Appendix D. Climate Change and Greenhouse Gas Emissions Technical Report

SEPULVEDA TRANSIT CORRIDOR PROJECT
Climate Change and Greenhouse Gas Emissions Technical Report

March 2025

SEPULVEDA TRANSIT CORRIDOR PROJECT

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Climate Change and Greenhouse Gas Emissions Technical Report

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Prepared for:

Metro

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Abbreviations and Acronyms

2008 Scoping Plan	Climate Change Scoping Plan
2015 pLAn	Sustainable City pLAn
2017 Scoping Plan	California's 2017 Climate Change Scoping Plan
2022 Scoping Plan	2022 Scoping Plan for Achieving Carbon Neutrality
AB	Assembly Bill
ABC	Accelerated Bridge Construction
AP-42	Compilation of Air Pollutant Emission Factors
APM	automated people mover
APTA	American Public Transportation Association
AQMP	Air Quality Management Plan
AR4	Assessment Report 4
BRT	bus rapid transit
CAA	Clean Air Act
CAAP	Climate Action and Adaption Plan
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen	California Green Building Standards Code
CARB	California Air Resources Board
CAPCOA	California Air Pollution Control Officers Association
CAT	Climate Action Team
CEQA	California Environmental Quality Act
CH_4	methane
CIDH	cast-in-drilled-hole
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CRP	Carbon Reduction Program
DCP	City of Los Angeles Department of City Planning
ECMP	Energy Conservation and Management Plan
EIR	Environmental Impact Report
EISA	Energy Independence and Security Act
EMFAC2021	EMission FACtors Model
EO	Executive Order
EPA	U.S. Environmental Protection Agency

ExpressLanes project	I-405 Sepulveda Pass ExpressLanes project
FHWA	Federal Highway Administration
FTIP	Federal Transportation Improvement Program
g/bhp-hr	grams per brake horsepower hour
GHG	greenhouse gas
GW	gigawatts
GWP	global warming potential
HFC	hydrofluorocarbon
HHDT	heavy-heavy duty trucks
hp	horsepower
HRT	heavy rail transit
HSC	Health and Safety Code
HTA	HTA Partners
I-10	Interstate 10
I-405	Interstate 405
IPCC	Intergovernmental Panel on Climate Change
kBtu	kilo British thermal units
kWh	kilowatt-hours
LA100	Los Angeles 100% Renewable Energy Study
LADWP	City of Los Angeles Department of Water and Power
LAMC	City of Los Angeles Municipal Code
LASRE	LA SkyRail Express
LAX	Los Angeles International Airport
lb/MWh	pounds per megawatt-hour
$lbCO_2e$/MWh	pounds of carbon dioxide equivalents per megawatt-hour
LCFS	low carbon fuel standard
LDA	light-duty autos
LDT	light-duty trucks
LDT1	light-duty truck type 1
LDT2	light-duty truck type 2
LEED	Leadership in Energy and Environmental Design
LEED v4 BD+C	Leadership in Energy and Environmental Design Version 4 Building Design and Construction
LEV	Low Emission Vehicle
LOSSAN	Los Angeles-San Diego-San Luis Obispo Corridor

LRT	light rail transit
Metro	Los Angeles County Metropolitan Transportation Authority
MHDT	medium-heavy duty trucks
$MMTCO_2e$	million metric tons of carbon dioxide equivalents
MOW	maintenance-of-way
MPO	Metropolitan Planning Organization
MRT	monorail transit
MSF	maintenance and storage facility
$MTCO_2e$	metric tons of carbon dioxide equivalents
MWh	megawatt-hour
NF_3	nitrogen trifluoride
N_2O	nitrous oxide
NO_X	nitrogen oxides
NOP	Notice of Preparation
NREL	National Renewable Energy Laboratory
NWL	natural and working land
OPR	Office of Planning and Research
PFCs	perfluorocarbons
PM	particulate matter
Project	Sepulveda Transit Corridor Project
RPS	renewable portfolio standard
RTP	Regional Transportation Plan
SAR	Second Assessment Report
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCORE	Southern California Optimized Rail Expansion
SCS	Sustainable Communities Strategy
SF_6	sulfur hexafluoride
SORE	small off-road engine
STCP	Sepulveda Transit Corridor Partners
TBM	tunnel boring machine
TPSS	traction power substations
UCLA	University of California, Los Angeles
US	United States
US-101	U.S. Highway 101

U.S.C.	United States Code
VA	U.S. Department of Veteran Affairs
Valley	San Fernando Valley
VMT	vehicle miles traveled
Westside	Westside of Los Angeles
ZEVs	zero emission vehicles

1 INTRODUCTION

1.1 Project Background

The Sepulveda Transit Corridor Project (Project) is intended to provide a high-capacity rail transit alternative to serve the large and growing travel market and transit needs currently channeled through the Sepulveda Pass and nearby canyon roads between the San Fernando Valley (Valley) and the Westside of Los Angeles (Westside). The Project would have a northern terminus with a connection to the Van Nuys Metrolink/Amtrak Station and a southern terminus with a connection to the Los Angeles County Metropolitan Transportation Authority's (Metro) E Line. In addition to providing local and regional connections to the existing and future Metro rail and bus network, the Project is anticipated to improve access to major employment, educational, and cultural centers in the greater Los Angeles area.

In 2019, Metro completed the Sepulveda Transit Corridor Feasibility Study and released the Project's *Final Feasibility Report* (Metro, 2019a), which documented the transportation conditions and travel patterns in the Sepulveda corridor; identified mobility problems affecting travel between the Valley and the Westside; and defined the Purpose and Need, goals, and objectives of the Project. Using an iterative evaluation process, the Feasibility Study identified feasible transit solutions that met the Purpose and Need, goals, and objectives of the Project. The Feasibility Study determined that a reliable, high-capacity, fixed guideway transit system connecting the Valley to the Westside could be constructed along several different alignments. Such a transit system, operated as either heavy rail transit (HRT) or monorail transit (MRT), would serve the major travel markets in the Sepulveda Transit corridor and would provide travel times competitive with the automobile.

1.2 Project Alternatives

In November 2021, Metro released a Notice of Preparation (NOP) of an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act, for the Project that included six alternatives (Metro, 2021). Alternatives 1 through 5 included a southern terminus station at the Metro E Line Expo/Sepulveda Station, and Alternative 6 included a southern terminus station at the Metro E Line Expo/Bundy Station. The alternatives were described in the NOP as follows:

- Alternative 1: Monorail with aerial alignment in the Interstate 405 (I-405) corridor and an electric bus connection to the University of California, Los Angeles (UCLA)
- Alternative 2: Monorail with aerial alignment in the I-405 corridor and an aerial automated people mover connection to UCLA
- Alternative 3: Monorail with aerial alignment in the I-405 corridor and underground alignment between the Getty Center and Wilshire Boulevard
- Alternative 4: Heavy rail with underground alignment south of Ventura Boulevard and aerial alignment generally along Sepulveda Boulevard in the San Fernando Valley
- Alternative 5: Heavy rail with underground alignment including along Sepulveda Boulevard in the San Fernando Valley
- Alternative 6: Heavy rail with underground alignment including along Van Nuys Boulevard in the San Fernando Valley and a southern terminus station on Bundy Drive

The NOP also stated that Metro is considering a No Project Alternative that would not include constructing a fixed guideway line. Metro established a public comment period of 74 days, extending from November 30, 2021 through February 11, 2022. Following the public comment period, refinements to the alternatives were made to address comments received. Further refinements to optimize the designs and address technical challenges of the alternatives were made in 2023 following two rounds of community open houses.

In July 2024, following community meetings held in May 2024, Alternative 2 was removed from further consideration in the environmental process because it did not provide advantages over the other alternatives, and the remaining alternatives represent a sufficient range of alternatives for environmental review, inclusive of modes and routes (Metro, 2024a). Detailed descriptions of the No Project Alternative and the five remaining “build” alternatives are presented in Sections 5 through 10.

1.3 Project Study Area

Figure 1-1 shows the Project Study Area. It generally includes Transportation Analysis Zones from Metro’s travel demand model that are within 1 mile of the alignments of the four “Valley-Westside” alternatives from the *Sepulveda Transit Corridor Project Final Feasibility Report* (Metro, 2019a). The Project Study Area represents the area in which the transit concepts and ancillary facilities are expected to be located. The analysis of potential impacts encompasses all areas that could potentially be affected by the Project, and the EIR will disclose all potential impacts related to the Project.

1.4 Purpose of this Report and Structure

This technical report examines the environmental impacts of the Project as it relates to climate change and greenhouse gas emissions. It describes existing climate change and greenhouse gas emissions conditions in the Project Study Area, the regulatory setting, methodology for impact evaluation, and potential impacts from operation and construction of the project alternatives, including maintenance and storage facility site options.

The report is organized according to the following sections:

- Section 1 Introduction
- Section 2 Regulatory and Policy Framework
- Section 3 Methodology
- Section 4 Future Background Projects
- Section 5 No Project Alternative
- Section 6 Alternative 1
- Section 7 Alternative 3
- Section 8 Alternative 4
- Section 9 Alternative 5
- Section 10 Alternative 6
- Section 11 Preparers of the Technical Report
- Section 12 References

Figure 1-1. Sepulveda Transit Corridor Project Study Area

Source: HTA, 2024

2 REGULATORY AND POLICY FRAMEWORK

The subject of greenhouse gas (GHG) emissions and climate change resiliency adaptation has garnered substantial regulatory attention in recent years. Climate change refers to variations in average long-term meteorological conditions on Earth as a whole, including changes in temperature, wind patterns, precipitation, and frequency and severity of extreme weather events. Historical records indicate that global climate fluctuations have occurred in the past due to natural phenomena; however, recent data increasingly suggests that the current global conditions are distinct from previous patterns and are influenced by anthropogenic (human-caused) GHG emissions. GHGs are a class of pollutants that are generally understood to play a critical role in controlling atmospheric temperature near the Earth's surface by allowing high frequency shortwave solar radiation to enter the planet's atmosphere and then subsequently trapping low frequency infrared radiative energy that would otherwise emanate back out into space. The greenhouse effect compares the Earth and the atmosphere surrounding it to a greenhouse with glass panes; the glass panes in a greenhouse let heat from sunlight in and reduce the amount of heat that escapes. The levels of GHGs in the atmosphere affect how much heat energy can be absorbed.

Radiative forcing is an expression of the net difference in energy entering the Earth's atmosphere versus leaving it. Each GHG possesses its own degree of climate-forcing ability to absorb low frequency infrared energy, meaning that some GHGs are more effective in trapping heat in the atmosphere than others. Water vapor is the most environmentally prevalent GHG; however, definitive methods are not established to regulate emissions and concentrations of water vapor in the atmosphere. After water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are the most ubiquitous GHGs. CO_2 is commonly used as the standard reference for characterizing the relative global warming potential (GWP) of other GHGs. The GWP value describes the relative magnitude of climate-forcing effects of GHGs and is used to convert emissions into carbon dioxide equivalents (CO_2e). Table 2-1 presents the GWP values and atmospheric lifetimes of CO_2, CH_4, and N_2O, as well as other regulated GHGs emitted by human activities. For example, CH_4 is 25 times more potent than CO_2 over a 100-year period.

Table 2-1. Common Greenhouse Gases and Characteristics

Pollutant	Lifetime (Years)[a]	Global Warming Potential (20-Year)	Global Warming Potential (100-Year)[b]
Carbon Dioxide (CO_2)	—	1	1
Methane (CH_4)	12	21	25
Nitrous Oxide (N_2O)	114	310	298
Nitrogen Trifluoride (NF_3)	740	Unknown	17,200
Sulfur Hexafluoride (SF_6)	3,200	23,900	22,800
Perfluorocarbons (PFCs)	2,600-50,000	6,500-9,200	7,390-12,200
Hydrofluorocarbons (HFCs)	1-270	140-11,700	124-14,800

Source: CARB, 2023a

[a]Lifetime refers to the approximate amount of time it would take for the anthropogenic increment of an atmospheric pollutant concentration to return to its natural level as a result of either being converted to another chemical compound or being taken out of the atmosphere via a sink.

[b]The 20-year global warming potentials (GWPs) are based on the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (SAR) (IPCC, 1995) and the 100-year GWPs are based on the IPCC Assessment Report 4 (AR4) (IPCC, 2007). The California Air Resources Board (CARB) uses AR4 GWPs for their GHG emissions inventories.

— = no data

Note: The United States primarily uses the 100-year GWP as a measure of the relative impact of different GHGs. However, the scientific community has developed a number of other metrics that could be used for comparing one GHG to another. These metrics may differ based on timeframe, the climate endpoint measured, or the method of calculation. For example, the 20-year GWP is sometimes used as an alternative to the 100-year GWP. Similar to how the 100-year GWP is based on the energy absorbed by a gas over 100 years, the 20-year GWP is based on the energy absorbed over 20 years. This 20-year GWP prioritizes gases with shorter lifetimes, because it does not consider impacts that happen more than 20 years after the emissions occur. Because all GWPs are calculated relative to CO_2, GWPs based on shorter timeframes will be higher for gases with lifetimes shorter than that of CO_2, and lower for gases with lifetimes longer than CO_2.

2.1 Federal

2.1.1 Clean Air Act

In *Massachusetts v. Environmental Protection Agency* (2007) 549 U.S. 497, the United States (U.S.) Supreme Court held in April 2007 that the U.S. Environmental Protection Agency (EPA) has statutory authority under Section 202 of the federal Clean Air Act (CAA) to regulate GHG emissions. The court did not hold that the EPA was required to regulate GHG emissions; however, it indicated that the agency must decide whether GHG emissions cause or contribute to air pollution that is reasonably anticipated to endanger public health or welfare. On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHG emissions under Section 202(a) of the CAA (42 United States Code [U.S.C.] Section 7521) (EPA, 2009). These findings included that GHG emissions threaten the public health and welfare of future generations and motor vehicle engines contribute to air pollution, which poses an ongoing threat to public health and welfare.

2.1.2 Energy Independence and Security Act

The Energy Independence and Security Act (EISA) of 2007 includes several key provisions that will increase energy efficiency and the availability of renewable energy, which will reduce GHG emissions as a result. The Act facilitates the reduction of GHG emissions by increasing the supply of alternative fuel sources, revising standards affecting regional efficiency for heating and cooling products, phasing out old incandescent light bulbs, and improving fuel efficiency standards. Additional provisions of EISA promote energy savings in government and public institutions, research for alternative energy, additional research in carbon capture, international energy programs, and the creation of green jobs.

2.1.3 Heavy-Duty Vehicle Program

The EPA’s Heavy-Duty Vehicle Program was adopted on August 9, 2011 to establish the first fuel efficiency requirements for medium- and heavy-duty vehicles beginning with the model year 2014.

2.1.4 Federal Transit Administration Climate Change Adaptation Initiative

The Federal Transit Administration has implemented a Climate Change Adaptation Initiative program to investigate potential strategies for reducing climate impacts from transit. The program was established in 2014 and providing funding to conduct seven climate adaptation pilot studies to increase knowledge of how transit agencies can adapt to climate change, advance the state of the practice in adapting transit assets and operations to the impacts of climate change, and build strategic partnerships between transit agencies and climate adaptation experts. The approach of the pilot projects involved identification of climate hazards and potential climatic events, characterization of risks on transit projects and operations, development of initial adaptation strategies and linking strategies to organizational structures.

2.1.5 Federal Highway Administration Carbon Reduction Program

Established by the passage of the 2021 Bipartisan Infrastructure Law, the Federal Highway Administration's (FHWA) Carbon Reduction Program (CRP) provides funds for projects designed to reduce transportation emissions, defined as CO_2 emissions from on-road highway sources. The CRP requires each state to develop a carbon reduction strategy no later than 2 years after enactment and update the strategy at least every 4 years. The state-level carbon reduction strategy shall support efforts—and identify projects and strategies—to support the reduction of transportation-related GHG emissions and quantify the total carbon emissions from production, transport, and use of materials used in the construction of transportation facilities in the state. Under the CRP, the FHWA is tasked with reviewing each states' process for developing its carbon reduction strategy and certify that the strategy meets statutory requirements.

2.2 State

2.2.1 California Air Resources Board

The California Air Resources Board (CARB), a department within the California Environmental Protection Agency (CalEPA), is responsible for protecting public health and the environment by regulating air pollution and addressing climate change. Established in 1967 through the Mulford-Carrell Act, CARB oversees efforts to achieve and maintain health-based air quality standards, reduce greenhouse gas (GHG) emissions, and minimize exposure to toxic air contaminants. CARB works in coordination with 35 local air districts in California to regulate stationary and mobile sources of emissions, develop emissions inventories, and monitor air quality to ensure compliance with state and federal standards. It has implemented several landmark programs, including the Low Emission Vehicle (LEV) standards, the Advanced Clean Cars Program, and the Cap-and-Trade Program, which are instrumental in reducing emissions from vehicles, industrial sources, and other sectors. CARB also promotes the use of zero-emission vehicles (ZEVs) and cleaner technologies through its regulatory framework and incentive programs. CARB's policies, many of which exceed federal requirements, serve as a model for air quality and climate change regulations nationwide.

2.2.1.1 CARB Off-Road Regulation and 2023 Amendment

The CARB Off-Road Regulation is designed to reduce GHG emissions and criteria air pollutants from in-use off-road diesel equipment, such as construction and industrial machinery. Initially adopted in 2007, the regulation establishes fleet average emissions standards and mandates the phase-out of older, higher-polluting engines, encouraging the transition to cleaner technologies. The regulation applies to fleets operating within California and sets compliance requirements based on fleet size and composition.

The 2023 Amendment to the Off-Road Regulation, taking effect in 2024, introduces stricter emissions limits and accelerates the transition to zero-emission equipment. Key updates include the prohibition of Tier 0 and Tier 1 engines, stricter fleet average emissions standards, and mandates for large fleets to transition a portion of their horsepower to zero-emission equipment (e.g., 10% by 2026 and 25% by 2030). Additionally, the amendment lowers the operational threshold for low-use equipment and enhances reporting and recordkeeping requirements to improve compliance oversight.

The regulation, including the 2023 Amendment, supports California's broader climate goals by reducing GHG emissions from the construction and industrial sectors, promoting electrification, and improving air quality, particularly in disadvantaged communities near major construction activities. These provisions are relevant to the evaluation of GHG emissions and climate impacts in environmental review documents.

2.2.2 California Greenhouse Gas Reduction Targets

2.2.2.1 Executive Order S-3-05

On June 1, 2005, Executive Order (EO) S-3-05 set the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels. EO S-3-05 calls for the Secretary of the California Environmental Protection Agency (CalEPA) to be responsible for coordination of state agencies and progress reporting.

In response to EO S-3-05, the Secretary of CalEPA created the Climate Action Team (CAT). The original mandate for the CAT was to develop proposed measures to meet the emission reduction targets set forth in EO S-3-05. The CAT is responsible for preparing reports that summarize the state's progress in reducing GHG emissions. The most recent *Climate Action Team Report* was published in December 2010. The report discusses mitigation and adaptation strategies, state research programs, policy development, and future efforts (DCP, 2006).

2.2.2.2 Assembly Bill 32

In 2006, the California State Legislature adopted Assembly Bill (AB) 32—codified in the California Health and Safety Code (HSC), Division 25.5 – California Global Warming Solutions Act of 2006—which focused on reducing GHG emissions in California to 1990 levels by 2020. AB 32 defines regulated GHGs as CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) and represents the first enforceable statewide program to limit emissions of these GHGs from all major industries with penalties for noncompliance. The law further requires that reduction measures be technologically feasible and cost effective. Under AB 32, the California Air Resources Board (CARB) has the primary responsibility for reducing GHG emissions. AB 32 required CARB to adopt rules and regulations directing state actions that would achieve GHG emissions reductions equivalent to 1990 statewide levels by 2020.

A specific requirement of AB 32 was to prepare a climate change scoping plan for achieving the maximum technologically feasible and cost-effective GHG emission reductions by 2020 (HSC Section 38561(h)). CARB developed an AB 32 *Climate Change Scoping Plan* (2008 Scoping Plan) that contained strategies to achieve the 2020 emissions cap (CARB, 2008a). The 2008 Scoping Plan was approved in 2008 and contains a mix of recommended strategies that combined direct regulations, market-based approaches, voluntary measures, policies, and other emission reduction programs calculated to meet the 2020 statewide GHG emission limit and initiate the transformations needed to achieve the state's long-range climate objectives.

As required by AB 32, CARB approved the 1990 GHG emissions inventory, thereby establishing the emissions limit for 2020. The 2020 emissions limit was originally set at 427 million metric tons of carbon dioxide equivalents ($MMTCO_2e$) using the GWP values from the IPCC SAR (IPCC, 1995). CARB also projected the state's 2020 GHG emissions under No-Action-Taken conditions – that is, emissions that would occur without any plans, policies, or regulations to reduce GHG emissions. CARB originally used an average of the state's GHG emissions from 2002 through 2004 and projected the 2020 levels at approximately 596 $MMTCO_2e$.

The *First Update to the Climate Change Scoping Plan* (First Update) was approved by CARB in May 2014 and built upon the 2008 Scoping Plan with new strategies and recommendations. In 2014, CARB revised the target using the GWP values from the IPCC AR4 and determined that the 1990 GHG emissions inventory and 2020 GHG emissions limit was 431 $MMTCO_2e$. CARB also updated the state's 2020 CAT emissions estimate to account for the effect of the 2007–2009 economic recession, new estimates for future fuel and energy demand, and the reductions required by regulation that were adopted for motor vehicles and renewable energy. CARB projected statewide 2020 emissions using the GWP values from the IPCC AR4 and estimated them to be 509.4 $MMTCO_2e$.[1]

2.2.2.3 Executive Order B-16-2012

On March 23, 2012, Governor Brown issued EO B-16-2012, which established benchmarks for reducing transportation-related GHG emissions. It requires agencies to implement the Plug-in Electric Vehicle Collaborative and California Fuel Cell Partnership by 2015 and sets forth targets specific to the transportation section, including the goal of reducing transportation-related GHG emissions to 80 percent less than 1990 levels by 2050.

2.2.2.4 Executive Order B-30-15

On April 29, 2015, Governor Brown issued EO B-30-15, which established a medium-term goal for 2030 of reducing GHG emissions by 40 percent below 1990 levels and required CARB to update its 2014 Scoping Plan to identify measures to meet the 2030 target. The EO supports EO S-03-05, described above, but is currently only binding on state agencies. The adoption of Senate Bill (SB) 32 formally established a target for 2030.

2.2.2.5 Senate Bill 32

In 2016, the California State Legislature adopted SB 32—which adds Section 38566 to the HSC and requires a commitment to reducing statewide GHG emissions to 1990 levels by 2020 and 40 percent below 1990 levels by 2030—and its companion, AB 197, which provides additional direction for developing the 2017 Scoping Plan. Both were signed by Governor Brown to update AB 32 and include an emissions reduction goal for the year 2030. SB 32 and AB 197 amend AB 32 and establish a new climate pollution reduction target of 40 percent below 1990 levels by 2030 and include provisions to ensure the benefits of state climate policies reach into disadvantaged communities.

In response to the 2030 GHG reduction target, CARB adopted *California's 2017 Climate Change Scoping Plan* (2017 Scoping Plan) at a public meeting held in December 2017 (CARB, 2017). The 2017 Scoping Plan outlined the strategies that the state would implement to achieve the 2030 GHG reduction target. The strategies included building upon the existing Cap-and-Trade Regulation[2], low carbon fuel standard (LCFS), improved emissions standards, and increasing renewable energy. The strategies also included

[1] Refer to Table 5-1 for actual state-wide GHG emissions for years 2013 through 2021.

[2] "The Cap-and-Trade Regulation establishes a declining limit on major sources of GHG emissions. CARB creates allowances equal to the total amount of permissible emissions (i.e., the "cap"). One allowance equals one metric ton of carbon dioxide equivalent emissions (using the 100-year global warming potential). Each year, fewer allowances are created and the annual cap declines. An increasing annual auction reserve (or floor) price for allowances and the reduction in annual allowances create a steady and sustained carbon price signal to prompt action to reduce GHG emissions." (CARB, 2024)

reducing CH_4 emissions from agricultural and other wastes by using it to meet California's energy needs. CARB's projected statewide 2030 emissions accounted for 2020 GHG reduction policies and programs.

CARB stated that the 2017 Scoping Plan Scenario "is the best choice to achieve the state's climate and clean air goals". The majority of the reductions would result from the continuation of the Cap-and-Trade Regulation. Additional reductions are achieved by the following activities:

- Applying electricity sector standards (i.e., utility providers to supply at least 50 percent renewable electricity by 2030)
- Doubling the energy efficiency savings at end uses
- Making additional reductions from the LCFS, implementing the short-lived GHG strategy (e.g., HFCs)
- Implementing the mobile source strategy and sustainable freight action plan. (The alternatives were designed to consider various combinations of these programs, as well as consideration of a carbon tax in the event the Cap-and-Trade Regulation is not continued. However, in July 2017, the California Legislature voted to extend the Cap-and-Trade Regulation to 2030.)

2.2.2.6 Assembly Bill 1279

AB 1279 was adopted on September 16, 2022, and requires the state to achieve net zero GHG emissions as soon as possible, but no later than 2045, and achieve and maintain net negative GHG emissions. Additionally, AB 1279 requires California to reduce statewide GHG emissions by 85 percent compared to 1990 levels by 2045.

The framework for achieving these goals is outlined in the latest update to California's GHG scoping plan, the *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) (CARB, 2022). The 2022 Scoping Plan would continue to build on efforts in reducing GHG emissions from all sectors (energy, transportation, industrial, etc.) and would be the first of its kind to include "carbon neutrality as a science-based guide and touchstone for California's climate work." To support the carbon neutrality goal, the 2022 Scoping Plan analyzed natural and working lands (NWLs), such as forests, shrublands, croplands, and wetlands, and how NWLs will play an important role in reducing GHG emissions from hard-to-abate industries such as cement, internal combustion vehicles, and refrigerants. Carbon storage in NWLs on their own will not be enough to meet carbon neutrality and development of feasible technologies to pull CO_2 from smokestacks or the atmosphere, and permanently storing CO_2 will be crucial to meeting carbon neutrality and net negative emissions.

To meet the 2022 Scoping Plan goals, electrification in all sectors will continue to play an important role. Development of clean energy production and distribution are critical in having a decarbonized economy. The energy transition to achieve a decarbonized economy would require adding four times the current amount of solar and wind generation, and 1,700 times the current hydrogen supply by 2045. Developing clean energy and fuels is critical to reducing GHG emissions from the transportation sector and is necessary to support long-term GHG reductions.

Overall, the 2022 Scoping Plan has an ambitious and aggressive approach to reducing GHG emissions by 85 percent compared to 1990 levels by 2045 and reducing demand for liquid petroleum and total fossil fuel by 94 percent and 86 percent respectively, by 2045 relative to 2022 (CARB, 2022).

2.2.3 Renewable Energy Standards/Renewable Portfolio Standards

2.2.3.1 Senate Bill 1078 and Senate Bill 107

SB 1078 (2002) and SB 107 (2006) created the Renewable Energy Standard, which required electric utility companies to increase procurements from eligible renewable energy resources by at least 1 percent of their retail sales annually until reaching 20 percent by 2010. SB 2 (1X) (2011) requires a Renewables Portfolio Standard, functionally the same thing as the Renewable Energy Standard, of 33 percent by 2020. In 2013, the statewide average for the three largest electrical suppliers (Pacific Gas and Electric, Southern California Edison, and San Diego Gas & Electric) was 22.7 percent. As noted in Section 2.2.3.4, SB 350 increased the renewable requirement to 50 percent for 2030.

2.2.3.2 Senate Bill 1 and Senate Bill 1017 (Million Solar Roofs)

SB 1 and SB 1017, enacted in August 2006, set a goal to install 3,000 megawatts of new solar capacity by 2017 – moving the state toward a cleaner energy future and helping lower the cost of solar systems for consumers. The Million Solar Roofs Program is a ratepayer-financed incentive program aimed at transforming the market for rooftop solar systems by driving down costs over time. It provides up to $3.3 billion in financial incentives that decline over time. The state reached its one million solar roofs milestone in 2019.

2.2.3.3 Assembly Bill 811

AB 811, enacted on July 21, 2008, authorizes California cities and counties to designate districts within which willing property owners may enter into contractual assessments to finance the installation of renewable energy generation and energy efficiency improvements that are permanently fixed to the property.

2.2.3.4 Senate Bill 350

SB 350, also known as the Clean Energy and Pollution Reduction Act of 2015, was approved in 2015 and includes key provisions to require the following by 2030: (1) a renewables portfolio standard of 50 percent and (2) a doubling of energy efficiency for existing buildings.

2.2.3.5 Senate Bill 100

SB 100, adopted in August 2018, established a state goal of 100 percent clean electricity by 2045 and advances the Renewables Portfolio Standard to 50 percent by 2025 and 60 percent by 2030.

2.2.3.6 Senate Bill 1020

SB 1020 was adopted on September 16, 2022 and is a revision to SB 100 that would require eligible renewable energy resources and zero-carbon resources to supply the following:

- 90 percent of all retail electricity sales to California end-use customers by December 31, 2035, 95 percent by 2040, and 100 percent by 2045
- 100 percent of electricity procured to serve all state agencies by December 31, 2035

2.2.4 Advanced Clean Cars

2.2.4.1 Assembly Bill 1493 (Pavley I)

AB 1493 amended the Clean Car Standards (Chapter 200, Statutes of 2002), also known as the “Pavley I” regulations which required reductions in GHG emissions in new passenger vehicles from 2009 through 2016. The Clean Car Standards required CARB to develop and adopt standards for vehicle manufacturers to reduce GHG emissions coming from passenger vehicles and light-duty trucks at a "maximum feasible and cost-effective reduction" by January 1, 2005. Fleet average emission reached 22 percent reduction by 2012 and 30 percent by 2016. In January 2012, CARB adopted the Advanced Clean Cars I program to extend AB 1493 through model years 2017 to 2025 (also known as "Pavley II"). This program promoted all types of clean fuel technologies such as plugin hybrids, battery electric vehicles, compressed natural gas vehicles, and hydrogen powered vehicles while reducing smog and saving consumers' money in fuel costs.

Most recently in 2022, CARB adopted the Advanced Clean Cars II regulations, which would impose the next level of emissions standards for passenger vehicles and light-duty trucks for model years 2026 through 2035. Additionally, these regulations would require that by 2035, all new passenger cars, trucks, and sport utility vehicles sold in California will be zero emission vehicles.

2.2.4.2 Executive Order S-1-07

On January 18, 2007, EO S-1-07 was issued requiring a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. The LCFS was identified by CARB as a discrete early action item in the 2008 Scoping Plan developed from AB 32. The LCFS was most recently amended in 2018 to align the carbon intensity benchmarks with the 2030 GHG target enacted by SB 32.

2.2.5 Land Use and Transportation Planning

2.2.5.1 Senate Bill 375

Adopted on September 30, 2008, SB 375 established mechanisms for the development of regional targets for reducing passenger vehicle GHG emissions. SB 375 required CARB to consult 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. In February 2011, CARB adopted the GHG emissions reduction targets of 8 percent by 2020 and 13 percent by 2035 relative to 2005 GHG emissions for the Southern California Association of Governments (SCAG). Beginning in October 2018, the 2035 target was revised to 19 percent below 2005 levels.

Under SB 375, the reduction target must be incorporated within that region's Regional Transportation Plan (RTP), which is used for long-term transportation planning, in a Sustainable Communities Strategy (SCS). Certain transportation planning and programming activities would then need to be consistent with the SCS; however, SB 375 expressly provides that the SCS does not regulate the use of land, and further provides that local land use plans and policies (e.g., general plan) are not required to be consistent with either the RTP or SCS.

2.2.5.2 Senate Bill 743

SB 743, adopted September 27, 2013, encourages land use and transportation planning decisions and investments that reduce vehicle miles traveled (VMT), which contribute to GHG emissions, as required by AB 32. Key provisions of SB 743 include reforming how the California Environmental Quality Act (CEQA) analyzes aesthetic and parking impacts of urban infill sites, and eliminating the measurement of auto delay, including Level of Service, as a metric that can be used for measuring traffic impacts in transit priority areas. SB 743 requires that the Governor's Office of Planning and Research (OPR) revise CEQA Guidelines[3] to establish criteria for determining the significance of transportation impacts of

[3] CEQA Guidelines refers to Title 14, Division 6, Chapter 3 of the California Code of Regulations and are administrative regulations governing implementation of the California Environmental Quality Act.

projects within transit priority areas that promote the reduction of GHG emissions, the development of multimodal transportation networks, and a diversity of land uses.

2.2.6 California Green Building Standards Code

The California Building Standards Commission adopted the statewide mandatory California Green Building Standards Code (CALGreen) Part 11 of Title 24, California Code of Regulations, which identifies mandatory building measures and voluntary measures that may be incorporated into the design of buildings to improve building energy savings. These measures would be applied to planning, designing, operating, constructing, and occupying newly constructed buildings or structures.

2.2.7 California Energy Code

The California Building Standards Commission adopted the statewide mandatory California Energy Code, Part 6 of Title 24, California Code of Regulations. Title 24 applies to all newly constructed nonresidential buildings and regulates minimum energy efficiencies for cooling, heating, ventilation, water heating, and lighting. Title 24, Part 6 contains requirements for cool roofs, exterior lighting, bicycle parking, and electric vehicle charging. In addition, it requires mandatory inspections of energy systems (e.g., heat furnace, air conditioner, and mechanical equipment) for non-residential buildings larger than 10,000 square feet to ensure that all are working at their maximum capacity and according to their design efficiencies.

2.2.8 Assembly Bill 1346

AB 1346 was signed into law on October 9, 2021, and mandates CARB to adopt regulations prohibiting the sale of new gas-powered small off-road engines (SOREs), such as those used in lawn equipment and generators, by January 1, 2024, or as soon as feasible. The law aims to reduce air pollution from SOREs, which contribute significantly to smog and greenhouse gas emissions. It supports the transition to zero-emission alternatives by providing $30 million in funding for rebate programs to assist small businesses and individuals in purchasing compliant electric-powered equipment. While the law targets new sales, existing equipment can continue to be used, ensuring a phased and economically feasible transition to cleaner technologies.

2.3 Regional

2.3.1 Southern California Association of Governments

Federal law (23 U.S.C. Section 134 et seq.) requires that any urbanized area with population of 50,000 or more be guided and maintained by a regional entity known as a Metropolitan Planning Organization (MPO). The MPO for the Project Study Area is SCAG, which also serves as the Regional Transportation Planning Agency. The SCAG region encompasses six counties—Imperial, Los Angeles, Orange, Riverside, Bernardino, and Ventura—and 191 cities in an area covering more than 38,000 square miles. The Project Study Area spans across portions of southwest Los Angeles County, and Los Angeles County Metropolitan Transportation Authority (Metro) facilities within the SCAG region are accounted for in SCAG regional planning activities.

SCAG is required by federal law to prepare and update a long-range RTP (23 U.S.C. Section 134 et seq.) every 4 years. California SB 375, codified in 2008 in Government Code Section 65080(b)(2)(B), also requires that the RTP include an SCS that outlines growth strategies for land use and transportation and helps reduce the State’s GHG emissions from cars and light duty trucks. SCAG’s most recently adopted plan is the *Connect SoCal, 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy*

(SCAG, 2024a), which was adopted by the SCAG Regional Council on April 4, 2024. It received federal approval from the FHWA and Federal Transit Administration on May 10, 2024. The Sepulveda Transit Corridor Project (Project) is identified in the *Connect SoCal, 2024-2050 RTP/SCS Final Connect SoCal Project List Technical Report* as the "Sepulveda Pass Transit Corridor (Phase 2)," RTP ID 1160001 (SCAG, 2024b).

The 2024-2050 RTP/SCS is an update to SCAG's *Connect SoCal, 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy*. The foundation of the 2020-2045 RTP/SCS was rooted in its "Core Vision," which focused on maintaining and better managing the regional transportation network for moving people and goods while expanding mobility choices by locating housing, jobs, and transit in close proximity and increasing investment in transit and complete streets (SCAG, 2020a, 2020b). The Core Vision was originally developed in the 2008 and 2012 RTP documents and the 2024-2050 RTP/SCS provides the most comprehensive RTP/SCS to date that builds upon previous work. SCAG's regional transportation and land use planning initiatives are closely intertwined with improving regional air quality.

The 2024-2050 RTP/SCS builds upon the goals and strategies developed in the 2020-2045 RTP/SCS. The 2024-2050 RTP/SCS goals and visions fall into four primary categories:

- Mobility—Build and maintain an integrated multimodal transportation network
- Communities—Develop, connect, and sustain livable and thriving communities
- Environment—Create a healthy region for the people of today and tomorrow
- Economy—Support a sustainable, efficient, and productive regional economic environment that provides opportunities for all people in the region

For each of these categories, regional planning policies were developed to provide guidance for integrating land use and transportation planning to meet the goals of the 2024-2050 RTP/SCS. Within the environment category, regional planning policies for air quality included 1) reduce hazardous air pollutants and GHG emissions and improve air quality throughout the region through planning and implementation efforts, 2) support investments that reduce hazardous air pollutants and GHG emissions, and 3) reduce the exposure and impacts of emissions and pollutants and promote local and regional efforts that improve air quality for vulnerable populations, including but not limited to Priority Equity Communities and the AB 617 Communities (SCAG, 2024a).

Performance of the 2024-2050 RTP/SCS in 2050 is measured by comparing a "Plan" vs "No Plan," where the No Plan represents 2050 conditions without implementation of the 2024-2050 RTP/SCS. When compared to the No Plan scenario, the Plan would reduce regional VMT per capita by 6.3 percent, daily minutes of person delay per capita would decrease from 8.2 minutes to 6.3 minutes, and trips by transit would increase by 1.4 percent. These performance results highlight how implementation of the 2024-2050 RTP/SCS will help reduce mobile source air pollutant and GHG emissions.

The 2024-2050 RTP/SCS optimizes opportunities for shorter trip distances and drivers to switch to electric vehicles by directing growth to areas with high quality transit. Development in these areas will be guided by strategies to reduce GHG emissions by focusing growth near destinations and mobility options, promoting diverse housing choice, leveraging technology innovations, supporting implementation of sustainability policies, and promoting a green region. For the SCAG region, CARB set a GHG reduction target of goals for automobiles and light-duty trucks at 8 percent below 2005 per capita levels by 2020 and 19 percent below 2005 per capita levels by 2035 (SCAG, 2024a). SCAG met the 2020 target and the 2024-2050 RTP/SCS outlines a suite of strategies to meet the 2035 target (SCAG, 2024a).

2.3.2 South Coast Air Quality Management District

The South Coast Air Quality Management District (SCAQMD) published its first formal action to address GHG emissions in 1991, titled "Policy on Global Warming and Stratospheric Ozone Depletion." The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the Air Quality Management Plan (AQMP). In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy. Years later in 2008, the SCAQMD Climate Change Policy was issued, which outlined various approaches the agency would explore to pursue opportunities to 1) reduce pollutant emissions and 2) maximize synergistic effects of strategies that reduce emissions across multiple categories of pollutants (SCAQMD, 2008a).

Subsequently, SCAQMD's 2011 Air Quality-Related Energy Policy addressed the correlated intersection of control strategies related to improving air quality, reducing GHG emissions, and enhancing energy efficiency. The 2011 policy advocated for concurrent benefits of GHG strategies that reduce criteria pollutant and air toxic emissions while recognizing that climate change can, in itself, exacerbate ozone and particulate matter (PM) pollution.

SCAQMD released a draft guidance regarding interim CEQA GHG significance thresholds. In its October 2008 document, SCAQMD proposed the use of a percent emission reduction target (e.g., 30 percent) to determine significance for commercial/residential projects that emit greater than 3,000 metric tons of carbon dioxide equivalents ($MTCO_2e$) per year. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for stationary source/industrial projects where the SCAQMD is the lead agency (SCAQMD, 2008b). However, SCAQMD has yet to adopt a GHG significance threshold for land use development or transportation projects and has formed a GHG CEQA Significance Threshold Working Group to further evaluate potential GHG significance thresholds.

The GHG CEQA Significance Threshold Working Group is tasked with providing guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. Members of the working group included government agencies implementing CEQA and representatives from various stakeholder groups that will provide input to the SCAQMD staff on developing CEQA GHG significance thresholds. The working group discussed multiple methodologies for determining project significance. These methodologies included categorical exemptions, consistency with regional GHG budgets in approved plans, a numerical threshold, performance standards, and emissions offsets. The GHG CEQA Significance Threshold Working Group has not convened since 2008, and no quantitative thresholds were ever officially adopted for projects that are not under the purview of SCAQMD as the lead agency.

2.3.3 Los Angeles Countywide Sustainability Plan

In 2019, the Los Angeles County Sustainability Office published "Our County", a regional sustainability plan for the communities in Los Angeles County. It outlines what local governments and stakeholders can do to enhance their communities while reducing damage to the environment. It contains 12 goals focusing on a variety of sectors. Goals relevant to the Project include the following:

- **Goal 7:** A fossil fuel-free Los Angeles County
  - By 2025, achieve a 25 percent reduction in total GHG emissions and add 3 gigawatts (GW) of new distributed energy
  - By 2035, achieve a 50 percent reduction in total GHG emissions and add 6 GW of new distributed energy resources

  - By 2045, add 10 GW of new distributed energy resources
  - By 2050, achieve carbon neutrality

- **Goal 8:** A convenient, safe, clean, and affordable transportation system that enhances mobility while reducing car dependency
  - By 2025, increase to at least 15 percent all trips by foot, bike, micromobility, or public transit and reduce average daily VMT per capita to 20 miles
  - By 2035, increase to at least 30 percent all trips by foot, bike, micromobility, or public transit and reduce average daily VMT per capita to 15 miles
  - By 2045, increase to at least 50 percent all trips by foot, bike, micromobility, or public transit and reduce average daily VMT per capita to 10 miles

2.3.4 Metro Countywide Sustainability Planning Program

Over the past 15 years, Metro has developed policies directed toward controlling GHG emissions, enhancing energy efficiency, and adapting to the effects of climate change. In 2011, Metro published its *Energy Conservation and Management Plan* (ECMP) (Metro, 2011b) to serve as a strategic blueprint for proactively guiding energy use in a sustainable, cost-effective, and efficient manner. The ECMP complements Metro's *2007 Energy and Sustainability Policy* (Metro, 2007), focusing on electricity for rail vehicle propulsion, electricity for rail and bus facility purposes, natural gas for rail and bus facility purposes, and the application of renewable energy. The ECMP addresses current and projected energy needs based on 2010 utility data and existing agency plans to meet increasing ridership through system expansion and new facility construction incorporating Measure R initiatives.

Following publication of the ECMP, Metro began preparing annual energy and resource reports to provide evaluations on the effectiveness of ECMP strategies. The most recent iteration is the *2019 Energy and Resource Report* (Metro, 2019b), which analyzes the sustainability and environmental performance of Metro's operational activities during the 2018 calendar year. Relative to 2017, Metro operations in 2018 reduced GHG emissions by 13 percent through vehicle electrification and ongoing transition to low carbon fuel sources and reduced total energy consumption by 7.9 percent through reduced vehicle fuel consumption by buses and support vehicles. These achievements are testaments to the effectiveness of the ECMP. The *2019 Energy and Resource Report* will be the final report in its current format as Metro moves toward preparing an overall agency-wide sustainability report as part of the *Moving Beyond Sustainability – Strategic Plan 2020* (Metro, 2020a) (referred to as "Moving Beyond Sustainability"*)* as discussed herein.

In addition to the annual energy and resource reports, Metro expanded its sustainability planning program through the following initiatives: the Green Construction Policy (Metro, 2011a), the Metro *Countywide Sustainability Planning Policy and Implementation Plan* (Metro, 2012), the *Resiliency Indicator Framework Report* (Metro, 2015), the *Climate Action and Adaptation Plan* (CAAP) (Metro, 2019c), and Moving Beyond Sustainability (Metro, 2020a). Moving Beyond Sustainability was published as the culmination of over a decade of policies, plans, initiatives, and reporting to develop a more efficient and equitable transportation network, which builds upon the goals and strategies established in the 2019 CAAP, including reducing Metro's systemwide emissions to levels 79 percent below 2017 levels by 2030 and 100 percent below 2017 levels by 2050. Moving Beyond Sustainability updates and consolidates the principles established in Metro's prior sustainability planning documents and outlines a comprehensive sustainability strategy through 2030, along with identifying other long-term goals.

