APPENDIX J

GREENHOUSE GAS EMISSIONS TECHNICAL REPORT

Prepared for
The Los Angeles Aerial Rapid Transit Draft Environmental Impact Report

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GREENHOUSE GAS EMISSIONS TECHNICAL REPORT

LOS ANGELES AERIAL RAPID TRANSIT PROJECT LOS ANGELES, CALIFORNIA

RAMBOLL

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ACC	Advanced Clean Cars
ACR	American Carbon Registry
AR4	IPCC's Forth Assessment Report
AR5	IPCC's Fifth Assessment Report
ART	aerial rapid transit
BAU	Business-As-Usual
bhp	brake horsepower
CalEEMod®	California Emission Estimator Model®
CAA	Clean Air Act
CAAP	Climate Action and Adaptation Plan
CAFE	Corporate Average Fuel Economy
CalGreen	The California Green Building Standards
CalRecycle	California Department of Resources Recycling and Recovery
CAP	Climate Action Plan
CARB	California Air Resources Board
CCCC	California Climate Change Center
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CH_4	Methane
CO_2	Carbon dioxide
CO_2/year	Carbon dioxide per year
CO_2e	CO_2 Equivalents
CPUC	California Public Utilities Commission
DWR	Department of Water Resources
EISA	Energy Independence and Security Act of 2007
EMFAC	EMission FACtor Model
EO	Executive Order
ES	Executive Summary
FAR	first assessment report

ACRONYMS AND ABBREVIATIONS *(CONTINUED)*

FHWA	Federal Highway Administration
FTA	Federal Transit Administration
g/bhp-hr	gram per brake horsepower-hour
GHG	Greenhouse Gas
GHS	grid harmonization strategies
GW	Gigawatt
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
HVAC	heating, ventilation and air conditioning
i	equipment type
IPCC	Intergovernmental Panel on Climate Change
LA	Los Angeles
LADWP	Los Angeles Department of Water and Power
LAUS	Los Angeles Union Station
lbs	pounds
LEED	Leadership in Energy and Environmental Design
LID	Low Impact Development
Metro	Los Angeles County Metropolitan Transportation Authority
MPO	Metropolitan Planning Organization
MSW	Municipal Solid Waste
MT	Metric Tons
$MTCO_2e$	Metric Tons of CO_2 Equivalent
$MTCO_2e$/yr	Metric Tons of CO_2 Equivalent per year
MT/year	Metric Tons per Year
MW	Megawatt
MWh	Megawatt-Hour
N_2O	Nitrous Oxide
NHTSA	National Highway Traffic Safety Administration
OPR	Office of Planning and Research
PFCs	perfluorocarbons
ppm	Parts Per Million
ROW	right-of-way

ACRONYMS AND ABBREVIATIONS *(CONTINUED)*

RPS	Renewables Portfolio Standard
RTP	Regional Transportation Plan
SAFE	Safer Affordable Fuel-Efficient
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
SLCPs	short-lived climate pollutants
SLTRP	Strategic Long-Term Resource Plan
TDV	Time Dependent Valuation
TDM	Transportation Demand Management
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
yd	yard
ZEV	zero emission vehicles
ZNE	zero net energy

EXECUTIVE SUMMARY

The proposed Los Angeles Aerial Rapid Transit Project ("Project") would connect Los Angeles Union Station (LAUS) to the Dodger Stadium property via an aerial gondola system. The Project would provide an aerial rapid transit (ART) option for visitors to Dodger Stadium, while also providing access between Dodger Stadium, the surrounding communities and the regional transit system accessible at Union Station. This Project would reduce the traffic to and from Dodger Stadium on game day, with resulting benefits to air quality and greenhouse gases (GHGs).

The Project represents the first aerial transportation gondola system in a densely populated area in the United States since 2007. The Project will facilitate acceptance of transportation alternatives consistent with local, regional and statewide policies to reduce traffic, air pollution, and GHGs by reducing vehicle miles traveled. As a breakthrough and innovative technology for the region, the Project advances future alternative transportation modes in the Los Angeles area while providing a template for aerial projects elsewhere in California and the United States.

This assessment evaluates the changes in GHG emissions. The Project is expected to be operational as early as 2026, with construction beginning as early as 2024.

The Project would result in one-time and annual direct and indirect emissions of GHGs. The term, "direct emissions of GHGs" refers to GHGs that are emitted directly as a result of the project and include land use change and construction emissions. Indirect emissions are those emissions that the project entitlement would enable, but are not controlled by the project proponent. This report provides an inventory surveying the emissions that would result from the Project.

The GHG emissions inventory presented in **Section 3** of this analysis includes the following sources of emissions: (1) area sources (e.g., landscaping-related fuel combustion sources); (2) energy use associated with the gondola; (3) water and wastewater treatment and distribution; (4) solid waste; (5) mobile sources (e.g., passenger vehicles); (6) construction; and (7) vegetation changes. The ongoing operational emissions consist of the first five categories, while the one-time emissions are associated with construction and vegetation changes. The most significant GHG emissions resulting from infrastructure developments such as the Project are emissions of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). GHG emissions are typically measured in terms of metric tons of CO_2 equivalents (CO_2e), calculated as the product of the mass emitted of a given GHG and its specific global warming potential (GWP). The electrical power for the Project would be supplied by the City of Los Angeles Department of Water and Power (LADWP) through the utility's Green Power Program. Accordingly, the primary electricity usage associated with the Project would come from renewable resources.

This report quantifies the Project's GHG emission inventory, considers the potential for whether the Project's GHG inventory could result in a significant GHG impact, and assesses the significance of the Project's GHG emissions by evaluating the Project's compliance and consistency with applicable statutes, regulations, plans and policies adopted for the purpose of reducing the emissions of GHGs, including Assembly Bill (AB) 32 and Senate Bill (SB) 32, SB 375, the Los Angeles County Metropolitan Transportation Authority's (Metro) 2019

Climate Action and Adaptation Plan,[1] and the Southern California Association of Government's 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy *Connect SoCal.*[2]

Table ES-1 presents the Project's annual average GHG emissions in metric tons of carbon dioxide equivalents per year as well as the GHG emissions inventory for the existing conditions.

As shown in the table, the Project would result in a ***net decrease*** in GHG emissions as compared to the existing conditions. In addition, the Project would be consistent with State, regional, and local GHG plans, policies, and regulations. The Project's GHG impacts would be less than significant.

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1 Los Angeles County Metropolitan Transportation Authority (Metro). 2019. Metro Climate and Adaptation Plan 2019. Available at: https://media.metro.net/projects_studies/sustainability/images/Climate_Action_Plan.pdf. Accessed: April 2022.

2 Southern California Association of Governments (SCAG). 2020. The 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy of the Southern California Association of Governments. Adopted September 3, 2020. Available at: https://scag.ca.gov/read-plan-adopted-final-plan. Accessed: April 2022.

1. INTRODUCTION

The purpose of this technical report is to present the quantitative analyses that were used to evaluate the greenhouse gas (GHG) emissions associated with the proposed Los Angeles Aerial Rapid Transit Project ("Project"). Emissions during both construction and operations of the Project were quantified. Legislation and rules regarding climate change, as well as scientific understanding of the extent to which different activities emit GHGs, continue to evolve; as such, the inventory in this report is a reflection of the guidance and knowledge currently available.

Existing conditions are represented by the GHG emissions in 2019 from vehicle traffic associated with those attending Dodger games and other major events at Dodger Stadium.

1.1 Project Description

1.1.1 Project Overview

The Project would connect Los Angeles Union Station (LAUS) to the Dodger Stadium property via an aerial gondola system. The Project would include an intermediate station at the southernmost entrance of the Los Angeles State Historic Park. The Project would provide an aerial rapid transit (ART) option for visitors to Dodger Stadium, while also providing access between the Dodger Stadium property, the surrounding communities (including Chinatown, Mission Junction, the Los Angeles State Historic Park, Elysian Park, and Solano Canyon), and the regional transit system accessible at LAUS. The aerial gondola system would be approximately 1.2 miles and consist of cables, three passenger stations, a non-passenger junction, towers, and gondola cabins. When complete, the Project would have a maximum capacity of approximately 5,000 people per hour per direction, and the travel time from LAUS to Dodger Stadium would be approximately seven minutes.

The Project would provide amenities at Los Angeles State Historic Park and would provide pedestrian improvements, including hardscape and landscape improvements. The ART system has the ability to overcome grade and elevation issues between LAUS and Dodger Stadium, be powered by renewable electricity, and provide safe, environmentally friendly, and high-capacity transit connectivity in the Project area that would reduce GHG emissions as a result of reduced vehicular congestion in and around Dodger Stadium and on neighborhood streets, arterial roadways, and freeways. The Project would operate daily to serve existing residents, workers, park users, and visitors to Los Angeles.

1.1.2 Project Location

The Project is located in the City of Los Angeles, situated northeast of downtown Los Angeles.

The Project would commence adjacent to LAUS and El Pueblo de Los Angeles ("El Pueblo") and terminate at Dodger Stadium, with an intermediate station at the southernmost entrance of the Los Angeles State Historic Park. The Project would include three stations, a non-passenger junction, and three cable-supporting towers at various locations along the alignment. The Project "alignment" is defined as the length and width of suspended above-grade cables and cabins following the position of the Project components along the ART route from Alameda Station to Dodger Stadium Station.

The Project location would generally be located within public right-of-way (ROW), or on publicly owned property, following Alameda Street and then continuing along Spring Street in a northeast direction through the community of Chinatown to the southernmost corner of the Los Angeles State Historic Park. The alignment would then continue northeast over the western edge of the Los Angeles State Historic Park and the Los Angeles County Metropolitan Transportation Authority (Metro) L Line (Gold) to the intersection of North Broadway and Bishops Road. At this intersection, the Project alignment would turn and continue northwest following Bishops Road towards its terminus at Dodger Stadium, located in the Elysian Park community.

1.1.3 Project System Operations

During operations, the cabins would travel on a continuous loop between the Alameda Station and the Dodger Stadium Station. Cabins would pass through passenger stations at roughly one foot per second (less than one mile per hour) to allow for unloading and loading. Operation of the Project would require approximately 20 personnel.

The Project would require routine maintenance that would be performed by the system operator. The overall system would be observed on a daily basis as part of the startup routine.

Operational power requirements can be separated into two categories: normal operations and emergency operations. Power requirements for one hundred percent of the power for the Project would be provided by the City of Los Angeles Department of Water and Power's (LADWP's) Green Power Program, through a connection to their power grid, and would include the power to operate the gondola system and the non-gondola system components (i.e. lights, ventilation, escalators, elevators). When operating at capacity, normal operations are estimated to require a total of approximately 2.5 megawatts of power.

Power requirements for emergency operations consist of the energy needed for operations in the event of a temporary power grid failure. The Project would install backup battery storage at each station, tower, and junction to provide backup power to allow unloading of the system in the event of a temporary power grid failure. The total backup power required to allow unloading of the system is 1.4 megawatts.

1.1.4 Project Sustainability Features

The Project's stations, junction, towers, and gondola cabins would incorporate energy efficient, sustainable, water and waste efficient, and resilient features. The proposed stations and junction are designed to be open-air buildings, allowing for passive ventilation strategies and providing direct access to outdoor air and natural daylight, while also providing adequate shade protection from heat. The cabins would be ventilated to enhance air quality for passengers. The electrical power for the Project would be supplied by LADWP through the utility's Green Power Program. Accordingly, the primary electricity usage associated with the Project would come from renewable resources. In addition, the Project would install backup battery storage at each station, tower, and junction to provide backup power to allow unloading of the system in the event of a temporary power grid failure.

The design intent and structural strategy for the stations and towers also provides an efficiency of materials. The steel plate tower forms have been designed as "Monocoque" structures, where structure, form, and finish are unified. Materials for the stations, junction, and towers would be locally sourced where possible and would include recycled content were possible. Light-toned finish materials will also serve to minimize heat island concerns.

The Project would be designed to comply with all applicable State and local codes, including conformance with the City of Los Angeles Green Building and Low-Impact Development (LID) Ordinances.

This Project would reduce the traffic to and from Dodger Stadium on game days and for other events, with resulting benefits to air quality and GHGs. This assessment evaluates the changes in emissions of GHGs.

Analysis of the Project's GHG emissions incorporates the following regulatory measures:

Regulatory Measures

- The CO_2e intensity factor from LADWP incorporates the progress made to date to meet the requirements of the Renewable Portfolio Standard (RPS) as well as estimates the progress to be made under Senate Bill (SB) 100, which increases the RPS to 50% of total retail electricity sales by 2026, and 60% of total retail electricity sales by 2030, as well as establishing a State policy goal to achieve 100 percent carbon-free electricity by 2045.
- State and federal regulations aimed at lowering vehicle emission rates such as California's Advanced Clean Trucks and Heavy-Duty Omnibus regulations are included in vehicle emissions estimates for the Project,[3].
- New non-residential buildings will meet the 2019 Title 24 Part 6 building code.

[3] As stated in the EMFAC2021 technical documentation. Available at: https://ww2.arb.ca.gov/sites/default/files/2021-08/emfac2021_technical_documentation_april2021.pdf. Accessed: April 2022.

2. SCIENTIFIC BACKGROUND, REGULATORY BACKGROUND, AND SIGNIFICANCE THRESHOLDS

This section presents the scientific and regulatory frameworks associated with global climate change and GHG emissions and discuss the significance thresholds used to evaluate the Project's GHG emissions.

2.1 Scientific Background

2.1.1 Science of Global Climate Change

There is a general scientific consensus that global climate change is occurring, caused in whole or in part by increased emissions of GHGs that keep the Earth's surface warm by trapping heat in the Earth's atmosphere, in much the same way as glass traps heat in a greenhouse. The Earth's climate is changing because human activities, primarily the combustion of fossil fuels, are altering the chemical composition of the atmosphere through the buildup of GHGs.

GHGs allow the sun's radiation to penetrate the atmosphere and warm the Earth's surface, but do not let the infrared radiation emitted from the Earth escape back into outer space. As a result, global temperatures are predicted to increase over the century. In particular, if climate change remains unabated, surface temperatures in California are expected to increase anywhere from 4.1 to 8.6 degrees Fahrenheit by the end of the century.

Emissions of carbon dioxide (CO_2) are the leading cause of global warming, with other pollutants such as methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride also contributing. The magnitude of each GHG's impact on global warming differs because each GHG has a different global warming potential (GWP), which indicates, on a pound for pound basis, how much the pollutant will contribute to global warming relative to how much warming would be caused by the same mass of CO_2. CH_4 and N_2O, for example, are substantially more potent than CO_2, with GWPs of 25 and 298, respectively.[4]

The effect each GHG has on climate change is measured as a combination of the volume of its emissions, and its GWP, and is expressed as a function of how much warming would be caused by the same mass of CO_2. Thus, GHG emissions are typically measured in terms of pounds or metric tons of CO_2 equivalents (CO_2e). CO_2 has the greatest impact on global warming because of the relatively large quantities of CO_2 emitted into the atmosphere.

Globally, CO_2 concentrations, which ranged from 265 parts per million (ppm) to 280 ppm over the last 10,000 years, only began rising in the last 200 years to current levels of approximately 418 ppm,[5] a 49 percent increase.

In 2017, the United States emitted about 6.5 billion metric tons (gross emissions) of CO_2e. This represents a 1.3 percent increase since 1990, and a 13.0 percent reduction below peak levels in 2005. Of the six economic sectors - residential, commercial, industrial, transportation, electric power, and agriculture - transportation accounted for the highest

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4 The GWPs are based on 2007 IPCC's Fourth Assessment Report (AR4) as used in CalEEMod® and GHG emissions inventories published by the California Air Resources Board. The IPCC Fifth Assessment Report revises the 100-year GWPs to 28 and 265 for CH_4 and N_2O, respectively.

5 NOAA. 2020. Monthly Average Mauna Loa CO_2. Available at: https://www.esrl.noaa.gov/gmd/ccgg/trends/. Accessed: April 2022.

fraction of GHG emissions in 2017 (approximately 29 percent). Of the transportation-related emissions, 6.9 percent were from commercial aircraft and 2.4 percent from other aircraft. The majority of transportation emissions were from passenger cars (41.2 percent); freight trucks (23.3 percent), and light-duty trucks (17.5 percent).[6]

According to the 2016 U.S. Climate Action Report,[7] from 2005 to 2013, transportation emissions dropped by 9 percent due, in part, to increased fuel efficiency across the U.S. vehicle fleet and efficiency in the domestic aviation system. However, from 1990 to 2017 as a whole, transportation emissions rose by 17 percent, principally because of increased demand for travel as a result of a confluence of factors including population growth, economic growth, urban sprawl, and periods of low fuel prices.[8]

In 2018, California emitted approximately 425 million metric tons of CO_2e, or about 7 percent of the U.S. emissions. Of these emissions, approximately 40 percent were attributed to the transportation sector, including direct emissions from vehicle tailpipe, off-road transportation mobile sources, intrastate aviation, rail, and watercraft.[9] California's percent contribution to overall U.S. emissions is due primarily to the sheer size of California compared to other states, as California has among the lowest per capita GHG emission rates in the country, due to the success of its energy efficiency and renewable energy programs and other commitments that have lowered the State's GHG emissions rate of growth by more than half of what it would have been otherwise. Another factor that has reduced California's fuel use and GHG emissions is its mild climate compared to that of many other states.

The largest contributor to California's 2018 GHG emissions inventory was the transportation sector at 40 percent, followed by industrial sources at 21 percent, electricity generation (both in-state and out-of-state) at 15 percent, and commercial and residential sources at 10 percent. Agriculture, high GWP sources (including the release of ozone depleting substances, losses from the electricity transmission and distribution system, and gases from semiconductor manufacturing processes), and the recycling and waste sectors made up the remainder of the inventory.[10]

2.1.2 Effects of Human Activity on Global Climate Change

Globally, climate change has the potential to impact numerous environmental resources through anticipated, though uncertain, impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. At the end of the 21st century, global surface temperature

[6] USEPA. 2019. Inventory of U.S. Greenhouse Gas Emissions and Sinks. Available at: https://www.epa.gov/sites/production/files/2019-04/documents/us-ghg-inventory-2019-main-text.pdf. Accessed: April 2022.

[7] United States. 2016. 2016 Climate Action Report: Second Biennial Report of the United States of America Under the United Nations Framework Convention on Climate Change.

[8] USEPA. 2019. Inventory of U.S. Greenhouse Gas Emissions and Sinks. Available at: https://www.epa.gov/sites/production/files/2019-04/documents/us-ghg-inventory-2019-main-text.pdf. Accessed: April 2022.

[9] CARB. 2020. California Greenhouse Gas Emissions for 2000-2018 – Trends of Emissions and Other Indicators. Available at: https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2018/ghg_inventory_trends_00-18.pdf. Accessed: April 2022.

[10] Ibid.

change is likely to exceed 1.5 degrees Celsius (relative to 1850-1900 levels) in all of the four assessed climate model projections but one.[11]

The understanding of GHG emissions, particulate matter, and aerosols on global climate trends is complex and involves varying uncertainties and a balance of different effects. In addition to uncertainties about the extent to which human activity rather than solar or volcanic activity is responsible for increasing warming, there is also evidence that some human activity has cooling, rather than warming, effects, as discussed in detail in numerous publications by the Intergovernmental Panel on Climate Change (IPCC), such as the Fifth Assessment Report (AR5) Synthesis Report.[12,13] Nonetheless, when all effects and uncertainties are considered together, there is a strong scientific consensus that human activity has contributed significantly to global warming. As stated in the AR5 discussion of attribution of climate changes and impacts, "The evidence for human influence on the climate system has grown since IPCC'S Fourth Assessment Report (AR4) ….it is extremely likely to have been the dominant cause of the observed warming since the mid-20th century."[14]

2.1.3 Potential Effects of Climate Change on State of California

According to the California Air Resources Board (CARB), some of the potential impacts in California of global warming may include loss in snowpack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years.[15] The California Climate Change Center (CCCC) has released four assessment reports on climate change in California, the most recent in 2019.[16] Per California's Fourth Climate Change Assessment, by 2050, the statewide average annual maximum daily temperature is projected to warm by approximately 5.6 to 8.8 degrees Fahrenheit above 2000 averages.[17]

Below is a summary of some of the potential effects reported in an array of studies that could be experienced in California as a result of global warming and climate change.

2.1.4 Air Quality

Higher temperatures, conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. For other pollutants,

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[11] Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. Climate Change 2014: Synthesis Report. 2014. Available at: https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf. Accessed: April 2022.

[12] The IPCC was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme to assess scientific, technical, and socio-economic information relevant for the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC has produced a series of Assessment Reports comprised of full scientific and technical assessments of climate change. The first assessment report (FAR) was developed in 1990. The Fifth Assessment Report was completed in November 2014 with the Synthesis Report.

[13] IPCC Fifth Assessment Report. Climate Change 2014: Synthesis Report. 2014. Available at: https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf. Accessed: April 2022.

[14] Ibid.

[15] CARB. 2006. Public Workshop to Discuss Establishing the 1990 Emissions Level and the California 2020 Limit and Developing Regulations to Require Reporting of Greenhouse Gas Emissions, Sacramento, CA. December 1.

[16] California Climate Change Center (CCCC). 2019. California's Fourth Climate Change Assessment. Available at: http://www.climateassessment.ca.gov/. Accessed: April 2022.

[17] Ibid.

the effects of climate change and/or weather are less well studied, and even less well understood.

If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. Studies have been conducted to evaluate the potential impacts of climate change on wildfire frequency based on lower and higher emissions scenarios. Per California's Fourth Climate Change Assessment, under a higher emissions scenario, the average area burned statewide could increase by 77 percent above historic levels by 2100.[18] Per California's Third Climate Change Assessment, the estimated burned area is projected to increase between 57 and 169 percent, depending on location. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thus ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the State.[19]

It is estimated that over the next decade, higher temperatures could increase the demand for electricity by 1 Gigawatt (GW) during summer months, which would require purchase of costly peak power from external sources or the construction of one new large power plant in California.[20] During periods of extreme heat, efficiency of electricity generation is reduced at natural gas plants; hydropower generation is reduced; and increased losses occur at substations; all while electricity demands are increased. These factors are projected to result in the need for more than 17 GW, or 38 percent of additional capacity, needed by 2100. Additionally, transmission lines lose 7 to 8 percent of transmitting capacity in higher temperatures, which also results in a need for increased power generation.[21]

2.1.5 Water Supply

Uncertainty remains with respect to the overall impact of global climate change on future water supplies in California. For example, models that predict drier conditions suggest decreased reservoir inflows and storage, and decreased river flows, relative to current conditions. By comparison, models that predict wetter conditions project increased reservoir inflows and storage, and increased river flows.[22]

The California Department of Water Resources (DWR) analyzed the State Water Project, the Central Valley Project, and the Sacramento-San Joaquin Delta. Although the report projects that, "[c]limate change will likely have a significant effect on California's future water resources … [and] future water demand," it also reports that, "there is much uncertainty about future water demand, especially those aspects of future demand that will be directly affected by climate change and warming. While climate change is expected to continue

[18] Ibid.

[19] CCCC. 2006. Our Changing Climate: Assessing the Risks to California. CEC500-2006-077. July. Available at: https://www.ucsusa.org/resources/our-changing-climate-assessing-risks-california. Accessed: April 2022.

[20] CCCC. 2012. Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California. CEC-500-2012-007. July.

[21] Ibid.

[22] Brekke, L.D., et al, 2004. —Climate Change Impacts Uncertainty for Water Resources in the San Joaquin River Basin, California. Journal of the American Water Resources Association. 40(2): 149–164. Malden, MA, Blackwell Synergy for AWRA.

through at least the end of this century, the magnitude and, in some cases, the nature of future changes is uncertain. This uncertainty serves to complicate the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood."[23] DWR adds that "[i]t is unlikely that this level of uncertainty will diminish significantly in the foreseeable future."[24] Still, changes in water supply are expected to occur, and regional studies have shown that large changes in the reliability of water yields from reservoirs could result from changes in inflows.[25]

California's Third Climate Change Assessment outlines the state's water management challenges brought on as a result of climate change. These include increasing demand from a growing population as temperatures rise, earlier snowmelt and runoff, and faster-than-historical sea-level rise threatening aging coastal water infrastructure and levees in the Sacramento-San Joaquin Delta.[26] Additionally, they predict that competition between urban and agriculture water users and environmental needs will increase due to effects on water supply and stream flows. The Fourth Climate Change Assessment concludes that by 2100, water supply from snowpack is projected to decline by two-thirds, and that by 2050, California's agricultural production could face climate-related water shortages of up to 16 percent in certain regions.[27]

2.1.6 Hydrology

As discussed above, climate change could potentially affect the following: the amount of snowfall, rainfall and snowpack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for saltwater intrusion. Sea level rise can be a product of global warming through two main processes -- expansion of sea water as the oceans warm and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could also jeopardize California's water supply. In particular, saltwater intrusion would threaten the quality and reliability of the state's major fresh water supply that is pumped from the southern portion of the Sacramento/San Joaquin River Delta. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

Assuming the rate of sea level rise continues to follow global trends, sea level along California's coastline in 2050 could be 10-18 inches higher than in 2000, and 31-55 inches higher by the end of this century.[28] Based on these current projections, the current 100-year storm could occur once every year. California's Fourth Climate Change Assessment projects that without implementation of protective measures, major airports will be susceptible to

[23] California Department of Water Resources (DWR). 2006. Progress on Incorporating Climate Change into Management of California Water Resources. July. Available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=6454. Accessed: May 2022.

[24] DWR. 2006. Progress on Incorporating Climate Change into Management of California Water Resources. July. Available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=6454. Accessed: May 2022.

[25] Kiparsky 2003, op. cit; DWR, 2005, op. cit.; Cayan, D., et al, 2006. Scenarios of Climate Change in California: An Overview (White Paper, CEC-500-2005-203-SF). February.

[26] CCCC. 2012. Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California. CEC-500-2012-007. July.

[27] CCCC. 2019. California's Fourth Climate Change Assessment. Key Findings. Available at: http://www.climateassessment.ca.gov/state/overview/. Accessed: April 2022.

[28] Ibid.

major flooding from a combination of sea-level rise and storm surge by years 2040 to 2080 and that the miles of highways susceptible to coastal flooding from a 100-year storm will triple from current levels by 2100. [29]

2.1.7 Agriculture

California has a $30 billion agricultural industry that produces half the country's fruits and vegetables. The CCCC notes that higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, water demand could increase, crop yield could be threatened by a less reliable water supply, and greater ozone pollution could render plants more susceptible to pest and disease outbreaks. In addition, temperature increases could change the time of year that certain crops, such as wine grapes, bloom or ripen, and thus affect their quality.[30]

2.1.8 Ecosystems and Wildlife

Increases in global temperatures and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. The Pew Center on Global Climate Change examined possible impacts of climate change on ecosystems and wildlife.[31] The report outlines four major ways in which it is thought that climate change could affect plants and animals: (1) timing of ecological events, (2) geographic range, (3) species' composition within communities, and (4) ecosystem processes such as carbon cycling and storage.

2.2 Regulatory Setting

2.2.1 Federal

2.2.1.1 Massachusetts v. EPA

In April 2007, in *Massachusetts v. EPA*, the U.S. Supreme Court directed the Administrator of the U.S. Environmental Protection Agency (USEPA) to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the EPA Administrator was directed to follow the language of Section 202(a) of the Clean Air Act (CAA). In December 2009, the Administrator signed a final rule with two distinct findings regarding GHGs under Section 202(a) of the CAA:

- Elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, perfluorocarbons (PFCs), and sulfur hexafluoride (SF6)—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the "endangerment finding."
- The combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the CAA. By regulating the emissions of GHGs

[29] Ibid.

[30] CCCC. 2006. op. cit.

