lb/day)
Locomotive (idling)[a]	0.794	0.003	0.667	0.003	0.010	332.223

Locomotive Emission Factors[b]

Description	CO (g/hp-hr)	VOC (g/hp-hr)	NOx (g/hp-hr)	SOx (g/hp-hr)	PM10 (g/hp-hr)
2031 Fleet Average	1.28	0.0053753	1.1	0.00	0.0161628

Notes/Assumptions

g/hp-hr means grams per horsepower-hour

[a]Idling Emissions [lb/day] = (Emission Factor [g/hp-hr]) x (1/BSFC [hp-hr/lb]) x (Fuel Density [lb/gal]) x (Fuel Use [gal/hr]) x (Idling Time [hr/day]) x (1/453.6 [lb/g])

Locomotive rating:	3200	horsepower (hp)
Idling time:	1	hr/day
Fuel:	Diesel	
Fuel usage while idling:	15	gal/hr

[b] CO, VOC (HC), NOx, and PM10 (PM) emission factors from EPA's *Exhaust Emission Standards - 40CFR1033.101*

SOx emission factor calculated based on sulfur content of diesel fuel:
SCAQMD Rule 431.2 (Sulfur Content of Liquid Fuels) limits the sulfur content of liquid fuels sold in the District to 500 ppmw. Effective 1 Jan 2005, a refiner or importer shall not produce or supply any diesel fuel for any stationary or mobile source application in the District, unless the diesel fuel is low sulfur diesel for which the sulfur content shall not exceed 15 ppm by weight.

Diesel fuel sulfur content:	15	ppmw (as S)
Diesel fuel fuel density:	6.943	lb/gal
Higher Heating Value (HHV) of diesel fuel:	138000	Btu/gal
Brake Specific Fuel Consumption (BSFC):	0.37	lb/hp-hr
	7354	Btu/hp-hr

SOx as SO2 (lb/hp-hr) = (ppmw as S/1000000) x (Fuel Density [lb/gal]) x (1 gal/138000 Btu) x (1 lb-mol S/32 lb S) x (1 lb-mole SO2/1 lb-mole S) x (64 lb SO2/1 lb-mole SO2) x (BSFC [Btu/hp-hr])

SOx EF:	1.11E-05	lb/hp-hr
	0.01	g/hp-hr

CO2 emission factor calculated based on carbon content of fuel

CO2 = (fuel desity [g/gal]) x (44 g of CO2/12 g C) x (carbon content of diesel fuel)

CO2 EF:	10046	g/gal
@ 15 gal/hr:	332	lb/hr

2040 Locomotive Idling Emissions - Per Train Per Hour

Description	CO (lb/day)	VOC (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	CO2 (lb/day)
Locomotive (idling)[a]	0.793	0.016	0.686	0.003	0.009	332.223

Locomotive Emission Factors[b]

Description	CO (g/hp-hr)	VOC (g/hp-hr)	NOx (g/hp-hr)	SOx (g/hp-hr)	PM10 (g/hp-hr)
2040 Fleet Average	1.28	0.0254808	1.1	0.00	0.0144231

Notes/Assumptions

g/hp-hr means grams per horsepower-hour

[a]Idling Emissions [lb/day] = (Emission Factor [g/hp-hr]) x (1/BSFC [hp-hr/lb]) x (Fuel Density [lb/gal]) x (Fuel Use [gal/hr]) x (Idling Time [hr/day]) x (1/453.6 [lb/g])

Locomotive rating:	3200	horsepower (hp)
Idling time:	1	hr/day
Fuel:	Diesel	
Fuel usage while idling:	15	gal/hr

[b] CO, VOC (HC), NOx, and PM10 (PM) emission factors from EPA's *Exhaust Emission Standards - 40CFR1033.101*

SOx emission factor calculated based on sulfur content of diesel fuel:
SCAQMD Rule 431.2 (Sulfur Content of Liquid Fuels) limits the sulfur content of liquid fuels sold in the District to 500 ppmw. Effective 1 Jan 2005, a refiner or importer shall not produce or supply any diesel fuel for any stationary or mobile source application in the District, unless the diesel fuel is low sulfur diesel for which the sulfur content shall not exceed 15 ppm by weight.

Diesel fuel sulfur content:	15	ppmw (as S)
Diesel fuel fuel density:	6.943	lb/gal
Higher Heating Value (HHV) of diesel fuel:	138000	Btu/gal
Brake Specific Fuel Consumption (BSFC):	0.37	lb/hp-hr
	7354	Btu/hp-hr

SOx as SO2 (lb/hp-hr) = (ppmw as S/1000000) x (Fuel Density [lb/gal]) x (1 gal/138000 Btu) x (1 lb-mol S/32 lb S) x (1 lb-mole SO2/1 lb-mole S) x (64 lb SO2/1 lb-mole SO2) x (BSFC [Btu/hp-hr])

SOx EF:	1.11E-05	lb/hp-hr
	0.01	g/hp-hr

CO2 emission factor calculated based on carbon content of fuel

CO2 = (fuel desity [g/gal]) x (44 g of CO2/12 g C) x (carbon content of diesel fuel)

CO2 EF:	10046	g/gal
@ 15 gal/hr:	332	lb/hr

2040 Mitigated Locomotive Idling Emissions - Per Train Per Hour

Description	CO (lb/day)	VOC (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)
Locomotive (idling)[a]	0.794	0.002	0.622	0.003	0.009

Locomotive Emission Factors[b]

Description	CO (g/hp-hr)	VOC (g/hp-hr)	NOx (g/hp-hr)	SOx (g/hp-hr)	PM10 (g/hp-hr)
2040 Fleet Average	1.28	0.0028163	1.0	0.00	0.0149805

Notes/Assumptions
g/hp-hr means grams per horsepower-hour

[a]Idling Emissions [lb/day] = (Emission Factor [g/hp-hr]) x (1/BSFC [hp-hr/lb]) x (Fuel Density [lb/gal]) x (Fuel Use [gal/hr]) x (Idling Time [hr/day]) x (1/453.6 [lb/g])

Locomotive rating:	3200	horsepower (hp)
Idling time:	1	hr/day
Fuel:	Diesel	
Fuel usage while idling:	15	gal/hr

[b] CO, VOC (HC), NOx, and PM10 (PM) emission factors from EPA's
Exhaust Emission Standards - 40CFR1033.101

SOx emission factor calculated based on sulfur content of diesel fuel:
SCAQMD Rule 431.2 (Sulfur Content of Liquid Fuels) limits the sulfur content of liquid fuels sold in the District to 500 ppmw. Effective 1 Jan 2005, a refiner or importer shall not produce or supply any diesel fuel for any stationary or mobile source applica in the District, unless the diesel fuel is low sulfur diesel for which the sulfur content shall not exceed 15 ppm by weight.

Diesel fuel sulfur content:	15	ppmw (as S)
Diesel fuel fuel density:	6.943	lb/gal
Higher Heating Value (HHV) of diesel fuel:	138000	Btu/gal
Brake Specific Fuel Consumption (BSFC):	0.37	lb/hp-hr
	7354	Btu/hp-hr

SOx as SO2 (lb/hp-hr) = (ppmw as S/1000000) x (Fuel Density [lb/gal]) x (1 gal/138000 Btu) x
(1 lb-mol S/32 lb S) x (1 lb-mole SO2/1 lb-mole S) x (64 lb SO2/1 lb-mole SO2) x (BSFC [Btu/hp-l

SOx EF:	1.11E-05	lb/hp-hr
	0.01	g/hp-hr

CO2 emission factor calculated based on carbon content of fuel

CO2 = (fuel desity [g/gal]) x (44 g of CO2/12 g C) x (carbon content of diesel fuel)

CO2 EF:	10046	g/gal
@ 15 gal/hr:	332	lb/hr

Link US - 2031 Operational Emissions

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	30.00	1000sqft	0.69	30,000.00	0
Regional Shopping Center	410.60	1000sqft	9.43	410,600.00	0
Strip Mall	159.40	1000sqft	3.66	159,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2031
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	834	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Intensity factor from LADWP 2017 Power Strategic Long-Term Resource Plan

Land Use - Regional Shopping Center represents the new passenger concourse space not included in the retail or office uses

Construction Phase - Construction is calculated separately

Off-road Equipment - Construction is calculated separately

Trips and VMT - Construction is calculated separately

Architectural Coating - Construction is calculated separately

Vehicle Trips - Trip rates from traffic analysis

Energy Use - .

Energy Mitigation - CalEEMod includes 2013 Title 24. 2016 Title 24 is 5% more energy efficient for non-residential uses

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	300,000.00	0.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	900,000.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	1227.89	834
tblTripsAndVMT	WorkerTripNumber	38.00	0.00
tblVehicleTrips	ST_TR	2.46	0.49
tblVehicleTrips	ST_TR	49.97	0.00
tblVehicleTrips	ST_TR	42.04	8.10
tblVehicleTrips	SU_TR	1.05	0.21
tblVehicleTrips	SU_TR	25.24	0.00
tblVehicleTrips	SU_TR	20.43	3.94
tblVehicleTrips	WD_TR	11.03	2.21
tblVehicleTrips	WD_TR	42.70	0.00
tblVehicleTrips	WD_TR	44.32	8.54

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**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**

Link US - 2031 Operational Emissions - South Coast Air Basin, Annual

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.4469	7.0000e-005	7.6200e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159
Energy	6.7200e-003	0.0611	0.0514	3.7000e-004		4.6500e-003	4.6500e-003		4.6500e-003	4.6500e-003	0.0000	3,124.9600	3,124.9600	0.1076	0.0232	3,134.5710
Mobile	0.1920	1.0994	2.0832	9.5400e-003	0.9621	5.7800e-003	0.9678	0.2577	5.3700e-003	0.2630	0.0000	889.0200	889.0200	0.0377	0.0000	889.9630
Waste						0.0000	0.0000		0.0000	0.0000	127.1535	0.0000	127.1535	7.5146	0.0000	315.0175
Water						0.0000	0.0000		0.0000	0.0000	15.0865	356.7331	371.8196	1.5619	0.0392	422.5358
Total	**2.6456**	**1.1606**	**2.1422**	**9.9100e-003**	**0.9621**	**0.0105**	**0.9725**	**0.2577**	**0.0101**	**0.2677**	**142.2400**	**4,370.7279**	**4,512.9679**	**9.2219**	**0.0624**	**4,762.1031**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.4469	7.0000e-005	7.6200e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159
Energy	6.4700e-003	0.0588	0.0494	3.5000e-004		4.4700e-003	4.4700e-003		4.4700e-003	4.4700e-003	0.0000	3,076.5651	3,076.5651	0.1060	0.0229	3,086.0229
Mobile	0.1920	1.0994	2.0832	9.5400e-003	0.9621	5.7800e-003	0.9678	0.2577	5.3700e-003	0.2630	0.0000	889.0200	889.0200	0.0377	0.0000	889.9630
Waste						0.0000	0.0000		0.0000	0.0000	127.1535	0.0000	127.1535	7.5146	0.0000	315.0175
Water						0.0000	0.0000		0.0000	0.0000	15.0865	356.7331	371.8196	1.5619	0.0392	422.5358
Total	**2.6454**	**1.1583**	**2.1402**	**9.8900e-003**	**0.9621**	**0.0103**	**0.9723**	**0.2577**	**9.8700e-003**	**0.2675**	**142.2400**	**4,322.3331**	**4,464.5731**	**9.2202**	**0.0620**	**4,713.5550**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.01**	**0.20**	**0.09**	**0.20**	**0.00**	**1.72**	**0.02**	**0.00**	**1.79**	**0.07**	**0.00**	**1.11**	**1.07**	**0.02**	**0.59**	**1.02**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	1/4/2021	1/3/2021	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	0	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Architectural Coating - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1920	1.0994	2.0832	9.5400e-003	0.9621	5.7800e-003	0.9678	0.2577	5.3700e-003	0.2630	0.0000	889.0200	889.0200	0.0377	0.0000	889.9630
Unmitigated	0.1920	1.0994	2.0832	9.5400e-003	0.9621	5.7800e-003	0.9678	0.2577	5.3700e-003	0.2630	0.0000	889.0200	889.0200	0.0377	0.0000	889.9630

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	66.30	14.70	6.30	162,224	162,224
Regional Shopping Center	0.00	0.00	0.00		
Strip Mall	1,361.28	1,291.14	628.04	2,371,600	2,371,600
Total	1,427.58	1,305.84	634.34	2,533,824	2,533,824

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.554622	0.041562	0.206751	0.111062	0.012660	0.005774	0.022378	0.035217	0.002175	0.001476	0.004853	0.000718	0.000752
Regional Shopping Center	0.554622	0.041562	0.206751	0.111062	0.012660	0.005774	0.022378	0.035217	0.002175	0.001476	0.004853	0.000718	0.000752
Strip Mall	0.554622	0.041562	0.206751	0.111062	0.012660	0.005774	0.022378	0.035217	0.002175	0.001476	0.004853	0.000718	0.000752

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	3,012.5662	3,012.5662	0.1048	0.0217	3,021.6436
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	3,058.4100	3,058.4100	0.1064	0.0220	3,067.6255
NaturalGas Mitigated	6.4700e-003	0.0588	0.0494	3.5000e-004		4.4700e-003	4.4700e-003		4.4700e-003	4.4700e-003	0.0000	63.9990	63.9990	1.2300e-003	1.1700e-003	64.3793
NaturalGas Unmitigated	6.7200e-003	0.0611	0.0514	3.7000e-004		4.6500e-003	4.6500e-003		4.6500e-003	4.6500e-003	0.0000	66.5500	66.5500	1.2800e-003	1.2200e-003	66.9455

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	312300	1.6800e-003	0.0153	0.0129	9.0000e-005		1.1600e-003	1.1600e-003		1.1600e-003	1.1600e-003	0.0000	16.6655	16.6655	3.2000e-004	3.1000e-004	16.7646
Regional Shopping Center	673384	3.6300e-003	0.0330	0.0277	2.0000e-004		2.5100e-003	2.5100e-003		2.5100e-003	2.5100e-003	0.0000	35.9343	35.9343	6.9000e-004	6.6000e-004	36.1479
Strip Mall	261416	1.4100e-003	0.0128	0.0108	8.0000e-005		9.7000e-004	9.7000e-004		9.7000e-004	9.7000e-004	0.0000	13.9502	13.9502	2.7000e-004	2.6000e-004	14.0331
Total		**6.7200e-003**	**0.0611**	**0.0514**	**3.7000e-004**		**4.6400e-003**	**4.6400e-003**		**4.6400e-003**	**4.6400e-003**	**0.0000**	**66.5500**	**66.5500**	**1.2800e-003**	**1.2300e-003**	**66.9455**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	297270	1.6000e-003	0.0146	0.0122	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	15.8635	15.8635	3.0000e-004	2.9000e-004	15.9577
Regional Shopping Center	649774	3.5000e-003	0.0319	0.0268	1.9000e-004		2.4200e-003	2.4200e-003		2.4200e-003	2.4200e-003	0.0000	34.6744	34.6744	6.6000e-004	6.4000e-004	34.8805
Strip Mall	252250	1.3600e-003	0.0124	0.0104	7.0000e-005		9.4000e-004	9.4000e-004		9.4000e-004	9.4000e-004	0.0000	13.4611	13.4611	2.6000e-004	2.5000e-004	13.5410
Total		**6.4600e-003**	**0.0588**	**0.0494**	**3.5000e-004**		**4.4700e-003**	**4.4700e-003**		**4.4700e-003**	**4.4700e-003**	**0.0000**	**63.9990**	**63.9990**	**1.2200e-003**	**1.1800e-003**	**64.3793**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	389700	147.4220	5.1300e-003	1.0600e-003	147.8662
Regional Shopping Center	5.5431e+006	2,096.9328	0.0729	0.0151	2,103.2512
Strip Mall	2.1519e+006	814.0552	0.0283	5.8600e-003	816.5081
Total		**3,058.4100**	**0.1064**	**0.0220**	**3,067.6255**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	382800	144.8117	5.0400e-003	1.0400e-003	145.2481
Regional Shopping Center	5.46077e+006	2,065.7894	0.0718	0.0149	2,072.0140
Strip Mall	2.11994e+006	801.9650	0.0279	5.7700e-003	804.3815
Total		**3,012.5662**	**0.1048**	**0.0217**	**3,021.6436**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.4469	7.0000e-005	7.6200e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159
Unmitigated	2.4469	7.0000e-005	7.6200e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2781					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.1681					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	7.0000e-004	7.0000e-005	7.6200e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159
Total	**2.4469**	**7.0000e-005**	**7.6200e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.0149**	**0.0149**	**4.0000e-005**	**0.0000**	**0.0159**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2781					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.1681					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	7.0000e-004	7.0000e-005	7.6200e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159
Total	**2.4469**	**7.0000e-005**	**7.6200e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.0149**	**0.0149**	**4.0000e-005**	**0.0000**	**0.0159**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	371.8196	1.5619	0.0392	422.5358
Unmitigated	371.8196	1.5619	0.0392	422.5358

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	5.33201 / 3.26801	41.6910	0.1751	4.3900e-003	47.3777
Regional Shopping Center	30.4142 / 18.6409	237.8084	0.9990	0.0250	270.2455
Strip Mall	11.8072 / 7.23665	92.3202	0.3878	9.7200e-003	104.9126
Total		**371.8196**	**1.5619**	**0.0392**	**422.5358**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	5.33201 / 3.26801	41.6910	0.1751	4.3900e-003	47.3777
Regional Shopping Center	30.4142 / 18.6409	237.8084	0.9990	0.0250	270.2455
Strip Mall	11.8072 / 7.23665	92.3202	0.3878	9.7200e-003	104.9126
Total		**371.8196**	**1.5619**	**0.0392**	**422.5358**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	127.1535	7.5146	0.0000	315.0175
Unmitigated	127.1535	7.5146	0.0000	315.0175

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	27.9	5.6635	0.3347	0.0000	14.0310
Regional Shopping Center	431.13	87.5155	5.1720	0.0000	216.8159
Strip Mall	167.37	33.9746	2.0078	0.0000	84.1706
Total		**127.1535**	**7.5146**	**0.0000**	**315.0175**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	27.9	5.6635	0.3347	0.0000	14.0310
Regional Shopping Center	431.13	87.5155	5.1720	0.0000	216.8159
Strip Mall	167.37	33.9746	2.0078	0.0000	84.1706
Total		**127.1535**	**7.5146**	**0.0000**	**315.0175**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Link US - 2031 Operational Emissions

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	30.00	1000sqft	0.69	30,000.00	0
Regional Shopping Center	410.60	1000sqft	9.43	410,600.00	0
Strip Mall	159.40	1000sqft	3.66	159,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2031
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	834	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Intensity factor from LADWP 2017 Power Strategic Long-Term Resource Plan

Land Use - Regional Shopping Center represents the new passenger concourse space not included in the retail or office uses

Construction Phase - Construction is calculated separately

Off-road Equipment - Construction is calculated separately

Trips and VMT - Construction is calculated separately

Architectural Coating - Construction is calculated separately

Vehicle Trips - Trip rates from traffic analysis

Energy Use - .