Moving Beyond Sustainability is outlined in a hierarchical framework of goals, targets, strategies, and actions to organize the measures, programs, and projects comprising Metro's mission and vision. The plan is organized into topical strategic focus areas, including 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. By recognizing the intersectionality of these various focus areas, Metro designed a robust, holistic plan to guide the expansion and enhancement of its transit services into the future. Targets of the plan specifically related to GHG emissions include the following:

- Reduce potable water use by 22 percent from the 2030 Business-as-Usual scenario.
- Reduce annual operational solid waste disposal 24 percent from the 2030 Business-as-Usual scenario[4].
- Achieve a 50 percent landfill diversion rate for operational waste.
- Achieve an 85 percent construction landfill diversion rate.
- Achieve Leadership in Energy and Environmental Design (LEED) Silver certification for all new facilities over 10,000 square feet and achieve Envision certification where LEED is not applicable.
- Design and build 100 percent of capital projects to CALGreen Tier 2 standards.
- Reduce energy consumption by 17 percent at facilities from the 2030 Business-as-Usual scenario.
- Increase on-site renewable energy generation to 7.5 megawatts.
- Displace 903,000 $MTCO_2e$ annually.
- Reduce total GHG emissions by 79 percent from the 2017 baseline.
- Implement the flexible adaptation pathways concept to incorporate climate adaptation into planning, procurement, asset management, and operations by 2025.

2.3.5 Los Angeles County Metropolitan Transportation Authority Green Construction Policy

Construction contractors are required to comply with the provisions of the Metro Green Construction Policy, which was adopted in 2011 to reduce harmful air pollutant emissions (particularly PM and nitrogen oxides [NO_x]) during Metro construction projects (Metro, 2011a). Provisions of the Green Construction Policy also contribute to minimizing GHG emissions during construction activities. Through adopting the Green Construction Policy, Metro committed to the following construction equipment requirements, construction best management practices, and implementation strategies for all construction projects performed on Metro properties or within Metro right-of-way. The strategies are listed as follows:

- All off-road diesel-powered construction equipment greater than 50 horsepower (hp) shall meet Tier 4 off-road emission standards at a minimum. In addition, if not already supplied with a factor-equipped diesel particulate filter, all construction equipment shall be outfitted with Best Available Control Technology devices certified by CARB achieving no less than the equivalent of a Level 3 diesel emission control strategy.

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[4] The 2030 Business-as-Usual scenario was developed through a review of historical organizational practices, utility consumption, waste and emissions generation, and planned agency growth. The Business-as-Usual scenario accounts for planned construction and improvements.

- All on-road heavy-duty diesel trucks or equipment with a gross vehicle weight rating of 19,500 pounds or greater shall comply with EPA 2007 on-road emission standards for PM and N_2O (0.01 grams per brake horsepower hour [g/bhp-hr] and 1.2 g/bhp-hr, respectively).
- Every effort shall be made to utilize grid-based electric power at any construction site, where feasible. Where access to the power grid is not available, on-site generators must meet the following standards:
  – Meet a 0.01 g/bhp-hr standard for PM, or be equipped with best available control technology for PM emissions reductions
- Best management practices shall include, at a minimum, the following:
  – Use of diesel particulate traps or best available control technology, as feasible
  – Maintain equipment according to manufacturer's specifications
  – Restrict idling of construction equipment and on-road heavy-duty trucks to a maximum of 5 minutes when not in use (CARB exceptions apply)
  – Maintain a buffer zone that is a minimum of 1,000 feet between truck traffic and sensitive receptors, where feasible
  – Work with local jurisdictions to improve traffic flow by signal synchronization during construction hours, where feasible
  – Configure construction parking to minimize traffic interference, where feasible
  – Enforce truck parking restrictions, where applicable
  – Prepare haul routes that conform to local requirements to minimize traversing through congested streets or near sensitive receptor areas
  – Provide dedicated turn lanes for movement of construction trucks and equipment on- and off-site, as feasible
  – Schedule construction activities that affect traffic flow on the arterial system to off-peak hours to the extent practicable
  – Use electric power in lieu of diesel power where available
  – Maintain traffic speeds on all unpaved areas at or below 15 miles per hour
  – In 2018, this policy was revised, requiring contractors to use renewable diesel for all diesel engines and thus reducing the negative health impacts from diesel exhaust and reduce GHG emissions.

All Metro construction project solicitations shall include provisions authorizing enforcement of the requirements of the Green Construction Policy. Contractors operating under Metro agreements shall provide certified statements and documentation ensuring that equipment and vehicles employed to complete construction activities conform to the previously listed requirements listed.

2.4 Local

2.4.1 City of Los Angeles GreenLA

The City of Los Angeles issued GreenLA as a climate action plan to provide guidance in promoting sustainable development to reduce citywide GHG emissions (DCP, 2007). The objective of GreenLA is to reduce GHG emissions 35 percent below 1990 levels by 2030. GreenLA identifies goals and actions designed to make the city a leader in confronting global climate change. The measures would reduce emissions directly from municipal facilities and operations and create a framework to address citywide GHG emissions. GreenLA lists various focus areas in which to implement GHG reduction strategies. Focus areas include energy, water, transportation, land use, waste, port, airport, and smart planning practices.

In order to provide detailed information on action items discussed in GreenLA, the city published an implementation document titled *ClimateLA* (DCP, 2008). *ClimateLA* presents the existing GHG inventory for the city, describes enforceable GHG reduction requirements, provides mechanisms to monitor and evaluate progress, and includes mechanisms that allow the plan to be revised in order to meet targets. By 2030, the plan aims to reduce GHG emissions by 35 percent from 1990 levels, which were estimated to be approximately 54.1 $MMTCO_2e$. Therefore, the city will need to lower annual GHG emissions to approximately 35.1 $MMTCO_2e$ by 2030.

2.4.2 City of Los Angeles Sustainable City pLAn

Under Mayor Eric Garcetti, the City of Los Angeles released its first-ever *Sustainable City pLAn* (referred to as the 2015 pLAn) on April 8, 2015 (City of Los Angeles Mayor's Office, 2015). Recognizing the risks posed by climate change, the pLAn set time-bound outcomes on climate action, most notably to reduce GHG emissions by 45 percent by 2025, 60 percent by 2035, and 80 percent by 2050, all against a 1990 baseline. Through the completion and verification of the GHG inventory update, the city concluded that:

- The city accounted for approximately 36.2 $MMTCO_2e$ in 1990.
- The city's most recent inventory shows that emissions fell to 29 $MMTCO_2e$ in 2013.
- Los Angeles' emissions were 20 percent below the 1990 baseline as of 2013, putting Los Angeles nearly halfway to the 2025 pLAn reduction target of 45 percent.

In addition, the 20 percent reduction exceeds the 15 percent statewide goal listed in the First Update (CARB, 2014).

On April 29, 2019, Mayor Garcetti released *LA's Green New Deal, Sustainable City pLAn* (City of Los Angeles Mayor's Office, 2019), which is the first 4-year update to the 2015 pLAn, henceforth referred to as the "2019 updates to the pLAn"). The 2019 updates to the pLAn augments, expands, and elaborates in even more detail the city's vision for a sustainable future and assigns accelerated GHG emission reduction targets and new aggressive goals to place the city on the path to a zero carbon future by 2050. The 2019 updates to the pLAn accelerate the following targets:

- The City of Los Angeles Department of Water and Power (LADWP) will supply 55 percent renewable energy by 2025, 80 percent by 2036, and 100 percent by 2045.
- Source 70 percent of the city's water locally by 2035 and capture 150,000 acre-feet per year of stormwater by 2035.
- Reduce building energy use per square feet for all types of buildings 22 percent by 2025, 34 percent by 2035, and 44 percent by 2050.
- Reduce VMT per capita by at least 13 percent by 2025, 39 percent by 2035, and 45 percent by 2050.
- Ensure 57 percent of new housing units are built within 1,500 feet of transit by 2025, and 75 percent by 2035.

- Increase the percentage of zero emission vehicles in the city to 25 percent by 2025, 80 percent by 2035, and 100 percent by 2050.
- Create 300,000 green jobs by 2035 and 400,000 by 2050.
- Convert all city fleet vehicles to zero emission, where technically feasible, by 2028.
- Reduce municipal GHG emissions 55 percent by 2025 and 65 percent by 2035 from 2008 baseline levels, reaching carbon neutral by 2045.

Overall, the updated plan calls for reducing GHGs to 50 percent below 1990 levels by 2025 and 73 percent below 1990 levels by 2035, and becoming carbon neutral by 2050. By following the 2019 updates to the pLAn, the city is expected to reduce an additional 30 percent in GHG emissions above and beyond the 2015 pLAn.

2.4.3 City of Los Angeles General Plan – Mobility Plan 2035

Mobility Plan 2035 is an element of the *City of Los Angeles' General Plan* and was adopted in 2016. Mobility Plan 2035 provides a policy foundation for achieving a transportation system that balances the needs of all road users by incorporating "complete streets" principles to guide future modifications to the regional network (DCP, 2016). Key policy initiatives related to GHG emissions include establishing new complete street standards that provide safe and efficient active transportation opportunities and targeting GHG emissions through a more sustainable transportation system. Mobility Plan 2035 emphasizes the efficacy of multi-modal street design in reducing GHG emissions through encouraging the use of transit and active transportation, which decreases regional dependence on passenger vehicles.

2.4.4 City of Los Angeles Green Building Code

On December 11, 2019, the Los Angeles City Council approved ordinance No. 186488, which amended Chapter IX of the Los Angeles Municipal Code (LAMC), referred to as the Los Angeles Green Building Code, by adding the new Article 9 to incorporate various provisions of the 2019 CALGreen Code. Projects filed on or after January 1, 2020, must comply with the provisions of the Los Angeles Green Building Code. Specific mandatory requirements and elective measures are provided for low-rise residential buildings, nonresidential and high-rise residential buildings, and additions and alterations to nonresidential and high-rise residential buildings.

2.4.5 City of Los Angeles All-Electric Building Ordinance

Chapter IX of the LAMC also requires that all new buildings be all-electric buildings, with some exceptions. Equipment typically powered by natural gas such as space heating, water heating, cooking appliances, and clothes drying would need to be powered by electricity for new construction. Exceptions are made for commercial restaurants, laboratories, and research and development uses. The LAMC is consistent with 2022 Title 24 goals, which encourage all-electric development and requires new residential uses to be electric-ready (i.e., wiring installed for all-electric appliances). Buildings in Los Angeles account for 43 percent of GHG emissions—more than any other sector in the city. These LAMC requirements ensure that new buildings being constructed are built to leverage the increasingly clean electric grid, which is anticipated to be carbon-free by 2035, rather than relying on fossil fuels.

3 METHODOLOGY

This section describes the methodology used to estimate greenhouse gas (GHG) emissions from temporary construction activities and long-term operations of each project alternative. The analysis for each alternative quantified emissions for carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Carbon dioxide equivalent (CO_2e) emissions were estimated using the Intergovernmental Panel on Climate Change (IPCC) Assessment Report 4 (AR4) (IPCC, 2007) global warming potentials (GWPs) for each of these GHGs, which is consistent with the California Air Resources Board's (CARB) approach for its annual GHG emission inventories.

3.1 Construction

Construction of the project alternatives would generate emissions of CO_2, CH_4, and N_2O associated with off-road equipment; mobile sources, including worker vehicles, vendor trucks, and haul trucks; and electricity consumption from electric-powered equipment and on-site portable offices. Construction GHG emissions were estimated using a spreadsheet approach based on emission factors and methodologies from the California Emissions Estimator Model (CalEEMod), version 2022.1.1.24 (CAPCOA, 2022); CARB's EMission FACtors model (EMFAC2021), version 1.0.2; and the U.S. Environmental Protection Agency's (EPA) Compilation of Air Pollutant Emission Factors (AP-42). CalEEMod is a model developed by the California Air Pollution Control Officers Association (CAPCOA) that quantifies ozone precursors, criteria pollutants, and GHG emissions from construction and operation of new land use development and linear projects in California; EMFAC2021 is a model developed and used by CARB to assess emissions from on-road vehicles, including cars, trucks, and buses in California; and AP-42, while not a model, contains emissions factors and process information for more than 200 air pollution source categories, some of which are incorporated into CalEEMod's calculation methods.

The emissions modeling for each project alternative was based on alternative-specific construction data (schedule, equipment quantities, truck volumes, etc.) provided by developers of each of the alternative. Construction data for LA SkyRail Express alternatives (Alternatives 1 and 3) and Sepulveda Transit Corridor Partners alternatives (Alternatives 4 and 5) went through a collaborative process with HTA Partners, the environmental team, to develop reasonable construction assumptions based on current phases of design plans. Where alternative-specific data was not available, reasonable assumptions based on similar infrastructure/transit projects and default values from CalEEMod were used in the analysis. Based on the scale of project alternatives and progress in design development, conservative construction assumptions were used for each project alternative and would likely yield conservative emissions estimates. Additionally, the construction assumptions used for the GHG analysis of each project alternative were also used in the air quality analysis.

Construction GHG emissions from project alternatives would be temporary and would not generate GHG emissions once construction is completed. Because GHG emissions are cumulative and build up over time, the temporary nature of construction emissions makes it unlikely that they would interfere with long-term GHG emission reduction targets established by state, regional, and local planning documentation. The total GHG emissions generated over the lifetime of each project alternative's construction activity was estimated and amortized over the lifetime of project alternatives in accordance with South Coast Air Quality Management District (SCAQMD) guidance (SCAQMD, 2008b). Based on SCAQMD's guidance, 30 years was considered the lifetime of project alternatives. Although service life of infrastructure projects such as the Sepulveda Transit Corridor Project (Project) are typically longer than 30 years, using 30 years would result in a conservative estimate of construction GHG emissions. Consistent with SCAQMD guidance, the amortized construction GHG emissions for each project alternative were added to the annual operational GHG emissions for each project alternative.

3.1.1 Off-Road Equipment

Project construction would utilize a variety of diesel-powered off-road equipment (e.g., cranes, bulldozers, excavators, etc.) throughout the construction period of each project alternative. Emission factors and load factors for off-road equipment were obtained from CalEEMod and did not incorporate the potential use of renewable diesel, as outlined in Metro's *Green Construction Policy*. Consequently, the estimated emissions from off-road construction equipment may be conservatively high, as the analysis does not account for potential reductions resulting from contractors utilizing renewable diesel to power on-site equipment.

Off-road equipment emissions were estimated based on the equipment activity data, which included the equipment quantity, horsepower (hp), load factor, and daily usage (hours per day). The construction analysis assumed that all off-road equipment greater than or equal to 50 hp would meet Tier 4 Final engine specifications in accordance with Metro's *Green Construction Policy*, thus, the emissions analysis used Tier 4 Final emission factors obtained from CalEEMod. For off-road equipment less than 50 hp, emission factors were based on the CalEEMod fleet average. Total GHG emissions for a piece of equipment were based on the daily emissions multiplied by the total days of usage during the construction period. Detailed emissions calculations for off-road equipment from each project alternative are provided in Appendix A.

3.1.2 Mobile Sources

Mobile source GHG emissions would be generated from worker vehicles, vendor trucks, and haul trucks commuting to and from the construction worksites throughout each project alternative's construction period. Mobile sources would generate GHG emissions from combustion of gasoline and diesel fuels. Consistent with CalEEMod methodology, the worker vehicle fleet mix consisted of 25 percent light-duty autos (LDAs), 50 percent light-duty trucks (LDTs) type 1 (LDT1), and 25 percent light-duty trucks type 2 (LDT2). Based on EMFAC2021 data, the majority of LDA, LDT1, and LDT2 vehicle categories were gasoline powered; therefore, worker vehicle emissions were conservatively based on gasoline-powered vehicles.

Consistent with CalEEMod methodology, the vendor truck fleet mix consisted of 50 percent medium-heavy duty trucks (MHDTs) and 50 percent heavy-heavy duty trucks (HHDTs). The vendor truck fleet would also apply to water trucks used for dust control. The haul truck fleet mix consisted of 100 percent HHDTs. Based on EMFAC2021 data, the majority of MHDT and HHDT vehicle categories were diesel powered; therefore, vendor and haul truck emissions were conservatively based solely on diesel-powered trucks.

GHG emissions would be generated as a result of fuel combustion of gasoline and diesel during vehicle travel, as well as engine starting and idling. Daily exhaust emissions were estimated based on EMFAC2021 emissions factors for CO_2, CH_4, and N_2O from the running (i.e., traveling), starting, and idling processes combined with the daily vehicle activity data, which included the daily number of trips and trip lengths. Total GHG emissions from mobile sources were based on the daily emissions multiplied by the total days of usage during the construction period.

On-site emissions would be generated from vendor trucks and haul trucks visiting worksites to deliver or pick-up materials and equipment. Emission factors for on-site truck travel were based on a speed of 15 miles per hour. A trip length of 0.10 miles was assumed for all on-site truck trips.

Off-site emissions would be generated from worker vehicles, vendor trucks, and haul trucks commuting to and from construction worksites. Emission factors for workers vehicles, vendor trucks, and haul trucks were based on aggregate vehicle speeds and aggregate model years, except for vendor and haul trucks which would have model years of 2007 or newer to be consistent with Los Angeles County Metropolitan Transportation Authority's (Metro) Green Construction Policy. Off-site trip lengths varied depending on the construction component. Detailed emissions calculations for mobile sources for each project alternative are provided in Appendix A.

3.1.3 Electricity Consumption

Construction activities would also generate GHG emissions from electricity consumption. For project alternatives that include underground segments, an electric-powered tunnel boring machine (TBM) would be utilized to construct the tunnel. Electricity would also be consumed by on-site portable offices for each project alternative. For each project alternative, it was assumed that three portable offices would be utilized throughout the duration of the construction period. Specific sizes of portable offices are currently unknown, it was assumed that each portable office would have an area of 720 square feet, which is on the higher end for portable office trailers.

Electricity for the Project Study Area is provided by the City of Los Angeles Department of Water and Power (LADWP). LADWP has CO_2e intensity factors, measured in pounds per megawatt-hour (lb/MWh). The CO_2e intensity factor represents the amount of CO_2e emissions produced per megawatt-hour (MWh) of electricity generated. Based on LADWP's 2022 power mix, its CO_2e intensity factor was 567 lb/MWh (LADWP, 2022a). Although construction of the project alternatives is expected to occur several years after 2022, using LADWP's 2022 intensity factor is a conservative approach, as it would result in higher GHG estimates because future intensity factors are likely to be lower as LADWP continues to increase the amount of renewable energy sources in its power mix to meet state renewable portfolio standard (RPS) goals.

GHG emissions from TBM activity were estimated by multiplying the TBM's total electricity consumption in MWh by LADWP's CO_2e intensity factor. TBM electricity consumption estimates were based on the power requirements of the TBMs and total usage hours throughout the construction period. Some project alternatives would utilize multiple TBMs for single-bore and dual-bore tunneling activities. GHG emissions from electricity consumption for the portable offices were estimated in CalEEMod where the offices were categorized as a "General Office Building" land use. Detailed emissions calculations for TBM and on-site portable office electricity consumption for project alternatives are provided in Appendix A.

3.2 Operations

Operations of the project alternatives would generate emissions of CO_2, CH_4, and N_2O associated with area sources, electricity consumption, mobile sources, water consumption and wastewater conveyance, waste generation, and in some cases, emergency generators. The emissions modeling for each project alternative relied on alternative-specific operational and design data. Where project-specific information was not available, reasonable assumptions based on similar projects and default values from CalEEMod were used in the analysis.

Operational emissions for each project alternative were estimated using emission factors and methodologies from CalEEMod and EMFAC2021. Annual emissions for each project alternative were estimated for the Horizon Year 2045. The emissions estimation approach for each emission source is discussed in the following sections.

3.2.1 Area Sources

GHG emissions from area sources were estimated using CalEEMod and were primarily associated with landscaped areas of MSFs and stations. Area sources would generate GHG emissions from the use of gasoline-powered landscaping equipment. Landscaping emissions are based on the emissions factors, area to be landscaped, and the number of summer days for the Project Study Area. The CalEEMod default value is 250 summer days. Although Assembly Bill (AB) 1346 would ban the sale of new gas-powered small off-road engines (SOREs) used for landscaping and encourages the transition to electric-powered equipment; existing gas-powered equipment could still be used in the future. Therefore, the analysis conservatively assumed landscaping equipment in 2045 would continue to be gas powered. Details of area source emissions and landscaping areas are provided in the CalEEMod output files in Appendix A.

3.2.2 Energy Sources

3.2.2.1 Electricity

GHG emissions would be generated from electricity consumption during operations of each project alternative. Each project alternative's transit system would be electric powered, and its traction power substations (TPSSs) would consume electricity. In addition to TPSSs, various components of project alternatives would consume electricity such as stations, maintenance and storage facilities (MSFs), and electric buses.

Electricity consumption related to TPSSs and electric buses were estimated outside of CalEEMod based on alternative-specific electricity consumption data provided by the developers of each of the alternatives. Electricity consumption related to MSFs and stations were estimated using CalEEMod. MSF buildings were modeled as a "General Office Building" and parking areas were modeled as a "Parking Lot" land use in CalEEMod. For MSF buildings, energy for space heating and water heating would be provided by electricity because new buildings in 2045 would be all-electric in accordance with City of Los Angeles-passed Ordinance 187714, as described in the following section. For stations, CalEEMod does not have a train station as a land use; therefore, all stations were modeled as an "Enclosed Parking with Elevator" land use. This land use best represents an aerial or underground station because it accounts for electricity use related to lighting, ventilation, and elevator use.

Annual electricity consumption in MWh was estimated for the components of each project alternative. Emissions were estimated based on the annual consumption multiplied by the utility emission factor measured in pounds of CO_2e per MWh (lbCO_2e/MWh). As discussed previously, LADWP supplies power for the Project Study Area and its CO_2e intensity factor was used to estimate GHG emissions from electricity consumption.

The GHG analysis was based on a horizon year of 2045, which is also the target year of Senate Bill (SB) 100, which would require renewable energy resources and zero-carbon resources to supply 100 percent of electricity. LADWP partnered with the National Renewable Energy Laboratory (NREL) on the *Los Angeles 100% Renewable Energy Study* (LA100) to support development of its *2022 Power Strategic Long-Term Resource Plan* (NREL, 2021; LADWP, 2022b). LA100 analyzed potential scenarios that provided a pathway for the city to achieve a 100 percent renewable power system by 2045. The potential scenarios were based on projections for electricity demand and electricity supply with varying assumptions. Of all the scenarios analyzed, the SB 100 scenario is the only scenario that would allow for electricity generation to come from natural gas through the use of renewable electricity credits, which are a market-based mechanism to help meet renewable energy targets (NREL, 2021). Because the SB

100 scenario allows for a portion of electricity generation from natural gas combustion, which would result in GHG emissions, this scenario was selected to forecast LADWP's CO_2e intensity factor in 2045. The LA100 has potential scenarios to reach this goal by 2035; however, it requires aggressive assumptions. For this GHG analysis, it was conservatively assumed that the goal would not be met until the compliance date of 2045, ensuring GHG emissions from project alternatives are not underestimated.

Under the SB 100 scenario, combustion of natural gas could provide up to 10 percent of electricity generation; thus, it was assumed the 2045 power mix for LADWP would consist of 90 percent renewables and 10 percent non-renewables. LADWP's 2022 power mix consisted of 36 percent renewables and 64 percent non-renewables with a CO_2e intensity factor of 567 lb/MWh (LADWP, 2022a). The CO_2e intensity factor for 2045 was estimated based on the percent decrease in the non-renewable portion of LADWP's power mix from 2022 to 2045. This percent decrease was then applied to the 2022 GHG intensity factor to derive the 2045 CO_2e intensity factor.

In 2022, the non-renewable portion of the power mix was 64 percent and in 2045, the non-renewable portion of the power mix would be 10 percent, which resulted in an approximately 84 percent reduction from 2022 to 2045. This 84 percent reduction was then applied to the 2022 CO_2e intensity factor of 567 lb/MWh, resulting in a CO_2e intensity factor of 88 lb/MWh for 2045.

GHG emissions were estimated using the forecasted 2045 CO_2e intensity factor multiplied by the electricity consumption of each project alternative's components. This intensity factor was also entered in CalEEMod to estimate GHG emissions from MSFs and stations. Details of the electricity consumption for each project alternative are provided in Appendix A.

3.2.2.2 Natural Gas

On December 10, 2022, the City of Los Angeles passed Ordinance 187714, which would require all newly constructed buildings in the City of Los Angeles to be all-electric (City of Los Angeles, 2022). This ordinance was added to the City of Los Angeles Municipal Code (LAMC) under Section 99.04.106.8 and had an effective date of January 1, 2023. Based on this ordinance, the GHG analysis did not include GHG emissions from combustion of natural gas related to building space and water heating, because project alternative buildings would be considered new construction and would be required to comply with the LAMC.

As described in Section 3.2.2.1, CalEEMod was used to estimate GHG emissions from the MSF based on building size. CalEEMod's default approach to energy consumption is to use the building size to estimate energy source consumption and generates annual amounts of electricity and natural gas consumed in kilowatt-hours (kWh) per year and kilo British thermal units (kBtu) per year, respectively. The natural gas consumption amounts are related to space heating and water heating in MSF buildings. The natural gas consumption amount is estimated because this is CalEEMod's default approach and does not account for the all-electric buildings ordinance as previously described. Because electricity will provide the energy for space heating and water heating, the natural gas consumption amount generated by CalEEMod was converted to kWh via a conversion factor, then this additional electricity amount was added to the default electricity amount generated by CalEEMod. This approach ensures that the additional electricity related to electric-powered space heating and water heating appliances is accounted for in the emissions analysis.

3.2.3 Mobile Sources

Mobile sources would generate GHG emissions from combustion of fossil fuels, primarily gasoline and diesel, during vehicle operation. The *Sepulveda Transit Corridor Project Transportation Technical Report*

(Metro, 2025) evaluated vehicle miles traveled (VMT) in the Project Study Area for the existing conditions under Baseline Year 2021 (Existing Conditions 2021), the No Project Alternative in forecasted Horizon Year 2045 (No Project Alternative 2045), 2045 without Project conditions, and for each project alternative in forecasted Horizon Year 2045.

The daily VMT values for each scenario were converted to annual VMT using a factor of 347 days per year, which accounts for reduced weekend and holiday mileage (CARB, 2008b). Emission factors for CO_2, CH_4, and N_2O were generated from EMFAC2021, and were based on all vehicle categories and fuel types, aggregate speeds, and model years, and the appropriate calendar year (2021 for Existing Conditions, and 2045 for No Project Alternative and project alternatives). Annual GHG emissions for each scenario were calculated by multiplying the annual VMT by the mobile emission factors, and then applying the appropriate GWPs.[5]

Additionally, mobile source emissions would be generated from employees traveling to and from each project alternative's MSF. Daily employee trips were based on the number of MSF employees multiplied by two to account for trips to and from the MSF. The trip length for employees was based on CalEEMod's default value for non-residential Home-to-Work trips for a General Office Building. The daily trips and trip length were multiplied together to derive a daily VMT. Like the VMT analysis, the daily VMT for employee travel was multiplied by 347 to generate the annual VMT. Emission factors for CO_2, CH_4, and N_2O were generated from EMFAC2021 and were based on all vehicle categories and fuel types, aggregate speeds and model years, and calendar year 2045. Annual GHG emissions were calculated by multiplying the annual VMT by the mobile emission factors, and then applying the appropriate GWPs. Detailed emissions calculations for mobile sources are provided in Appendix A.

3.2.4 Water and Wastewater Conveyance

Water and wastewater related to MSFs and stations would generate GHG emissions due to the energy required to supply, distribute, and treat the water and wastewater. Stations would primarily consume water for landscaping purposes. MSFs and stations would primarily consume recycled water for landscaping with native plants or drought-tolerant landscaping. Emissions related to water use were calculated using CalEEMod and were based on the water usage rate for the land use categories, the electrical intensity factors for water supply, treatment, and distribution, and the forecasted 2045 CO_2e intensity for LADWP as described in Section 3.2.2.1. Wastewater emissions were calculated using CalEEMod and were based on the water usage rate for the land use categories, electrical intensity factors for treatment, method of wastewater treatment, and the forecasted 2045 CO_2e intensity for LADWP. Details of water and wastewater emissions are provided in the CalEEMod output files in Appendix A.

3.2.5 Waste

GHG emissions related to solid waste disposal at landfills were also calculated using CalEEMod. Solid waste would be primarily generated from MSF buildings. CalEEMod estimates the annual solid waste amounts based on the size of the land use and solid waste generation rates. GHG emissions, primarily CO_2 and CH_4, are generated from the decomposition of solid waste. The GHG emission factors, particularly for CH_4, depend on characteristics of the landfill, such as the presence of a landfill gas capture system and subsequent flaring or energy recovery. The default values, as provided in CalEEMod,

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[5] Note that GHG emissions related to electric vehicles would be accounted for in the Electric Utility Sector emissions inventory, not the Mobile Sources emissions inventory.

for landfill gas capture (e.g., no capture, flaring, energy recovery) are statewide averages and were used in the GHG analysis. Details of solid waste emissions are provided in the CalEEMod output files in Appendix A.

3.2.6 Refrigerants

GHG emissions would be generated from refrigerants used in air conditioning at the MSF buildings. CalEEMod was used to estimate GHG emissions from refrigerants. Emissions are based on the amount of refrigerant required for the equipment, which is dependent on the size of the land use category, as well as the operational and service leak rates over the equipment lifetime. Based on the lifetime of the equipment, CalEEMod derives the annual average GHG emissions. Details of refrigerant emissions are provided in the CalEEMod output files in Appendix A.

3.2.7 Emergency Generators

The use of emergency generators may be required to provide power for lighting and emergency systems during unplanned power outages. Emissions associated with periodic maintenance and testing of the emergency generators were included in annual operational emissions. The emergency generator emissions were calculated based on compliance with the applicable federal emissions standards and compliance with SCAQMD Rule 1470 (Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines) mandated emission limits and operating hour constraints. Rule 1470 applies to stationary compression ignition engines greater than 50 brake hp and sets limits on emissions and operating hours. In general, new stationary emergency standby diesel-fueled engines greater than 50 brake hp are not permitted to operate more than 50 hours per year for maintenance and testing.

Emergency generator emissions were estimated outside CalEEMod using a spreadsheet approach. GHG emissions were estimated based on generator size (hp), and emission factors and load factors were obtained from CalEEMod. Generator size was based on data from alternative designs. Consistent with Rule 1470, annual GHG emissions for emergency generators were based on an annual usage of 50 hours per year per generator. Details of emergency generator emission calculations are provided in Appendix A.

3.3 CEQA Thresholds of Significance

For the purposes of the Environmental Impact Report, impacts are considered significant if the Project would:

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

California Environmental Quality Act (CEQA) Guidelines Section 15064.4 provides guidance to lead agencies for determining the significance of impacts from GHG emissions. Section 15064.4(a) provides that a lead agency shall make a good-faith effort based, to the extent possible, on scientific and factual data to describe, calculate, or estimate the amount of GHG emissions resulting from a project. Section 15064.4(a) further provides that a lead agency shall have the discretion to determine, in the context of a particular project, whether to: (1) quantify GHG emissions resulting from a project and/or (2) to rely on qualitative analysis or performance-based standards.

Pursuant to CEQA Guidelines Section 15064.4(a), the analysis presented herein quantifies GHG emissions resulting from the project alternatives and provides a good-faith effort to describe, calculate, and estimate GHG emissions resulting from project alternatives.

CEQA Guidelines Section 15064.4(b) also provides that, when assessing the significance of impacts from GHG emissions, a lead agency should focus the analysis on the reasonably foreseeable incremental contribution of the project's emissions to the effects of climate change and consider a timeframe that is appropriate for the project. The lead agency's analysis should reasonably reflect evolving scientific knowledge and state regulatory schemes, and consider (1) the extent to which the project operations may increase or reduce GHG emissions compared with existing conditions, (2) whether the project's GHG 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. The analysis of the potential impacts from each project alternative's GHG emissions follows this approach.

The CEQA Guidelines do not provide numeric or qualitative thresholds of significance for evaluating GHG emissions. Instead, they leave the determination of the significance of GHG emissions up to the lead agency and authorize the lead agency to consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence (CEQA Guidelines Sections 15064.7[b] and 15064.7[c]). Additionally, any public agency may also use an environmental standard as a threshold of significance, as it would promote consistency in significance determination and integrates environmental review with other environmental program planning and regulations (CEQA Guidelines Section 15064.7[d]). Neither the CARB, SCAQMD, the Governor's Office of Planning and Research (OPR), nor Metro have established significance thresholds for a project's GHG emissions under CEQA. However, CARB and the OPR acknowledge that transforming public transit systems and reducing VMT are effective strategies for reducing GHG emissions on a regional scale. In 2018 and 2021, the OPR issued technical advisories for the streamlined review of transportation projects under CEQA (OPR, 2018, 2021). In these advisories, consistent with Section 15064.3 of the CEQA Guidelines, the OPR presumes that certain types of transportation projects that would reduce VMT would also result in a less than significant impact on transportation and would align with SB 743 goals to reduce GHG emissions, increase multimodal transportation, and facilitate mixed-use development. While the OPR does recognize that reducing VMT would be essential to meeting state GHG reduction targets, it does not presume any conclusions relative to GHG emission impacts specifically for VMT-reducing projects. Consequently, the impacts analysis for project alternatives quantified the GHG emissions associated with construction and future operations to satisfy the recommendations in Section 15064.4 of the CEQA Guidelines. The comparison of emissions in Horizon Year 2045 from each project alternative to Existing Conditions 2021 is presented for informational purposes only.

Pursuant to CEQA Guidelines section 15125(a)(2), a lead agency has the discretion to exclusively use a future conditions baseline for the purposes of determination of significance under CEQA in instances where showing an existing conditions analysis would be misleading or without informational value. Use of an existing conditions baseline would be misleading for the Project because it ignores the regional background growth in population, traffic, and transportation infrastructure that would occur between the Existing Conditions Baseline Year of 2021 and Project build-out in 2045. The 2021 Existing Conditions will be substantially altered by regional growth that will occur independent of the Project, which, in turn, would mask the impacts that are attributable to the Project and would not provide the reader with an accurate and meaningful delineation of Project-related impacts. Considering such growth is critical when determining future effects for transit projects designed to reduce traffic congestion, VMT, and associated air quality impacts over time. Isolating the Project's impacts from ancillary changes in the environment would result in a misleading analysis.

Therefore, GHG impacts are evaluated using the net change in emissions between project alternatives in Horizon Year 2045 and a projected future conditions baseline. The projected future conditions baseline represents the Existing Conditions in 2021, adjusted for regional background growth that would occur by 2045. In this case, the projected future conditions baseline is *2045 without Project conditions*. The horizon year (2045) of the regional travel demand Corridor Based Model 2018, which incorporates Metro Measure M projects identified in the Measure M Expenditure Plan, roadway improvements, and other transit improvements anticipated to occur throughout the transit corridor, was selected as the Project's horizon year. By using Horizon Year 2045, the analysis more accurately assesses the incremental impact of the Project within the context of ongoing efforts to reduce GHG emissions.

The GHG analysis evaluates GHG emissions impacts in accordance with CEQA Guidelines 15064.4(b), and the Appendix G checklist questions previously listed. The significance of GHG emissions from the project alternatives is be based on 1) the extent to which the project alternatives may increase or reduce GHG emissions compared with the projected future conditions baseline (2045 without Project conditions), and 2) evaluating the project alternatives' consistency with state, regional, and local GHG reduction plans.

4 FUTURE BACKGROUND PROJECTS

This section describes planned improvements to highway, transit, and regional rail facilities within the Project Study Area and the region that would occur whether or not the Project is constructed. These improvements are relevant to the analysis of the No Project Alternative and the project alternatives because they are part of the future regional transportation network within which the Project would be incorporated. These improvements would not be considered reasonably foreseeable consequences of not approving the Project as they would occur whether or not the Project is constructed.

The future background projects include all existing and under-construction highway and transit services and facilities, as well as the transit and highway projects scheduled to be operational by 2045 according to the *Measure R Expenditure Plan* (Metro, 2008), the *Measure M Expenditure Plan* (Metro, 2016), the Southern California Association of Governments (SCAG) *Connect SoCal, 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy* (2020-2045 RTP/SCS) (SCAG, 2020a, 2020b), and the Federal Transportation Improvement Program (FTIP), with the exception of the Sepulveda Transit Corridor Project (Project). The year 2045 was selected as the analysis year for the Project because it was the horizon year of SCAG's adopted RTP/SCS at the time Metro released the NOP for the Project.

4.1 Highway Improvements

The only major highway improvement in the Project Study Area included in the future background projects is the Interstate 405 (I-405) Sepulveda Pass ExpressLanes project (ExpressLanes project). This would include the ExpressLanes project as defined in the *2021 FTIP Technical Appendix, Volume II of III* (SCAG, 2021a), which is expected to provide for the addition of one travel lane in each direction on I-405 between U.S. Highway 101 (US-101) and Interstate 10 (I-10). Metro is currently studying several operational and physical configurations of the ExpressLanes project, which may also be used by commuter or rapid bus services, as are other ExpressLanes in Los Angeles County.

4.2 Transit Improvements

Table 4-1 lists the transit improvements that would be included in the future background projects. This list includes projects scheduled to be operational by 2045 as listed in the *Measure R and Measure M Expenditure Plans* (with the exception of the Project) as well as the Inglewood Transit Connector and LAX APM. In consultation with the Federal Transit Administration, Metro selected 2045 as the analysis year to provide consistency across studies for Measure M transit corridor projects. The Inglewood Transit Connector, a planned automated people mover (APM), which was added to the FTIP with *Consistency Amendment #21-05* in 2021, would also be included in the future background projects (SCAG, 2021b). These projects would also include the Los Angeles International Airport (LAX) APM, currently under construction by Los Angeles World Airports. The APM will extend from a new Consolidated Rent-A-Car Center to the Central Terminal Area of LAX and will include four intermediate stations. In addition, the new Airport Metro Connector Transit Station at Aviation Boulevard and 96th Street will also serve as a direct connection from the Metro K Line and Metro C Line to LAX by connecting with one of the APM stations.

During peak hours, heavy rail transit (HRT) services would generally operate at 4-minute headways (i.e., the time interval between trains traveling in the same direction), and light rail transit (LRT) services would operate at 5- to 6-minute headways. During off-peak hours, HRT services would generally operate at 8-minute headways and LRT services at 10- to 12-minute headways. Bus rapid transit (BRT) services would generally operate at peak headways between 5 and 10 minutes and off-peak headways between

10 and 14 minutes. The Inglewood Transit Connector would operate at a headway of 6 minutes, with more frequent service during major events. The LAX APM would operate at 2-minute headways during peak and off-peak periods.

Table 4-1. Fixed Guideway Transit System in 2045

Transit Line	Mode	Alignment Description[a]
Metro A Line	LRT	Claremont to downtown Long Beach via downtown Los Angeles
Metro B Line	HRT	Union Station to North Hollywood Station
Metro C Line	LRT	Norwalk to Torrance
Metro D Line	HRT	Union Station to Westwood/VA Hospital Station
Metro E Line	LRT	Downtown Santa Monica Station to Lambert Station (Whittier) via downtown Los Angeles
Metro G Line	BRT	Pasadena to Chatsworth[b]
Metro K Line	LRT	Norwalk to Expo/Crenshaw Station
East San Fernando Valley Light Rail Transit Line	LRT	Metrolink Sylmar/San Fernando Station to Metro G Line Van Nuys Station
Southeast Gateway Line	LRT	Union Station to Artesia
North San Fernando Valley Bus Rapid Transit Network Improvements	BRT	North Hollywood to Chatsworth[c]
Vermont Transit Corridor	BRT	Hollywood Boulevard to 120th Street
Inglewood Transit Connector	APM	Market Street/Florence Avenue to Prairie Avenue/Hardy Street
Los Angeles International Airport APM	APM	Aviation Boulevard/96th Street to LAX Central Terminal Area

Source: HTA, 2024

[a]Alignment descriptions reflect the project definition as of the date of the Project's Notice of Preparation (Metro, 2021).

[b]As defined in Metro Board actions of July 2018 and May 2021, the Metro G Line will have an eastern terminus near Pasadena City College and will include aerial stations at Sepulveda Boulevard and Van Nuys Boulevard.

[c]The North San Fernando Valley network improvements are assumed to be as approved by the Metro Board in December 2022.

4.3 Regional Rail Projects

The future background projects would include the Southern California Optimized Rail Expansion (SCORE) program, which is Metrolink's Capital Improvement Program that will upgrade the regional rail system (including grade crossings, stations, and signals) and add tracks as necessary to be ready in time for the 2028 Olympic and Paralympic Games. The SCORE program will also help Metrolink to move toward a zero emissions future. The following SCORE projects planned at Chatsworth and Burbank Stations will upgrade station facilities and allow 30-minute all-day service in each direction by 2045 on the Metrolink Ventura County Line:

1. Chatsworth Station: This SCORE project will include replacing an at-grade crossing and adding a new pedestrian bridge and several track improvements to enable more frequent and reliable service.
2. Burbank Station: This SCORE project will include replacing tracks, adding a new pedestrian crossing, and realigning tracks to achieve more frequency, efficiency, and shorter headways.

In addition, the Link Union Station project will provide improvements to Los Angeles Union Station that will transform the operations of the station by allowing trains to arrive and depart in both directions, rather than having to reverse direction to depart the station. Link Union Station will also prepare Union Station for the arrival of California High-Speed Rail, which will connect Union Station to other regional multimodal transportation hubs such as Hollywood Burbank Airport and the Anaheim Regional Transportation Intermodal Center.

5 NO PROJECT ALTERNATIVE

The only reasonably foreseeable transportation project under the No Project Alternative would be improvements to Metro Line 761, which would continue to serve as the primary transit option through the Sepulveda Pass with peak-period headways of 10 minutes in the peak direction and 15 minutes in the other direction. Metro Line 761 would operate between the Metro E Line Expo/Sepulveda Station and the Metro G Line Van Nuys Station, in coordination with the opening of the East San Fernando Valley Light Rail Transit Line, rather than to its current northern terminus at the Sylmar Metrolink Station.

5.1 Existing Conditions

The primary effect of rising global concentrations of atmospheric GHGs is an increase in the average global temperature. Since 1982, the Earth's temperature has risen at an average rate of approximately 0.2 degrees Celsius per decade. Climate change modeling indicates that further warming is likely to occur due to the anticipated rise in global atmospheric GHG concentrations from various sources worldwide, including emissions from both developed and developing countries, as well as deforestation. This continued increase in GHGs is expected to induce further changes in the global climate system during the current century. Adverse impacts from global climate change worldwide and in California could include the following (CARB, 2022):

- Declining sea ice and mountain snowpack levels: This decline increases sea levels and sea surface evaporation rates, leading to higher atmospheric water vapor due to the atmosphere's ability to hold more moisture at elevated temperatures.
- Rising average global sea levels: Primarily resulting from thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets.
- Changing weather patterns: Alterations in precipitation, ocean salinity, and wind patterns, along with more extreme weather events, including droughts, heavy precipitation, heatwaves, cold spells, and intensified tropical cyclones.
- Declining Sierra Nevada snowpack levels: The Sierra Nevada snowpack, which accounts for approximately half of California's surface water storage, is projected to decrease significantly over the next century, posing challenges for water resources in the state.
- Increased ozone formation: Higher temperatures can lead to more days conducive to ozone formation (e.g., clear days with intense sunlight), potentially increasing ozone levels in high-ozone areas such as Southern California and the San Joaquin Valley by the end of the 21st century.
- Coastal erosion and seawater intrusion: Rising sea levels may exacerbate erosion along California's coastlines and increase the intrusion of seawater into the Sacramento-San Joaquin Delta and its levee systems, impacting freshwater supplies and infrastructure.

These projected impacts underscore the importance of mitigating GHG emissions and implementing adaptive strategies to address the challenges posed by climate change.

5.1.1 Statewide Greenhouse Gas Emissions Inventory

The California Air Resources Board (CARB) maintains the statewide GHG emission inventory, and Table 5-1 displays GHG emissions from 2013 to 2021 in California by economic sector as defined in the *Climate Change Scoping Plan* (2008 Scoping Plan) (CARB, 2008a). California's GHG emissions have followed a declining trend over the past decade. In 2021, emissions from routine emitting activities statewide were approximately 12.6 million metric tons of carbon dioxide equivalents ($MMTCO_2e$) higher than 2020, but 23.1 $MMTCO_2e$ lower than 2019 levels. As shown in Table 5-1, GHG emissions related to the electric power sector has continually declined as California continues to meet renewable portfolio standard (RPS) goals. The increase and decrease over the 2019 to 2021 timeframe are likely due to impacts of the COVID-19 pandemic (CARB, 2023b). The plurality of California GHG emissions is attributed to automobile exhaust associated with the transportation sector, including public and private vehicles, comprising approximately 40 percent of the total statewide emission inventory. Despite statewide population growth, approximately 4 percent from 2011 to 2021, annual GHG emissions attributed to the transportation sector have remained relatively constant over the last decade. However, in 2020, the transportation sector had the largest decrease compared to 2019, which likely resulted in less light-duty vehicle travel due to shelter-in place orders in response to the COVID-19 pandemic. Overall, the transportation sector in 2021 was 16.7 $MMTCO_2e$ below pre-pandemic (2019) levels.