[31] Parmesan, C. and H. Galbraith. 2004. Observed Impacts of Global Climate Change in the U.S., Arlington, VA: Pew Center on Global Climate Change. November.

from new motor vehicles, energy conservation benefits typically result through increased engine efficiency and the reduced consumption of petroleum-based fuels (e.g., gasoline).

2.2.1.2 Federal Vehicle Standards

In response to the *Massachusetts v. EPA* decision discussed above, in 2009, the National Highway Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency for and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, the USEPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Obama issued a memorandum directing the same federal agencies to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the USEPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model year 2017–2025 light-duty vehicles. The proposed standards are projected to achieve 163 grams/mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon (mpg) if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021, with NHTSA intending to set standards for model years 2022–2025 in a future rulemaking.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the USEPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles.

In August 2016, the USEPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans and all types of sizes of buses and work trucks. The final standards are expected to lower carbon dioxide emissions by approximately 1.1 billion metric tons (MT) and reduce oil consumption by up to two billion barrels over the lifetime of the vehicles sold under the program.[32]

In August 2017, the USEPA asked for additional information and data relevant to assessing whether the GHG emissions standards for model years 2022-2025 remain appropriate. In early 2018, the USEPA Administrator announced that the midterm evaluation for the GHG emissions standards for cars and light-duty trucks for model years 2022-2025 was completed and stated his determination that the current standards should be revised in light of recent data. Subsequently, in April 2018, the USEPA and NHTSA proposed to amend certain existing Corporate Average Fuel Economy (CAFE) standards for passenger cars and light trucks and establish new standards, covering model years 2022-2025. Compared to maintaining the post-2020 standards now in place, the pending proposal would increase U.S. fuel consumption.[33] California and other states have announced their intent to challenge

[32] USEPA and NHTSA. 2016. Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles – Phase 2. Available at: https://www.gpo.gov/fdsys/pkg/FR-2016-10-25/pdf/2016-21203.pdf. Accessed: April 2022.

[33] NHTSA. 2018. Federal Register, Vol. 83, No. 72, *Rules & Regulations, Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light Duty Vehicles*. April 13. Available at:

federal actions that would delay or eliminate GHG reductions. In April 2020, NHTSA and EPA amended the CAFE and GHG emissions standards for passenger cars and light trucks and established new less stringent standards, covering model years 2021 through 2026.

On September 27, 2019, the USEPA and NHTSA published the SAFE Rule (Part One).[34] The SAFE Rule (Part One) went into effect in November 2019, and revoked California's authority to set its own GHGs standards and set zero emission vehicle mandates in California. The SAFE Rule (Part One) froze the requirements for new zero emission vehicles (ZEV) sales at model year 2020 levels for year 2021 and beyond, and would have likely resulted in a lower number of future ZEVs and a corresponding greater number of future gasoline internal combustion engine vehicles. The SAFE Rule was subject to ongoing litigation and on February 8, 2021 the D.C. Circuit Court of Appeals granted the Biden Administration's motion to stay litigation over Part 1 of the SAFE Rule. On April 22 and April 28, 2021, respectively, NHTSA and USEPA formally announced their intent to reconsider the Safe Rule (Part One).[35,36] In December 2021, after reviewing all the public comments submitted on NHTSA's April 2021 Notice of Proposed Rulemaking, NHTSA finalized the CAFE Preemption rulemaking to withdraw its portions of the SAFE Rule (Part One).[37] Also in December 2021, USEPA finalized revised national GHG emissions standards for passenger cars and light trucks for Model Years 2023- 2026.[38] On March 9, 2022, USEPA reinstated California's authority under the Clean Air Act to implement its own GHG emission standards and ZEV sales mandate and entirely rescinded the SAFE Rule (Part One).

2.2.1.3 Energy Independence and Security Act

The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;
- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;

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https://www.federalregister.gov/documents/2018/04/13/2018-07364/mid-term-evaluation-of-greenhouse-gas-emissions-standards-for-model-year-2022-2025-light-duty. Accessed: April 2022.

[34] USEPA and NHTSA. 2019. Federal Register, Vol. 84, No. 188, *The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program*. September 27. Available at: https://www.govinfo.gov/content/pkg/FR-2019-09-27/pdf/2019-20672.pdf. Accessed: April 2022.

[35] NHTSA. 2021. NHTSA Advances Biden-Harris Administration's Climate & Jobs Goals. April 22. Available at: https://www.nhtsa.gov/press-releases/nhtsa-advances-biden-harris-administrations-climate-jobs-goals. Accessed: April 2022.

[36] USEPA. 2021. Federal Register, Vol. 86, No. 80, *California State Motor Vehicle Pollution Control Standards; Advanced Clean Car Program; Reconsideration of a previous Withdrawal of a Waiver of Preemption; Opportunity for Public Hearing and Public Comment*. April 28. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/notice-reconsideration-previous-withdrawal-waiver. Accessed: April 2022.

[37] NHTSA. 2021. NHTSA Repeals SAFE I Rule. December 21. Available at: https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy. Accessed: April 2022.

[38] USEPA. 2021. *Final Rule to Revise Existing National GHG Emissions Standards for Passenger Cars and Light Trucks Through Model Year 2026.* Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-revise-existing-national-ghg-emissions. Accessed: April 2022.

- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020; and
- While superseded by the USEPA and NHTSA actions described above, (i) establishing miles per gallon targets for cars and light trucks and (ii) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

2.2.1.4 Clean Power Plan and New Source Performance Standards for Electric Generating Units

On October 23, 2015, the USEPA published a final rule establishing the Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electricity Utility Generating Units (80 FR 64510-64660), also known as the Clean Power Plan. These guidelines prescribe how states must develop plans to reduce GHG emissions from existing fossil-fuel-fired electric generating units. The guidelines establish CO_2 emission performance rates representing the best system of emission reduction for two subcategories of existing fossil-fuel-fired electric generating units: (1) fossil-fuel fired electric utility steam-generating units, and (2) stationary combustion turbines. Concurrently, the USEPA published a final rule establishing Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (80 FR 64661-65120). The rule prescribes CO_2 emission standards for newly constructed, modified, and reconstructed affected fossil-fuel-fired electric utility generating units.

Implementation of the Clean Power Plan was stayed by the U.S. Supreme Court pending resolution of several lawsuits. In March 2017, President Donald Trump signed an executive order that calls for the USEPA's review of the Clean Power Plan. In June 2019, the USEPA issued the final Affordable Clean Energy rule, which became effective in August 2019. It officially rescinded the Clean Power Plan rule issued during the Obama Administration. However, on January 19, 2021, the D.C. Circuit Court of Appeals vacated the Affordable Clean Energy rule and remanded it to the USEPA to revise the regulations.

2.2.1.5 Executive Order 14008

On January 27, 2021, President Biden issued an Executive Order on Tackling the Climate Crisis at Home and Abroad (Executive Order 14008).[39] Part I of the Order highlights putting the climate crisis at the center of United States foreign policy and national security. Addressing the climate crisis will require significant short-term global reductions in GHG emissions and net-zero global emissions by mid-century or sooner. The United States will pursue green recovery efforts and initiatives to advance the clean energy transition.

Part II of the Order relays the government-wide approach to the climate crisis, which involves reducing climate pollution in every sector of the economy, especially through innovation, commercialization, and deployment of clean energy technologies and

[39] White House Briefing Room. 2021. *Executive Order on Tackling the Climate Crisis at Home and Abroad*. January 27. Available at: https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/. Accessed: April 2022.

infrastructure. A National Climate Task Force is established to focus on addressing the climate crisis through key federal actions to reduce climate change impacts. A 100% carbon pollution-free electricity sector is targeted by no later than 2035 and a net-zero emissions economy is to be achieved by no later than 2050. Electricity production by offshore wind resources is aimed to be doubled by 2030. Opportunities for federal funding of clean energy technology and infrastructure shall be identified. Federal permitting decisions need to consider the effects of GHG emissions and climate change.

2.2.2 State

2.2.2.1 Assembly Bill 32

AB 32 (Nunez, 2006), the California Global Warming Solutions Act of 2006, was enacted after considerable study and expert testimony before the Legislature. The heart of AB 32 is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020. In order to achieve this reduction mandate, AB 32 requires CARB to adopt rules and regulations in an open public process that achieve the maximum technologically feasible and cost-effective GHG reductions.

In 2007, CARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline. CARB's adoption of this limit is in accordance with Health & Safety Code Section 38550.

Per Health & Safety Code Section 38561(b), CARB also is required to prepare, approve and amend a scoping plan that identifies and makes recommendations on "direct emission reduction measures, alternative compliance mechanisms, market-based compliance mechanisms, and potential monetary and nonmonetary incentives for sources and categories of sources that [CARB] finds are necessary or desirable to facilitate the achievement of the maximum feasible and cost-effective reductions of greenhouse gas emissions by 2020."

2008 Scoping Plan

In 2008, CARB adopted the *Climate Change Scoping Plan: A Framework for Change* ("2008 Scoping Plan") in accordance with Health & Safety Code Section 38561. During the development of the 2008 Scoping Plan, CARB created a planning framework that is comprised of eight emissions sectors: (1) transportation; (2) electricity; (3) commercial and residential; (4) industry; (5) recycling and waste; (6) high global warming potential (GWP) gases; (7) agriculture; and, (8) forest net emissions.

The 2008 Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions from the eight emissions sectors to 1990 levels by 2020. In the Scoping Plan, CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5 percent from the otherwise projected 2020 emissions level; i.e., those emissions that would occur in 2020, absent GHG-reducing laws and regulations (referred to as "Business-As-Usual" [BAU]).[40] For example, in further explaining CARB's BAU methodology, CARB assumed that all new electricity generation would be supplied by natural gas plants, no further regulatory action would impact vehicle fuel efficiency, and building energy efficiency codes would be held at 2005 standards.

[40] CARB. 2008. Climate Change Scoping Plan: A Framework for Change. December. Available at: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2008-scoping-plan-documents. Accessed: April 2022.

To achieve the necessary GHG reductions to meet AB 32's 2020 target, CARB developed a series of reduction measures in the Scoping Plan covering a range of sectors and activities.

In the 2011 *Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document* ("2011 Final Supplement"),[41] CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations. Based on the new economic data, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7 percent (down from 28.5 percent) from the BAU conditions. When the 2020 emissions level projection was also updated to account for newly implemented regulatory measures, including Pavley I (model years 2009–2016) and the Renewable Portfolio Standard (12 percent to 20 percent), CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16 percent (down from 28.5 percent) from the BAU conditions.

2014 First Update to the Scoping Plan

In 2014, CARB adopted the *First Update to the Climate Change Scoping Plan: Building on the Framework* ("2014 First Update").[42] The stated purpose of the 2014 First Update is to "highlight[…] California's success to date in reducing its GHG emissions and lay[…] the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050."[43] The 2014 First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80 percent below 1990 levels by 2050 if the State realizes the expected benefits of existing policy goals.[44]

In conjunction with the 2014 First Update, CARB identified "six key focus areas comprising major components of the State's economy to evaluate and describe the larger transformative actions that will be needed to meet the State's more expansive emission reduction needs by 2050."[45] Those six areas are: (1) energy; (2) transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure); (3) agriculture; (4) water; (5) waste management; and (6) natural and working lands. The 2014 First Update identifies key recommended actions for each sector that will facilitate achievement of the 2050 reduction target.

Based on CARB's research efforts, it has a "strong sense of the mix of technologies needed to reduce emissions through 2050."[46] Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles,

[41] CARB. 2011. Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document. Available at: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2008-scoping-plan-documents. Accessed: April 2022.

[42] Health & Safety Code Section 38561(h) requires CARB to update the Scoping Plan every five years.

[43] CARB. 2014. First Update to the Climate Change Scoping Plan: Building on the Framework. May. Available at: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2013-scoping-plan-documents. Accessed: April 2022.

[44] Ibid.

[45] Ibid.

[46] Ibid.

buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and the rapid market penetration of efficient and clean energy technologies.

As part of the 2014 First Update, CARB recalculated the State's 1990 emissions level using more recent global warming potentials identified by the IPCC. Using the recalculated 1990 emissions level and the revised 2020 emissions level projection identified in the 2011 Final Supplement, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 15.3 percent (instead of 28.5 percent or 16 percent) from the BAU conditions.

The 2014 First Update included a strong recommendation from CARB for setting a mid-term statewide GHG emissions reduction target. CARB specifically recommended that the mid-term target be consistent with: (i) the United States' pledge to reduce emissions 42 percent below 2005 levels (which translates to a 35 percent reduction from 1990 levels in California); and (ii) the long-term policy goal of reducing emissions to 80 percent below 1990 levels by 2050.

The 2014 First Update discussed new residential and commercial building energy efficiency improvements, specifically identifying progress towards zero net energy buildings as an element of meeting mid-term and long-term GHG reduction goals. The 2014 First Update expressed CARB's commitment to working with the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) to facilitate further achievements in building energy efficiency.

2017 Scoping Plan

In November 2017, CARB published California's 2017 Climate Change Scoping Plan ("2017 Scoping Plan"), which was subsequently adopted by CARB's Board in December 2017.[47] The 2017 Scoping Plan identifies CARB's strategy for achieving the State's 2030 GHG target as established in SB 32 (discussed below).The strategy includes continuation of the Cap-and-Trade Program through 2030, and incorporates a Mobile Source Strategy that includes strategies targeted to increase zero emission vehicle fleet penetration and a more stringent target for the Low Carbon Fuel Standard by 2030. The 2017 Scoping Plan also incorporates approaches to cutting short-lived climate pollutants (SLCPs) under the Short-Lived Climate Pollutant Reduction Strategy (a planning document that was adopted by CARB in March 2017) and acknowledges the need for reducing emissions in agriculture and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon.

When discussing project-level GHG emissions reduction actions and thresholds, the 2017 Scoping Plan identified steps that local governments can take to support climate action as follows:

> "*Project-Level Greenhouse Gas Emissions Reduction Actions and Thresholds*
>
> Beyond plan-level goals and actions, local governments can also support climate action when considering discretionary approvals and entitlements of individual projects through California Environmental Quality Act (CEQA). Absent conformity with an adequate geographically-specific GHG reduction plan…, CARB recommends that

[47] CARB. 2017. California's 2017 Climate Change Scoping Plan. November. Available at: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed: April 2022.

> projects incorporate design features and GHG reduction measures, to the degree feasible, to minimize GHG emissions. Achieving no net additional increase in GHG emissions, resulting in no contribution to GHG impacts, is an appropriate overall objective for new development. …
>
> Achieving net zero increases in GHG emissions, resulting in no contribution to GHG impacts, may not be feasible or appropriate for every project, however, and the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA. …
>
> California's future climate strategy will require increased focus on integrated land use planning to support livable, transit-connected communities, and conservation and other lands. Accommodating population and economic growth through travel- and energy-efficient land use provides GHG-efficient growth, reducing GHGs from both transportation and building energy use. GHGs can be further reduced at the project level through implementing energy-efficient construction and travel demand management approaches."

The 2022 Scoping Plan Update, which is currently under review, assesses progress toward the statutory 2030 target, while laying out a path to achieving carbon neutrality no later than 2045.[48]

2.2.2.2 Senate Bill 32 and Assembly Bill 197

Enacted in 2016, SB 32 (Pavley, 2016) codifies the 2030 emissions reduction goal of Executive Order B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40 percent below 1990 levels by 2030.

SB 32 was coupled with a companion bill: AB 197 (Garcia, 2016). Designed to improve the transparency of CARB's regulatory and policy-oriented processes, AB 197 created the Joint Legislative Committee on Climate Change Policies, a committee with the responsibility to ascertain facts and make recommendations to the Legislature concerning statewide programs, policies, and investments related to climate change. AB 197 also requires CARB to make certain GHG emissions inventory data publicly available on its website; consider the social costs of GHG emissions when adopting rules and regulations designed to achieve GHG emission reductions; and include specified information in all Scoping Plan updates for the emission reduction measures contained therein.

2.2.2.3 Energy Sources

Renewable Portfolio Standard

As most recently amended by SB 100 (2018), California's Renewables Portfolio Standard requires retail sellers of electric services and local publicly-owned electric utilities to increase procurement from eligible renewable energy resources to 50 percent of total retail sales by 2026, and 60 percent of total retail sales by 2030. SB 100 also established a State policy goal to achieve 100 percent carbon-free electricity by 2045, a goal which was accompanied by Executive Order B-55-18 (2018) which established a goal to achieve carbon neutrality as

[48] CARB. 2022. 2022 Scoping Plan Documents. Available at: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents#:~:text=The%202022%20Scoping%20Plan%20Update%20focuses%20on%20outcomes%20needed%20to,economic%2C%20environmental%2C%20energy%20security%2C. Accessed June 2022.

soon as possible, and no later than 2045, achieve and maintain net negative greenhouse gas emissions thereafter.[49]

Building Energy Efficiency Standards

The Energy Efficiency Standards for Residential and Nonresidential Buildings, as specified in Title 24, Part 6, of the California Code of Regulations, were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods for building features such as space conditioning, water heating, lighting, and whole envelope. The 2005, 2008, 2013, and 2016 updates to the efficiency standards included provisions such as cool roofs on commercial buildings, increased use of skylights, and higher efficiency lighting, heating, ventilation, and air conditioning (HVAC), and water heating systems. Additionally, some standards focused on larger energy saving concepts such as reducing loads at peak periods and seasons and improving the quality of such energy-saving installations. Past updates to the Title 24 standards have proved very effective in reducing building energy use, with the 2013 update estimated to reduce energy consumption in residential buildings by 25% and energy consumption in commercial buildings by 30%, relative to the 2008 standards.[50]

The 2019 Title 24 standards are the currently applicable building energy efficiency standards, and became effective on January 1, 2020.[51] The 2019 updates include a requirement for solar photovoltaic systems for new homes, requirements for newly constructed healthcare facilities, additional high efficiency lighting requirements, high performance attic and walls, higher efficiency water and space heaters, and high efficiency air filters.

The CPUC, CEC, and CARB also have a shared, established goal of achieving zero net energy (ZNE) for new construction in California. The ZNE goal generally means that new buildings must use a combination of improved efficiency and renewable energy generation to meet 100 percent of their annual energy need, as specifically defined by the CEC:

> "A ZNE Code Building is one where the value of the energy produced by on-site renewable energy resources is equal to the value of the energy consumed annually by the building, at the level of a single 'project' seeking development entitlements and building code permits, measured using the [CEC]'s Time Dependent Valuation (TDV) metric. A ZNE Code Building meets an Energy Use Intensity value designated in the Building Energy Efficiency Standards by building type and climate zone that reflect best practices for highly efficient buildings."[52]

While the adopted 2019 Title 24 standards do not achieve the 2020 Zero Net Energy goal, they do move the State further along the path to achieving this goal. The CEC has more

[49] California Executive Department. 2018. Executive Order B-55-18 to Achieve Carbon Neutrality. Available at: https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf. Accessed June 2022.

[50] CEC. 2012. Energy Commission Approves More Efficient Buildings for California's Future. May. Available online at: https://planning.lacity.org/eir/CrossroadsHwd/deir/files/references/C17.pdf. Accessed: April 2022.

[51] CEC. 2019. California's Energy Efficiency Standards for Residential and Nonresidential Buildings. Available online at: https://www.energy.ca.gov/title24/2019standards/. Accessed: April 2022.

[52] CEC. 2015. Integrated Energy Policy Report.

recently focused on grid harmonization strategies (GHS), to bring maximum benefits to the grid, environment, and occupants; and GHG emissions reductions.[53]

In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CalGreen Building Standard (CalGreen) and establishes voluntary and mandatory standards pertaining to the planning and design of sustainable site development, energy efficiency, water conservation, material conservation, and interior air quality. Like Part 6 of Title 24, the CalGreen standards are periodically updated, with increasing energy savings and efficiencies associated with each code update.

2.2.2.4 Mobile Sources

Sustainable Communities Strategy Plans

SB 375 (Steinberg, 2008), the Sustainable Communities and Climate Protection Act, coordinates land use planning, regional transportation plans, and funding priorities to reduce GHG emissions from passenger vehicles through better-integrated regional transportation, land use, and housing planning that provides easier access to jobs, services, public transit, and active transportation options. SB 375 specifically requires the Metropolitan Planning Organization (MPO) relevant to the Project area (here, Southern California Association of Governments [SCAG]) to include a Sustainable Communities Strategy (SCS) in its Regional Transportation Plan (RTP) that will achieve GHG emission reduction targets set by CARB by reducing VMT from light-duty vehicles through the development of more compact, complete, and efficient communities. The SB 375 targets for the Southern California region under SCAG's jurisdiction in 2020 and 2035 are reductions in per capita GHG emissions of 8 percent and 19 percent, respectively as compared to 2005.[54] The SCS prepared as part of SCAG's 2020-2045 RTP/SCS called *Connect SoCal* complies with the emission reduction targets established by CARB and meets the requirements of SB 375 by achieving GHG emission reductions at 8% below 2005 per capita emissions levels by 2020 and 19% below 2005 per capita emissions levels by 2035.[55]

Pursuant to Government Code Section 65080(b)(2)(K), a Sustainable Communities Strategy does not: (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it.

Senate Bill 743

Public Resources Code Section 21099(c)(1), as codified through enactment of SB 743, was enacted with the intent to change the focus of transportation analyses conducted under CEQA. SB 743 reflects a legislative policy to balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of GHG emissions. SB 743 requires the Office of Planning and Research (OPR) to establish "alternative metrics to the metrics used for traffic levels of

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[53] CEC. 2018. The 2019 Building Energy Efficiency Standards ZNE Strategy. September 11.

[54] CARB. SB 375 Regional Plan Climate Targets. Available at: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets. Accessed: April 2022.

[55] SCAG. 2020. The 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy of the Southern California Association of Governments. Adopted September 3, 2020. Available at: https://scag.ca.gov/read-plan-adopted-final-plan. Accessed: April 2022.

service for transportation impacts outside transit priority areas." [56] Under SB 743, the new metrics or significance criteria must promote the reduction of GHG emissions, the development of multimodal transportation networks, and a diversity of land uses. SB 743 dictates that once the CEQA Guidelines are amended to include new thresholds, automobile delay, as described by level of service or similar measures of vehicular capacity or congestion, shall no longer be considered a significant impact under CEQA in all locations in which the new thresholds are applied. The Legislature gave OPR the option of applying the new thresholds only to transit priority areas, or more broadly to areas throughout the State. OPR proposed to apply the new thresholds throughout the State.

In January 2016, OPR issued its *Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA* (Revised SB 743 Proposal). Included in the Revised SB 743 Proposal were proposed new CEQA Guidelines Section 15064.3 and related revisions to Appendix G. Under the proposed new Guidelines, the analysis of transportation impacts in the CEQA context would shift from a levels of service metric to a VMT metric. In proposing the new approach, OPR noted the relationship between VMT and GHG emissions.

A VMT metric was adopted as part of the 2018 CEQA Guidelines Amendments (described above), which became effective on December 28, 2018. As described in the Final Statement of Reasoning[57] for the 2018 CEQA Guidelines amendments: "The current emphasis on traffic congestion in transportation analyses tends to promote increased vehicle use. This new guidance instead focuses on a project's effect on vehicle miles traveled, which should promote project designs that reduce reliance on automobile travel."

Low Carbon Fuel Standard

EO S-1-07, as issued by former Governor Schwarzenegger, called for a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB by 2020. [58] In response, CARB approved the Low Carbon Fuel Standard (LCFS) regulations in 2009, which became fully effective in April 2010. In 2011, the Board approved amendments to clarify, streamline, and enhance certain provisions of the regulation. In 2015, the Board re-adopted the LCFS to address procedural issues, which began implementation on January 1, 2016. In 2018, the Board approved amendments to the regulation, which includes strengthening and smoothing the carbon intensity benchmarks through 2030 in-line with California's 2030 GHG target enacted through SB 32, adding new crediting opportunities to promote zero emission vehicle adoption, alternative jet fuel, carbon capture and sequestration, and advanced technologies to achieve deep decarbonization in the transportation sector.[59]

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[56] California Legislative Information. 2013. SB-743 Environmental quality: transit oriented infill projects, judicial review streamlining for environmental leadership development projects, and entertainment and sports center in the City of Sacramento. Available at: http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB743. Accessed: April 2022.

[57] CNRA. 2018. Final Statement of Reasons for Regulatory Action: Amendments to the State CEQA Guidelines. Available at: http://resources.ca.gov/ceqa/docs/2018_CEQA_Final_Statement_of%20Reasons_111218.pdf. Accessed: April 2022.

[58] Carbon intensity is a measure of the GHG emissions associated with the various production, distribution, and use steps in the "lifecycle" of a transportation fuel.

[59] CARB. 2020. LCFS Basics. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-09/basics-notes.pdf. Accessed: April 2022.

Advanced Clean Cars Program

In 2012, CARB approved the Advanced Clean Cars (ACC) program, a new emissions-control program for non-commercial passenger vehicles and light-duty truck for model years 2017–2025. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero emission vehicles. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

Executive Order N-79-20

On September 23, 2020, California Governor Gavin Newsom issued Executive Order N-79-20, which entails the following actions:

- All new passenger vehicles sold in California be zero-emission by 2035
- All medium- and heavy-duty vehicles be zero-emission where feasible by 2045
- All off-road vehicles and equipment be zero-emission where feasible by 2035

Governor Newsom ordered extensive inter-agency efforts to support the Executive Order, including evaluations of technological feasibility and cost effectiveness, expansion of EV charging options and affordable fueling, as well as identification of near-term strategies to increase zero-emission public transportation options.

2.2.2.5 Senate Bill 44

Senate Bill (SB) 44, signed October 7, 2021, provides specialized procedures for the administrative and judicial review of processes and approvals for an "environmental leadership transit project." SB 44 defines an "environmental leadership transit project" as "a project to construct a fixed guideway and related fixed facilities" that meets all of the following conditions:

A. The fixed guideway operates at zero-emissions.

B. (i) If the project is more than two miles in length, the project reduces emissions by no less than 400,000 metric tons of greenhouse gases directly in the corridor of the project defined in the applicable environmental document over the useful life of the project, without using offsets.

   (ii) If the project is no more than two miles in length, the project reduces emissions by no less than 50,000 metric tons of greenhouse gases directly in the corridor of the project defined in the applicable environmental document over the useful life of the project, without using offsets.

C. The project reduces no less than 30,000,000 vehicle miles traveled in the corridor of the project defined in the applicable environmental document over the useful life of the project.

D. The project is consistent with the applicable sustainable communities strategy or alternative planning strategy.

E. The project is consistent with the applicable regional transportation plan.

F. The project applicant demonstrates how it has incorporated sustainable infrastructure practices to achieve sustainability, resiliency, and climate change mitigation and adaptation goals in the project, including principles, frameworks, or guidelines as recommended by one or more of the following:

(i) The sustainability, resiliency, and climate change policies and standards of the American Society of Civil Engineers.

(ii) The Envision Rating System of the Institute for Sustainable Infrastructure.

(iii) The Leadership in Energy and Environment Design (LEED) rating system of the United States Green Building Council.

2.2.3 Regional

2.2.3.1 Southern California Association of Governments' Regional Transportation Plan/Sustainable Communities Strategy

As previously discussed, SB 375 requires SCAG to incorporate a Sustainable Communities Strategy into its RTP that achieves the GHG emission reduction targets set by CARB.

In May 2020, SCAG released the Adopted Final 2020-2045 RTP/SCS called Connect SoCal.60 This update to the RTP/SCS is expected to meet the State's goal of 19% reductions per capita transportation emissions in 2035 as compared to 2005. Connect SoCal was adopted by SCAG's Regional Council on May 7, 2020 and on September 3, 2020, the final plan was unanimously adopted. On June 5, 2020, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) found that Connect SoCal was in air quality conformance with the State implementation plan.[61]

2.2.3.2 South Coast Air Quality Management District

CEQA Guidelines and Proposed GHG Thresholds

The South Coast Air Quality Management District (SCAQMD) is principally responsible for comprehensive air pollution control in the South Coast Air Basin, which includes Los Angeles, Orange, and the urbanized portions of Riverside and San Bernardino Counties, including the Project site. SCAQMD works directly with SCAG, Los Angeles County transportation commissions, and local governments, and cooperates actively with all federal and State government agencies to regulate air quality.