Energy Mitigation - CalEEMod includes 2013 Title 24. 2016 Title 24 is 5% more energy efficient for non-residential uses

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	300,000.00	0.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	900,000.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	1227.89	834
tblTripsAndVMT	WorkerTripNumber	38.00	0.00
tblVehicleTrips	ST_TR	2.46	0.49
tblVehicleTrips	ST_TR	49.97	0.00
tblVehicleTrips	ST_TR	42.04	8.10
tblVehicleTrips	SU_TR	1.05	0.21
tblVehicleTrips	SU_TR	25.24	0.00
tblVehicleTrips	SU_TR	20.43	3.94
tblVehicleTrips	WD_TR	11.03	2.21
tblVehicleTrips	WD_TR	42.70	0.00
tblVehicleTrips	WD_TR	44.32	8.54

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**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**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	13.4094	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Energy	0.0369	0.3350	0.2814	2.0100e-003		0.0255	0.0255		0.0255	0.0255		401.9662	401.9662	7.7000e-003	7.3700e-003	404.3548
Mobile	1.2634	6.5449	13.0640	0.0602	5.9568	0.0351	5.9919	1.5930	0.0326	1.6256		6,179.6997	6,179.6997	0.2513		6,185.9832
Total	**14.7096**	**6.8804**	**13.4064**	**0.0622**	**5.9568**	**0.0608**	**6.0176**	**1.5930**	**0.0583**	**1.6513**		**6,581.7971**	**6,581.7971**	**0.2594**	**7.3700e-003**	**6,590.4778**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	13.4094	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Energy	0.0354	0.3221	0.2706	1.9300e-003		0.0245	0.0245		0.0245	0.0245		386.5576	386.5576	7.4100e-003	7.0900e-003	388.8547
Mobile	1.2634	6.5449	13.0640	0.0602	5.9568	0.0351	5.9919	1.5930	0.0326	1.6256		6,179.6997	6,179.6997	0.2513		6,185.9832
Total	**14.7082**	**6.8676**	**13.3956**	**0.0622**	**5.9568**	**0.0598**	**6.0166**	**1.5930**	**0.0573**	**1.6503**		**6,566.3886**	**6,566.3886**	**0.2591**	**7.0900e-003**	**6,574.9777**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.01**	**0.19**	**0.08**	**0.13**	**0.00**	**1.61**	**0.02**	**0.00**	**1.68**	**0.06**	**0.00**	**0.23**	**0.23**	**0.11**	**3.80**	**0.24**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	1/4/2021	1/3/2021	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	0	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Architectural Coating - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2634	6.5449	13.0640	0.0602	5.9568	0.0351	5.9919	1.5930	0.0326	1.6256		6,179.6997	6,179.6997	0.2513		6,185.9832
Unmitigated	1.2634	6.5449	13.0640	0.0602	5.9568	0.0351	5.9919	1.5930	0.0326	1.6256		6,179.6997	6,179.6997	0.2513		6,185.9832

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	66.30	14.70	6.30	162,224	162,224
Regional Shopping Center	0.00	0.00	0.00		
Strip Mall	1,361.28	1,291.14	628.04	2,371,600	2,371,600
Total	1,427.58	1,305.84	634.34	2,533,824	2,533,824

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.554622	0.041562	0.206751	0.111062	0.012660	0.005774	0.022378	0.035217	0.002175	0.001476	0.004853	0.000718	0.000752
Regional Shopping Center	0.554622	0.041562	0.206751	0.111062	0.012660	0.005774	0.022378	0.035217	0.002175	0.001476	0.004853	0.000718	0.000752
Strip Mall	0.554622	0.041562	0.206751	0.111062	0.012660	0.005774	0.022378	0.035217	0.002175	0.001476	0.004853	0.000718	0.000752

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0354	0.3221	0.2706	1.9300e-003		0.0245	0.0245		0.0245	0.0245		386.5576	386.5576	7.4100e-003	7.0900e-003	388.8547
NaturalGas Unmitigated	0.0369	0.3350	0.2814	2.0100e-003		0.0255	0.0255		0.0255	0.0255		401.9662	401.9662	7.7000e-003	7.3700e-003	404.3548

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	855.616	9.2300e-003	0.0839	0.0705	5.0000e-004		6.3800e-003	6.3800e-003		6.3800e-003	6.3800e-003		100.6608	100.6608	1.9300e-003	1.8500e-003	101.2589
Regional Shopping Center	1844.89	0.0199	0.1809	0.1519	1.0900e-003		0.0138	0.0138		0.0138	0.0138		217.0456	217.0456	4.1600e-003	3.9800e-003	218.3354
Strip Mall	716.208	7.7200e-003	0.0702	0.0590	4.2000e-004		5.3400e-003	5.3400e-003		5.3400e-003	5.3400e-003		84.2598	84.2598	1.6100e-003	1.5400e-003	84.7605
Total		**0.0369**	**0.3350**	**0.2814**	**2.0100e-003**		**0.0255**	**0.0255**		**0.0255**	**0.0255**		**401.9662**	**401.9662**	**7.7000e-003**	**7.3700e-003**	**404.3548**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	0.814438	8.7800e-003	0.0799	0.0671	4.8000e-004		6.0700e-003	6.0700e-003		6.0700e-003	6.0700e-003		95.8163	95.8163	1.8400e-003	1.7600e-003	96.3857
Regional Shopping Center	1.7802	0.0192	0.1745	0.1466	1.0500e-003		0.0133	0.0133		0.0133	0.0133		209.4358	209.4358	4.0100e-003	3.8400e-003	210.6804
Strip Mall	0.691097	7.4500e-003	0.0678	0.0569	4.1000e-004		5.1500e-003	5.1500e-003		5.1500e-003	5.1500e-003		81.3056	81.3056	1.5600e-003	1.4900e-003	81.7887
Total		**0.0354**	**0.3221**	**0.2706**	**1.9400e-003**		**0.0245**	**0.0245**		**0.0245**	**0.0245**		**386.5576**	**386.5576**	**7.4100e-003**	**7.0900e-003**	**388.8547**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	13.4094	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Unmitigated	13.4094	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.8800					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.5800e-003	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Total	**13.4094**	**5.5000e-004**	**0.0610**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1313**	**0.1313**	**3.4000e-004**		**0.1398**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.8800					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.5800e-003	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Total	**13.4094**	**5.5000e-004**	**0.0610**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1313**	**0.1313**	**3.4000e-004**		**0.1398**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Link US - 2031 Operational Emissions

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	30.00	1000sqft	0.69	30,000.00	0
Regional Shopping Center	410.60	1000sqft	9.43	410,600.00	0
Strip Mall	159.40	1000sqft	3.66	159,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2031
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	834	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Intensity factor from LADWP 2017 Power Strategic Long-Term Resource Plan

Land Use - Regional Shopping Center represents the new passenger concourse space not included in the retail or office uses

Construction Phase - Construction is calculated separately

Off-road Equipment - Construction is calculated separately

Trips and VMT - Construction is calculated separately

Architectural Coating - Construction is calculated separately

Vehicle Trips - Trip rates from traffic analysis

Energy Use - .

Energy Mitigation - CalEEMod includes 2013 Title 24. 2016 Title 24 is 5% more energy efficient for non-residential uses

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	300,000.00	0.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	900,000.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	1227.89	834
tblTripsAndVMT	WorkerTripNumber	38.00	0.00
tblVehicleTrips	ST_TR	2.46	0.49
tblVehicleTrips	ST_TR	49.97	0.00
tblVehicleTrips	ST_TR	42.04	8.10
tblVehicleTrips	SU_TR	1.05	0.21
tblVehicleTrips	SU_TR	25.24	0.00
tblVehicleTrips	SU_TR	20.43	3.94
tblVehicleTrips	WD_TR	11.03	2.21
tblVehicleTrips	WD_TR	42.70	0.00
tblVehicleTrips	WD_TR	44.32	8.54

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**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**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	13.4094	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Energy	0.0369	0.3350	0.2814	2.0100e-003		0.0255	0.0255		0.0255	0.0255		401.9662	401.9662	7.7000e-003	7.3700e-003	404.3548
Mobile	1.2010	6.5632	12.5385	0.0571	5.9568	0.0353	5.9921	1.5930	0.0328	1.6258		5,865.1054	5,865.1054	0.2558		5,871.5007
Total	**14.6472**	**6.8987**	**12.8809**	**0.0591**	**5.9568**	**0.0610**	**6.0178**	**1.5930**	**0.0584**	**1.6514**		**6,267.2028**	**6,267.2028**	**0.2639**	**7.3700e-003**	**6,275.9953**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	13.4094	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Energy	0.0354	0.3221	0.2706	1.9300e-003		0.0245	0.0245		0.0245	0.0245		386.5576	386.5576	7.4100e-003	7.0900e-003	388.8547
Mobile	1.2010	6.5632	12.5385	0.0571	5.9568	0.0353	5.9921	1.5930	0.0328	1.6258		5,865.1054	5,865.1054	0.2558		5,871.5007
Total	**14.6458**	**6.8859**	**12.8701**	**0.0591**	**5.9568**	**0.0600**	**6.0168**	**1.5930**	**0.0575**	**1.6505**		**6,251.7943**	**6,251.7943**	**0.2636**	**7.0900e-003**	**6,260.4952**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.01**	**0.19**	**0.08**	**0.14**	**0.00**	**1.61**	**0.02**	**0.00**	**1.68**	**0.06**	**0.00**	**0.25**	**0.25**	**0.11**	**3.80**	**0.25**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	1/4/2021	1/3/2021	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	0	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Architectural Coating - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2010	6.5632	12.5385	0.0571	5.9568	0.0353	5.9921	1.5930	0.0328	1.6258		5,865.1054	5,865.1054	0.2558		5,871.5007
Unmitigated	1.2010	6.5632	12.5385	0.0571	5.9568	0.0353	5.9921	1.5930	0.0328	1.6258		5,865.1054	5,865.1054	0.2558		5,871.5007

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	66.30	14.70	6.30	162,224	162,224
Regional Shopping Center	0.00	0.00	0.00		
Strip Mall	1,361.28	1,291.14	628.04	2,371,600	2,371,600
Total	1,427.58	1,305.84	634.34	2,533,824	2,533,824

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.554622	0.041562	0.206751	0.111062	0.012660	0.005774	0.022378	0.035217	0.002175	0.001476	0.004853	0.000718	0.000752
Regional Shopping Center	0.554622	0.041562	0.206751	0.111062	0.012660	0.005774	0.022378	0.035217	0.002175	0.001476	0.004853	0.000718	0.000752
Strip Mall	0.554622	0.041562	0.206751	0.111062	0.012660	0.005774	0.022378	0.035217	0.002175	0.001476	0.004853	0.000718	0.000752

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0354	0.3221	0.2706	1.9300e-003		0.0245	0.0245		0.0245	0.0245		386.5576	386.5576	7.4100e-003	7.0900e-003	388.8547
NaturalGas Unmitigated	0.0369	0.3350	0.2814	2.0100e-003		0.0255	0.0255		0.0255	0.0255		401.9662	401.9662	7.7000e-003	7.3700e-003	404.3548

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	855.616	9.2300e-003	0.0839	0.0705	5.0000e-004		6.3800e-003	6.3800e-003		6.3800e-003	6.3800e-003		100.6608	100.6608	1.9300e-003	1.8500e-003	101.2589
Regional Shopping Center	1844.89	0.0199	0.1809	0.1519	1.0900e-003		0.0138	0.0138		0.0138	0.0138		217.0456	217.0456	4.1600e-003	3.9800e-003	218.3354
Strip Mall	716.208	7.7200e-003	0.0702	0.0590	4.2000e-004		5.3400e-003	5.3400e-003		5.3400e-003	5.3400e-003		84.2598	84.2598	1.6100e-003	1.5400e-003	84.7605
Total		**0.0369**	**0.3350**	**0.2814**	**2.0100e-003**		**0.0255**	**0.0255**		**0.0255**	**0.0255**		**401.9662**	**401.9662**	**7.7000e-003**	**7.3700e-003**	**404.3548**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	0.814438	8.7800e-003	0.0799	0.0671	4.8000e-004		6.0700e-003	6.0700e-003		6.0700e-003	6.0700e-003		95.8163	95.8163	1.8400e-003	1.7600e-003	96.3857
Regional Shopping Center	1.7802	0.0192	0.1745	0.1466	1.0500e-003		0.0133	0.0133		0.0133	0.0133		209.4358	209.4358	4.0100e-003	3.8400e-003	210.6804
Strip Mall	0.691097	7.4500e-003	0.0678	0.0569	4.1000e-004		5.1500e-003	5.1500e-003		5.1500e-003	5.1500e-003		81.3056	81.3056	1.5600e-003	1.4900e-003	81.7887
Total		**0.0354**	**0.3221**	**0.2706**	**1.9400e-003**		**0.0245**	**0.0245**		**0.0245**	**0.0245**		**386.5576**	**386.5576**	**7.4100e-003**	**7.0900e-003**	**388.8547**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	13.4094	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Unmitigated	13.4094	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.8800					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.5800e-003	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Total	**13.4094**	**5.5000e-004**	**0.0610**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1313**	**0.1313**	**3.4000e-004**		**0.1398**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.8800					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.5800e-003	5.5000e-004	0.0610	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Total	**13.4094**	**5.5000e-004**	**0.0610**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1313**	**0.1313**	**3.4000e-004**		**0.1398**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Link US - 2040 Operational Emissions

South Coast, Summary Report

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	30.00	1000sqft	0.69	30,000.00	0
Regional Shopping Center	410.60	1000sqft	9.43	410,600.00	0
Strip Mall	159.40	1000sqft	3.66	159,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2040
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1135	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments

Only CalEEMod defaults were used.

Project Characteristics - Intensity factor from https://data.lacity.org/A-Livable-and-Sustainable-City/LADWP-CO2-Generation/e5ni-eqan/10

Land Use - Regional Shopping Center represents the new passenger concourse space not included in the retail or office uses

Construction Phase - Construction is calculated separately

Off-road Equipment -

Off-road Equipment - Construction is calculated separately

Trips and VMT - Construction is calculated separately

Grading - Construction is calculated separately

Vehicle Trips - Trip rates from traffic analysis

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Energy Use - .

Energy Mitigation - CalEEMod includes 2013 Title 24. 2016 Title 24 is 5% more energy efficient for non-residential uses

2.0 Peak Daily Emissions

Peak Daily Construction Emissions

Peak Daily Construction Emissions

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
Year	Phase	lb/day											
2017	Site Preparation	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S
	Peak Daily Total	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S
	Air District Threshold												
	Exceed Significance?												

Peak Daily Operational Emissions

Peak Daily Operational Emissions

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
	Operational Activity	lb/day											
On-Site	Area	13.4094 S	5.5000e-004 S	0.0609 S	0.0000 S	2.2000e-004 S	2.2000e-004 S	13.4094 S	5.5000e-004 S	0.0609 S	0.0000 S	2.2000e-004 S	2.2000e-004 S
On-Site	Energy	0.0371 S	0.3369 S	0.2830 S	2.0200e-003 S	0.0256 S	0.0256 S	0.0356 S	0.3240 S	0.2721 S	1.9400e-003 S	0.0246 S	0.0246 S
Off-Site	Mobile	0.9412 S	6.4764 S	10.2667 S	0.0568 S	5.9825 W	1.6153 W	0.9412 S	6.4764 S	10.2667 S	0.0568 S	5.9825 W	1.6153 W
	Peak Daily Total	14.3877 S	6.8138 S	10.6106 S	0.0589 S	6.0084 W	1.6412 W	14.3862 S	6.8009 S	10.5997 S	0.0588 S	6.0074 W	1.6402 W
	Air District Threshold												

	Exceed Significance?												

3.0 Annual GHG Emissions

Annual GHG

Annual GHG

		Unmitigated				Mitigated			
		CO2	CH4	N2O	CO2e	CO2	CH4	N2O	CO2e
GHG Activity	Year	MT/yr							
Construction	2017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Operational	2040	5,810.7892	9.2203	0.0630	6,060.0606	5,742.8719	9.2186	0.0626	5,991.9841
	Total								
	Significance Threshold								
	Exceed Significance?								

Link US - 2040 Operational Emissions

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	30.00	1000sqft	0.69	30,000.00	0
Regional Shopping Center	410.60	1000sqft	9.43	410,600.00	0
Strip Mall	159.40	1000sqft	3.66	159,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2040
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1135	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Intensity factor from https://data.lacity.org/A-Livable-and-Sustainable-City/LADWP-CO2-Generation/e5ni-eqan/10

Land Use - Regional Shopping Center represents the new passenger concourse space not included in the retail or office uses

Construction Phase - Construction is calculated separately

Off-road Equipment -

Off-road Equipment - Construction is calculated separately

Trips and VMT - Construction is calculated separately

Grading - Construction is calculated separately

Vehicle Trips - Trip rates from traffic analysis

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Energy Use - .