Table 5-1. Greenhouse Gas Annual $MMTCO_2e$ Emissions Trends by Sector

Sector	2013	2014	2015	2016	2017	2018	2019	2020	2021
Transportation	156.9	157.6	161.2	165.0	166.4	165.2	162.3	135.6	145.6
Electric Power	94.0	90.3	86.3	70.8	64.4	65.0	60.2	59.5	62.4
Industrial	82.7	85.0	82.7	81.2	81.4	82.0	80.8	73.3	73.9
Commercial/Residential	39.0	35.5	37.2	37.7	38.3	37.5	40.6	38.9	38.8
Agriculture	33.7	33.7	32.6	32.1	31.6	32.1	31.3	31.5	30.9
High GWP Sources	17.0	17.9	18.8	19.4	20.1	20.5	20.7	21.3	21.3
Recycling and waste	8.3	8.1	8.1	7.9	8.2	8.3	8.4	8.6	8.4
Emissions Total	**431.6**	**428.2**	**426.9**	**414.2**	**410.4**	**410.7**	**404.4**	**368.7**	**381.3**

Source: CARB, 2023c

GWP = global warming potential
$MMTCO_2e$ = million metric tons of carbon dioxide equivalents

5.1.2 Southern California Association of Governments Regional Greenhouse Gas Emissions

An element of the SCAG *Connect SoCal 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy* (SCAG, 2024a) is a regional GHG emissions inventory and emissions forecast based on the growth projections and control strategies incorporated into its development. SCAG provides estimates of the regional GHG emissions through the RTP/SCS horizon year, accounting for programmed transportation projects, population, employment, and housing growth, and other regional factors. The 2024-2050 RTP/SCS has a horizon year of 2050, but provides data for interim year 2045 to address consistency with other GHG reduction policies. Table 5-2 presents modeled emissions from on-road mobile sources in 2019 and 2045. The data demonstrates that from 2019 to 2045, the regional on-road emissions are anticipated to decrease by 32.4 percent (64.35 $MMTCO_2e$ to 43.52 $MMTCO_2e$ by 2045) with plan implementation.

In addition, SCAG provides the total regional GHG emissions from the three primary sources of GHG emissions within the region: transportation, building energy, and water-related energy. Table 5-3 shows that total GHG emissions across the SCAG region are anticipated to decrease by approximately 28.9 percent from 2019 to 2045, and transportation emissions are projected to decrease by 29.9 percent. Expansion of public transportation systems spurring mode shift away from passenger vehicles is a fundamental pillar of regional efforts to reduce GHG emissions and meet regional and statewide GHG emissions reduction targets.

Table 5-2. Greenhouse Gas Emissions from On-Road Emissions in the SCAG Region

Sector	2019 (MMT/Year)			2045 (MMT/Year)		
	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
Light and Medium Duty Vehicles	49.30	0.0025	0.0010	32.91	0.0007	0.0002
Heavy Duty Vehicles	12.64	0.0005	0.0014	9.75	0.0002	0.0005
Buses	1.54	0.0008	0.0001	0.61	0.0001	<0.0001
On-Road Vehicles (Subtotal) in CO_2	63.48	0.0039	0.0026	43.27	0.0010	0.0007
On-Road Vehicles (Subtotal) in CO_2e	63.48	0.0810	0.7943	43.27	0.0212	0.2294
Total Emissions from On-Road Vehicles in CO_2e	**64.35**			**43.52**		

Source: SCAG, 2024b

CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
MMT/Year = million metric tons per year
N_2O = nitrous oxide
SCAG = Southern California Association of Governments

Table 5-3. Annual Greenhouse Gas Emissions for the SCAG Region from Three Primary Sectors

Area	2019 ($MMTCO_2e$)	2030 ($MMTCO_2e$)	2045 ($MMTCO_2e$)	2050 ($MMTCO_2e$)	2019 vs 2045
Transportation	66.42	53.38	46.55	47.84	-29.9%
Building Energy	64.64	57.30	47.30	43.97	-26.8%
Water-Related Energy	2.89	2.26	1.40	1.12	-51.6%
Total	**133.95**	**112.94**	**95.26**	**97.8**	**-28.9%**

Source: SCAG, 2024b

$MMTCO_2e$ = million metric tons of carbon dioxide equivalents
SCAG = Southern California Association of Governments

5.1.3 Los Angeles County Metropolitan Transportation Authority Transit System Emissions

Metro has prepared detailed emissions inventories to track its progress in displacing GHG emissions from its operations, which include operation of transit services and facilities, and employee commuting. GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage (APTA, 2018). Metro has been tracking its progress since 2008 through 2019 with its annual energy and resource reports. The 2019 Energy and Resource Report was the last version in this format. For future sustainability reports, Metro will prepare an overall agency-wide sustainability report as part of Moving Beyond Sustainability. Metro's latest annual sustainability report analyzed the sustainability and environmental performance of its operational activities during the 2019 calendar year. Based on 2019 data, the largest emissions sources for Metro's total operational emissions were bus fleets and rail systems at 54 percent and 20 percent, respectively (Metro, 2020b). Non-modal sources (facility energy consumption, employee commuting, etc.) made up 22 percent of total operational emissions. New fleet technologies powered by renewable energy and reduced building energy usage can reduce Metro's emissions over the long term. Since 2012, emissions resulting from building energy use have decreased by 23 percent while emissions from water consumption have been cut in half. Table 5-4 summarizes Metro's recent progress in displacing GHG emissions from its operations and continually shows an annual net displacement of GHG emissions.

Table 5-4. Metro Operations Annual Greenhouse Gas Emissions Displacement

Category	2014	2015	2016	2017	2018	2019
Total Emissions ($MTCO_2e$)[a]	396,380	391,275	390,840	415,872	371,911	326,953
Total Displacement ($MTCO_2e$)[b,d]	-482,813	-465,101	-448,301	-1,020,485	-987,490	-918,076
Mode Shift to Transit	-482,813	-465,101	-448,301	-207,374	-200,669	-186,515
Land Use[c]	NA	NA	NA	-813,110	-786,820	-731,561
Net Emissions ($MTCO_2e$)	**-86,433**	**-73,827**	**-57,461**	**-604,613**	**-615,579**	**-591,123**

Source: Metro, 2020b

[a]Total emissions represent the GHG emissions generated from Metro's operation of transit services such as buses, rail, and vanpools, as well as operations of facilities, including consumption of electricity, natural gas, and water, refrigerants, and employee commuting.

[b]GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage.

[c]GHG emissions displacement calculations were updated in 2018 to reflect the addition of Land Use as a source of emissions displacement. Reporting of land use emissions began with the 2017 reporting year.

[d]In 2018, Metro updated its 2017 GHG emissions inventory baseline with inclusion of the Land Use category and updated utility emission factors.

$MMTCO_2e$ = million metric tons of carbon dioxide equivalents
NA = not applicable

5.1.4 Regional Highway Emissions

As required by the California Environmental Quality Act (CEQA), existing conditions (Baseline 2021) emissions from regional mobile sources were estimated in the analysis for comparison with project alternatives for informational purposes only. As discussed in Section 3.3, CEQA Thresholds of Significance, GHG emissions impacts would be evaluated by comparing emissions of project alternatives to 2045 without Project conditions. Table 5-5 summarizes the GHG emissions from existing conditions and 2045 without Project conditions.

Table 5-5. Existing Conditions (Baseline Year 2021) Regional Mobile Source Greenhouse Gas Emissions

Category	Existing Conditions (2021)	2045 without Project Conditions
Daily VMT[a]	456,869,300	568,557,200
Days per Year[b]	347	347
Annual VMT	158,533,647,100	197,289,348,400
Annual GHG Emissions ($MTCO_2e$)	**64,691,322**	**57,188,730**

Source: HTA, 2024

[a]VMT data as provided in the *Sepulveda Transit Corridor Project Transportation Technical Report* (Metro, 2025) used 2019 as the base year for the VMT analysis because it is the most recent year for which Metro's CBM18B Transportation Analysis Model has been calibrated. Section 3.1 of the *Sepulveda Transit Corridor Project Transportation Technical Report* discusses the methodology for VMT.

[b]Annual miles are calculated using a factor of 347 days per year to account for reduced weekend and holiday mileage.

CBM18B = Corridor Based Model 2018
GHG = greenhouse gas
$MTCO_2e$ = metric tons of carbon dioxide equivalents
VMT = vehicle miles traveled

5.2 Impact Evaluation

5.2.1 Impact GHG-1: Would the project result in greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

5.2.1.1 Construction Impact

The No Project Alternative includes modifications to Metro Line 761. The modifications would include the construction of additional bus stops for Metro Line 761 to facilitate route changes under the No Project Alternative. Construction of Metro Line 761 elements would be temporary and conform with applicable federal, state, regional, and local regulations and standards related to GHG emissions. The project would undergo project-specific environmental clearance and would implement project-specific mitigation measures, as necessary to avoid or minimize potential GHG impacts. Construction of additional bus stops along Metro Line 761 would result in minimal GHG emissions as installation of bus stop components (benches, enclosures, signage, etc.) could be installed in a few days and would not require substantial amounts of off-road equipment or truck hauling. Overall, because project alternatives would not be constructed under the No Project Alternative and construction of additional bus stops along Metro Line 761 would result in minimal GHG emissions, GHG emissions generated under the No Project Alternative would not have a significant impact on the environment and impacts would be less than significant.

5.2.1.2 Operational Impact

The No Project Alternative annual GHG emissions were estimated for two scenarios: No Project Alternative compared to 2045 without Project conditions and No Project Alternative compared to Existing Conditions 2021. As discussed in Section 3.3, CEQA Thresholds of Significance, GHG impacts would be evaluated based on the net change in emissions between project alternatives in Horizon Year 2045 and 2045 without Project conditions. The comparison for the No Project Alternative and Existing Conditions 2021 is presented for informational purposes only.

The No Project Alternative would not benefit from long-term GHG reductions associated with the project alternatives. However, the No Project Alternative includes modifications to Metro Line 761. The modifications would include the construction and operation of additional bus stops for Metro line 761 to facilitate route changes under the No Project Alternative. Operational emissions associated with the No Project Alternative would include direct emissions from highway traffic without implementation of the Project. The additional bus stops related to Metro Line 761 would not be a source of emissions when operational. Regional highway traffic emissions would be the same under the No Project Alternative and 2045 without Project conditions because project build alternatives would not be implemented. Because the No Project Alternative highway traffic emissions would be essentially the same as 2045 without Project conditions (projected future conditions baseline), there would be no perceptible change in GHG emissions relative to the baseline on the project level under the No Project Alternative. Therefore, GHG emissions under the No Project Alternative would not have a significant impact on the environment and impacts would be less than significant.

GHG emissions from the No Project Alternative represent a future condition relative to baseline conditions, accounting only for changes that would occur specifically because the Project is not approved. No new track installation, stations, or maintenance and storage facilities (MSFs) would be constructed nor operated under the No Project Alternative; however, there would be operations of additional bus stops related to Metro Line 761, but these bus stops would not generate GHG emissions. Table 5-6 compares GHG emissions from the No Project Alternative compared to existing conditions. As shown in Table 5-6, the No Project Alternative would result in a GHG emission reduction. Although VMT for the No Project Alternative would increase compared to existing conditions, the decrease in mobile source GHG emission factors over this time frame outweighs the increase in VMT. Reductions in GHG emissions factors are related to implementation of state policies to reduce vehicular emissions and retirement of older, high-polluting vehicles.

Table 5-6. Annual Greenhouse Gas Emissions for the No Project Alternative (Horizon Year 2045) Compared to Existing Conditions (Baseline Year 2021)

Scenario	CO_2 EF (g/mile)	CH_4 EF (g/mile)	N_2O EF (g/mile)	CO_2e (g/mile)	Annual VMT	Annual Emissions ($MTCO_2e$)
Existing Conditions (2021)	402.15	0.012	0.019	408.11	158,533,647,100	64,691,322
No Project Alternative (2045) W/O	285.87	0.003	0.01	288.93	197,289,348,400	57,188,730
No Project Alternative (2045) W/P	285.87	0.003	0.01	288.93	197,289,348,400	57,188,730
Net Change (2045 W/P – 2021)	**-116.28**	**-0.009**	**-0.006**	**-119.18**	**38,755,701,300**	**-7,502,592**
Net Change (%)	-28.9	-73.4	-30.1	-29.2	24.4	-11.6
Net Change (2045 W/P – 2045 W/O)	**0.00**	**0.00**	**0.00**	**0.00**	**0**	**0.0**
Net Change (%)	0.0	0.0	0.0	0.0	0.0	0.0

Source: HTA, 2024

CH_4 = methane
CO_2 = carbon dioxide
EF = emission factor
g/mile = grams per mile
$MTCO_2e$ = metric tons of carbon dioxide equivalents
N_2O = nitrous oxide
VMT = vehicle miles traveled
W/O = without project
W/P = with project

5.2.2 Impact GHG-2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

5.2.2.1 Construction Impact

The No Project Alternative includes modifications to Metro Line 761. The modifications would include the construction of additional bus stops for Metro Line 761 to facilitate route changes under the No Project Alternative. Construction of Metro Line 761 elements would be temporary and conform with applicable federal, state, regional, and local regulations and standards related to GHG emissions. Construction of additional bus stops along Metro Line 761 would result in minimal GHG emissions as installation of bus stop components (benches, enclosures, signage, etc.) could be installed in a few days and would not require substantial amounts of off-road equipment or truck hauling. Construction of the bus stops would be conducted in accordance with measures in Metro's Green Construction Policy to reduce GHG emissions where possible. The project would undergo project-specific environmental clearance and would implement project-specific mitigation measures, as necessary to avoid or minimize potential GHG impacts. Overall, because project alternatives would not be constructed under the No Project Alternative and would not generate GHG emissions, and construction of bus stops would be required to comply with Metro's Green Construction Policy, the No Project Alternative would not conflict with plans, policies, or regulations for reducing GHG emissions and impacts would be less than significant.

5.2.2.2 Operational Impact

The No Project Alternative includes all existing and under-construction highway and transit services and facilities, including modifications to Metro Line 761. The modifications would include the construction and operation of additional bus stops for Metro Line 761 to facilitate route changes under the No Project Alternative. Operational emissions associated with the No Project Alternative would include direct emissions from highway traffic without implementation of the Project. The additional bus stops related to Metro Line 761 would not be a source of emissions when operational. No new track installation, stations, or MSFs would be constructed under the No Project Alternative.

As discussed in Section 5.1.2, an element of the 2024-2050 RTP/SCS is a regional GHG emissions inventory and emissions forecast based on the growth projections and control strategies incorporated into its development. SCAG provides estimates of the regional GHG emissions through the RTP/SCS horizon year accounting for programmed transportation projects, population, employment, and housing growth, and other regional factors. Expansion of public transportation systems spurring mode shift away from passenger vehicles is a fundamental pillar of regional efforts to reduce GHG emissions and meet regional and statewide GHG emissions reduction targets. The No Project Alternative would conflict with these targets, as the Project is in and of itself one of the strategies in the SCAG 2024-2050 RTP/SCS to contribute to achieving the per capita reduction targets; therefore, impacts would be significant and unavoidable.

6 ALTERNATIVE 1

6.1 Alternative Description

Alternative 1 is an entirely aerial monorail alignment that would run along the Interstate 405 (I-405) corridor and would include eight aerial monorail transit (MRT) stations and a new electric bus route from the Los Angeles County Metropolitan Transportation Authority's (Metro) D Line Westwood/VA Hospital Station to the University of California, Los Angeles (UCLA) Gateway Plaza via Wilshire Boulevard and Westwood Boulevard. This alternative would provide transfers to five high-frequency fixed guideway transit and commuter rail lines, including the Metro E, Metro D, and Metro G Lines, the East San Fernando Valley Light Rail Transit Line, and the Metrolink Ventura County Line. The length of the alignment between the terminus stations would be approximately 15.1 miles. The length of the bus route would be 1.5 miles.

The eight aerial MRT stations and three bus stops would be as follows:

1. Metro E Line Expo/Sepulveda Station (aerial)
2. Santa Monica Boulevard Station (aerial)
3. Wilshire Boulevard/Metro D Line Station (aerial)
    a. Wilshire Boulevard/VA Medical Center bus stop
    b. Westwood Village bus stop
    c. UCLA Gateway Plaza bus stop
4. Getty Center Station (aerial)
5. Ventura Boulevard/Sepulveda Boulevard Station (aerial)
6. Metro G Line Sepulveda Station (aerial)
7. Sherman Way Station (aerial)
8. Van Nuys Metrolink Station (aerial)

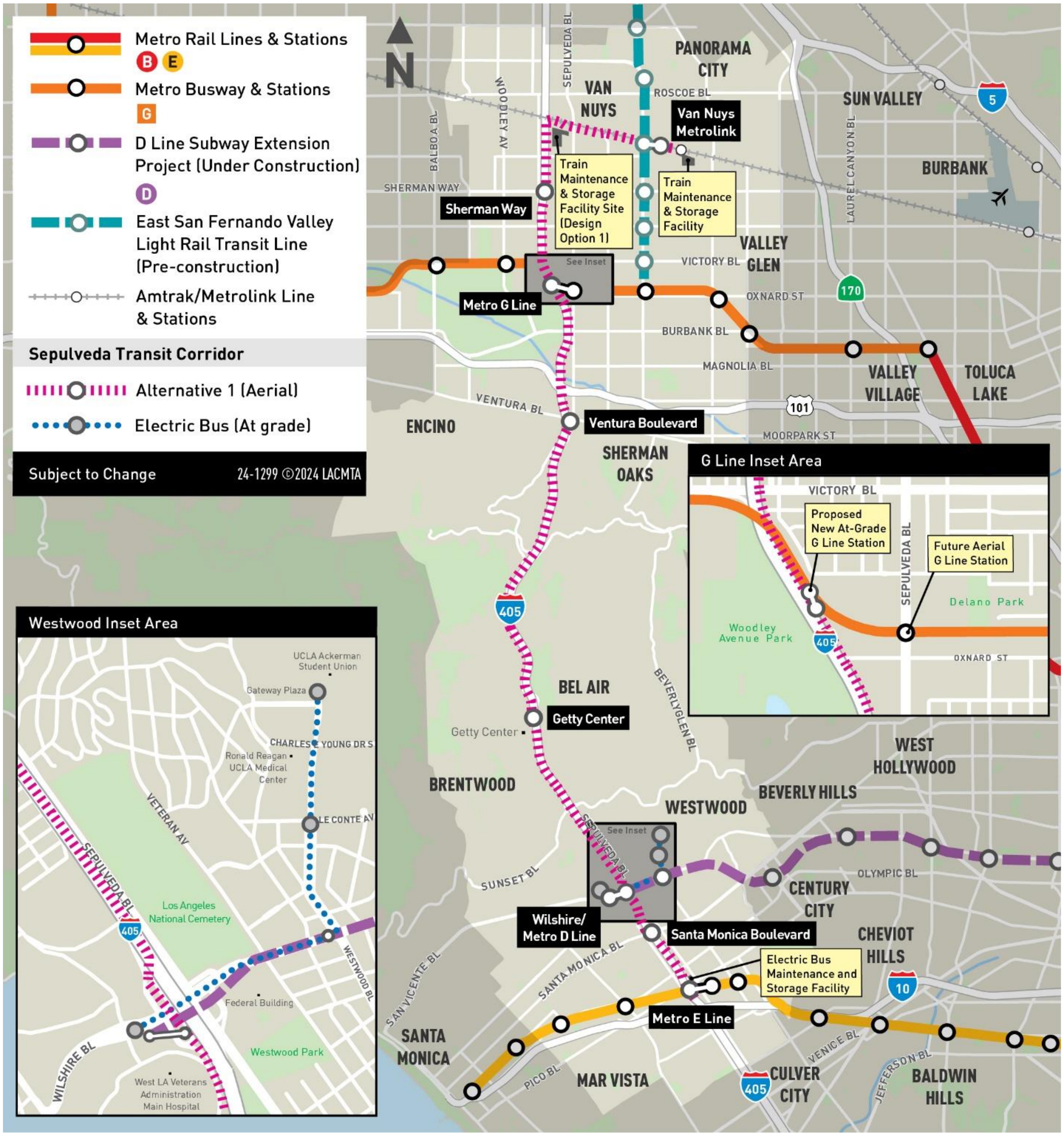
6.1.1 Operating Characteristics

6.1.1.1 Alignment

As shown on Figure 6-1, from its southern terminus at the Metro E Line Expo/Sepulveda Station, the alignment of Alternative 1 would generally follow I-405 to the Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor near the alignment's northern terminus at the Van Nuys Metrolink Station. At several points, the alignment would transition from one side of the freeway to the other or to the median. North of U.S. Highway 101 (US-101), the alignment would be on the east side of the I-405 right-of-way and would then curve eastward along the south side of the LOSSAN rail corridor to Van Nuys Boulevard.

The proposed southern terminus station would be located west of the existing Metro E Line Expo/Sepulveda Station and east of I-405, between Pico Boulevard and Exposition Boulevard. Tail tracks would extend just south of the station adjacent to the eastbound Interstate 10 to northbound I-405 connector over Exposition Boulevard. North of the Metro E Line Expo/Sepulveda Station, a storage track would be located off the main alignment north of Pico Boulevard, between I-405 and Cotner Avenue. The alignment would continue north along the east side of I-405 until just south of Santa Monica Boulevard, where a proposed station would be located between the I-405 northbound travel lanes and Cotner Avenue. The alignment would cross over the northbound and southbound freeway lanes north of Santa Monica Boulevard and travel along the west side of I-405, before reaching a proposed station within the I-405 southbound-to-eastbound loop off-ramp to Wilshire Boulevard, near the Metro D Line Westwood/VA Hospital Station.

Figure 6-1. Alternative 1: Alignment



Source: LASRE, 2024; HTA, 2024

An electric bus would serve as a shuttle between the Wilshire Boulevard/Metro D Line Station and UCLA Gateway Plaza. From the Wilshire Boulevard/Metro D Line Station, the bus would travel east on Wilshire Boulevard and turn north on Westwood Boulevard to UCLA Gateway Plaza and make an intermediate stop in Westwood Village near the intersection of Le Conte Avenue and Westwood Boulevard.

North of Wilshire Boulevard, the monorail alignment would transition over the southbound I-405 freeway lanes to the freeway median, where it would continue north over the Sunset Boulevard overcrossing. The alignment would remain in the median to Getty Center Drive, where it would cross over the southbound freeway lanes to the west side of I-405, just north of the Getty Center Drive undercrossing, to the proposed Getty Center Station located north of the Getty Center tram station. The alignment would return to the median for a short distance before curving back to the west side of I-405, south of the Sepulveda Boulevard undercrossing north of the Getty Center Drive interchange. After crossing over Bel Air Crest Road and Skirball Center Drive, the alignment would return to the median and run under the Mulholland Drive Bridge, then continue north within the I-405 median to descend into the San Fernando Valley (Valley).

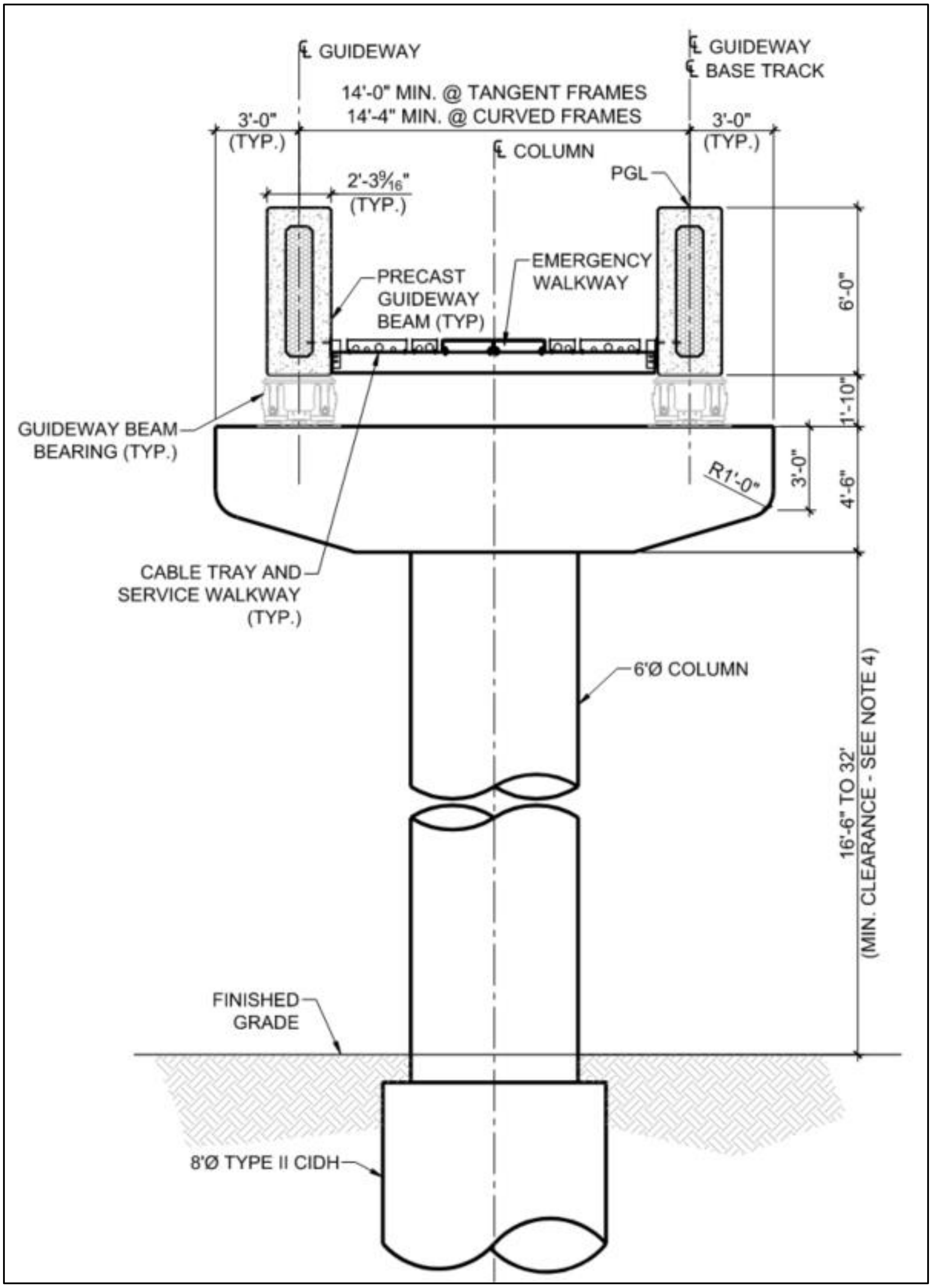
Near Greenleaf Street, the alignment would cross over the northbound freeway lanes and northbound on-ramps toward the proposed Ventura Boulevard Station on the east side of I-405. This station would be located above a transit plaza and would replace an existing segment of Dickens Street adjacent to I-405, just south of Ventura Boulevard. Immediately north of the Ventura Boulevard Station, the alignment would cross over northbound I-405 to the US-101 connector and continue north between the connector and the I-405 northbound travel lanes. The alignment would continue north along the east side of I-405—crossing over US-101 and the Los Angeles River—to a proposed station on the east side of I-405 near the Metro G Line Busway. A new at-grade station on the Metro G Line would be constructed for Alternative 1 adjacent to the proposed monorail station. These proposed stations are shown on the Metro G Line inset area on Figure 6-1.

The alignment would then continue north along the east side of I-405 to the proposed Sherman Way Station. The station would be located inside the I-405 northbound loop off-ramp to Sherman Way. North of the station, the alignment would continue along the eastern edge of I-405, then curve to the southeast parallel to the LOSSAN rail corridor. The alignment would remain aerial along Raymer Street, east of Sepulveda Boulevard and cross over Van Nuys Boulevard to the proposed terminus station adjacent to the Van Nuys Metrolink/Amtrak Station. Overhead utilities along Raymer Street would be undergrounded where they would conflict with the guideway or its supporting columns. Tail tracks would be located southeast of this terminus station.

6.1.1.2 Guideway Characteristics

The monorail alignment of Alternative 1 would be entirely aerial, utilizing straddle-beam monorail technology, which allows the monorail vehicle to straddle a guide beam that both supports and guides the vehicle. Northbound and southbound trains would travel on parallel beams supported by either a single-column or a straddle-bent structure. Figure 6-2 shows a typical cross-section of the aerial monorail guideway.

Figure 6-2. Typical Monorail Guideway Cross-Section

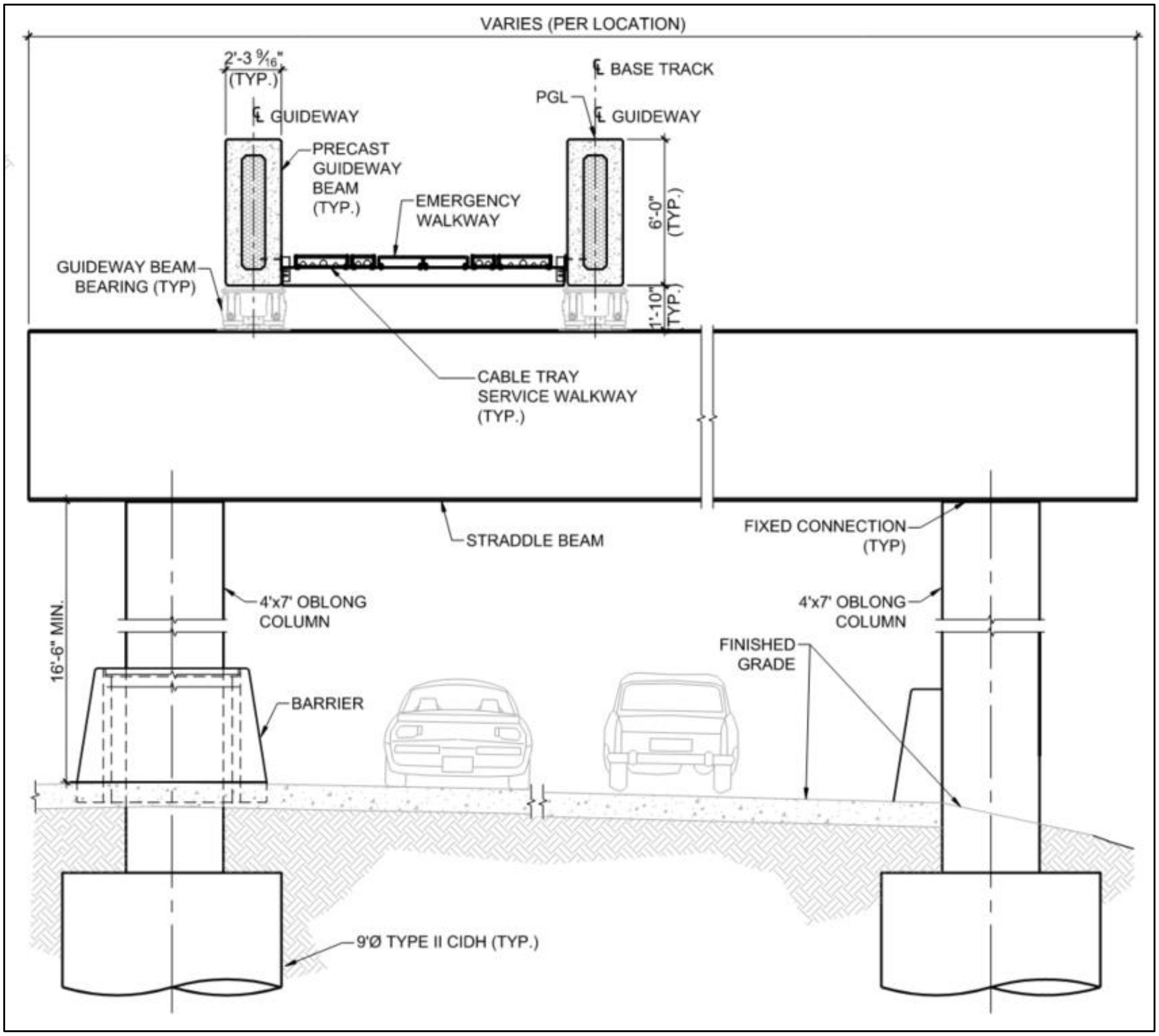


Source: LASRE, 2024

On a typical guideway section (i.e., not at a station), guide beams would rest on 20-foot-wide column caps (i.e., the structure connecting the columns and the guide beams), with typical spans (i.e., the distance between columns) ranging from 70 to 190 feet. The bottom of the column caps would typically be between 16.5 feet and 32 feet above ground level.

Over certain segments of roadway and freeway facilities, a straddle-bent configuration, as shown on Figure 6-3, consisting of two concrete columns constructed outside of the underlying roadway would be used to support the guide beams and column cap. Typical spans for these structures would range between 65 and 70 feet. A minimum 16.5-foot clearance would be maintained between the underlying roadway and the bottom of the column caps.

Figure 6-3. Typical Monorail Straddle-Bent Cross-Section



Source: LASRE, 2024

Structural support columns would vary in size and arrangement by alignment location. Columns would be 6 feet in diameter along main alignment segments adjacent to I-405 and be 4 feet wide by 6 feet long in the I-405 median. Straddle-bent columns would be 4 feet wide by 7 feet long. At stations, six rows of dual 5-foot by 8-foot columns would support the aerial guideway. Beam switch locations and long-span structures would also utilize different sized columns, with dual 5-foot columns supporting switch locations and 9-foot- or 10-foot-diameter columns supporting long-span structures. Crash protection barriers would be used to protect the columns. Columns would have a cast-in-drilled-hole (CIDH) pile foundation extending 1 foot in diameter beyond the column width with varying depths for appropriate geotechnical considerations and structural support.

6.1.1.3 Vehicle Technology

Alternative 1 would utilize straddle-beam monorail technology, which allows the monorail vehicle to straddle a guide beam that both supports and guides the vehicle. Rubber tires would sit both atop and on each side of the guide beam to provide traction and guide the train. Trains would be automated and powered by power rails mounted to the guide beam, with planned peak-period headways of 166 seconds and off-peak-period headways of 5 minutes. Monorail trains could consist of up to eight cars. Alternative 1 would have a maximum operating speed of 56 miles per hour; actual operating speeds would depend on the design of the guideway and distance between stations.

Monorail train cars would be 10.5 feet wide, with two double doors on each side. End cars would be 46.1 feet long with a design capacity of 97 passengers, and intermediate cars would be 35.8 feet long and have a design capacity of 90 passengers.

The electric bus connecting the Wilshire Boulevard/Metro D Line Station, Westwood Village, and UCLA Gateway Plaza would be a battery electric, low-floor transit bus, either 40 or 60 feet in length. The buses would run with headways of 2 minutes during peak periods. The electric bus service would operate in existing mixed-flow travel lanes.

6.1.1.4 Stations

Alternative 1 would include eight aerial MRT stations with platforms approximately 320 feet long, elevated 50 feet to 75 feet above the existing ground level. The Metro E Line Expo/Sepulveda, Santa Monica Boulevard, Ventura Boulevard/Sepulveda Boulevard, Sherman Way, and Van Nuys Metrolink Stations would be center-platform stations, where passengers would travel up to a shared platform that would serve both directions of travel. The Wilshire Boulevard/Metro D Line, Getty Center, and Metro G Line Sepulveda Stations would be side-platform stations, where passengers would select and travel up to one of two station platforms, depending on their direction of travel. Each station, regardless of whether it has side or center platforms, would include a concourse level prior to reaching the train platforms. Each station would have a minimum of two elevators, two escalators, and one stairway from ground level to the concourse.

Station platforms would be approximately 320 feet long and would be supported by six rows of dual 5-foot by 8-foot columns. Station platforms would be covered, but not enclosed. Side-platform stations would be 61.5 feet wide to accommodate two 13-foot-wide station platforms with a 35.5-foot-wide intermediate gap for side-by-side trains. Center-platform stations would be 49 feet wide, with a 25-foot-wide center platform.

Monorail stations would include automatic, bi-parting fixed doors along the edges of station platforms. These doors would be integrated into the automatic train control system and would not open unless a train is stopped at the platform.

The following information describes each station, with relevant entrance, walkway, and transfer information. Bicycle parking would be provided at each station.

Metro E Line Expo/Sepulveda Station

- This aerial station would be located near the existing Metro E Line Expo/Sepulveda Station, just east of I-405, between Pico Boulevard and Exposition Boulevard.
- A transit plaza and station entrance would be located on the east side of the station.
- An off-street passenger pick-up/drop-off loop would be located south of Pico Boulevard, west of Cotner Avenue.
- An elevated pedestrian walkway would connect the concourse level of the proposed station to the Metro E Line Expo/Sepulveda Station within the fare paid zone.
- Passengers would be able to park at the existing Metro E Line Expo/Sepulveda Station parking facility, which provides 260 parking spaces. No additional automobile parking would be provided at the proposed station.

Santa Monica Boulevard Station

- This aerial station would be located just south of Santa Monica Boulevard, between the I-405 northbound travel lanes and Cotner Avenue.
- Station entrances would be located on the southeast and southwest corners of Santa Monica Boulevard and Cotner Avenue. The entrance on the southeast corner of the intersection would be connected to the station concourse level via an elevated pedestrian walkway spanning Cotner Avenue.
- No dedicated station parking would be provided at this station.

Wilshire Boulevard/Metro D Line Station

- This aerial station would be located west of I-405 and south of Wilshire Boulevard within the southbound I-405 loop off-ramp to eastbound Wilshire Boulevard.
- An elevated pedestrian walkway spanning the adjacent I-405 ramps would connect the concourse level of the proposed station to a station plaza adjacent to the Metro D Line Westwood/VA Hospital Station within the fare paid zone. The station plaza would be the only entrance to the proposed station.
- The station plaza would include an electric bus stop and provide access to the Metro D Line Station via a new station entrance and concourse constructed using a knock-out panel provided in the Metro D Line Station.
- The passenger pick-up/drop-off facility at the Metro D Line Station would be reconfigured, maintaining the original capacity.
- No dedicated station parking would be provided at this station.

Getty Center Station

- This aerial station would be located on the west side of I-405 near the Getty Center, approximately 1,000 feet north of the Getty Center tram station.
- An elevated pedestrian walkway would connect the concourse level of the proposed station to the Getty Center tram station. The proposed connection would occur outside the fare paid zone.
- The pedestrian walkway would provide the only entrance to the proposed station.

- No dedicated station parking would be provided at this station.

Ventura Boulevard/Sepulveda Boulevard Station

- This aerial station would be located east of I-405, just south of Ventura Boulevard.
- A transit plaza, including two station entrances, would be located on the east side of the station. The plaza would require the closure of a 0.1-mile segment of Dickens Street, between Sepulveda Boulevard and Ventura Boulevard, with a passenger pick-up/drop-off loop and bus stops provided south of the station, off Sepulveda Boulevard.
- No dedicated station parking would be provided at this station.

Metro G Line Sepulveda Station

- This aerial station would be located near the Metro G Line Sepulveda Station, between I-405 and the Metro G Line Busway.
- Entrances to the MRT station would be located on both sides of a proposed new Metro G Line bus rapid transit (BRT) station.
- An elevated pedestrian walkway would connect the concourse level of the proposed station to the proposed new Metro G Line BRT station outside of the fare paid zone.
- Passengers would be able to park at the existing Metro G Line Sepulveda Station parking facility, which has a capacity of 1,205 parking spaces. Currently, only 260 parking spaces are used for transit parking. No additional automobile parking would be provided at the proposed station.

Sherman Way Station

- This aerial station would be located inside the I-405 northbound loop off-ramp to Sherman Way.
- A station entrance would be located on the north side of Sherman Way.
- An on-street passenger pick-up/drop-off area would be provided on the north side of Sherman Way west of Firmament Avenue.
- No dedicated station parking would be provided at this station.

Van Nuys Metrolink Station

- This aerial station would be located on the east side of Van Nuys Boulevard, just south of the LOSSAN rail corridor, incorporating the site of the current Amtrak ticket office.
- A station entrance would be located on the east side of Van Nuys Boulevard, just south of the LOSSAN rail corridor. A second entrance would be located north of the LOSSAN rail corridor with an elevated pedestrian walkway connecting to both the concourse level of the proposed station and the platform of the Van Nuys Metrolink/Amtrak Station.
- Existing Metrolink station parking would be reconfigured, maintaining approximately the same number of spaces, but 180 parking spaces would be relocated north of the LOSSAN rail corridor. Metrolink parking would not be available to Metro transit riders.

6.1.1.5 Station-to-Station Travel Times

Table 6-1 presents the station-to-station distance and travel times for Alternative 1. The travel times include both run time and dwell time. Dwell time is 30 seconds per station. Northbound and southbound travel times vary slightly because of grade differentials and operational considerations at end-of-line stations.

Table 6-1. Alternative 1: Station-to-Station Travel Times and Station Dwell Times

From Station	To Station	Distance (miles)	Northbound Station to Station Travel Time (seconds)	Southbound Station to Station Travel Time (seconds)	Dwell Time (seconds)
Metro E Line Station					*30*
Metro E Line	Santa Monica Boulevard	0.9	122	98	—
Santa Monica Boulevard Station					*30*
Santa Monica Boulevard	Wilshire/Metro D Line	0.7	99	104	—
Wilshire/Metro D Line Station					*30*
Wilshire/Metro D Line	Getty Center	2.9	263	266	—
Getty Center Station					*30*
Getty Center	Ventura Boulevard	4.7	419	418	—
Ventura Boulevard Station					*30*
Ventura Boulevard	Metro G Line	2.0	177	184	—
Metro G Line Station					*30*
Metro G Line	Sherman Way	1.5	135	134	—
Sherman Way Station					*30*
Sherman Way	Van Nuys Metrolink	2.4	284	284	—
Van Nuys Metrolink Station					*30*

Source: LASRE, 2024

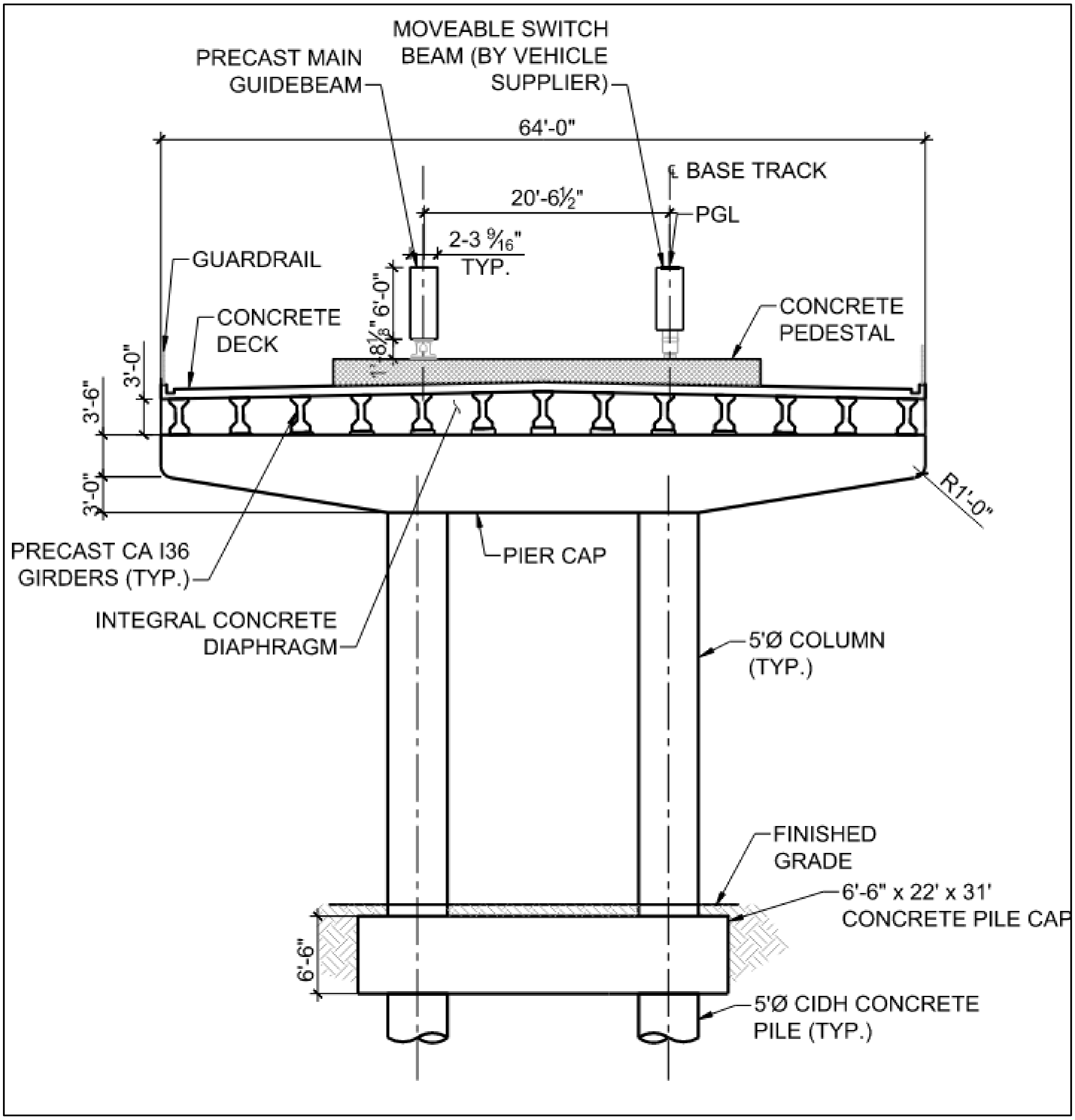
— = no data

6.1.1.6 Special Trackwork

Alternative 1 would include five pairs of beam switches to enable trains to cross over to the opposite beam. From south to north, the first pair of beam switches would be located just north of the Metro E Line Expo/Sepulveda Station. The second pair of beam switches would be located near the Wilshire Boulevard/Metro D Line Station on the north side of Wilshire Boulevard, within the Wilshire Boulevard westbound to I-405 southbound loop on-ramp. A third pair of beam switches would be located in the Sepulveda Pass, just south of Mountaingate Drive and Sepulveda Boulevard. A fourth pair of beam switches would be located south of the Metro G Line Station, between the I-405 northbound lanes and the Metro G Line Busway. The final pair would be located near the Van Nuys Metrolink Station.