In April 2008, SCAQMD convened a Working Group to develop GHG significance thresholds. On December 5, 2008, the SCAQMD Governing Board adopted its staff proposal for an interim CEQA GHG significance threshold for projects where the SCAQMD is the lead agency. As to all other projects, where the SCAQMD is not the lead agency, the Board has, to date, only adopted an interim threshold of 10,000 MT CO_2e per year for industrial stationary source projects.[62]

For all other projects, SCAQMD staff proposed a multiple tier analysis to determine the appropriate threshold to be used. The draft proposal suggests the following tiers: Tier 1 is any applicable CEQA exemptions, Tier 2 is consistency with a GHG reduction plan, Tier 3 is a

[60] Available at: https://scag.ca.gov/read-plan-adopted-final-plan. Accessed: April 2022.

[61] FTA/FHWA. June 2020. SCAG Connect SoCal RTP/SCS, 2019 FTIP Amendment No. 19- 12 (and associated conformity determination) Letter. Available at: https://scag.ca.gov/sites/main/files/file-attachments/scagff12_060520_2.pdf. Accessed June 2022.

[62] SCAQMD. 2008. Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans for use by the AQMD. Available at: https://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgattachmente.pdf. Accessed: April 2022.

screening value or bright line, Tier 4 is a performance-based standard, and Tier 5 is GHG mitigation offsets.[63]

The Working Group has not convened since the fall of 2010. As of April 2022, the proposal has not been considered or approved for use by the SCAQMD Board. In the meantime, no GHG significance thresholds for non-industrial sources have been approved by the SCAMD Board.

2.2.3.3 2019 Metro Climate Action and Adaptation Plan

Approved by the Metro Board in June 2012, the Climate Action and Adaptation Plan (CAAP) establishes a framework to identify the areas of greatest opportunity for Metro to reduce GHG emissions and evaluates opportunities based on their costs and the volumes of emissions they reduce. Metro's influence on GHG emissions extends to all of the County's transportation systems.

The 2019 CAAP outlines how Metro will reduce operational GHG emissions and protect riders from climate change. Since the adoption of the first CAAP, Metro has reported that its GHG emissions have decreased by 12%, despite an increase in service by 4%.[64] The CAAP includes a GHG emissions inventory for Metro activities from 2017 and demonstrates how these emissions are expected to change by 2030 and 2050. Metro outlines 13 GHG reduction measures in the CAAP that will enable Metro to achieve a goal of 79% reduction in emissions relative to 2017 levels by 2030 and 100% by 2050. It also includes climate adaptation actions to protect its infrastructure, along with Metro staff and riders.

Metro will use the CAAP to inform and align other programs, including the Vision 2028 Strategic Plan.

2.2.3.4 Metro Vision 2028 Strategic Plan

Metro approved the Vision 2028 Strategic Plan ("Vision 2028") in June 2018 following the passage of Measure M in November 2016, a voter-approved sales tax anticipated to inject $120 billion of transportation funds into the Los Angeles Metropolitan area over the next 40 years.[65] By 2028, Metro intends to double the percent usage of transportation modes besides passenger vehicles, which generate the highest GHG emissions per person per trip. Vision 2028 aims to accomplish the following to achieve this outcome:

- "Ensuring that all County residents have access to high-quality mobility options within a 10-minute walk or roll from home
- Reducing maximum wait times for any trip to 15 minutes during any time of day
- Improving average travel speeds on the County's bus network by 30%
- Providing reliable and convenient options for users to bypass congestion"

The Plan serves as a guide to Metro's other specific plans, including the Long-Range Transportation Plan.

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[63] Ibid.

[64] Metro. 2019. Metro Climate and Adaptation Plan 2019. Available at: https://media.metro.net/projects_studies/sustainability/images/Climate_Action_Plan.pdf. Accessed: April 2022.

[65] Metro. Metro Vision 2028 Strategic Plan. Available at: http://media.metro.net/about_us/vision-2028/report_metro_vision_2028_plan_2018-0628.pdf. Accessed: April 2022.

2.2.3.5 Metro Green Construction Policy

Metro adopted a Green Construction Policy in August 2011 and is committed to using more sustainable construction equipment and vehicles, as well as implementing best practices, to reduce harmful diesel emissions from all Metro construction projects performed on Metro properties and in Metro ROW. The Green Construction Policy requires the use of construction equipment with technologies such as hybrid drives and specific fuel economy standards, both of which are methods to reduce GHG emissions during the construction period.

2.2.3.6 Metro Moving Beyond Sustainability

In September 2020, the Metro Board approved Moving Beyond Sustainability,[66] a plan outlining a comprehensive strategy for the next decade to make Metro facilities greener, reduce air pollution and trash from construction, and reduce smog and greenhouse gases across L.A. County. The plan has goals tied to water quality and conservation, solid waste, materials, construction and operations, energy resource management, emissions and pollution control, resilience and climate adaptation, and economic and workforce development. Moving Beyond Sustainability will be updated every five years with formal progress reports every two years, and annual performance updates through Metro's Sustainability dashboard.

2.2.4 Local

2.2.4.1 Sustainable City pLAn and Los Angeles' Green New Deal

The Sustainable City pLAn (pLAn), first introduced by Mayor Eric Garcetti in April 2015, identifies goals and strategies for improving Los Angeles' sustainability related to the environment, economy, and equity. One of the initial action steps within the pLAn is the appointment of a Chief Sustainability Officer within 18 key departments.

In April 2019, Mayor Eric Garcetti released Los Angeles' Green New Deal, which provides greater detail to the former pLAn, and offers more accelerated targets and new goals. The climate-oriented goals of the Green New Deal are inspired by the initiatives set forth by the 2017 Paris Climate Agreement. With respect to GHGs, the Green New Deal commits to increasing solar power generation and increasing energy efficiency. In addition, it accelerates the City's commitment to attaining GHG reductions, with the goals of reducing levels 50% by 2025, 73% by 2035, and 100% by 2050 in comparison to 1990 baseline emissions.[67] Other targets identified in the Green New Deal include a 13% reduction in VMT per capita by 2025 and a 39% reduction by 2035, as well increasing the percentage of trips made by walking, biking, or transit to 35% by 2025, 50% by 2035, and maintaining at least 50% by 2050.

2.2.4.2 Proposed 2040 Community Plan

The City of Los Angeles is currently in the process of updating the Central City and Central City North Community Plans through the Downtown Los Angeles 2040 Draft Community Plan. Because it is unknown when the new community plan would be adopted and its EIR certified, the analysis in this section is based on the current applicable plans.

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[66] Metro. We Are Moving Beyond Sustainability. Sustainability Strategic Plan 2020. Available at: http://media.metro.net/2020/Moving-Beyond-Sustainability-Strategic-Plan-2020.pdf. Accessed: April 2022.

[67] City of Los Angeles. 2019. L.A.'s Green New Deal: Sustainable City pLAn. Available at: https://plan.lamayor.org/sites/default/files/pLAn_2019_final.pdf. Accessed: April 2022.

3. SIGNIFICANCE THRESHOLDS

There are no adopted applicable thresholds of significance for GHG emissions that apply to the Project. A quantitative threshold of significance for GHG emissions has not been established in the State CEQA Guidelines.

State CEQA Guidelines section 15064.4[68] discusses the significance evaluation for GHG emissions. Section 15064.4(a) recognizes that the "determination of the significance calls for a careful judgment" by the lead agency that is coupled with lead agency discretion to determine whether to (1) quantify greenhouse gas emissions resulting from a project,[69] and/or (2) rely on a qualitative analysis or performance based thresholds. Section 15064.4(b) states that a lead agency should focus analysis on the incremental contribution of the project's emissions to climate change, and that a project's incremental contribution may be cumulatively considerable even if it appears small compared to statewide, national, or global emissions. Section 15064.4(b) further states that a lead agency should consider the following, non-exclusive list of factors when assessing the significance of GHG emissions:

1. The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
2. The extent to which project emissions exceed a threshold of significance that the lead agency determines applies to the project; and
3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. In determining the significance of impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is not cumulatively considerable.[70]

In addition, Appendix G to the State CEQA Guidelines contains two criteria for purposes of assessing GHG emissions.[71] These include if the Project would:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment;
2. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

In accordance with CEQA Guidelines section 15064.4(b) and the Appendix G criteria, this technical report assesses the significance of the Project's GHG emissions based on the extent to which the Project increases GHG emission levels relative to existing emission levels (see **Section 5.1** for this discussion). This report also assesses the significance of the Project's GHG emissions based on consistency with State, regional, and local GHG reduction plans (see **Section 5.2** for this discussion).

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68 CNRA. 2018. Final Adopted Text of the 2018 Amendments and Additions to the State CEQA Guidelines. Available at: http://resources.ca.gov/ceqa/docs/2018_CEQA_FINAL_TEXT_122818.pdf. Accessed: April 2022.

69 Ibid. Section 15064.4(c) states that a lead agency may use a model or methodology of its discretion to estimate greenhouse gas emissions resulting from a project. The selection of the model or methodology must be supported with substantial evidence.

70 Ibid. Section 15064.4(b).

71 Ibid. Appendix G Environmental Checklist Form.

4. GHG EMISSIONS INVENTORY

This section describes the methodology that Ramboll US Corporation (Ramboll) used to develop the GHG emission inventories associated with the Project, which include one-time emissions (construction emissions and emissions due to vegetation changes), and operational emissions.

4.1 Scenarios Evaluated

4.1.1 Construction Scenarios Evaluated

Ramboll evaluated GHG emissions associated with the construction of the Project. As described in the Project Description in **Section 1.1**, the Project would include the construction of stations, a junction, and towers for an aerial gondola system. During construction, some staging and assembly of Project materials and equipment could occur at a laydown area within the Mesa lot at Dodger Stadium. Construction of the Project components is phased, and construction activities would occur at multiple stations, junction, and towers at the same time within the construction period.

Construction activities could commence as early as 2024 through 2026 and are anticipated to occur predominantly on weekdays (i.e., Monday through Friday) from approximately 7am to 5pm.

4.1.2 Operational Scenarios Evaluated

Ramboll evaluated the GHG emissions associated with the operation of the Project. The availability and use of the gondola system would decrease the number of people traveling to Dodger Stadium (and surrounding areas) in passenger vehicles and increase the number of people using transit. This shift in transportation mode would reduce total VMT and vehicle idling time in and around Dodger Stadium, associated with passenger vehicles. In addition to evaluating emissions associated with VMT, this assessment evaluated emissions from the following source categories: gondola electricity, backup power supply, area sources (e.g., landscaping-related fuel combustion sources), water and wastewater treatment and distribution, and solid waste.

Furthermore, Ramboll evaluated the emissions for the following:

1. Baseline/Existing – calculated existing conditions in year 2019
2. Project Build-out – calculated projected emissions in year 2026, after completion of all construction activity
3. Horizon Year Projection – calculated projected emissions in year 2042

4.2 Measurement, Resources and Existing Conditions

4.2.1 Units of Measurement: Metric Tons of CO_2 and CO_2e

The term “GHGs” includes gases that contribute to the natural greenhouse effect, such as CO_2, CH_4, N_2O, and water, as well as gases that are only man-made and that are emitted through the use of modern industrial products, such as hydrofluorocarbons (HFCs) and chlorofluorocarbons (CFCs). The most important greenhouse gas in human-induced global warming is CO_2. While many gases have much higher GWPs than CO_2, CO_2 is emitted in such vastly higher quantities that it accounts for 81.6% of the GWP of all GHGs emitted by the United States.

The effect each of these gases has on global warming is a combination of the volume of their emissions and their GWP. GWP indicates, on a pound for pound basis, how much a gas will contribute to global warming relative to how much warming would be caused by the same mass of CO_2. CH_4 and N_2O are substantially more potent than CO_2, with GWPs of 25 and 298, respectively. GHG emissions are typically measured in terms of mass of CO_2e. CO_2e are calculated as the product of the mass of a given GHG and its specific GWP.

In many sections of this report, including the final summary sections, emissions are presented in units of CO_2e either because the GWPs of CH_4 and N_2O were accounted for explicitly, or the CH_4 and N_2O are assumed to contribute a negligible amount of GWP when compared to the CO_2 emissions from that particular emissions category.

In this report, emissions are presented as metric tons (1,000 kilograms). Additionally, exact totals presented in all tables and report sections may not equal the sum of components due to independent rounding of numbers.

4.2.2 Methodology Resources

4.2.2.1 California Emission Estimator Model®

Ramboll utilized emissions factors and methodology from CalEEMod® version 2020.4.0[72] to quantify the GHG emissions in the inventories presented in this report for the Project. CalEEMod® provides methodology to calculate both construction emissions and operational emissions from a land use development project. Specifically, the model aids the user in the following calculations:

- Short-term construction emissions associated with site preparation, demolition, grading, utility installation, building, coating, and paving from off-road construction equipment, and on-road mobile equipment associated with workers, vendors, and hauling.
- One-time vegetation sequestration changes, such as permanent vegetation land use changes and new tree plantings.
- Operational emissions associated with buildout, such as on-road mobile vehicle traffic generated by the Project, off-road emissions from landscaping equipment, electricity usage in the buildings, water usage by the land uses, and solid waste disposal by the land uses.

CalEEMod® is a statewide program designed to calculate both criteria and GHG emissions from development projects in California. This model was developed by SCAQMD in coordination with other California air districts. CalEEMod® is currently recommended by SCAQMD and numerous lead agencies to quantify the emissions associated with development projects undergoing environmental review. CalEEMod® utilizes well-established and SCAQMD-accepted models for emission estimates combined with documented modeling assumptions that can be used if site-specific information is not available. CalEEMod® incorporates and relies upon models and emissions estimates that are based on published and well-established sources such as the USEPA AP-42 emission factors,[73] CARB's on-road

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[72] SCAQMD. California Emissions Estimator Model®. Available at: http://www.aqmd.gov/caleemod/download-model. Accessed: April 2022.

[73] The USEPA maintains a compilation of Air Pollutant Emission Factors and process information for several air pollution source categories. The data is based on source test data, material balance studies, and engineering

and off-road mobile source emission factor models (EMFAC and OFFROAD, respectively), and studies commissioned by California agencies such as the CEC and CalRecycle. Regional data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) have been provided by the various California air districts to account for local requirements and conditions. The model is an accepted and comprehensive tool for quantifying air quality and GHG impacts from land use projects throughout California and is recommended by the SCAQMD as the technical expert agency on air quality matters. Accordingly, utilizing CalEEMod® provides a consistent, transparent, and reasonable methodology for estimating the Project's construction and operational air quality emissions for purposes of this analysis.

4.2.2.2 OFFROAD2021

OFFROAD[74] is an emission factor model used to calculate emission rates from off-road mobile sources (e.g., construction equipment). Where feasible, emission factors derived from OFFROAD2021[75] were used to calculate the GHG emissions from the off-road equipment associated with Project construction. When OFFROAD2021 emission factors were unavailable, CalEEMod® emission factors derived from OFFROAD2011 were used to calculate emissions.

4.2.2.3 EMFAC2021

EMFAC is an emission factor model used to calculate emissions rates from on-road vehicles (e.g., passenger vehicles). On April 30, 2021, CARB released EMFAC2021 (v1.0.1), the newest version of the modeling software for modeling traffic emissions in California.[76] EMFAC2021 emission factors were used to calculate the GHG emissions associated with on-road vehicles associated with Project construction and operation.

4.2.3 Indirect Greenhouse Gas Emissions from Electricity Use

Project-related electricity use can result in indirect emissions, due to electricity generation activities occurring at off-site power plant locations. For this Project, the electrical power for operation of the aerial gondola system and associated stations, junction, and towers would be supplied by LADWP under the utility's Green Power Program. As a result, the primary electricity usage associated with the Project would come from renewable resources. A small amount of electricity related to the park amenities at Chinatown/State Park Station would be supplied by LADWP's standard electricity portfolio.[77] In addition, some of the Project's emission sources involve indirect electricity usage (e.g., the treatment and conveyance of water and wastewater), which can result in indirect GHG emissions depending on the utility

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estimates. Available at: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors. Accessed: April 2022.

[74] CARB. MSEI – Off-Road Documentation. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-road-documentation-0. Accessed: April 2022.

[75] CARB. OFFROAD2021 Web Query Tool. Available at: https://arb.ca.gov/emfac/emissions-inventory/. Accessed: April 2022.

[76] CARB. 2021. EMFAC2021. The USEPA published a notice of availability for the official release of EMFAC2017 motor vehicle emission factor model use in the State of California. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools-emfac-software-and. Accessed: April 2022.

[77] These amenities will include approximately 740 square feet of concessions, 770 square feet of restrooms, and a 220 square foot covered breezeway connecting the concessions and restrooms.

provider. The indirect GHG emissions created as a result of this Project-related electricity use are estimated through application of the following methodology.

For purposes of electricity use, intensity factors are GHG emission rates from a given source relative to energy generation activities and are expressed in terms of the amount of GHG released per megawatt (MW) of energy produced. The default electricity intensity factors for LADWP in CalEEMod® for CO_2, CH_4, and N_2O are 691.983, 0.033, and 0.004 pounds (lbs) of GHG per megawatt-hour (MWh), respectively. The CO_2 default factor is based on LADWP's 2019 emissions. The CH_4 and N_2O default factors are based on CARB's and E-Grid values as included in CalEEMod®.

For emission sources relying on LADWP's standard electricity portfolio (e.g., construction electricity usage; see **Section 4.3.1.3**), Ramboll conservatively used CalEEMod®'s emission factors for CH_4 and N_2O. For a representative CO_2 intensity factor, Ramboll modified CalEEMod®'s intensity factor using 2014, 2015, and 2016 data from LADWP's most recent Strategic Long-Term Resource Plan (SLTRP),[78] to account for the improvements made by LADWP towards meeting RPS requirements. The 2017 SLTRP report along with CEC Power Content Labels, which reports the mix of renewable and non-RPS-eligible/non-renewable energy sources in LADWP's energy supply, were used to calculate the intensity factors for LADWP's non-RPS-eligible/non-renewable energy. This data was used to project what the intensity factor would be when the Project reaches build out in 2026, as well as in the 2042 horizon year. The intensity factor for CO_2 is calculated by multiplying the percentage of energy delivered by LADWP from non-RPS-eligible/non-renewable energy resources with the intensity factor for non-RPS-eligible/non-renewable energy as calculated (see **Table 4-1**).

Ramboll assumed that sources powered by renewable electricity (e.g., gondola electricity usage; see **Section 4.4.2.1**) will result in zero greenhouse gas emissions.

4.2.4 Existing Condition

The GHG emissions associated with existing conditions in the 2019 baseline year are calculated using the same methods as described above. The existing condition represents the GHG emissions in 2019 from vehicle traffic (i.e., VMT) associated with those attending Dodger games and other major events at Dodger Stadium.

4.3 One-Time Emissions

One-time emissions are those emissions that are not recurring over the life of the project. This includes emissions associated with construction and changes in on-site vegetation. The emission estimation methodology for both construction and vegetation changes are described in this section.

4.3.1 Construction

This section describes the estimation of GHG emissions from construction activities at the Project component sites. The proposed plan for the Project anticipates construction to occur as early as 2024 to 2026. The major construction phases included in this analysis are:

- Utilities: involves the potential relocation of the water, sanitary sewer, storm, natural gas, electrical transmission and distribution, and communications lines.

[78] LADWP. 2017. Strategic Long-Term Resource Plan. Appendix C. Available at: https://www.ladwp.com/ladwp/faces/wcnav_externalId/a-p-doc?_adf.ctrl-state=njgtmtsj9_17&_afrLoop=985115648971896. Accessed: April 2022.

- Foundations, Columns & Tower Base: involves demolition, hauling of material, augering piles, laying rebar, and pouring of concrete.
- Structural Steel & Gondola Equipment Erection: involves delivery of steel and erecting the steel structure.
- Asphalt & Re-Striping: involves paving.
- Vertical Circulation/Hardscape & Landscape/Interior Work: involves introduction of vertical circulation elements (i.e., elevators, escalators, stairs) and architectural coating.
- Rope Pulling: involves delivery of ropes on large spools and pulling the rope between Project components.

The GHG emissions from these phases are largely attributable to fuel use from off-road construction equipment and on-road vehicle trips associated with worker commutes, vendor deliveries, and material hauling. In addition, some indirect GHG emissions are produced from electricity usage during construction. A construction schedule for the Project is provided in **Table 4-2**.

4.3.1.1 Emissions from Off-Road Construction Equipment

This section describes the methodology used to estimate emissions from off-road equipment activities at the Project component sites. Off-road equipment-related emissions of GHGs were estimated using Project-specific equipment lists and CalEEMod® for equipment horsepower, load factors, and emission factors. Two equipment lists were developed for the Project, one specific to the construction activity at the stations, junctions, and laydown area, and one specific to the construction activity at the towers. These lists are presented in **Tables 4-3a and 4-3b**. The emissions calculations assumed that the off-road equipment would operate up to 9 hours a day, five days a week for durations based on Project-specific estimates (see **Table 4-4**).

Where feasible, the off-road equipment emission factors used in this analysis were derived from OFFROAD2021. When OFFROAD2021 emission factors were unavailable, CalEEMod® emission factors derived from OFFROAD2011 were used to calculate emissions. Since the majority of off-road equipment used for construction projects is diesel-fueled, CalEEMod® makes the simplifying assumption that all off-road equipment operates on diesel fuel. These emission factors include running exhaust. Further, since the equipment is assumed to be diesel, there are no starting emissions, as these are *de minimis* for diesel-fueled equipment. Exhaust emissions were calculated using CalEEMod® methodology, which uses the equation presented below.[79]

$$\text{Emissions}_{\text{Diesel}} = \sum_i \left(\text{EF}_i \times \text{Pop}_i \times \text{AvgHP}_i \times \text{Load}_i \times \text{Activity}_i \right)$$

Where:

EF = Emission factor in grams per horsepower-hour (g/bhp-hr) as processed from OFFROAD2021 or OFFROAD2011

Pop = Population, or the number of pieces of equipment

79 SCAQMD. California Emissions Estimator Model® User's Guide, Appendix A. Available at: http://www.aqmd.gov/caleemod/user's-guide. Accessed: April 2022.

AvgHp = Maximum rated average horsepower

Load = Load factor

Activity = Hours of operation

i = equipment type

GHG emissions from off-road equipment are presented in **Appendix A**. Off-road equipment emission factors are presented in **Appendix B**.

4.3.1.2 Emissions from On-Road Construction Trips

Construction generates GHG emissions from on-road vehicle trips associated with worker commuting, shuttles for transporting workers to their respective worksites,[80] vendor deliveries, and material hauling. These emissions are based on the number of trips and VMT along with emission factors from EMFAC2021.

Trip Rates

Trip rates are one factor used to calculate emissions from on-road construction trips. Ramboll estimated on-road GHG emissions using Project-specific trip rates as shown in **Table 4-5**.

Trip Lengths

Total VMT by on-road source is estimated as a product of trip rates and the average trip length. The default CalEEMod® trip length of 14.7 miles for home-work trips was used to represent trips taken by construction workers commuting to the Project site. The vendor trip length and haul truck trip length were based on the CalEEMod® default trip lengths of 6.9 miles and 20 miles, respectively. The vendor trip length was assumed for trips associated with the laydown area at the Mesa lot. The CalEEMod® default trip lengths are derived from regional average trip information and represent a reasonable estimate for purposes of calculating emissions. A trip length of 1.7 miles for worker shuttles was derived from the Google Maps default route from LAUS to Dodger Stadium. In the absence of project-specific information, the default trip lengths are reasonable to apply as they are based on the region and an urban setting. Trip lengths and total VMT are presented in **Table 4-5**.

Vehicle Fleet Mix

Vehicle fleet mix is another parameter used to estimate mobile source emissions from the Project. The fleet mix for worker, vendor, and hauling vehicles was based on the CalEEMod® default fleet mixed for construction activities because the construction vehicle types for the Project are expected to be light-duty vehicles for workers (mix of light-duty autos and light-duty trucks), medium-heavy and heavy-heavy duty trucks for vendors, and heavy-heavy duty trucks for hauling. The vehicle class assumed for the worker shuttles was based on Project-specific information.

Mobile Source Emission Factors

Emission factors were obtained from EMFAC2021 for Los Angeles County (South Coast) and are presented in **Appendix B**. The emission factors used to estimate mobile emissions from running exhaust are on a "per mile" basis and thus the associated emissions were calculated

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[80] There would be one shuttle per hour from Dodger Stadium to each of the Project component sites that would transport construction workers.

by multiplying these factors by the estimate VMT for each vehicle type listed in **Table 4-5**. The emission factors for starting exhaust are on a "per trip" basis and thus the associated emissions were calculated by multiplying these factors by the estimated number of trips for each vehicle type listed in **Table 4-5**. The emission factors used to estimate GHG emissions from shuttle, vendor, and truck idling are on a "per minute of idling" basis and thus the emissions were calculated by multiplying these factors by the estimated idle duration of 5 minutes per one-way trip (5 minutes at entry and 5 minutes at exit) for each trip. Please note that the trip counts shown in **Table 4-5** are round trips; hence these trip counts were multiplied by two to estimate the number of one-way trips. GHG emissions from on-road vehicles are presented in **Appendix A**.

4.3.1.3 Emissions from Construction Electricity Usage

Construction of the Project is anticipated to result in some electricity demand, such as due to the presence of on-site trailers and uses of various types of equipment. This electricity demand would be supplied by LADWP's standard electricity portfolio. The total electricity usage for Project construction was estimated by quantifying the power requirements for the larger items onsite (e.g., trailers, welders), as well as coming up with an estimate based on the size of each construction site and the planned duration of construction.

The GHG emissions associated with electricity usage were calculated using the total estimated electricity usage for construction and the GHG intensity factors for the utility provider, LADWP. As stated in **Section 4.2.3**, the GHG emissions from LADWP's standard electricity portfolio have been calculated using a CO_2 intensity factor derived from 2014-2016 LADWP data that was then adjusted to reflect anticipated progress under RPS as required under SB 100 (**Table 4-1**). The emissions of GHGs were converted to CO_2e using global warming potentials from the Intergovernmental Panel on Climate Change Fourth Assessment Report and are shown in **Table 4-6**.

4.3.2 Vegetation Changes

Permanent vegetation changes that occur because of land use development constitute a one-time change in the carbon sequestration capacity of a project site. In this case, developed land would be converted to gondola stations, towers, and a junction with landscaped areas with trees. Ramboll calculated the minor change in sequestered CO_2e that would result from the Project using the methodology described in Section 11.1 of Appendix A of the CalEEMod® User's Guide (see **Table 4-7** for results).[81]

4.4 Annual Operational Emissions

Operational emissions are emissions that would occur after build-out of the Project. This analysis identifies operational emissions for source categories including direct emissions from area, mobile, and stationary sources and indirect emissions from energy use, water/wastewater, and waste management.

4.4.1 Area Sources

Area sources in CalEEMod® are direct sources of GHG emissions. The area source GHG emissions would include landscaping-related fuel combustion sources, such as lawn mowers.

[81] SCAQMD. California Emissions Estimator Model® User's Guide, Appendix A. Available at: http://www.aqmd.gov/caleemod/user's-guide. Accessed: April 2022.

Based on CalEEMod® defaults, all operational days (i.e., 250 days per year) were assumed to be summer days, with no snow days.

Based on the amount of landscaping expected around the Project and the factors in CalEEMod®, the GHG emissions from landscaping are expected to be negligible (< 0.1 MT CO_2e/year).