Energy Mitigation - CalEEMod includes 2013 Title 24. 2016 Title 24 is 5% more energy efficient for non-residential uses

Table Name	Column Name	Default Value	New Value
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	1227.89	1135
tblProjectCharacteristics	OperationalYear	2018	2040
tblVehicleTrips	ST_TR	2.46	0.49
tblVehicleTrips	ST_TR	49.97	0.00
tblVehicleTrips	ST_TR	42.04	8.10
tblVehicleTrips	SU_TR	1.05	0.21
tblVehicleTrips	SU_TR	25.24	0.00
tblVehicleTrips	SU_TR	20.43	3.94
tblVehicleTrips	WD_TR	11.03	2.21
tblVehicleTrips	WD_TR	42.70	0.00
tblVehicleTrips	WD_TR	44.32	8.54

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**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**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	13.4094	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Energy	0.0371	0.3369	0.2830	2.0200e-003		0.0256	0.0256		0.0256	0.0256		404.2869	404.2869	7.7500e-003	7.4100e-003	406.6893
Mobile	0.9412	6.4764	10.2667	0.0568	5.9594	0.0230	5.9825	1.5938	0.0214	1.6153		5,856.4839	5,856.4839	0.2210		5,862.0097
Total	**14.3877**	**6.8138**	**10.6106**	**0.0589**	**5.9594**	**0.0488**	**6.0083**	**1.5938**	**0.0472**	**1.6411**		**6,260.9021**	**6,260.9021**	**0.2291**	**7.4100e-003**	**6,268.8388**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	13.4094	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Energy	0.0356	0.3240	0.2721	1.9400e-003		0.0246	0.0246		0.0246	0.0246		388.7623	388.7623	7.4500e-003	7.1300e-003	391.0725
Mobile	0.9412	6.4764	10.2667	0.0568	5.9594	0.0230	5.9825	1.5938	0.0214	1.6153		5,856.4839	5,856.4839	0.2210		5,862.0097
Total	**14.3862**	**6.8009**	**10.5997**	**0.0588**	**5.9594**	**0.0479**	**6.0073**	**1.5938**	**0.0463**	**1.6401**		**6,245.3775**	**6,245.3775**	**0.2288**	**7.1300e-003**	**6,253.2220**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.01**	**0.19**	**0.10**	**0.14**	**0.00**	**2.01**	**0.02**	**0.00**	**2.07**	**0.06**	**0.00**	**0.25**	**0.25**	**0.13**	**3.78**	**0.25**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	3/16/2017	3/15/2017	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40

Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.9412	6.4764	10.2667	0.0568	5.9594	0.0230	5.9825	1.5938	0.0214	1.6153		5,856.4839	5,856.4839	0.2210		5,862.0097
Unmitigated	0.9412	6.4764	10.2667	0.0568	5.9594	0.0230	5.9825	1.5938	0.0214	1.6153		5,856.4839	5,856.4839	0.2210		5,862.0097

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	66.30	14.70	6.30	162,224	162,224
Regional Shopping Center	0.00	0.00	0.00		
Strip Mall	1,361.28	1,291.14	628.04	2,371,600	2,371,600
Total	1,427.58	1,305.84	634.34	2,533,824	2,533,824

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.552848	0.041144	0.205921	0.110574	0.011987	0.005763	0.023182	0.038654	0.002242	0.001394	0.004854	0.000710	0.000727
Regional Shopping Center	0.552848	0.041144	0.205921	0.110574	0.011987	0.005763	0.023182	0.038654	0.002242	0.001394	0.004854	0.000710	0.000727
Strip Mall	0.552848	0.041144	0.205921	0.110574	0.011987	0.005763	0.023182	0.038654	0.002242	0.001394	0.004854	0.000710	0.000727

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0356	0.3240	0.2721	1.9400e-003		0.0246	0.0246		0.0246	0.0246		388.7623	388.7623	7.4500e-003	7.1300e-003	391.0725
NaturalGas Unmitigated	0.0371	0.3369	0.2830	2.0200e-003		0.0256	0.0256		0.0256	0.0256		404.2869	404.2869	7.7500e-003	7.4100e-003	406.6893

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	859.726	9.2700e-003	0.0843	0.0708	5.1000e-004		6.4100e-003	6.4100e-003		6.4100e-003	6.4100e-003		101.1442	101.1442	1.9400e-003	1.8500e-003	101.7453
Regional Shopping Center	1856.14	0.0200	0.1820	0.1529	1.0900e-003		0.0138	0.0138		0.0138	0.0138		218.3691	218.3691	4.1900e-003	4.0000e-003	219.6667
Strip Mall	720.575	7.7700e-003	0.0706	0.0593	4.2000e-004		5.3700e-003	5.3700e-003		5.3700e-003	5.3700e-003		84.7736	84.7736	1.6200e-003	1.5500e-003	85.2773
Total		**0.0371**	**0.3369**	**0.2830**	**2.0200e-003**		**0.0256**	**0.0256**		**0.0256**	**0.0256**		**404.2869**	**404.2869**	**7.7500e-003**	**7.4000e-003**	**406.6894**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	0.818342	8.8300e-003	0.0802	0.0674	4.8000e-004		6.1000e-003	6.1000e-003		6.1000e-003	6.1000e-003		96.2756	96.2756	1.8500e-003	1.7700e-003	96.8477
Regional Shopping Center	1.79089	0.0193	0.1756	0.1475	1.0500e-003		0.0133	0.0133		0.0133	0.0133		210.6931	210.6931	4.0400e-003	3.8600e-003	211.9451
Strip Mall	0.695246	7.5000e-003	0.0682	0.0573	4.1000e-004		5.1800e-003	5.1800e-003		5.1800e-003	5.1800e-003		81.7937	81.7937	1.5700e-003	1.5000e-003	82.2797
Total		**0.0356**	**0.3240**	**0.2721**	**1.9400e-003**		**0.0246**	**0.0246**		**0.0246**	**0.0246**		**388.7623**	**388.7623**	**7.4600e-003**	**7.1300e-003**	**391.0725**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	13.4094	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Unmitigated	13.4094	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.8800					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.5700e-003	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Total	**13.4094**	**5.5000e-004**	**0.0609**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1313**	**0.1313**	**3.4000e-004**		**0.1398**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.8800					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.5700e-003	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Total	**13.4094**	**5.5000e-004**	**0.0609**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1313**	**0.1313**	**3.4000e-004**		**0.1398**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Link US - 2040 Operational Emissions

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	30.00	1000sqft	0.69	30,000.00	0
Regional Shopping Center	410.60	1000sqft	9.43	410,600.00	0
Strip Mall	159.40	1000sqft	3.66	159,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2040
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1135	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Intensity factor from https://data.lacity.org/A-Livable-and-Sustainable-City/LADWP-CO2-Generation/e5ni-eqan/10

Land Use - Regional Shopping Center represents the new passenger concourse space not included in the retail or office uses

Construction Phase - Construction is calculated separately

Off-road Equipment -

Off-road Equipment - Construction is calculated separately

Trips and VMT - Construction is calculated separately

Grading - Construction is calculated separately

Vehicle Trips - Trip rates from traffic analysis

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Energy Use - .

Energy Mitigation - CalEEMod includes 2013 Title 24. 2016 Title 24 is 5% more energy efficient for non-residential uses

Table Name	Column Name	Default Value	New Value
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	1227.89	1135
tblProjectCharacteristics	OperationalYear	2018	2040
tblVehicleTrips	ST_TR	2.46	0.49
tblVehicleTrips	ST_TR	49.97	0.00
tblVehicleTrips	ST_TR	42.04	8.10
tblVehicleTrips	SU_TR	1.05	0.21
tblVehicleTrips	SU_TR	25.24	0.00
tblVehicleTrips	SU_TR	20.43	3.94
tblVehicleTrips	WD_TR	11.03	2.21
tblVehicleTrips	WD_TR	42.70	0.00
tblVehicleTrips	WD_TR	44.32	8.54

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**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**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	13.4094	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Energy	0.0371	0.3369	0.2830	2.0200e-003		0.0256	0.0256		0.0256	0.0256		404.2869	404.2869	7.7500e-003	7.4100e-003	406.6893
Mobile	0.8992	6.4622	9.8572	0.0539	5.9594	0.0231	5.9825	1.5938	0.0215	1.6153		5,559.6273	5,559.6273	0.2264		5,565.2879
Total	**14.3457**	**6.7997**	**10.2010**	**0.0559**	**5.9594**	**0.0489**	**6.0084**	**1.5938**	**0.0473**	**1.6412**		**5,964.0455**	**5,964.0455**	**0.2345**	**7.4100e-003**	**5,972.1170**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	13.4094	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Energy	0.0356	0.3240	0.2721	1.9400e-003		0.0246	0.0246		0.0246	0.0246		388.7623	388.7623	7.4500e-003	7.1300e-003	391.0725
Mobile	0.8992	6.4622	9.8572	0.0539	5.9594	0.0231	5.9825	1.5938	0.0215	1.6153		5,559.6273	5,559.6273	0.2264		5,565.2879
Total	**14.3443**	**6.7867**	**10.1902**	**0.0559**	**5.9594**	**0.0479**	**6.0074**	**1.5938**	**0.0463**	**1.6402**		**5,948.5209**	**5,948.5209**	**0.2342**	**7.1300e-003**	**5,956.5002**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.01**	**0.19**	**0.11**	**0.14**	**0.00**	**2.00**	**0.02**	**0.00**	**2.07**	**0.06**	**0.00**	**0.26**	**0.26**	**0.13**	**3.78**	**0.26**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	3/16/2017	3/15/2017	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40

Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.8992	6.4622	9.8572	0.0539	5.9594	0.0231	5.9825	1.5938	0.0215	1.6153		5,559.6273	5,559.6273	0.2264		5,565.2879
Unmitigated	0.8992	6.4622	9.8572	0.0539	5.9594	0.0231	5.9825	1.5938	0.0215	1.6153		5,559.6273	5,559.6273	0.2264		5,565.2879

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	66.30	14.70	6.30	162,224	162,224
Regional Shopping Center	0.00	0.00	0.00		
Strip Mall	1,361.28	1,291.14	628.04	2,371,600	2,371,600
Total	1,427.58	1,305.84	634.34	2,533,824	2,533,824

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.552848	0.041144	0.205921	0.110574	0.011987	0.005763	0.023182	0.038654	0.002242	0.001394	0.004854	0.000710	0.000727
Regional Shopping Center	0.552848	0.041144	0.205921	0.110574	0.011987	0.005763	0.023182	0.038654	0.002242	0.001394	0.004854	0.000710	0.000727
Strip Mall	0.552848	0.041144	0.205921	0.110574	0.011987	0.005763	0.023182	0.038654	0.002242	0.001394	0.004854	0.000710	0.000727

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0356	0.3240	0.2721	1.9400e-003		0.0246	0.0246		0.0246	0.0246		388.7623	388.7623	7.4500e-003	7.1300e-003	391.0725
NaturalGas Unmitigated	0.0371	0.3369	0.2830	2.0200e-003		0.0256	0.0256		0.0256	0.0256		404.2869	404.2869	7.7500e-003	7.4100e-003	406.6893

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	859.726	9.2700e-003	0.0843	0.0708	5.1000e-004		6.4100e-003	6.4100e-003		6.4100e-003	6.4100e-003		101.1442	101.1442	1.9400e-003	1.8500e-003	101.7453
Regional Shopping Center	1856.14	0.0200	0.1820	0.1529	1.0900e-003		0.0138	0.0138		0.0138	0.0138		218.3691	218.3691	4.1900e-003	4.0000e-003	219.6667
Strip Mall	720.575	7.7700e-003	0.0706	0.0593	4.2000e-004		5.3700e-003	5.3700e-003		5.3700e-003	5.3700e-003		84.7736	84.7736	1.6200e-003	1.5500e-003	85.2773
Total		**0.0371**	**0.3369**	**0.2830**	**2.0200e-003**		**0.0256**	**0.0256**		**0.0256**	**0.0256**		**404.2869**	**404.2869**	**7.7500e-003**	**7.4000e-003**	**406.6894**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	0.818342	8.8300e-003	0.0802	0.0674	4.8000e-004		6.1000e-003	6.1000e-003		6.1000e-003	6.1000e-003		96.2756	96.2756	1.8500e-003	1.7700e-003	96.8477
Regional Shopping Center	1.79089	0.0193	0.1756	0.1475	1.0500e-003		0.0133	0.0133		0.0133	0.0133		210.6931	210.6931	4.0400e-003	3.8600e-003	211.9451
Strip Mall	0.695246	7.5000e-003	0.0682	0.0573	4.1000e-004		5.1800e-003	5.1800e-003		5.1800e-003	5.1800e-003		81.7937	81.7937	1.5700e-003	1.5000e-003	82.2797
Total		**0.0356**	**0.3240**	**0.2721**	**1.9400e-003**		**0.0246**	**0.0246**		**0.0246**	**0.0246**		**388.7623**	**388.7623**	**7.4600e-003**	**7.1300e-003**	**391.0725**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	13.4094	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Unmitigated	13.4094	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.8800					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.5700e-003	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Total	**13.4094**	**5.5000e-004**	**0.0609**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1313**	**0.1313**	**3.4000e-004**		**0.1398**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.8800					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.5700e-003	5.5000e-004	0.0609	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1313	0.1313	3.4000e-004		0.1398
Total	**13.4094**	**5.5000e-004**	**0.0609**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1313**	**0.1313**	**3.4000e-004**		**0.1398**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Link US - 2040 Operational Emissions

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	30.00	1000sqft	0.69	30,000.00	0
Regional Shopping Center	410.60	1000sqft	9.43	410,600.00	0
Strip Mall	159.40	1000sqft	3.66	159,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2040
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1135	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Intensity factor from https://data.lacity.org/A-Livable-and-Sustainable-City/LADWP-CO2-Generation/e5ni-eqan/10

Land Use - Regional Shopping Center represents the new passenger concourse space not included in the retail or office uses

Construction Phase - Construction is calculated separately

Off-road Equipment -

Off-road Equipment - Construction is calculated separately

Trips and VMT - Construction is calculated separately

Grading - Construction is calculated separately

Vehicle Trips - Trip rates from traffic analysis

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Energy Use - .

Energy Mitigation - CalEEMod includes 2013 Title 24. 2016 Title 24 is 5% more energy efficient for non-residential uses

Table Name	Column Name	Default Value	New Value
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	1227.89	1135
tblProjectCharacteristics	OperationalYear	2018	2040
tblVehicleTrips	ST_TR	2.46	0.49
tblVehicleTrips	ST_TR	49.97	0.00
tblVehicleTrips	ST_TR	42.04	8.10
tblVehicleTrips	SU_TR	1.05	0.21
tblVehicleTrips	SU_TR	25.24	0.00
tblVehicleTrips	SU_TR	20.43	3.94
tblVehicleTrips	WD_TR	11.03	2.21
tblVehicleTrips	WD_TR	42.70	0.00
tblVehicleTrips	WD_TR	44.32	8.54

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**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**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.4469	7.0000e-005	7.6100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159
Energy	6.7600e-003	0.0615	0.0517	3.7000e-004		4.6700e-003	4.6700e-003		4.6700e-003	4.6700e-003	0.0000	4,339.8982	4,339.8982	0.1105	0.0238	4,349.7567
Mobile	0.1440	1.0823	1.6347	9.0100e-003	0.9625	3.7900e-003	0.9663	0.2578	3.5300e-003	0.2613	0.0000	843.1540	843.1540	0.0333	0.0000	843.9866

Waste						0.0000	0.0000		0.0000	0.0000	127.1535	0.0000	127.1535	7.5146	0.0000	315.0175
Water						0.0000	0.0000		0.0000	0.0000	15.0865	485.4821	500.5686	1.5619	0.0392	551.2848
Total	**2.5976**	**1.1439**	**1.6939**	**9.3800e-003**	**0.9625**	**8.4900e-003**	**0.9710**	**0.2578**	**8.2300e-003**	**0.2660**	**142.2400**	**5,668.5491**	**5,810.7892**	**9.2203**	**0.0630**	**6,060.0614**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.4469	7.0000e-005	7.6100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159
Energy	6.5000e-003	0.0591	0.0497	3.5000e-004		4.4900e-003	4.4900e-003		4.4900e-003	4.4900e-003	0.0000	4,271.9809	4,271.9809	0.1087	0.0234	4,281.6794
Mobile	0.1440	1.0823	1.6347	9.0100e-003	0.9625	3.7900e-003	0.9663	0.2578	3.5300e-003	0.2613	0.0000	843.1540	843.1540	0.0333	0.0000	843.9866
Waste						0.0000	0.0000		0.0000	0.0000	127.1535	0.0000	127.1535	7.5146	0.0000	315.0175
Water						0.0000	0.0000		0.0000	0.0000	15.0865	485.4821	500.5686	1.5619	0.0392	551.2848
Total	**2.5974**	**1.1415**	**1.6920**	**9.3600e-003**	**0.9625**	**8.3100e-003**	**0.9708**	**0.2578**	**8.0500e-003**	**0.2659**	**142.2400**	**5,600.6318**	**5,742.8719**	**9.2186**	**0.0626**	**5,991.9841**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.01**	**0.21**	**0.12**	**0.21**	**0.00**	**2.12**	**0.02**	**0.00**	**2.19**	**0.07**	**0.00**	**1.20**	**1.17**	**0.02**	**0.64**	**1.12**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	3/16/2017	3/15/2017	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1440	1.0823	1.6347	9.0100e-003	0.9625	3.7900e-003	0.9663	0.2578	3.5300e-003	0.2613	0.0000	843.1540	843.1540	0.0333	0.0000	843.9866
Unmitigated	0.1440	1.0823	1.6347	9.0100e-003	0.9625	3.7900e-003	0.9663	0.2578	3.5300e-003	0.2613	0.0000	843.1540	843.1540	0.0333	0.0000	843.9866

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	66.30	14.70	6.30	162,224	162,224
Regional Shopping Center	0.00	0.00	0.00		
Strip Mall	1,361.28	1,291.14	628.04	2,371,600	2,371,600
Total	1,427.58	1,305.84	634.34	2,533,824	2,533,824