At beam switch locations, the typical cross-section of the guideway would increase in column and column cap width. The column cap at these locations would be 64 feet wide, with dual 5-foot-diameter columns. Underground pile caps for additional structural support would also be required at beam switch locations. Figure 6-4 shows a typical cross-section of the monorail beam switch.

Figure 6-4. Typical Monorail Beam Switch Cross-Section



Source: LASRE, 2024

6.1.1.7 Monorail Maintenance and Storage Facility

MSF Base Design

In the maintenance and storage facility (MSF) Base Design for Alternative 1, the MSF would be located on City of Los Angeles Department of Water and Power (LADWP) property east of the Van Nuys Metrolink Station. The MSF Base Design site would be approximately 18 acres and would be designed to accommodate a fleet of 208 monorail vehicles. The site would be bounded by the LOSSAN rail corridor to the north, Saticoy Street to the south, and property lines extending north of Tyrone and Hazeltine Avenues to the east and west, respectively.

Monorail trains would access the site from the main alignment's northern tail tracks at the northwest corner of the site. Trains would travel parallel to the LOSSAN rail corridor before curving southeast to maintenance facilities and storage tracks. The guideway would remain in an aerial configuration within the MSF Base Design, including within maintenance facilities.

The site would include the following facilities:

- Primary entrance with guard shack
- Primary maintenance building that would include administrative offices, an operations control center, and a maintenance shop and office
- Train car wash building
- Emergency generator
- Traction power substation (TPSS)
- Maintenance-of-way (MOW) building
- Parking area for employees

MSF Design Option 1

In the MSF Design Option 1, the MSF would be located on industrial property, abutting Orion Avenue, south of the LOSSAN rail corridor. The MSF Design Option 1 site would be approximately 26 acres and would be designed to accommodate a fleet of 224 monorail vehicles. The site would be bounded by I-405 to the west, Stagg Street to the south, the LOSSAN rail corridor to the north, and Orion Avenue and Raymer Street to the east. The monorail guideway would travel along the northern edge of the site.

Monorail trains would access the site from the monorail guideway east of Sepulveda Boulevard, requiring additional property east of Sepulveda Boulevard and north of Raymer Street. From the northeast corner of the site, trains would travel parallel to the LOSSAN rail corridor before turning south to maintenance facilities and storage tracks parallel to I-405. The guideway would remain in an aerial configuration within the MSF Design Option 1, including within maintenance facilities.

The site would include the following facilities:

- Primary entrance with guard shack
- Primary maintenance building that would include administrative offices, an operations control center, and a maintenance shop and office
- Train car wash building
- Emergency generator
- TPSS
- MOW building
- Parking area for employees

Figure 6-5 shows the locations of the MSF Base Design and MSF Design Option 1 for Alternative 1.

Figure 6-5. Alternative 1: Maintenance and Storage Facility Options

Source: LASRE, 2024; HTA, 2024

6.1.1.8 Electric Bus Maintenance and Storage Facility

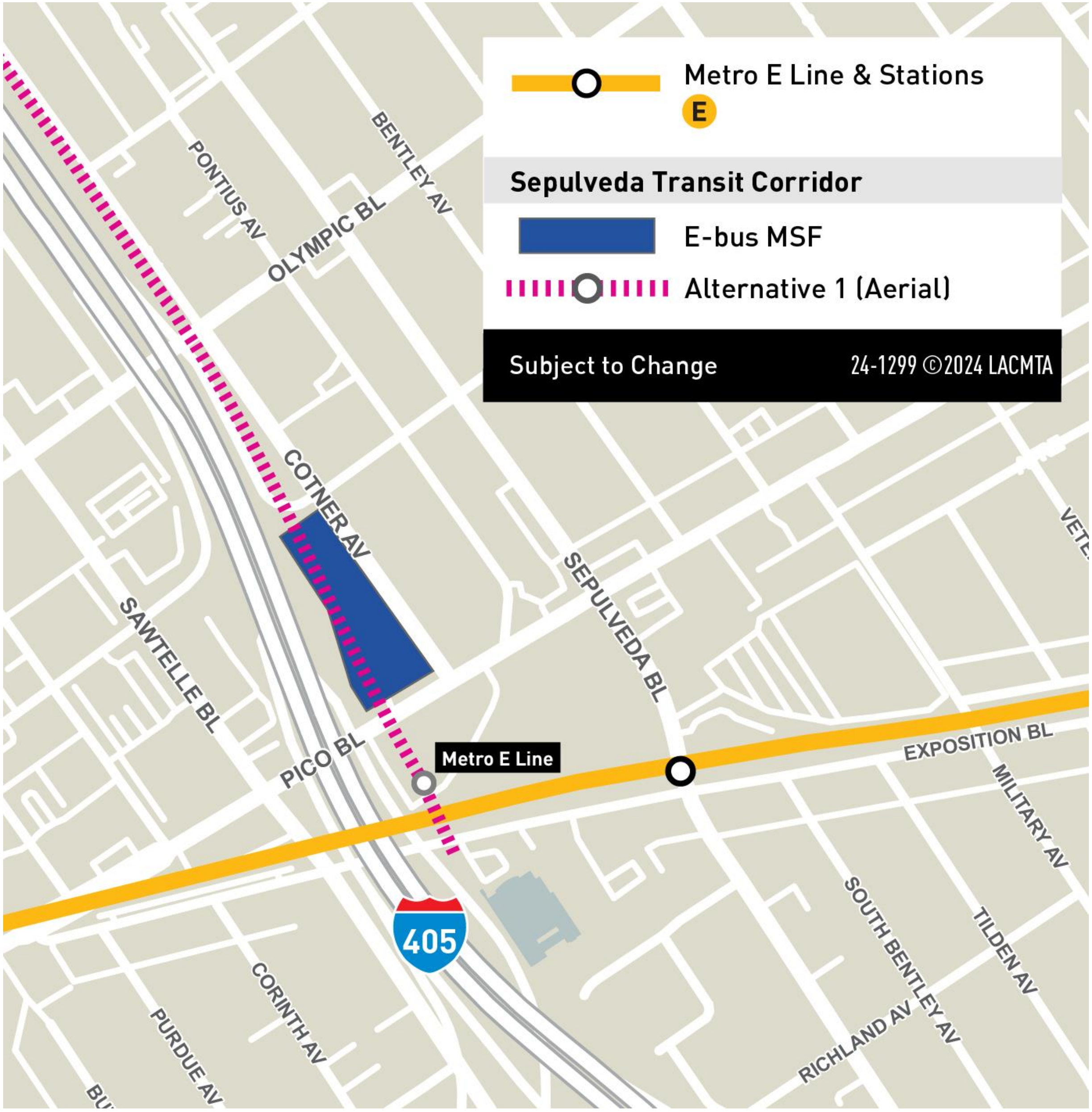
An electric bus MSF would be located on the northwest corner of Pico Boulevard and Cotner Avenue and would be designed to accommodate 14 electric buses. The site would be approximately 2 acres and would comprise six parcels bounded by Cotner Avenue to the east, I-405 to the west, Pico Boulevard to the south, and the I-405 northbound on-ramp to the north.

The site would include approximately 45,000 square feet of buildings and include the following facilities:

- Maintenance shop and bay
- Maintenance office
- Operations center
- Bus charging equipment
- Parts storeroom with service areas
- Parking area for employees

Figure 6-6 shows the location of the proposed electric bus MSF.

Figure 6-6. Alternative 1: Electric Bus Maintenance and Storage Facility



Source: LASRE, 2024; HTA, 2024

6.1.1.9 Traction Power Substations

Traction power substations (TPSSs) transform and convert high voltage alternating current supplied from power utility feeders into direct current suitable for transit operation. A TPSS on a site of approximately 8,000 square feet would be located approximately every 1 mile along the alignment. Table 6-2 lists the TPSS locations proposed for Alternative 1.

Figure 6-7 shows the TPSS locations along the Alternative 1 alignment.

Table 6-2. Alternative 1: Traction Power Substation Locations

TPSS No.	TPSS Location Description	Configuration
1	TPSS 1 would be located east of I-405, just south of Exposition Boulevard and the monorail guideway tail tracks.	At-grade
2	TPSS 2 would be located west of I-405, just north of Wilshire Boulevard, inside the Westbound Wilshire Boulevard to I-405 Southbound Loop On-Ramp.	At-grade
3	TPSS 3 would be located west of I-405, just north of Sunset Boulevard, inside the Church Lane to I-405 Southbound Loop On-Ramp.	At-grade
4	TPSS 4 would be located east of I-405 and Sepulveda Boulevard, just north of the Getty Center Station.	At-grade
5	TPSS 5 would be located west of I-405, just east of the intersection between Promontory Road and Sepulveda Boulevard.	At-grade
6	TPSS 6 would be located between I-405 and Sepulveda Boulevard, just north of the Skirball Center Drive Overpass.	At-grade
7	TPSS 7 would be located east of I-405, just south of Ventura Boulevard Station, between Sepulveda Boulevard and Dickens Street.	At-grade
8	TPSS 8 would be located east of I-405, just south of the Metro G Line Sepulveda Station.	At-grade
9	TPSS 9 would be located east of I-405, just east of the Sherman Way Station, inside the I-405 Northbound Loop Off-Ramp to Sherman Way westbound.	At-grade
10	TPSS 10 would be located east of I-405, at the southeast quadrant of the I-405 overcrossing with the LOSSAN rail corridor.	At-grade
11	TPSS 11 would be located east of I-405, at the southeast quadrant of the I-405 overcrossing with the LOSSAN rail corridor.	At-grade (within MSF Design Option)
12	TPSS 12 would be located between Van Nuys Boulevard and Raymer Street, south of the LOSSAN rail corridor.	At-grade
13	TPSS 13 would be located south of the LOSSAN rail corridor, between Tyrone Avenue and Hazeltine Avenue.	At-grade (within MSF Base Design)

Source: LASRE, 2024; HTA, 2024

Figure 6-7. Alternative 1: Traction Power Substation Locations

Source: LASRE, 2024; HTA, 2024

6.1.1.10 Roadway Configuration Changes

Table 6-3 lists the roadway changes necessary to accommodate the guideway of Alternative 1. Figure 6-8 shows the location of these roadway changes in the Sepulveda Transit Corridor Project (Project) Study Area, except for I-405 configuration changes, which would occur throughout the corridor.

Table 6-3. Alternative 1: Roadway Changes

Location	From	To	Description of Change
Cotner Avenue	Nebraska Avenue	Santa Monica Boulevard	Roadway realignment to accommodate aerial guideway columns and station access
Beloit Avenue	Massachusetts Avenue	Ohio Avenue	Roadway narrowing to accommodate aerial guideway columns
I-405 Southbound On-Ramp, Southbound Off-Ramp, and Northbound On-Ramp at Wilshire Boulevard	Wilshire Boulevard	I-405	Ramp realignment to accommodate aerial guideway columns and I-405 widening
Sunset Boulevard	Gunston Drive	I-405 Northbound Off-Ramp at Sunset Boulevard	Removal of direct eastbound to southbound on-ramp to accommodate aerial guideway columns and I-405 widening. Widening of Sunset Boulevard bridge with additional westbound lane
I-405 Southbound On-Ramp and Off-Ramp at Sunset Boulevard and North Church Lane	Sunset Boulevard	Not Applicable	Ramp realignment to accommodate aerial guideway columns and I-405 widening
I-405 Northbound On-Ramp and Off-Ramp at Sepulveda Boulevard near I-405 Exit 59	Sepulveda Boulevard near I-405 Northbound Exit 59	Sepulveda Boulevard/ I-405 Undercrossing (near Getty Center)	Ramp realignment to accommodate aerial guideway columns and I-405 widening
Sepulveda Boulevard	I-405 Southbound Skirball Center Drive Ramps (north of Mountaingate Drive)	Skirball Center Drive	Roadway realignment into existing hillside to accommodate aerial guideway columns and I-405 widening
I-405 Northbound On-Ramp at Mulholland Drive	Mulholland Drive	Not Applicable	Roadway realignment into the existing hillside between the Mulholland Drive Bridge pier and abutment to accommodate aerial guideway columns and I-405 widening
Dickens Street	Sepulveda Boulevard	Ventura Boulevard	Vacation and permanent removal of street for Ventura Boulevard Station construction. Pick-up/drop-off area would be provided along Sepulveda Boulevard at the truncated Dickens Street.
Sherman Way	Haskell Avenue	Firmament Avenue	Median improvements, passenger drop-off and pick-up areas, and bus pads within existing travel lanes
Raymer Street	Sepulveda Boulevard	Van Nuys Boulevard	Curb extensions and narrowing of roadway width to accommodate aerial guideway columns
I-405	Sunset Boulevard	Bel Terrace	I-405 widening to accommodate aerial guideway columns in the median

Location	From	To	Description of Change
I-405	Sepulveda Boulevard Northbound Off-Ramp (Getty Center Drive interchange)	Sepulveda Boulevard Northbound On-Ramp (Getty Center Drive interchange)	I-405 widening to accommodate aerial guideway columns in the median
I-405	Skirball Center Drive	I-405 Northbound On-Ramp at Mulholland Drive	I-405 widening to accommodate aerial guideway columns in the median

Source: LASRE, 2024; HTA, 2024

Figure 6-8. Alternative 1: Roadway Changes

Source: LASRE, 2024; HTA, 2024

In addition to the changes made to accommodate the guideway, as listed in Table 6-3, roadways and sidewalks near stations would be reconstructed, which would result in modifications to curb ramps and driveways.

6.1.1.11 Fire/Life Safety – Emergency Egress

Continuous emergency evacuation walkways would be provided along the guideway. The walkways would typically consist of structural steel frames anchored to the guideway beams to support non-slip walkway panels. The walkways would be located between the two guideway beams for most of the alignment; however, where the beams split apart, such as entering center-platform stations, short portions of the walkway would be located on the outside of the beams.

6.1.2 Construction Activities

Construction activities for Alternative 1 would include constructing the aerial guideway and stations, widening I-405, and constructing ancillary facilities. Construction of the transit through substantial completion is expected to have a duration of 6½ years. Early works, such as site preparation, demolition, and utility relocation, could start in advance of construction of the transit facilities.

Aerial guideway construction would begin at the southern and northern ends of the alignment and connect in the middle. Constructing the guideway would require a combination of freeway and local street lane closures throughout the work limits to provide sufficient work area. The first stage of I-405 widening would include a narrowing of adjacent freeway lanes to a minimum width of 11 feet (which would eliminate shoulders) and placing K-rail on the outside edge of the travel lanes to create outside work areas. Within these outside work zones, retaining walls, drainage infrastructure, and outer pavement widenings would be constructed to allow for I-405 widening. The reconstruction of on- and off-ramps would be the final stage of I-405 widening.

A median work zone along I-405 for the length of the alignment would be required for erection of the guideway structure. In the median work zone, demolition of the existing median and drainage infrastructure would be followed by the installation of new K-rail and installation of guideway structural components, which would include full directional freeway closures when guideway beams must be transported into the median work areas during late-night hours. Additional night and weekend directional closures would be required for installation of long-span structures over I-405 travel lanes where the guideway would transition from the median.

Aerial station construction is anticipated to last the duration of construction activities for Alternative 1 and would include the following general sequence of construction:

- Site clearing
- Utility relocation
- Construction fencing and rough grading
- CIDH pile drilling and installation
- Elevator pit excavation
- Soil and material removal
- Pile cap and pier column construction
- Concourse level and platform level falsework for cast-in-place structural concrete
- Guideway beam installation
- Elevator and escalator installation
- Completion of remaining concrete elements such as pedestrian bridges
- Architectural finishes and mechanical, electrical, and plumbing installation

Alternative 1 would require construction of a concrete casting facility for columns and beams associated with the elevated guideway. A specific site has not been identified; however, it is expected that the facility would be located on industrially zoned land adjacent to a truck route in either the Antelope Valley or Riverside County. When a site is identified, the contractor would obtain all permits and approvals necessary from the relevant jurisdiction, the appropriate air quality management entity, and other regulatory entities.

TPSS construction would require additional lane closures. Large equipment including transformers, rectifiers, and switchgears would be delivered and installed through prefabricated modules where possible in at-grade TPSSs. The installation of transformers would require temporary lane closures on Exposition Boulevard, Beloit Avenue, Sepulveda Boulevard just north of Cashmere Street, and the I-405 northbound on-ramp at Burbank Boulevard.

Table 6-4 and Figure 6-9 show the potential construction staging areas for Alternative 1. Staging areas would provide the necessary space for the following activities:

- Contractors' equipment
- Receiving deliveries
- Storing materials
- Site offices
- Work zone for excavation
- Other construction activities (including parking and change facilities for workers, location of construction office trailers, storage, staging and delivery of construction materials and permanent plant equipment, and maintenance of construction equipment)

Table 6-4. Alternative 1: Construction Staging Locations

No.	Location Description
1	Public Storage between Pico Boulevard and Exposition Boulevard, east of I-405
2	South of Dowlen Drive and east of Greater LA Fisher House
3	At 1400 N Sepulveda Boulevard
4	At 1760 N Sepulveda Boulevard
5	East of I-405 and north of Mulholland Drive Bridge
6	Inside of I-405 Northbound to US-101 Northbound Loop Connector, south of US-101
7	ElectroRent Building south of Metro G Line Busway, east of I-405
8	Inside the I-405 Northbound Loop Off-Ramp at Victory Boulevard
9	Along Cabrito Road east of Van Nuys Boulevard

Source: LASRE, 2024; HTA, 2024

Figure 6-9. Alternative 1: Construction Staging Locations

Source: LASRE, 2024; HTA, 2024

6.2 Existing Conditions

The primary effect of rising global concentrations of atmospheric GHGs is an increase in the average global temperature. Since 1982, the Earth's temperature has risen at an average rate of approximately 0.2 degrees Celsius per decade. Climate change modeling indicates that further warming is likely to occur due to the anticipated rise in global atmospheric GHG concentrations from various sources worldwide, including emissions from both developed and developing countries, as well as deforestation. This continued increase in GHGs is expected to induce further changes in the global climate system during the current century. Adverse impacts from global climate change worldwide and in California could include the following (CARB, 2022):

- Declining sea ice and mountain snowpack levels: This decline increases sea levels and sea surface evaporation rates, leading to higher atmospheric water vapor due to the atmosphere's ability to hold more moisture at elevated temperatures.
- Rising average global sea levels: Primarily resulting from thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets.
- Changing weather patterns: Alterations in precipitation, ocean salinity, and wind patterns, along with more extreme weather events, including droughts, heavy precipitation, heatwaves, cold spells, and intensified tropical cyclones.
- Declining Sierra Nevada snowpack levels: The Sierra Nevada snowpack, which accounts for approximately half of California's surface water storage, is projected to decrease significantly over the next century, posing challenges for water resources in the state.
- Increased ozone formation: Higher temperatures can lead to more days conducive to ozone formation (e.g., clear days with intense sunlight), potentially increasing ozone levels in high-ozone areas such as Southern California and the San Joaquin Valley by the end of the 21st century.
- Coastal erosion and seawater intrusion: Rising sea levels may exacerbate erosion along California's coastlines and increase the intrusion of seawater into the Sacramento-San Joaquin Delta and its levee systems, impacting freshwater supplies and infrastructure.

These projected impacts underscore the importance of mitigating GHG emissions and implementing adaptive strategies to address the challenges posed by climate change.

6.2.1 Statewide Greenhouse Gas Emissions Inventory

The California Air Resources Board (CARB) maintains the statewide GHG emission inventory, and Table 6-5 displays GHG emissions from 2013 to 2021 in California by economic sector as defined in the *Climate Change Scoping Plan* (2008 Scoping Plan) (CARB, 2008a). California’s GHG emissions have followed a declining trend over the past decade. In 2021, emissions from routine emitting activities statewide were approximately 12.6 million metric tons of carbon dioxide equivalents ($MMTCO_2e$) higher than 2020, but 23.1 $MMTCO_2e$ lower than 2019 levels. As shown in Table 6-5, GHG emissions related to the electric power sector has continually declined as California continues to meet renewable portfolio standard (RPS) goals. The increase and decrease over the 2019 to 2021 timeframe are likely due to impacts of the COVID-19 pandemic (CARB, 2023b). The plurality of California GHG emissions is attributed to automobile exhaust associated with the transportation sector, including public and private vehicles, comprising approximately 40 percent of the total statewide emission inventory. Despite statewide population growth, approximately 4 percent from 2011 to 2021, annual GHG emissions attributed to the transportation sector have remained relatively constant over the last decade. However, in 2020, the transportation sector had the largest decrease compared to 2019, which likely resulted in less light-duty vehicle travel due to shelter-in place orders in response to the COVID-19 pandemic. Overall, the transportation sector in 2021 was 16.7 $MMTCO_2e$ below pre-pandemic (2019) levels.

Table 6-5. Greenhouse Gas Annual $MMTCO_2e$ Emissions Trends by Sector

Sector	2013	2014	2015	2016	2017	2018	2019	2020	2021
Transportation	156.9	157.6	161.2	165.0	166.4	165.2	162.3	135.6	145.6
Electric Power	94.0	90.3	86.3	70.8	64.4	65.0	60.2	59.5	62.4
Industrial	82.7	85.0	82.7	81.2	81.4	82.0	80.8	73.3	73.9
Commercial/Residential	39.0	35.5	37.2	37.7	38.3	37.5	40.6	38.9	38.8
Agriculture	33.7	33.7	32.6	32.1	31.6	32.1	31.3	31.5	30.9
High GWP Sources	17.0	17.9	18.8	19.4	20.1	20.5	20.7	21.3	21.3
Recycling and waste	8.3	8.1	8.1	7.9	8.2	8.3	8.4	8.6	8.4
Emissions Total	**431.6**	**428.2**	**426.9**	**414.2**	**410.4**	**410.7**	**404.4**	**368.7**	**381.3**

Source: CARB, 2023c

GWP = global warming potential
$MMTCO_2e$ = million metric tons of carbon dioxide equivalents

6.2.2 Southern California Association of Governments Regional Greenhouse Gas Emissions

An element of the Southern California Association of Governments (SCAG) *Connect SoCal 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy*) (SCAG, 2024a) is a regional GHG emissions inventory and emissions forecast based on the growth projections and control strategies incorporated into its development. SCAG provides estimates of the regional GHG emissions through the RTP/SCS horizon year accounting for programmed transportation projects, population, employment, and housing growth, and other regional factors. The 2024-2050 RTP/SCS has a horizon year of 2050, but provides data for interim year 2045 to address consistency with other GHG reduction policies. Table 6-6 presents modeled emissions from on-road mobile sources in 2019 and 2045. The data demonstrates that from 2019 to 2045, the regional on-road emissions are anticipated to decrease by 32.4 percent (64.35 $MMTCO_2e$ to 43.52 $MMTCO_2e$ by 2045) with plan implementation.

In addition, SCAG provides the total regional GHG emissions from the three primary sources of GHG emissions within the region: transportation, building energy, and water related energy. Table 6-7 shows that total GHG emissions across the SCAG region are anticipated to decrease by approximately 28.9 percent from 2019 to 2045, and transportation emissions are projected to decrease by 29.9 percent. Expansion of public transportation systems spurring mode shift away from passenger vehicles is a fundamental pillar of regional efforts to reduce GHG emissions and meet regional and statewide GHG emissions reduction targets.

Table 6-6. Greenhouse Gas Emissions from On-Road Emissions in the SCAG Region

Sector	2019 (MMT/Year)			2045 (MMT/Year)		
	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
Light and Medium Duty Vehicles	49.30	0.0025	0.0010	32.91	0.0007	0.0002
Heavy Duty Vehicles	12.64	0.0005	0.0014	9.75	0.0002	0.0005
Buses	1.54	0.0008	0.0001	0.61	0.0001	<0.0001
On-Road Vehicles (Subtotal) in CO_2	63.48	0.0039	0.0026	43.27	0.0010	0.0007
On-Road Vehicles (Subtotal) in CO_2e	63.48	0.0810	0.7943	43.27	0.0212	0.2294
Total Emissions from On-Road Vehicles in CO_2e	**64.35**			**43.52**		

Source: SCAG, 2024b

CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
MMT/Year = million metric tons per year
N_2O = nitrous oxide
SCAG = Southern California Association of Governments

Table 6-7. Annual Greenhouse Gas Emissions for the SCAG Region from Three Primary Sectors

Area	2019 ($MMTCO_2e$)	2030 ($MMTCO_2e$)	2045 ($MMTCO_2e$)	2050 ($MMTCO_2e$)	2019 vs 2045
Transportation	66.42	53.38	46.55	47.84	-29.9%
Building Energy	64.64	57.30	47.30	43.97	-26.8%
Water-Related Energy	2.89	2.26	1.40	1.12	-51.6%
Total	**133.95**	**112.94**	**95.26**	**97.8**	**-28.9%**

Source: SCAG, 2024b

$MMTCO_2e$ = million metric tons of carbon dioxide equivalents
SCAG = Southern California Association of Governments

6.2.3 Los Angeles County Metropolitan Transportation Authority Transit System Emissions

Metro has prepared detailed emissions inventories to track its progress in displacing GHG emissions from its operations, which includes operation of transit services and facilities, and employee commuting. GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage (APTA, 2018). Metro has been tracking its progress since 2008 through 2019 with its annual energy and resource reports. The *2019 Energy and Resource Report* (Metro, 2019b) was the last version in this format. For future sustainability reports, Metro will prepare an overall agency-wide sustainability report as part of Moving Beyond Sustainability. Metro's latest annual sustainability report analyzed the sustainability and environmental performance of its operational activities during the 2019 calendar year. Based on 2019 data, the largest emissions sources for Metro's total operational emissions were bus fleets and rail systems at 54 percent and 20 percent, respectively (Metro, 2020b). Non-modal sources (facility energy consumption, employee commuting, etc.) made up 22 percent of total operational emissions. New fleet technologies powered by renewable energy and reduced building energy usage can reduce Metro's emissions over the long term. Since 2012, emissions resulting from building energy use have decreased by 23 percent while emissions from water consumption have been cut in half. Table 6-8 summarizes Metro's recent progress in displacing GHG emissions from its operations and continually shows an annual net displacement of GHG emissions.

Table 6-8. Metro Operations Annual Greenhouse Gas Emissions Displacement

Category	2014	2015	2016	2017	2018	2019
Total Emissions ($MTCO_2e$)[a]	396,380	391,275	390,840	415,872	371,911	326,953
Total Displacement ($MTCO_2e$)[b,d]	-482,813	-465,101	-448,301	-1,020,485	-987,490	-918,076
Mode Shift to Transit	-482,813	-465,101	-448,301	-207,374	-200,669	-186,515
Land Use[c]	NA	NA	NA	-813,110	-786,820	-731,561
Net Emissions ($MTCO_2e$)	**-86,433**	**-73,827**	**-57,461**	**-604,613**	**-615,579**	**-591,123**

Source: Metro, 2020b

[a]Total emissions represent the GHG emissions generated from Metro's operation of transit services such as buses, rail, and vanpools, as well as operations of facilities, including consumption of electricity, natural gas, and water, refrigerants, and employee commuting.

[b]GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage.

[c]GHG emissions displacement calculations were updated in 2018 to reflect the addition of Land Use as a source of emissions displacement. Reporting of land use emissions began with the 2017 reporting year.

[d]In 2018, Metro updated its 2017 GHG emissions inventory baseline with inclusion of the Land Use category and updated utility emission factors.

GHG = greenhouse gas
$MTCO_2e$ = million tons of carbon dioxide equivalents
NA = not applicable

6.3 Impact Evaluation

6.3.1 Impact GHG-1: Would the project result in greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

6.3.1.1 Construction Impact

Construction of Alternative 1 would result in GHG emissions from off-road equipment, mobile sources, including worker vehicles, vendor trucks, and haul trucks, as well as electricity consumption from on-site portable offices. These emissions sources would be related to constructing the monorail aerial alignment, TPSSs, stations, monorail MSF, and e-bus MSF. For Alternative 1, its precast concrete facility would be offsite in Antelope Valley or Riverside County. GHG emissions related to hauling precast components from the precast facility to the construction worksites were included in the emissions analysis. The Alternative 1 alignment would be completely aerial and would not require use of a tunnel boring machine (TBM).

As discussed previously under Section 3.1, Construction, construction GHG emissions are inherently cumulative in nature and the South Coast Air Quality Management District (SCAQMD) guidance states construction-related GHG emissions should be amortized over the lifetime of a project and the amortized construction emissions should be combined with annual operational emissions to evaluate a project's potential impacts from long-term emissions. Based on this, the Alternative 1 construction emissions were amortized over its design lifetime of 30 years, then combined with the Alternative 1 annual operational GHG emissions. Table 6-9 summarizes the Alternative 1 GHG emissions throughout the construction period. As shown in Table 6-9, Alternative 1 construction would generate a total of

60,653 $MTCO_2e$ and would result in 2,022 $MTCO_2e$ annually when amortized over the project lifetime of 30 years. Detailed emissions calculations are summarized in Appendix A.

Table 6-9. Alternative 1: Construction Greenhouse Gas Emissions

Construction Year	GHG Emissions ($MTCO_2e$)[a,b]
2029	4,906
2030	5,999
2031	8,898
2032	14,860
2033	13,240
2034	8,605
2035	3,916
2036	163
TBM Electricity Consumption	–
Portable Office Electricity Consumption	66
Total Construction Emissions	**60,653**
Amortized Construction Emissions (30 Years)	2,022

Source: HTA, 2024

[a]Totals may vary due to rounding.

[b]GHG emissions related to electricity consumption represent the total GHG emissions over the entire construction period.

[c]Alternative 1 would not require a TBM.

– = no data
GHG = greenhouse gas
$MTCO_2e$ = metric tons of carbon dioxide equivalents
TBM = tunnel boring machine

It should be noted that total and annual construction GHG emissions represent a conservative assessment because GHG emissions would decrease in future years as the construction industry shifts toward implementation of cleaner fuels (i.e., electrified equipment) and more efficient technologies. Additionally, Metro's Green Construction Policy requires contractors to use renewable diesel, which would reduce upstream GHG emissions related to producing the fuel, as well as reduce GHG emissions from fuel combustion in off-road equipment and trucks as compared to petroleum diesel. Thus, the annual construction GHG emissions associated with Alternative 1 would decrease with time and are likely to be lower than estimated herein. Alternative 1 construction emissions were amortized over Alternative 1's design lifetime of 30 years, then combined with Alternative 1 annual operational GHG emissions. As shown in Table 6-10, annual operations of Alternative 1 compared to 2045 without Project conditions would result in a net reduction of GHG emissions; therefore, impacts from Alternative 1 construction emissions would be considered less than significant.

6.3.1.2 Operational Impact

Operations of Alternative 1 would generate long-term GHG emissions from direct and indirect sources. Direct sources consist of mobile sources, including regional VMT and employees traveling to and from the monorail MSF and electric bus MSF, area sources related to landscaping equipment, emergency generator usage during maintenance testing, and refrigerants used in building air conditioning systems. Indirect sources include electricity generation at power plants associated with traction power for the alignment and electric buses, building electricity consumption, electricity consumption related to water and wastewater conveyance, and waste decomposition at landfills from solid waste generation. As described in Section 6.1.1.7, the monorail MSF Base Design and MSF Design Option 1 would have the same facilities; therefore, operational emissions for MSF Design Option 1 would be equivalent to the GHG emissions modeled for the MSF Base Design. Regardless of which MSF is selected in future final design decisions, the GHG analysis adequately accounted for emissions from either of these MSFs.

The Alternative 1 annual GHG emissions were estimated for two scenarios: Alternative 1 compared to 2045 without Project conditions and Alternative 1 compared to Existing Conditions 2021. As discussed in Section 3.3, CEQA Thresholds of Significance, GHG impacts would be evaluated based on the net change in emissions between project alternatives in Horizon Year 2045 and 2045 without Project conditions. The comparison for Alternative 1 2045 and Existing Conditions 2021 is presented for informational purposes only. Detailed emissions calculations are summarized in Appendix A.

Table 6-10 summarizes the Alternative 1 annual GHG emissions for each source category compared to 2045 without Project conditions. As shown in Table 6-10, when compared to 2045 without Project conditions, Alternative 1 would result in a net reduction of annual GHG emissions in Horizon Year 2045. This reduction is primarily related to mobile emissions associated with a reduction in VMT. As stated in the *Sepulveda Transit Corridor Project Transportation Technical Report* (Metro, 2025), implementation of Alternative 1 would reduce regional daily VMT by 341,800 miles per day compared to 2045 without Project conditions.

Table 6-10. Alternative 1: Annual Greenhouse Gas Emissions Compared to 2045 without Project Conditions

Source Category	GHG Emissions ($MTCO_2e$/Year)[a]
Alternative 1	
Area	14
Electricity	3,067
Mobile-VMT Analysis	57,154,350
Mobile-Employee Travel	1,232
Water	37
Waste	37
Refrigerants	<0.1
Emergency Generators[b]	45
Amortized Construction	2,022
Alternative 1 Total Annual Emissions	**57,160,803**
2045 without Project Conditions	
Mobile – 2045 VMT Analysis Annual Emissions	57,188,730
Net Change in Emissions	**-27,927**

Source: HTA, 2024

[a]Totals may vary due to rounding.
[b]An emergency generator would be located at MSF.

GHG = greenhouse gas
$MTCO_2e$/Year = metric tons of carbon dioxide equivalents per year
VMT = vehicle miles traveled

Alternative 1 would support state, regional and local efforts to reduce GHG emissions by providing an efficient transit system as an alternative mode of transportation for commuters traveling between the Valley and Westside of Los Angeles. Implementation of Alternative 1 would expand Metro's regional transit network with an all-electric transit system, thereby reducing GHG emissions related to regional VMT and providing further contributions to Metro's net displacement of operational GHG emissions. Overall, Alternative 1 would not result in an incremental increase in GHG emissions that would contribute to climate change, but rather would result in an environmental benefit by reducing GHG emissions; therefore, impacts of operational GHG emissions would be less than significant.

Table 6-11 summarizes the Alternative 1 annual GHG emissions for each source category compared to existing conditions 2021. This is presented for informational purposes only. As shown in Table 6-11, when compared to existing conditions, Alternative 1 would result in a net reduction of annual GHG emissions. The primary driver of the net reduction is mobile source emissions, which are a function of VMT and emission factors.

Table 6-11. Alternative 1: Annual Greenhouse Gas Emissions (Horizon Year 2045) Compared to Existing Conditions (Baseline Year 2021)

Source Category	GHG Emissions ($MTCO_2e$/Year)[a]
Alternative 1	
Area	14
Electricity	3,067
Mobile-VMT Analysis	57,154,350
Mobile-Employee Travel	1,232
Water	37
Waste	37
Refrigerants	<0.1
Emergency Generators[b]	45
Amortized Construction	2,022
Alternative 1 Total Annual Emissions	**57,160,803**
Existing Conditions	
Mobile – 2021 VMT Analysis Annual Emissions	64,691,322
Net Change in Emissions	**-7,530,519**

Source: HTA, 2024

[a]Totals may vary due to rounding.
[b]An emergency generator would be located at MSF.

GHG = greenhouse gas
$MTCO_2e$/Year = metric tons of carbon dioxide equivalents per year
VMT = vehicle miles traveled

6.3.2 Impact GHG-2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

6.3.2.1 Construction Impact

Construction of Alternative 1 would generate short-term GHG emissions related to off-road equipment, mobile sources, and electricity consumption. Alternative 1 construction would comply with Metro's Green Construction Policy, which requires idling restrictions for off-road equipment and trucks, using trucks with model years 2007 or newer, requiring contractors to use renewable diesel for all diesel engines, and implementing best management practices, such as using electric-powered equipment in lieu of diesel equipment where available. Upon completion of Alternative 1 construction, these emissions would cease. As GHG emissions are exclusively cumulative impacts, the Alternative 1 amortized construction emissions were included with the long-term operational emissions for

Alternative 1. Based on the discussion in Section 6.3.2.2, annual operational emissions, which included amortized construction emissions, were found to not conflict with plans or policies to reduce GHG emissions; therefore, impacts for construction-related GHG emissions would be less than significant.

6.3.2.2 Operational Impact

Plans, policies, and regulations focused on reducing GHG emissions occur at the state, regional, and local levels. At the state level, these efforts are guided primarily by Assembly Bill (AB) 32, Senate Bill (SB) SB 32, AB 1279, and the *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) (CARB, 2022). At the regional level, the 2024-2050 RTP/SCS contains strategies for reducing GHG emissions within the Sustainable Development focus area, as well as Metro's 2019 *Climate Action and Adaptation Plan* (CAAP) (Metro, 2019c) and the *Moving Beyond Sustainability – Strategic Plan 2020* (Metro, 2020a) (referred to as "Moving Beyond Sustainability"). Lastly at the local level, relevant plans include the City of Los Angeles' *Sustainable City pLAn* and *Mobility Plan 2035* (City of Los Angeles, 2015, 2016). The following sections discuss the consistency of Alternative 1 with these state, regional, and local plans for reducing GHG emissions.

Consistency with AB 32, SB 32, AB 1279, and 2022 Scoping Plan

AB 32, SB 32, and AB 1279 outline the state's GHG emissions reduction targets for 2020, 2030, and 2045, respectively. In 2008 and 2014, CARB adopted the 2008 Scoping Plan and the 2014 *First Update to the Climate Change Scoping Plan*, respectively, as a framework for achieving the emissions reduction targets in AB 32 (CARB, 2008a, 2014). These plans outline a series of technologically feasible and cost-effective measures to reduce statewide GHG emissions. CARB adopted *California's 2017 Climate Change Scoping Plan* (CARB, 2017) in November 2017 as a framework to achieve the 2030 GHG reduction goal described in SB 32, which is to reduce statewide GHG emissions to 1990 levels by 2020 and to 40 percent below 1990 levels by 2030. Most recently, the 2022 Scoping Plan was adopted in September 2022 and outlines how the state will achieve carbon neutrality and reduce statewide GHG emissions 85 percent below 1990 levels by 2045. The analysis year for Alternative 1 is 2045 (horizon year); therefore, the statewide GHG emissions reduction target for 2045 is the statutory statewide milestone target that is applicable to Alternative 1.

As discussed in Section 6.2 Existing Conditions, the transportation sector is the largest contributor to statewide GHG emissions. Similarly, the 2022 Scoping Plan focuses heavily on strategies and actions to reduce GHG emissions from the transportation sector, such as reducing VMT through transportation infrastructure that aligns with the state's climate goals. Alternative 1 would be consistent with this objective because it would reduce regional daily VMT by 341,800 miles per day (compared to 2045 without Project conditions), resulting in an overall net reduction in annual GHG emissions.

The 2022 Scoping Plan also focuses on transitioning commercial building energy from fossil fuel sources to non-combustion alternatives. Alternative 1 would be consistent with this effort because it would comply with the City of Los Angeles Municipal Code Section 99.04.106.8, which requires all new buildings to be all-electric. Additionally, Alternative 1 would be designed to meet sustainable certifications for its major components. The entire track alignment would be designed to attain a minimum Envision Verified Award Level (currently version 3), MSF buildings would be designed to achieve a minimum of Leadership in Energy and Environmental Design (LEED) Silver, and all stations and MSFs would be designed to meet Tier 2 of the California Green Building Standards Code (LASRE, 2024). Overall, Alternative 1 would not conflict with the state goals and strategies for reducing GHG emissions.

Consistency with 2024-2050 RTP/SCS

The 2024-2050 RTP/SCS is a long-range planning document that balances future mobility and housing needs with economic, environmental, and public health goals in the SCAG region. One of the key strategies of the plan is to integrate land use, housing, and transportation planning to ensure sustainable regional growth. The SCS portion of the 2024-2050 RTP/SCS includes a combination of transportation and land use strategies to meet GHG reduction goals, such as emphasizing land use patterns that facilitate multimodal access to work, educational and other destinations; focusing on a regional jobs/housing balance to reduce commute times and distances and expand job opportunities near transit and along center-focused main streets; and encouraging design and transportation options that reduce the reliance on solo car trips. Alternative 1 would support these strategies by providing access to a safe, sustainable, and efficient transit system located in dense urban communities with major job centers, including connecting to UCLA via its electric bus route from the Wilshire Boulevard/Metro D Line Station.

Implementation of the 2024-2050 RTP/SCS would achieve regional GHG reductions relative to 2005 SCAG areawide levels of approximately 8 percent in 2020 and approximately 19 percent by 2035 (SCAG, 2024a). Additionally, SCAG indicates effective implementation of the 2024-2050 RTP/SCS would reduce daily VMT per capita by 6.3 percent compared to the SCAG 2050 Baseline scenario. The Baseline scenario represents how the region would perform without implementation of the 2024-2050 RTP/SCS. As shown in Table 6-10, implementation of Alternative 1 would result in a net reduction of GHG emissions and would directly contribute to meeting the objectives and emission reduction targets outlined in the 2024-2050 RTP/SCS. Overall, Alternative 1 would not conflict with the goals and strategies of the 2024-2050 RTP/SCS to reduce VMT and associated GHG emissions.

Consistency with Metro Plans

Metro has developed policies directed toward controlling GHG emissions through a variety of plans over the last decade. The most recent and relevant plans are the 2019 CAAP and Moving Beyond Sustainability, which builds upon previous commitment to environmental and sustainability stewardship. The 2019 CAAP set a goal of reducing GHG emissions by 79 percent relative to 2017 by 2030, and 100 percent by 2050. Moving Beyond Sustainability also includes goals of reducing GHG emissions by 100 percent relative to 2017 by 2050 and displacing or preventing GHG emissions. As a Metro project, Alternative 1 would inherently be required to be consistent with goals and strategies for each of these plans. As shown in Table 6-10, implementation of Alternative 1 would result in a net reduction in GHG emissions compared to future conditions, thus supporting the GHG reduction goals for both of these plans. Overall, Alternative 1 would not conflict with the goals and strategies of Metro's plans to reduce GHG emissions.

Consistency with Sustainable City pLAn

LA's Green New Deal, Sustainable City pLAn (City of Los Angeles Mayor's Office, 2019) was the first 4-year update to the *Sustainable City pLAn* (2015 pLAn) (City of Los Angeles, 2015) and expands in more detail the vision to achieve a sustainable future that entails a carbon-neutral economy by 2050. *LA's Green New Deal, Sustainable City pLAn* (henceforth referred to as the "2019 updates to the pLAn") accelerates targets from the 2015 pLAn for supplying renewable energy, increasing local water sourcing, reducing building energy, reducing VMT per capita, reducing municipal GHG emissions, increasing the percentage of zero emission passenger and city-fleet vehicles, building new housing near transit, and increasing the number of green jobs.

The 2019 updates to the pLAn would accelerate GHG reductions targets, including reducing GHG emissions by 50 percent by 2025, 73 percent by 2035, and becoming carbon neutral by 2050, all relative to a 1990 baseline. As shown in Table 6-10, implementation of Alternative 1 would result in a net reduction in GHG emissions compared to future conditions, thus supporting GHG reduction goals. Additionally, Alternative 1 would provide access to a safe and efficient transit system located in dense urban communities near major job centers and UCLA, and would be developed to meet sustainable certifications, such as Envision, LEED, and CALGreen building codes. Overall, Alternative 1 would not conflict with the goals and strategies of the 2019 updates to the pLAn to reduce GHG emissions.