4.4.2 Energy Use

GHG emissions from electricity use are based on anticipated sources of power. Renewable electricity sources are assumed to have zero GHG emissions (e.g., the gondola operations will be powered by renewable electricity). Other sources not powered by renewable electricity, such as the electricity usage by the park amenities at Chinatown/State Park Station, will result in a small amount of GHG emissions. These amenities will be operated by the Los Angeles State Historic Park. This energy usage and an estimate of the emissions reduced due to the commitment to use renewable electricity is described further below.

As stated in **Section 4.2.3**, the GHG emissions related to the standard LADWP electricity supply were calculated using a CO_2 intensity factor derived from 2014-2016 LADWP data that was then adjusted to reflect anticipated progress under RPS as required under SB 100 (**Table 4-1**).

4.4.2.1 Project Electricity Usage

Operation of the Project would result in electricity demand for the aerial gondola system as well as energy needed for complementary components such as station lighting, restrooms, escalators, etc. The annual electricity usage for the Project is based on the anticipated usage of the aerial gondola system.

The emissions reduced associated with the Project's commitment to obtaining power through LADWP's Green Power Program was quantified using the expected power consumption of the aerial gondola system and the GHG intensity factors for LADWP's standard power portfolio. The emissions of GHGs reduced were converted to CO_2e using global warming potentials from the Intergovernmental Panel on Climate Change Fourth Assessment Report and are shown in **Table 4-8**.

The GHG emissions associated with the electricity usage by the park amenities was calculated using the expected power consumption of the park amenities and the GHG intensity factors for LADWP's standard power portfolio. Additional detail on this calculation is presented in **Table 4-9**.

4.4.2.2 Backup Power Supply

The Project would feature backup power supplies to allow for unloading of the aerial gondola system in the event of a temporary power grid failure. The Project would use battery storage in lieu of diesel generators, which are normally tested on a regular basis. GHG emission reductions based on this Project commitment to use battery storage were calculated using anticipated annual maintenance hours of operation (assumed to be six hours per year) and emission factors obtained from CalEEMod® and USEPA AP-42 associated with diesel backup generators. The emission reductions associated with backup emergency generators are shown in **Table 4-10**.

4.4.3 Water Supply, Treatment, and Distribution

Indirect GHG emissions result from the production of electricity used to convey, treat and distribute water and wastewater. The amount of electricity required to convey, treat and distribute water depends on the volume of water, as well as the sources of the water. Additional emissions from wastewater treatment include CH_4 and N_2O, which are emitted directly from the wastewater.

The Project's water demand estimates and wastewater generation values were Project-specific estimates. The assumed embodied energy for the supply, treatment, and distribution of water and treatment of wastewater are based on CalEEMod® defaults, as are the emission factors associated with wastewater treatment. The CO_2e electricity intensity factor was derived from 2014-2016 LADWP data and then adjusted to reflect anticipated progress under RPS as required under SB 100. The Project's water usage and wastewater generation and associated GHG emissions are presented in **Tables 4-11 and 4-12**.

4.4.4 Solid Waste

Municipal solid waste (MSW) is the amount of material that is disposed of by landfilling, recycling, or composting. CalEEMod® calculates the indirect GHG emissions associated with waste that is disposed of at a landfill. The program uses annual waste disposal rates from the CalRecycle data for individual land uses. CalEEMod® uses the overall California Waste Stream composition to generate the necessary types of different waste disposed into landfills. The program quantifies the GHG emissions associated with the decomposition of the waste, which generates methane based on the total amount of degradable organic carbon. The program quantifies the CO_2 emissions associated with the combustion of methane, if applicable. Default landfill gas concentrations were used as reported in Section 2.4 of AP-42. The IPCC has a similar method to calculate GHG emissions from MSW in its 2006 Guidelines for National Greenhouse Gas Inventories.

Solid waste generation associated with the aerial gondola system is expected to be small and there are no default standards for waste generation in CalEEMod®. The approximate solid waste generation rate was developed by assuming one-in-four riders would throw away a nominal amount of waste (e.g., a beverage cup) during their trip on the gondola. The solid waste generation associated with users of the park amenities was calculated using a default generation rate from Table 10.1 of Appendix D of the CalEEMod® User's Guide.

The Project's GHG emissions associated with solid waste are provided in **Table 4-13.**

4.4.5 Mobile Sources

Current vehicular emissions associated with events at Dodger Stadium result from passengers in vehicles traveling to the game along with employees (i.e., total VMT). By transitioning the passengers of these vehicles to the gondola, total VMT would be reduced along with corresponding reductions in emissions.

GHG emissions associated with total VMT were calculated using emission factors from EMFAC2021 and annual VMT as provided by Fehr & Peers. A light duty and medium duty fleet mix was assumed, as these vehicle categories are expected to be representative of people traveling to and from Dodger Stadium. Emissions associated with mobiles sources are shown in **Table 4-14**.

5. IMPACT ANALYSIS

This section assesses the significance of the project's emissions for purposes of CEQA.

5.1 Assessment of the Project's Potential to Emit GHG Emissions

State CEQA Guidelines, Appendix G, Section VIII, Question a)

> "Would the project generate greenhouse gas emissions, either directly or indirectly, that may a significant impact on the environment?"

To determine whether the Project would generate GHGs, the Project's estimated operational emissions are compared to the GHG emissions associated with the 2019 existing condition (otherwise referred to as the baseline year). GHG emissions were approximately 18,655 MT CO_2e/yr in the 2019 existing conditions from VMT associated with those attending Dodger games and other major events at Dodger Stadium.

The total GHG emissions from Project construction are 3,792 MT CO_2e and are summarized in **Table 4-6** for construction electricity usage and **Table A.1-3** in **Appendix A** for construction off-road equipment and mobile trips. When amortized over a period of 30 years, the emission estimates for the Project become 127 MT CO_2e/yr.[82]

At its build-out operational year (2026), Project emissions are estimated to be approximately 15,174 MT CO_2e/yr. Accordingly, the Project would result in a ***decrease*** from existing conditions by 3,482 MT CO_2e/yr.

At its horizon operational year (2042), Project emissions are estimated to be approximately 12,281 MT CO_2e/yr. Accordingly, the Project would result in a ***decrease*** from existing GHG conditions by 6,375 MT CO_2e/yr. The environmentally beneficial decrease in GHG emissions associated with the Project are summarized in **Table ES-1**.[83]

As shown, the Project would reduce GHG emissions compared to the baseline conditions. CEQA Guidelines Section 15064.4(b) indicates that "[i]n determining the significance of a project's greenhouse gas emissions, the lead agency should focus its analysis on the *reasonably foreseeable incremental contribution* of the project's emissions to the effects of climate change." (Emphasis added.) The Project does not result in any incremental contribution of GHG emissions to the effects of climate change, and in fact results in an incremental decrease in net GHG emissions. Accordingly, the Project's GHG emissions would be less than significant.

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82 This approach to one-time construction and vegetation change GHG emissions is based on guidance from the SCAQMD GHG Threshold Working Group, Meeting #13 Minutes, from August 26, 2009. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-13/ghg-meeting-13-minutes.pdf. Accessed: April 2022.

83 As discussed in **Section 2.2.2.5**, proposed SB 44 may be applicable to a certain class of projects provided certain conditions are met. One of those conditions is that for projects less than two miles in length (such as this Project), the project must reduce emissions by no less than 50,000 MT of greenhouse gases over the useful life of the project, without using offsets. For informational purposes, the Project was analyzed for consistency with this condition. Over an estimated 30-year lifespan (2026-2055), the Project is estimated to reduce a total of -166,653 MT CO_2e of GHG emissions. Therefore, the Project would satisfy this condition of proposed SB 44.

5.2 The Project's Consistency with Applicable GHG Reduction Plans

State CEQA Guidelines, Appendix G, Section VIII, Question b)

> "Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?"

State climate policy under AB 32 and SB 32 is rooted in achieving GHG emissions reductions below the reference year of 1990 even as California's population and economy continue to grow over time. Applicable GHG reduction plans, such as the Scoping Plan, are premised on achieving long-term reductions in GHG emissions even as sectors of the economy continue to emit GHGs. Because the Project results in a net decrease of GHG emissions, the Project is consistent with applicable GHG reduction plans, policies and regulations that were designed to achieve overall GHG reductions even as growth occurs.

The following section provides additional information about the Project's consistency with specific elements of applicable State, regional, and local GHG plans, policies, and regulations.

5.2.1 State Reduction Strategies

Ramboll evaluated the Project's potential to impede or conflict with the State's GHG reduction strategies, including: the California Renewables Portfolio Standard as most recently amended by SB 100, Title 24, Assembly Bill 1109, CalGreen Building Code, AB 1493 (Pavley), the Low Carbon Fuel Standard, Advanced Clean Cars Program, SB 375, Senate Bill X7-7, IWMA and AB 341.

As shown in **Table C-1 of Appendix C**, the Project would be consistent with applicable State strategies for the reduction of GHG emissions.

5.2.1.1 Consistency with CARB Scoping Plan

The Scoping Plan has a range of GHG reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 implementation fee to fund the program. The 2017 Scoping Plan Update identifies additional GHG reduction measures necessary to achieve the 2030 target. These measures build upon those identified in the First Update to the Scoping Plan (2013). **Table C-2 of Appendix C** evaluates the Project's consistency with the 2017 Scoping Plan. As shown, the Project would not conflict with the implementation of the 2017 Scoping Plan.

5.2.1.2 Consistency with SB 375

SB 375 facilitates GHG reductions through integrated regional transportation, land use, and housing planning that provides access to jobs, services, public transit, and active transportation options. The SB 375 GHG reduction targets for the Southern California region under SCAG's jurisdiction in 2020 and 2035 are reductions in per capita GHG emissions of 8 percent and 19 percent, respectively as compared to 2005.[84] The SCS prepared as part of *Connect SoCal* complies with the emission reduction targets established by CARB and meets the requirements of SB 375 by achieving GHG emission reductions at 8% below 2005 per

[84] CARB. SB 375 Regional Plan Climate Targets. Available at: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets. Accessed: April 2022.

capita emissions levels by 2020 and 19% below 2005 per capita emissions levels by 2035.[85] *Connect SoCal* includes new initiatives of land use, transportation, and technology to reach the GHG reduction goals. The goals are based on four categories: economy, mobility, environment, and healthy/complete communities. As shown in **Table C-3 of Appendix C**, the Project would be consistent with goals laid out in *Connect SoCal* and in turn SB 375.

5.2.2 Consistency with 2019 Metro Climate Action and Adaptation Plan

The 2019 Metro CAAP commits to reducing its GHG emissions by 79% relative to 2017 levels by 2030 and 100% (i.e., zero emissions) by 2050. The CAAP identifies thirteen measures to help achieve the goal of zero emissions by 2050. **Table C-4 of Appendix C** demonstrates that the Project would be consistent with CAAP's GHG reduction strategies and climate adaptation measures.

5.3 Project Innovation

The Project represents an innovative gondola system in a densely populated area that will facilitate acceptance of transportation alternatives consistent with local, regional, and statewide policies to reduce traffic, air pollution, and GHGs by reducing vehicle miles traveled. As a breakthrough and innovative technology for the region, the Project advances future alternative transportation modes in the Los Angeles area while providing a template for aerial projects elsewhere in California and the United States. This new transportation technology would reduce dependence on conventional vehicle modes and encourage alternatives modes of transportation to reduce VMT and emissions.

For additional information about the Project's environmental benefits as an innovative technology to facilitate the reduction of VMT and GHG emissions, see the analysis provided in **Appendix D.**

[85] SCAG. 2020. The 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy of the Southern California Association of Governments. Adopted September 3, 2020. Available at: https://scag.ca.gov/read-plan-adopted-final-plan. Accessed: April 2022.

TABLES

Table ES-1. Summary of Project GHG Emissions
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Greenhouse Gas Emissions (MT/yr)	
Description	CO_2e[1]
2019: Baseline/Existing	
On-Road Mobile Emissions	18,655
2026: Build-Out	
On-Road Mobile Emissions	14,869
Electricity Usage	6
Water and Wastewater	7
Solid Waste	163
Land Use Change	2
Construction Equipment/Trips (30-yr Amortization)	117
Construction Electricity (30-yr Amortization)	10
Net Emissions	-3,482
2042: Horizon Year	
On-Road Mobile Emissions	11,950
Electricity Usage	1
Water and Wastewater	2
Solid Waste	199
Land Use Change	2
Construction Equipment/Trips (30-yr Amortization)	117
Construction Electricity (30-yr Amortization)	10
Net Emissions	-6,375

Notes:

[1] The Project analysis conservatively does not include hydrofluorocarbon (HFC) emissions associated with refrigerant leaking from air conditioning units of on-road mobile sources. If they were incorporated, the net reduction in GHG emissions would be greater (i.e., more reductions of GHGs), than currently estimated.

Abbreviations:

CO_2e - carbon dioxide equivalents
GHG - greenhouse gas
MT - metric tons
yr - year

Table 4-1. Utility GHG Intensity Factors Associated with Renewable Portfolio Standard
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

	2014	2015	2016	Average	Units
Total Energy Delivered[1]	28,481,817	28,104,157	27,925,836	--	MWh
Renewables	*5,696,363*	*5,901,873*	*8,098,492*	--	MWh
Non-Renewables	*22,785,454*	*22,202,284*	*19,827,344*	--	MWh
% of Total Energy From Renewables[2]	20%	21%	29%	--	
% of Total Energy From Non-Renewables	80%	79%	71%	--	
CO_2 Intensity Factor for Total Energy Delivered[3,4]	1,154	1,131	834	1,040	lbs CO_2/MWh delivered
CO_2 Intensity Factor for Total Non-Renewable Energy[5]	1,443	1,432	1,175	1,350	lbs CO_2/MWh delivered

Estimated CO_2 Intensity Factors for Total Energy Delivered[6]					
2026 RPS (50%)[7]	721	716	587	652	lbs CO_2/MWh delivered
2042 RPS (92%)[7]	115	115	94.0	104	lbs CO_2/MWh delivered

Notes:

[1] The total energy delivered in years 2014 through 2016 provided in Appendix C of the 2017 LADWP SLTRP, page C-15. Available at: https://www.ladwp.com/ladwp/faces/wcnav_externalId/a-p-doc?_adf.ctrl-state=njgtmtsj9_17&_afrLoop=985115648971896. Accessed: April 2022.

[2] The percentage of total energy from renewable energy as provided by California Energy Commission Power Content Labels. Available at: https://www.energy.ca.gov/programs-and-topics/programs/power-source-disclosure/power-content-label. Accessed: April 2022.

[3] The carbon intensity factors per total energy delivered obtained from Appendix C of the 2017 LADWP SLTRP, page C-15.

[4] The percentage of energy delivered from renewables increased significantly from 2015 to 2016; therefore, a 2014-2016 average intensity factor was developed to create a more representative baseline value from which to project future intensity factors.

[5] The emissions metric presented here is calculated by dividing the CO_2 intensity factor for total energy by the fraction of energy provided by non-renewables.

[6] The intensity factors shown here are estimated by multiplying the expected percentage of energy delivered from non-renewable energy by the CO_2 intensity factors for total non-renewable energy shown above. These estimates assume that renewable energy sources will not result in any CO_2 emissions.

[7] RPS for 2026 is based on California Senate Bill 100. RPS for 2042 was determined by linearly interpolating between the 2030 RPS (60%) and the 2045 RPS (100%), as listed in Senate Bill 100. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100. Accessed: April 2022.

Abbreviations:

CO_2 - carbon dioxide	MWh - megawatt-hour
lbs - pounds	RPS - Renewable Portfolio Standard
MT - metric tons	SLTRP - Strategic Long-Term Resource Plan

Table 4-2. Construction Schedule
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Project Sub-Activity	Total Days	Start Date	End Date
Alameda Station	Utilities	36	1/9/24	2/27/24
	Foundations	79	2/28/24	6/17/24
	Demolition	5	2/28/24	3/5/24
	Hauling	3	3/6/24	3/9/24
	Columns	71	3/10/24	6/17/24
	Deck Erection	10	6/18/24	7/1/24
	Gondola	139	7/2/24	1/10/25
	Deck Removal	12	1/11/25	1/28/25
	Asphalt	10	1/11/25	1/24/25
	Hardscape	132	1/11/25	7/15/25
	Rope Pulling	51	7/16/25	9/24/25
Alpine Tower	Utilities	15	4/8/24	4/28/24
	Foundations	74	4/29/24	8/8/24
	Demolition	8	4/29/24	5/8/24
	Hauling	3	5/9/24	5/13/24
	Columns	63	5/14/24	8/8/24
	Gondola	141	8/10/24	2/24/25
	Asphalt	10	12/25/24	1/7/25
	Hardscape	59	12/25/24	3/17/25
Broadway Junction	Utilities	41	1/2/24	2/27/24
	Foundations	141	2/28/24	9/11/24
	Demolition	15	2/28/24	3/19/24
	Hauling	8	3/20/24	3/29/24
	Columns	118	3/30/24	9/11/24
	Deck Erection	11	9/12/24	9/26/24
	Gondola	189	9/12/24	6/3/25
	Deck Removal	16	5/13/25	6/3/25
	Asphalt	10	3/8/25	3/21/25
	Hardscape	145	3/8/25	9/26/25
	Rope Pulling	102	7/16/25	12/4/25
Dodger Stadium Station	Utilities	26	1/23/24	2/27/24
	Foundations	155	2/28/24	10/1/24
	Demolition	23	2/28/24	3/29/24
	Hauling	24	3/30/24	5/2/24
	Columns	108	5/3/24	10/1/24
	Gondola	117	10/2/24	3/13/25
	Asphalt	10	6/10/25	6/23/25
	Hardscape	162	3/14/25	10/27/25
	Rope Pulling	51	9/25/25	12/4/25

Table 4-2. Construction Schedule
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Project Sub-Activity	Total Days	Start Date	End Date
Stadium Tower	Utilities	15	5/6/24	5/26/24
	Foundations	75	5/28/24	9/9/24
	Demolition	5	5/28/24	6/3/24
	Hauling	4	6/4/24	6/8/24
	Columns	66	6/9/24	9/9/24
	Gondola	132	9/10/24	3/12/25
	Hardscape	53	3/13/25	5/26/25
Chinatown/State Park Station	Utilities	11	2/13/24	2/27/24
	Foundations	106	2/28/24	7/24/24
	Demolition	8	2/28/24	3/9/24
	Hauling	7	3/10/24	3/19/24
	Columns	91	3/20/24	7/24/24
	Gondola	137	7/25/24	1/31/25
	Asphalt	10	4/4/25	4/17/25
	Hardscape	200	12/21/24	9/26/25
Alameda Tower	Utilities	10	7/29/24	8/11/24
	Foundations	81	8/12/24	12/2/24
	Demolition	5	8/12/24	8/18/24
	Hauling	3	8/19/24	8/21/24
	Columns	73	8/22/24	12/2/24
	Gondola	128	12/11/24	6/6/25
	Asphalt	10	4/11/25	4/24/25
	Hardscape	71	4/11/25	7/18/25
Mesa Lot Laydown Area	Laydown Area	503	1/2/24	12/4/25
Shuttling	Shuttling	503	1/2/24	12/4/25

Notes:

[1] Construction schedule and number of working days are Project-specific estimates.

[2] Start and end dates are approximate.

Table 4-3a. Construction Equipment Mix Assumptions: Stations/Junctions
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Sub-Activity[1]	Equipment Type[1,3]	CalEEMod Equipment Type	Number of Non-Tier 4 Equipment	Number of Tier 4 Equipment	Hours per day[2]	Horsepower[1] (hp)	Load Factor[1]
Utilities	Tractor	Tractors/Loaders/Backhoes	0	1	6.75	97	0.37
	Plate Compactors	Plate Compactors	1	0	9	8	0.43
	Rollers	Rollers	0	1	9	80	0.38
	Rough Terrain Forklift	Rough Terrain Forklifts	0	1	4.5	100	0.40
	Rubber Tired Loaders	Rubber Tired Loaders	0	1	4.5	203	0.36
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	2.25	64	0.46
Foundations	Bore/Drill Rigs	Bore/Drill Rigs	0	2	6.75	221	0.50
	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	0	2	4.5	97	0.37
	Plate Compactors	Plate Compactors	2	0	6.75	8	0.43
	Air Compressors	Air Compressors	0	2	2.25	78	0.48
	Pumps	Pumps	0	2	4.5	84	0.74
	Cranes	Cranes	0	1	2.25	231	0.29
	Rubber Tired Dozers	Rubber Tired Dozers	0	1	4.5	247	0.40
	Excavators	Excavators	0	2	4.5	158	0.38
	Rough Terrain Forklift	Rough Terrain Forklifts	0	1	6.75	100	0.40
	Other Construction Equipment	Other Construction Equipment	0	1	4.5	172	0.42
	Surfacing Equipment	Surfacing Equipment	0	1	9	263	0.30
	Pavers	Pavers	0	1	9	130	0.42
	Rollers	Rollers	0	1	9	80	0.38
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	6.75	64	0.46
	Welders	Welders	1	0	2.25	46	0.45
Deck Erection	Rough Terrain Forklift	Rough Terrain Forklifts	0	2	6.75	100	0.40
	Cranes	Cranes	0	1	6.75	231	0.29
	Welders	Welders	1	0	4.5	46	0.45
	Air Compressors	Air Compressors	0	2	4.5	78	0.48
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	2.25	64	0.46
Gondola	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	0	2	2.25	97	0.37
	Plate Compactors	Plate Compactors	2	0	4.5	8	0.43
	Air Compressors	Air Compressors	0	1	2.25	78	0.48
	Cranes	Cranes	0	1	6.75	231	0.29
	Pumps	Pumps	0	1	4.5	84	0.74
	Rough Terrain Forklift	Rough Terrain Forklifts	0	1	6.75	100	0.40
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	2.25	64	0.46
	Aerial Lifts	Aerial Lifts	0	2	6.75	63	0.31
	Welders	Welders	4	0	2.25	46	0.45
Deck Removal	Rough Terrain Forklift	Rough Terrain Forklifts	0	2	6.75	100	0.40
	Cranes	Cranes	0	1	4.5	231	0.29
	Welders	Welders	1	0	4.5	46	0.45
	Air Compressors	Air Compressors	0	2	4.5	78	0.48
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	2.25	64	0.46
Asphalt	Pavers	Pavers	0	1	9	130	0.42
	Rollers	Rollers	0	1	9	80	0.38
	Plate Compactors	Plate Compactors	2	0	4.5	8	0.43
	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	0	2	6.75	97	0.37
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	2.25	64	0.46
Hardscape	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	0	1	4.5	97	0.37
	Plate Compactors	Plate Compactors	1	0	2.25	8	0.43
	Cranes	Cranes	0	1	4.5	231	0.29
	Generator Sets	Generator Sets	0	2	0	84	0.74
	Rough Terrain Forklift	Rough Terrain Forklifts	0	1	4.5	100	0.40
	Welders	Welders	1	0	2.25	46	0.45
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	2.25	64	0.46
Laydown Area	Rough Terrain Forklift	Rough Terrain Forklifts	0	2	7.2	100	0.40
	Crane	Cranes	0	1	4.5	231	0.29
Rope Pulling	Diesel Hydrostat winch	Other General Industrial Equipment	0	1	9	88	0.34
	Crane	Cranes	0	1	2.25	231	0.29
	Tractor/Lift	Tractors/Loaders/Backhoes	0	1	2.25	97	0.37

Notes:

[1] Construction equipment list and usage are Project-specific estimates. CalEEMod® defaults were used for off-road construction equipment horsepower and load factors other than for the skid-mounted generator which is a Project-specific size. Available at: www.caleemod.com. Accessed: April 2022.

[2] The hours of day for each piece of equipment incorporate the expected amount of the day when the equipment will be in use.

[3] The welders are assumed to utilize existing electrical line power.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
hp - horsepower

Table 4-3b. Construction Equipment Mix Assumptions: Towers
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Sub-Activity[1]	Equipment Type[1,3]	CalEEMod Equipment Type	Number of Non-Tier 4 Equipment	Number of Tier 4 Equipment	Hours per day[2]	Horsepower[1] (hp)	Load Factor[1]
Utilities	Tractor	Tractors/Loaders/Backhoes	0	1	6.75	97	0.37
	Plate Compactors	Plate Compactors	1	0	9	8	0.43
	Rollers	Rollers	0	1	9	80	0.38
	Rough Terrain Forklift	Rough Terrain Forklifts	0	1	4.5	100	0.40
	Rubber Tired Loaders	Rubber Tired Loaders	0	1	4.5	203	0.36
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	2.25	64	0.46
Foundations	Bore/Drill Rigs	Bore/Drill Rigs	0	2	6.75	221	0.50
	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	0	2	4.5	97	0.37
	Plate Compactors	Plate Compactors	2	0	6.75	8	0.43
	Air Compressors	Air Compressors	0	2	2.25	78	0.48
	Pumps	Pumps	0	2	4.5	84	0.74
	Cranes	Cranes	0	1	2.25	231	0.29
	Excavators	Excavators	0	2	4.5	158	0.38
	Rough Terrain Forklift	Rough Terrain Forklifts	0	1	6.75	100	0.40
	Other Construction Equipment	Other Construction Equipment	0	1	4.5	172	0.42
	Surfacing Equipment	Surfacing Equipment	0	1	9	263	0.30
	Pavers	Pavers	0	1	9	130	0.42
	Rollers	Rollers	0	1	9	80	0.38
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	6.75	64	0.46
	Welders	Welders	1	0	2.25	46	0.45
Gondola	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	0	2	2.25	97	0.37
	Plate Compactors	Plate Compactors	2	0	4.5	8	0.43
	Air Compressors	Air Compressors	0	1	2.25	78	0.48
	Cranes	Cranes	0	1	6.75	231	0.29
	Pumps	Pumps	0	1	4.5	84	0.74
	Rough Terrain Forklift	Rough Terrain Forklifts	0	1	6.75	100	0.40
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	2.25	64	0.46
	Aerial Lifts	Aerial Lifts	0	2	4.5	63	0.31
	Welders	Welders	4	0	2.25	46	0.45
Asphalt	Pavers	Pavers	0	1	9	130	0.42
	Rollers	Rollers	0	1	9	80	0.38
	Plate Compactors	Plate Compactors	2	0	4.5	8	0.43
	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	0	2	6.75	97	0.37
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	2.25	64	0.46
Hardscape	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	0	1	4.5	97	0.37
	Plate Compactors	Plate Compactors	1	0	2.25	8	0.43
	Generator Sets	Generator Sets	0	2	0	84	0.74
	Rough Terrain Forklift	Rough Terrain Forklifts	0	1	4.5	100	0.40
	Welders	Welders	1	0	2.25	46	0.45
	Sweepers/Scrubbers	Sweepers/Scrubbers	0	1	2.25	64	0.46

Notes:

[1] Construction equipment list and usage are Project-specific estimates. CalEEMod® defaults were used for off-road construction equipment horsepower and load factors. Available at: www.caleemod.com. Accessed: April 2022.

[2] The hours of day for each piece of equipment incorporate the expected amount of the day when the equipment will be in use.

[3] The welders are assumed to utilize existing electrical line power.