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4

Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.552848	0.041144	0.205921	0.110574	0.011987	0.005763	0.023182	0.038654	0.002242	0.001394	0.004854	0.000710	0.000727
Regional Shopping Center	0.552848	0.041144	0.205921	0.110574	0.011987	0.005763	0.023182	0.038654	0.002242	0.001394	0.004854	0.000710	0.000727
Strip Mall	0.552848	0.041144	0.205921	0.110574	0.011987	0.005763	0.023182	0.038654	0.002242	0.001394	0.004854	0.000710	0.000727

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	4,207.6169	4,207.6169	0.1075	0.0222	4,216.9330
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	4,272.9640	4,272.9640	0.1092	0.0226	4,282.4247
NaturalGas Mitigated	6.5000e-003	0.0591	0.0497	3.5000e-004		4.4900e-003	4.4900e-003		4.4900e-003	4.4900e-003	0.0000	64.3640	64.3640	1.2300e-003	1.1800e-003	64.7464
NaturalGas Unmitigated	6.7600e-003	0.0615	0.0517	3.7000e-004		4.6700e-003	4.6700e-003		4.6700e-003	4.6700e-003	0.0000	66.9342	66.9342	1.2800e-003	1.2300e-003	67.3320

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	313800	1.6900e-003	0.0154	0.0129	9.0000e-005		1.1700e-003	1.1700e-003		1.1700e-003	1.1700e-003	0.0000	16.7456	16.7456	3.2000e-004	3.1000e-004	16.8451
Regional Shopping Center	677490	3.6500e-003	0.0332	0.0279	2.0000e-004		2.5200e-003	2.5200e-003		2.5200e-003	2.5200e-003	0.0000	36.1535	36.1535	6.9000e-004	6.6000e-004	36.3683
Strip Mall	263010	1.4200e-003	0.0129	0.0108	8.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	14.0352	14.0352	2.7000e-004	2.6000e-004	14.1186
Total		**6.7600e-003**	**0.0615**	**0.0517**	**3.7000e-004**		**4.6700e-003**	**4.6700e-003**		**4.6700e-003**	**4.6700e-003**	**0.0000**	**66.9342**	**66.9342**	**1.2800e-003**	**1.2300e-003**	**67.3320**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	298695	1.6100e-003	0.0146	0.0123	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	15.9395	15.9395	3.1000e-004	2.9000e-004	16.0342
Regional Shopping Center	653675	3.5200e-003	0.0320	0.0269	1.9000e-004		2.4400e-003	2.4400e-003		2.4400e-003	2.4400e-003	0.0000	34.8826	34.8826	6.7000e-004	6.4000e-004	35.0899
Strip Mall	253765	1.3700e-003	0.0124	0.0105	7.0000e-005		9.5000e-004	9.5000e-004		9.5000e-004	9.5000e-004	0.0000	13.5419	13.5419	2.6000e-004	2.5000e-004	13.6223
Total		**6.5000e-003**	**0.0591**	**0.0497**	**3.5000e-004**		**4.5000e-003**	**4.5000e-003**		**4.5000e-003**	**4.5000e-003**	**0.0000**	**64.3640**	**64.3640**	**1.2400e-003**	**1.1800e-003**	**64.7464**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	399600	205.7250	5.2600e-003	1.0900e-003	206.1805

Regional Shopping Center	5.69092e+006	2,929.8392	0.0749	0.0155	2,936.3261
Strip Mall	2.20928e+006	1,137.3998	0.0291	6.0100e-003	1,139.9181
Total		**4,272.9640**	**0.1092**	**0.0226**	**4,282.4247**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	392370	202.0028	5.1600e-003	1.0700e-003	202.4501
Regional Shopping Center	5.60469e+006	2,885.4476	0.0737	0.0153	2,891.8363
Strip Mall	2.17581e+006	1,120.1665	0.0286	5.9200e-003	1,122.6466
Total		**4,207.6169**	**0.1075**	**0.0222**	**4,216.9330**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.4469	7.0000e-005	7.6100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159
Unmitigated	2.4469	7.0000e-005	7.6100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2781					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.1681					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	7.0000e-004	7.0000e-005	7.6100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159
Total	**2.4469**	**7.0000e-005**	**7.6100e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.0149**	**0.0149**	**4.0000e-005**	**0.0000**	**0.0159**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2781					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.1681					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	7.0000e-004	7.0000e-005	7.6100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0149	0.0149	4.0000e-005	0.0000	0.0159
Total	**2.4469**	**7.0000e-005**	**7.6100e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.0149**	**0.0149**	**4.0000e-005**	**0.0000**	**0.0159**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	500.5686	1.5619	0.0392	551.2848
Unmitigated	500.5686	1.5619	0.0392	551.2848

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	5.33201 / 3.26801	56.1272	0.1751	4.3900e-003	61.8139
Regional Shopping Center	30.4142 / 18.6409	320.1537	0.9990	0.0250	352.5908
Strip Mall	11.8072 / 7.23665	124.2876	0.3878	9.7200e-003	136.8801
Total		**500.5686**	**1.5619**	**0.0392**	**551.2848**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e

Land Use	Mgal	MT/yr			
General Office Building	5.33201 / 3.26801	56.1272	0.1751	4.3900e-003	61.8139
Regional Shopping Center	30.4142 / 18.6409	320.1537	0.9990	0.0250	352.5908
Strip Mall	11.8072 / 7.23665	124.2876	0.3878	9.7200e-003	136.8801
Total		**500.5686**	**1.5619**	**0.0392**	**551.2848**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	127.1535	7.5146	0.0000	315.0175
Unmitigated	127.1535	7.5146	0.0000	315.0175

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	27.9	5.6635	0.3347	0.0000	14.0310

Regional Shopping Center	431.13	87.5155	5.1720	0.0000	216.8159
Strip Mall	167.37	33.9746	2.0078	0.0000	84.1706
Total		**127.1535**	**7.5146**	**0.0000**	**315.0175**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	27.9	5.6635	0.3347	0.0000	14.0310
Regional Shopping Center	431.13	87.5155	5.1720	0.0000	216.8159
Strip Mall	167.37	33.9746	2.0078	0.0000	84.1706
Total		**127.1535**	**7.5146**	**0.0000**	**315.0175**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

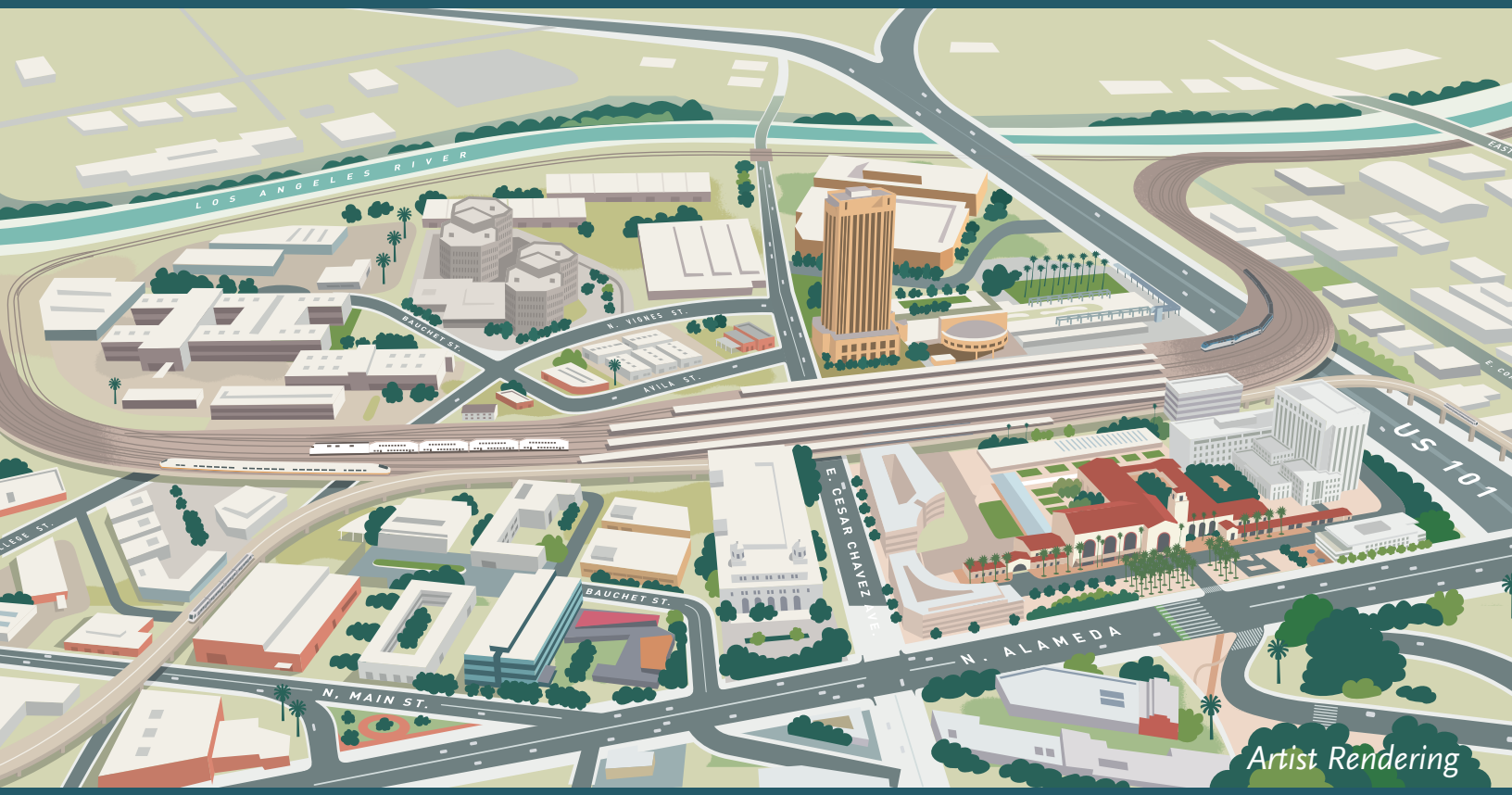
User Defined Equipment

Equipment Type	Number

Link Union Station

Draft Health Risk Assessment

June 2024



The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

Metro

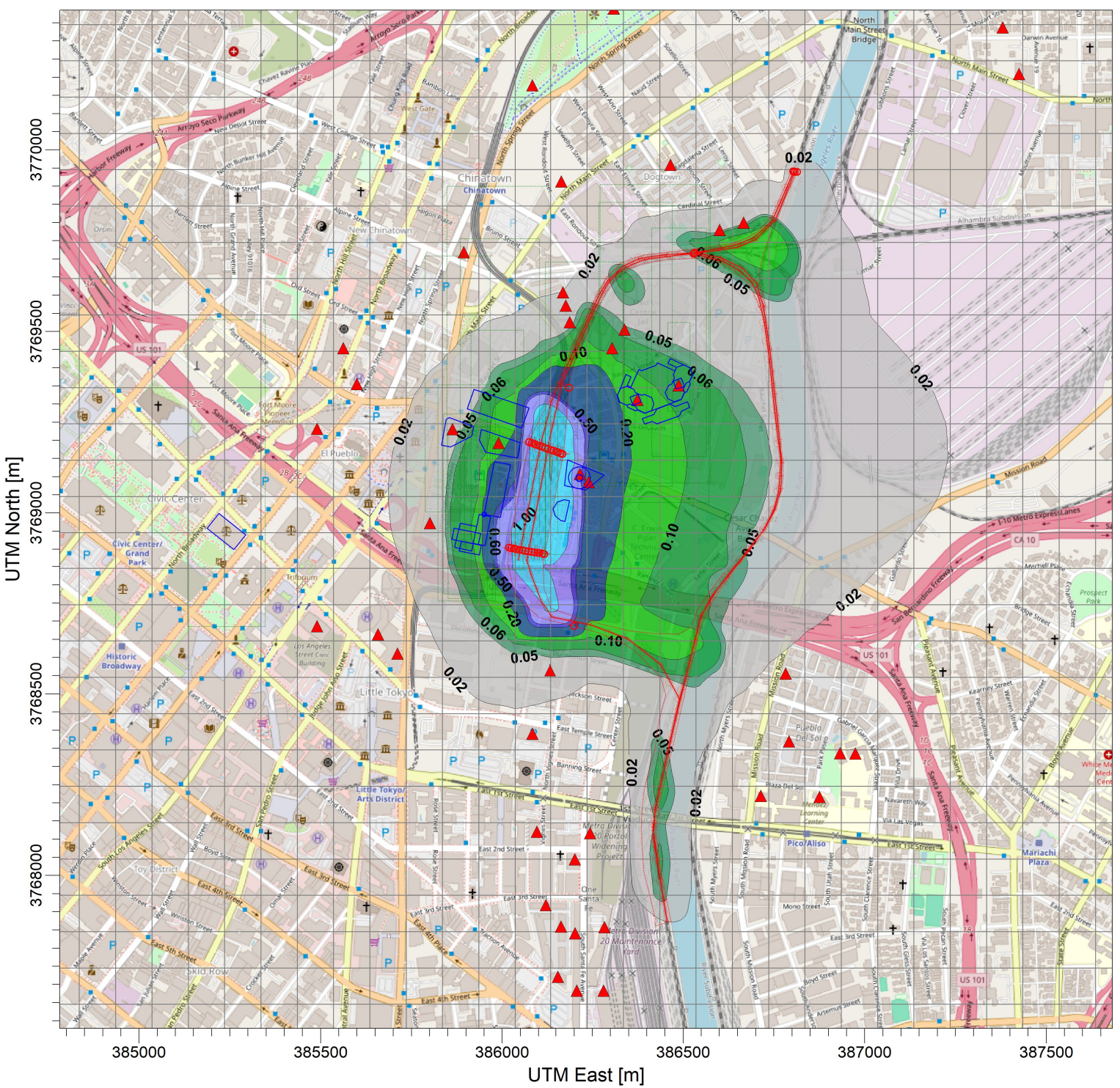
CALIFORNIA High-Speed Rail Authority

LINKUS Construction At-Grade-Unmitigated: Receptor Risk Summary					70-year Cancer Risk per 10^6	30-year Cancer Risk per 10^6
Analysis ID	**Sensitive Receptors Modeled (Discrete Locations)**	**Land-use Type**	**X - UTM Coordinate (m)**	**Y - UTM Coordinate (m)**	**Unmitigated**	**Unmitigated**
S-1	Hilda L. Solis Care First Village	Residential	386187.86	3769525.53	30.56	26.51
S-2	Residential1 - Darwin Ave. & Mozart St.	Residential	387379.88	3770337.66	3.56	3.09
S-3	Residential2 - Albion St.	Residential	387263.90	3770496.58	2.83	2.46
S-4	Residential3 - S. Vignes St. & E. 2nd St.	Residential	386095.16	3768120.76	5.62	4.87
S-5	Riverfront Lofts	Residential	386201.88	3768044.45	4.82	4.18
S-6	Binford Lofts	Residential	386155.39	3767721.32	2.87	2.49
S-7	Alisio	Residential	386119.85	3767918.39	3.91	3.39
S-8	Llewellyn Apartments	Residential	386164.52	3769913.51	4.95	4.29
S-9	Molina Street Apartments	Residential	386127.31	3767531.44	2.33	2.02
S-10	AMP Lofts	Residential	386419.51	3766751.99	0.98	0.85
S-11	2121 Lofts	Residential	386570.19	3766587.71	0.83	0.72
S-12	RHF Rio Vista Village	Residential	387234.73	3765708.76	0.47	0.41
S-13	Senior Housing - N. Alameda St. & Alpine St.	Residential	385893.96	3769717.93	1.23	5.71
S-14	Jia Apartments	Residential	385562.65	3769454.08	6.40	5.55
S-15	Cathay Manor Apartments	Residential	385599.36	3769355.77	8.24	7.14
S-16	LA Plaza Village Apartments	Residential	385489.71	3769231.75	7.03	6.10
S-17	Residentia 4 - 726 S. Santa Fe Ave.	Residential	386470.43	3766602.16	0.88	0.76
S-18	William Mead Homes	Residential	386600.55	3769779.86	32.97	28.60
S-19	Mission Road Residences	Residential	386782.61	3768556.15	12.15	10.54
S-20	One SantaFe Apartments	Residential	386243.89	3768116.8	5.68	4.92
S-21	Mosaic Apartments	Residential	385990.07	3769192.91	94.54	82.01
S-22	First 5 LA Headquarters-LA Petite Academy	School	385800.82	3768972.29	6.24	
S-23	Mendez High School	School	386714.06	3768219.72	0.15	
S-24	Albion Elementary School	School	387384.51	3770473.59	0.06	
S-25	PUC Excel Charter Academy	School	387424.99	3770209.00	0.09	
S-26	Beyond the Bell	School	386132.58	3768565.01	0.47	
S-27	Ann Street Elementary School	School	386465.43	3769959.32	0.12	
S-28	Metro Gateway Childhood Development Center	School	386239.70	3769084.62	74.91	
S-29	Harry Pregerson Child Care Center	School	385658.17	3768663.67	1.87	
S-30	Southern Calif. Institute of Architecture	School	386202.87	3767840.81	0.02	
S-32	Utah Street Elementary School	School	386932.16	3768336.87	0.10	
S-33	City of LA Medical Services Division	Medical	386082.65	3768390.05	0.17	
S-34	Downtown LA VA Clinic	Medical	385711.78	3768610.79	0.14	
S-35	Metro Offices	Offices	386215.93	3769107.17	6.73	
S-36	Los Angeles State Historic Park	Recreational	386082.90	3770178.64	0.08	
S-37	Albion Riverside Park/Downey Rec Center	Recreational	387154.31	3770561.67	0.07	
S-38	Twin Towers Correctional Facilities	Jail	386374.02	3769311.92	1.62	
S-39	Los Angeles County Men's Central Jail	Jail	386304.71	3769454.16	0.87	
S-40	LAPD Metropolitan Detention Center	Jail	385490.09	3768686.30	0.06	