Consistency with City of Los Angeles Mobility Plan 2035

Mobility Plan 2035 emphasizes the efficacy of multi-modal street design in reducing GHG emissions through encouraging the use of transit and active transportation, which decreases regional dependence on passenger vehicles (DCP, 2016). Alternative 1 would support these strategies by providing access to a safe, sustainable, and efficient transit system located in dense urban communities with major job centers and UCLA via its electric bus route from the Wilshire Boulevard/Metro D Line Station. Alternative 1 would not conflict with the goals and strategies of *Mobility Plan 2035* to reduce GHG emissions.

Overall, Alternative 1 would not conflict with plans, policies, or regulations adopted for the purpose of reducing GHG emissions; therefore, impacts would be less than significant.

6.4 Mitigation Measures

6.4.1 Construction Impacts

No mitigation measures are required.

6.4.2 Operational Impacts

No mitigation measures are required.

6.4.3 Impacts After Mitigation

No mitigation measures are required; impacts are less than significant.

7 ALTERNATIVE 3

7.1 Alternative Description

Alternative 3 is an aerial monorail alignment that would run along the Interstate 405 (I-405) corridor and would include seven aerial monorail transit (MRT) stations and an underground tunnel alignment between the Getty Center and Wilshire Boulevard with two underground stations. This alternative would provide transfers to five high-frequency fixed guideway transit and commuter rail lines, including the Los Angeles County Metropolitan Transportation Authority's (Metro) E, Metro D, and Metro G Lines, the East San Fernando Valley Light Rail Transit Line, and the Metrolink Ventura County Line. The length of the alignment between the terminus stations would be approximately 16.1 miles, with 12.5 miles of aerial guideway and 3.6 miles of underground configuration.

The seven aerial and two underground MRT stations would be as follows:

1. Metro E Line Expo/Sepulveda Station (aerial)
2. Santa Monica Boulevard Station (aerial)
3. Wilshire Boulevard/Metro D Line Station (underground)
4. UCLA Gateway Plaza Station (underground)
5. Getty Center Station (aerial)
6. Ventura Boulevard/Sepulveda Boulevard Station (aerial)
7. Metro G Line Sepulveda Station (aerial)
8. Sherman Way Station (aerial)
9. Van Nuys Metrolink Station (aerial)

7.1.1 Operating Characteristics

7.1.1.1 Alignment

As shown on Figure 7-1, from its southern terminus at the Metro E Line Expo/Sepulveda Station, the alignment of Alternative 3 would generally follow I-405 to the Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor, except for an underground segment between Wilshire Boulevard and the Getty Center.

The proposed southern terminus station would be located west of the existing Metro E Line Expo/Sepulveda Station, east of I-405, between Pico Boulevard and Exposition Boulevard. Tail tracks would extend just south of the station adjacent to the eastbound Interstate 10 to northbound I-405 connector over Exposition Boulevard. North of the Metro E Line Expo/Sepulveda Station, a storage track would be located off of the main alignment north of Pico Boulevard, between I-405 and Cotner Avenue. The alignment would continue north along the east side of I-405 until just south of Santa Monica Boulevard, where a proposed station would be located between the I-405 northbound travel lanes and Cotner Avenue. The alignment would cross over the northbound and southbound freeway lanes north of Santa Monica Boulevard and travel along the west side of I-405. Once adjacent to the U.S. Department of Veterans Affairs (VA) Hospital site, the alignment would cross back over the I-405 lanes and Sepulveda Boulevard, before entering an underground tunnel south of the Federal Building parking lot.

Figure 7-1. Alternative 3: Alignment

Source: LASRE, 2024; HTA, 2024

The alignment would proceed east underground and turn north under Veteran Avenue toward the proposed Wilshire Boulevard/Metro D Line Station located under the University of California, Los Angeles (UCLA) Lot 36 on the east side of Veteran Avenue north of Wilshire Boulevard. North of this station, the underground alignment would curve northeast parallel to Weyburn Avenue before curving north and traveling underneath Westwood Plaza at Le Conte Avenue. The alignment would follow Westwood Plaza until the underground UCLA Gateway Plaza Station in front of the Luskin Conference

Center. The alignment would then continue north under the UCLA campus until Sunset Boulevard, where the tunnel would curve northwest for approximately 2 miles to rejoin I-405.

The Alternative 3 alignment would transition from an underground configuration to an aerial guideway structure after exiting the tunnel portal located at the northern end of the Leo Baeck Temple parking lot. The alignment would cross over Sepulveda Boulevard and the I-405 lanes to the proposed Getty Center Station on the west side of I-405, just north of the Getty Center tram station. The alignment would return to the median for a short distance before curving back to the west side of I-405 south of the Sepulveda Boulevard undercrossing north of the Getty Center Drive interchange. After crossing over Bel Air Crest Road and Skirball Center Drive, the alignment would again return to the median and run under the Mulholland Drive Bridge, then continue north within the I-405 median to descend into the San Fernando Valley (Valley).

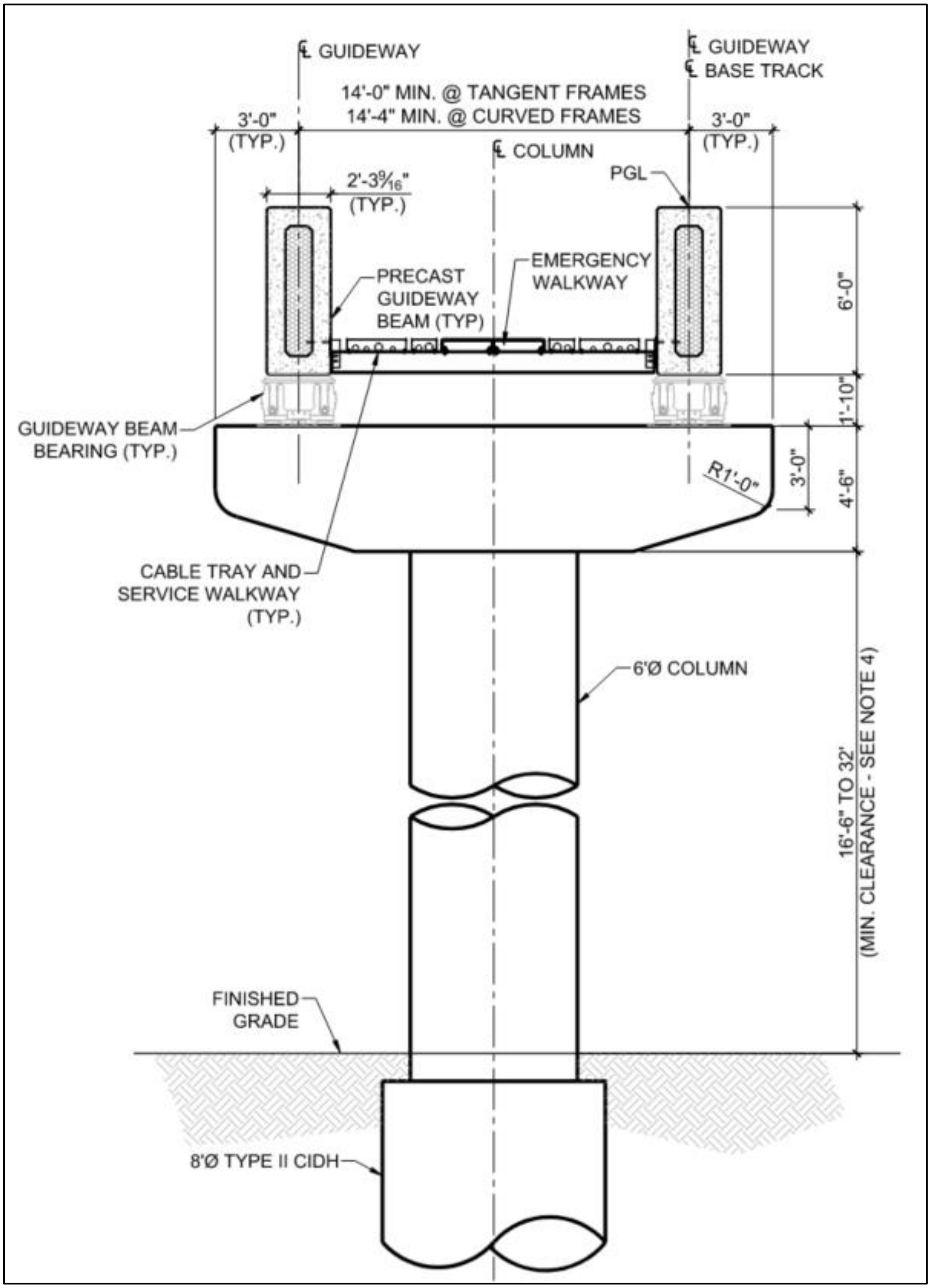
Near Greenleaf Street, the alignment would cross over the northbound freeway lanes and on-ramps toward the proposed Ventura Boulevard Station on the east side of I-405. This station would be located above a transit plaza and replace an existing segment of Dickens Street adjacent to I-405, just south of Ventura Boulevard. Immediately north of the Ventura Boulevard Station, the alignment would cross over the northbound I-405 to U.S. Highway 101 (US-101) connector and continue north between the connector and the I-405 northbound travel lanes. The alignment would continue north along the east side of I-405—crossing over US-101 and the Los Angeles River—to a proposed station on the east side of I-405, near the Metro G Line Busway. A new at-grade station on the Metro G Line would be constructed for Alternative 3 adjacent to the proposed station. These proposed stations are shown on the Metro G Line inset area on Figure 7-1.

The alignment would then continue north along the east side of I-405 to the proposed Sherman Way Station. The station would be located inside the I-405 northbound loop off-ramp to Sherman Way. North of the station, the alignment would continue along the eastern edge of I-405, then curve to the southeast parallel to the LOSSAN rail corridor. The alignment would run elevated along Raymer Street east of Sepulveda Boulevard and cross over Van Nuys Boulevard to the proposed terminus station adjacent to the Van Nuys Metrolink/Amtrak Station. Overhead utilities along Raymer Street would be undergrounded where they would conflict with the guideway or its supporting columns. Tail tracks would be located southeast of this terminus station.

7.1.1.2 Guideway Characteristics

Alternative 3 would utilize straddle-beam monorail technology, which allows the monorail vehicle to straddle a guide beam that both supports and guides the vehicle. Alternative 3 would operate on aerial and underground guideways with dual-beam configurations. Northbound and southbound trains would travel on parallel beams either in the same tunnel or supported by a single-column or straddle-bent aerial structure. Figure 7-2 shows a typical cross-section of the aerial monorail guideway.

Figure 7-2. Typical Aerial Monorail Guideway Cross-Section

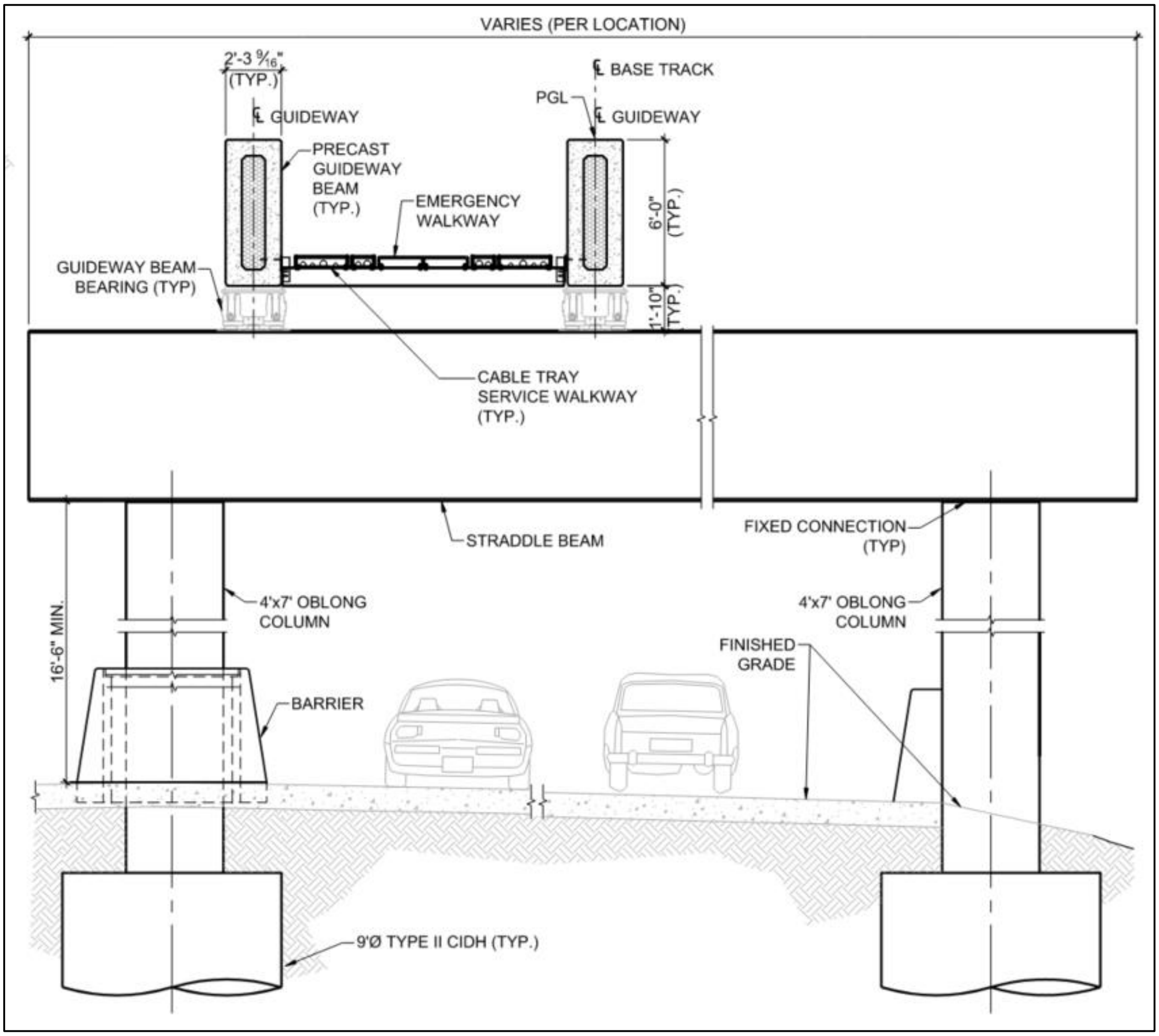


Source: LASRE, 2024

On a typical guideway section (i.e., not at a station), guide beams would rest on 20-foot-wide column caps (i.e., the structure connecting the columns and the guide beams), with typical spans (i.e., the distance between columns) ranging from 70 to 190 feet. The bottom of the column caps would typically be between 16.5 feet and 32 feet above ground level.

Over certain segments of roadway and freeway facilities, a straddle-bent configuration, as shown on Figure 7-3, consisting of two concrete columns constructed outside of the underlying roadway would be used to support the guide beams and column cap. Typical spans for these structures would range between 65 and 70 feet. A minimum 16.5-foot clearance would be maintained between the underlying roadway and the bottom of the column caps.

Figure 7-3. Typical Monorail Straddle-Bent Cross-Section

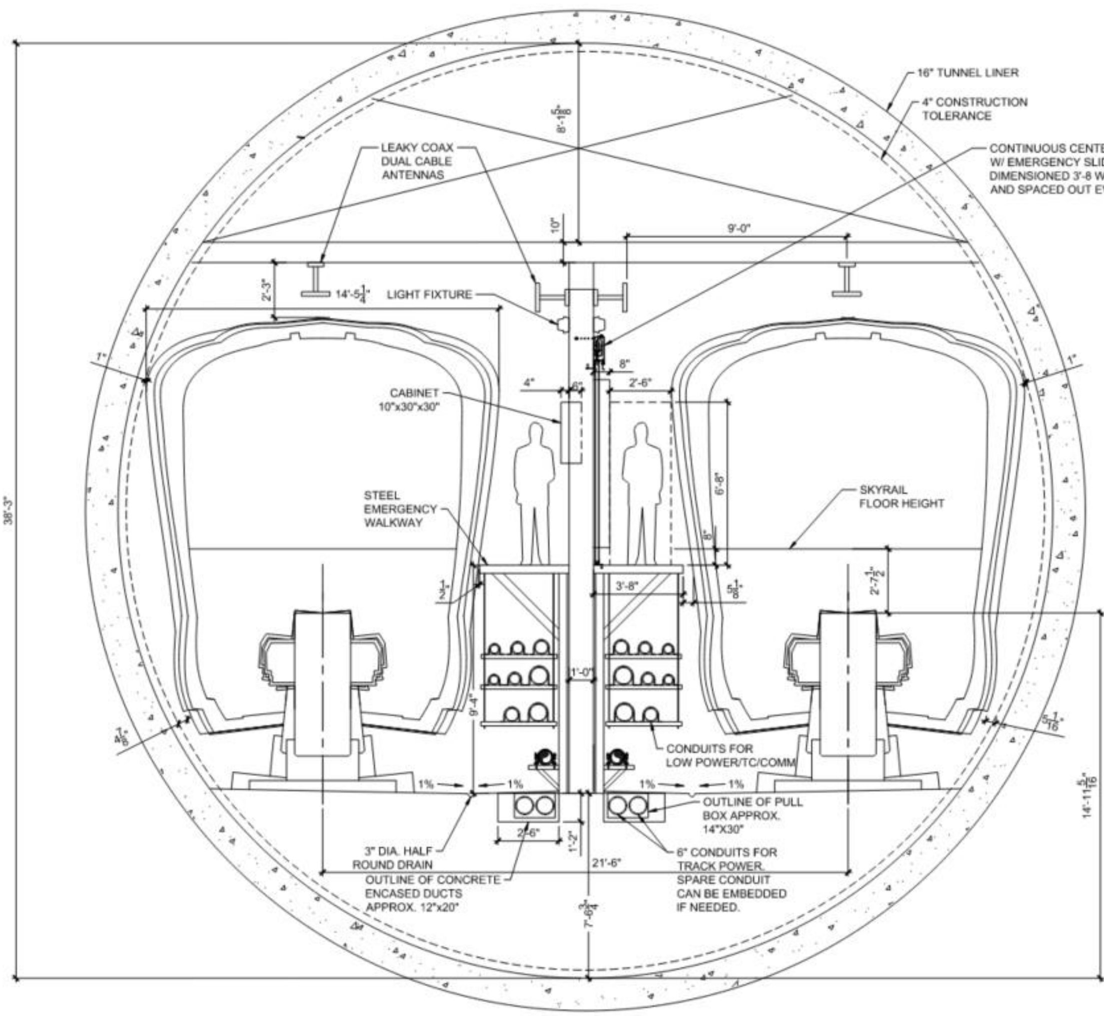


Source: LASRE, 2024

Structural support columns would vary in size and arrangement by alignment location. Columns would be 6 feet in diameter along main alignment segments adjacent to I-405 and be 4 feet wide by 6 feet long in the I-405 median. Straddle-bent columns would be 4 feet wide by 7 feet long. At stations, six rows of dual 5-foot by 8-foot columns would support the aerial guideway. Beam switch locations and long-span structures would also utilize different sized columns, with dual 5-foot columns supporting switch locations and either 9-foot or 10-foot-diameter columns supporting long-span structures. Crash protection barriers would be used to protect the columns. All columns would have a cast-in-drilled-hole (CIDH) pile foundation extending 1 foot in diameter beyond the column width with varying depths for appropriate geotechnical considerations and structural support.

For underground sections, a single 40-foot-diameter tunnel would be needed to accommodate dual-beam configuration. The tunnel would be divided by a 1-foot-thick center wall dividing two compartments with a 14.5-foot-wide space for trains and a 4-foot-wide emergency evacuation walkway. The center wall would include emergency sliding doors placed every 750 to 800 feet. A plenum within the crown of the tunnel, measuring 8 feet tall from the top of the tunnel, would allow for air circulation and ventilation. Figure 7-4 illustrates these components at a typical cross-section of the underground monorail guideway.

Figure 7-4. Typical Underground Monorail Guideway Cross-Section



Source: LASRE, 2024

7.1.1.3 Vehicle Technology

Alternative 3 would utilize straddle-beam monorail technology, which allows the monorail vehicle to straddle a guide beam that both supports and guides the vehicle. Rubber tires would sit both atop and on each side of the guide beam to provide traction and guide the train. Trains would be automated and powered by power rails mounted to the guide beam, with planned peak-period headways of 166 seconds and off-peak-period headways of 5 minutes. Monorail trains could consist of up to eight cars. Alternative 3 would have a maximum operating speed of 56 miles per hour; actual operating speeds would depend on the design of the guideway and distance between stations.

Monorail train cars would be 10.5 feet wide, with two double doors on each side. End cars would be 46.1 feet long with a design capacity of 97 passengers, and intermediate cars would be 35.8 feet long and have a design capacity of 90 passengers.

7.1.1.4 Stations

Alternative 3 would include seven aerial and two underground MRT stations with platforms approximately 320 feet long. Aerial stations would be elevated 50 feet to 75 feet above the ground level, and underground stations would be 80 feet to 110 feet underneath the existing ground level. The Metro E Line Expo/Sepulveda, Santa Monica Boulevard, Ventura Boulevard/Sepulveda Boulevard, Sherman Way, and Van Nuys Metrolink Stations would be center-platform stations where passengers would travel up to a shared platform that would serve both directions of travel. The Wilshire Boulevard/Metro D Line, UCLA Gateway Plaza, Getty Center, and Metro G Line Sepulveda Stations would be side-platform stations where passengers would select and travel up or down to station platforms, depending on their direction of travel. Each station, regardless of whether it has side or center platforms, would include a concourse level prior to reaching the train platforms. Each station would have a minimum of two elevators, two escalators, and one stairway from ground level to the concourse.

Aerial station platforms would be approximately 320 feet long and would be supported by six rows of dual 5-foot by 8-foot columns. The platforms would be covered but not enclosed. Side-platform stations would be 61.5 feet wide to accommodate two 13-foot-wide station platforms with a 35.5-foot-wide intermediate gap for side-by-side trains. Center-platform stations would be 49 feet wide, with a 25-foot-wide center platform.

Underground side platforms would be 320 feet long and 26 feet wide, separated by a distance of 31.5 feet for side-by-side trains.

Monorail stations would include automatic, bi-parting fixed doors along the edges of station platforms. These doors would be integrated into the automatic train control system and would not open unless a train is stopped at the platform.

The following information describes each station, with relevant entrance, walkway, and transfer information. Bicycle parking would be provided at each station.

Metro E Line Expo/Sepulveda Station

- This aerial station would be located near the existing Metro E Line Expo/Sepulveda Station, just east of I-405, between Pico Boulevard and Exposition Boulevard.
- A transit plaza and station entrance would be located on the east side of the station.
- An off-street passenger pick-up/drop-off loop would be located south of Pico Boulevard west of Cotner Avenue.
- An elevated pedestrian walkway would connect the concourse level of the proposed station to the Metro E Line Expo/Sepulveda Station within the fare paid zone.

- Passengers would be able to park at the existing Metro E Line Expo/Sepulveda Station parking facility, which provides 260 parking spaces. No additional automobile parking would be provided at the proposed station.

Santa Monica Boulevard Station

- This aerial station would be located just south of Santa Monica Boulevard, between the I-405 northbound travel lanes and Cotner Avenue.
- Station entrances would be located on the southeast and southwest corners of Santa Monica Boulevard and Cotner Avenue. The entrance on the southeast corner of the intersection would be connected to the station concourse level via an elevated pedestrian walkway spanning Cotner Avenue.
- No dedicated station parking would be provided at this station.

Wilshire Boulevard/Metro D Line Station

- This underground station would be located under UCLA Lot 36 on the east side of Veteran Avenue, north of Wilshire Boulevard.
- A station entrance would be located on the northeast corner of the intersection of Veteran Avenue and Wilshire Boulevard.
- An underground pedestrian walkway would connect the concourse level of the proposed station to the Metro D Line Westwood/UCLA Station using a knock-out panel provided in the Metro D Line Station box. This connection would occur within the fare paid zone.
- No dedicated station parking would be provided at this station.

UCLA Gateway Plaza Station

- This underground station would be located beneath Gateway Plaza.
- Station entrances would be located on the northern end and southeastern end of the plaza.
- No dedicated station parking would be provided at this station.

Getty Center Station

- This aerial station would be located on the west side of I-405 near the Getty Center, approximately 1,000 feet north of the Getty Center tram station.
- An elevated pedestrian walkway would connect the proposed station's concourse level with the Getty Center tram station. The proposed connection would occur outside the fare paid zone.
- An entrance to the walkway above the Getty Center's parking lot would be the proposed station's only entrance.
- No dedicated station parking would be provided at this station.

Ventura Boulevard/Sepulveda Boulevard Station

- This aerial station would be located east of I-405, just south of Ventura Boulevard.
- A transit plaza, including two station entrances, would be located on the east side of the station. The plaza would require the closure of a 0.1-mile segment of Dickens Street, between Sepulveda

Boulevard and Ventura Boulevard, with a passenger pick-up/drop-off loop and bus stops provided south of the station, off Sepulveda Boulevard.

- No dedicated station parking would be provided at this station.

Metro G Line Sepulveda Station

- This aerial station would be located near the Metro G Line Sepulveda Station, between I-405 and the Metro G Line Busway.
- Entrances to the MRT station would be located on both sides of the new proposed Metro G Line bus rapid transit (BRT) station.
- An elevated pedestrian walkway would connect the concourse level of the proposed station to the proposed new Metro G Line BRT station outside of the fare paid zone.
- Passengers would be able to park at the existing Metro G Line Sepulveda Station parking facility, which has a capacity of 1,205 parking spaces. Currently, only 260 parking spaces are used for transit parking. No additional automobile parking would be provided at the proposed station.

Sherman Way Station

- This aerial station would be located inside the I-405 northbound loop off-ramp to Sherman Way.
- A station entrance would be located on the north side of Sherman Way, directly across the street from the I-405 northbound off-ramp to Sherman Way East.
- An on-street passenger pick-up/drop-off area would be provided on the north side of Sherman Way west of Firmament Avenue.
- No dedicated station parking would be provided at this station.

Van Nuys Metrolink Station

- This aerial station would be located on the east side of Van Nuys Boulevard, just south of the LOSSAN rail corridor, incorporating the site of the current Amtrak ticket office.
- A station entrance would be located on the east side of Van Nuys Boulevard, just south of the LOSSAN rail corridor. A second entrance would be located to the north of the LOSSAN rail corridor with an elevated pedestrian walkway connecting to both the concourse level of the proposed station and the platform of the Van Nuys Metrolink/Amtrak Station.
- Existing Metrolink Station parking would be reconfigured, maintaining approximately the same number of spaces, but 180 parking spaces would be relocated north of the LOSSAN rail corridor. Metrolink parking would not be available to Metro transit riders.

7.1.1.5 Station-to-Station Travel Times

Table 7-1 presents the station-to-station distance and travel times for Alternative 3. The travel times include both running time and dwelling time. The travel times differ between northbound and southbound trips because of grade differentials and operational considerations at end-of-line stations.

Table 7-1. Alternative 3: Station-to-Station Travel Times and Station Dwell Times

From Station	To Station	Distance (miles)	Northbound Station to Station Travel Time (seconds)	Southbound Station to Station Travel Time (seconds)	Dwell Time (seconds)
Metro E Line Station					*30*
Metro E Line	Santa Monica Boulevard	0.9	123	97	—
Santa Monica Boulevard Station					*30*
Santa Monica Boulevard	Wilshire/Metro D Line	1.1	192	194	—
Wilshire/Metro D Line Station					*30*
Wilshire/Metro D Line	UCLA Gateway Plaza	0.9	138	133	—
UCLA Gateway Plaza Station					*30*
UCLA Gateway Plaza	Getty Center	2.6	295	284	—
Getty Center Station					*30*
Getty Center	Ventura Boulevard	4.7	414	424	—
Ventura Boulevard Station					*30*
Ventura Boulevard	Metro G Line	2.0	179	187	—
Metro G Line Station					*30*
Metro G Line	Sherman Way	1.5	134	133	—
Sherman Way Station					*30*
Sherman Way	Van Nuys Metrolink	2.4	284	279	—
Van Nuys Metrolink Station					*30*

Source: LASRE, 2024

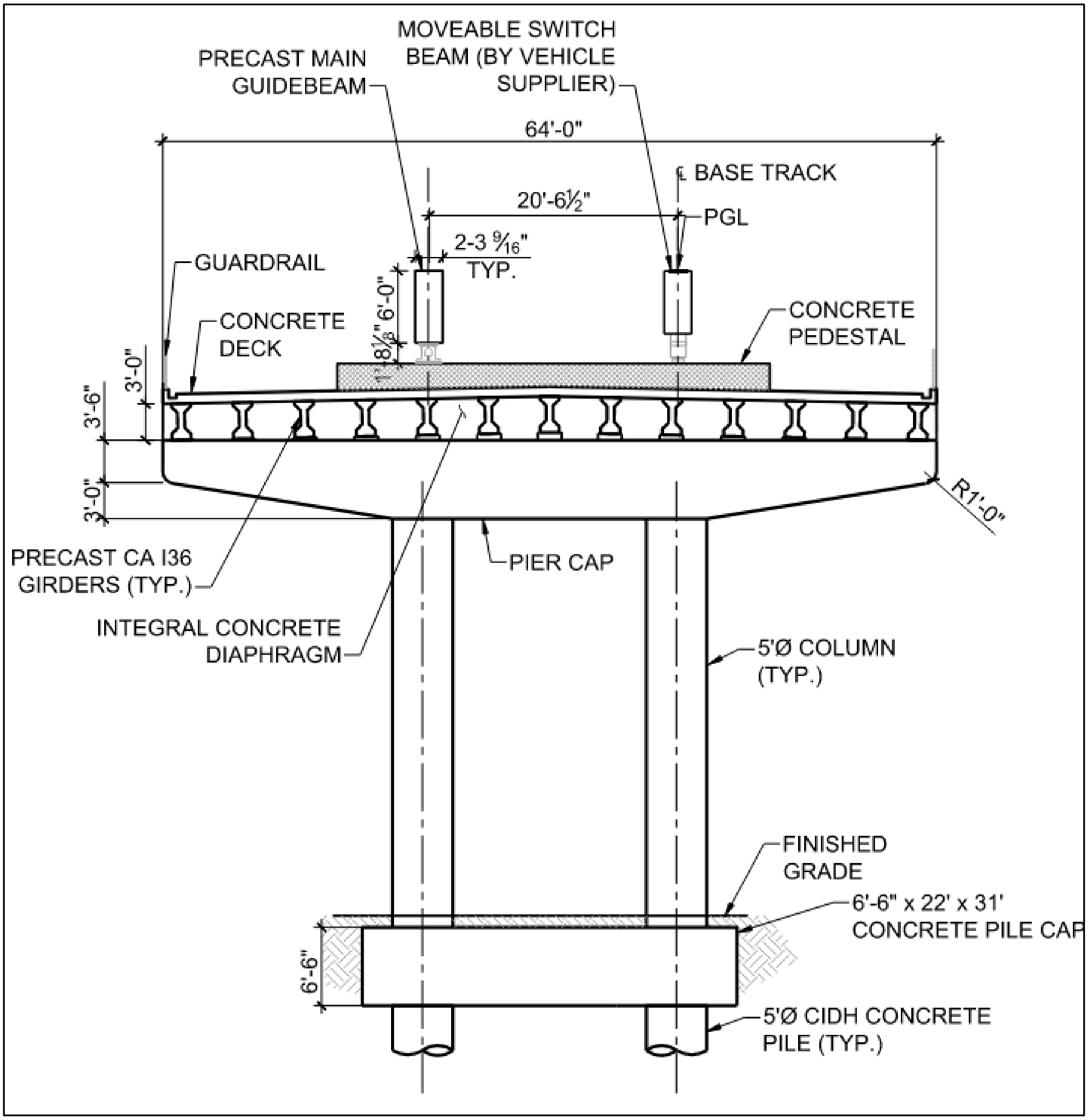
— = no data

7.1.1.6 Special Trackwork

Alternative 3 would include five pairs of beam switches to enable trains to cross over and reverse direction on the opposite beam. All beam switches would be located on aerial portions of the alignment of Alternative 3. From south to north, the first pair of beam switches would be located just north of the Metro E Line Expo/Sepulveda Station. A second pair of beam switches would be located on the west side of I-405, directly adjacent to the VA Hospital site, south of the Wilshire Boulevard/Metro D Line Station. A third pair of beam switches would be located in the Sepulveda Pass just south of Mountaingate Drive and Sepulveda Boulevard. A fourth pair of beam switches would be located south of the Metro G Line Station between the I-405 northbound lanes and the Metro G Line Busway. The final pair would be located near the Van Nuys Metrolink Station.

At beam switch locations, the typical cross-section of the guideway would increase in column and column cap width. The column cap width at these locations would be 64 feet, with dual 5-foot-diameter columns. Underground pile caps for additional structural support would also be required at these locations. Figure 7-5 shows a typical cross-section of the monorail beam switch.

Figure 7-5. Typical Monorail Beam Switch Cross-Section



Source: LASRE, 2024

7.1.1.7 Maintenance and Storage Facility

MSF Base Design

In the maintenance and storage facility (MSF) Base Design for Alternative 3, the MSF would be located on City of Los Angeles Department of Water and Power (LADWP) property east of the Van Nuys Metrolink Station. The MSF Base Design site would be approximately 18 acres and would be designed to accommodate a fleet of 208 monorail vehicles. The site would be bounded by the LOSSAN rail corridor to the north, Saticoy Street to the south, and property lines extending north of Tyrone and Hazeltine Avenues to the east and west, respectively.

Monorail trains would access the site from the main alignment's northern tail tracks at the northwest corner of the site. Trains would travel parallel to the LOSSAN rail corridor before curving southeast to maintenance facilities and storage tracks. The guideway would remain in an aerial configuration within the MSF Base Design, including within maintenance facilities.

The site would include the following facilities:

- Primary entrance with guard shack
- Primary maintenance building that would include administrative offices, an operations control center, and a maintenance shop and office
- Train car wash building
- Emergency generator
- Traction power substation (TPSS)
- Maintenance-of-way (MOW) building
- Parking area for employees

MSF Design Option 1

In the MSF Design Option 1, the MSF would be located on industrial property, abutting Orion Avenue, south of the LOSSAN rail corridor. The MSF Design Option 1 site would be approximately 26 acres and would be designed to accommodate a fleet of 224 monorail vehicles. The site would be bounded by I-405 to the west, Stagg Street to the south, the LOSSAN rail corridor to the north, and Orion Avenue and Raymer Street to the east. The monorail guideway would travel along the northern edge of the site.

Monorail trains would access the site from the monorail guideway east of Sepulveda Boulevard, requiring additional property east of Sepulveda Boulevard and north of Raymer Street. From the northeast corner of the site, trains would travel parallel to the LOSSAN rail corridor before turning south to maintenance facilities and storage tracks parallel to I-405. The guideway would remain in an aerial configuration within the MSF Design Option 1, including within maintenance facilities.

The site would include the following facilities:

- Primary entrance with guard shack
- Primary maintenance building that would include administrative offices, an operations control center, and a maintenance shop and office
- Train car wash building
- Emergency generator
- TPSS
- MOW building
- Parking area for employees

Figure 7-6 shows the locations of the MSF Base Design and MSF Design Option 1 for Alternative 3.

Figure 7-6. Alternative 3: Maintenance and Storage Facility Options

Source: LASRE, 2024; HTA, 2024

7.1.1.8 Traction Power Substations

TPSSs transform and convert high voltage alternating current supplied from power utility feeders into direct current suitable for transit operation. A TPSS on a site of approximately 8,000 square feet would be located approximately every 1 mile along the alignment. Table 7-2 lists the TPSS locations proposed for Alternative 3.

Figure 7-7 shows the TPSS locations along the Alternative 3 alignment.

Table 7-2. Alternative 3: Traction Power Substation Locations

TPSS No.	TPSS Location Description	Configuration
1	TPSS 1 would be located east of I-405, just south of Exposition Boulevard and the monorail guideway tail tracks.	At-grade
2	TPSS 2 would be located east of I-405 and Sepulveda Boulevard, just north of the Getty Center Station.	At-grade
3	TPSS 3 would be located west of I-405, just east of the intersection between Promontory Road and Sepulveda Boulevard.	At-grade
4	TPSS 4 would be located between I-405 and Sepulveda Boulevard, just north of the Skirball Center Drive Overpass.	At-grade
5	TPSS 5 would be located east of I-405, just south of Ventura Boulevard Station, between Sepulveda Boulevard and Dickens Street.	At-grade

TPSS No.	TPSS Location Description	Configuration
6	TPSS 6 would be located east of I-405, just south of the Metro G Line Sepulveda Station.	At-grade
7	TPSS 7 would be located east of I-405, just east of the Sherman Way Station, inside the I-405 Northbound Loop Off-Ramp to Sherman Way westbound.	At-grade
8	TPSS 8 would be located east of I-405, at the southeast quadrant of the I-405 overcrossing with the LOSSAN rail corridor.	At-grade
9	TPSS 9 would be located east of I-405, at the southeast quadrant of the I-405 overcrossing with the LOSSAN rail corridor.	At-grade (within MSF Design Option)
10	TPSS 10 would be located between Van Nuys Boulevard and Raymer Street, south of the LOSSAN rail corridor.	At-grade
11	TPSS 11 would be located south of the LOSSAN rail corridor, between Tyrone Avenue and Hazeltine Avenue.	At-grade (within MSF Base Design)
12	TPSS 12 would be located southwest of Veteran Avenue at Wellworth Avenue.	Underground
13	TPSS 13 would be located within the Wilshire Boulevard/Metro D Line Station.	Underground (adjacent to station)
14	TPSS 14 would be located underneath UCLA Gateway Plaza.	Underground (adjacent to station)

Source: LASRE, 2024; HTA, 2024

Figure 7-7. Alternative 3: Traction Power Substation Locations

Source: LASRE, 2024; HTA, 2024

7.1.1.9 Roadway Configuration Changes

Table 7-3 lists the roadway changes necessary to accommodate the guideway of Alternative 3. Figure 7-8 shows the location of these roadway changes in the Sepulveda Transit Corridor Project (Project) Study Area, except for the I-405 configuration changes, which occur throughout the corridor.

Table 7-3. Alternative 3: Roadway Changes

Location	From	To	Description of Change
Cotner Avenue	Nebraska Avenue	Santa Monica Boulevard	Roadway realignment to accommodate aerial guideway columns
Beloit Avenue	Massachusetts Avenue	Ohio Avenue	Roadway narrowing to accommodate aerial guideway columns
Sepulveda Boulevard	Getty Center Drive	Not Applicable	Southbound right turn lane to Getty Center Drive shortened to accommodate aerial guideway columns
I-405 Northbound On-Ramp and Off-Ramp at Sepulveda Boulevard near I-405 Exit 59	Sepulveda Boulevard near I-405 Northbound Exit 59	Sepulveda Boulevard/I-405 Undercrossing (near Getty Center)	Ramp realignment to accommodate aerial guideway columns and I-405 widening
Sepulveda Boulevard	I-405 Southbound Skirball Center Drive Ramps (north of Mountaingate Drive)	Skirball Center Drive	Roadway realignment into existing hillside to accommodate aerial guideway columns and I-405 widening
I-405 Northbound On-Ramp at Mulholland Drive	Mulholland Drive	Not Applicable	Roadway realignment into the existing hillside between the Mulholland Drive Bridge pier and abutment to accommodate aerial guideway columns and I-405 widening
Dickens Street	Sepulveda Boulevard	Ventura Boulevard	Permanent removal of street for Ventura Boulevard Station construction Pick-up/drop-off area would be provided along Sepulveda Boulevard at the truncated Dickens Street
Sherman Way	Haskell Avenue	Firmament Avenue	Median improvements, passenger drop-off and pick-up areas, and bus pads within existing travel lanes
Raymer Street	Sepulveda Boulevard	Van Nuys Boulevard	Curb extensions and narrowing of roadway width to accommodate aerial guideway columns
I-405	Sepulveda Boulevard Northbound Off-Ramp (Getty Center Drive interchange)	Sepulveda Boulevard Northbound On-Ramp (Getty Center Drive interchange)	I-405 widening to accommodate aerial guideway columns in the median
I-405	Skirball Center Drive	U.S. Highway 101	I-405 widening to accommodate aerial guideway columns in the median

Source: LASRE, 2024; HTA, 2024

Figure 7-8. Alternative 3: Roadway Changes

Source: LASRE, 2024; HTA, 2024

In addition to the changes made to accommodate the guideway, as listed in Table 7-3, roadways and sidewalks near stations would be reconstructed, which would result in modifications to curb ramps and driveways.

7.1.1.10 Ventilation Facilities

For ventilation of the monorail's underground portion, a plenum within the crown of the tunnel would provide a separate compartment for air circulation and allow multiple trains to operate between stations. Vents would be located at the southern portal near the Federal Building parking lot, Wilshire/Metro D Line Station, UCLA Gateway Plaza Station, and at the northern portal near the Leo Baeck Temple parking lot. Emergency ventilation fans would be located at the UCLA Gateway Plaza Station and at the northern and southern tunnel portals.

7.1.1.11 Fire/Life Safety – Emergency Egress

Continuous emergency evacuation walkways would be provided along the guideway. Walkways along the alignment's aerial portions would typically consist of structural steel frames anchored to the guideway beams to support non-slip walkway panels. The walkways would be located between the two guideway beams for most of the aerial alignment; however, where the beams split apart, such as entering center-platform stations, short portions of the walkway would be located on the outside of the beams. For the underground portion of Alternative 3, 3.5-foot-wide emergency evacuation walkways would be located on both sides of the beams. Access to tunnel segments for first responders would be through stations.

7.1.2 Construction Activities

Construction activities for Alternative 3 would include constructing the aerial guideway and stations, underground tunnel and stations, and ancillary facilities, and widening I-405. Construction of the transit facilities through substantial completion is expected to have a duration of 8 ½ years. Early works, such as site preparation, demolition, and utility relocation, could start in advance of construction of the transit facilities.

Aerial guideway construction would begin at the southern and northern ends of the alignment and connect in the middle. Constructing the guideway would require a combination of freeway and local street lane closures throughout the working limits to provide sufficient work area. The first stage of I-405 widening would include a narrowing of adjacent freeway lanes to a minimum width of 11 feet (which would eliminate shoulders) and placing K-rail on the outside edge of the travel lanes to create outside work areas. Within these outside work zones, retaining walls, drainage, and outer pavement widenings would be constructed to allow for I-405 widening. The reconstruction of on- and off-ramps would be the final stage of I-405 widening.

A median work zone along I-405 for the length of the alignment would be required for erection of the guideway structure. In the median work zone, demolition of existing median and drainage infrastructure would be followed by the installation of new K-rails and installation of guideway structural components, which would include full directional freeway closures when guideway beams must be transported into the median work areas during late-night hours. Additional night and weekend directional closures would be required for installation of long-span structures over I-405 travel lanes where the guideway would transition from the median.

Aerial station construction is anticipated to last the duration of construction activities for Alternative 3 and would include the following general sequence of construction:

- Site clearing
- Utility relocation
- Construction fencing and rough grading
- CIDH pile drilling and installation
- Elevator pit excavation
- Soil and material removal

- Pile cap and pier column construction
- Concourse level and platform level falsework and cast-in-place structural concrete
- Guideway beam installation
- Elevator and escalator installation
- Completion of remaining concrete elements such as pedestrian bridges
- Architectural finishes and mechanical, electrical, and plumbing installation

Underground stations, including the Wilshire Boulevard/Metro D Line Station and the UCLA Gateway Plaza Station, would use a “cut-and-cover” construction method whereby the station structure would be constructed within a trench excavated from the surface that is covered by a temporary deck and backfilled during the later stages of station construction. Traffic and pedestrian detours would be necessary during underground station excavation until decking is in place and the appropriate safety measures are taken to resume cross traffic.

A tunnel boring machine (TBM) would be used to construct the underground segment of the guideway. The TBM would be launched from a staging area on Veteran Avenue south of Wilshire Boulevard, and head north toward an exit portal location north of Leo Baeck Temple. The southern portion of the tunnel between Wilshire Boulevard and the Bel Air Country Club would be at a depth between 80 to 110 feet from the surface to the top of the tunnel. The UCLA Gateway Plaza Station would be constructed using cut-and-cover methods. Through the Santa Monica Mountains, the tunnel would range between 30 to 300 feet deep.

Alternative 3 would require construction of a concrete casting facility for columns and beams associated with the elevated guideway. A specific site has not been identified; however, it is expected that the facility would be located on industrially zoned land adjacent to a truck route in either the Antelope Valley or Riverside County. When a site is identified, the contractor would obtain all permits and approvals necessary from the relevant jurisdiction, the appropriate air quality management entity, and other regulatory entities.