Abbreviations:

CalEEMod® - California Emissions Estimator Model

hp - horsepower

Table 4-4. Construction Equipment Days of Use
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Sub-Activity	Equipment Type	CalEEMod Equipment Type	Alameda Station	Chinatown/ State Park Station	Broadway Junction	Dodger Stadium Station	Alameda Tower	Alpine Tower	Stadium Tower
Utilities	Tractor	Tractors/Loaders/Backhoes	35	11	38	25	11	13	13
	Concrete/Industrial Saws	Concrete/Industrial Saws	7	2	8	5	2	3	3
	Plate Compactors	Plate Compactors	7	2	8	5	2	3	3
	Rollers	Rollers	7	2	8	5	2	3	3
	Rough Terrain Forklift	Rough Terrain Forklifts	35	11	38	25	11	13	13
	Rubber Tired Loaders	Rubber Tired Loaders	15	6	19	13	6	6	7
	Sweepers/Scrubbers	Sweepers/Scrubbers	35	11	38	25	11	13	13
Foundations	Bore/Drill Rigs	Bore/Drill Rigs	32	42	56	62	32	30	30
	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	80	105	140	155	80	75	75
	Plate Compactors	Plate Compactors	5	5	5	5	5	5	5
	Air Compressors	Air Compressors	9	9	9	9	9	9	9
	Pumps	Pumps	9	11.5	15	16.5	9	8.5	8.5
	Concrete/Industrial Saws	Concrete/Industrial Saws	1	1	1	1	1	1	1
	Cranes	Cranes	80	105	140	155	80	75	75
	Rubber Tired Dozers	Rubber Tired Dozers	0	0	12	0	0	0	0
	Cement and Mortar Mixers	Cement and Mortar Mixers	0	0	0	0	0	0	0
	Excavators	Excavators	34	44	58	64	34	32	32
	Rubber Tired Loaders	Rubber Tired Loaders	0	0	0	0	0	0	0
	Generator Sets	Generator Sets	0	0	0	0	0	0	0
	Rough Terrain Forklift	Rough Terrain Forklifts	80	105	140	155	80	75	75
	Other Construction Equipment	Other Construction Equipment	1	1	1	1	1	1	1
	Surfacing Equipment	Surfacing Equipment	1	1	1	1	1	1	1
	Pavers	Pavers	1	1	1	1	1	1	1
	Rollers	Rollers	1	1	1	1	1	1	1
	Sweepers/Scrubbers	Sweepers/Scrubbers	16	21	28	31	16	15	15
	Welders	Welders	30	30	30	30	30	30	30
Deck Erection	Rough Terrain Forklift	Rough Terrain Forklifts	10	0	10	0	0	0	0
	Cranes	Cranes	10	0	10	0	0	0	0
	Welders	Welders	5	0	5	0	0	0	0
	Air Compressors	Air Compressors	10	0	10	0	0	0	0
	Sweepers/Scrubbers	Sweepers/Scrubbers	1	0	1	0	0	0	0

Table 4-4. Construction Equipment Days of Use
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Sub-Activity	Equipment Type	CalEEMod Equipment Type	Alameda Station	Chinatown/ State Park Station	Broadway Junction	Dodger Stadium Station	Alameda Tower	Alpine Tower	Stadium Tower
Gondola	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	14	14	19	12	13	14	13
	Plate Compactors	Plate Compactors	14	14	19	12	13	14	13
	Air Compressors	Air Compressors	140	140	190	120	130	140	130
	Cranes	Cranes	140	140	190	120	130	140	130
	Cement and Mortar Mixers	Cement and Mortar Mixers	0	0	0	0	0	0	0
	Generator Sets	Generator Sets	0	0	0	0	0	0	0
	Pumps	Pumps	14	14	19	12	13	14	13
	Rough Terrain Forklift	Rough Terrain Forklifts	140	140	190	120	130	140	130
	Sweepers/Scrubbers	Sweepers/Scrubbers	28	28	38	24	26	28	26
	Aerial Lifts	Aerial Lifts	120	120	170	100	110	120	110
	Welders	Welders	140	140	190	120	130	140	130
Deck Removal	Rough Terrain Forklift	Rough Terrain Forklifts	15	0	15	0	0	0	0
	Cranes	Cranes	15	0	15	0	0	0	0
	Welders	Welders	7	0	7	0	0	0	0
	Air Compressors	Air Compressors	15	0	15	0	0	0	0
	Sweepers/Scrubbers	Sweepers/Scrubbers	1	0	1	0	0	0	0
Asphalt	Pavers	Pavers	10	10	10	10	10	10	0
	Rollers	Rollers	10	10	10	10	10	10	0
	Plate Compactors	Plate Compactors	5	10	5	5	5	5	0
	Excavators	Excavators	10	10	10	10	10	10	0
	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	10	10	10	10	10	10	0
	Sweepers/Scrubbers	Sweepers/Scrubbers	2	2	2	2	2	2	0
Hardscape	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	54	80	58	66	28	24	22
	Plate Compactors	Plate Compactors	15	15	15	15	15	15	15
	Cranes	Cranes	50	100	58	66	0	0	0
	Generator Sets	Generator Sets	0	0	0	0	0	0	0
	Rough Terrain Forklift	Rough Terrain Forklifts	135	200	145	165	70	60	55
	Welders	Welders	135	200	145	165	70	60	55
	Sweepers/Scrubbers	Sweepers/Scrubbers	27	27	27	27	27	27	27
Mesa Lot Laydown Area	Rough Terrain Forklift	Rough Terrain Forklifts	503	503	503	503	503	503	503
	Crane	Cranes	101	101	101	101	101	101	101
Rope Pulling	Diesel Hydrostat winch	Other General Industrial Equipment	38	0	77	38	0	0	0
	Crane	Cranes	38	0	77	38	0	0	0
	Tractor/Lift	Tractors/Loaders/Backhoes	38	0	77	38	0	0	0

Notes:

[1] For greenhouse gas emissions and energy use, the duration of equipment use within a particular Project sub-activity at each applicable location was accounted for using the days listed in this table.

Table 4-5. Construction On-Road Mobile Trip Assumptions
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Project Sub-Activity	Trip Counts[1] (round trips/day)			Paved Road Trip Length[2,3] (miles)			Paved Road VMT (miles/day)		
		Worker	Vendor	Hauling	Worker	Vendor	Hauling	Worker	Vendor	Hauling
Alameda Station	Utilities	5	2	24	14.7	6.9	20	147	27.6	960
Alameda Station	Foundations	25	10	0	14.7	6.9	20	735	138	0
Alameda Station	*Demolition*	25	10	0	14.7	6.9	20	735	138	0
Alameda Station	*Hauling*	25	10	80	14.7	6.9	20	735	138	3,200
Alameda Station	*Columns*	25	10	0	14.7	6.9	20	735	138	0
Alameda Station	Deck Erection	12	5	0	14.7	6.9	20	352.8	69	0
Alameda Station	Gondola	25	10	2	14.7	6.9	20	735	138	80
Alameda Station	Deck Removal	12	10	0	14.7	6.9	20	352.8	138	0
Alameda Station	Asphalt	10	0	10	14.7	6.9	20	294	0	400
Alameda Station	Hardscape	20	10	0	14.7	6.9	20	588	138	0
Alameda Station	Rope Pulling	10	0	0	14.7	6.9	20	294	0	0
Alpine Tower	Utilities	5	2	5	14.7	6.9	20	147	27.6	200
Alpine Tower	Foundations	25	10	0	14.7	6.9	20	735	138	0
Alpine Tower	*Demolition*	25	10	0	14.7	6.9	20	735	138	0
Alpine Tower	*Hauling*	25	10	80	14.7	6.9	20	735	138	3,200
Alpine Tower	*Columns*	25	10	0	14.7	6.9	20	735	138	0
Alpine Tower	Gondola	25	10	2	14.7	6.9	20	735	138	80
Alpine Tower	Asphalt	10	0	10	14.7	6.9	20	294	0	400
Alpine Tower	Hardscape	20	10	0	14.7	6.9	20	588	138	0
Broadway Junction	Utilities	5	2	5	14.7	6.9	20	147	27.6	200
Broadway Junction	Foundations	25	10	0	14.7	6.9	20	735	138	0
Broadway Junction	*Demolition*	5	10	70	14.7	6.9	20	147	138	2,800
Broadway Junction	*Hauling*	25	10	80	14.7	6.9	20	735	138	3,200
Broadway Junction	*Columns*	25	10	0	14.7	6.9	20	735	138	0
Broadway Junction	Deck Erection	12	5	0	14.7	6.9	20	352.8	69	0
Broadway Junction	Gondola	25	10	2	14.7	6.9	20	735	138	80
Broadway Junction	Deck Removal	12	10	0	14.7	6.9	20	352.8	138	0
Broadway Junction	Asphalt	10	0	10	14.7	6.9	20	294	0	400
Broadway Junction	Hardscape	20	10	0	14.7	6.9	20	588	138	0
Broadway Junction	Rope Pulling	10	0	0	14.7	6.9	20	294	0	0
Dodger Stadium Station	Utilities	5	2	5	14.7	6.9	20	147	27.6	200
Dodger Stadium Station	Foundations	25	10	0	14.7	6.9	20	735	138	0
Dodger Stadium Station	*Demolition*	25	10	0	14.7	6.9	20	735	138	0
Dodger Stadium Station	*Hauling*	25	10	80	14.7	6.9	20	735	138	3,200
Dodger Stadium Station	*Columns*	25	10	0	14.7	6.9	20	735	138	0
Dodger Stadium Station	Gondola	25	10	2	14.7	6.9	20	735	138	80
Dodger Stadium Station	Asphalt	10	0	10	14.7	6.9	20	294	0	400
Dodger Stadium Station	Hardscape	20	10	0	14.7	6.9	20	588	138	0
Dodger Stadium Station	Rope Pulling	10	0	0	14.7	6.9	20	294	0	0
Stadium Tower	Utilities	5	2	5	14.7	6.9	20	147	27.6	200
Stadium Tower	Foundations	25	10	0	14.7	6.9	20	735	138	0
Stadium Tower	*Demolition*	25	10	0	14.7	6.9	20	735	138	0
Stadium Tower	*Hauling*	25	10	20	14.7	6.9	20	735	138	800
Stadium Tower	*Columns*	25	10	0	14.7	6.9	20	735	138	0
Stadium Tower	Gondola	25	10	2	14.7	6.9	20	735	138	80
Stadium Tower	Hardscape	20	10	0	14.7	6.9	20	588	138	0

Table 4-5. Construction On-Road Mobile Trip Assumptions
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Project Sub-Activity	Trip Counts[1] (round trips/day)			Paved Road Trip Length[2,3] (miles)			Paved Road VMT (miles/day)		
		Worker	Vendor	Hauling	Worker	Vendor	Hauling	Worker	Vendor	Hauling
Chinatown/State Park Station	Utilities	5	2	5	14.7	6.9	20	147	27.6	200
Chinatown/State Park Station	Foundations	25	10	0	14.7	6.9	20	735	138	0
Chinatown/State Park Station	*Demolition*	25	10	0	14.7	6.9	20	735	138	0
Chinatown/State Park Station	*Hauling*	25	10	80	14.7	6.9	20	735	138	3,200
Chinatown/State Park Station	*Columns*	25	10	0	14.7	6.9	20	735	138	0
Chinatown/State Park Station	Gondola	25	10	2	14.7	6.9	20	735	138	80
Chinatown/State Park Station	Asphalt	10	0	10	14.7	6.9	20	294	0	400
Chinatown/State Park Station	Hardscape	20	10	0	14.7	6.9	20	588	138	0
Alameda Tower	Utilities	5	2	5	14.7	6.9	20	147	27.6	200
Alameda Tower	Foundations	25	10	0	14.7	6.9	20	735	138	0
Alameda Tower	*Demolition*	25	10	0	14.7	6.9	20	735	138	0
Alameda Tower	*Hauling*	25	10	80	14.7	6.9	20	735	138	3,200
Alameda Tower	*Columns*	25	10	0	14.7	6.9	20	735	138	0
Alameda Tower	Gondola	25	10	2	14.7	6.9	20	735	138	80
Alameda Tower	Asphalt	10	0	10	14.7	6.9	20	294	0	400
Alameda Tower	Hardscape	20	10	0	14.7	6.9	20	588	138	0
Mesa Lot	Laydown Area	0	4	0	0	6.9	0	0	55.2	0
Shuttling	Shuttling	10	0	0	1.7	0	0	34	0	0

Notes:

[1] Trips are presented as round trips. One round trip consists of two one-way trips, e.g., for a worker/vendor/haul truck/shuttle to come to the site and leave the site. Trip counts by phase type are the same in all years of construction. Worker, haul, and shuttle trip counts provided by client.

[2] Worker, vendor, and hauling trip lengths are based on CalEEMod® defaults for Los Angeles County.

[3] Shuttle trip lengths are based on Google Maps default route from Union Station to Dodger Stadium.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
VMT - vehicle miles traveled

Table 4-6. GHG Emissions Associated with Construction Electricity Usage
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Years	Energy Intensity Factors[1,2] (lbs/MWh)			Electricity Emissions[3,4] (MT)			
	CO_2	N_2O	CH_4	CO_2	N_2O	CH_4	CO_2e
2024-2025	756	0.004	0.033	296	0.002	0.013	297

Notes:

[1] CO_2 intensity factors developed by using the average CO_2 intensity factor for LADWP in 2014-2016 and adjusting for future RPS requirements under Senate Bill 100. Conservatively used 2024 RPS requirement (44% renewables) for all three years of construction.

[2] CH_4 and N_2O intensity factors obtained from CalEEMod® Appendix D, Table 1.2.

[3] Electricity emissions calculated by multiplying the estimated annual electricity usage by the energy intensity factors. Estimated annual electricity usage provided by PCL Construction.

Estimated electricity usage (kWh): 864,544

[4] CO_2e estimate was developed using the following global warming potentials: CO_2 = 1; CH_4 = 25, N_2O = 298.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
CO_2 - carbon dioxide equivalents
kWh - kilowatt-hour
LADWP - Los Angeles Department of Water & Power
MWh - megawatt-hour
lbs - pounds
MT - metric ton
N_2O - nitrous oxide
RPS - Renewable Portfolio Standard

Table 4-7. GHG Emissions Associated with Land Use Change
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Land Use[1]	Net Acreage[2]	CO_2 Accumulation Per Acre[3] (MT)	CO_2 Sequestered[3] (MT)
Forest Land-Scrub	-0.11	14.3	-1.6

Notes:

[1] Forest Land-Scrub was chosen as a conservative representation of the type of vegetation anticipated to be displaced by the Project.

[2] Land use change was based on Project-specific estimates wherein a net loss of less than 5,000 square feet (0.11 acres) in vegetation is expected.

[3] CO_2 sequestered (or CO_2 emitted, when negative) based on methodology for land use change in Section 11.1 of Appendix A of the CalEEMod® User's Guide.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CO_2 - carbon dioxide
MT - metric tons

Table 4-8. GHG Emissions Reduced Associated with Gondola System Electricity Usage
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Year	Energy Intensity Factors[1,2,3] (lbs/MWh)			Electricity Emissions[4,5,6] (MT/yr)			
	CO_2	N_2O	CH_4	CO_2	N_2O	CH_4	CO_2e
2026	579	0.004	0.033	-1,807	-0.012	-0.103	-1,814
2042	104	0.004	0.033	-325	-0.012	-0.103	-332

Notes:

[1] 2026 CO_2 intensity factor conservatively assumed to be equal to LADWP's 2020 CO_2 intensity factor, which is lower than the extrapolated value from 2014-2016 data. Available at: https://www.ladwp.com/powercontent. Accessed: April 2022.

[2] 2042 CO_2 intensity factor developed by using the average CO_2 intensity factor for LADWP in 2014-2016 and adjusting for future RPS requirements under Senate Bill 100.

[3] CH_4 and N_2O intensity factors obtained from CalEEMod® Appendix D, Table 1.2.

[4] Electricity emissions calculated by multiplying the estimated annual electricity usage by the energy intensity factors. Estimated annual electricity usage provided by SJC Alliance and was reduced by the amount of electricity anticipated to be used by the park amenities.

Estimated electricity usage (kWh/yr): 6,881,212

[5] Emissions are shown as negative to represent the emissions benefit gained by the Project by committing to LADWP's Green Power Program, which is supplied by 100% renewable resources.

[6] CO_2e estimate was developed using the following global warming potentials: CO_2 = 1; CH_4 = 25, N_2O = 298.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
kWh - kilowatt-hour
LADWP - Los Angeles Department of Water & Power
MWh - megawatt-hour
lbs - pounds
MT - metric ton
N_2O - nitrous oxide
RPS - Renewable Portfolio Standard
yr - year

Table 4-9. GHG Emissions Associated with Park Amenities Electricity Usage
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Electricity Usage

Description[1]			Title 24 Electricity[2]	Lighting Electricity[2]	Non-Title 24 Electricity[3]	Total Electricity
			kWh/sq. ft.	kWh/sq. ft.	kWh/sq. ft.	kWh/year
Park Amenities	1,730	sq. ft.	2.01	3.10	5.75	18,788

Energy Intensity Factors[4,5] (lbs/MWh)

Year	CO_2	N_2O	CH_4
2026	652	0.004	0.033
2042	104	0.004	0.033

Electricity Emissions[6] (MT/yr)

Year	CO_2	N_2O	CH_4	CO_2e
2026	6	0.0000	0.0003	6
2042	1	0.0000	0.0003	1

Notes:

[1] Park amenities include 740 square feet of concessions, 770 square feet of restrooms, and a 220 square foot covered breezeway.

[2] CalEEMod® default values of 2.01 kWh/sq. ft. and 3.10 kWh/sq. ft. for 2019 Title 24 electricity and lighting electricity usage, respectively, were used.

[3] Non-Title 24 electricty value based on default value in Table 8.1 of Appendix D of the CalEEMod® User's Guide.

[4] CO_2 intensity factors developed by using the average CO_2 intensity factor for LADWP in 2014-2016 and adjusting for future RPS requirements under Senate Bill 100.

[5] CH_4 and N_2O intensity factors obtained from CalEEMod® Appendix D, Table 1.2.

[6] CO_2e estimate was developed using the following global warming potentials: CO_2 = 1; CH_4 = 25, N_2O = 298.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
kWh - kilowatt-hour
LADWP - Los Angeles Department of Water & Power
MWh - megawatt-hour
lbs - pounds
MT - metric ton
N_2O - nitrous oxide
RPS - Renewable Portfolio Standard
sq. ft. - square feet
yr - year

Table 4-10. GHG Emissions Reduced Associated with Backup Power Supply
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Junction/Tower	Engine Rating[1] (hp)	Fuel Usage Rate[2] (gal/hr)	Tier[1]	Fuel Usage[3] (gal/yr)	Emissions (MT/yr)[3,6]		
					CO_2	CH_4	CO_2e
Alameda Station	314	15.4	Tier 4 Interim	92	-1.0	-1.4E-04	-1.0
Alpine Tower	314	15.4	Tier 4 Interim	92	-1.0	-1.4E-04	-1.0
Broadway Junction	314	15.4	Tier 4 Interim	92	-1.0	-1.4E-04	-1.0
Alameda Tower	314	15.4	Tier 4 Interim	92	-1.0	-1.4E-04	-1.0
Chinatown/State Park Station	755	35	Tier 2	210	-2.4	-3.3E-04	-2.4
Stadium Tower	314	15.4	Tier 4 Interim	92	-1.0	-1.4E-04	-1.0
Dodger Stadium Station	755	35	Tier 2	210	-2.4	-3.3E-04	-2.4
			Total	882	-9.6	-0.001	-9.7

Pollutant[4,5]	Emission Factors (lbs/hp-hr)	
	Tier 2	Tier 4 Interim
Horsepower (hp)	755	314
CO_2	1.15	1.15
CH_4	0.00016	0.00016

Notes:

[1] Engine rating and tier reflect generator sizing were the Project to rely on emergency generators as the backup power supply at each station/junction/tower.

[2] Generator specifications are based on information from a potential manufacturer, Cummins.

[3] Annual fuel consumption and emissions are estimated assuming 6 hours of operation per year for maintenance and readiness testing. Emissions are shown as negative to represent the emissions benefit gained by the Project by committing to batteries as the backup power supply.

[4] CO_2 emission factor obtained from AP-42, Chapter 3.3. Available at: https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s03.pdf. Accessed: April 2022.

[5] CH_4 emission factor obtained from CalEEMod®, Appendix D, Page D-358.

[6] CO_2e estimate was developed using the following global warming potentials: CO_2 = 1; CH_4 = 25.

Abbreviations:

AP-42 - EPA Compilation of Air Pollutant Emissions Factors
CalEEMod® - California Emissions Estimator Model
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
CH_4 - methane
gal - gallon
hp - horsepower
hr - hours
lbs - pounds
MT - metric ton
yr - year

Table 4-11. GHG Emissions Associated with Water Usage
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Category		2026	2042
Total Water Use (Mgal/yr)[1]		1.68	1.68
Electricity Requirements (kWh/Mgal)[2]	Supply	9,727	9,727
	Treat	111	111
	Distribute	1,272	1,272
Annual Energy Use by Source (kWh/yr)[3]		18,682	18,682
Electricity Intensity Factor[4]	lbs CO_2e/MWh	654	107
Total GHG Emissions (MT CO_2e/yr)[5]		5.5	0.9

Notes:
[1] Total water usage based on project-specific estimates generated using the LASAN sewerage generation factor.
[2] CalEEMod® default assumptions are used for average embodied energy for the supply, treatment, and distribution of water for Southern California.
[3] Total water use is multiplied by the sum of the electricity requirements to supply, treat, and distribute the water.
[4] Intensity factors presented here are for LADWP and are based on RPS projections consistent with SB 100. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100. Accessed: April 2022.
[5] GHG emissions were calculated by multiplying the annual energy use by the electricity intensity factor.

Abbreviations:
CalEEMod® - California Emissions Estimator Model
CO_2e - carbon dioxide equivalents
GHG - greenhouse gases
kWh - kilowatt-hour
LADWP - Los Angeles Department of Water and Power
LASAN - Los Angeles Sanitation
lbs - pounds
Mgal - million gallons
MWh - megawatt-hour
MT - metric tons
RPS - Renewable Portfolio Standard
SB - Senate Bill
yr - year

Table 4-12. GHG Emissions Associated with Wastewater Treatment
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Category		2026	2042
Total Wastewater Generation (Mgal/yr)[1]		0.80	0.80
Electricity Requirements (kWh/Mgal)[2]	Wastewater Treatment	1,911	1,911
Annual Energy Use by Source (kWh/yr)[3]		1,535	1,535
Electricity Intensity Factor[4]	lbs CO_2e/MWh	654	107
GHG Emissions from Electricity (MT CO_2e/yr)[5]		0.5	0.1
GHG Emissions from Wastewater Treatment (MT CO_2e/yr)[6]		1.1	1.1
Total GHG Emissions (MT CO_2e/yr)		1.5	1.2

Wastewater Treatment Types[7]

County	Septic Tank	Aerobic	Anaerobic, Facultative Lagoons	Anaerobic, Combustion of Gas	Anaerobic, Cogeneration of Gas
Los Angeles - South Coast	10.33%	87.46%	2.21%	100%	0%

Wastewater Treatment Direct Emission Factors[7]

Wastewater Treatment Type	CO_2 Biogenic	CO_2 Non-Biogenic	CH_4	N_2O
	(ton/gal)	(ton/gal)	(ton/gal)	(ton/gal)
Septic	0	0	2.5E-07	8.5E-10
Aerobic	3.9E-07	0	1.3E-09	8.5E-10
Anaerobic Facultative	3.9E-07	0	4.0E-07	8.5E-10
Digester Burn	0	0	0	0
Digester Cogen	0	0	0	0

Notes:

[1] Wastewater generation based on project-specific estimates generated using the LASAN sewerage generation factor.

[2] CalEEMod® default assumptions used for average embodied energy for wastewater treatment of water for Southern California.

[3] Wastewater generated is multiplied by the electricity intensity factors for water treatment.

[4] Intensity factors presented here are for LADWP and are based on RPS projections consistent with SB 100. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100. Accessed: April 2022.

[5] GHG emissions from electricity was calculated by multiplying the annual energy use by the electricity intensity factor.

[6] GHG emissions from wastewater treatment calculated by applying CalEEMod® default assumptions for wastewater treatment options.

[7] Water Treatment Types from Table 9.3 of Appendix D of the CalEEMod® User's Guide. Wastewater Treatment Direct Emission Factors from Table 9.4 of Appendix D of the CalEEMod® User's Guide.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
GHG - greenhouse gases
kWh - kilowatt-hour
LADWP - Los Angeles Department of Water and Power
LASAN - Los Angeles Sanitation
lbs - pounds
Mgal - million gallons
MWh - megawatt-hour
MT - metric tons
N_2O - nitrous oxide
RPS - Renewable Portfolio Standard
SB - Senate Bill
yr - year

Table 4-13. GHG Emissions Associated with Solid Waste
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Solid Waste Generation - Gondola Riders

Description[1]			Solid Waste Generated[2] (ton/year)
2026	4.02	million rider trips/year	314
2042	4.94	million rider trips/year	386

Solid Waste Generation - Users of Park Amenities

Description[3]			Solid Waste Generated[4] (ton/year)
Park Amenities	1,730	square feet	10

Solid Waste Landfill Gas (LFG) Treatment Types[5]

County	Landfill, No Gas Capture	Landfill, Capture Gas Flare
Los Angeles - South Coast	6%	94%

Solid Waste Landfill Gas Emission Factors[6]

Description	CO_2 Emissions (ton/ton waste)	CH_4 Emissions (ton/ton waste)
No LFG Collection	0.14	0.043
LFG Collect and Combust	0.23	0.011

GHG Emissions from Solid Waste

Description	CO_2	CH_4	CO_2e
	(MT/year)		
2026	66	4	163
2042	80	5	199

Notes:

[1] The ridership trip estimate was developed by Fehr & Peers and represents gondola travel associated with those going to and from major events at Dodger Stadium (i.e., Dodger games and concerts), tourists, and access by those in the neighborhood/region.

[2] Solid waste generated assumed to be equivalent of 1 in 4 riders discarding waste weighing approximately 10 ounces (i.e., equivalent to a beverage cup).

[3] Park amenities include 740 square feet of concessions, 770 square feet of restrooms, and a 220 square foot covered breezeway.

[4] Solid waste generated calculated using CalEEMod® factor of 5.70 tons/1000 square feet/year.

[5] Solid Waste Landfill Gas Treatment Types from CalEEMod® User's Guide, Section 4.8 Solid Waste, PDF page 51, which is all applicable to all land uses within California.

[6] Solid Waste Landfill Gas Emission Factors from Table 10.2 of CalEEMod® User's Guide Appendix D.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
GHG - greenhouse gases
LFG - landfill gas
MT - metric tons

Table 4-14. GHG Emissions Associated with Traffic
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Year	Annual VMT[1]	Annual Trips[2]	Mobile Emissions[3,4] (MT/yr)			
			CO_2	N_2O	CH_4	CO_2e
2019	53,549,000	2,403,456	18,477	0.55	0.56	18,655
2026	51,115,000	2,294,210	14,768	0.32	0.28	14,869
2042	48,482,000	2,176,032	11,886	0.20	0.13	11,950

Notes:

[1] The VMT estimate was developed by Fehr & Peers and represents the travel associated with those going to and from major events at Dodger Stadium (i.e., Dodger games and concerts). This estimate also includes VMT associated with LA ART employees and Dodger employees traveling to/from the stadium.

[2] The annual trip estimate was calculated using an average trip length value derived from Fehr & Peers data.

Trip Length (mi) 22.3

[3] Mobile emissions were calculated using annual VMT and trip estimates along with emission factors in g/VMT and g/trip derived from EMFAC2021 for light duty vehicles.