LINKUS Construction At-Grade-Mitigated: Receptor Risk Summary					70-year Cancer Risk per 10^6	30-year Cancer Risk per 10^6
Analysis ID	**Sensitive Receptors Modeled (Discrete Locations)**	**Land-use Type**	**X - UTM Coordinate (m)**	**Y - UTM Coordinate (m)**	**Mitigated**	**Mitigated**
S-1	Hilda L. Solis Care First Village	Residential	386187.86	3769525.53	3.12	2.71
S-2	Residential1 - Darwin Ave. & Mozart St.	Residential	387379.88	3770337.66	0.36	0.32
S-3	Residential2 - Albion St.	Residential	387263.90	3770496.58	0.29	0.25
S-4	Residential3 - S. Vignes St. & E. 2nd St.	Residential	386095.16	3768120.76	0.57	0.50
S-5	Riverfront Lofts	Residential	386201.88	3768044.45	0.49	0.42
S-6	Binford Lofts	Residential	386155.39	3767721.32	0.30	0.26
S-7	Alisio	Residential	386119.85	3767918.39	0.40	0.35
S-8	Llewellyn Apartments	Residential	386164.52	3769913.51	0.50	0.44
S-9	Molina Street Apartments	Residential	386127.31	3767531.44	0.24	0.21
S-10	AMP Lofts	Residential	386419.51	3766751.99	0.10	0.09
S-11	2121 Lofts	Residential	386570.19	3766587.71	0.08	0.07
S-12	RHF Rio Vista Village	Residential	387234.73	3765708.76	0.04	0.04
S-13	Senior Housing - N. Alameda St. & Alpine St.	Residential	385893.96	3769717.93	0.13	0.59
S-14	Jia Apartments	Residential	385562.65	3769454.08	0.65	0.57
S-15	Cathay Manor Apartments	Residential	385599.36	3769355.77	0.85	0.73
S-16	LA Plaza Village Apartments	Residential	385489.71	3769231.75	0.72	0.62
S-17	Residentia 4 - 726 S. Santa Fe Ave.	Residential	386470.43	3766602.16	0.09	0.08
S-18	William Mead Homes	Residential	386600.55	3769779.86	3.36	2.92
S-19	Mission Road Residences	Residential	386782.61	3768556.15	1.24	1.07
S-20	One SantaFe Apartments	Residential	386243.89	3768116.8	0.58	0.50
S-21	Mosaic Apartments	Residential	385990.07	3769192.91	9.68	8.40
S-22	First 5 LA Headquarters-LA Petite Academy	School	385800.82	3768972.29	0.64	
S-23	Mendez High School	School	386714.06	3768219.72	0.02	
S-24	Albion Elementary School	School	387384.51	3770473.59	0.01	
S-25	PUC Excel Charter Academy	School	387424.99	3770209.00	0.01	
S-26	Beyond the Bell	School	386132.58	3768565.01	0.05	
S-27	Ann Street Elementary School	School	386465.43	3769959.32	0.01	
S-28	Metro Gateway Childhood Development Center	School	386239.70	3769084.62	7.67	
S-29	Harry Pregerson Child Care Center	School	385658.17	3768663.67	0.19	
S-30	Southern Calif. Institute of Architecture	School	386202.87	3767840.81	0.00	
S-32	Utah Street Elementary School	School	386932.16	3768336.87	0.01	
S-33	City of LA Medical Services Division	Medical	386082.65	3768390.05	0.02	
S-34	Downtown LA VA Clinic	Medical	385711.78	3768610.79	0.01	
S-35	Metro Offices	Offices	386215.93	3769107.17	0.69	
S-36	Los Angeles State Historic Park	Recreational	386082.90	3770178.64	0.01	
S-37	Albion Riverside Park/Downey Rec Center	Recreational	387154.31	3770561.67	0.01	
S-38	Twin Towers Correctional Facilities	Jail	386374.02	3769311.92	0.17	
S-39	Los Angeles County Men's Central Jail	Jail	386304.71	3769454.16	0.09	
S-40	LAPD Metropolitan Detention Center	Jail	385490.09	3768686.30	0.01	

PROJECT TITLE:

METRO LINKUS Construction_atgrade_unmit Isopleth, DPM concentrations PM10 (Assume DPM) in ug/m3



ug/m^3

2.08
2.00
1.00
0.60
0.50
0.20
0.10
0.06
0.05
0.02

PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL

Max: 2.08 [ug/m^3] at (386135.34, 3769145.66)

COMMENTS:

Unmitigated at-grade construction

90% 5% 5%

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

2.08 ug/m^3

COMPANY NAME:

ZMAssociates Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/27/2023

SCALE: 1:15,293

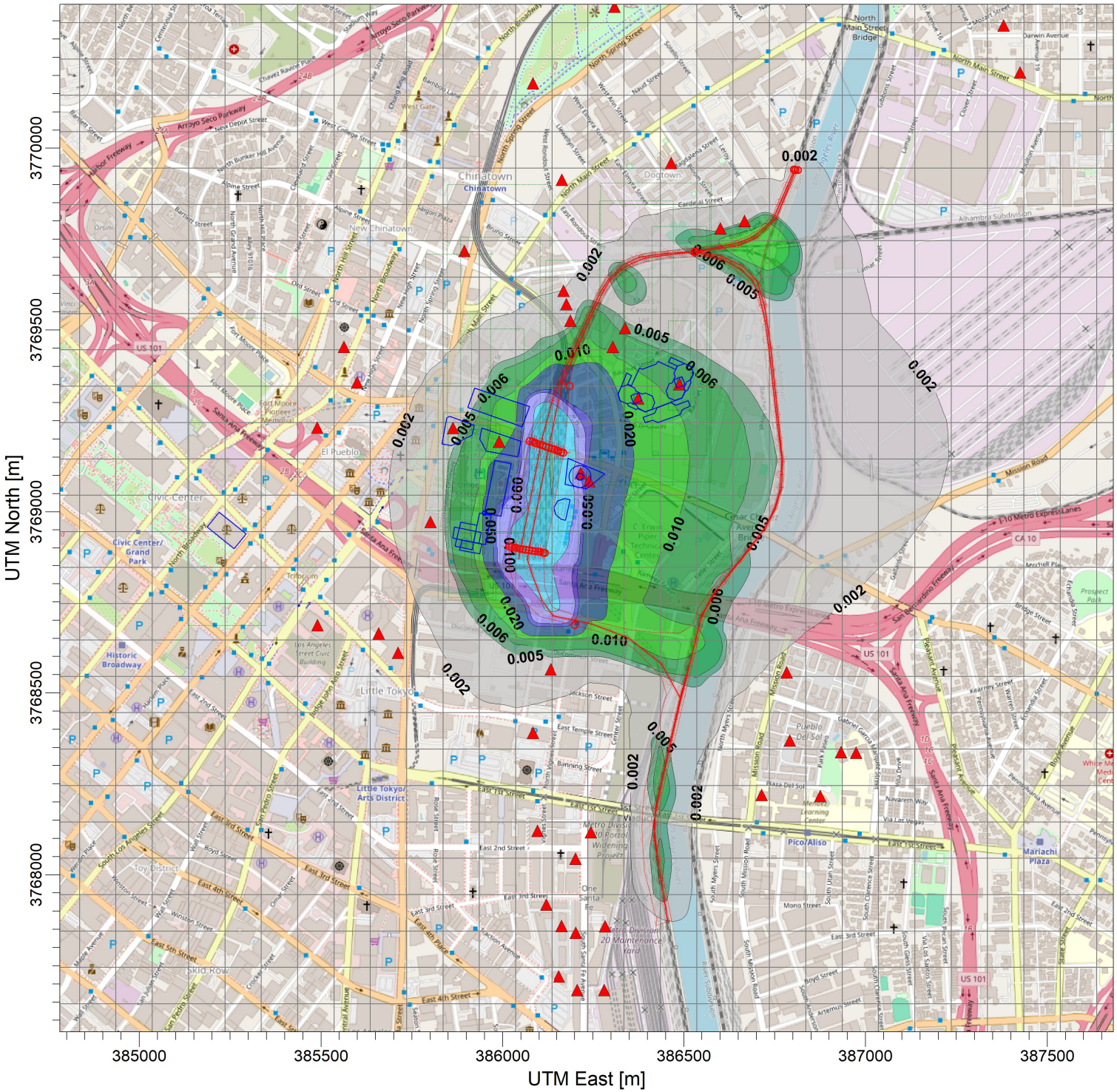
0 0.4 km

PROJECT NO.:

DR-LINKUS AQ/HHR

PROJECT TITLE:

METRO LINKUS Construction_atgrade_Mit Isopleth, DPM concentrations
PM10 (Assume DPM) in ug/m3





PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL
Max: 0.213 [ug/m^3] at (386135.34, 3769145.66)

COMMENTS:

Mitigated at-grade construction

90% 5% 5%

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

0.213 ug/m^3

COMPANY NAME:

ZMAssociates Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/27/2023

SCALE: 1:15,411

0 0.4 km

PROJECT NO.:

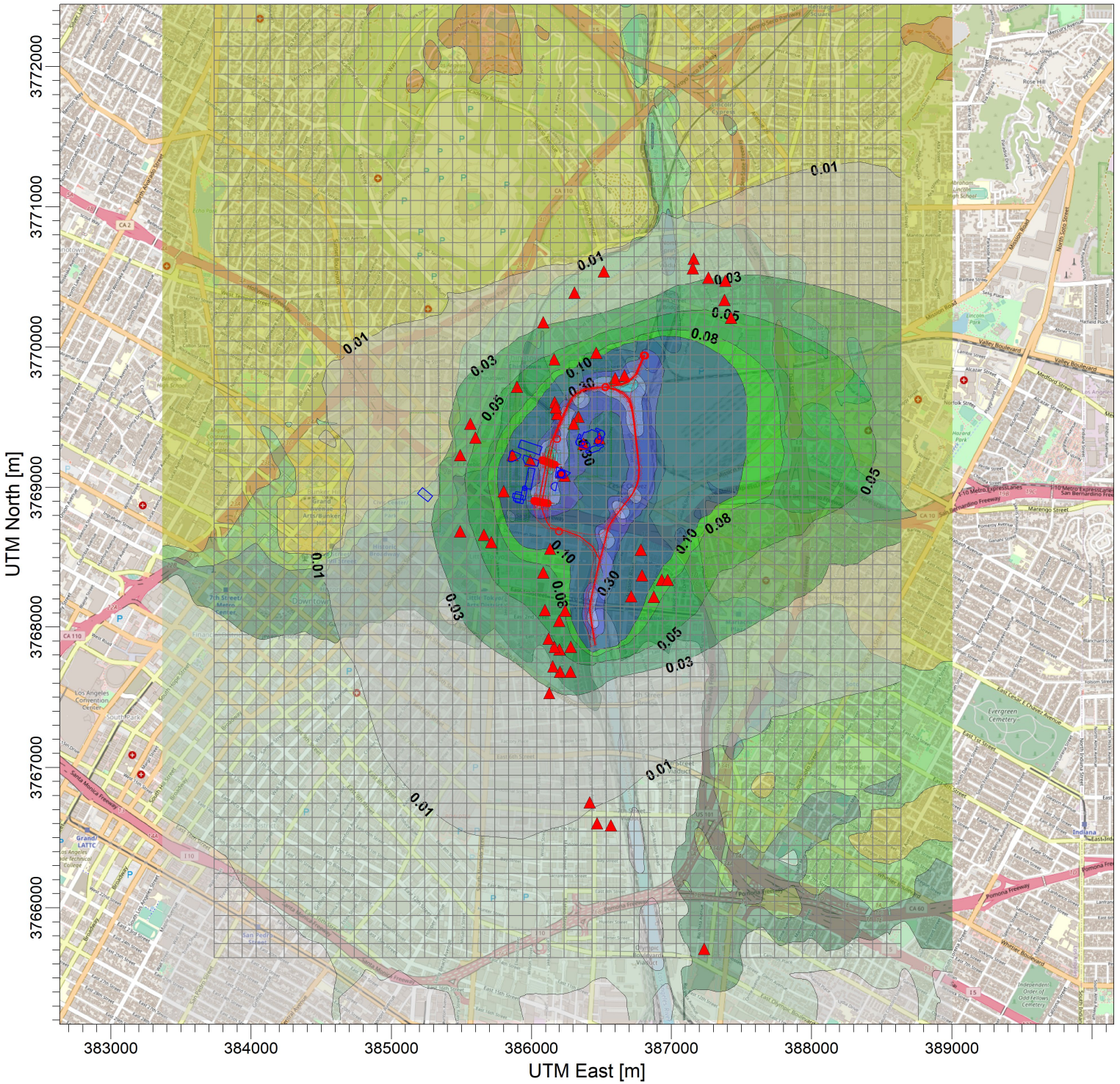
DR-LINKUS AQ/HHR

LINKUS Operation: Receptor Risk Summary					Cancer Risk per 10^6									
Analysis ID	Sensitive Receptors Modeled (Discrete Locations)	Land-use Type	X - UTM Coordinate (m)	Y - UTM Coordinate (m)	2016 Existing	2026 NoBuild	2026 Build	2026 Build Mitigated	2031 NoBuild	2031 Build	2031 Build Mitigated	2040 NoBuild	2040 Build	2040 Build Mitigated
S-1	Hilda L. Solis Care First Village	Residential	386187.86	3769525.53	190.45	52.96	60.58	14.76	30.51	54.13	12.65	11.41	25.26	12.64
S-2	Residential1 - Darwin Ave. & Mozart St.	Residential	387379.88	3770337.66	26.93	7.56	11.03	2.68	4.33	9.80	2.29	1.53	4.58	2.29
S-3	Residential2 - Albion St.	Residential	387263.90	3770496.58	18.89	5.34	7.69	1.87	3.04	6.76	1.56	1.04	3.17	1.57
S-4	Residential3 - S. Vignes St. & E. 2nd St.	Residential	386095.16	3768120.76	36.48	10.56	19.24	4.67	5.89	16.65	3.80	1.73	7.82	3.84
S-5	Riverfront Lofts	Residential	386201.88	3768044.45	42.17	11.99	21.25	5.17	6.78	18.80	4.36	2.25	8.79	4.38
S-6	Binford Lofts	Residential	386155.39	3767721.32	24.16	6.93	12.27	2.98	3.89	10.73	2.47	1.22	5.03	2.49
S-7	Alisio	Residential	386119.85	3767918.39	29.98	8.61	15.23	3.70	4.83	13.28	3.05	1.50	6.23	3.08
S-8	Llewellyn Apartments	Residential	386164.52	3769913.51	36.59	10.35	14.59	3.55	5.88	12.80	2.95	2.00	6.00	2.97
S-9	Molina Street Apartments	Residential	386127.31	3767531.44	18.62	5.36	9.63	2.34	3.01	8.39	1.92	0.92	3.94	1.94
S-10	AMP Lofts	Residential	386419.51	3766751.99	7.79	2.27	3.91	0.95	1.26	3.35	0.76	0.36	1.58	0.77
S-11	2121 Lofts	Residential	386570.19	3766587.71	6.56	1.92	3.29	0.80	1.06	2.80	0.63	0.30	1.32	0.64
S-12	RHF Rio Vista Village	Residential	387234.73	3765708.76	3.13	0.92	1.57	0.38	0.51	1.33	0.30	0.14	0.63	0.30
S-13	Senior Housing - N. Alameda St. & Alpine St.	Residential	385893.96	3769717.93	36.70	10.61	15.31	17.41	5.93	12.94	2.90	1.76	6.12	2.96
S-14	Jia Apartments	Residential	385562.65	3769454.08	28.03	8.30	12.62	3.71	4.55	10.34	2.27	1.13	4.92	2.34
S-15	Cathay Manor Apartments	Residential	385599.36	3769355.77	32.07	9.54	14.46	3.04	5.21	11.75	2.56	1.25	5.60	2.65
S-16	LA Plaza Village Apartments	Residential	385489.71	3769231.75	24.99	7.39	11.61	3.49	4.06	9.59	2.11	1.02	4.55	2.18
S-17	Residentia 4 - 726 S. Santa Fe Ave.	Residential	386470.43	3766602.16	6.81	1.98	3.42	2.81	1.10	2.92	0.66	0.32	1.38	0.67
S-18	William Mead Homes	Residential	386600.55	3769779.86	335.97	91.69	127.93	31.32	53.62	119.23	28.66	22.03	55.17	28.24
S-19	Mission Road Residences	Residential	386782.61	3768556.15	102.49	28.72	71.27	17.41	16.45	65.14	15.45	5.91	30.26	15.33
S-20	One SantaFe Apartments	Residential	386243.89	3768116.8	51.49	14.55	25.90	6.31	8.28	23.09	5.39	2.83	10.78	5.39
S-21	Mosaic Apartments	Residential	385990.07	3769192.91	167.77	51.00	68.70	16.46	27.39	52.52	10.82	5.34	25.38	11.55
S-22	First 5 LA Headquarters-LA Petite Academy	School	385800.82	3768972.29	20.21	6.19	9.47	2.27	3.30	7.35	1.54	0.59	3.54	1.63
S-23	Mendez High School	School	386714.06	3768219.72	2.54	0.70	1.16	0.28	0.41	1.06	0.25	0.15	0.49	0.25
S-24	Albion Elementary School	School	387384.51	3770473.59	0.47	0.13	0.20	0.05	0.08	0.17	0.04	0.03	0.08	0.04
S-25	PUC Excel Charter Academy	School	387424.99	3770209.00	0.81	0.23	0.32	0.08	0.13	0.29	0.07	0.05	0.14	0.07
S-26	Beyond the Bell	School	386132.58	3768565.01	1.48	0.45	1.01	0.25	0.24	0.86	0.19	0.05	0.40	0.20
S-27	Ann Street Elementary School	School	386465.43	3769959.32	1.22	0.34	0.44	0.11	0.20	0.39	0.09	0.07	0.18	0.09
S-28	Metro Gateway Childhood Development Center	School	386239.70	3769084.62	66.69	19.37	27.72	6.71	10.78	23.27	5.19	3.10	11.01	5.31
S-29	Harry Pregerson Child Care Center	School	385658.17	3768663.67	9.92	3.01	4.95	1.19	1.62	3.96	0.85	0.32	1.90	0.89
S-30	Southern Calif. Institute of Architecture	School	386202.87	3767840.81	0.22	0.06	0.11	0.03	0.04	0.10	0.02	0.01	0.05	0.02
S-32	Utah Street Elementary School	School	386932.16	3768336.87	1.35	0.38	0.70	0.17	0.22	0.64	0.15	0.92	0.30	0.15
S-33	City of LA Medical Services Division	Medical	386082.65	3768390.05	0.84	0.25	0.48	0.12	0.14	0.41	0.09	0.38	0.19	0.09
S-34	Downtown LA VA Clinic	Medical	385711.78	3768610.79	0.71	0.22	0.36	0.09	0.12	0.29	0.06	0.26	0.14	0.06
S-35	Metro Offices	Offices	386215.93	3769107.17	4.94	1.43	2.06	0.50	0.80	1.74	0.39	2.61	0.82	0.40
S-36	Los Angeles State Historic Park	Recreational	386082.90	3770178.64	0.60	0.17	0.26	0.06	0.10	0.22	0.05	0.18	0.10	0.05
S-37	Albion Riverside Park/Downey Rec Center	Recreational	387154.31	3770561.67	0.51	0.15	0.21	0.05	0.08	0.18	0.04	0.16	0.08	0.04
S-38	Twin Towers Correctional Facilities	Jail	386374.02	3769311.92	3.47	1.00	1.37	0.33	0.56	1.16	0.26	1.91	0.55	0.27
S-39	Los Angeles County Men's Central Jail	Jail	386304.71	3769454.16	5.02	1.39	1.77	0.43	0.80	1.59	0.37	3.37	0.74	0.37
S-40	LAPD Metropolitan Detention Center	Jail	385490.09	3768686.30	0.35	0.11	0.17	0.04	0.06	0.14	0.03	0.03	0.07	0.03