TPSS construction would require additional lane closures. Large equipment, including transformers, rectifiers, and switchgears would be delivered and installed through prefabricated modules where possible in at-grade TPSSs. The installation of transformers would require temporary lane closures on Exposition Boulevard, Beloit Avenue, and the I-405 northbound on-ramp at Burbank Boulevard.

Table 7-4 and Figure 7-9 show the potential construction staging areas for Alternative 3. Staging areas would provide the necessary space for the following activities:

- Contractors’ equipment
- Receiving deliveries
- Storing materials
- Site offices
- Work zone for excavation
- Other construction activities (including parking and change facilities for workers, location of construction office trailers, storage, staging and delivery of construction materials and permanent plant equipment, and maintenance of construction equipment)

Table 7-4. Alternative 3: Construction Staging Locations

No.	Location Description
1	Public Storage between Pico Boulevard and Exposition Boulevard, east of I-405
2	South of Dowlen Drive and east of Greater LA Fisher House
3	Federal Building Parking Lot
4	Kinross Recreation Center and UCLA Lot 36
5	North end of the Leo Baeck Temple Parking Lot (tunnel boring machine retrieval)
6	At 1400 N Sepulveda Boulevard
7	At 1760 N Sepulveda Boulevard
8	East of I-405 and north of Mulholland Drive Bridge
9	Inside of I-405 Northbound to US-101 Northbound Loop Connector, south of US-101
10	ElectroRent Building south of G Line Busway, east of I-405
11	Inside the I-405 Northbound Loop Off-Ramp at Victory Boulevard
12	Along Cabrito Road east of Van Nuys Boulevard

Source: LASRE, 2024; HTA, 2024

Figure 7-9. Alternative 3: Construction Staging Locations

Source: LASRE, 2024; HTA, 2024

7.2 Existing Conditions

The primary effect of rising global concentrations of atmospheric GHGs is an increase in the average global temperature. Since 1982, the Earth's temperature has risen at an average rate of approximately 0.2 degrees Celsius per decade. Climate change modeling indicates that further warming is likely to occur due to the anticipated rise in global atmospheric GHG concentrations from various sources worldwide, including emissions from both developed and developing countries, as well as deforestation. This continued increase in GHGs is expected to induce further changes in the global climate system during the current century. Adverse impacts from global climate change worldwide and in California could include the following (CARB, 2022):

- Declining sea ice and mountain snowpack levels: This decline increases sea levels and sea surface evaporation rates, leading to higher atmospheric water vapor due to the atmosphere's ability to hold more moisture at elevated temperatures.
- Rising average global sea levels: Primarily resulting from thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets.
- Changing weather patterns: Alterations in precipitation, ocean salinity, and wind patterns, along with more extreme weather events, including droughts, heavy precipitation, heatwaves, cold spells, and intensified tropical cyclones.
- Declining Sierra Nevada snowpack levels: The Sierra Nevada snowpack, which accounts for approximately half of California's surface water storage, is projected to decrease significantly over the next century, posing challenges for water resources in the state.
- Increased ozone formation: Higher temperatures can lead to more days conducive to ozone formation (e.g., clear days with intense sunlight), potentially increasing ozone levels in high-ozone areas such as Southern California and the San Joaquin Valley by the end of the 21st century.
- Coastal erosion and seawater intrusion: Rising sea levels may exacerbate erosion along California's coastlines and increase the intrusion of seawater into the Sacramento-San Joaquin Delta and its levee systems, impacting freshwater supplies and infrastructure.

These projected impacts underscore the importance of mitigating GHG emissions and implementing adaptive strategies to address the challenges posed by climate change.

7.2.1 Statewide Greenhouse Gas Emissions Inventory

The California Air Resources Board (CARB) maintains the statewide GHG emission inventory, and Table 7-5 displays GHG emissions from 2013 to 2021 in California by economic sector as defined in the *Climate Change Scoping Plan* (2008 Scoping Plan) (CARB, 2008a). California’s GHG emissions have followed a declining trend over the past decade. In 2021, emissions from routine emitting activities statewide were approximately 12.6 million metric tons of carbon dioxide equivalents ($MMTCO_2e$) higher than 2020, but 23.1 $MMTCO_2e$ lower than 2019 levels. As shown in Table 5-1, GHG emissions related to the electric power sector has continually declined as California continues to meet renewable portfolio standard (RPS) goals. The increase and decrease over the 2019 to 2021 timeframe are likely due to impacts of the COVID-19 pandemic (CARB, 2023b). The plurality of California GHG emissions is attributed to automobile exhaust associated with the transportation sector, including public and private vehicles, comprising approximately 40 percent of the total statewide emission inventory. Despite statewide population growth, approximately 4 percent from 2011 to 2021, annual GHG emissions attributed to the transportation sector have remained relatively constant over the last decade. However, in 2020, the transportation sector had the largest decrease compared to 2019, which likely resulted in less light-duty vehicle travel due to shelter-in place orders in response to the COVID-19 pandemic. Overall, the transportation sector in 2021 was 16.7 $MMTCO_2e$ below pre-pandemic (2019) levels.

Table 7-5. Greenhouse Gas Annual $MMTCO_2e$ Emissions Trends by Sector

Sector	2013	2014	2015	2016	2017	2018	2019	2020	2021
Transportation	156.9	157.6	161.2	165.0	166.4	165.2	162.3	135.6	145.6
Electric Power	94.0	90.3	86.3	70.8	64.4	65.0	60.2	59.5	62.4
Industrial	82.7	85.0	82.7	81.2	81.4	82.0	80.8	73.3	73.9
Commercial/Residential	39.0	35.5	37.2	37.7	38.3	37.5	40.6	38.9	38.8
Agriculture	33.7	33.7	32.6	32.1	31.6	32.1	31.3	31.5	30.9
High GWP Sources	17.0	17.9	18.8	19.4	20.1	20.5	20.7	21.3	21.3
Recycling and waste	8.3	8.1	8.1	7.9	8.2	8.3	8.4	8.6	8.4
Emissions Total	**431.6**	**428.2**	**426.9**	**414.2**	**410.4**	**410.7**	**404.4**	**368.7**	**381.3**

Source: CARB, 2023c

GWP = global warming potential
$MMTCO_2e$ = million metric tons of carbon dioxide equivalents

7.2.2 Southern California Association of Governments Regional Greenhouse Gas Emissions

An element of the Southern California Association of Governments (SCAG) *Connect SoCal 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy* (SCAG, 2024a) is a regional GHG emissions inventory and emissions forecast based on the growth projections and control strategies incorporated into its development. SCAG provides estimates of the regional GHG emissions through the RTP/SCS horizon year accounting for programmed transportation projects, population, employment, and housing growth, and other regional factors. The 2024-2050 RTP/SCS has a horizon year of 2045, but provides data for interim year 2045 to address consistency with other GHG reduction policies. Table 7-6 presents modeled emissions from on-road mobile sources in 2019 and 2045. The data demonstrates that from 2019 to 2045, the regional on-road emissions are anticipated to decrease by 32.4 percent (64.35 $MMTCO_2e$ to 43.52 $MMTCO_2e$ by 2045) with plan implementation.

In addition, SCAG provides the total regional GHG emissions from the three primary sources of GHG emissions within the region: transportation, building energy, and water-related energy. Table 7-7 shows that total GHG emissions across the SCAG region are anticipated to decrease by approximately 28.9 percent from 2019 to 2045, and transportation emissions are projected to decrease by 29.9 percent. Expansion of public transportation systems spurring mode shift away from passenger vehicles is a fundamental pillar of regional efforts to reduce GHG emissions and meet regional and statewide GHG emissions reduction targets.

Table 7-6. Greenhouse Gas Emissions from On-Road Emissions in the SCAG Region

Sector	2019 (MMT/Year)			2045 (MMT/Year)		
	CO_2	CH_4	CO_2	CH_4	CO_2	CH_4
Light and Medium Duty Vehicles	49.30	0.0025	0.0010	32.91	0.0007	0.0002
Heavy Duty Vehicles	12.64	0.0005	0.0014	9.75	0.0002	0.0005
Buses	1.54	0.0008	0.0001	0.61	0.0001	<0.0001
On-Road Vehicles (Subtotal) in CO_2	63.48	0.0039	0.0026	43.27	0.0010	0.0007
On-Road Vehicles (Subtotal) in CO_2e	63.48	0.0810	0.7943	43.27	0.0212	0.2294
Total Emissions from On-Road Vehicles in CO_2e	**64.35**			**43.52**		

Source: SCAG, 2020b

CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
MMT/Year = million metric tons per year
N_2O = nitrous oxide
SCAG = Southern California Association of Governments

Table 7-7. Annual Greenhouse Gas Emissions for the SCAG Region from Three Primary Sectors

Area	2019 ($MMTCO_2e$)	2030 ($MMTCO_2e$)	2045 ($MMTCO_2e$)	2050 ($MMTCO_2e$)	2019 vs 2045
Transportation	66.42	53.38	46.55	47.84	-29.9%
Building Energy	64.64	57.30	47.30	43.97	-26.8%
Water-Related Energy	2.89	2.26	1.40	1.12	-51.6%
Total	**133.95**	**112.94**	**95.26**	**97.8**	**-28.9%**

Source: SCAG, 2020b

MMTCO2e = million metric tons of carbon dioxide equivalents
SCAG = Southern California Association of Governments

7.2.3 Los Angeles County Metropolitan Transportation Authority Transit System Emissions

Metro has prepared detailed emissions inventories to track its progress in displacing GHG emissions from its operations, which include operation of transit services and facilities, and employee commuting. GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage (APTA, 2018). Metro has been tracking its progress since 2008 through 2019 with its annual energy and resource reports. The *2019 Energy and Resource Report* (Metro, 2019b) was the last version in this format. For future sustainability reports, Metro will prepare an overall agency-wide sustainability report as part of Moving Beyond Sustainability. Metro's latest annual sustainability report analyzed the sustainability and environmental performance of its operational activities during the 2019 calendar year. Based on 2019 data, the largest emissions sources for Metro's total operational emissions were bus fleets and rail systems at 54 percent and 20 percent, respectively (Metro, 2020b). Non-modal sources (facility energy consumption, employee commuting, etc.) made up 22 percent of total operational emissions. New fleet technologies powered by renewable energy and reduced building energy usage can reduce Metro's emissions over the long term. Since 2012, emissions resulting from building energy use have decreased by 23 percent while emissions from water consumption have been cut in half. Table 7-8 summarizes Metro's recent progress in displacing GHG emissions from its operations and continually shows an annual net displacement of GHG emissions.

Table 7-8. Metro Operations Annual Greenhouse Gas Emissions Displacement

Category	2014	2015	2016	2017	2018	2019
Total Emissions ($MTCO_2e$)[a]	396,380	391,275	390,840	415,872	371,911	326,953
Total Displacement ($MTCO_2e$)[b,d]	-482,813	-465,101	-448,301	-1,020,485	-987,490	-918,076
Mode Shift to Transit	-482,813	-465,101	-448,301	-207,374	-200,669	-186,515
Land Use[c]	NA	NA	NA	-813,110	-786,820	-731,561
Net Emissions ($MTCO_2e$)	**-86,433**	**-73,827**	**-57,461**	**-604,613**	**-615,579**	**-591,123**

Source: Metro, 2020b

[a]Total emissions represent the GHG emissions generated from Metro's operation of transit services such as buses, rail, and vanpools, as well as operations of facilities, including consumption of electricity, natural gas, and water, refrigerants, and employee commuting.

[b]GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage.

[c]GHG emissions displacement calculations were updated in 2018 to reflect the addition of Land Use as a source of emissions displacement. Reporting of land use emissions began with the 2017 reporting year.

[d]In 2018, Metro updated its 2017 GHG emissions inventory baseline with inclusion of the Land Use category and updated utility emission factors.

GHG = greenhouse gas
$MTCO_2e$ = metric tons of carbon dioxide equivalents
NA = Not applicable

7.3 Impact Evaluation

7.3.1 Impact GHG-1: Would the project result in greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

7.3.1.1 Construction Impact

Construction of Alternative 3 would result in GHG emissions from off-road equipment, mobile sources including worker vehicles, vendor trucks, and haul trucks, as well as electricity consumption from TBM usage and on-site portable offices. These emissions sources would be related to constructing the MRT system alignment, TPSSs, stations, and the MSF (either option). For Alternative 3, its precast concrete facility would be offsite in Antelope Valley or Riverside County. GHG emissions related to hauling precast components from the precast facility to the construction worksites were included in the emissions analysis.

As discussed previously under Section 3.3, CEQA Thresholds of Significance, GHG emissions are measured exclusively as cumulative impacts; therefore, the Alternative 3 construction emissions are considered part of its total GHG emissions in conjunction with operational emissions. In accordance with South Coast Air Quality Management District guidance, the Alternative 3 construction emissions were amortized over its design lifetime of 30 years, then combined with the Alternative 3 annual operational GHG emissions. Table 7-9 summarizes the Alternative 3 GHG emissions throughout the construction period. As shown in Table 7-9, Alternative 3 construction would generate a total of 218,741 $MTCO_2e$ and would result in 7,291 $MTCO_2e$ annually when amortized over the project lifetime of 30 years. Detailed emissions calculations are summarized in Appendix A.

Table 7-9. Alternative 3: Construction Greenhouse Gas Emissions

Construction Year	GHG Emissions ($MTCO_2e$)[a,b]
2029	5,392
2030	7,241
2031	10,100
2032	18,685
2033	18,232
2034	11,598
2035	6,942
2036	1,880
2037	569
TBM Electricity Consumption	138,024
Portable Office Electricity Consumption	77
Total Construction Emissions	**218,741**
Amortized Construction Emissions (30 Years)	7,291

Source: HTA, 2024

[a]Totals may vary due to rounding.
[b]GHG emissions related to electricity consumption represent the total GHG emissions over the entire construction period.

GHG = greenhouse gas
$MTCO_2e$ = metric tons of carbon dioxide equivalents
TBM = tunnel boring machine

Because construction emission sources would cease once construction is complete, they are considered short term. It should be noted that total and annual construction GHG emissions represent a conservative assessment because GHG emissions would decrease in future years as the construction industry shifts toward implementation of cleaner fuels (i.e., electrified equipment) and more efficient technologies. Additionally, Metro's Green Construction Policy requires contractors to use renewable diesel, which would reduce upstream GHG emissions related to producing the fuel, as well as reduce GHG emissions from fuel combustion in off-road equipment and trucks as compared to petroleum diesel. GHG emissions for electric powered equipment such as the TBM and portable offices would also decrease in future years as LADWP continues to increase the amount of renewable energy sources in its power mix to meet state RPS goals. Thus, the annual construction GHG emissions associated with Alternative 3 would decrease with time and are likely to be lower than estimated herein. Alternative 3 construction emissions were amortized over Alternative 3's design lifetime of 30 years, then combined with Alternative 3 annual operational GHG emissions. As shown in Table 7-10, annual operations of Alternative 3 compared to 2045 without Project conditions would result in a net reduction of GHG emissions; therefore, impacts from Alternative 3 construction emissions would be considered less than significant.

7.3.1.2 Operational Impact

Operations of Alternative 3 would generate long-term GHG emissions from direct and indirect sources. Direct sources consist of mobile sources, including regional VMT and employees traveling to and from the MSF, area sources related to landscaping equipment, emergency generator usage during maintenance testing, and refrigerants used in building air conditioning systems. Indirect sources include electricity generation at power plants associated with traction power for the alignment, building electricity consumption, electricity consumption related to water and wastewater conveyance, and waste decomposition at landfills from solid waste generation.

The Alternative 3 annual GHG emissions were estimated for two scenarios: Alternative 3 compared to 2045 without Project conditions and Alternative 3 compared to Existing Conditions 2021. As discussed in Section 3.3, CEQA Thresholds of Significance, GHG impacts would be evaluated based on the net change in emissions between project alternatives in Horizon Year 2045 and 2045 without Project conditions. The comparison for Alternative 3 2045 and Existing Conditions 2021 is presented for informational purposes only. Detailed emissions calculations are summarized in Appendix A.

Table 7-10 summarizes the Alternative 3 annual GHG emissions for each source category compared to 2045 without Project conditions. As shown in Table 7-10, when compared to the 2045 without Project conditions, Alternative 3 would result in a net reduction of annual GHG emissions in Horizon Year 2045. This reduction is primarily related to mobile emissions associated with a reduction in VMT. As stated in the *Sepulveda Transit Corridor Project Transportation Technical Report* (Metro, 2025), implementation of Alternative 3 would reduce regional daily VMT by 451,100 miles per day compared to 2045 without Project conditions.

Table 7-10. Alternative 3: Annual Greenhouse Gas Emissions Compared to 2045 without Project Conditions

Source Category	GHG Emissions ($MTCO_2e$/Year)[a]
Alternative 3	
Area	20
Electricity	3,561
Mobile-VMT Analysis	57,143,356
Mobile-Employee Travel	1,027
Water	24
Waste	24
Refrigerants	<0.1
Emergency Generators[b]	134
Amortized Construction	7,291
Alternative 3 Total Annual Emissions	**57,155,436**
2045 without Project Conditions	
Mobile – 2045 VMT Analysis Annual Emissions	57,188,730
Net Change in Emissions	**-33,294**

Source: HTA, 2024

[a]Totals may vary due to rounding.
[b]An emergency generator would be located at the MSF and at the two underground stations for a total of three emergency generators.

GHG = greenhouse gas
$MTCO_2e$/Year = metric tons of carbon dioxide equivalents per year
VMT = vehicle miles traveled

Alternative 3 would support state, regional and local efforts to reduce GHG emissions by providing an efficient transit system as an alternative mode of transportation for commuters traveling between the Valley and the Westside of Los Angeles. Implementation of Alternative 3 would expand Metro's regional transit network with an all-electric transit system, thereby reducing GHG emissions related to regional VMT and providing further contributions to Metro's net displacement of operational GHG emissions. Overall, Alternative 3 would not result in an incremental increase in GHG emissions that would contribute to climate change, but rather would result in an environmental benefit by reducing GHG emissions; therefore, impacts of GHG emissions would be less than significant.

Table 7-11 summarizes the Alternative 3 annual GHG emissions for each source category compared to Existing Conditions 2021. This is presented for informational purposes only. As shown in Table 7-11, when compared to existing conditions, Alternative 3 would result in a net reduction of annual GHG emissions. The primary driver of the net reduction is mobile source emissions, which are a function of VMT and emission factors.

Table 7-11. Alternative 3: Annual Greenhouse Gas Emissions (Horizon Year 2045) Compared to Existing Conditions (Baseline Year 2021)

Source Category	GHG Emissions ($MTCO_2e$/year)[a]
Alternative 3	
Area	20
Electricity	3,561
Mobile-VMT Analysis	57,143,356
Mobile-Employee Travel	1,027
Water	24
Waste	24
Refrigerants	<0.1
Emergency Generators[b]	134
Amortized Construction	7,291
Alternative 3 Total Annual Emissions	**57,155,436**
Existing Conditions	
Mobile – 2021 VMT Analysis Annual Emissions	64,691,322
Net Change in Emissions	**-7,535,886**

Source: HTA, 2024

[a]Totals may vary due to rounding.
[b]An emergency generator would be located at the MSF and at the two underground stations for a total of three emergency generators.

GHG = greenhouse gas
$MTCO_2e$/Year = metric tons of carbon dioxide equivalents per year
VMT = vehicle miles traveled

7.3.2 Impact GHG-2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

7.3.2.1 Construction Impact

Construction of Alternative 3 would generate short-term GHG emissions related to off-road equipment, mobile sources, and electricity consumption. Alternative 3 construction would comply with Metro's Green Construction Policy, which requires idling restrictions for off-road equipment and trucks, using trucks with model years 2007 or newer, requiring contractors to use renewable diesel for all diesel engines, and implementing best management practices, such as using electric-powered equipment in lieu of diesel equipment where available. Upon completion of Alternative 3 construction, these emissions would cease. As GHG emissions are exclusively cumulative impacts, the Alternative 3 amortized construction emissions were included with the long-term operational emissions for Alternative 3. Based on the discussion below, annual operational emissions, which included amortized construction emissions, were found to not conflict with plans or policies to reduce GHG emissions; therefore, impacts for construction-related GHG emissions would be less than significant.

7.3.2.2 Operational Impact

Plans, policies, and regulations focused on reducing GHG emissions occur at the state, regional, and local levels. At the state level, these efforts are guided primarily by Assembly Bill (AB) 32, Senate Bill (SB) 32, AB 1279, and the *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) (CARB, 2022). At the regional level, the 2024-2050 RTP/SCS contains strategies for reducing GHG emissions within the Sustainable Development focus area, as well as Metro's 2019 *Climate Action and Adaptation Plan* (CAAP) (Metro, 2019c) and the *Moving Beyond Sustainability – Strategic Plan 2020* (Metro, 2020a) (henceforth referred to as "Moving Beyond Sustainability"). Lastly at the local level, relevant plans include the City of Los Angeles' *Sustainable City pLAn* and *Mobility Plan 2035* (City of Los Angeles, 2015, 2016). The following sections discuss the consistency of Alternative 3 with these state, regional, and local plans for reducing GHG emissions.

Consistency with AB 32, SB 32, AB 1279, and 2022 Scoping Plan

AB 32, SB 32, and AB 1279 outline the state's GHG emissions reduction targets for 2020, 2030, and 2045, respectively. In 2008 and 2014, CARB adopted the 2008 Scoping Plan and the 2014 *First Update to the Climate Change Scoping Plan*, respectively, as a framework for achieving the emissions reduction targets in AB 32 (CARB, 2008a, 2014). These plans outline a series of technologically feasible and cost-effective measures to reduce statewide GHG emissions. CARB adopted *California's 2017 Climate Change Scoping Plan* (CARB, 2017) in November 2017 as a framework to achieve the 2030 GHG reduction goal described in SB 32, which is to reduce statewide GHG emissions to 1990 levels by 2020 and 40 percent below 1990 levels by 2030. Most recently, the 2022 Scoping Plan was adopted in September 2022 and outlines how the state will achieve carbon neutrality and reduce statewide GHG emissions 85 percent below 1990 levels by 2045. The analysis year for Alternative 3 is 2045 (horizon year); therefore, the statewide GHG emissions reduction target for 2045 is the statutory statewide milestone target that is applicable to Alternative 3.

As discussed in Section 7.2 Existing Conditions, the transportation sector is the largest contributor to statewide GHG emissions. Similarly, the 2022 Scoping Plan focuses heavily on strategies and actions to reduce GHG emissions from the transportation sector, such as reducing VMT through transportation infrastructure that aligns with the state's climate goals. Alternative 3 would be consistent with this objective because it would reduce regional daily VMT by 451,100 miles per day (compared to 2045 without Project conditions), resulting in an overall net reduction in annual GHG emissions.

The 2022 Scoping Plan also focuses on transitioning commercial building energy from fossil fuel sources to non-combustion alternatives. Alternative 3 would be consistent with this effort because it would comply with the City of Los Angeles Municipal Code Section 99.04.106.8, which requires all new buildings to be all-electric. Additionally, Alternative 3 would be designed to meet sustainable certifications for its major components. The entire track alignment would be designed to attain a minimum Envision Verified Award Level (currently version 3), MSF buildings would be designed to achieve a minimum of Leadership in Energy and Environmental Design (LEED) Silver, and all stations and the MSF would be designed to meet Tier 2 of the California Green Building Standards Code (LASRE, 2024). Overall, Alternative 3 would not conflict with the state goals and strategies for reducing GHG emissions.

Consistency with 2024-2050 RTP/SCS

The 2024-2050 RTP/SCS is a long-range planning document that balances future mobility and housing needs with economic, environmental, and public health goals in the SCAG region. One of the key strategies of the plan is to integrate land use, housing, and transportation planning to ensure sustainable regional growth. The SCS portion of the 2024-2050 RTP/SCS includes a combination of transportation and land use strategies to meet GHG reduction goals, such as emphasizing land use patterns that facilitate multimodal access to work, educational and other destinations; focusing on a regional jobs/housing balance to reduce commute times and distances and expand job opportunities near transit and along center-focused main streets; and encouraging design and transportation options that reduce the reliance on solo car trips. Alternative 3 would support these strategies by providing access to a safe, sustainable, and efficient transit system located in dense urban communities with major job centers, including a direct connection with UCLA via the UCLA Gateway Plaza Station.

Implementation of the 2024-2050 RTP/SCS would achieve regional GHG reductions relative to 2005 SCAG areawide levels of approximately 8 percent in 2020 and approximately 19 percent by 2035 (SCAG, 2024a). Additionally, SCAG indicates implementation of the 2024-2050 RTP/SCS would reduce daily VMT per capita by 6.3 percent compared to the SCAG 2050 Baseline scenario. The Baseline scenario represents how the region would perform without implementation of the 2024-2050 RTP/SCS. As shown in Table 7-10, implementation of Alternative 3 would result in a net reduction of GHG emissions and would directly contribute to meeting the objectives and emission reduction targets outlined in the 2024-2050 RTP/SCS. Overall, Alternative 3 would not conflict with the goals and strategies of the 2024-2050 RTP/SCS to reduce VMT and associated GHG emissions.

Consistency with Metro Plans

Metro has developed policies directed toward controlling GHG emissions through a variety of plans over the last decade. The most recent and relevant plans are the 2019 CAAP and Moving Beyond Sustainability, which builds upon previous commitment to environmental and sustainability stewardship. The 2019 CAAP set a goal of reducing GHG emissions by 79 percent relative to 2017 by 2030, and 100 percent by 2050. Moving Beyond Sustainability also includes goals of reducing GHG emissions by 100 percent relative to 2017 by 2050 and displacing or preventing GHG emissions. As a Metro project, Alternative 3 would inherently be required to be consistent with goals and strategies for each of these plans. As shown in Table 7-10, implementation of Alternative 3 would result in a net reduction in GHG emissions compared to future conditions, thus supporting the GHG reduction goals for both of these plans. Overall, Alternative 3 would not conflict with the goals and strategies of Metro's plans to reduce GHG emissions.

Consistency with Sustainable City pLAn

LA's Green New Deal, Sustainable City pLAn (City of Los Angeles Mayor's Office, 2019) was the first 4-year update to the *Sustainable City pLAn* (2015 pLAn) (City of Los Angeles, 2015) and expands in more detail the vision to achieve a sustainable future that entails a carbon-neutral economy by 2050. *LA's Green New Deal, Sustainable City pLAn* (henceforth referred to as the "2019 updates to the pLAn") accelerates targets from the 2015 pLAn for supplying renewable energy, increasing local water sourcing, reducing building energy, reducing VMT per capita, reducing municipal GHG emissions, increasing the percentage of zero emission passenger and city-fleet vehicles, building new housing near transit, and increasing the number of green jobs.

The 2019 updates to the pLAn would accelerate GHG reductions targets, including reducing GHG emissions by 50 percent by 2025, 73 percent by 2035, and becoming carbon neutral by 2050, all relative to a 1990 baseline. As shown in Table 7-10, implementation of Alternative 3 would result in a net reduction in GHG emissions compared to future conditions, thus supporting the GHG reduction goals. Additionally, Alternative 3 would provide access to a safe and efficient transit system located in close proximity to dense urban communities near major job centers and a direct connection with UCLA, and would be developed to meet sustainable certifications, such as Envision, LEED, and CALGreen building codes. Overall, Alternative 3 would not conflict with the goals and strategies of the 2019 updates to the pLAn to reduce GHG emissions.

Consistency with City of Los Angeles Mobility Plan 2035

Mobility Plan 2035 emphasizes the efficacy of multi-modal street design in reducing GHG emissions through encouraging the use of transit and active transportation, which decreases regional dependence on passenger vehicles (DCP, 2016). Alternative 3 would support these strategies by providing access to a safe, sustainable, and efficient transit system located in dense urban communities with major job centers and UCLA via the UCLA Gateway Plaza Station. Alternative 3 would not conflict with the goals and strategies of *Mobility Plan 2035* to reduce GHG emissions.

Overall, Alternative 3 would not conflict with plans, policies, or regulations adopted for the purpose of reducing GHG emissions; therefore, impacts would be less than significant.

7.4 Mitigation Measures

7.4.1 Construction Impacts

No mitigation measures are required.

7.4.2 Operational Impacts

No mitigation measures are required.

7.4.3 Impacts After Mitigation

No mitigation measures are required; impacts are less than significant.

8 ALTERNATIVE 4

8.1 Alternative Description

Alternative 4 is a heavy rail transit (HRT) system with a hybrid underground and aerial guideway track configuration that would include four underground stations and four aerial stations. This alternative would provide transfers to five high-frequency fixed guideway transit and commuter rail lines, including the Los Angeles County Metropolitan Transportation Authority's (Metro) E, Metro D, and Metro G Lines, the East San Fernando Valley Light Rail Transit Line, and the Metrolink Ventura County Line. The length of the alignment between the terminus stations would be approximately 13.9 miles, with 5.7 miles of aerial guideway and 8.2 miles of underground configuration.

The four underground and four aerial HRT stations would be as follows:

1. Metro E Line Expo/Sepulveda Station (underground)
2. Santa Monica Boulevard Station (underground)
3. Wilshire Boulevard/Metro D Line Station (underground)
4. UCLA Gateway Plaza Station (underground)
5. Ventura Boulevard/Sepulveda Boulevard Station (aerial)
6. Metro G Line Sepulveda Station (aerial)
7. Sherman Way Station (aerial)
8. Van Nuys Metrolink Station (aerial)

8.1.1 Operating Characteristics

8.1.1.1 Alignment

As shown on Figure 8-1, from its southern terminus station at the Metro E Line Expo/Sepulveda Station, the alignment of Alternative 4 would run underground north through the Westside of Los Angeles (Westside) and the Santa Monica Mountains to a tunnel portal south of Ventura Boulevard in the San Fernando Valley (Valley). At the tunnel portal, the alignment would transition to an aerial guideway that would generally run above Sepulveda Boulevard before curving eastward along the south side of the Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor to the northern terminus station adjacent to the Van Nuys Metrolink/Amtrak Station.

The proposed southern terminus station would be located underground east of Sepulveda Boulevard, between the existing elevated Metro E Line tracks and Pico Boulevard. Tail tracks for vehicle storage would extend underground south of National Boulevard, east of Sepulveda Boulevard. The alignment would continue north beneath Bentley Avenue before curving northwest to an underground station at the southeast corner of Santa Monica Boulevard and Sepulveda Boulevard. From the Santa Monica Boulevard Station, the alignment would continue and curve eastward toward the Wilshire Boulevard/Metro D Line Station, beneath the Metro D Line Westwood/UCLA Station, which is currently under construction as part of the Metro D Line Extension project. From there, the underground alignment would curve slightly to the northeast and continue beneath Westwood Boulevard before reaching the UCLA Gateway Plaza Station.

Figure 8-1. Alternative 4: Alignment

Source: STCP, 2024; HTA, 2024

From the UCLA Gateway Plaza Station, the alignment would turn to the northwest beneath the Santa Monica Mountains, to the east of Interstate 405 (I-405). South of Mulholland Drive, the alignment would curve to the north to reach a tunnel portal at Del Gado Drive, just east of I-405 and south of Sepulveda Boulevard.

The alignment would transition from an underground configuration to an aerial guideway structure after exiting the tunnel portal and would continue northeast to the Ventura Boulevard/Sepulveda Boulevard

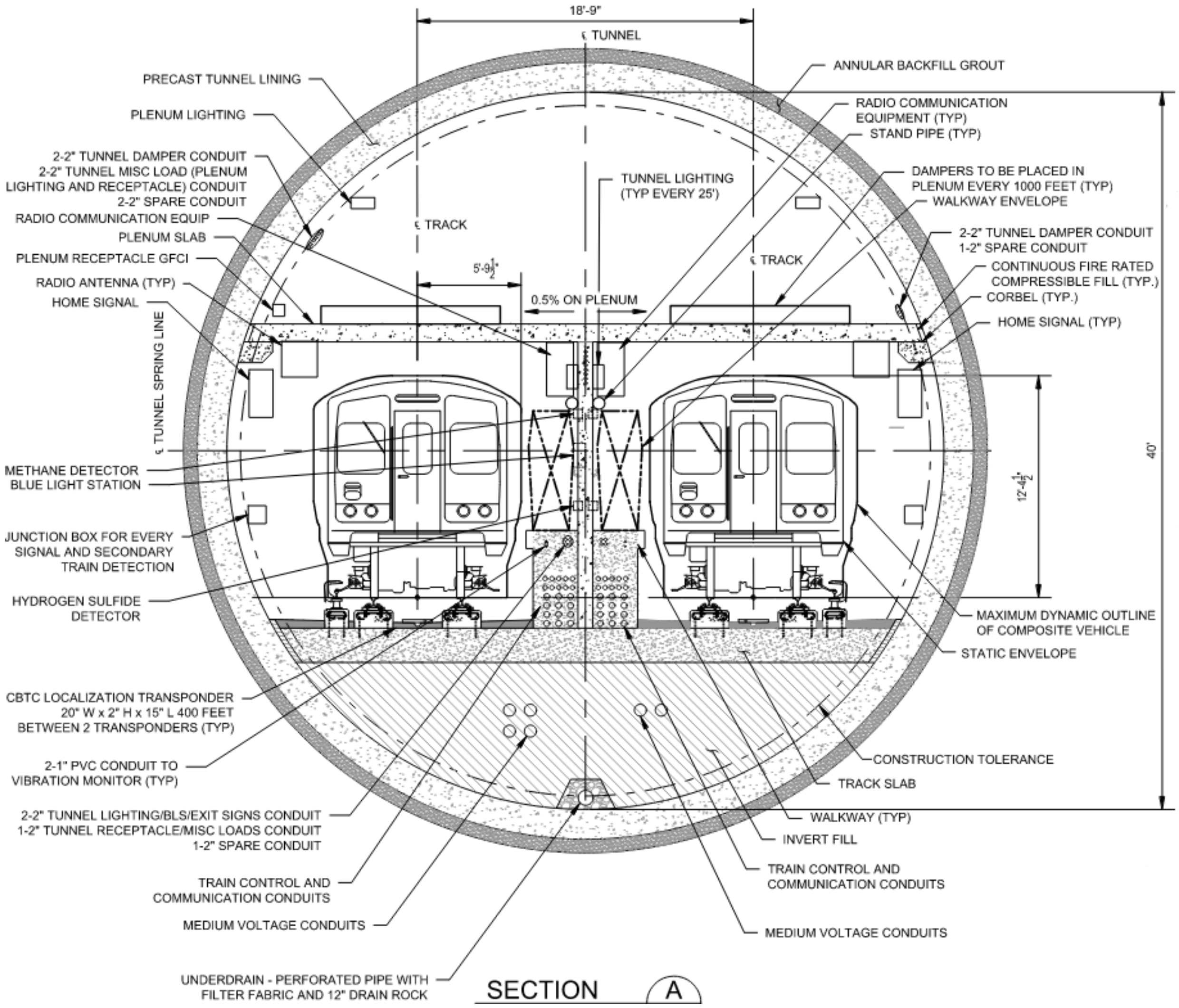
Station located over Dickens Street, immediately west of the Sepulveda Boulevard and Dickens Street intersection. North of the station, the aerial guideway would transition to the center median of Sepulveda Boulevard. The aerial guideway would continue north on Sepulveda Boulevard and cross over U.S. Highway 101 (US-101) and the Los Angeles River before continuing to the Metro G Line Sepulveda Station, immediately south of the Metro G Line Busway. Overhead utilities along Sepulveda Boulevard in the Valley would be undergrounded where they would conflict with the guideway or its supporting columns.

The aerial guideway would continue north above Sepulveda Boulevard where it would reach the Sherman Way Station just south of Sherman Way. After leaving the Sherman Way Station, the alignment would continue north before curving to the southeast to parallel the LOSSAN rail corridor on the south side of the existing tracks. Parallel to the LOSSAN rail corridor, the guideway would conflict with the existing Willis Avenue Pedestrian Bridge, which would be demolished. The alignment would follow the LOSSAN rail corridor before reaching the proposed northern terminus Van Nuys Metrolink Station located adjacent to the existing Metrolink/Amtrak Station. Tail tracks and yard lead tracks would descend to a proposed at-grade maintenance and storage facility (MSF) east of the northern terminus station. Modifications to the existing pedestrian underpass to the Metrolink platforms to accommodate these tracks would result in reconfiguration of an existing rail spur serving City of Los Angeles Department of Water and Power (LADWP) property.

8.1.1.2 Guideway Characteristics

Alternative 4 would utilize a single-bore tunnel configuration for underground tunnel sections, with an outside diameter of approximately 43.5 feet. The tunnel would include two parallel tracks with 18.75-foot track spacing in tangent sections separated by a continuous central dividing wall throughout the tunnel. Inner walkways would be constructed adjacent to the two tracks. Inner and outer walkways would be constructed within tunnel sections near the track crossovers. At the crown of tunnel, a dedicated air plenum would be provided by constructing a concrete slab above the railway corridor. The air plenum would allow for ventilation throughout the underground portion of the alignment. Figure 8-2 illustrates these components at a typical cross-section of the underground guideway.

Figure 8-2. Typical Underground Guideway Cross-Section

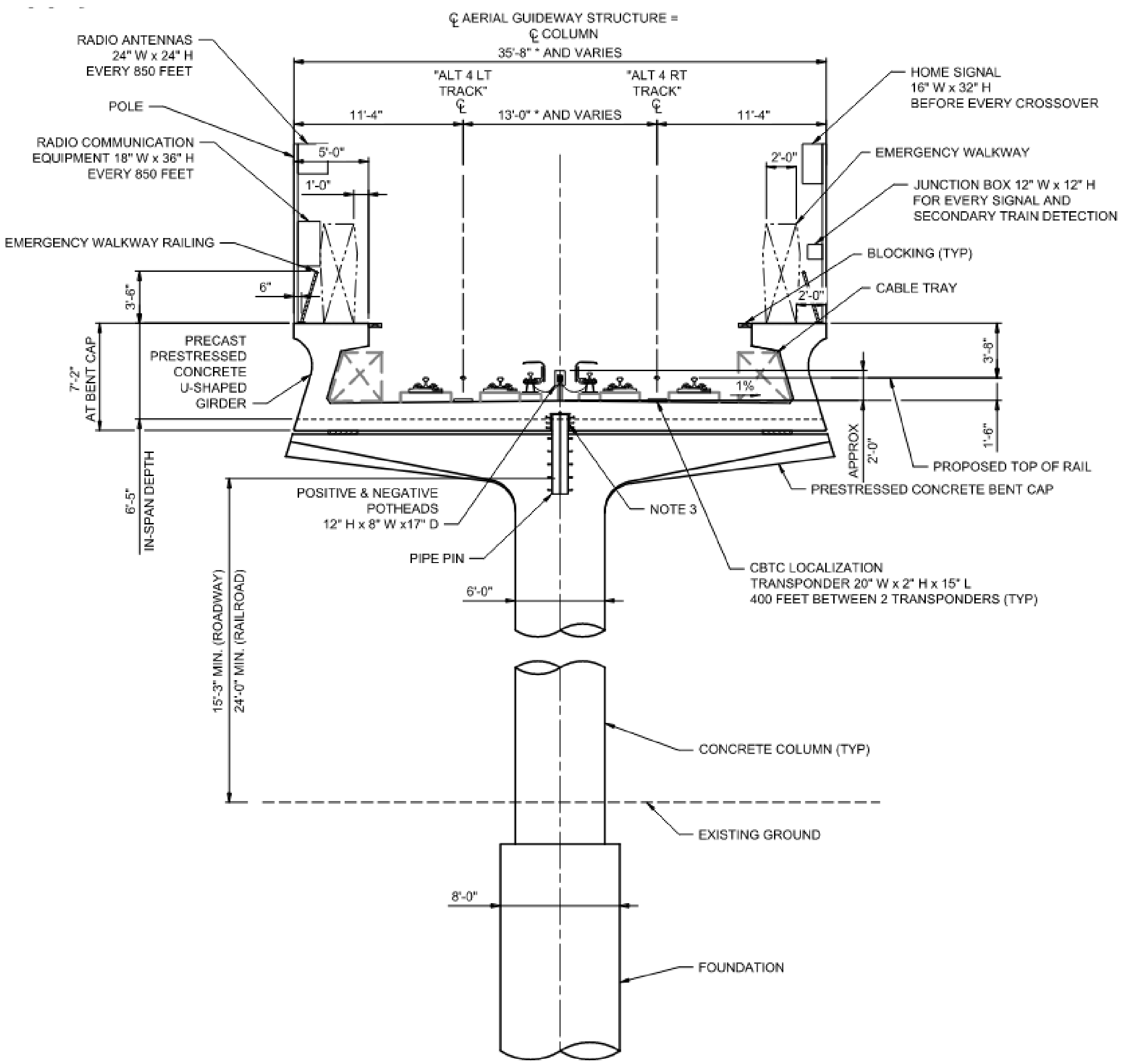


Source: STCP, 2024

In aerial sections, the guideway would be supported by either single columns or straddle-bents. Both types of structures would support a U-shaped concrete girder and the HRT track. The aerial guideway would be approximately 36 feet wide. The track would be constructed on the concrete girders with direct fixation and would maintain a minimum of 13 feet between the centerlines of the two tracks. On the outer side of the tracks, emergency walkways would be constructed with a minimum width of 2 feet.

The single-column pier would be the primary aerial structure throughout the aerial portion of the alignment. Crash protection barriers would be used to protect columns located in the median of Sepulveda Boulevard in the Valley. Figure 8-3 shows a typical cross-section of the single-column aerial guideway.

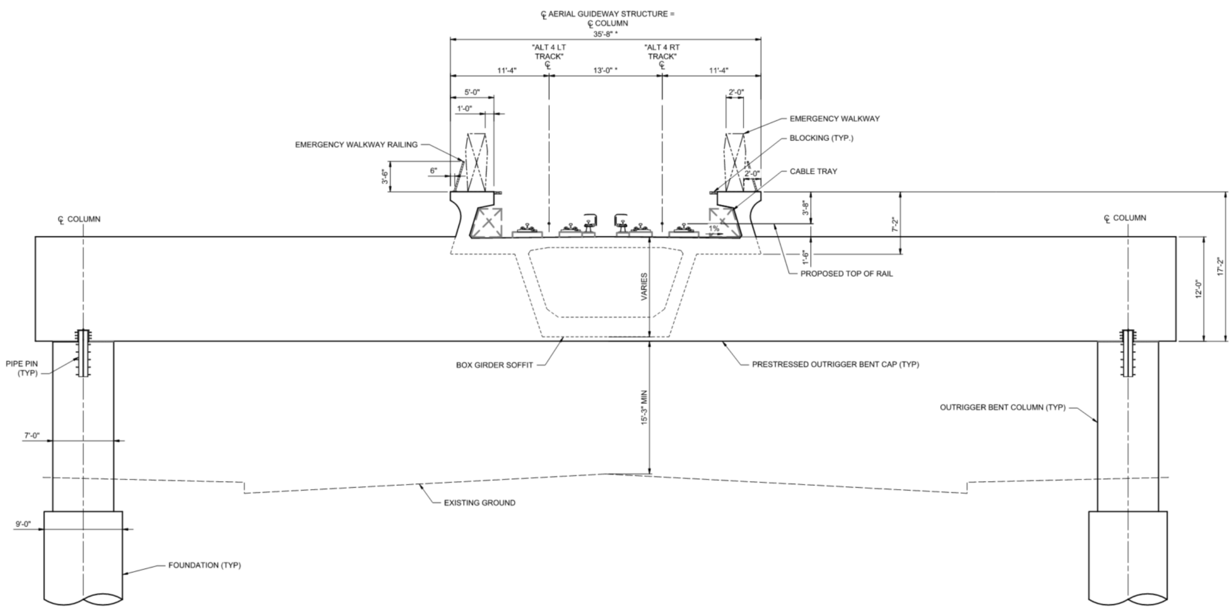
Figure 8-3. Typical Aerial Guideway Cross-Section



Source: STCP, 2024

In order to span intersections and maintain existing turn movements, sections of the aerial guideway would be supported by straddle bents, a concrete straddle-beam placed atop two concrete columns constructed outside of the underlying roadway. Figure 8-4 illustrates a typical straddle-bent configuration.

Figure 8-4. Typical Aerial Straddle-Bent Cross-Section



Source: STCP, 2024

8.1.1.3 Vehicle Technology

Alternative 4 would utilize steel-wheel HRT trains, with automated train operations and planned peak-period headways of 2.5 minutes and off-peak-period headways ranging from 4 to 6 minutes. Each train could consist of three or four cars with open gangways between cars. The HRT vehicle would have a maximum operating speed of 70 miles per hour; actual operating speeds would depend on the design of the guideway and distance between stations. Train cars would be approximately 10 feet wide with three double doors on each side. Each car would be approximately 72 feet long, with capacity for 170 passengers. Trains would be powered by a third rail.