[4] CO_2e estimate was developed using the following global warming potentials:
CO_2 = 1; CH_4 = 25, N_2O = 298.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
EMFAC - Emission Factors model
g - grams
lbs - pounds
MT - metric ton
N_2O - nitrous oxide
VMT - vehicle miles traveled
yr - year

APPENDIX A
PROJECT GHG EMISSION ESTIMATES

Table A.1-1. Construction Emission Estimates for Off-Road Equipment
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Alameda Station	2024	Utilities	12.99	0.00E+00	3.78E-03
	2024	Foundations			
	2024	*Demolition*	4.54	0.00E+00	1.26E-03
	2024	*Hauling*	2.73	0.00E+00	7.55E-04
	2024	*Columns*	64.50	0.00E+00	1.79E-02
	2024	Deck Erection	7.18	0.00E+00	1.64E-03
	2024	Gondola	75.90	0.00E+00	2.01E-02
	2025	Gondola	4.64	0.00E+00	1.22E-03
	2025	Deck Removal	7.66	0.00E+00	1.68E-03
	2025	Asphalt	6.70	0.00E+00	1.95E-03
	2025	Hardscape	25.74	0.00E+00	7.48E-03
	2025	Rope Pulling	10.12	0.00E+00	2.92E-03
Alpine Tower	2024	Utilities	5.61	0.00E+00	1.63E-03
	2024	Foundations			
	2024	*Demolition*	7.29	0.00E+00	2.02E-03
	2024	*Hauling*	2.73	0.00E+00	7.57E-04
	2024	*Columns*	57.38	0.00E+00	1.59E-02
	2024	Gondola	55.06	0.00E+00	1.44E-02
	2025	Gondola	21.06	0.00E+00	5.52E-03
	2024	Asphalt	3.35	0.00E+00	9.73E-04
	2025	Asphalt	3.35	0.00E+00	9.73E-04
	2024	Hardscape	0.72	0.00E+00	2.11E-04
	2025	Hardscape	7.83	0.00E+00	2.28E-03
Broadway Junction	2024	Utilities	15.33	0.00E+00	4.46E-03
	2024	Foundations			
	2024	*Demolition*	13.70	0.00E+00	3.82E-03
	2024	*Hauling*	7.31	0.00E+00	2.04E-03
	2024	*Columns*	107.75	0.00E+00	3.01E-02
	2024	Deck Erection	10.04	0.00E+00	2.80E-03
	2024	Gondola	46.18	0.00E+00	1.22E-02
	2025	Gondola	64.31	0.00E+00	1.70E-02
	2025	Deck Removal	10.22	0.00E+00	2.24E-03
	2025	Asphalt	6.70	0.00E+00	1.95E-03
	2025	Hardscape	28.89	0.00E+00	8.39E-03
	2025	Rope Pulling	20.24	0.00E+00	5.85E-03

Table A.1-1. Construction Emission Estimates for Off-Road Equipment
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Dodger Stadium Station	2024	Utilities	9.72	0.00E+00	2.83E-03
	2024	Foundations			
	2024	*Demolition*	20.50	0.00E+00	5.72E-03
	2024	*Hauling*	21.39	0.00E+00	5.97E-03
	2024	*Columns*	96.26	0.00E+00	2.69E-02
	2024	Gondola	57.93	0.00E+00	1.62E-02
	2025	Gondola	29.96	0.00E+00	7.91E-03
	2025	Asphalt	6.70	0.00E+00	1.95E-03
	2025	Hardscape	41.48	0.00E+00	1.20E-02
	2025	Rope Pulling	10.12	0.00E+00	2.92E-03
Stadium Tower	2024	Utilities	5.61	0.00E+00	1.63E-03
	2024	Foundations			
	2024	*Demolition*	4.55	0.00E+00	1.26E-03
	2024	*Hauling*	3.64	0.00E+00	1.01E-03
	2024	*Columns*	60.11	0.00E+00	1.66E-02
	2024	Gondola	73.77	0.00E+00	2.04E-02
	2025	Gondola	27.48	0.00E+00	7.20E-03
	2025	Hardscape	7.76	0.00E+00	2.26E-03
Chinatown/State Park Station	2024	Utilities	4.11	0.00E+00	1.20E-03
	2024	Foundations			
	2024	*Demolition*	7.20	0.00E+00	2.00E-03
	2024	*Hauling*	6.30	0.00E+00	1.75E-03
	2024	*Columns*	81.90	0.00E+00	2.28E-02
	2024	Gondola	66.05	0.00E+00	1.75E-02
	2025	Gondola	13.33	0.00E+00	3.52E-03
	2025	Asphalt	6.79	0.00E+00	1.96E-03
	2024	Hardscape	1.49	0.00E+00	4.34E-04
	2025	Hardscape	41.17	0.00E+00	1.20E-02

Table A.1-1. Construction Emission Estimates for Off-Road Equipment
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Alameda Tower	2024	Utilities	3.74	0.00E+00	1.09E-03
	2024	Foundations			
	2024	*Demolition*	4.54	0.00E+00	1.26E-03
	2024	*Hauling*	2.73	0.00E+00	7.55E-04
	2024	*Columns*	66.31	0.00E+00	1.84E-02
	2024	Gondola	8.08	0.00E+00	2.12E-03
	2025	Gondola	60.89	0.00E+00	1.60E-02
	2025	Asphalt	6.70	0.00E+00	1.95E-03
	2025	Hardscape	10.14	0.00E+00	2.95E-03
Mesa Lot Laydown Area	2024	Laydown Area	88.13	0.00E+00	2.54E-02
	2025	Laydown Area	81.75	0.00E+00	2.36E-02

Notes:

[1] Emissions are calculated as the sum of all equipment used during a particular Project sub-activity at each applicable location.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
MT - metric tons
N_2O - nitrous oxide

Table A.1-2a. Construction Emission Estimates for Construction Worker and Shuttle Trips
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/yr)		
			CO_2	N_2O	CH_4
Alameda Station	2024	Utilities	1.67	4.88E-05	5.36E-05
	2024	Foundations			
	2024	*Demolition*	1.16	3.39E-05	3.73E-05
	2024	*Hauling*	0.69	2.03E-05	2.24E-05
	2024	*Columns*	16.43	4.81E-04	5.29E-04
	2024	Deck Erection	1.11	3.25E-05	3.58E-05
	2024	Gondola	30.32	8.87E-04	9.76E-04
	2025	Gondola	1.81	5.08E-05	5.49E-05
	2025	Deck Removal	1.30	3.66E-05	3.95E-05
	2025	Asphalt	0.90	2.54E-05	2.75E-05
	2025	Hardscape	23.88	6.71E-04	7.25E-04
	2025	Rope Pulling	4.61	1.30E-04	1.40E-04
Alpine Tower	2024	Utilities	0.69	2.03E-05	2.24E-05
	2024	Foundations			
	2024	*Demolition*	1.85	5.42E-05	5.96E-05
	2024	*Hauling*	0.69	2.03E-05	2.24E-05
	2024	*Columns*	14.58	4.27E-04	4.69E-04
	2024	Gondola	23.61	6.91E-04	7.60E-04
	2025	Gondola	8.82	2.48E-04	2.68E-04
	2024	Asphalt	0.46	1.35E-05	1.49E-05
	2025	Asphalt	0.45	1.27E-05	1.37E-05
	2024	Hardscape	0.93	2.71E-05	2.98E-05
	2025	Hardscape	9.77	2.74E-04	2.97E-04
Broadway Junction	2024	Utilities	1.90	5.55E-05	6.11E-05
	2024	Foundations			
	2024	*Demolition*	0.69	2.03E-05	2.24E-05
	2024	*Hauling*	1.85	5.42E-05	5.96E-05
	2024	*Columns*	27.31	7.99E-04	8.79E-04
	2024	Deck Erection	1.22	3.58E-05	3.93E-05
	2024	Gondola	18.28	5.35E-04	5.89E-04
	2025	Gondola	24.87	6.99E-04	7.55E-04
	2025	Deck Removal	1.74	4.88E-05	5.27E-05
	2025	Asphalt	0.90	2.54E-05	2.75E-05
	2025	Hardscape	26.23	7.37E-04	7.96E-04
	2025	Rope Pulling	9.23	2.59E-04	2.80E-04

Table A.1-2a. Construction Emission Estimates for Construction Worker and Shuttle Trips
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/yr)		
			CO_2	N_2O	CH_4
Dodger Stadium Station	2024	Utilities	1.20	3.52E-05	3.87E-05
	2024	Foundations			
	2024	*Demolition*	5.32	1.56E-04	1.71E-04
	2024	*Hauling*	5.55	1.63E-04	1.79E-04
	2024	*Columns*	25.00	7.31E-04	8.05E-04
	2024	Gondola	15.04	4.40E-04	4.84E-04
	2025	Gondola	11.76	3.30E-04	3.57E-04
	2025	Asphalt	0.90	2.54E-05	2.75E-05
	2025	Hardscape	37.81	1.06E-03	1.15E-03
	2025	Rope Pulling	4.61	1.30E-04	1.40E-04
Stadium Tower	2024	Utilities	0.69	2.03E-05	2.24E-05
	2024	Foundations			
	2024	*Demolition*	1.16	3.39E-05	3.73E-05
	2024	*Hauling*	0.93	2.71E-05	2.98E-05
	2024	*Columns*	15.28	4.47E-04	4.92E-04
	2024	Gondola	18.75	5.49E-04	6.04E-04
	2025	Gondola	11.53	3.24E-04	3.50E-04
	2025	Hardscape	9.59	2.69E-04	2.91E-04
Chinatown/State Park Station	2024	Utilities	0.51	1.49E-05	1.64E-05
	2024	Foundations			
	2024	*Demolition*	1.85	5.42E-05	5.96E-05
	2024	*Hauling*	1.62	4.74E-05	5.22E-05
	2024	*Columns*	21.06	6.16E-04	6.78E-04
	2024	Gondola	26.38	7.72E-04	8.49E-04
	2025	Gondola	5.20	1.46E-04	1.58E-04
	2025	Asphalt	0.90	2.54E-05	2.75E-05
	2024	Hardscape	1.30	3.79E-05	4.17E-05
	2025	Hardscape	34.91	9.81E-04	1.06E-03

Table A.1-2a. Construction Emission Estimates for Construction Worker and Shuttle Trips
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/yr)		
			CO_2	N_2O	CH_4
Alameda Tower	2024	Utilities	0.46	1.35E-05	1.49E-05
	2024	Foundations			
	2024	*Demolition*	1.16	3.39E-05	3.73E-05
	2024	*Hauling*	0.69	2.03E-05	2.24E-05
	2024	*Columns*	16.90	4.94E-04	5.44E-04
	2024	Gondola	3.47	1.02E-04	1.12E-04
	2025	Gondola	25.55	7.18E-04	7.76E-04
	2025	Asphalt	0.90	2.54E-05	2.75E-05
	2025	Hardscape	12.84	3.61E-04	3.90E-04
Shuttling	2024	Shuttling	9.66	1.52E-03	4.20E-05
	2025	Shuttling	8.88	1.40E-03	3.75E-05

Notes:

[1] Includes emissions from running exhaust, running loss, starting exhaust, diurnal loss, hot soak, and resting loss. Emissions were estimated using fleet-weighted emission factors and project VMT and trip counts for workers and shuttles.

Abbreviations:

CH_4 - methane

CO_2 - carbon dioxide

MT - metric tons

N_2O - nitrous oxide

Table A.1-2b. Construction Emission Estimates for Vendor Trips
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/yr)		
			CO_2	N_2O	CH_4
Alameda Station	2024	Utilities	1.38	1.91E-04	4.26E-05
	2024	Foundations			
	2024	*Demolition*	0.96	1.33E-04	2.96E-05
	2024	*Hauling*	0.57	7.98E-05	1.77E-05
	2024	*Columns*	13.60	1.89E-03	4.20E-04
	2024	Deck Erection	0.96	1.33E-04	2.96E-05
	2024	Gondola	25.09	3.48E-03	7.75E-04
	2025	Gondola	1.51	2.10E-04	4.53E-05
	2025	Deck Removal	2.26	3.15E-04	6.79E-05
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2025	Hardscape	24.86	3.46E-03	7.47E-04
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00
Alpine Tower	2024	Utilities	0.57	7.98E-05	1.77E-05
	2024	Foundations			
	2024	*Demolition*	1.53	2.13E-04	4.73E-05
	2024	*Hauling*	0.57	7.98E-05	1.77E-05
	2024	*Columns*	12.07	1.67E-03	3.73E-04
	2024	Gondola	19.54	2.71E-03	6.03E-04
	2025	Gondola	7.34	1.02E-03	2.21E-04
	2024	Asphalt	0.00	0.00E+00	0.00E+00
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2024	Hardscape	0.96	1.33E-04	2.96E-05
	2025	Hardscape	0.94	1.31E-04	2.83E-05
Broadway Junction	2024	Utilities	0.19	2.66E-05	5.91E-06
	2024	Foundations			
	2024	*Demolition*	7.85	1.09E-03	2.42E-04
	2024	*Hauling*	27.00	3.75E-03	8.34E-04
	2024	*Columns*	2.87	3.99E-04	8.87E-05
	2024	Deck Erection	0.77	1.06E-04	2.37E-05
	2024	Gondola	22.60	3.14E-03	6.98E-04
	2025	Gondola	2.07	2.88E-04	6.23E-05
	2025	Deck Removal	14.88	2.07E-03	4.47E-04
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2025	Hardscape	3.01	4.19E-04	9.06E-05
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00

Table A.1-2b. Construction Emission Estimates for Vendor Trips
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/yr)		
			CO_2	N_2O	CH_4
Dodger Stadium Station	2024	Utilities	3.91	5.42E-04	1.21E-04
	2024	Foundations			
	2024	*Demolition*	4.98	6.91E-04	1.54E-04
	2024	*Hauling*	29.69	4.12E-03	9.17E-04
	2024	*Columns*	4.41	6.11E-04	1.36E-04
	2024	Gondola	4.60	6.38E-04	1.42E-04
	2025	Gondola	20.34	2.83E-03	6.11E-04
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2025	Hardscape	9.79	1.36E-03	2.94E-04
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00
Stadium Tower	2024	Utilities	1.95	2.71E-04	6.03E-05
	2024	Foundations			
	2024	*Demolition*	14.36	1.99E-03	4.44E-04
	2024	*Hauling*	0.96	1.33E-04	2.96E-05
	2024	*Columns*	0.77	1.06E-04	2.37E-05
	2024	Gondola	12.64	1.75E-03	3.90E-04
	2025	Gondola	15.25	2.12E-03	4.59E-04
	2025	Hardscape	9.60	1.34E-03	2.89E-04
Chinatown/State Park Station	2024	Utilities	2.03	2.82E-04	6.27E-05
	2024	Foundations			
	2024	*Demolition*	20.30	2.82E-03	6.27E-04
	2024	*Hauling*	1.53	2.13E-04	4.73E-05
	2024	*Columns*	1.34	1.86E-04	4.14E-05
	2024	Gondola	1.34	1.86E-04	4.14E-05
	2025	Gondola	17.14	2.39E-03	5.15E-04
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2024	Hardscape	4.41	6.11E-04	1.36E-04
	2025	Hardscape	1.88	2.62E-04	5.66E-05

Table A.1-2b. Construction Emission Estimates for Vendor Trips
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/yr)		
			CO_2	N_2O	CH_4
Alameda Tower	2024	Utilities	0.27	3.72E-05	8.28E-06
	2024	Foundations			
	2024	*Demolition*	1.92	2.66E-04	5.91E-05
	2024	*Hauling*	15.51	2.15E-03	4.79E-04
	2024	*Columns*	0.96	1.33E-04	2.96E-05
	2024	Gondola	0.57	7.98E-05	1.77E-05
	2025	Gondola	13.75	1.91E-03	4.13E-04
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2025	Hardscape	21.28	2.96E-03	6.40E-04
Mesa Lot Laydown Area	2024	Laydown Area	19.99	2.78E-03	6.17E-04
	2025	Laydown Area	18.23	2.54E-03	5.48E-04

Notes:

[1] Includes emissions from running exhaust, running loss, starting exhaust, diurnal loss, hot soak, and resting loss. Emissions were estimated using fleet-weighted emission factors and project VMT and trip counts for vendors.

Abbreviations:

CH_4 - methane

CO_2 - carbon dioxide

MT - metric tons

N_2O - nitrous oxide

Table A.1-2c. Construction Emission Estimates for Haul Truck Trips
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Alameda Station	2024	Utilities	53.91	8.59E-03	2.54E-03
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	14.97	2.39E-03	7.06E-04
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Deck Erection	0.00	0.00E+00	0.00E+00
	2024	Gondola	16.35	2.61E-03	7.71E-04
	2025	Gondola	0.98	1.56E-04	4.50E-05
	2025	Deck Removal	0.00	0.00E+00	0.00E+00
	2025	Asphalt	6.13	9.77E-04	2.81E-04
	2025	Hardscape	0.00	0.00E+00	0.00E+00
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00
Alpine Tower	2024	Utilities	4.68	7.46E-04	2.21E-04
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	14.97	2.39E-03	7.06E-04
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Gondola	12.73	2.03E-03	6.00E-04
	2025	Gondola	4.78	7.62E-04	2.19E-04
	2024	Asphalt	3.12	4.97E-04	1.47E-04
	2025	Asphalt	3.07	4.89E-04	1.41E-04
	2024	Hardscape	0.00	0.00E+00	0.00E+00
	2025	Hardscape	0.00	0.00E+00	0.00E+00
Broadway Junction	2024	Utilities	12.79	2.04E-03	6.03E-04
	2024	Foundations			
	2024	*Demolition*	65.51	1.04E-02	3.09E-03
	2024	*Hauling*	39.93	6.36E-03	1.88E-03
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Deck Erection	0.00	0.00E+00	0.00E+00
	2024	Gondola	9.86	1.57E-03	4.65E-04
	2025	Gondola	13.49	2.15E-03	6.19E-04
	2025	Deck Removal	0.00	0.00E+00	0.00E+00
	2025	Asphalt	6.13	9.77E-04	2.81E-04
	2025	Hardscape	0.00	0.00E+00	0.00E+00
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00

Table A.1-2c. Construction Emission Estimates for Haul Truck Trips
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Dodger Stadium Station	2024	Utilities	8.11	1.29E-03	3.83E-04
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	119.80	1.91E-02	5.65E-03
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Gondola	8.11	1.29E-03	3.83E-04
	2025	Gondola	6.38	1.02E-03	2.93E-04
	2025	Asphalt	6.13	9.77E-04	2.81E-04
	2025	Hardscape	0.00	0.00E+00	0.00E+00
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00
Stadium Tower	2024	Utilities	4.68	7.46E-04	2.21E-04
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	4.99	7.96E-04	2.35E-04
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	*Gondola*	10.11	1.61E-03	4.77E-04
	2025	Gondola	6.25	9.97E-04	2.87E-04
	2025	Hardscape	0.00	0.00E+00	0.00E+00
Chinatown/State Park Station	2024	Utilities	3.43	5.47E-04	1.62E-04
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	34.94	5.57E-03	1.65E-03
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Gondola	14.23	2.27E-03	6.71E-04
	2025	Gondola	2.82	4.50E-04	1.29E-04
	2025	Asphalt	6.13	9.77E-04	2.81E-04
	2024	Hardscape	0.00	0.00E+00	0.00E+00
	2025	Hardscape	0.00	0.00E+00	0.00E+00

Table A.1-2c. Construction Emission Estimates for Haul Truck Trips
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Alameda Tower	2024	Utilities	3.12	4.97E-04	1.47E-04
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	14.97	2.39E-03	7.06E-04
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Gondola	1.87	2.98E-04	8.83E-05
	2025	Gondola	13.86	2.21E-03	6.36E-04
	2025	Asphalt	6.13	9.77E-04	2.81E-04
	2025	Hardscape	0.00	0.00E+00	0.00E+00

Notes:

[1] Includes emissions from running exhaust, running loss, starting exhaust, diurnal loss, hot soak, and resting loss. Emissions were estimated using fleet-weighted emission factors and project VMT and trip counts for haul trucks.

Abbreviations:

CH_4 - methane

CO_2 - carbon dioxide

MT - metric tons

N_2O - nitrous oxide

Table A.1-2d. Construction Emission Estimates for Shuttle Idling
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Activity	Year	Project Sub-Activity	Pollutant Emissions[1] (MT/yr)		
			CO_2	N_2O	CH_4
Shuttling	2024	Shuttling	2.82	0.0E+00	2.1E-05
	2025	Shuttling	2.58	0.0E+00	1.9E-05

Notes:

[1] Includes emissions from on-site truck idling that is estimated using the number of one-way trips and an idle duration of 5 minutes per one-way trip.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
MT - metric tons
N_2O - nitrous oxide

Table A.1-2e. Construction Emission Estimates for Vendor Idling
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Alameda Station	2024	Utilities	0.07	1.11E-05	1.28E-05
	2024	Foundations			
	2024	*Demolition*	0.05	7.71E-06	8.88E-06
	2024	*Hauling*	0.03	4.63E-06	5.33E-06
	2024	*Columns*	0.69	1.09E-04	1.26E-04
	2024	Deck Erection	0.05	7.71E-06	8.88E-06
	2024	Gondola	1.27	2.02E-04	2.33E-04
	2025	Gondola	0.08	1.21E-05	1.40E-05
	2025	Deck Removal	0.11	1.82E-05	2.10E-05
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2025	Hardscape	1.25	2.00E-04	2.32E-04
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00
Alpine Tower	2024	Utilities	0.03	4.63E-06	5.33E-06
	2024	Foundations			
	2024	*Demolition*	0.08	1.23E-05	1.42E-05
	2024	*Hauling*	0.03	4.63E-06	5.33E-06
	2024	*Columns*	0.61	9.72E-05	1.12E-04
	2024	Gondola	0.99	1.57E-04	1.81E-04
	2025	Gondola	0.37	5.90E-05	6.84E-05
	2024	Asphalt	0.00	0.00E+00	0.00E+00
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2024	Hardscape	0.05	7.71E-06	8.88E-06
	2025	Hardscape	0.51	8.17E-05	9.47E-05
Broadway Junction	2024	Utilities	0.08	1.26E-05	1.46E-05
	2024	Foundations			
	2024	*Demolition*	0.15	2.31E-05	2.66E-05
	2024	*Hauling*	0.08	1.23E-05	1.42E-05
	2024	*Columns*	1.14	1.82E-04	2.09E-04
	2024	Deck Erection	0.05	8.48E-06	9.76E-06
	2024	Gondola	0.77	1.22E-04	1.40E-04
	2025	Gondola	1.04	1.66E-04	1.93E-04
	2025	Deck Removal	0.15	2.42E-05	2.81E-05
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2025	Hardscape	1.38	2.19E-04	2.54E-04
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00

Table A.1-2e. Construction Emission Estimates for Vendor Idling
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Dodger Stadium Station	2024	Utilities	0.05	8.02E-06	9.23E-06
	2024	Foundations			
	2024	*Demolition*	0.22	3.55E-05	4.08E-05
	2024	*Hauling*	0.23	3.70E-05	4.26E-05
	2024	*Columns*	1.05	1.67E-04	1.92E-04
	2024	Gondola	0.63	1.00E-04	1.15E-04
	2025	Gondola	0.49	7.87E-05	9.12E-05
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2025	Hardscape	1.98	3.16E-04	3.67E-04
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00
Stadium Tower	2024	Utilities	0.03	4.63E-06	5.33E-06
	2024	Foundations			
	2024	*Demolition*	0.05	7.71E-06	8.88E-06
	2024	*Hauling*	0.04	6.17E-06	7.10E-06
	2024	*Columns*	0.64	1.02E-04	1.17E-04
	2024	Gondola	0.78	1.25E-04	1.44E-04
	2025	Gondola	0.48	7.71E-05	8.95E-05
	2025	Hardscape	0.50	8.02E-05	9.30E-05
Chinatown/State Park Station	2024	Utilities	0.02	3.39E-06	3.91E-06
	2024	Foundations			
	2024	*Demolition*	0.08	1.23E-05	1.42E-05
	2024	*Hauling*	0.07	1.08E-05	1.24E-05
	2024	*Columns*	0.88	1.40E-04	1.62E-04
	2024	Gondola	0.00	0.00E+00	0.00E+00
	2025	Gondola	0.22	3.48E-05	4.03E-05
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2024	Hardscape	0.07	1.08E-05	1.24E-05
	2025	Hardscape	1.83	2.92E-04	3.39E-04

Table A.1-2e. Construction Emission Estimates for Vendor Idling
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Alameda Tower	2024	Utilities	0.02	3.08E-06	3.55E-06
	2024	Foundations			
	2024	*Demolition*	0.05	7.71E-06	8.88E-06
	2024	*Hauling*	0.03	4.63E-06	5.33E-06
	2024	*Columns*	0.71	1.13E-04	1.30E-04
	2024	Gondola	0.15	2.31E-05	2.66E-05
	2025	Gondola	1.07	1.71E-04	1.98E-04
	2025	Asphalt	0.00	0.00E+00	0.00E+00
	2025	Hardscape	0.67	1.07E-04	1.25E-04
Mesa Lot Laydown Area	2024	Laydown Area	1.01	1.61E-04	1.85E-04
	2025	Laydown Area	0.92	1.46E-04	1.70E-04

Notes:

[1] Includes emissions from on-site truck idling that are estimated using fleet-weighted idling emission factors and trip counts for vendors.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
MT - metric tons
N_2O - nitrous oxide

Table A.1-2f. Construction Emission Estimates for Haul Truck Idling
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Alameda Station	2024	Utilities	1.43	2.30E-04	2.72E-04
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	0.40	6.38E-05	7.56E-05
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Deck Erection	0.00	0.00E+00	0.00E+00
	2024	Gondola	0.43	6.97E-05	8.26E-05
	2025	Gondola	0.03	4.16E-06	4.96E-06
	2025	Deck Removal	0.00	0.00E+00	0.00E+00
	2025	Asphalt	0.16	2.60E-05	3.10E-05
	2025	Hardscape	0.00	0.00E+00	0.00E+00
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00
Alpine Tower	2024	Utilities	0.12	2.00E-05	2.36E-05
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	0.40	6.38E-05	7.56E-05
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Gondola	0.34	5.43E-05	6.43E-05
	2025	Gondola	0.13	2.03E-05	2.42E-05
	2024	Asphalt	0.08	1.33E-05	1.58E-05
	2025	Asphalt	0.08	1.30E-05	1.55E-05
	2024	Hardscape	0.00	0.00E+00	0.00E+00
	2025	Hardscape	0.00	0.00E+00	0.00E+00
Broadway Junction	2024	Utilities	0.34	5.45E-05	6.46E-05
	2024	Foundations			
	2024	*Demolition*	1.74	2.79E-04	3.31E-04
	2024	*Hauling*	1.06	1.70E-04	2.02E-04
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Deck Erection	0.00	0.00E+00	0.00E+00
	2024	Gondola	0.26	4.20E-05	4.98E-05
	2025	Gondola	0.36	5.72E-05	6.82E-05
	2025	Deck Removal	0.00	0.00E+00	0.00E+00
	2025	Asphalt	0.16	2.60E-05	3.10E-05
	2025	Hardscape	0.00	0.00E+00	0.00E+00
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00

Table A.1-2f. Construction Emission Estimates for Haul Truck Idling
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Dodger Stadium Station	2024	Utilities	0.22	3.46E-05	4.10E-05
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	3.18	5.11E-04	6.05E-04
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Gondola	0.22	3.46E-05	4.10E-05
	2025	Gondola	0.17	2.71E-05	3.22E-05
	2025	Asphalt	0.16	2.60E-05	3.10E-05
	2025	Hardscape	0.00	0.00E+00	0.00E+00
	2025	Rope Pulling	0.00	0.00E+00	0.00E+00
Stadium Tower	2024	Utilities	0.12	2.00E-05	2.36E-05
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	0.13	2.13E-05	2.52E-05
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Gondola	0.27	4.31E-05	5.11E-05
	2025	Gondola	0.17	2.65E-05	3.16E-05
	2025	Hardscape	0.00	0.00E+00	0.00E+00
Chinatown/State Park Station	2024	Utilities	0.09	1.46E-05	1.73E-05
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	0.93	1.49E-04	1.76E-04
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Gondola	0.38	6.07E-05	7.19E-05
	2025	Gondola	0.07	1.20E-05	1.43E-05
	2025	Asphalt	0.16	2.60E-05	3.10E-05
	2024	Hardscape	0.00	0.00E+00	0.00E+00
	2025	Hardscape	0.00	0.00E+00	0.00E+00

Table A.1-2f. Construction Emission Estimates for Haul Truck Idling
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Year	Project Sub-Activity	Emissions[1] (MT/year)		
			CO_2	N_2O	CH_4
Alameda Tower	2024	Utilities	0.08	1.33E-05	1.58E-05
	2024	Foundations			
	2024	*Demolition*	0.00	0.00E+00	0.00E+00
	2024	*Hauling*	0.40	6.38E-05	7.56E-05
	2024	*Columns*	0.00	0.00E+00	0.00E+00
	2024	Gondola	0.05	7.98E-06	9.45E-06
	2025	Gondola	0.37	5.88E-05	7.01E-05
	2025	Asphalt	0.16	2.60E-05	3.10E-05
	2025	Hardscape	0.00	0.00E+00	0.00E+00

Notes:

[1] Includes emissions from on-site truck idling that are estimated using fleet-weighted idling emission factors and trip counts for haul trucks.