LINKUS Operation: Receptor Risk Summary					30-year Residential Cancer Risk per 10^6										70-year Residential Cancer Risk per 10^6									
Analysis ID	Residential Sensitive Receptors Modeled (Discrete Locations)	Land-use Type	X - UTM Coordinate (m)	Y - UTM Coordinate (m)	2016 Existing	2026 NoBuild	2026 Build	2026 Build Mitigated	2031 NoBuild	2031 Build	2031 Build Mitigated	2040 NoBuild	2040 Build	2040 Build Mitigated	2016 Existing	2026 NoBuild	2026 Build	2026 Build Mitigated	2031 NoBuild	2031 Build	2031 Build Mitigated	2040 NoBuild	2040 Build	2040 Build Mitigated
S-1	Hilda L. Solis Care First Village	Residential	386187.86	3769525.53	190.45	52.96	60.58	14.76	30.51	54.13	12.65	11.412	25.264	12.635	219.54	61.05	69.84	17.01	35.17	62.39	14.58	13.155	29.123	14.57
S-2	Residential1 - Darwin Ave. & Mozart St.	Residential	387379.88	3770337.66	26.93	7.56	11.03	2.68	4.33	9.80	2.29	1.532	4.583	2.285	31.04	8.72	12.71	3.09	4.99	11.30	2.63	1.766	5.283	2.63
S-3	Residential2 - Albion St.	Residential	387263.90	3770496.58	18.89	5.34	7.69	1.87	3.04	6.76	1.56	1.036	3.167	1.571	21.77	6.16	8.87	2.16	3.50	7.79	1.80	1.195	3.651	1.81
S-4	Residential3 - S. Vignes St. & E. 2nd St.	Residential	386095.16	3768120.76	36.48	10.56	19.24	4.67	5.89	16.65	3.80	1.731	7.821	3.843	42.05	12.18	22.18	5.39	6.79	19.19	4.38	1.996	9.015	4.43
S-5	Riverfront Lofts	Residential	386201.88	3768044.45	42.17	11.99	21.25	5.17	6.78	18.80	4.36	2.246	8.792	4.377	48.61	13.82	24.49	5.96	7.82	21.67	5.03	2.590	10.136	5.05
S-6	Binford Lofts	Residential	386155.39	3767721.32	24.16	6.93	12.27	2.98	3.89	10.73	2.47	1.223	5.033	2.485	27.85	7.98	14.14	3.44	4.49	12.37	2.85	1.410	5.802	2.86
S-7	Alisio	Residential	386119.85	3767918.39	29.98	8.61	15.23	3.70	4.83	13.28	3.05	1.500	6.231	3.077	34.55	9.93	17.56	4.27	5.57	15.31	3.52	1.729	7.182	3.55
S-8	Llewellyn Apartments	Residential	386164.52	3769913.51	36.59	10.35	14.59	3.55	5.88	12.80	2.95	2.002	5.999	2.967	42.17	11.93	16.82	4.09	6.78	14.75	3.40	2.308	6.915	3.42
S-9	Molina Street Apartments	Residential	386127.31	3767531.44	18.62	5.36	9.63	2.34	3.01	8.39	1.92	0.920	3.939	1.944	21.47	6.18	11.10	2.70	3.47	9.68	2.22	1.061	4.541	2.24
S-10	AMP Lofts	Residential	386419.51	3766751.99	7.79	2.27	3.91	0.95	1.26	3.35	0.76	0.360	1.577	0.772	8.99	2.61	4.51	1.10	1.45	3.87	0.88	0.416	1.818	0.89
S-11	2121 Lofts	Residential	386570.19	3766587.71	6.56	1.92	3.29	0.80	1.06	2.80	0.63	0.296	1.320	0.644	7.56	2.21	3.79	0.92	1.22	3.23	0.73	0.341	1.521	0.74
S-12	RHF Rio Vista Village	Residential	387234.73	3765708.76	3.13	0.92	1.57	0.38	0.51	1.33	0.30	0.135	0.631	0.303	3.61	1.06	1.81	0.44	0.59	1.54	0.34	0.156	0.727	0.35
S-13	Senior Housing - N. Alameda St. & Alpine St.	Residential	385893.96	3769717.93	36.70	10.61	15.31	17.41	5.93	12.94	2.90	1.757	6.115	2.961	7.90	2.28	3.29	3.75	1.28	2.79	0.62	0.378	1.316	0.64
S-14	Jia Apartments	Residential	385562.65	3769454.08	28.03	8.30	12.62	3.71	4.55	10.34	2.27	1.133	4.918	2.337	32.31	9.57	14.54	4.27	5.25	11.92	2.61	1.306	5.669	2.69
S-15	Cathay Manor Apartments	Residential	385599.36	3769355.77	32.07	9.54	14.46	3.04	5.21	11.75	2.56	1.249	5.600	2.652	36.97	11.00	16.66	3.51	6.00	13.54	2.95	1.439	6.455	3.06
S-16	LA Plaza Village Apartments	Residential	385489.71	3769231.75	24.99	7.39	11.61	3.49	4.06	9.59	2.11	1.023	4.551	2.176	28.80	8.52	13.39	4.02	4.67	11.06	2.43	1.180	5.246	2.51
S-17	Residentia 4 - 726 S. Santa Fe Ave.	Residential	386470.43	3766602.16	6.81	1.98	3.42	2.81	1.10	2.92	0.66	0.315	1.377	0.669	7.85	2.29	3.94	3.24	1.27	3.37	0.76	0.364	1.588	0.77
S-18	William Mead Homes	Residential	386600.55	3769779.86	335.97	91.69	127.93	31.32	53.62	119.23	28.66	22.026	55.169	28.238	387.29	105.70	147.48	36.11	61.81	137.45	33.04	25.391	63.596	32.55
S-19	Mission Road Residences	Residential	386782.61	3768556.15	102.49	28.72	71.27	17.41	16.45	65.14	15.45	5.909	30.259	15.326	118.15	33.11	82.16	20.07	18.96	75.09	17.82	6.811	34.881	17.67
S-20	One SantaFe Apartments	Residential	386243.89	3768116.8	51.49	14.55	25.90	6.31	8.28	23.09	5.39	2.826	10.781	5.387	59.35	16.78	29.86	7.27	9.54	26.62	6.21	3.257	12.428	6.21
S-21	Mosaic Apartments	Residential	385990.07	3769192.91	167.77	51.00	68.70	16.46	27.39	52.52	10.82	5.342	25.380	11.547	193.40	58.79	79.19	18.98	31.57	60.55	12.47	6.158	29.256	13.31

PROJECT TITLE:

METRO LINKUS Operations 2016-Existing Isopleth, DPM concentrations
PM10 (Assume DPM) in ug/m3





PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL
Max: 1.16 [ug/m^3] at (386135.34, 3769245.66)

COMMENTS:

Using all daily train traffic at and around LAUS, trains backing out - existing scenario

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

1.16 ug/m^3

COMPANY NAME:

ZMAssociates Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/5/2023

SCALE: 1:39,642

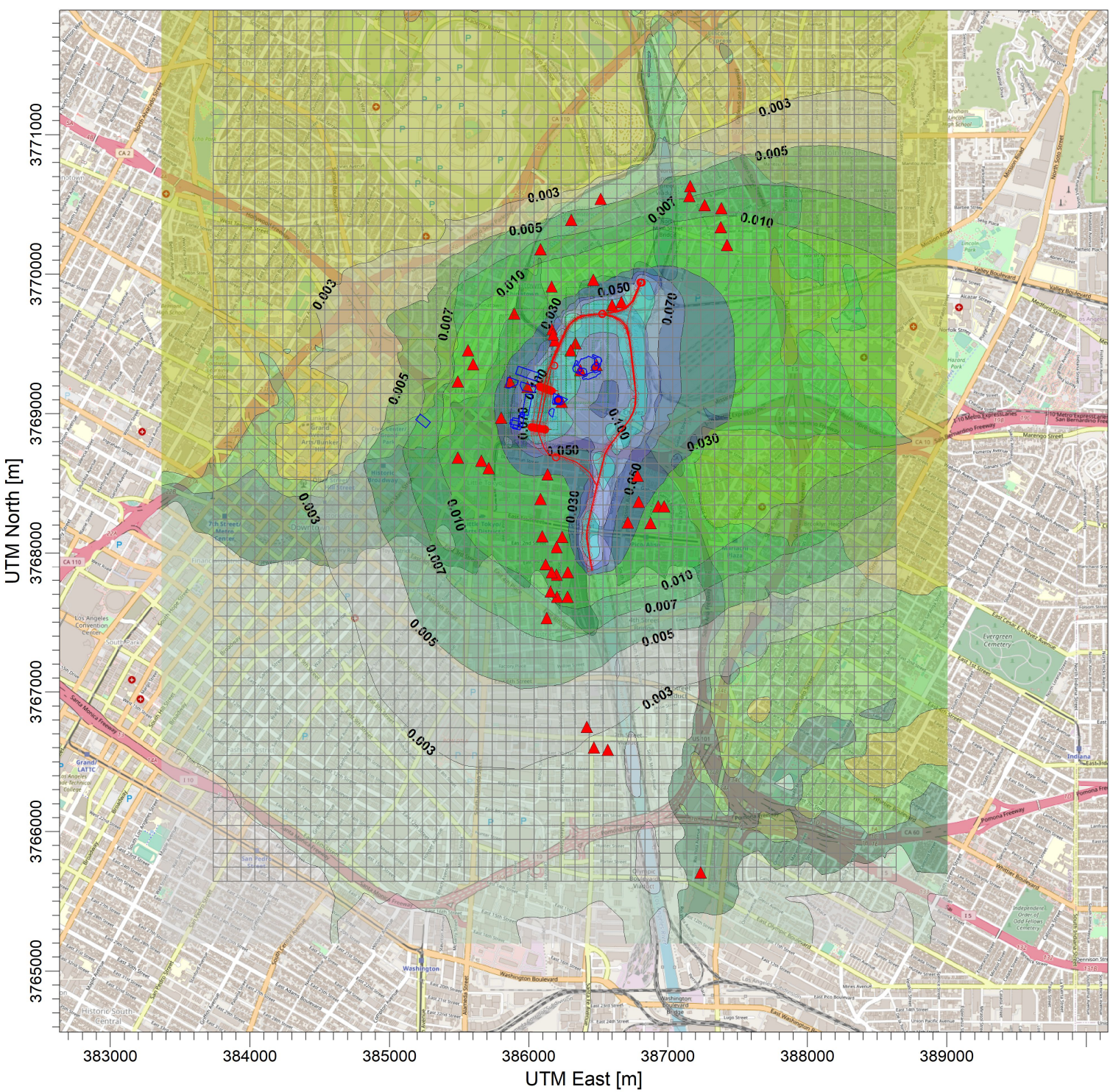
0 1 km

PROJECT NO.:

DR-LINKUS AQ/HHR

PROJECT TITLE:

METRO LINKUS Operations 2026-NoBuild DPM Isopleth Conc.
PM10 (Assume DPM) in ug/m3



ug/m^3
0.330
0.300
0.100
0.070
0.050
0.030
0.010
0.007
0.005
0.003

PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL
Max: 0.330 [ug/m^3] at (386135.34, 3769245.66)

COMMENTS:

Using all daily train traffic at and around LAUS, trains backing out - existing scenario

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

0.330 ug/m^3

COMPANY NAME:

ZMAssociates
Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/5/2023

SCALE: 1:39,948

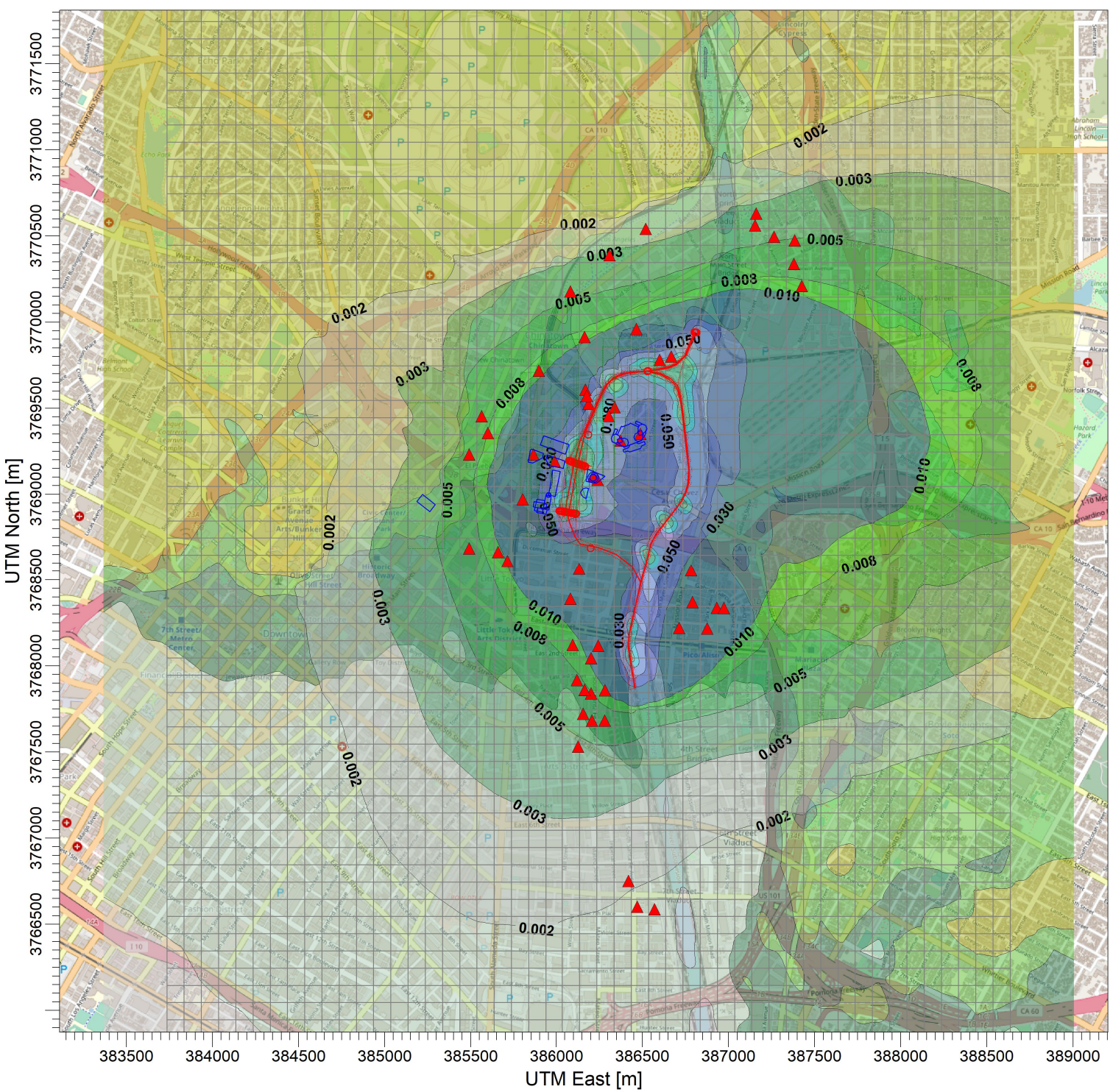
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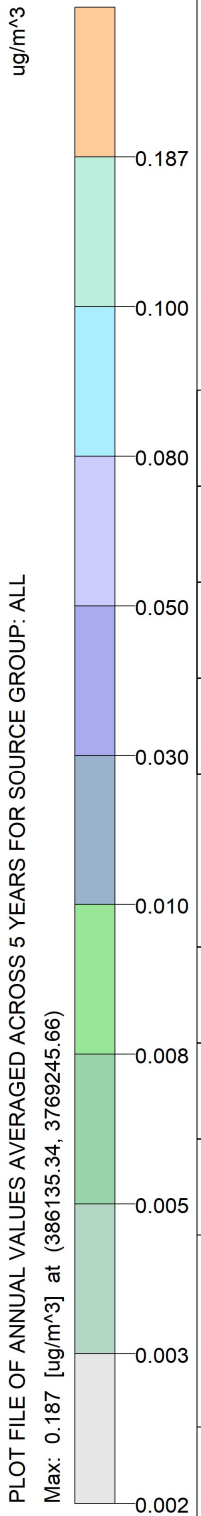
PROJECT NO.:

DR-LINKUS AQ/HHR

PROJECT TITLE:

METRO LINKUS Operations 2031-NoBuild DPM Isopleth Conc.
PM10 (Assume DPM) in ug/m3





PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL
Max: 0.187 [ug/m^3] at (386135.34, 3769245.66)

COMMENTS:

Using all daily train traffic at and around LAUS, trains backing out - existing scenario

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

0.187 ug/m^3

COMPANY NAME:

ZMAssociates Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/5/2023

SCALE: 1:32,360

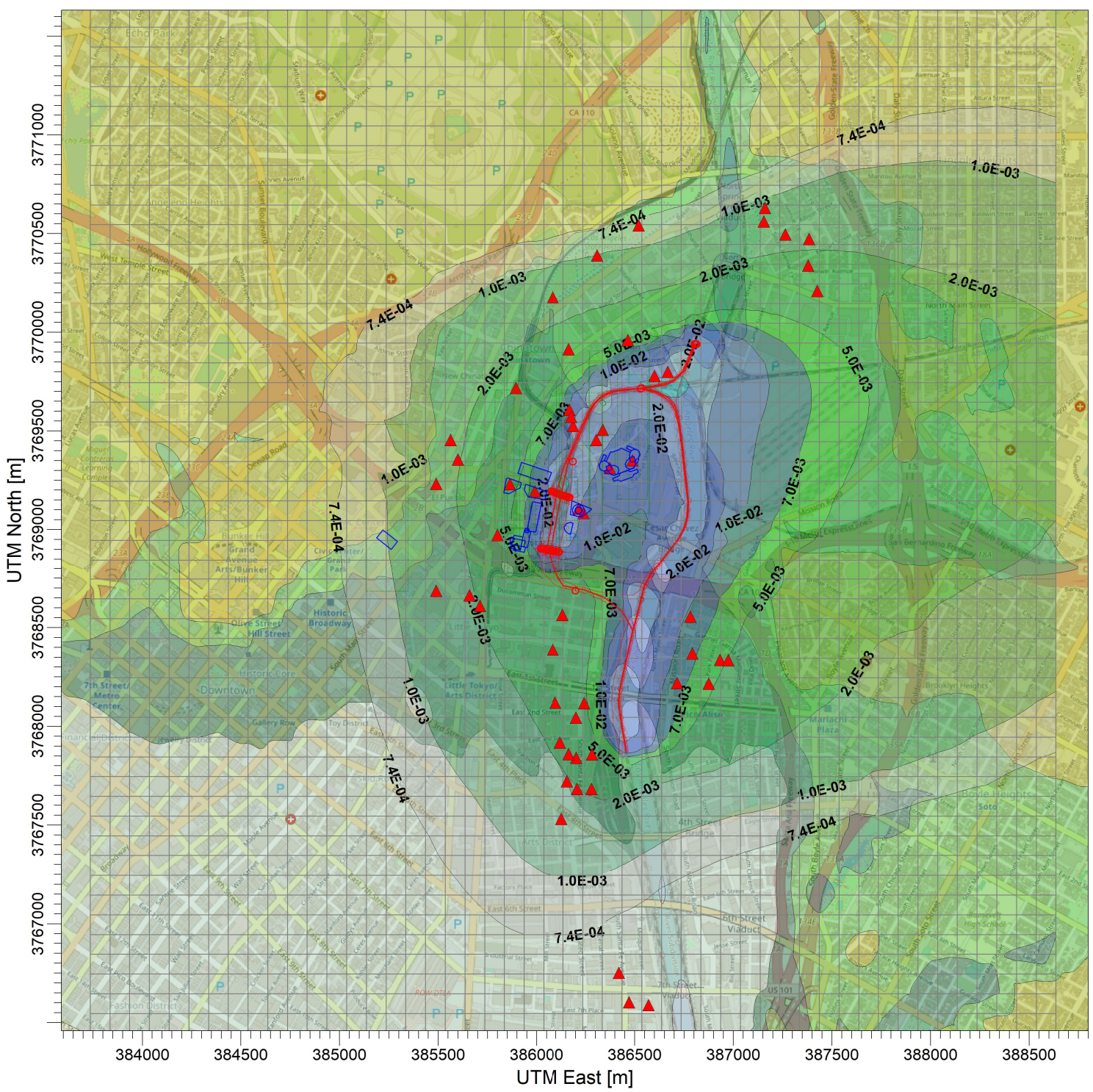
0 1 km

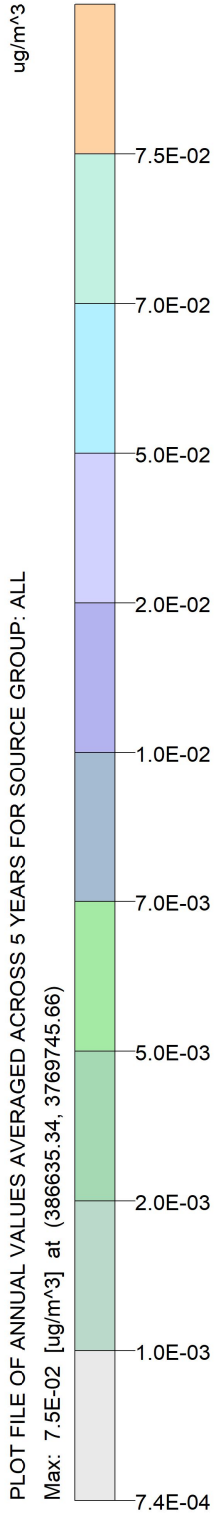
PROJECT NO.:

DR-LINKUS AQ/HHR

PROJECT TITLE:

METRO LINKUS Operations 2040-NoBuild_DPM Isopleth Conc.
PM10 (Assume DPM) in ug/m3





PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL
Max: 7.5E-02 [ug/m^3] at (386635.34, 3769745.66)

COMMENTS:

Using all daily train traffic at and around LAUS, trains backing out - existing scenario

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

7.5E-02 ug/m^3

COMPANY NAME:

ZMAssociates Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/5/2023

SCALE: 1:28,202

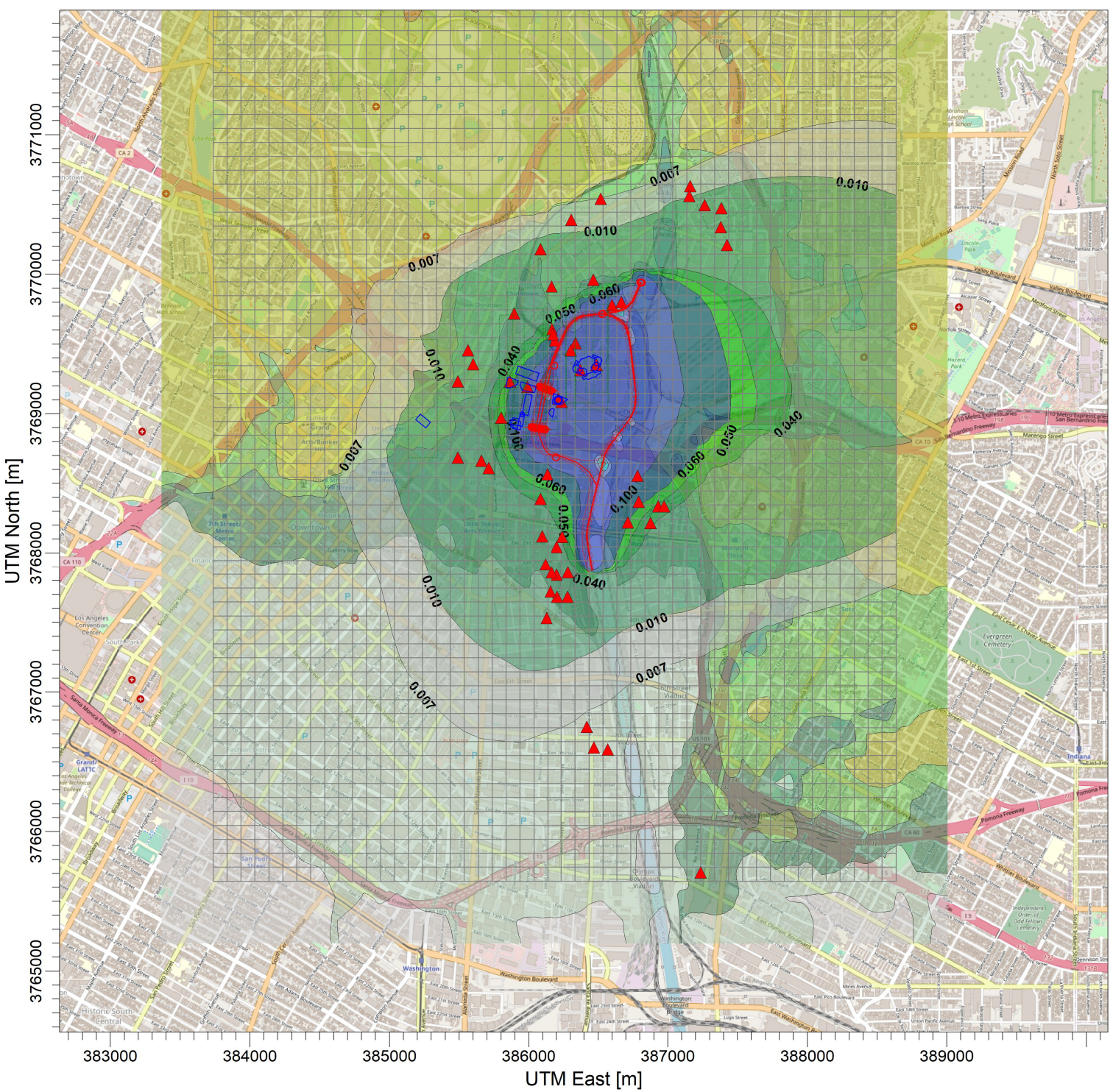
0 0.5 km

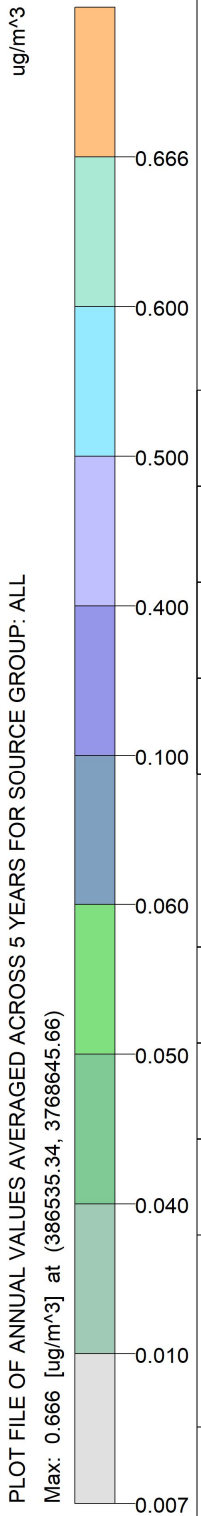
PROJECT NO.:

DR-LINKUS AQ/HHR

PROJECT TITLE:

METRO LINKUS Operations 2026-Build DPM Isopleth Conc.
PM10 (Assume DPM) in ug/m3





PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL
Max: 0.666 [ug/m^3] at (386535.34, 3768645.66)

COMMENTS:

Using all daily train traffic at and around LAUS, trains backing out - existing scenario

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

0.666 ug/m^3

COMPANY NAME:

ZMAssociates Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/5/2023

SCALE: 1:39,948

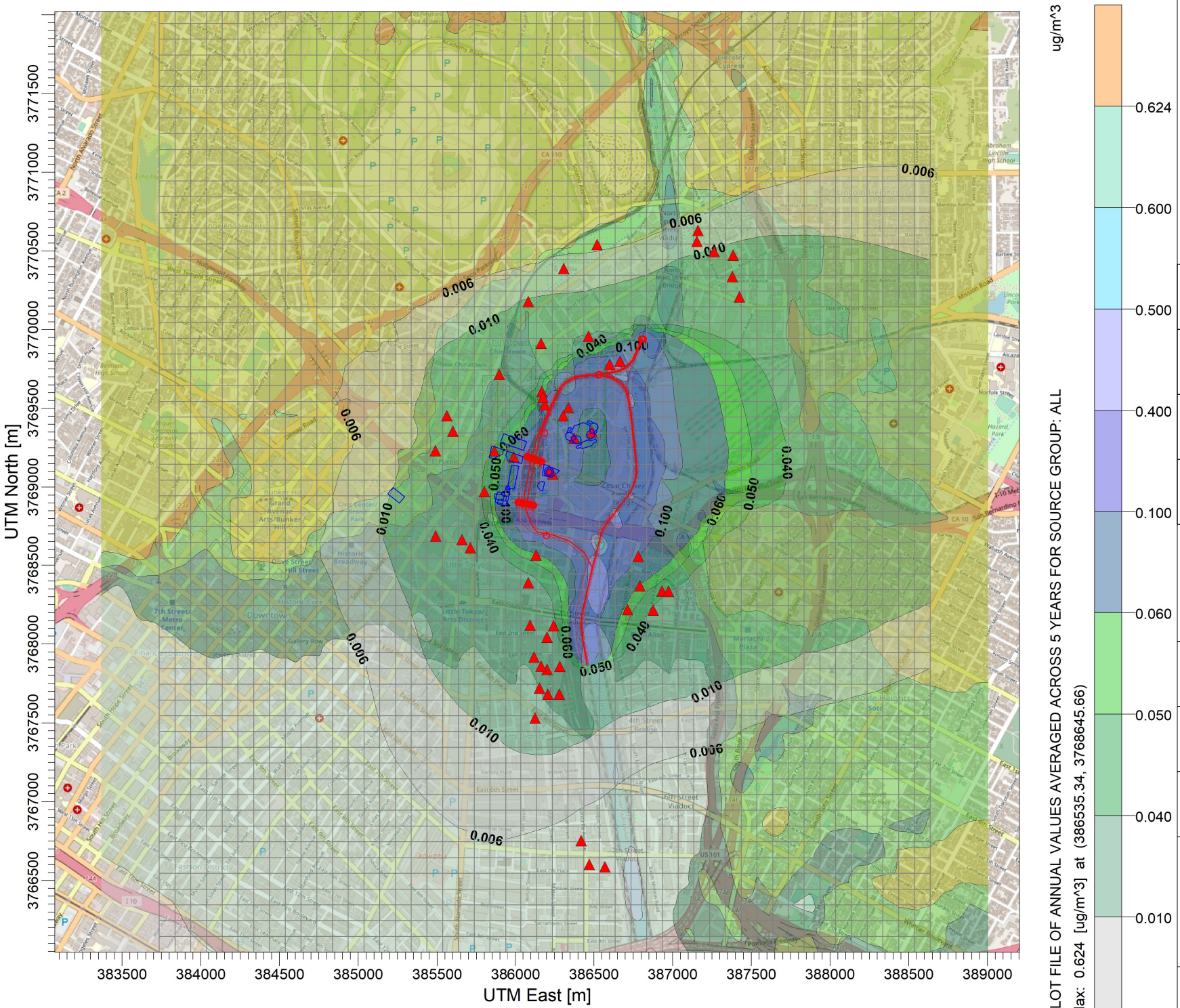
0 1 km

PROJECT NO.:

DR-LINKUS AQ/HHR

PROJECT TITLE:

METRO LINKUS Operations 2031-Build DPM Isopleth Conc.
PM10 (Assume DPM) in ug/m3



PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL
Max: 0.624 [ug/m^3] at (386535.34, 3768645.66)

COMMENTS:

Using all daily train traffic at and around LAUS, trains backing out - existing scenario

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

0.624 ug/m^3

COMPANY NAME:

ZMAssociates Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/5/2023

SCALE: 1:32,576

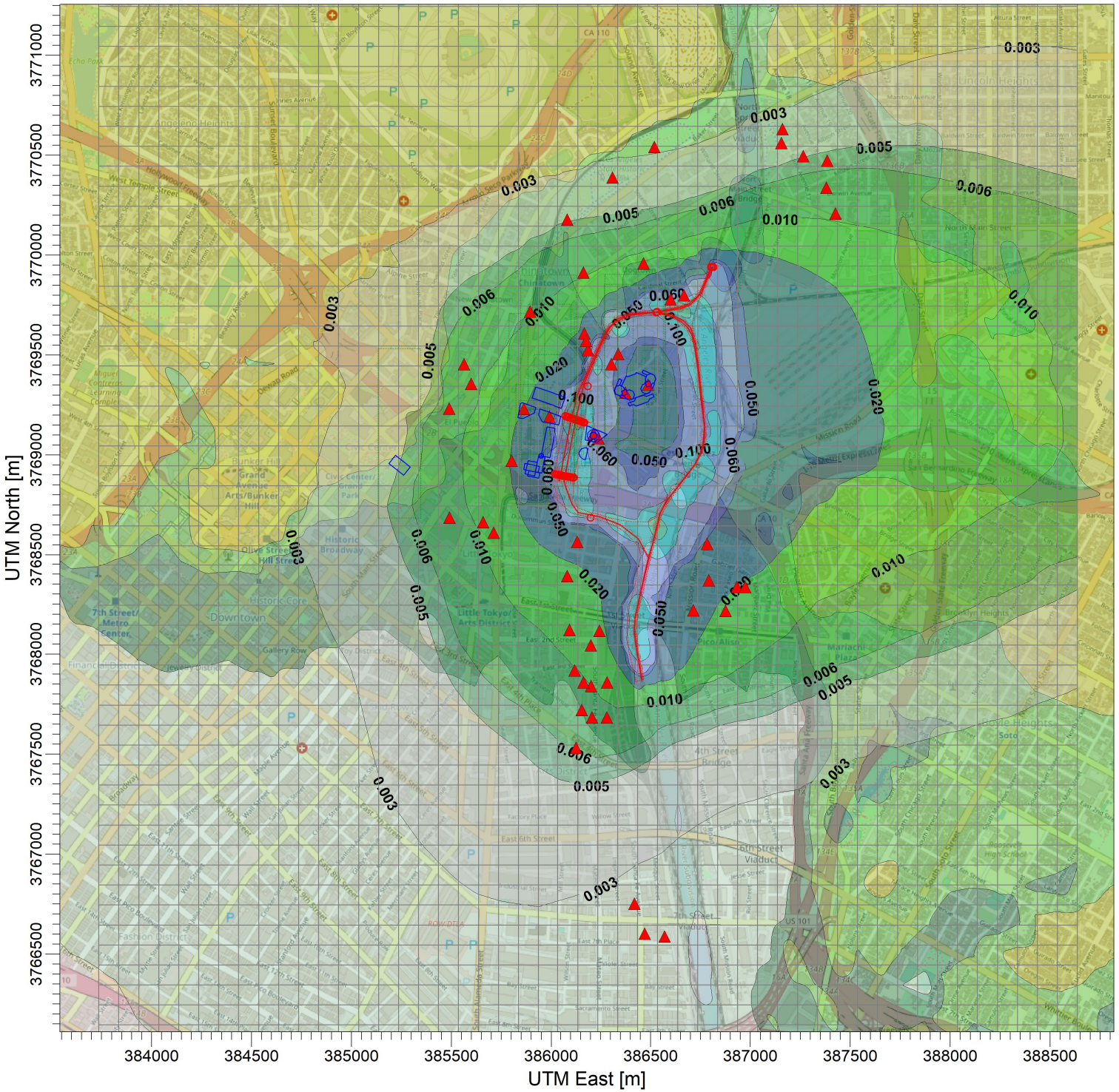
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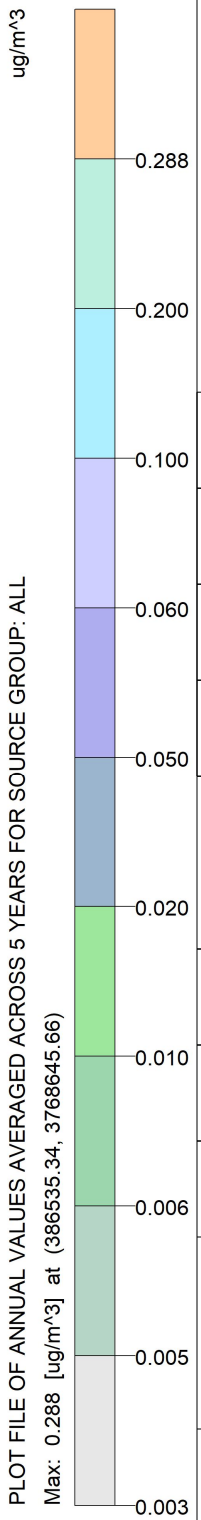
PROJECT NO.:

DR-LINKUS AQ/HHR

PROJECT TITLE:

METRO LINKUS Operations 2040-Build_DPM Isopleth Conc.
PM10 (Assume DPM) in ug/m3





PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL
Max: 0.288 [ug/m^3] at (386535.34, 3768645.66)

COMMENTS:

Using all daily train traffic at and around LAUS, trains backing out - existing scenario

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

0.288 ug/m^3

COMPANY NAME:

ZMAssociates Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/5/2023

SCALE: 1:28,041

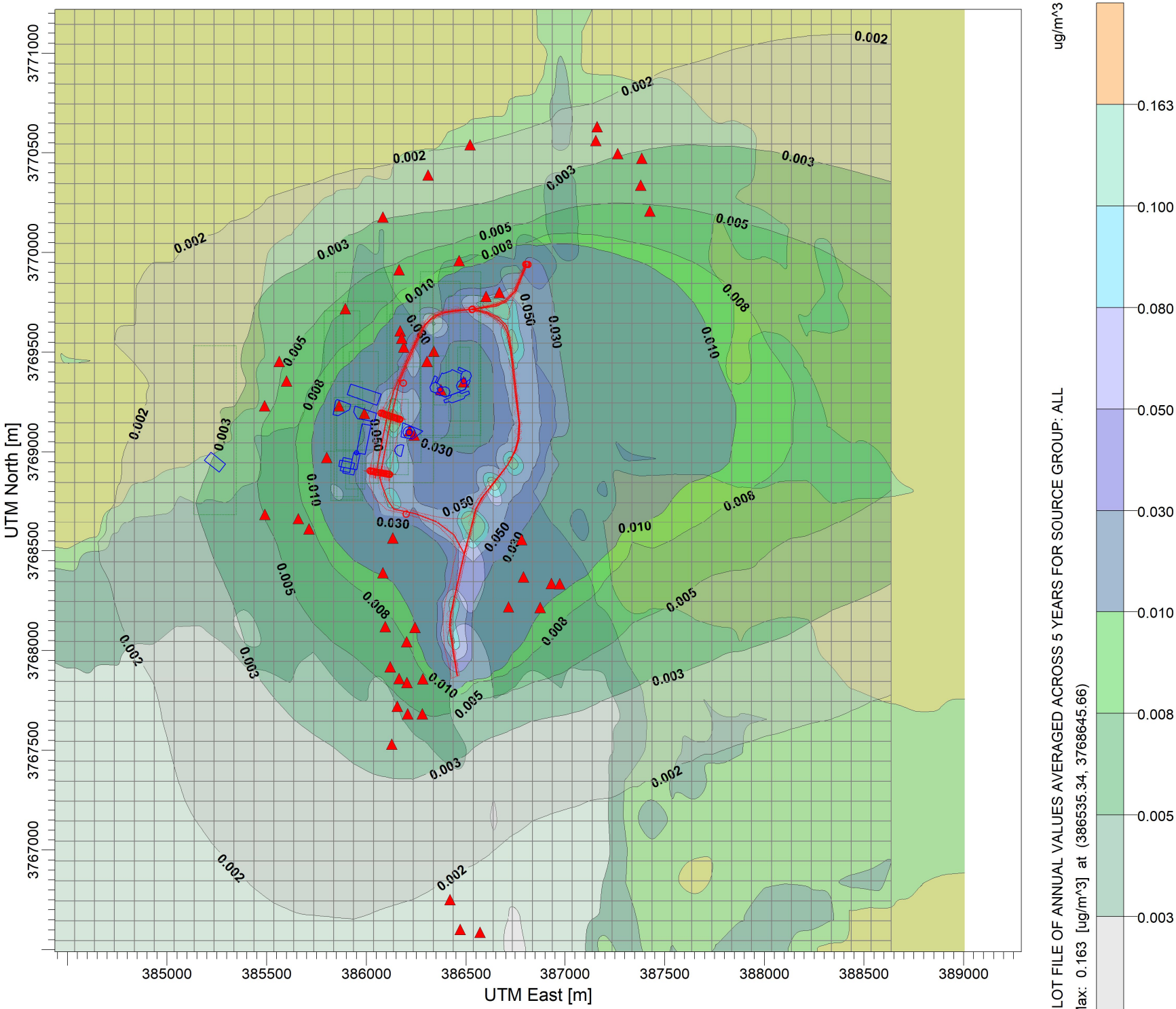
0 0.5 km

PROJECT NO.:

DR-LINKUS AQ/HHR

PROJECT TITLE:

METRO LINKUS Operations 2026-Build Mitigated Annual_ave_DPM Isopleth Conc.
PM10 (Assume DPM) in ug/m3



COMMENTS:

Additional Mitigation
Second Model Run

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

0.163 ug/m^3

COMPANY NAME:

ZMAssociates
Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/15/2023

SCALE: 1:25,780

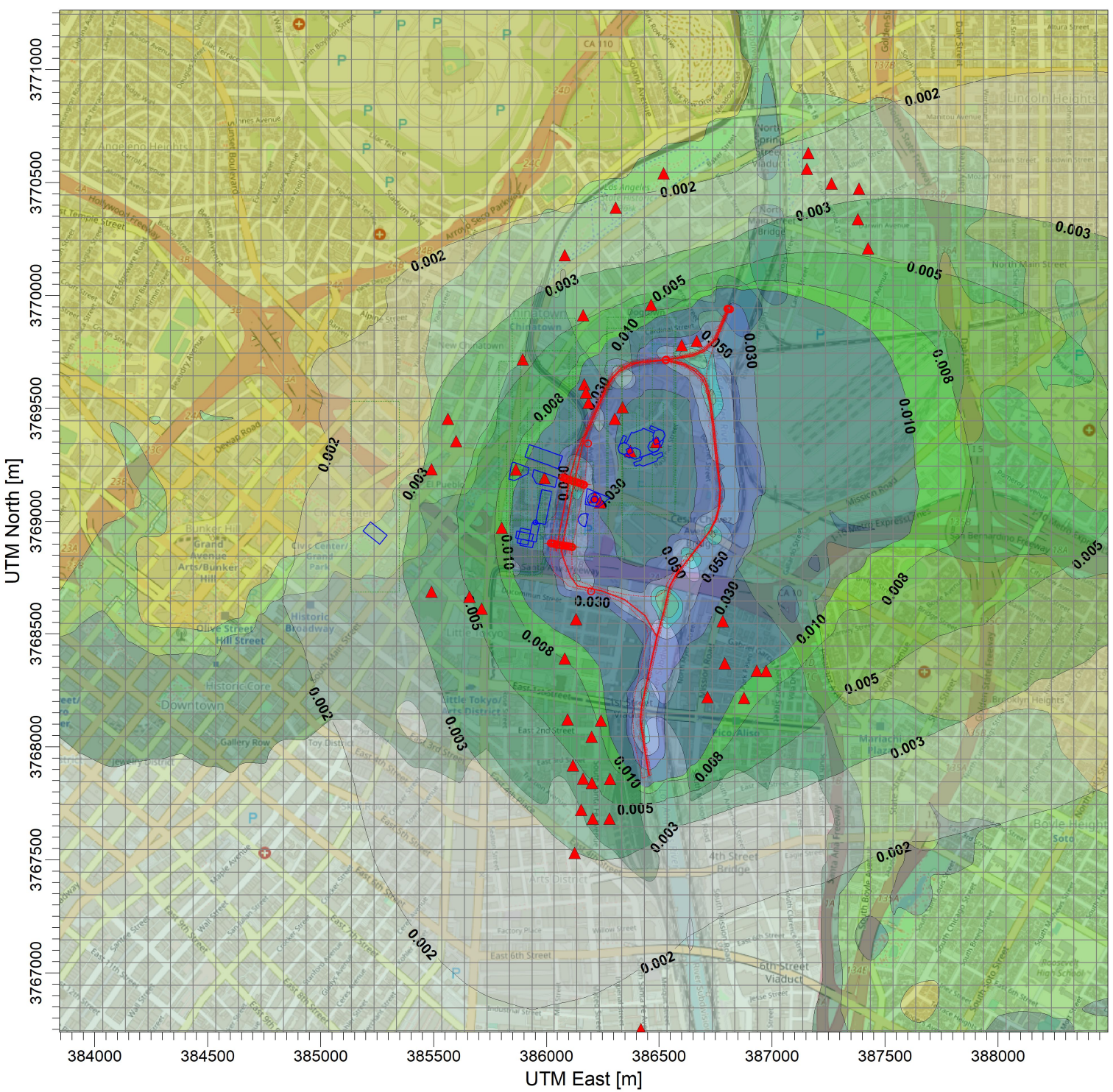
0 0.5 km

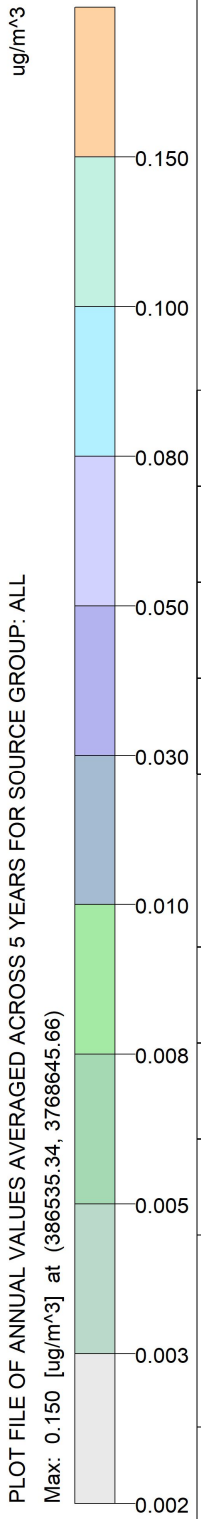
PROJECT NO.:

DR-LINKUS AQ/HHR

PROJECT TITLE:

METRO LINKUS Operations 2031-Build_Mitigated Annual_ave_DPM Isopleth Conc.
PM10 (Assume DPM) in ug/m3





PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL
Max: 0.150 [ug/m^3] at (386535.34, 3768645.66)

COMMENTS:

Additional Mitigation

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

0.150 ug/m^3

COMPANY NAME:

ZMAssociates
Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/15/2023

SCALE: 1:24,663

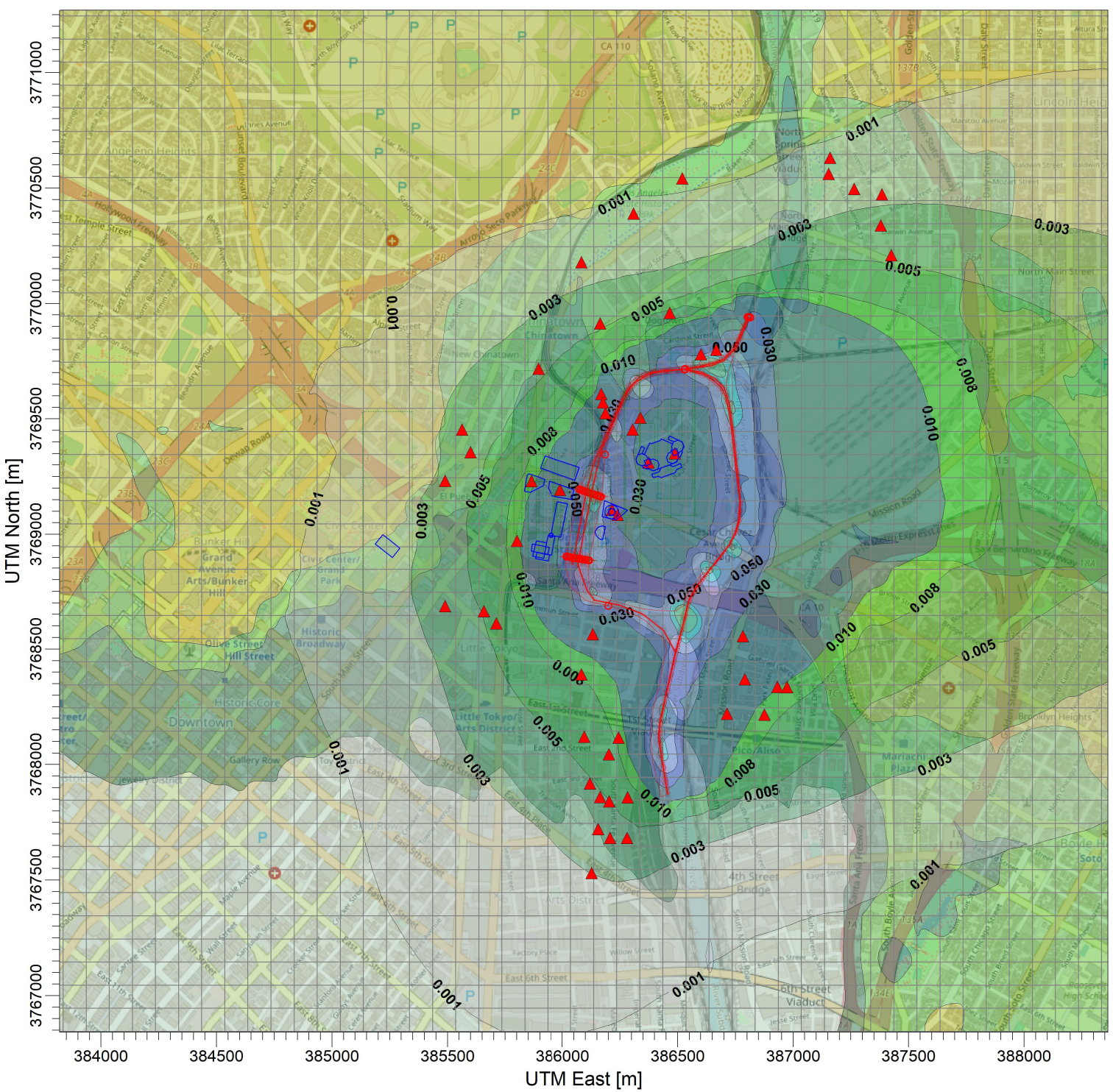
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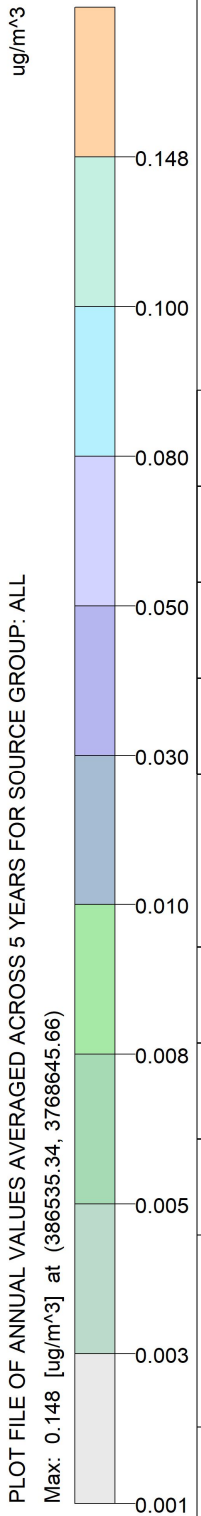
PROJECT NO.:

DR-LINKUS AQ/HHR

PROJECT TITLE:

METRO LINKUS Operations 2040-Build_Mit_Annual_ave_DPM Isopleth Conc.
PM10 (Assume DPM) in ug/m3





PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL
Max: 0.148 [ug/m^3] at (386535.34, 3768645.66)

COMMENTS:

Additional Mitigation

SOURCES:

35

RECEPTORS:

3805

OUTPUT TYPE:

Concentration

MAX:

0.148 ug/m^3

COMPANY NAME:

ZMAssociates
Emvironmental Corp

MODELER:

Thomas Miller

DATE:

12/16/2023

SCALE: 1:24,136

0 0.5 km

PROJECT NO.:

DR-LINKUS AQ/HHR