8.1.1.4 Stations

Alternative 4 would include four underground stations and four aerial stations with station platforms measuring 280 feet long for both station configurations. The aerial stations would be constructed a minimum of 15.25 feet above ground level, supported by rows of dual columns with 8-foot diameters. The southern terminus station would be adjacent to the Metro E Line Expo/Sepulveda Station, and the northern terminus station would be adjacent to the Van Nuys Metrolink/Amtrak Station.

All stations would be side-platform stations where passengers would select and travel to station platforms depending on their direction of travel. All stations would include 20-foot-wide side platforms separated by 30 feet for side-by-side trains. Aerial station platforms would be covered, but not enclosed. Each underground station would include an upper and lower concourse level prior to reaching the train platforms. Each aerial station, except for the Sherman Way Station, would include a mezzanine level prior to reaching the station platforms. At the Sherman Way Station, separate entrances on opposite sides of the street would provide access to either the northbound or southbound platform with an overhead pedestrian walkway providing additional connectivity across platforms. Each station would have a minimum of two elevators, two escalators, and one stairway from the ground level to the concourse or mezzanine.

Stations would include automatic, bi-parting fixed doors along the edges of station platforms. These platform screen doors would be integrated into the automatic train control system and would not open unless a train is stopped at the platform.

The following information describes each station, with relevant entrance, walkway, and transfer information. Bicycle parking would be provided at each station.

Metro E Line Expo/Sepulveda Station

- This underground station would be located just north of the existing Metro E Line Expo/Sepulveda Station, on the east side of Sepulveda Boulevard.
- A station entrance would be located on the east side of Sepulveda Boulevard north of the Metro E Line.
- A walkway to transfer to the Metro E Line would be provided at street level within the fare paid zone.
- A 126-space parking lot would be located immediately north of the station entrance, east of Sepulveda Boulevard. Passengers would also be able to park at the existing Metro E Line Expo/Sepulveda Station parking facility, which provides 260 parking spaces.

Santa Monica Boulevard Station

- This underground station would be located under the southeast corner of Santa Monica Boulevard and Sepulveda Boulevard.
- The station entrance would be located on the south side of Santa Monica Boulevard, between Sepulveda Boulevard and Bentley Avenue.
- No dedicated station parking would be provided at this station.

Wilshire Boulevard/Metro D Line Station

- This underground station would be located beneath the Metro D Line tracks and platform under Gayley Avenue between Wilshire Boulevard and Lindbrook Drive.
- Station entrances would be provided on the northeast corner of Wilshire Boulevard and Gayley Avenue and on the northeast corner of Lindbrook Drive and Gayley Avenue. Passengers would also be able to use the Metro D Line Westwood/UCLA Station entrances to access the station platform.
- A direct internal station transfer to the Metro D Line would be provided at the south end of the station.
- No dedicated station parking would be provided at this station.

UCLA Gateway Plaza Station

- This underground station would be located underneath Gateway Plaza on the University of California, Los Angeles (UCLA) campus.
- Station entrances would be provided on the north side of Gateway Plaza and on the east side of Westwood Boulevard, across from Strathmore Place.
- No dedicated station parking would be provided at this station.

Ventura Boulevard/Sepulveda Boulevard Station

- This aerial station would be located west of Sepulveda Boulevard, spanning over Dickens Street.

- A station entrance would be provided on the west side of Sepulveda Boulevard, south of Dickens Street.
- A 52-space parking lot would be located adjacent to the station entrance on the southwest corner of the Sepulveda Boulevard and Dickens Street intersection, and an additional 40-space parking lot would be located on the northwest corner of the same intersection.

Metro G Line Sepulveda Station

- This aerial station would be located over Sepulveda Boulevard, immediately south of the Metro G Line Busway.
- A station entrance would be provided on the west side of Sepulveda Boulevard, south of the Metro G Line Busway.
- An elevated pedestrian walkway would connect the platform level of the proposed station to the planned aerial Metro G Line Busway platforms within the fare paid zone.
- Passengers would be able to park at the existing Metro G Line Sepulveda Station parking facility, which has a capacity of 1,205 parking spaces. Currently, only 260 parking spaces are used for transit parking. No additional automobile parking would be provided at the proposed station.

Sherman Way Station

- This aerial station would be located over Sepulveda Boulevard, between Sherman Way and Gault Street.
- Station entrances would be provided on either side of Sepulveda Boulevard, south of Sherman Way.
- A 46-space parking lot would be located on the northwest corner of the Sepulveda Boulevard and Gault Street intersection, and an additional 76-space parking lot would be located west of the station along Sherman Way.

Van Nuys Metrolink Station

- This aerial station would span Van Nuys Boulevard, just south of the LOSSAN rail corridor.
- The primary station entrance would be located on the east side of Van Nuys Boulevard just south of the LOSSAN rail corridor. A secondary station entrance would be located between Raymer Street and Van Nuys Boulevard.
- An underground pedestrian walkway would connect the station plaza to the existing pedestrian underpass to the Metrolink/Amtrak platform outside the fare paid zone.
- Existing Metrolink Station parking would be reconfigured, maintaining approximately the same number of spaces, but 66 parking spaces would be relocated west of Van Nuys Boulevard. Metrolink parking would not be available to Metro transit riders.

8.1.1.5 Station-to-Station Travel Times

Table 8-1 presents the station-to-station distance and travel times at peak period for Alternative 4. The travel times include both run time and dwell time. Dwell time is 30 seconds for transfer stations and 20 seconds for other stations. Northbound and southbound travel times vary slightly because of grade differentials and operational considerations at end-of-line stations.

Table 8-1. Alternative 4: Station-to-Station Travel Times and Station Dwell Times

From Station	To Station	Distance (miles)	Northbound Station to Station Travel Time (seconds)	Southbound Station to Station Travel Time (seconds)	Dwell Time (seconds)
Metro E Line Station					*30*
Metro E Line	Santa Monica Boulevard	0.9	89	86	—
Santa Monica Boulevard Station					*20*
Santa Monica Boulevard	Wilshire/Metro D Line	0.9	91	92	—
Wilshire/Metro D Line Station					*30*
Wilshire/Metro D Line	UCLA Gateway Plaza	0.7	75	68	—
UCLA Gateway Plaza Station					*20*
UCLA Gateway Plaza	Ventura Boulevard	6.1	376	366	—
Ventura Boulevard Station					*20*
Ventura Boulevard	Metro G Line	1.9	149	149	—
Metro G Line Station					*30*
Metro G Line	Sherman Way	1.4	110	109	—
Sherman Way Station					*20*
Sherman Way	Van Nuys Metrolink	1.9	182	180	—
Van Nuys Metrolink Station					*30*

Source: STCP, 2024

— = no data

8.1.1.6 Special Trackwork

Alternative 4 would include 10 double crossovers throughout the alignment, enabling trains to cross over to the parallel track. Each terminus station would include a double crossover immediately north and south of the station. Except for the Santa Monica Boulevard Station, each station would have a double crossover immediately south of the station. The remaining crossovers would be located along the alignment midway between the UCLA Gateway Plaza Station and the Ventura Boulevard Station.

8.1.1.7 Maintenance and Storage Facility

The MSF for Alternative 4 would be located east of the Van Nuys Metrolink Station and would encompass approximately 46 acres. The MSF would be designed to accommodate 184 rail cars and would be bounded by single-family residences to the south, the LOSSAN rail corridor to the north, Woodman Avenue on the east, and Hazeltine Avenue and industrial manufacturing enterprises to the west. Trains would access the site from the fixed guideway's tail tracks at the northwest corner of the site. Trains would then travel southeast to maintenance facilities and storage tracks.

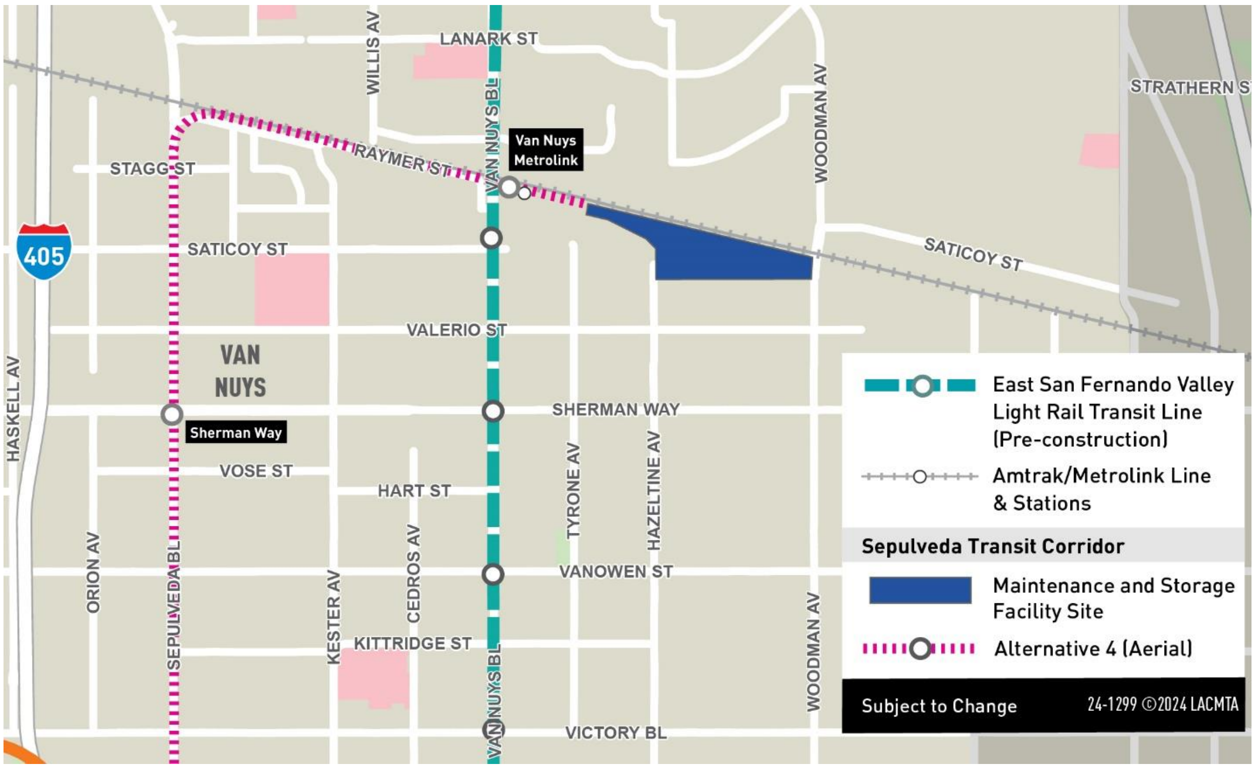
The site would include the following facilities:

- Two entrance gates with guard shacks
- Main shop building
- Maintenance-of-way building
- Storage tracks
- Carwash building
- Cleaning and inspections platforms
- Material storage building
- Hazmat storage locker

- Traction power substation (TPSS) located on the west end of the MSF to serve the mainline
- TPSS located on the east end of the MSF to serve the yard and shops
- Parking area for employees
- Grade-separated access roadway (over the HRT tracks at the east end of the facility, and necessary drainage)

Figure 8-5 shows the location of the MSF site for Alternative 4.

Figure 8-5. Alternative 4: Maintenance and Storage Facility Site



Source: STCP, 2024; HTA, 2024

8.1.1.8 Traction Power Substations

TPSSs transform and convert high voltage alternating current supplied from power utility feeders into direct current suitable for transit operation. Twelve TPSS facilities would be located along the alignment and would be spaced approximately 0.5 to 2.5 miles apart. TPSS facilities would generally be located within the stations, adjacent to the tunnel through the Santa Monica Mountains, or within the MSF. TPSSs would be approximately 2,000 to 3,000 square feet. Table 8-2 lists the TPSS locations for Alternative 4.

Figure 8-6 shows the TPSS locations along the Alternative 4 alignment.

Table 8-2. Alternative 4: Traction Power Substation Locations

TPSS No.	Location Description	Configuration
1	TPSS 1 would be located east of Sepulveda Boulevard and north of the Metro E Line.	Underground (within station)

TPSS No.	Location Description	Configuration
2	TPSS 2 would be located south of Santa Monica Boulevard, between Sepulveda Boulevard and Bentley Avenue.	Underground (within station)
3	TPSS 3 would be located at the southeast corner of UCLA Gateway Plaza.	Underground (within station)
4	TPSS 4 would be located south of Bellagio Road and west of Stone Canyon Road.	Underground (adjacent to tunnel)
5	TPSS 5 would be located west of Roscomare Road, between Donella Circle and Linda Flora Drive.	Underground (adjacent to tunnel)
6	TPSS 6 would be located east of Loom Place, between Longbow Drive and Vista Haven Road.	Underground (adjacent to tunnel)
7	TPSS 7 would be located west of Sepulveda Boulevard, between the I-405 Northbound On-Ramp and Dickens Street.	At-grade (within station)
8	TPSS 8 would be located west of Sepulveda Boulevard, between the Metro G Line Busway and Oxnard Street.	At-grade (within station)
9	TPSS 9 would be located at the southwest corner of Sepulveda Boulevard and Sherman Way.	At-grade (within station)
10	TPSS 10 would be located south of the LOSSAN rail corridor and north of Raymer Street and Kester Avenue.	At-grade
11	TPSS 11 would be located south of the LOSSAN rail corridor and east of the Van Nuys Metrolink Station.	At-grade (within MSF)
12	TPSS 12 would be located south of the LOSSAN rail corridor and east of Hazeltine Avenue.	At-grade (within MSF)

Source: STCP, 2024; HTA, 2024

Figure 8-6. Alternative 4: Traction Power Substation Locations

Source: STCP, 2024; HTA, 2024

8.1.1.9 Roadway Configuration Changes

Table 8-3 lists the roadway changes necessary to accommodate the guideway of Alternative 4. Figure 8-7 shows the location of roadway changes in the Sepulveda Transit Corridor Project (Project) Study Area, and Figure 8-8 shows detail of the street vacation at Del Gado Drive.

In addition to the changes made to accommodate the guideway, as listed in Table 8-3, roadways and sidewalks near stations would be reconstructed, resulting in modifications to curb ramps and driveways.

Table 8-3. Alternative 4: Roadway Changes

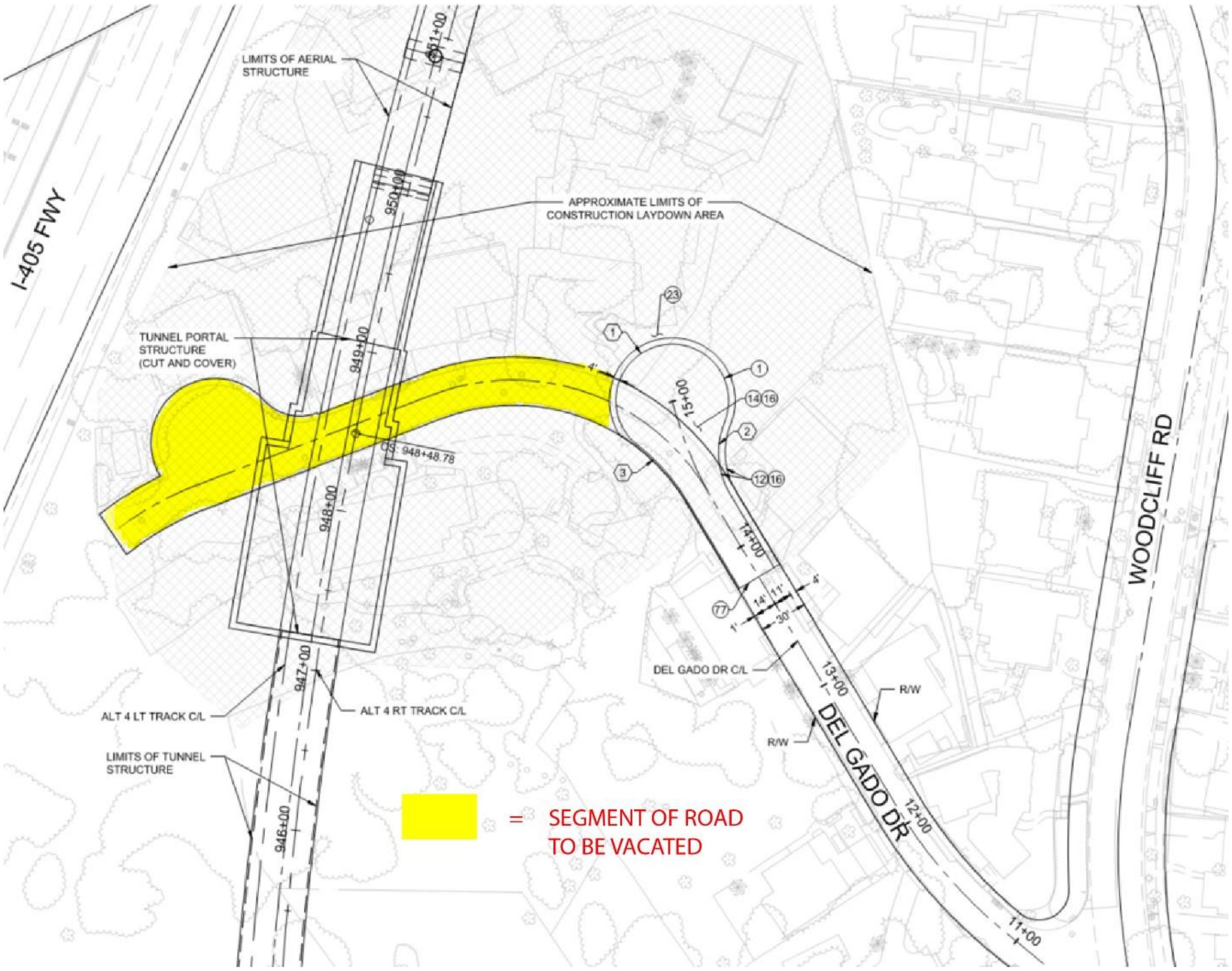
Location	From	To	Description of Change
Del Gado Drive	Woodcliff Road	Not Applicable	Vacation of approximately 325 feet of Del Gado Drive east of I-405 to accommodate tunnel portal
Sepulveda Boulevard	Ventura Boulevard	Raymer Street	Construction of raised median and removal of all on-street parking on the southbound side of the street and some on-street parking on the northbound side of the street to accommodate aerial guideway columns
Sepulveda Boulevard	La Maida Street	Not Applicable	Prohibition of left turns to accommodate aerial guideway columns
Sepulveda Boulevard	Valleyheart Drive South, Hesby Street, Hartsook Street, Archwood Street, Hart Street, Leadwell Street, Covello Street	Not Applicable	Prohibition of left turns to accommodate aerial guideway columns
Raymer Street	Kester Avenue	Van Nuys Boulevard	Reconstruction and narrowing of width to accommodate aerial guideway columns

Source: STCP, 2024; HTA, 2024

Figure 8-7. Alternative 4: Roadway Changes

Source: STCP, 2024; HTA, 2024

Figure 8-8. Alternative 4: Street Vacation at Del Gado Drive



Source: STCP, 2024; HTA, 2024

8.1.1.10 Ventilation Facilities

For ventilation of the alignment's underground portion, a plenum within the crown of the tunnel would provide a separate compartment for air circulation and allow multiple trains to operate between stations. Each underground station would include a fan room with additional ventilation facilities. Alternative 4 would also include a stand-alone ventilation facility at the tunnel portal on the northern end of the tunnel segment, located east of I-405 and south of Del Gado Drive. Within this facility, ventilation fan rooms would provide both emergency ventilation, in case of a tunnel fire, and regular ventilation, during non-revenue hours. The facility would also house sump pump rooms to collect water from various sources, including storm water; wash water (from tunnel cleaning); and water from a fire-fighting incident, system testing, or pipe leaks.

8.1.1.11 Fire/Life Safety – Emergency Egress

Within the tunnel segment, emergency walkways would be provided between the center dividing wall and each track. Sliding doors would be located in the central dividing wall at required intervals to connect the two sides of the railway with a continuous walkway to allow for safe egress to a point of safety (typically at a station) during an emergency. Similarly, the aerial guideway would include two emergency walkways with safety railing located on the outer side of the tracks. Access to tunnel segments for first responders would be through stations and the portal.

8.1.2 Construction Activities

Temporary construction activities for Alternative 4 would occur within project work zones at permanent facility locations, construction staging and laydown areas, and construction office areas. Construction of the transit facilities through substantial completion is expected to have a duration of 8 ¼ years. Early works, such as site preparation, demolition, and utility relocation, could start in advance of construction of the transit facilities.

For the guideway, Alternative 4 would consist of a single-bore tunnel through the Westside and Santa Monica Mountains. The tunnel would be comprised of two separate segments, one running north from the southern terminus to the UCLA Gateway Plaza Station (Westside segment), and the other running south from the portal in the San Fernando Valley to the UCLA Gateway Plaza Station (Santa Monica Mountains segment). Two tunnel boring machines (TBMs) with approximately 45-foot-diameter cutting faces would be used to construct the two tunnel segments underground. For the Westside segment, the TBM would be launched from Staging Area No. 1 in Table 8-4 at Sepulveda Boulevard and National Boulevard. For the Santa Monica Mountains segment, the TBM would be launched from Staging Area No. 4 in the San Fernando Valley. Both TBMs would be extracted from the UCLA Gateway Plaza Station Staging Area No. 3 in Table 8-4. Figure 8-9 shows the location of construction staging locations along the Alternative 4 alignment.

Table 8-4. Alternative 4: On-Site Construction Staging Locations

No.	Location Description
1	Commercial properties on southeast corner of Sepulveda Boulevard and National Boulevard
2	North side of Wilshire Boulevard, between Veteran Avenue and Gayley Avenue
3	UCLA Gateway Plaza
4	Residential properties on both sides of Del Gado Drive and south side of Sepulveda Boulevard adjacent to I-405
5	West of Sepulveda Boulevard, between Valley Vista Boulevard and Sutton Street
6	West of Sepulveda Boulevard, between US-101 and Sherman Oaks Castle Park
7	Lot behind Los Angeles Fire Department Station 88
8	Commercial property on southeast corner of Sepulveda Boulevard and Raymer Street
9	South of the LOSSAN rail corridor east of Van Nuys Metrolink Station, west of Woodman Avenue

Source: STCP, 2024; HTA, 2024

Figure 8-9. Alternative 4: On-Site Construction Staging Locations

Source: STCP, 2024; HTA, 2024

The distance from the surface to the top of the tunnel for the Westside tunnel segment would vary from approximately 40 feet to 90 feet depending on the depth needed to construct the underground stations. The depth of the Santa Monica Mountains tunnel segment would vary from approximately 470 feet as it passes under the Santa Monica Mountains to 50 feet near UCLA. The tunnel segment through the Westside would be excavated in soft ground, while the tunnel through the Santa Monica Mountains would be excavated primarily in hard ground or rock as geotechnical conditions transition from soft to hard ground near the UCLA Gateway Plaza Station.

The aerial guideway viaduct would be primarily situated in the center of Sepulveda Boulevard in the San Fernando Valley, with guideway columns located in both the center and outside of the right-of-way of Sepulveda Boulevard. This would result in a linear work zone spanning the full width of Sepulveda Boulevard along the length of the aerial guideway. Three to five main phases would be required to construct the aerial guideway. A phased approach would allow travel lanes along Sepulveda Boulevard to remain open as construction individually occupies either the center, left, or right side of the roadway via the use of lateral lane shifts. Additional lane closures on side streets may be required along with appropriate detour routing.

The aerial guideway would comprise a mix of simple spans and longer balanced cantilever spans ranging from 80 to 250 feet in length. The repetitive simple spans would be utilized when guideway bent is located within the center median of Sepulveda Boulevard and would be constructed using Accelerated Bridge Construction (ABC) segmental span-by-span technology. Longer balanced cantilever spans would be provided at locations such as freeways, arterials, or street crossings, and would be constructed using ABC segmental balance cantilever technology. Foundations would consist of cast-in-drilled-hole (CIDH) shafts with both precast and cast-in-place structural elements. During construction of the aerial guideway, multiple crews would work on components of the guideway simultaneously.

Construction work zones would also be co-located with future MSF and station locations. All work zones would comprise the permanent facility footprint with additional temporary construction easements from adjoining properties.

The Metro E Line, Santa Monica Boulevard, Wilshire Boulevard/Metro D Line, and UCLA Gateway Plaza Stations would be constructed using a “cut-and-cover” method, whereby the station structure would be constructed within a trench excavated from the surface with a portion or all being covered by a temporary deck and backfilled during the later stages of station construction. Traffic and pedestrian detours would be necessary during underground station excavation until decking is in place and the appropriate safety measures are taken to resume cross traffic. Constructing the Ventura Boulevard/Sepulveda Boulevard, Metro G Line Sepulveda, Sherman Way, and Van Nuys Metrolink Stations would include construction of CIDH-elevated viaduct with two parallel side platforms supported by outrigger bents.

In addition to work zones, Alternative 4 would require construction staging and laydown areas at multiple locations along the alignment as well as off-site staging areas. Construction staging areas would provide the necessary space for the following activities:

- Contractors’ equipment
- Receiving deliveries
- Testing of soils for minerals or hazards
- Storing materials
- Site offices
- Work zone for excavation
- Other construction activities (including parking and change facilities for workers, location of construction office trailers, storage, staging and delivery of construction materials and permanent plant equipment, and maintenance of construction equipment)

A larger, off-site staging area would be used for temporary storage of excavated material from both tunneling and station cut-and-cover excavation activities. Table 8-4 and Figure 8-9 present potential construction staging areas along the alignment for Alternative 4. Table 8-5 and Figure 8-10 present candidate sites for off-site staging and laydown areas.

Table 8-5. Alternative 4: Potential Off-Site Construction Staging Locations

No.	Location Description
S1	East of Santa Monica Airport Runway
S2	Ralph’s Parking Lot in Westwood Village
N1	West of Sepulveda Basin Sports Complex, south of the Los Angeles River
N2	West of Sepulveda Basin Sports Complex, north of the Los Angeles River
N3	Metro G Line Sepulveda Station Park & Ride Lot
N4	North of Roscoe Boulevard and Hayvenhurst Avenue
N5	LADWP property south of the LOSSAN rail corridor, east of Van Nuys Metrolink Station

Source: STCP, 2024; HTA, 2024

Figure 8-10. Alternative 4: Potential Off-Site Construction Staging Locations

Source: STCP, 2024; HTA, 2024

Construction of the HRT guideway between the Van Nuys Metrolink Station and the MSF would require reconfiguration of an existing rail spur serving LADWP property. The new location of the rail spur would require modification to the existing pedestrian undercrossing at the Van Nuys Metrolink Station.

Alternative 4 would require construction of a concrete casting facility for tunnel lining segments because no existing commercial fabricator capable of producing tunnel lining segments for a large-diameter tunnel exists within a practical distance of the Project Study Area. The site of the MSF would initially be used for this casting facility. The casting facility would include casting beds and associated casting equipment, storage areas for cement and aggregate, and a field quality control facility, which would need to be constructed on-site. When a more detailed design of the facility is completed, the contractor would obtain all permits and approvals necessary from the City of Los Angeles, the South Coast Air Quality Management District, and other regulatory entities.

As areas of the MSF site begin to become available following completion of pre-casting operations, construction of permanent facilities for the MSF would begin, including construction of surface buildings such as maintenance shops, administrative offices, train control, traction power and systems facilities. Some of the yard storage track would also be constructed at this time to allow delivery and inspection of passenger vehicles that would be fabricated elsewhere. Additional activities occurring at the MSF during the final phase of construction would include staging of trackwork and welding of guideway rail.

8.2 Existing Conditions

The primary effect of rising global concentrations of atmospheric GHGs is an increase in the average global temperature. Since 1982, the Earth's temperature has risen at an average rate of approximately 0.2 degrees Celsius per decade. Climate change modeling indicates that further warming is likely to occur due to the anticipated rise in global atmospheric GHG concentrations from various sources worldwide, including emissions from both developed and developing countries, as well as deforestation. This continued increase in GHGs is expected to induce further changes in the global climate system during the current century. Adverse impacts from global climate change worldwide and in California could include the following (CARB, 2022):

- Declining sea ice and mountain snowpack levels: This decline increases sea levels and sea surface evaporation rates, leading to higher atmospheric water vapor due to the atmosphere's ability to hold more moisture at elevated temperatures.
- Rising average global sea levels: Primarily resulting from thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets.
- Changing weather patterns: Alterations in precipitation, ocean salinity, and wind patterns, along with more extreme weather events, including droughts, heavy precipitation, heatwaves, cold spells, and intensified tropical cyclones.
- Declining Sierra Nevada snowpack levels: The Sierra Nevada snowpack, which accounts for approximately half of California's surface water storage, is projected to decrease significantly over the next century, posing challenges for water resources in the state.
- Increased ozone formation: Higher temperatures can lead to more days conducive to ozone formation (e.g., clear days with intense sunlight), potentially increasing ozone levels in high-ozone areas such as Southern California and the San Joaquin Valley by the end of the 21st century.
- Coastal erosion and seawater intrusion: Rising sea levels may exacerbate erosion along California's coastlines and increase the intrusion of seawater into the Sacramento-San Joaquin Delta and its levee systems, impacting freshwater supplies and infrastructure.

These projected impacts underscore the importance of mitigating GHG emissions and implementing adaptive strategies to address the challenges posed by climate change.

8.2.1 Statewide Greenhouse Gas Emissions Inventory

The California Air Resources Board (CARB) maintains the statewide GHG emission inventory, and Table 8-6 displays GHG emissions from 2013 to 2021 in California by economic sector as defined in the *Climate Change Scoping Plan* (2008 Scoping Plan) (CARB, 2008a). California's GHG emissions have followed a declining trend over the past decade. In 2021, emissions from routine emitting activities statewide were approximately 12.6 million metric tons of carbon dioxide equivalents ($MMTCO_2e$) higher than 2020, but 23.1 $MMTCO_2e$ lower than 2019 levels. As shown in Table 5-1, GHG emissions related to the electric power sector has continually declined as California continues to meet renewable portfolio standard (RPS) goals. The increase and decrease over the 2019 to 2021 timeframe are likely due to impacts of the COVID-19 pandemic (CARB, 2023b). The plurality of California GHG emissions is attributed to automobile exhaust associated with the transportation sector, including public and private vehicles, comprising approximately 40 percent of the total statewide emission inventory. Despite statewide population growth, approximately 4 percent from 2011 to 2021, annual GHG emissions attributed to the transportation sector have remained relatively constant over the last decade. However, in 2020, the transportation sector had the largest decrease compared to 2019, which likely resulted in less light-duty vehicle travel due to shelter-in-place orders in response to the COVID-19 pandemic. Overall, the transportation sector in 2021 was 16.7 $MMTCO_2e$ below pre-pandemic (2019) levels.

Table 8-6. Greenhouse Gas Annual $MMTCO_2e$ Emissions Trends by Sector

Sector	2013	2014	2015	2016	2017	2018	2019	2020	2021
Transportation	156.9	157.6	161.2	165.0	166.4	165.2	162.3	135.6	145.6
Electric Power	94.0	90.3	86.3	70.8	64.4	65.0	60.2	59.5	62.4
Industrial	82.7	85.0	82.7	81.2	81.4	82.0	80.8	73.3	73.9
Commercial/Residential	39.0	35.5	37.2	37.7	38.3	37.5	40.6	38.9	38.8
Agriculture	33.7	33.7	32.6	32.1	31.6	32.1	31.3	31.5	30.9
High GWP Sources	17.0	17.9	18.8	19.4	20.1	20.5	20.7	21.3	21.3
Recycling and waste	8.3	8.1	8.1	7.9	8.2	8.3	8.4	8.6	8.4
Emissions Total	**431.6**	**428.2**	**426.9**	**414.2**	**410.4**	**410.7**	**404.4**	**368.7**	**381.3**

Source: CARB, 2023c

GWP = global warming potential
$MMTCO_2e$ = million metric tons of carbon dioxide equivalents

8.2.2 Southern California Association of Governments Regional Greenhouse Gas Emissions

An element of the Southern California Association of Governments (SCAG) *Connect SoCal 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy* (SCAG, 2024a) is a regional GHG emissions inventory and emissions forecast based on the growth projections and control strategies incorporated into its development. SCAG provides estimates of the regional GHG emissions through the RTP/SCS horizon year accounting for programmed transportation projects, population, employment, and housing growth, and other regional factors. The 2024-2050 RTP/SCS has a horizon year of 2050, but provides data for interim year 2045 to address consistency with other GHG reduction policies. Table 8-7 presents modeled emissions from on-road mobile sources in 2019 and 2045. The data demonstrates that from 2019 to 2045, the regional on-road emissions are anticipated to decrease by 32.4 percent (64.35 $MMTCO_2e$ to 43.52 $MMTCO_2e$ by 2045) with plan implementation.

In addition, SCAG provides the total regional GHG emissions from the three primary sources of GHG emissions within the region: transportation, building energy, and water related energy. Table 8-8 shows that total GHG emissions across the SCAG region are anticipated to decrease by approximately 28.9 percent from 2019 to 2045, and transportation emissions are projected to decrease by 29.9 percent. Expansion of public transportation systems spurring mode shift away from passenger vehicles is a fundamental pillar of regional efforts to reduce GHG emissions and meet regional and statewide GHG emissions reduction targets.

Table 8-7. Greenhouse Gas Emissions from On-Road Emissions in the SCAG Region

Sector	2019 (MMT/Year)			2045 (MMT/Year)		
	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
Light and Medium Duty Vehicles	49.30	0.0025	0.0010	32.91	0.0007	0.0002
Heavy Duty Vehicles	12.64	0.0005	0.0014	9.75	0.0002	0.0005
Buses	1.54	0.0008	0.0001	0.61	0.0001	<0.0001
On-Road Vehicles (Subtotal) in CO_2	63.48	0.0039	0.0026	43.27	0.0010	0.0007
On-Road Vehicles (Subtotal) in CO_2e	63.48	0.0810	0.7943	43.27	0.0212	0.2294
Total Emissions from On-Road Vehicles in CO_2e	**64.35**			**43.52**		

Source: SCAG, 2024b

CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
MMT/Year = million metric tons per year
N_2O = nitrous oxide
SCAG = Southern California Association of Governments

Table 8-8. Annual Greenhouse Gas Emissions for the SCAG Region from Three Primary Sectors

Area	2019 ($MMTCO_2e$)	2030 ($MMTCO_2e$)	2045 ($MMTCO_2e$)	2050 ($MMTCO_2e$)	2019 vs 2045
Transportation	66.42	53.38	46.55	47.84	-29.9%
Building Energy	64.64	57.30	47.30	43.97	-26.8%
Water-Related Energy	2.89	2.26	1.40	1.12	-51.6%
Total	**133.95**	**112.94**	**95.26**	**97.8**	**-28.9%**

Source: SCAG, 2024b

$MMTCO_2e$ = million metric tons of carbon dioxide equivalents
SCAG = Southern California Association of Governments

8.2.3 Los Angeles County Metropolitan Transportation Authority Transit System Emissions

Metro has prepared detailed emissions inventories to track its progress in displacing GHG emissions from its operations, which include operation of transit services and facilities, and employee commuting. GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage (APTA, 2018). Metro has been tracking its progress since 2008 through 2019 with its annual energy and resource reports. The *2019 Energy and Resource Report* (Metro, 2019b) was the last version in this format. For future sustainability reports, Metro will prepare an overall agency-wide sustainability report as part of Moving Beyond Sustainability. Metro's latest annual sustainability report analyzed the sustainability and environmental performance of its operational activities during the 2019 calendar year. Based on 2019 data, the largest emissions sources for Metro's total operational emissions were bus fleets and rail systems at 54 percent and 20 percent, respectively (Metro, 2020b). Non-modal sources (facility energy consumption, employee commuting, etc.) made up 22 percent of total operational emissions. New fleet technologies powered by renewable energy and reduced building energy usage can reduce Metro's emissions over the long term. Since 2012, emissions resulting from building energy use have decreased by 23 percent while emissions from water consumption have been cut in half. Table 8-9 summarizes Metro's recent progress in displacing GHG emissions from its operations and continually shows an annual net displacement of GHG emissions.

Table 8-9. Metro Operations Annual Greenhouse Gas Emissions Displacement

Category	2014	2015	2016	2017	2018	2019
Total Emissions ($MTCO_2e$)[a]	396,380	391,275	390,840	415,872	371,911	326,953
Total Displacement ($MTCO_2e$)[b,d]	-482,813	-465,101	-448,301	-1,020,485	-987,490	-918,076
Mode Shift to Transit	-482,813	-465,101	-448,301	-207,374	-200,669	-186,515
Land Use[c]	NA	NA	NA	-813,110	-786,820	-731,561
Net Emissions ($MTCO_2e$)	**-86,433**	**-73,827**	**-57,461**	**-604,613**	**-615,579**	**-591,123**

Source: Metro, 2020b

[a]Total emissions represent the GHG emissions generated from Metro's operation of transit services such as buses, rail, and vanpools, as well as operations of facilities, including consumption of electricity, natural gas, and water, refrigerants, and employee commuting.

[b]GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage.

[c]GHG emissions displacement calculations were updated in 2018 to reflect the addition of Land Use as a source of emissions displacement. Reporting of land use emissions began with the 2017 reporting year.

[d]In 2018, Metro updated its 2017 GHG emissions inventory baseline with inclusion of the Land Use category and updated utility emission factors.

GHG = greenhouse gas
$MTCO_2e$ = metric tons of carbon dioxide equivalents
NA = Not applicable

8.3 Impact Evaluation

8.3.1 Impact GHG-1: Would the project result in greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

8.3.1.1 Construction Impact

Construction of Alternative 4 would result in GHG emissions from off-road equipment, mobile sources, including worker vehicles, vendor trucks, and haul trucks, as well as electricity consumption from TBM usage and on-site portable offices. These emissions sources would be related to constructing the HRT system alignment, TPSSS, stations, and the MSF.

As discussed previously under Section 3.3, CEQA Thresholds of Significance, GHG emissions are measured exclusively as cumulative impacts; therefore, the Alternative 4 construction emissions are considered part of its total GHG emissions in conjunction with operational emissions. In accordance with South Coast Air Quality Management District guidance, the Alternative 4 construction emissions were amortized over Alternative 4's design lifetime of 30 years, then combined with the Alternative 4 annual operational GHG emissions. Table 8-10 summarizes the Alternative 4 GHG emissions throughout the construction period. As shown in Table 8-10, Alternative 4 construction would generate a total of 274,027 $MTCO_2e$ and would result in 9,134 $MTCO_2e$ annually when amortized over the project lifetime of 30 years. Detailed emissions calculations are summarized in Appendix A.

Table 8-10. Alternative 4 Construction Greenhouse Gas Emissions

Construction Year	GHG Emissions ($MTCO_2e$)[a,b]
2027	476
2028	7,451
2029	23,169
2030	37,717
2031	36,532
2032	33,543
2033	16,632
2034	10,660
2035	4,729
2036	1,225
2037	605
TBM Electricity Consumption	101,198
Portable Office Electricity Consumption	88
Total Construction Emissions	**274,027**
Amortized Construction Emissions (30 Years)	9,134

Source: HTA, 2024

[a]Totals may vary due to rounding.
[b]GHG emissions related to electricity consumption represent the total GHG emissions over the entire construction period.

GHG = greenhouse gas
$MTCO_2e$ = metric tons of carbon dioxide equivalents
TBM = tunnel boring machine

Because construction emission sources would cease once construction is complete, they are considered short term. It should be noted that total and annual construction GHG emissions represent a conservative assessment, because GHG emissions would decrease in future years as the construction industry shifts toward implementation of cleaner fuels (i.e., electrified equipment) and more efficient technologies. Additionally, Metro’s Green Construction Policy requires contractors to use renewable diesel, which would reduce upstream GHG emissions related to producing the fuel, as well as reduce GHG emissions from fuel combustion in off-road equipment and trucks as compared to petroleum diesel. GHG emissions for electric-powered equipment such as the TBM and portable offices would also decrease in future years as LADWP continues to increase the amount of renewable energy sources in its power mix to meet state RPS goals. Thus, the annual construction GHG emissions associated with Alternative 4 would decrease with time and are likely to be lower than estimated herein. Alternative 4 construction emissions were amortized over Alternative 4’s design lifetime of 30 years, then combined with Alternative 4 annual operational GHG emissions. As shown in Table 8-11, annual operations of Alternative 4 compared to 2045 without Project conditions would result in a net reduction of GHG emissions; therefore, impacts from Alternative 4 construction emissions would be considered less than significant.

8.3.1.2 Operational Impact

Operations of Alternative 4 would generate long-term GHG emissions from direct and indirect sources. Direct sources consist of mobile sources, including regional VMT and employees traveling to and from the MSF, area sources related to landscaping equipment, emergency generator usage during maintenance testing, and refrigerants used in building air conditioning systems. Indirect sources include electricity generation at power plants associated with traction power for the alignment, building electricity consumption, electricity consumption related to water and wastewater conveyance, and waste decomposition at landfills from solid waste generation.

The Alternative 4 annual GHG emissions were estimated for two scenarios: Alternative 4 compared to 2045 without Project conditions and Alternative 4 compared to Existing Conditions 2021. As discussed in Section 3.3, CEQA Thresholds of Significance, GHG impacts would be evaluated based on the net change in emissions between project alternatives in Horizon Year 2045 and 2045 without Project conditions. The comparison for Alternative 4 2045 and Existing Conditions 2021 is presented for informational purposes only. Detailed emissions calculations are summarized in Appendix A.

Table 8-11 summarizes the Alternative 4 annual GHG emissions for each source category compared to the 2045 without Project conditions. As shown in Table 8-11, when compared to the 2045 without Project conditions, Alternative 4 would result in a net reduction of annual GHG emissions in Horizon Year 2045. This reduction is primarily related to mobile emissions associated with a reduction in VMT. As stated in the *Sepulveda Transit Corridor Project Transportation Technical Report* (Metro, 2025), implementation of Alternative 4 would reduce regional daily VMT by 767,800 miles per day compared to 2045 without Project conditions.

Table 8-11. Alternative 4: Annual Greenhouse Gas Emissions Compared to 2045 without Project Conditions

Source Category	GHG Emissions (MTCO2e/Year)[a]
Alternative 4	
Area	25
Electricity	5,708
Mobile-VMT Analysis	57,111,500
Mobile-Employee Travel	557
Water	85
Waste	78
Refrigerants	<0.1
Emergency Generators[b]	45
Amortized Construction	9,134
Alternative 4 Total Annual Emissions	**57,127,133**
2045 without Project Conditions	
Mobile – 2045 VMT Analysis Annual Emissions	57,188,730
Net Change in Emissions	**-61,597**

Source: HTA, 2024

[a]Totals may vary due to rounding.
[b]An emergency generator would be located at the maintenance and storage facility. Backup power for underground stations would be provided by a battery system.

GHG = greenhouse gas
$MTCO_2e$/Year = metric tons of carbon dioxide equivalents per year

VMT = vehicle miles traveled

Alternative 4 would support state, regional, and local efforts to reduce GHG emissions by providing an efficient transit system as an alternative mode of transportation for commuters traveling between the Valley and Westside. Implementation of Alternative 4 would expand Metro's regional transit network with an all-electric transit system, thereby reducing GHG emissions related to regional VMT and providing further contributions to Metro's net displacement of operational GHG emissions. Overall, Alternative 4 would not result in an incremental increase in GHG emissions that would contribute to climate change, but rather would result in an environmental benefit by reducing GHG emissions; therefore, impacts of GHG emissions would be less than significant.

Table 8-12 summarizes the Alternative 4 annual GHG emissions for each source category compared to Existing Conditions 2021. This is presented for informational purposes only. As shown in Table 8-12, when compared to existing conditions, Alternative 4 would result in a net reduction of annual GHG emissions. The primary driver of the net reduction is mobile source emissions, which are a function of VMT and emission factors.

Table 8-12. Alternative 4: Annual Greenhouse Gas Emissions (Horizon Year 2045) Compared to Existing Conditions (Baseline Year 2021)

Source Category	GHG Emissions ($MTCO_2e$/year)[a]
Alternative 4	
Area	25
Electricity	5,708
Mobile-VMT Analysis	57,111,500
Mobile-Employee Travel	557
Water	85
Waste	78
Refrigerants	<0.1
Emergency Generators[b]	45
Amortized Construction	9,134
Alternative 4 Total Annual Emissions	**57,127,133**
Existing Conditions	
Mobile – 2021 VMT Analysis Annual Emissions	64,691,322
Net Change in Emissions	**-7,564,189**

Source: HTA, 2024

[a]Totals may vary due to rounding.

[b]An emergency generator would be located at the maintenance and storage facility. Backup power for underground stations would be provided by a battery system.