Abbreviations:

CH_4 - methane

CO_2 - carbon dioxide

MT - metric tons

N_2O - nitrous oxide

Table A.1-3. Summary of Construction Equipment/Trips GHG Emissions
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Project Sub-Activity	Emissions (MT)			
		CO_2	N_2O	CH_4	CO_2e
Alameda Station	Utilities	71	9.07E-03	6.70E-03	74
	Foundations				
	Demolition	7	1.74E-04	1.33E-03	7
	Hauling	19	2.56E-03	1.58E-03	20
	Columns	95	2.48E-03	1.90E-02	96
	Deck Erection	9	1.73E-04	1.71E-03	9
	Gondola	158	7.68E-03	2.43E-02	161
	Deck Removal	11	3.69E-04	1.81E-03	11
	Asphalt	14	1.03E-03	2.29E-03	14
	Hardscape	76	4.33E-03	9.18E-03	77
	Rope Pulling	15	1.30E-04	3.06E-03	15
Alpine Tower	Utilities	12	8.71E-04	1.92E-03	12
	Foundations				
	Demolition	11	2.79E-04	2.14E-03	11
	Hauling	19	2.56E-03	1.58E-03	20
	Columns	85	2.20E-03	1.68E-02	86
	Gondola	155	7.75E-03	2.30E-02	158
	Asphalt	14	1.04E-03	2.29E-03	14
	Hardscape	22	6.55E-04	2.98E-03	22
Broadway Junction	Utilities	31	2.19E-03	5.21E-03	31
	Foundations				
	Demolition	90	1.19E-02	7.54E-03	93
	Hauling	77	1.03E-02	5.03E-03	80
	Columns	139	1.38E-03	3.13E-02	140
	Deck Erection	12	1.51E-04	2.88E-03	12
	Gondola	204	8.77E-03	3.29E-02	208
	Deck Removal	27	2.14E-03	2.77E-03	28
	Asphalt	14	1.03E-03	2.29E-03	14
	Hardscape	60	1.38E-03	9.53E-03	60
	Rope Pulling	29	2.59E-04	6.13E-03	30
Dodger Stadium Station	Utilities	23	1.91E-03	3.42E-03	24
	Foundations				
	Demolition	31	8.82E-04	6.09E-03	31
	Hauling	180	2.39E-02	1.34E-02	187
	Columns	127	1.51E-03	2.80E-02	128
	Gondola	156	6.79E-03	2.66E-02	158
	Asphalt	14	1.03E-03	2.29E-03	14
	Hardscape	91	2.74E-03	1.39E-02	92
	Rope Pulling	15	1.30E-04	3.06E-03	15

Table A.1-3. Summary of Construction Equipment/Trips GHG Emissions
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Project Station/Tower	Project Sub-Activity	Emissions (MT)			
		CO_2	N_2O	CH_4	CO_2e
Stadium Tower	Utilities	13	1.06E-03	1.96E-03	13
	Foundations				
	Demolition	20	2.04E-03	1.75E-03	21
	Hauling	11	9.83E-04	1.34E-03	11
	Columns	77	6.55E-04	1.73E-02	77
	Gondola	177	7.63E-03	3.05E-02	181
	Hardscape	27	1.69E-03	2.93E-03	28
Chinatown/State Park Station	Utilities	10	8.62E-04	1.46E-03	10
	Foundations				
	Demolition	29	2.88E-03	2.70E-03	30
	Hauling	45	5.99E-03	3.69E-03	47
	Columns	105	9.43E-04	2.37E-02	106
	Gondola	147	6.31E-03	2.35E-02	150
	Asphalt	14	1.03E-03	2.29E-03	14
	Hardscape	87	2.19E-03	1.40E-02	88
Alameda Tower	Utilities	8	5.64E-04	1.28E-03	8
	Foundations				
	Demolition	8	3.07E-04	1.36E-03	8
	Hauling	34	4.63E-03	2.04E-03	36
	Columns	85	7.40E-04	1.91E-02	86
	Gondola	130	5.58E-03	2.04E-02	132
	Asphalt	14	1.03E-03	2.29E-03	14
	Hardscape	45	3.43E-03	4.10E-03	46
Mesa Lot	Laydown Area	210	5.62E-03	5.05E-02	213
Shuttling	Shuttling	19	2.92E-03	7.95E-05	19
	TOTAL	3,427	0.18	0.55	3,495
			TOTAL (30-YEARS AMORTIZED)		117

Abbreviations:
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
MT - metric tons
N_2O - nitrous oxide

Global Warming Potential

CO_2	1
CH_4	25
N_2O	298

APPENDIX B
PROJECT GHG EMISSION FACTORS

Table B.1-1. Off-Road Equipment Emission Factors
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Equipment Type	CalEEMod Equipment Type	Horsepower	Horsepower Bin	OFFROAD Horsepower Bin	Tiered Horsepower Bin	2024 Emission Factor[1] (g/hp-hr)			2025 Emission Factor[1] (g/hp-hr)		
						CO_2	N_2O	CH_4	CO_2	N_2O	CH_4
Tractor	Tractors/Loaders/Backhoes	97	120	100	120	528	0	0.15	528	0	0.15
Bore/Drill Rigs	Bore/Drill Rigs	221	250	300	300	528	0	0.15	528	0	0.15
Cranes	Cranes	231	250	300	300	524	0	0.15	524	0	0.15
Rubber Tired Dozers	Rubber Tired Dozers	247	250	300	300	523	0	0.15	522	0	0.15
Cement and Mortar Mixers	Cement and Mortar Mixers	9	15	15	50	568	0	0.06	568	0	0.06
Excavators	Excavators	158	175	175	175	531	0	0.15	531	0	0.15
Rubber Tired Loaders	Rubber Tired Loaders	203	250	300	300	529	0	0.15	529	0	0.15
Generator Sets	Generator Sets	84	120	100	120	568	0	0.02	568	0	0.02
Rough Terrain Forklift	Rough Terrain Forklifts	100	120	100	120	531	0	0.15	531	0	0.15
Other Construction Equipment	Other Construction Equipment	172	175	175	175	520	0	0.15	521	0	0.15
Surfacing Equipment	Surfacing Equipment	263	500	300	300	532	0	0.15	531	0	0.15
Pavers	Pavers	130	175	175	175	523	0	0.15	523	0	0.15
Rollers	Rollers	80	120	100	120	521	0	0.15	521	0	0.15
Sweepers/Scrubbers	Sweepers/Scrubbers	64	120	100	75	474	0	0.15	474	0	0.15
Aerial Lifts	Aerial Lifts	63	120	100	75	525	0	0.15	525	0	0.15
Welders	Welders	46	50	50	50	568	0	0.06	568	0	0.05
Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	97	120	100	120	528	0	0.15	528	0	0.15
Plate Compactors	Plate Compactors	8	15	15	50	568	0	0.06	568	0	0.06
Air Compressors	Air Compressors	78	120	100	120	568	0	0.03	568	0	0.03
Pumps	Pumps	84	120	100	120	568	0	0.03	568	0	0.02
Diesel Hydrostat winch	Other General Industrial Equipment	88	120	100	120	532	0	0.15	531	0	0.15
Crane	Cranes	231	250	300	300	524	0	0.15	524	0	0.15
Tractor/Lift	Tractors/Loaders/Backhoes	97	120	100	120	528	0	0.15	528	0	0.15

Notes:

[1] Emission factors obtained from OFFROAD2021. Concrete/industrial saws, generator sets, sweepers/scrubbers, plate compactors, air compressors, and pumps are obtained from CalEEMod®, which uses OFFROAD2011, as OFFROAD2021 does not have adequate emission factor data available for these equipment at the sizes specified.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
g - grams
hp - horsepower
hr - hour

Table B.1-2a. Mobile Source Emission Factors (grams per mile)
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Calendar Year	Vehicle Class	Season	EMFAC VMT (miles/day)	Fleet Mix[1]	EMFAC Emissions[2] (tons/day)			Emission Factors[3] (g/mile)		
					CO_2	N_2O	CH_4	CO_2	N_2O	CH_4
Workers										
2024	LDA	Annual	143,571,148	50%	4.27E+04	7.06E-01	4.18E-01	2.70E+02	4.46E-03	2.64E-03
2024	LDT1	Annual	11,419,458	25%	4.35E+03	1.54E-01	1.25E-01	3.45E+02	1.22E-02	9.96E-03
2024	LDT2	Annual	65,972,702	25%	2.57E+04	4.71E-01	2.68E-01	3.54E+02	6.48E-03	3.68E-03
Fleet-Weighted Emission Factor, Annual[4]								3.10E+02	6.91E-03	4.73E-03
2025	LDA	Annual	142,243,405	50%	4.12E+04	6.56E-01	3.73E-01	2.63E+02	4.18E-03	2.38E-03
2025	LDT1	Annual	11,256,046	25%	4.21E+03	1.40E-01	1.12E-01	3.39E+02	1.13E-02	8.99E-03
2025	LDT2	Annual	67,367,143	25%	2.57E+04	4.48E-01	2.49E-01	3.46E+02	6.03E-03	3.35E-03
Fleet-Weighted Emission Factor, Annual[4]								3.03E+02	6.42E-03	4.28E-03
Vendors										
2024	MHDT	Annual	3,360,495	50%	4.50E+03	5.01E-01	3.78E-02	1.21E+03	1.35E-01	1.02E-02
2024	HHDT	Annual	6,988,727	50%	1.20E+04	1.92E+00	5.67E-01	1.56E+03	2.49E-01	7.36E-02
Fleet-Weighted Emission Factor, Annual[4]								1.39E+03	1.92E-01	4.19E-02
2025	MHDT	Annual	3,378,237	50%	4.45E+03	5.00E-01	3.69E-02	1.19E+03	1.34E-01	9.91E-03
2025	HHDT	Annual	7,131,494	50%	1.20E+04	1.92E+00	5.53E-01	1.53E+03	2.44E-01	7.03E-02
Fleet-Weighted Emission Factor, Annual[4]								1.36E+03	1.89E-01	4.01E-02

Table B.1-2a. Mobile Source Emission Factors (grams per mile)
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Calendar Year	Vehicle Class	Season	EMFAC VMT (miles/day)	Fleet Mix[1]	EMFAC Emissions[2] (tons/day)			Emission Factors[3] (g/mile)		
					CO_2	N_2O	CH_4	CO_2	N_2O	CH_4
Haul Trucks										
2024	HHDT	Annual	6,988,727	100%	1.20E+04	1.92E+00	5.67E-01	1.56E+03	2.49E-01	7.36E-02
							Emission Factor, Annual	1.56E+03	2.49E-01	7.36E-02
2025	HHDT	Annual	7,131,494	100%	1.20E+04	1.92E+00	5.53E-01	1.53E+03	2.44E-01	7.03E-02
							Emission Factor, Annual	1.53E+03	2.44E-01	7.03E-02
Shuttles										
2024	All Other Buses	Annual	82,649	100%	9.92E+01	1.56E-02	4.31E-04	1.09E+03	1.72E-01	4.73E-03
							Emission Factor, Annual	1.09E+03	1.72E-01	4.73E-03
2025	All Other Buses	Annual	82,326	100%	9.79E+01	1.54E-02	4.14E-04	1.08E+03	1.70E-01	4.56E-03
							Emission Factor, Annual	1.08E+03	1.70E-01	4.56E-03

Notes:

[1] CalEEMod default fleet mix.

[2] Sum of running exhaust and running loss emissions obtained from EMFAC2021 model output.

[3] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC VMT output.

[4] Emission factors for EMFAC vehicle classes are weighted based on CalEEMod default fleet mix to estimate VMT-based emission factors for workers and vendors.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
EMFAC - Emission Factors Model
g - grams
HHDT - heavy-heavy-duty trucks
LDA - light-duty automobiles
LDT - light-duty trucks
MHDT - medium-heavy-duty trucks
N_2O - nitrous oxide
VMT - vehicle miles traveled

Table B.1-2b. Mobile Source Emission Factors (grams per trip)
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Calendar Year	Vehicle Class	Season	EMFAC Trips (trips/day)	Fleet Mix[1]	EMFAC Emissions[2] (tons/day)			Emission Factors[3] (g/trip)		
					CO_2	N_2O	CH_4	CO_2	N_2O	CH_4
Workers										
2024	LDA	Annual	16,669,803	50%	1.21E+03	5.54E-01	1.18E+00	6.61E+01	3.02E-02	6.40E-02
2024	LDT1	Annual	1,380,212	25%	1.33E+02	6.02E-02	1.71E-01	8.74E+01	3.96E-02	1.12E-01
2024	LDT2	Annual	7,507,449	25%	7.10E+02	2.95E-01	6.42E-01	8.59E+01	3.56E-02	7.76E-02
Fleet-Weighted Emission Factor, Annual[4]								7.63E+01	3.39E-02	7.95E-02
2025	LDA	Annual	16,549,507	50%	1.17E+03	5.31E-01	1.10E+00	6.44E+01	2.91E-02	6.02E-02
2025	LDT1	Annual	1,362,565	25%	1.28E+02	5.74E-02	1.58E-01	8.54E+01	3.82E-02	1.05E-01
2025	LDT2	Annual	7,693,235	25%	7.10E+02	2.90E-01	6.16E-01	8.37E+01	3.42E-02	7.26E-02
Fleet-Weighted Emission Factor, Annual[4]								7.45E+01	3.27E-02	7.45E-02
Vendors										
2024	MHDT	Annual	1,031,430	50%	1.49E+01	1.07E-02	1.52E-02	1.31E+01	9.39E-03	1.34E-02
2024	HHDT	Annual	851,502	50%	5.28E-02	2.05E-05	8.70E-08	5.63E-02	2.19E-05	9.27E-08
Fleet-Weighted Emission Factor, Annual[4]								6.58E+00	4.71E-03	6.69E-03
2025	MHDT	Annual	1,044,086	50%	1.43E+01	1.03E-02	1.44E-02	1.24E+01	8.98E-03	1.26E-02
2025	HHDT	Annual	882,772	50%	4.63E-02	1.55E-05	8.60E-08	4.75E-02	1.59E-05	8.84E-08
Fleet-Weighted Emission Factor, Annual[4]								6.25E+00	4.50E-03	6.28E-03

Table B.1-2b. Mobile Source Emission Factors (grams per trip)
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Calendar Year	Vehicle Class	Season	EMFAC Trips (trips/day)	Fleet Mix[1]	EMFAC Emissions[2] (tons/day)			Emission Factors[3] (g/trip)		
					CO_2	N_2O	CH_4	CO_2	N_2O	CH_4
Haul Trucks										
2024	HHDT	Annual	851,502	100%	5.28E-02	2.05E-05	8.70E-08	5.63E-02	2.19E-05	9.27E-08
							Emission Factor, Annual	5.63E-02	2.19E-05	9.27E-08
2025	HHDT	Annual	882,772	100%	4.63E-02	1.55E-05	8.60E-08	4.75E-02	1.59E-05	8.84E-08
							Emission Factor, Annual	4.75E-02	1.59E-05	8.84E-08
Shuttles										
2024	All Other Buses	Annual	13,297	100%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
							Emission Factor, Annual	0.00E+00	0.00E+00	0.00E+00
2025	All Other Buses	Annual	13,543	100%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
							Emission Factor, Annual	0.00E+00	0.00E+00	0.00E+00

Notes:

[1] CalEEMod default fleet mix.

[2] Sum of starting exhaust, hot soak, and diurnal emissions obtained from EMFAC2021 model output.

[3] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC trips output.

[4] Emission factors for EMFAC vehicle classes are weighted based on CalEEMod default fleet mix to estimate trip-based emission factors for workers and vendors.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
EMFAC - Emission Factors Model
g - grams
HHDT - heavy-heavy-duty trucks
LDA - light-duty automobiles
LDT - light-duty trucks
MHDT - medium-heavy-duty trucks
N_2O - nitrous oxide

Table B.1-2c. Mobile Source Emission Factors - Haul Truck and Vendor Idling
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Calendar Year	Vehicle Class	Season	EMFAC Trips (trips/day)	Fleet Mix[1]	EMFAC Emissions[2] (tons/day)			Emission Factors[3] (g/trip)		
					CO_2	N_2O	CH_4	CO_2	N_2O	CH_4
Vendors										
2024	MHDT	Annual	1,031,430	50%	1.59E+02	2.41E-02	2.27E-02	1.40E+02	2.12E-02	2.00E-02
2024	HHDT	Annual	851,502	50%	7.77E+02	1.25E-01	1.48E-01	8.28E+02	1.33E-01	1.58E-01
Trip-Weighted Emission Factor, Annual[2]								4.84E+02	7.71E-02	8.88E-02
2025	MHDT	Annual	1,044,086	50%	1.61E+02	2.44E-02	2.35E-02	1.40E+02	2.12E-02	2.04E-02
2025	HHDT	Annual	882,772	50%	7.88E+02	1.27E-01	1.51E-01	8.10E+02	1.30E-01	1.55E-01
Trip-Weighted Emission Factor, Annual[2]								4.75E+02	7.56E-02	8.77E-02
Haul Trucks										
2024	HHDT	Annual	851,502	100%	7.77E+02	1.25E-01	1.48E-01	8.28E+02	1.33E-01	1.58E-01
Emission Factor, Annual								8.28E+02	1.33E-01	1.58E-01
2025	HHDT	Annual	882,772	100%	7.88E+02	1.27E-01	1.51E-01	8.10E+02	1.30E-01	1.55E-01
Emission Factor, Annual								8.10E+02	1.30E-01	1.55E-01

Notes:

[1] CalEEMod default fleet mix.

[2] Sum of idling emissions obtained from EMFAC2021 model output.

[3] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC trips output.

Abbreviations:

CH_4 - methane

CO_2 - carbon dioxide

g - grams

HHDT - heavy-heavy-duty trucks

MHDT - medium-heavy-duty trucks

N_2O - nitrous oxide

Table B.1-2d. Mobile Source Emission Factors - Shuttle Idling
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Calendar Year	Vehicle Class	Fleet Mix	Emission Factor[1] (g/idle-min)		
			CO_2	N_2O	CH_4
2024	All Other Buses	100%	1.08E+02	0.00E+00	8.00E-04
Emission Factor, Annual			1.08E+02	0.00E+00	8.00E-04
2025	All Other Buses	100%	1.07E+02	0.00E+00	7.70E-04
Emission Factor, Annual			1.07E+02	0.00E+00	7.70E-04

Notes:

[1] Idling emission rates were obtained from EMFAC for diesel-fueled buses.

Abbreviations:

CH_4 - methane

CO_2 - carbon dioxide

g - grams

N_2O - nitrous oxide

Table B.2-1a. Mobile Source Emission Factors - Operation (grams per mile)
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Calendar Year	Vehicle Class	Season	EMFAC VMT (miles/day)	Fleet Mix[1]	EMFAC Emissions[2] (tons/day)			Emission Factors[3] (g/mile)		
					CO_2	N_2O	CH_4	CO_2	N_2O	CH_4
2019	LDA	Annual	144,454,162	70%	4.82E+04	1.05E+00	7.49E-01	3.03E+02	6.58E-03	4.70E-03
2019	LDT1	Annual	11,696,392	6%	4.77E+03	2.33E-01	2.07E-01	3.70E+02	1.81E-02	1.61E-02
2019	LDT2	Annual	55,356,662	27%	2.42E+04	6.46E-01	3.96E-01	3.96E+02	1.06E-02	6.49E-03
Fleet-Weighted Emission Factor, Annual[4]								3.41E+02	8.52E-03	5.98E-03
2026	LDA	Annual	140,494,684	64%	3.97E+04	6.14E-01	3.36E-01	2.56E+02	3.96E-03	2.17E-03
2026	LDT1	Annual	11,090,769	5%	4.08E+03	1.27E-01	9.92E-02	3.33E+02	1.04E-02	8.12E-03
2026	LDT2	Annual	68,582,012	31%	2.56E+04	4.28E-01	2.32E-01	3.38E+02	5.66E-03	3.07E-03
Fleet-Weighted Emission Factor, Annual[4]								2.86E+02	4.82E-03	2.75E-03
2042	LDA	Annual	127,388,879	60%	2.97E+04	3.86E-01	1.41E-01	2.12E+02	2.75E-03	1.01E-03
2042	LDT1	Annual	9,913,050	5%	3.01E+03	3.92E-02	1.61E-02	2.76E+02	3.59E-03	1.47E-03
2042	LDT2	Annual	76,280,328	36%	2.44E+04	3.03E-01	1.30E-01	2.90E+02	3.61E-03	1.55E-03
Fleet-Weighted Emission Factor, Annual[4]								2.43E+02	3.09E-03	1.22E-03

Notes:

[1] CalEEMod® default fleet mix.

[2] Running exhaust emissions obtained from EMFAC2021 model output.

[3] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC VMT output.

[4] Emission factors for EMFAC vehicle classes are weighted based on CalEEMod default fleet mix to estimate VMT-based emission factors.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
EMFAC - Emission Factors Model
g - grams
LDA - light-duty automobiles
LDT - light-duty trucks
N_2O - nitrous oxide
VMT - vehicle miles traveled

Table B.2-1b. Mobile Source Emission Factors - Operation (grams per trip)
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Calendar Year	Vehicle Class	Season	EMFAC Trips (trips/day)	Fleet Mix[1]	EMFAC Emissions[2] (tons/day)			Emission Factors[3] (g/trip)		
					CO_2	N_2O	CH_4	CO_2	N_2O	CH_4
2019	LDA	Annual	17,979,656	70%	1.47E+03	6.84E-01	1.69E+00	7.41E+01	3.45E-02	8.54E-02
2019	LDT1	Annual	1,534,271	6%	1.64E+02	7.69E-02	2.55E-01	9.67E+01	4.55E-02	1.51E-01
2019	LDT2	Annual	6,858,912	27%	7.38E+02	3.45E-01	8.20E-01	9.77E+01	4.57E-02	1.08E-01
Fleet-Weighted Emission Factor, Annual[4]								8.41E+01	3.92E-02	9.80E-02
2026	LDA	Annual	16,440,313	64%	1.14E+03	5.12E-01	1.03E+00	6.28E+01	2.82E-02	5.67E-02
2026	LDT1	Annual	1,346,865	5%	1.24E+02	5.49E-02	1.45E-01	8.35E+01	3.70E-02	9.79E-02
2026	LDT2	Annual	7,880,984	31%	7.10E+02	2.88E-01	5.94E-01	8.17E+01	3.31E-02	6.84E-02
Fleet-Weighted Emission Factor, Annual[4]								6.97E+01	3.02E-02	6.24E-02
2042	LDA	Annual	15,535,937	60%	8.57E+02	3.70E-01	4.93E-01	5.00E+01	2.16E-02	2.88E-02
2042	LDT1	Annual	1,239,734	5%	8.86E+01	3.62E-02	5.02E-02	6.49E+01	2.65E-02	3.67E-02
2042	LDT2	Annual	9,434,744	36%	7.06E+02	2.94E-01	4.10E-01	6.79E+01	2.83E-02	3.94E-02
Fleet-Weighted Emission Factor, Annual[4]								5.71E+01	2.42E-02	3.29E-02

Notes:

[1] CalEEMod® default fleet mix.

[2] Starting exhaust emissions obtained from EMFAC2021 model output.

[3] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC trips output.

[4] Emission factors for EMFAC vehicle classes are weighted based on CalEEMod default fleet mix to estimate trip-based emission factors.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
EMFAC - Emission Factors Model
g - grams
LDA - light-duty automobiles
LDT - light-duty trucks
N_2O - nitrous oxide

APPENDIX C
PLAN CONSISTENCY ANALYSIS

Table C-1. Consistency with Applicable State Greenhouse Gas Reduction Strategies
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

#	Sector/Source	Strategy Description[1]	Consistency Analysis
Energy			
1	California Renewables Portfolio Standard (RPS) and SB 350	As most recently amended by SB 100 (2018), California's RPS increases the proportion of electricity from renewable sources to 33 percent renewable power by 2020; 50 percent renewable power by 2026; and, 60 percent renewable power by 2030. SB 350 (2015) also requires the State Energy Resources Conservation and Development Commission to double (by 2030) the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.	**Consistent.** Although this goal is not applicable to an individual transportation project, the electrical power for the operation of the Project's aerial gondola system and associated stations, junction, and towers would be supplied by the City of Los Angeles Department of Water and Power (LADWP) through the utility's Green Power Program. As such, the primary electricity usage associated with the Project would come from renewable resources. Furthermore, the Project would incorporate energy efficient features, such as open-air stations and high-efficiency lighting. As a result, the Project would not impair implementation of the state's RPS or the energy efficiency and conservation targets of SB 350. LADWP is a municipal electricity generation service provider. In 2017, LADWP developed its own Power Strategic Long-Term Resource Plan (SLTRP) as an outline for supplying energy in accordance with the state's renewable energy goals. (See https://www.ladwp.com/ladwp/faces/wcnav_externalId/a-p-doc?_adf.ctrl-state=rmkf94oql_25&_afrLoop=764064428747531.)
2	California Code of Regulations, Title 24, Part 6	Energy efficiency standards for residential and nonresidential buildings that are updated approximately every three years.	**Consistent.** To the extent applicable to the Project's components, the Project would meet or exceed the Title 24 energy efficiency standards in effect at the time of building permit application.
3	Assembly Bill 1109	The Lighting Efficiency And Toxics Reduction Act (AB 1109) requires a reduction in average statewide electrical energy consumption by not less than 50 percent from the 2007 levels for indoor residential lighting and not less than 25 percent from the 2007 levels for indoor commercial and outdoor lighting by 2018.	**Consistent.** Although AB 1109 does not impose specific requirements on individual development projects, the Project will utilize highly efficient light emitting diode (LED) lighting (or equivalent) for indoor and outdoor lighting.
4	California Code of Regulations, Title 24, Part 11	The California Green (CalGreen) Building Standards Code establishes green building standards for residential and nonresidential buildings to meet the goals of AB 32. Standards include requirements for site development, indoor and outdoor water use reduction, construction waste reduction, disposal and recycling, and building maintenance and operation.	**Consistent.** To the extent applicable to the Project's components, the Project would meet the CalGreen Building Standards Code in effect at the time of building permit application. Water-efficient restroom fixtures will be installed at Dodger Stadium Station and the Chinatown/State Park Station. Landscaping will utilize drought-tolerant plants and high-efficiency irrigation devices. Each gondola station will feature recycling receptacles. In addition, at least 65% of the construction waste from the Project will be salvaged for reuse, recycled, or diverted from landfills.

Table C-1. Consistency with Applicable State Greenhouse Gas Reduction Strategies
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

#	Sector/Source	Strategy Description[1]	Consistency Analysis
Mobile Sources			
5	AB 1493 (Pavley Regulations)	Reduces GHG emissions in new passenger vehicles from model years 2012-2016 (Phase I) and model years 2017–2025 (Phase II). Also reduces gasoline consumption to a rate of 31 percent of 1990 gasoline consumption (and associated GHG emissions) by 2020.	**Consistent.** The Project would not impair implementation of the AB 1493 regulations.
6	Low Carbon Fuel Standard (LCFS)	Establishes protocols for measuring and reducing the life-cycle carbon intensity of transportation fuels and helps to establish use of alternative fuels.	**Consistent.** The Project would not conflict with implementation of the LCFS.
7	Advanced Clean Cars (ACC) Program	In 2012, the California Air Resources Board (CARB) adopted the ACC program to reduce criteria pollutant emissions and GHG emissions for model year vehicles 2015 through 2025. ACC includes the Low-Emission Vehicle (LEV) regulations that reduce criteria pollutants and GHG emissions from light- and medium-duty vehicles, and the Zero-Emission Vehicle (ZEV) regulations that require manufacturers to produce an increasing number of pure ZEVs (meaning battery electric and fuel cell electric vehicles), with provisions to also produce plug-in hybrid electric vehicles (PHEV) in the 2018 through 2025 model years.	**Consistent.** The Project would not conflict with implementation of the ACC program.
8	SB 375	SB 375 establishes mechanisms for the development of regional targets for reducing passenger vehicle GHG emissions. Under SB 375, CARB is required, in consultation with the state's Metropolitan Planning Organizations, to set regional GHG reduction targets for the passenger vehicle and light-duty truck sector for 2020 and 2035.	**Consistent.** The Project would reduce passenger vehicle miles traveled by providing a new mode of public transportation. Therefore, the Project would assist with the implementation of SB 375. Furthermore, the Project would be consistent with the goals of the Southern California Association of Government's (SCAG's) Connect SoCal plan (see **Table C-3**), which demonstrates how the Southern California region under SCAG's jurisdiction will meet the emission reduction targets of SB 375.

Table C-1. Consistency with Applicable State Greenhouse Gas Reduction Strategies
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

#	Sector/Source	Strategy Description[1]	Consistency Analysis
Water			
9	Senate Bill X7-7	The Water Conservation Act of 2009 sets an overall goal of reducing per capita urban water use by 20 percent by December 31, 2020. Each urban retail water supplier shall develop water use targets to meet this goal.	**Consistent.** To the extent applicable to the Project's components, the Project will meet the CalGreen Building Standards Code in effect at the time of building permit application; these standards include water conservation measures. Also of note, LADWP provides water to the Project site. As noted in LADWP's 2025 Urban Water Management Plan, the targets under Senate Bill X7-7 are generally less stringent than those under the Sustainability Plan. (See: https://planning.lacity.org/eir/CrossroadsHwd/deir/files/references/M217.pdf)
Solid Waste			
10	California Integrated Waste Management Act (IWMA) of 1989 and Assembly Bill 341.	The IWMA mandated that state agencies develop and implement an integrated waste management plan which outlines the steps to be taken to divert at least 50 percent of their solid waste from disposal facilities. AB 341 directs CalRecycle to develop and adopt regulations for mandatory commercial recycling and sets a statewide goal for 75 percent disposal reduction by the year 2020.	**Consistent.** This measure applies to state agencies and not directly to an individual development project. However, each gondola station will feature recycling receptacles. In addition at least 65% of the construction waste from the Project will be salvaged for reuse, recycled, or diverted from landfills.

Note:
[1] Only the strategies relevant to the GHG emissions inventory are included.

Abbreviations:
AB - Assembly Bill
ACC - Advanced Clean Cars
CalGreen - California Green Building Standards Code
CARB - California Air Resources Board
GHG - Greenhouse Gas
IWMA - Integrated Waste Management Act
LADWP - Los Angeles Department of Water and Power
LED - light emitting diode
LEV - Low-Emission Vehicle
PHEV - plug-in hybrid electric vehicles
RPS - Renewable Portfolio Standard
SB - Senate Bill
SLTRP - Strategic Long-Term Resource Plan
ZEV - Zero-Emission Vehicle

Table C-2. Consistency with 2017 CARB Scoping Plan Update
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Programs and Policies	Primary Objective	Consistency
SB 350	Reduce GHG emissions in the electricity sector through the implementation of the 50 percent Renewables Portfolio Standard (RPS), doubling of energy savings, and other actions as appropriate to achieve GHG emissions reductions planning targets in the Integrated Resource Plan (IRP) process.	**Consistent.** Although this goal is not applicable to an individual transportation project, the electrical power for the operation of the Project's aerial gondola system and associated stations, junction, and towers would be supplied by the City of Los Angeles Department of Water and Power (LADWP) through the utility's Green Power Program. As such, the primary electricity usage associated with the Project would come from renewable resources. Furthermore, the Project would incorporate energy efficient features, such as open-air stations and high-efficiency lighting. As a result, the Project would not impair implementation of the state's RPS or the energy efficiency and conservation targets of SB 350. LADWP is a municipal electricity generation service provider. In 2017, LADWP developed its own Power Strategic Long-Term Resource Plan (SLTRP) as an outline for supplying energy in accordance with the state's renewable energy goals. (See https://www.ladwp.com/ladwp/faces/wcnav_externalId/a-p-doc?_adf.ctrl-state=rmkf94oql_25&_afrLoop=764064428747531.)
Low Carbon Fuel Standard (LCFS)	Transition to cleaner/less-polluting fuels that have a lower carbon footprint.	**Consistent.** The Project would not conflict with implementation of the LCFS.
Mobile Source Strategy (Cleaner Technology and Fuels)	Reduce GHGs and other pollutants from the transportation sector through transition to zero-emission and low-emission vehicles, cleaner transit systems and reduction of vehicle miles traveled.	**Consistent.** The Project is an urban gondola system which would be an innovative mode of transportation option in the City of Los Angeles that would reduce vehicle miles travelled (VMT). The gondola system and its components (i.e. lights, ventilation, escalators, elevators) would operate on renewable electricity provided by LADWP. As a breakthrough and innovative technology for the region, the Project would also advance future alternative transportation modes in the Los Angeles area while providing a template for aerial projects elsewhere in California.
SB 1383	Approve and Implement Short-Lived Climate Pollutants (SLCP) strategy to reduce highly potent GHGs.	**Consistent.** The Project would not conflict with implementation of SB 1383. Primary areas of focus under the SLCP reduction strategy are - dairy and livestock emissions, oil and natural gas production, processing, and storage, and stationary hydrofluorocarbon.
California Sustainable Freight Action Plan	Improve freight efficiency, transition to zero emission technologies, and increase competitiveness of California's freight system.	**Consistent.** The Project would not conflict with implementation of the California Sustainable Freight Action Plan.
Post-2020 Cap and Trade Program	Reduce GHGs acress largest GHG emissions sources	**Consistent.** Although the Project is not regulated by the Cap and Trade Program, the Project would be consistent with the program because it results in a net reduction of GHG emissions compared to the existing conditions.

Abbreviations:
CARB - California Air Resources Board
GHG - greenhouse gas
IRP - Integrated Resource Plan
LCFS - Low Carbon Fuel Standard
LADWP - City of Los Angeles Department of Water and Power
SB - Senate Bill
SLCP - Short-Lived Climate Pollutants
SLTRP - Strategic Long-Term Resource Plan
VMT - vehicle miles traveled

Table C-3. Consistency with Connect SoCal (2020-2045 Regional Transportation Plan/Sustainable Communities Strategy)
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

#	Goals	Consistency Analysis
1	Encourage regional economic prosperity and global competitiveness	**Consistent.** Although this goal is not applicable to an individual transportation project, the Project would encourage regional economic prosperity and global competitiveness by serving existing residents, workers, and visitors from local communities.
2	Improve mobility, accessibility, reliability, and travel safety for people and goods	**Consistent.** The Project would improve mobility, accessibility, reliability, and travel safety for people and goods by reducing passenger vehicle miles traveled and by providing a new mode of public transportation.
3	Enhance the preservation, security, and resilience of the regional transportation system	**Consistent.** Although this goal is not applicable to an individual transportation project, by creating an additional transit option that links to the existing Union Station, the Project helps to build the resilience of the regional transportation system.
4	Increase person and goods movement and travel choices within the transportation system	**Consistent.** The Project would create an increase in person and goods movement and travel choices within the transportation system would by providing an aerial rapid transit option in Downtown Los Angeles that would facilitate travel between Dodger Stadium, the surrounding communities, and the regional transit system accessible at Union Station.
5	Reduce greenhouse gas emissions and improve air quality	**Consistent.** The Project would result in a net decrease of GHG emissions, thus the proposed Project would be consistent with the Plan's efforts to reduce GHG emissions by 8% in 2020 and 19% in 2035, per the targets set by the California Air Resources Board for the region.
6	Support healthy and equitable communities	**Consistent.** Although this goal is not applicable to an individual transportation project, the Project would support healthy and equitable communities by providing a potential mobility hub at the Dodger Stadium property where passengers would be able to access a suite of first and last mile multi-modal options, such as a bike share program to provide connectivity to Elysian Park and the surrounding communities as well as a potential mobility hub at the Chinatown/State Park Station.

Table C-3. Consistency with Connect SoCal (2020-2045 Regional Transportation Plan/Sustainable Communities Strategy)
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

#	Goals	Consistency Analysis
7	Adapt to a changing climate and support an integrated regional development pattern and transportation network	**Consistent.** Although this goal is not applicable to an individual transportation project, the Project will facilitate adapting to a changing climate and supporting an integrated regional development pattern and transportation network by reducing emissions from on-road vehicles through offering an alternative mode of transportation. The proposed Project would facilitate integration of travel between Dodger Stadium, the surrounding communities, and the regional transit system accessible at Los Angeles Union Station.
8	Leverage new transportation technologies and data-driven solutions that result in more efficient travel	**Consistent.** As a breakthrough and innovative technology for the region, the proposed Project would leverage new transportation technologies and data-driven solutions that result in more efficient travel. The proposed Project would advance future alternative transportation systems and technology in the Los Angeles area while providing a template for other innovative aerial projects elsewhere in the state and the country.
9	Encourage development of diverse housing types in areas that are supported by multiple transportation options	**Consistent.** Although this goal is not applicable to an individual transportation project, the Project would encourage development of diverse housing types in areas that are supported by multiple transportation options by providing an additional transportation option for the residents and visitors in the City of Los Angeles and enabling access between Dodger Stadium, the surrounding communities, and the regional transit system accessible at Los Angeles Union Station.
10	Promote conservation of natural and agricultural lands and restoration of habitats	**Consistent.** Although this goal is not applicable to an individual transportation project, the Project would promote conservation of natural and agricultural lands and restoration of habitats by being constructed in a previously developed area and would not impede the region's goal of conserving land and restoring habitats.

Abbreviations:
CARB - California Air Resources Board
GHG - greenhouse gas

Table C-4. Consistency with 2019 Metro Climate Action and Adaptation Plan
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Measure	Strategies	Consistency Analysis
	Greenhouse Gas Mitigation Measures	
E-1 Renewable Energy Procurement	Expand use of renewable energy in electricity procurement (100% renewable electricity by 2035)	**Consistent.** Although this goal is not applicable to an individual transportation project, the electrical power for the operation of the Project's aerial gondola system and associated stations, junction, and towers would be supplied by the City of Los Angeles Department of Water and Power (LADWP) through the utility's Green Power Program. As such, the primary electricity usage associated with the Project would come from renewable resources. LADWP is a municipal electricity generation service provider. In 2017, LADWP developed its own Power Strategic Long-Term Resource Plan (SLTRP) as an outline for supplying energy in accordance with the state's renewable energy goals. (See https://www.ladwp.com/ladwp/faces/wcnav_externalId/a-p-doc?_adf.ctrl-state=rmkf94oql_25&_afrLoop=764064428747531.)
F-1 Photovoltaic Installations	Increase on-site solar photovoltaic installations	**Consistent.** The Project supports use of renewable power generation and use by committing to use green power from LADWP's Green Power Program. As such, the primary electricity usage for the Project would come from renewable resources.
F-2 Water-Saving Fixture Installation	Install new designs or retrofits of low-water sanitary fixtures that require less water and energy	**Consistent**. The Dodger Stadium Station and Chinatown/State Park Station will feature water-efficient fixtures to help reduce water and energy consumption.
F-3 Water Recycling System Installation	Install non-potable recycled water systems	**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, the Project would not inhibit the installation of non-potable recycled water systems by Metro.
F-4 Facility LED Lighting Installation	Replace lighting fixtures with LED lights	**Consistent.** The Project will utilize light emitting diode (LED) lighting (or equivalent) for indoor and outdoor lighting needs.
F-6 Facility Heating, Ventilation and Air Conditioning (HVAC) Electrification	Replace existing HVAC systems with electric systems	**Consistent.** While the proposed stations will be designed to be open-air buildings that allow for passive ventilation strategies, there will be HVAC at the Dodger Stadium Station employee area, which will be electric.

Table C-4. Consistency with 2019 Metro Climate Action and Adaptation Plan
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Measure	Strategies	Consistency Analysis
Climate Adaptation Measures		
Improve passenger and worker safety conditions (e.g., making sure bus AC works before revenue service)		**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, the Project, when operational, will have regular inspection and maintenance checks to ensure passenger and worker safety.
Regularly update plans and procedures for managing disruptions caused by weather-related events		**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, the Project will update and adapt its plans and procedures for disruptions caused by weather-related events.
Track pervasive maintenance/repair issues and use to improve practices		**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, the Project, when operational, will track maintenance/repair issues to respond to future issues with greater accuracy and to minimize downtime.
Collaborate with municipalities to enhance resilience of vulnerable transit stops and routes		**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, by creating an additional transit option that links to the existing Union Station, the Project helps to build the resilience of the regional transportation system.
Integrate climate resilience as part of project planning and design for new projects		**Consistent.** The entire Project (including gondola stations) has been designed with climate resiliency in mind and includes such features as open-air buildings, which will allow for passive ventilation strategies and thus reduce energy use. The station canopies will feature light-toned finish materials that will serve to minimize heat island concerns. Furthermore, the Project will result in no net loss of trees and will strategically use trees for shading certain areas. The Project will conserve water by utilizing water-efficient fixtures at the Dodger Stadium Station and Chinatown/State Park Station, as well as by implementing drought-tolerant landscape and high-efficiency irrigation devices.

Table C-4. Consistency with 2019 Metro Climate Action and Adaptation Plan
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Measure	Strategies	Consistency Analysis
Review Metro design and procurement criteria and incorporate thresholds and requirements based on climate change projections		**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, the Project would not impede implementation of this measure by Metro.
Implement erosion and mudslide control devices		**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, the Project would not impede implementation of this measure by Metro.
Upgrade infrastructure at end of useful life to protect against extreme precipitation and heat		**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, the Project will undergo upgrades as stations, cabins, and cable systems approach their projected useful lifetimes.
Improve stormwater management systems		**Consistent**. The Project will minimize stormwater runoff by incorporating permeable surfaces.
Implement green infrastructure to capture and reuse stormwater runoff		**Consistent**. The Project will support green infrastructure and minimize stormwater runoff by incorporating permeable surfaces.
Plant trees around transit stops, parking lots, yards and other open-space areas to provide shading		**Consistent.** The Project will strategically use trees to shade certain areas.
Increase use of vegetation in and around Metro spaces to improve air quality, water quality, carbon storage and community health		**Consistent.** The Project will strategically use trees to shade certain areas.
Increase redundancy in power systems, installing additional backup generators and establishing micro grids		**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, the Project will have backup battery storage to use if electric power is disrupted.
In locations where flooding occurs often, relocate assets to other areas, elevate, or incorporate low-impact development to avoid flood damage		**Consistent.** A portion of the Project is depicted in the Safety Element of the Los Angeles General Plan, Exhibit G as being located within the footprint of a dam failure inundation zone. Due to the regulatory monitoring of dams and typical flood control measures that are currently in place, the impact of inundation due to upstream dam failure is not considered a significant constraint to the proposed Project.
Increase climate hazard-related insurance coverage		**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, the Project would not impede implementation of this measure by Metro.

Table C-4. Consistency with 2019 Metro Climate Action and Adaptation Plan
Los Angeles Aerial Rapid Transit Project
Los Angeles, California

Measure	Strategies	Consistency Analysis
Improve worker emergency management training		**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, the Project staff will be diligently trained on procedures to take during an emergency.
Enhance continuity of operations plans for climate hazards		**Consistent.** The Project helps advance climate mitigation strategies by reducing GHG emissions and passenger VMT.
Set up fund for emergency response expenses		**Consistent.** Although this measure applies to Metro and not directly to an individual aerial transit project, the Project would not impede implementation of this measure by Metro.
Ensure adequate fuel storage before an extreme climate event occurs		**Consistent.** Although this goal is not applicable to an individual transportation project, the Project will have backup battery storage to ensure that passengers can safely disembark in the event of an extreme climate event.

Abbreviations:
AC - air conditioning
GHG - greenhouse gas
HVAC - heating, ventilation, and air conditioning
LADWP - Los Angeles Department of Water and Power
LED - light emitting diode
SLTRP - Strategic Long-Term Resource Plan
VMT - vehicle miles traveled

APPENDIX D
TECHNOLOGY PENETRATION ANALYSIS

RAMBOLL

ENVIRONMENT
& HEALTH

MEMORANDUM

To: **Los Angeles Aerial Rapid Transit**

From: **Ramboll US Consulting, Inc.**
Irvine, California

Subject: DISCUSSION OF THE LOS ANGELES AERIAL RAPID TRANSIT PROJECT'S EFFECT ON THE ADOPTION OF ALTERNATIVE MODES OF TRANSPORTATION IN CALIFORNIA

Date: April 28, 2022

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INTRODUCTION

The Los Angeles Aerial Rapid Transit project ("Project") will introduce the first aerial gondola system to the Los Angeles area, which represents the first aerial gondola system in a densely populated area the United States since 2007.[1] While this mode of transportation has existed since the late 1800s,[2] only approximately 50 systems in the world can be classified as a true mode of transit, rather than a ski lift or tourist attraction.[3]

The Project will provide a rapid transit option for visitors to Dodger Stadium, while also providing a reliable rapid transit system and first/last mile connector between Dodger Stadium, the surrounding communities, and Union Station, the City and County of Los Angeles' regional transit hub. The Project will also enhance transit access to Los Angeles State Historic Park, the Los Angeles River, and Elysian Park year-round.

The Project will facilitate acceptance of transportation alternatives. This transportation option will help commuters view modes of transit besides cars as a viable means of transportation and accessing key destination sites while reducing vehicle trips. As a breakthrough and innovative technology for the region, the Project advances future alternative transportation systems and technology in the Los Angeles region while providing a template for other innovative aerial projects elsewhere in California and the United States.

1 The Portland Aerial Tram, a 0.62 mile aerial tramway which has been operating since 2007, connects the city's South Waterfront district and the main Oregon Health & Science University campus in the Marquam Hill neighborhood and transports 2.6 million passengers per year.

2 Leitner. The History of Ropeways. Available at: https://www.leitner-ropeways.com/en/company/useful-information/evolution-of-ropeways/. Accessed: April 2022.

3 Jacobs. 2016. Aerial Cable Transit Feasibility Study. Available at: http://miamidadetpo.org/library/studies/aerial-cable-transit-feasbility-study-final-report-2016-02.pdf. Accessed: April 2022.

The Diffusion of Innovation Theory demonstrates the ongoing benefit of alternative modes of transportation such as the Project to facilitate the reduction of conventional vehicle use and associated emissions.[4]

BACKGROUND ON TRANSPORTATION EVOLUTION

Barriers to Entry for the Adoption of Transportation Technologies

There are various barriers to entry that limit the adoption of alternative modes of transportation and, which, in turn, highlight the benefits of projects that are able to overcome these barriers to jumpstart adoption of alternative modes of transportation. In general, existing modes of transportation appeal to different groups of people for a variety of reasons, which may include cost, accessibility, speed, convenience, and environmental impact. Existing modes of transportation do not have universal acceptance due to innate differences among people and their expectations of transportation. New technology will also experience resistance to universal adoption for similar reasons.

Passenger expectations can limit whether new or alternative modes of transportation are implemented or successful over time. Passengers may have initial questions about accessibility, feasibility, safety, and cost. Creating an alternative system will generally add to the cost of developing the alternative technology. The added costs to address passenger desires and concerns are inherent to any design that seeks to achieve a critical mass in ridership.

A major consideration for adoption of new transportation technology is how it will be built into the existing infrastructure. Many large urban areas suffer from congestion and limited space for new construction. New construction of a public transportation system often must address the availability of land for passenger stations.

The extensive review process is another common obstacle to new developments in alternative modes of transportation. Prior to adoption, a proposed transportation project needs to undergo many tiers of regulatory review. This may range from review of zoning and ordinances, to complex environmental impact analysis for federal- and state-level regulatory compliance.

Given the various economic, social and physical constraints on implementing alternative modes of transportation, significant direct and indirect community benefits occur when such projects are actually constructed and begin operation, as discussed below.

Regulatory Drivers for New Modes of Transportation

Innovative transportation technology helps advance local- and state-level sustainability initiatives and legislation. At the local level, Los Angeles' *Green New Deal*[5] was released in April 2019 and accelerates the City's commitments to attaining GHG reductions with goals specific to transit and vehicle miles traveled (VMT) including a 13% reduction in VMT per capita by 2025 and a 39% reduction by 2035, as well increasing the percentage of trips made by walking, biking, or transit to 35% by 2025, 50% by 2035, and maintaining at least 50% by 2050. The plan is explicit in highlighting the importance of "new technology, first/last mile solutions, and major innovations in mobility." At the state level, legislation has consistently pushed towards achieving greater reductions in GHG emissions, with strategies targeted at each major

[4] LaMorte, Wayne. 2019. Diffusion of Innovation Theory. Available at: https://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories4.html. Accessed: April 2022.

[5] City of Los Angeles. 2019. L.A.'s Green New Deal. Sustainable City pLAn. Available at: https://plan.lamayor.org/sites/default/files/pLAn_2019_final.pdf. Accessed: April 2022.

sector. Regarding transportation, California Senate Bill (SB) 375 is intended to reduce VMT by providing greater accessibility to low-carbon, alternative, and convenient transportation options. The development of new transportation technology in an urban area would create new jobs, both temporary from construction and permanent from operations, and new transportation technology would allow for realization of SB 375 goals of low-carbon transportation because such systems generally facilitate the mode shift from conventional transportation modes like a cars.

Regional agencies have put forth additional strategies for increasing sustainability of activity within cities and regions, including the Southern California Association of Governments (SCAG). The 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)[6] is intended to encourage future developments in transportation to align with environmental, economic, and public health goals. These general goals include providing increased mobility, reducing harmful emissions, increasing system efficiency and safety, and affecting land use to improve quality of life. An innovative, alternative transportation technology will help increase mobility and decrease VMT in the region.

Diffusion of Innovation Theory

The adoption of a new transportation technology (or an evolution on transportation modes) can be predicted using the Diffusion of Innovation Theory ("Diffusion Theory"). The Diffusion Theory explains that adoption of a new technology typically occurs based on the level of innovation, the societal system to which the technology is introduced, methods of communication, and time. The Diffusion Theory describes the process of the acceptance of technology by classifying members of society into five categories based on their rate of acceptance to new innovations. The categories are:

- Innovators
- Early Adopters
- Early Majority
- Late Majority
- Laggards[7]

Each category of people is compelled to adopt an innovation by its different attributes, which can range from its sheer conception (e.g., innovators) to pressure of adoption in the face of resistance (e.g., late majority and laggards). In the context of the evolution of transportation modes, the increased presence of alternative modes of transportation is a critical step to achieving the broader acceptance of alternative transportation modes.

The presence of new technology can show people how advantageous and compatible other transportation modes and technology can be, and further the adoption of alternative modes of transportation.[8] More specifically, the increased presence of alternative modes of transportation, will help get the "early

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[6] Southern California Association of Governments (SCAG). 2020. The 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy of the Southern California Association of Governments. Adopted September 3, 2020. Available at: https://scag.ca.gov/read-plan-adopted-final-plan. Accessed: April 2022.

[7] LaMorte, Wayne. 2019. Diffusion of Innovation Theory. Available at: https://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories4.html. Accessed: April 2022.

[8] Wolken et al. 2018. Driving change: technology diffusion in the transport sector. Available at: https://www.pwc.co.nz/pdfs/2018pdfs/driving-change-technology-diffusion-in-the-transport-sector.pdf. Accessed: April 2022.

majority" and "late majority" people (who tend to adopt new technology later as they determine how easy it is to understand and use) to more broadly accept and adopt alternative modes of transportation.

THE BENEFITS OF LA ART

Overcoming Transportation Obstacles through Innovation

As more people use the urban gondola system, they will learn and appreciate how it is an improved means of transportation between Dodger Stadium and Union Station, the City and County of Los Angeles' regional transit hub. The perceived "relative advantage" of an innovation and its "observability" are positively related to its rate of adoption.[9] Therefore, over time the aerial gondola system will be considered more conventional and lead to greater acceptance and expectation for other alternative modes of transportation.

It is expected that the urban gondola system will be able to transport up to 5,000 passengers per hour per direction. A large capacity for a new mode of transportation in Los Angeles will allow passengers to see the potential for other emerging innovations to be integrated into the public transit system, and not just serve as a niche technology. A popular case study for how an alternative mode of transit can increase acceptance of similar projects elsewhere is the impact of the aerial gondola system in Medellín, Colombia. In 2004, the City opened the world's first aerial gondola system, Metrocable. The most immediate impact of the aerial gondola system was significantly reduced commute times across Medellín, which subsequently lead to public investments in newly, feasibly accessible parts of the City. Soon after, major cities in the surrounding area- including La Paz, Caracas, and Rio de Janeiro- adopted aerial gondola systems of their own. Each city's transit system aimed to replicate the success of the Medellín system, in terms of accessible transportation and urban revitalization.[10] Aerial gondola systems have also been adopted elsewhere in the world, including Koblenz, Germany in 2010, Phu Quoc, Vietnam in 2018, and Mexico City, Mexico in 2016 (new line added in 2021).

The Project would exemplify how alternative transportation technology can be integrated into a city's transportation infrastructure. It will also demonstrate integration of all transportation modes. Specifically, passengers will be able to transfer from a Metro train at Union Station to the adjacent gondola station. These qualities of the Project will help show that new transportation technology can successfully operate in concert with other existing modes of transportation.

Aligning with Local and State-Level Sustainability Initiatives

The Project aligns with SB 375 and SCAG goals and will help local, regional and statewide agencies to reach targets for reducing passenger car VMT and transportation-related greenhouse gas emissions. The urban gondola system is expected to have a maximum capacity of 5,000 persons per hour per direction. By comparison, the maximum capacity of a single traffic lane of passenger vehicles is 9,000 persons per hour.[11] As such, the Project will allow for a substantial reduction in VMT from more conventional modes of transportation to an efficient, electricity-driven alternative that is also large enough in scale to support the

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[9] Ibid.

[10] Galvin. 2019. Urban Transformations: In Medellín, Metrocable Connects People in More Ways Than On. https://www.wri.org/blog/2019/03/urban-transformations-medellin-metrocable-connects-people-more-ways-one. Accessed: April 2022.

[11] Clément-Werny, Cécile, et al. 2011. Aerial Cableways as Urban Transport Systems. December. Available at: https://pdfs.semanticscholar.org/253d/5d27dfd3e6ea334bd481c3b9964f9bf0e827.pdf. Accessed: April 2022.

transportation demands in the vicinity of the Project site. The Project will also result in a net reduction in GHG emissions.

The Project also aligns with local goals, including those established by the Los Angeles County Metropolitan Transportation Authority's (Metro's) 2019 *Climate Action and Adaptation Plan,*[12] which sets forth a variety of strategies and actions to reduce GHG emissions. The Project will reinforce such efforts by reducing GHG emissions compared to baseline conditions and committing to renewable energy, incorporating energy efficient features, such as open-air stations and high-efficiency lighting, and using state-of-the-art gondola technologies, such as automated controls and contactless fare checking. The Project also aligns with the transit-oriented goals within Los Angeles' *Green New Deal* including those specific to reducing VMT and increasing the use of transit, as well as the plan's goal of transitioning to a 100% renewable energy supply by 2045.

[12] Los Angeles County Metropolitan Transportation Authority (Metro). 2019. Metro Climate and Adaptation Plan 2019. Available at: https://media.metro.net/projects_studies/sustainability/images/Climate_Action_Plan.pdf. Accessed: April 2022.