GHG = greenhouse gas
$MTCO_2e$/Year = metric tons of carbon dioxide equivalents per year
VMT = vehicle miles traveled

8.3.2 Impact GHG-2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

8.3.2.1 Construction Impact

Construction of Alternative 4 would generate short-term GHG emissions related to off-road equipment, mobile sources, and electricity consumption. Alternative 4 construction would comply with Metro's

Green Construction Policy, which requires idling restrictions for off-road equipment and trucks, using trucks with model years 2007 or newer, requiring contractors to use renewable diesel for all diesel engines, and implementing best management practices, such as using electric-powered equipment in lieu of diesel equipment where available. Upon completion of Alternative 4 construction, these emissions would cease. As GHG emissions are exclusively cumulative impacts, the Alternative 4 amortized construction emissions were included with the long-term operational emissions for Alternative 4. Based on the discussion in Section 8.3.2.2, annual operational emissions, which included amortized construction emissions, were found to not conflict with plans or policies to reduce GHG emissions; therefore, impacts for construction-related GHG emissions would be less than significant.

8.3.2.2 Operational Impact

Plans, policies, and regulations focused on reducing GHG emissions occur at the state, regional, and local levels. At the state level, these efforts are guided primarily by Assembly Bill (AB) 32, Senate Bill (SB) 32, AB 1279, and the *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) (CARB, 2022). At the regional level, the SCAG *Connect SoCal, 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy* (SCAG, 2020a, 2020b) contains strategies for reducing GHG emissions within the Sustainable Development focus area, as well as Metro's *2019 Climate Action and Adaptation Plan* (CAAP) (Metro, 2019c) and the *Moving Beyond Sustainability – Strategic Plan 2020* (Metro, 2020a) (referred to as "Moving Beyond Sustainability"). Lastly at the local level, relevant plans include the City of Los Angeles' *Sustainable City pLAn* and *Mobility Plan 2035* (City of Los Angeles, 2015, 2016). The following sections discuss the consistency of Alternative 4 with these state, regional, and local plans for reducing GHG emissions.

Consistency with AB 32, SB 32, AB 1279, and 2022 Scoping Plan

AB 32, SB 32, and AB 1279 outline the state's GHG emissions reduction targets for 2020, 2030, and 2045, respectively. In 2008 and 2014, CARB adopted the 2008 Scoping Plan and 2014 *First Update to the Climate Change Scoping Plan*, respectively, as a framework for achieving the emissions reduction targets in AB 32 (CARB, 2008a, 2014). These plans outline a series of technologically feasible and cost-effective measures to reduce statewide GHG emissions. CARB adopted *California's 2017 Climate Change Scoping Plan* (CARB, 2017) in November 2017 as a framework to achieve the 2030 GHG reduction goal described in SB 32, which is to reduce statewide GHG emissions to 1990 levels by 2020 and 40 percent below 1990 levels by 2030. Most recently, the 2022 Scoping Plan was adopted in September 2022 and outlines how the state will achieve carbon neutrality and reduce statewide GHG emissions 85 percent below 1990 levels by 2045. The analysis year for Alternative 4 is 2045 (horizon year); therefore, the statewide GHG emissions reduction target for 2045 is the statutory statewide milestone target that is applicable to Alternative 4.

As discussed in Section 0 Existing Conditions, the transportation sector is the largest contributor to statewide GHG emissions. Similarly, the 2022 Scoping Plan focuses heavily on strategies and actions to reduce GHG emissions from the transportation sector, such as reducing VMT through transportation infrastructure that aligns with the state's climate goals. Alternative 4 would be consistent with this objective because it would reduce regional daily VMT by 767,800 miles per day (compared to 2045 without Project conditions), resulting in an overall net reduction in annual GHG emissions.

The 2022 Scoping Plan also focuses on transitioning commercial building energy from fossil fuel sources to non-combustion alternatives. Alternative 4 would be consistent with this effort because it would comply with City of Los Angeles Municipal Code Section 99.04.106.8, which requires all newly constructed buildings to be all-electric buildings. Additionally, Alternative 4 would be designed to meet sustainable certifications for its major components. The entire track alignment, stations, and MSF would be designed in accordance with Envision Version 3, underground stations and the MSF would be designed to meet the Leadership in Energy and Environmental Design (LEED) Version 4 Building Design and Construction (LEED v4 BD+C) and Tier 2 of the California Green Building Standards Code (STCP, 2024). Overall, Alternative 4 would not conflict with the state goals and strategies for reducing GHG emissions.

Consistency with 2024-2050 RTP/SCS

The 2024-2050 RTP/SCS is a long-range planning document that balances future mobility and housing needs with economic, environmental, and public health goals in the SCAG region. One of the key strategies of the plan is to integrate land use, housing, and transportation planning to ensure sustainable regional growth. The SCS portion of the 2024-2050 RTP/SCS includes a combination of transportation and land use strategies to meet GHG reduction goals, such as emphasizing land use patterns that facilitate multimodal access to work, educational and other destinations; focusing on a regional jobs/housing balance to reduce commute times and distances and expand job opportunities near transit and along center-focused main streets; and encouraging design and transportation options that reduce the reliance on solo car trips. Alternative 4 would support these strategies by providing access to a safe, sustainable, and efficient transit system located in dense urban communities with major job centers, including a direct connection with UCLA via the UCLA Gateway Plaza Station.

Implementation of the 2024-2050 RTP/SCS would achieve regional GHG reductions relative to 2005 SCAG areawide levels of approximately 8 percent in 2020 and approximately 19 percent by 2035 (SCAG, 2024a). Additionally, SCAG indicates implementation of the 2024-2050 RTP/SCS would reduce daily VMT per capita by 6.3 percent compared to the SCAG 2050 Baseline scenario. The Baseline scenario represents how the region would perform without implementation of the 2024-2050 RTP/SCS. As shown in Table 8-11, implementation of Alternative 4 would result in a net reduction of GHG emissions and would directly contribute to meeting the objectives and emission reduction targets outlined in the 2024-2050 RTP/SCS. Overall, Alternative 4 would not conflict with the goals and strategies of the 2024-2050 RTP/SCS to reduce VMT and associated GHG emissions.

Consistency with Metro Plans

Metro has developed policies directed toward controlling GHG emissions through a variety of plans over the last decade. The most recent and relevant plans are the 2019 CAAP and Moving Beyond Sustainability, which builds upon previous commitment to environmental and sustainability stewardship. The 2019 CAAP sets a goal of reducing GHG emissions by 79 percent relative to 2017 by 2030, and 100 percent by 2050. Moving Beyond Sustainability also includes goals of reducing GHG emissions by 100 percent relative to 2017 by 2050 and displacing or preventing GHG emissions. As a Metro project, Alternative 4 would inherently be required to be consistent with goals and strategies for each of these plans. As shown in Table 8-11, implementation of Alternative 4 would result in a net reduction in GHG emissions compared to future conditions, thus supporting the GHG reduction goals for both of these plans. Overall, Alternative 4 would not conflict with the goals and strategies of Metro's plans to reduce GHG emissions.

Consistency with Sustainable City pLAn

LA's Green New Deal, Sustainable City pLAn (City of Los Angeles Mayor's Office, 2019) was the first 4-year update to the *Sustainable City pLAn* (2015 pLAn) (City of Los Angeles, 2015) and expands in more detail the vision to achieve a sustainable future that entails a carbon-neutral economy by 2050. *LA's Green New Deal, Sustainable City pLAn* (henceforth referred to as the "2019 updates to the pLAn") accelerates targets from the 2015 pLAn for supplying renewable energy, increasing local water sourcing, reducing building energy, reducing VMT per capita, reducing municipal GHG emissions, increasing the percentage of zero emission passenger and city-fleet vehicles, building new housing near transit, and increasing the number of green jobs.

The 2019 updates to the pLAn would accelerate GHG reductions targets, including reducing GHG emissions by 50 percent by 2025 and by 73 percent by 2035, and becoming carbon neutral by 2050, all relative to a 1990 baseline. As shown in Table 8-11, implementation of Alternative 4 would result in a net reduction in GHG emissions compared to future conditions, thus supporting the GHG reduction goals. Additionally, Alternative 4 would provide access to a safe and efficient transit system located in close proximity to dense urban communities near major job centers and a direct connection to UCLA, and would be developed to meet sustainable certifications, such as Envision, LEED, and CALGreen building codes. Overall, Alternative 4 would not conflict with the goals and strategies of the 2019 updates to the pLAn to reduce GHG emissions.

Consistency with City of Los Angeles Mobility Plan 2035

Mobility Plan 2035 emphasizes the efficacy of multi-modal street design in reducing GHG emissions through encouraging the use of transit and active transportation, which decreases regional dependence on passenger vehicles (DCP, 2016). Alternative 4 would support these strategies by providing access to a safe, sustainable, and efficient transit system located in dense urban communities with major job centers and UCLA via the UCLA Gateway Plaza Station. Alternative 4 would not conflict with the goals and strategies of *Mobility Plan 2035* to reduce GHG emissions.

Overall, Alternative 4 would not conflict with plans, policies, or regulations adopted for the purpose of reducing GHG emissions; therefore, impacts would be less than significant.

8.4 Mitigation Measures

8.4.1 Construction Impacts

No mitigation measures are required.

8.4.2 Operational Impacts

No mitigation measures are required.

8.4.3 Impacts After Mitigation

No mitigation measures are required; impacts are less than significant.

9 ALTERNATIVE 5

9.1 Alternative Description

Alternative 5 consists of a heavy rail transit (HRT) system with a primarily underground guideway track configuration, including seven underground stations and one aerial station. This alternative would include five transfers to high-frequency fixed guideway transit and commuter rail lines, including the Los Angeles County Metropolitan Transportation Authority's (Metro) E, Metro D, and Metro G Lines, East San Fernando Valley Light Rail Transit Line, and the Metrolink Ventura County Line. The length of the alignment between the terminus stations would be approximately 13.8 miles, with 0.7 miles of aerial guideway and 13.1 miles of underground configuration.

The seven underground and one aerial HRT stations would be as follows:

1. Metro E Line Expo/Sepulveda Station (underground)
2. Santa Monica Boulevard Station (underground)
3. Wilshire Boulevard/Metro D Line Station (underground)
4. UCLA Gateway Plaza Station (underground)
5. Ventura Boulevard/Sepulveda Boulevard Station (underground)
6. Metro G Line Sepulveda Station (underground)
7. Sherman Way Station (underground)
8. Van Nuys Metrolink Station (aerial)

9.1.1 Operating Characteristics

9.1.1.1 Alignment

As shown on Figure 9-1, from its southern terminus station at the Metro E Line Expo/Sepulveda Station, the alignment of Alternative 5 would run underground north through the Westside of Los Angeles (Westside), the Santa Monica Mountains, and the San Fernando Valley (Valley) to a tunnel portal east of Sepulveda Boulevard and south of Raymer Street. As it approaches the tunnel portal, the alignment would curve eastward and begin to transition to an aerial guideway along the south side of the Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor that would continue to the northern terminus station adjacent to the Van Nuys Metrolink/Amtrak Station.

The proposed southern terminus station would be located underground east of Sepulveda Boulevard, between the existing elevated Metro E Line tracks and Pico Boulevard. Tail tracks for vehicle storage would extend underground south of National Boulevard east of Sepulveda Boulevard. The alignment would continue north beneath Bentley Avenue before curving northwest to an underground station at the southeast corner of Santa Monica Boulevard and Sepulveda Boulevard. From the Santa Monica Boulevard Station, the alignment would continue and curve eastward to the Wilshire Boulevard/Metro D Line Station beneath the Metro D Line Westwood/UCLA Station, which is currently under construction as part of the Metro D Line Extension Project. From there, the underground alignment would curve slightly to the northeast and continue beneath Westwood Boulevard before reaching the UCLA Gateway Plaza Station.

Figure 9-1. Alternative 5: Alignment

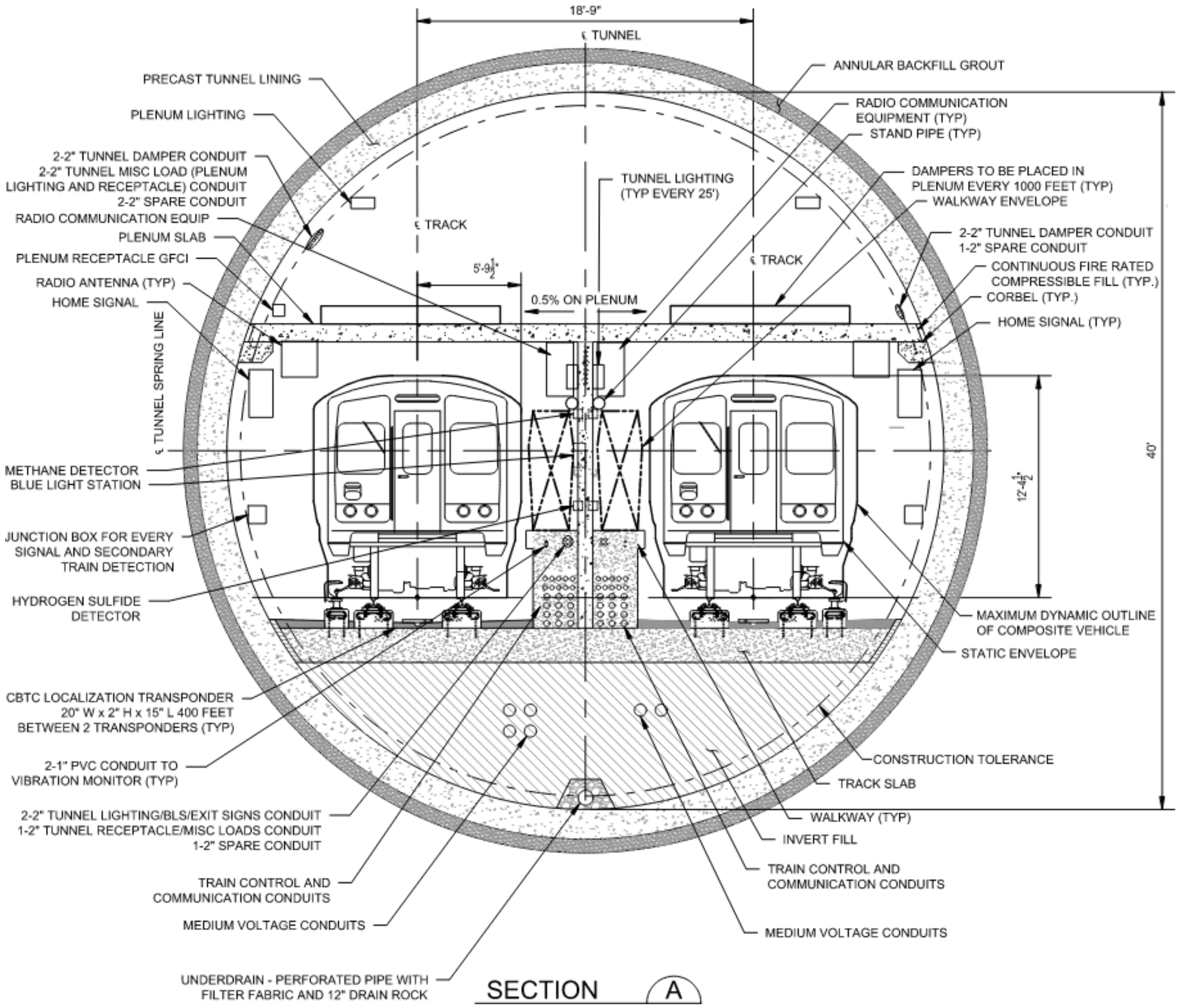
Source: STCP, 2024; HTA, 2024

From the UCLA Gateway Plaza Station, the alignment would turn to the northwest beneath the Santa Monica Mountains to the east of Interstate 405 (I-405). South of Mulholland Drive, the alignment would curve to the north, aligning with Saugus Avenue south of Valley Vista Boulevard. The Ventura Boulevard Station would be located under Saugus Avenue, between Greenleaf Street and Dickens Street. The alignment would then continue north beneath Sepulveda Boulevard to the Metro G Line Sepulveda Station immediately south of the Metro G Line Busway. After leaving the Metro G Line Sepulveda Station, the alignment would continue beneath Sepulveda Boulevard to reach the Sherman Way Station, the final underground station along the alignment, immediately south of Sherman Way. From the Sherman Way Station, the alignment would continue north before curving slightly to the northeast to the tunnel portal south of Raymer Street. The alignment would then transition from an underground configuration to an aerial guideway structure after exiting the tunnel portal. East of the tunnel portal, the alignment would transition to a cut-and-cover U-structure segment, followed by a trench segment before transitioning to an aerial guideway that would run east along the south side of the LOSSAN rail corridor. Parallel to the LOSSAN rail corridor, the guideway would conflict with the existing Willis Avenue Pedestrian Bridge, which would be demolished. The alignment would follow the LOSSAN rail corridor before reaching the proposed northern terminus Van Nuys Metrolink Station located adjacent to the existing Metrolink/Amtrak Station. The tail tracks and yard lead tracks would descend to the proposed at-grade maintenance and storage facility (MSF) east of the proposed northern terminus station. Modifications to the existing pedestrian underpass to the Metrolink platforms to accommodate these tracks would result in reconfiguration of an existing rail spur serving City of Los Angeles Department of Water and Power (LADWP) property.

9.1.1.2 Guideway Characteristics

For underground sections, Alternative 5 would utilize a single-bore tunnel configuration with an outside diameter of approximately 43.5 feet. The tunnel would include two parallel tracks at 18.75-foot spacing in tangent sections separated by a continuous central dividing wall throughout the tunnel. Inner walkways would be constructed adjacent to the two tracks. Inner and outer walkways would be constructed within tunnel sections near the track crossovers. At the crown of tunnel, a dedicated air plenum would be provided by constructing a concrete slab above the railway corridor. The air plenum would allow for ventilation throughout the underground portion of the alignment. Figure 9-2 illustrates these components at a typical cross-section of the underground guideway.

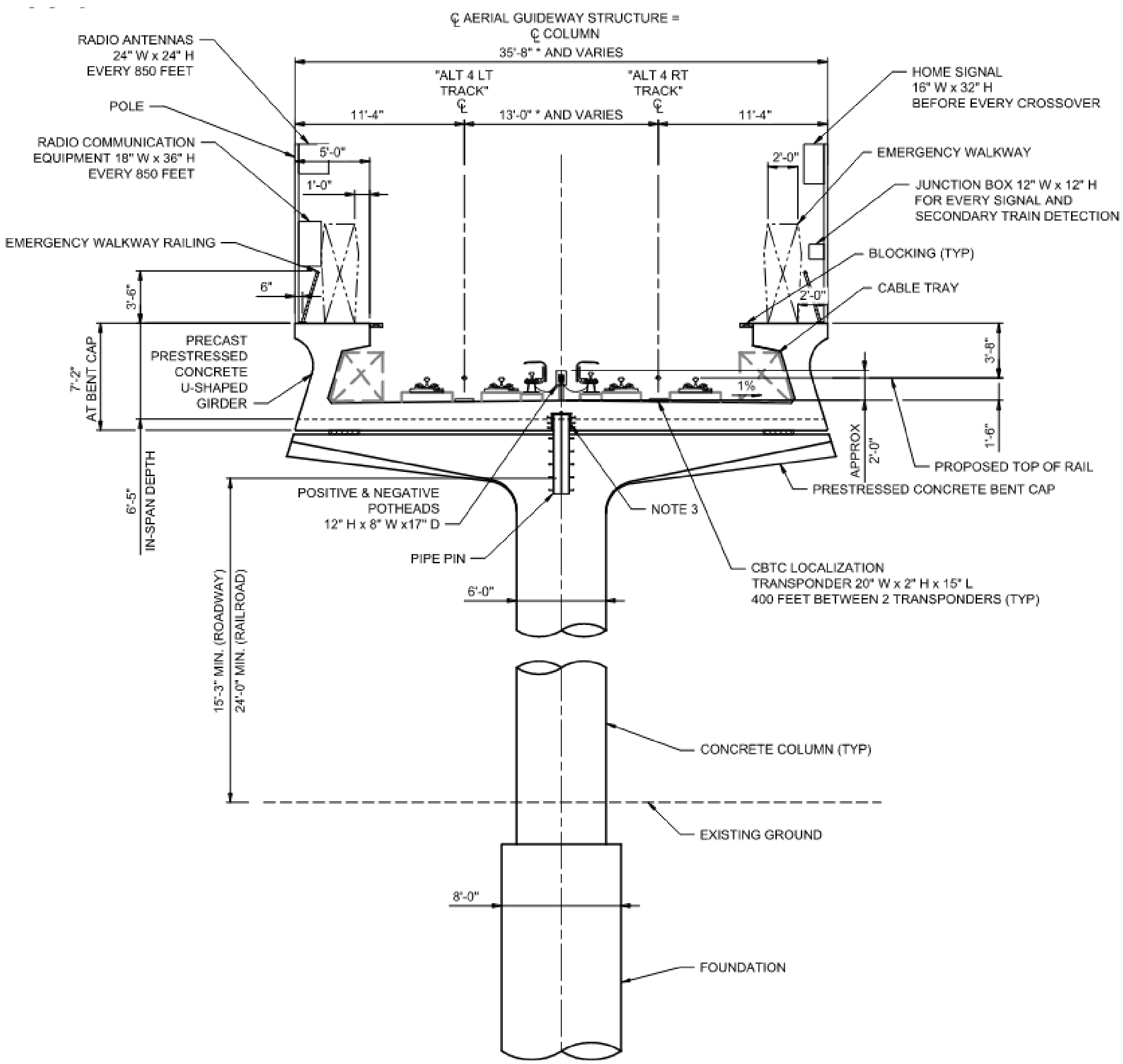
Figure 9-2. Typical Underground Guideway Cross-Section



Source: STCP, 2024

In aerial sections adjacent to Raymer Street and the LOSSAN rail corridor, the guideway would consist of single-column spans. The single-column spans would include a U-shaped concrete girder structure that supports the railway track atop a series of individual columns. The single-column aerial guideway would be approximately 36 feet wide. The track would be constructed on the concrete girders with direct fixation and would maintain a minimum of 13 feet between the two-track centerlines. On the outer side of the tracks, emergency walkways would be constructed with a minimum width of 2 feet. The single-column aerial guideway would be the primary aerial structure throughout the aerial portion of the alignment. Figure 9-3 shows a typical cross-section of the single-column aerial guideway.

Figure 9-3. Typical Aerial Guideway Cross-Section



Source: STCP, 2024

9.1.1.3 Vehicle Technology

Alternative 5 would utilize steel-wheel HRT trains, with automated train operations and planned peak-period headways of 2.5 minutes and off-peak-period headways ranging from 4 to 6 minutes. Each train could consist of three or four cars with open gangways between cars. The HRT vehicle would have a maximum operating speed of 70 miles per hour; actual operating speeds would depend on the design of the guideway and distance between stations. Train cars would be approximately 10 feet wide with three double doors on each side. Each car would be approximately 72 feet long with capacity for 170 passengers. Trains would be powered by a third rail.

9.1.1.4 Stations

Alternative 5 would include seven underground stations and one aerial station with station platforms measuring 280 feet long for both station configurations. The aerial station would be constructed a minimum of 15.25 feet above ground level, supported by rows of dual columns with 8-foot diameters. The southern terminus station would be adjacent to the Metro E Line Expo/Sepulveda Station, and the northern terminus station would be adjacent to the Van Nuys Metrolink/Amtrak Station.

All stations would be side-platform stations where passengers would select and travel up to station platforms depending on their direction of travel. All stations would include 20-foot-wide side platforms separated by 30 feet for side-by-side trains. Each underground station would include an upper and lower concourse level prior to reaching the train platforms. The Van Nuys Metrolink Station would include a mezzanine level prior to reaching the station platforms. Each station would have a minimum of two elevators, two escalators, and one stairway from ground level to the concourse or mezzanine.

Stations would include automatic, bi-parting fixed doors along the edges of station platforms. These platform screen doors would be integrated into the automatic train control system and would not open unless a train is stopped at the platform.

The following information describes each station, with relevant entrance, walkway, and transfer information. Bicycle parking would be provided at each station.

Metro E Line Expo/Sepulveda Station

- This underground station would be located just north of the existing Metro E Line Expo/Sepulveda Station, on the east side of Sepulveda Boulevard.
- A station entrance would be located on the east side of Sepulveda Boulevard north of the Metro E Line.
- A direct internal transfer to the Metro E Line would be provided at street level within the fare paid zone.
- A 126-space parking lot would be located immediately north of the station entrance, east of Sepulveda Boulevard. Passengers would also be able to park at the existing Metro E Line Expo/Sepulveda Station parking facility, which provides 260 parking spaces.

Santa Monica Boulevard Station

- This underground station would be located under the southeast corner of Santa Monica Boulevard and Sepulveda Boulevard.
- The station entrance would be located on the south side of Santa Monica Boulevard, between Sepulveda Boulevard and Bentley Avenue.
- No dedicated station parking would be provided at this station.

Wilshire Boulevard/Metro D Line Station

- This underground station would be located beneath the Metro D Line tracks and platform under Gayley Avenue between Wilshire Boulevard and Lindbrook Drive.
- Station entrances would be provided on the northeast corner of Wilshire Boulevard and Gayley Avenue and on the northeast corner of Lindbrook Drive and Gayley Avenue. Passengers would also be able to use the Metro D Line Westwood/UCLA Station entrances to access the station platform.

- A direct internal station transfer to the Metro D Line would be provided at the south end of the station.
- No dedicated station parking would be provided at this station.

UCLA Gateway Plaza Station

- This underground station would be located underneath Gateway Plaza on the University of California, Los Angeles (UCLA) campus.
- Station entrances would be provided on the north side of Gateway Plaza and on the east side of Westwood Boulevard across from Strathmore Place.
- No dedicated station parking would be provided at this station.

Ventura Boulevard/Sepulveda Boulevard Station

- This underground station would be located under Saugus Avenue between Greenleaf Street and Dickens Street.
- A station entrance would be located on the southeast corner of Saugus Avenue and Dickens Street.
- Approximately 92 parking spaces would be supplied at this station west of Sepulveda Boulevard, between Dickens Street and the U.S. Highway 101 (US-101) On-Ramp.

Metro G Line Sepulveda Station

- This underground station would be located under Sepulveda Boulevard immediately south of the Metro G Line Busway.
- A station entrance would be provided on the west side of Sepulveda Boulevard, south of the Metro G Line Busway.
- Passengers would be able to park at the existing Metro G Line Sepulveda Station parking facility, which has a capacity of 1,205 parking spaces. Currently, only 260 parking spaces are currently used for transit parking. No new parking would be constructed.

Sherman Way Station

- This underground station would be located below Sepulveda Boulevard, between Sherman Way and Gault Street.
- The station entrance would be located near the southwest corner of Sepulveda Boulevard and Sherman Way.
- Approximately 122 parking spaces would be supplied at this station on the west side of Sepulveda Boulevard, with vehicle access from Sherman Way.

Van Nuys Metrolink Station

- This aerial station would span Van Nuys Boulevard, just south of the LOSSAN rail corridor.
- The primary station entrance would be located on the east side of Van Nuys Boulevard just south of the LOSSAN rail corridor. A secondary station entrance would be located between Raymer Street and Van Nuys Boulevard.
- An underground pedestrian walkway would connect the station plaza to the existing pedestrian underpass to the Metrolink/Amtrak platform outside the fare paid zone.

- Existing Metrolink Station parking would be reconfigured, maintaining approximately the same number of spaces, but 66 parking spaces would be relocated west of Van Nuys Boulevard. Metrolink parking would not be available to Metro transit riders.

9.1.1.5 Station-to-Station Travel Times

Table 9-1 presents the station-to-station distance and travel times at peak period for Alternative 5. The travel times include both run time and dwell time. Dwell time is 30 seconds for transfer stations and 20 seconds for other stations. Northbound and southbound travel times vary slightly because of grade differentials and operational considerations at end-of-line stations.

Table 9-1. Alternative 5: Station-to-Station Travel Times and Station Dwell Times

From Station	To Station	Distance (miles)	Northbound Station to Station Travel Time (seconds)	Southbound Station to Station Travel Time (seconds)	Dwell Time (seconds)
Metro E Line Station					*30*
Metro E Line	Santa Monica Boulevard	0.9	89	86	—
Santa Monica Boulevard Station					*20*
Santa Monica Boulevard	Wilshire/Metro D Line	0.9	91	92	—
Wilshire/Metro D Line Station					*30*
Wilshire/Metro D Line	UCLA Gateway Plaza	0.7	75	69	—
UCLA Gateway Plaza Station					*20*
UCLA Gateway Plaza	Ventura Boulevard	6.0	368	359	—
Ventura Boulevard Station					*20*
Ventura Boulevard	Metro G Line	2.0	137	138	—
Metro G Line Station					*30*
Metro G Line	Sherman Way	1.4	113	109	—
Sherman Way Station					*20*
Sherman Way	Van Nuys Metrolink	1.9	166	162	—
Van Nuys Metrolink Station					*30*

Source: STCP, 2024

— = no data

9.1.1.6 Special Trackwork

Alternative 5 would include 10 double crossovers throughout the alignment enabling trains to cross over to the parallel track. Each terminus station would include a double crossover immediately north and south of the station. Except for the Santa Monica Boulevard Station, each station would have a double crossover immediately south of the station. The remaining crossover would be located along the alignment midway between the UCLA Gateway Plaza Station and the Ventura Boulevard Station.

9.1.1.7 Maintenance and Storage Facility

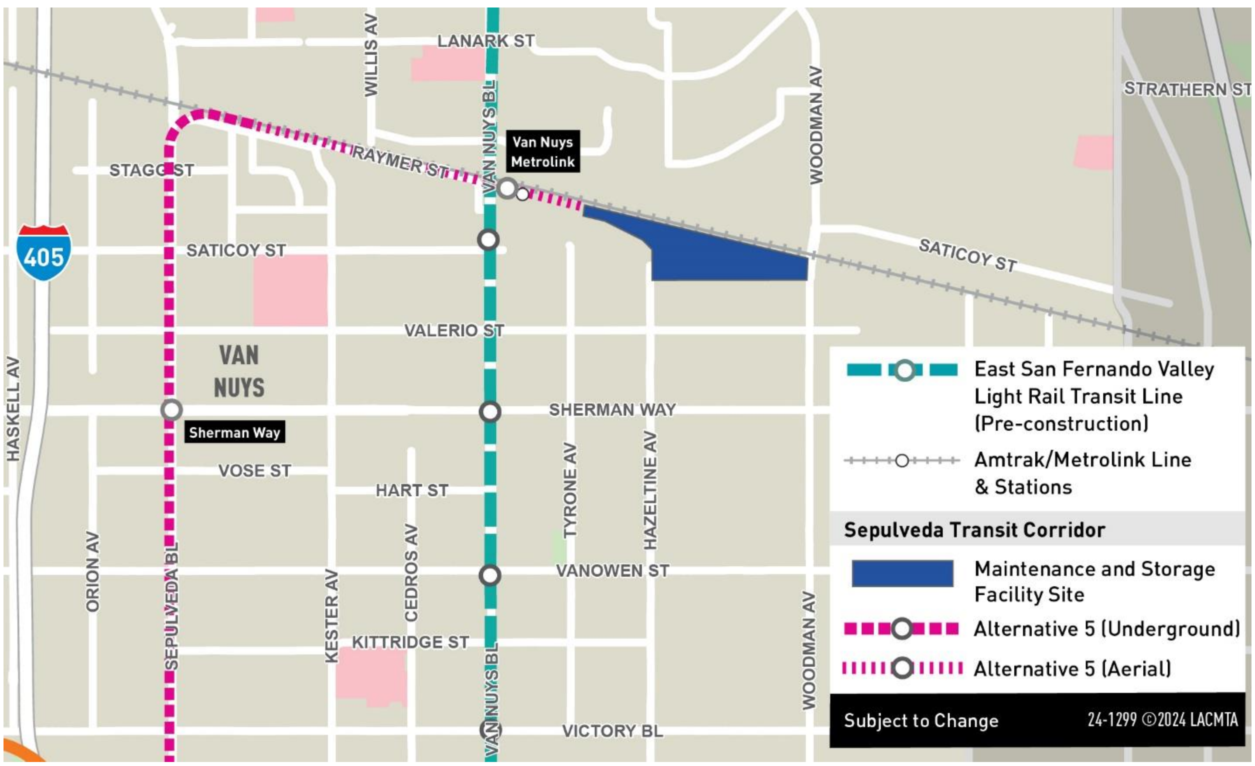
The MSF for Alternative 5 would be located east of the Van Nuys Metrolink Station and would encompass approximately 46 acres. The MSF would be designed to accommodate 184 rail cars and would be bounded by single-family residences to the south, the LOSSAN rail corridor to the north, Woodman Avenue on the east, and Hazeltine Avenue and industrial manufacturing enterprises to the west. Trains would access the site from the fixed guideway's tail tracks at the northwest corner of the site. Trains would then travel southeast to maintenance facilities and storage tracks.

The site would include the following facilities:

- Two entrance gates with guard shacks
- Main shop building
- Maintenance-of-way building
- Storage tracks
- Carwash building
- Cleaning and inspections platforms
- Material storage building
- Hazmat storage locker
- Traction power substation (TPSS) located on the west end of the MSF to serve the mainline
- TPSS located on the east end of the MSF to serve the yard and shops
- Parking area for employees
- Grade separated access roadway (over the HRT tracks at the east end of the facility) and necessary drainage

Figure 9-4 shows the location of the MSF site for Alternative 5.

Figure 9-4. Alternative 5: Maintenance and Storage Facility Site



Source: STCP, 2024; HTA, 2024

9.1.1.8 Traction Power Substations

TPSSs transform and convert high voltage alternating current supplied from power utility feeders into direct current suitable for transit operation. Twelve TPSS facilities would be located along the alignment and would be spaced approximately 0.5 to 2.5 miles apart. All TPSS facilities would be located within the stations, adjacent to the tunnel through the Santa Monica Mountains, or within the MSF. Table 9-2 lists the TPSS locations for Alternative 5.

Figure 9-5 shows the TPSS locations along the Alternative 5 alignment.

Table 9-2. Alternative 5: Traction Power Substation Locations

TPSS No.	TPSS Location Description	Configuration
1	TPSS 1 would be located east of Sepulveda Boulevard and north of the Metro E Line.	Underground (within station)
2	TPSS 2 would be located south of Santa Monica Boulevard, between Sepulveda Boulevard and Bentley Avenue.	Underground (within station)
3	TPSS 3 would be located at the southeast corner of UCLA Gateway Plaza.	Underground (within station)
4	TPSS 4 would be located south of Bellagio Road and west of Stone Canyon Road.	Underground (adjacent to tunnel)
5	TPSS 5 would be located west of Roscomare Road, between Donella Circle and Linda Flora Drive.	Underground (adjacent to tunnel)
6	TPSS 6 would be located east of Loom Place, between Longbow Drive and Vista Haven Road.	Underground (adjacent to tunnel)
7	TPSS 7 would be located west of Sepulveda Boulevard, between the I-405 Northbound On-Ramp and Dickens Street.	Underground (within station)
8	TPSS 8 would be located west of Sepulveda Boulevard, between the Metro G Line Busway and Oxnard Street.	Underground (within station)
9	TPSS 9 would be located at the southwest corner of Sepulveda Boulevard and Sherman Way.	Underground (within station)
10	TPSS 10 would be located south of the LOSSAN rail corridor and north of Raymer Street and Kester Avenue.	At-grade
11	TPSS 11 would be located south of the LOSSAN rail corridor and east of the Van Nuys Metrolink Station.	At-grade (within MSF)
12	TPSS 12 would be located south of the LOSSAN rail corridor and east of Hazeltine Avenue.	At-grade (within MSF)

Source: STCP, 2024; HTA, 2024

Note: Sepulveda Transit Corridor Partners (STCP) has stated that Alternative 5 TPSS locations are derived from and assumed to be similar to the Alternative 4 TPSS locations.

Figure 9-5. Alternative 5: Traction Power Substation Locations

Source: STCP, 2024; HTA, 2024

9.1.1.9 Roadway Configuration Changes

Table 9-3 lists the roadway changes necessary to accommodate the guideway of Alternative 5. Figure 9-6 shows the location of the roadway changes within the Sepulveda Transit Corridor Project (Project) Study Area. In addition to the changes made to accommodate the guideway, as listed in Table 9-3, roadways and sidewalks near stations would be reconstructed, resulting in modifications to curb ramps and driveways.

Table 9-3. Alternative 5: Roadway Changes

Location	From	To	Description of Change
Raymer Street	Kester Avenue	Keswick Street	Reconstruction resulting in narrowing of width and removal of parking on the westbound side of the street to accommodate aerial guideway columns.
Cabrito Road	Raymer Street	Marson Street	Closure of Cabrito Road at the LOSSAN rail corridor at-grade crossing. A new segment of Cabrito Road would be constructed from Noble Avenue and Marson Street to provide access to extra space storage from the north.

Source: STCP, 2024; HTA, 2024

Figure 9-6. Alternative 5: Roadway Changes

Source: STCP, 2024; HTA, 2024

9.1.1.10 Ventilation Facilities

For ventilation, a plenum within the crown of the tunnel would provide a separate compartment for air circulation and allow multiple trains to operate between stations. Each underground station would include a fan room with additional ventilation facilities. Alternative 5 would also include a stand-alone ventilation facility at the tunnel portal on the northern end of the tunnel segment, located east of Sepulveda Boulevard and south of Raymer Street. Within this facility, ventilation fan rooms would provide both emergency ventilation, in case of a tunnel fire, and regular ventilation, during non-revenue hours. The facility would also house sump pump rooms to collect water from various sources, including storm water; wash-water (from tunnel cleaning); and water from a fire-fighting incident, system testing, or pipe leaks.

9.1.1.11 Fire/Life Safety – Emergency Egress

Within the tunnel segment, emergency walkways would be provided between the center dividing wall and each track. Sliding doors would be located in the central dividing wall at required intervals to connect the two sides of the railway with a continuous walkway to allow for safe egress to a point of safety (typically at a station) during an emergency. Similarly, the aerial guideway near the LOSSAN rail corridor would include two emergency walkways with safety railing located on the outer side of the tracks. Access to tunnel segments for first responders would be through stations and the portal.

9.1.2 Construction Activities

Temporary construction activities for Alternative 5 would include project work zones at permanent facility locations, construction staging and laydown areas, and construction office areas. Construction of the transit facilities through substantial completion is expected to have a duration of 8 ¼ years. Early works, such as site preparation, demolition, and utility relocation, could start in advance of construction of the transit facilities.

For the guideway, Alternative 5 would consist of a single-bore tunnel through the Westside, Valley, and Santa Monica Mountains. The tunnel would comprise three separate segments, one running north from the southern terminus to the UCLA Gateway Plaza Station (Westside segment), one running south from the Ventura Boulevard Station to the UCLA Gateway Plaza Station (Santa Monica Mountains segment), and one running north from the Ventura Boulevard Station to the portal near Raymer Street (Valley segment). Tunnel boring machines (TBMs) with approximately 45-foot-diameter cutting faces would be used to construct the tunnel segments underground. For the Westside segment, the TBM would be launched from Staging Area No. 1 in Table 9-4 at Sepulveda Boulevard and National Boulevard. For the Santa Monica Mountains segment, the TBMs would be launched from the Ventura Boulevard Station. Both TBMs would be extracted from the UCLA Gateway Plaza Station Staging Area No. 3 in Table 9-4. For the Valley segment, the TBM would be launched from Staging Area No. 8, as shown in Table 9-4, and extracted from the Ventura Boulevard Station. Figure 9-7 shows the location of construction staging locations along the Alternative 5 alignment.

Table 9-4. Alternative 5: On-Site Construction Staging Locations

No.	Location Description
1	Commercial properties on southeast corner of Sepulveda Boulevard and National Boulevard
2	North side of Wilshire Boulevard between Veteran Avenue and Gayley Avenue
3	UCLA Gateway Plaza
4	Commercial property on southwest corner of Sepulveda Boulevard and Dickens Street
5	West of Sepulveda Boulevard between US-101 and Sherman Oaks Castle Park
6	Lot behind Los Angeles Fire Department Station 88
7	Property on the west side of Sepulveda Boulevard between Sherman Way and Gault Street
8	Industrial property on both sides of Raymer Street, west of Burnet Avenue
9	South of the LOSSAN rail corridor east of Van Nuys Metrolink Station, west of Woodman Avenue

Source: STCP, 2024; HTA, 2024

Figure 9-7. Alternative 5: On-Site Construction Staging Locations

Source: STCP, 2024; HTA, 2024

The distance from the surface to the top of the tunnel for the Westside tunnel would vary from approximately 40 feet to 90 feet depending on the depth needed to construct the underground stations. The depth of the Santa Monica Mountains tunnel segment varies greatly from approximately 470 feet as it passes under the Santa Monica Mountains to 50 feet near UCLA. The depth of the Valley segment would vary from approximately 40 feet near the Ventura Boulevard/Sepulveda Station and north of the Metro G Line Sepulveda Station to 150 feet near Weddington Street. The tunnel segments through the Westside and Valley would be excavated in soft ground while the tunnel through the Santa Monica Mountains would be excavated primarily in hard ground or rock as geotechnical conditions transition from soft to hard ground near the UCLA Gateway Plaza Station.

Construction work zones would also be co-located with future MSF and station locations. All work zones would comprise the permanent facility footprint with additional temporary construction easements from adjoining properties.

All underground stations would be constructed using a “cut-and-cover” method, whereby the underground station structure would be constructed within a trench excavated from the surface with a portion or all being covered by a temporary deck and backfilled during the later stages of station construction. Traffic and pedestrian detours would be necessary during underground station excavation until decking is in place and the appropriate safety measures are taken to resume cross traffic.

In addition to work zones, Alternative 5 would include construction staging and laydown areas at multiple locations along the alignment as well as off-site staging areas. Construction staging areas would provide the necessary space for the following activities:

- Contractors’ equipment
- Receiving deliveries
- Testing of soils for minerals or hazards
- Storing materials
- Site offices
- Work zone for excavation
- Other construction activities (including parking and change facilities for workers, location of construction office trailers, storage, staging and delivery of construction materials and permanent plant equipment, and maintenance of construction equipment).

A larger, off-site staging area would be used for temporary storage of excavated material from both tunneling and station cut-and-cover excavation activities. Table 9-4 and Figure 9-7 present the potential construction staging areas along the alignment for Alternative 5. Table 9-5 and Figure 9-8 present candidate sites for off-site staging and laydown areas.

Table 9-5. Alternative 5: Potential Off-Site Construction Staging Locations

No.	Location Description
S1	East of Santa Monica Airport Runway
S2	Ralph’s Parking Lot in Westwood Village
N1	West of Sepulveda Basin Sports Complex, south of the Los Angeles River
N2	West of Sepulveda Basin Sports Complex, north of the Los Angeles River
N3	Metro G Line Sepulveda Station Park & Ride Lot
N4	North of Roscoe Boulevard and Hayvenhurst Avenue
N5	LADWP property south of the LOSSAN rail corridor, east of Van Nuys Metrolink Station

Source: STCP, 2024; HTA, 2024

Figure 9-8. Alternative 5: Potential Off-Site Construction Staging Locations

Source: STCP, 2024; HTA, 2024

Construction of the HRT guideway between the Van Nuys Metrolink Station and the MSF would require reconfiguration of an existing rail spur serving LADWP property. The new location of the rail spur would require modification to the existing pedestrian undercrossing at the Van Nuys Metrolink Station.

Alternative 5 would require construction of a concrete casting facility for tunnel lining segments because no existing commercial fabricator capable of producing tunnel lining segments for a large-diameter tunnel exists within a practical distance of the Project Study Area. The site of the MSF would initially be used for this casting facility. The casting facility would include casting beds and associated casting equipment, storage areas for cement and aggregate, and a field quality control facility, which would need to be constructed on-site. When a more detailed design of the facility is completed, the contractor would obtain all permits and approvals necessary from the City of Los Angeles, the South Coast Air Quality Management District, and other regulatory entities.

As areas of the MSF site begin to become available following completion of pre-casting operations, construction of permanent facilities for the MSF would begin, including construction of surface buildings such as maintenance shops, administrative offices, train control, traction power, and systems facilities. Some of the yard storage track would also be constructed at this time to allow delivery and inspection of passenger vehicles that would be fabricated elsewhere. Additional activities occurring at the MSF during the final phase of construction would include staging of trackwork and welding of guideway rail.

9.2 Existing Conditions

The primary effect of rising global concentrations of atmospheric GHGs is an increase in the average global temperature. Since 1982, the Earth's temperature has risen at an average rate of approximately 0.2 degrees Celsius per decade. Climate change modeling indicates that further warming is likely to occur due to the anticipated rise in global atmospheric GHG concentrations from various sources worldwide, including emissions from both developed and developing countries, as well as deforestation. This continued increase in GHGs is expected to induce further changes in the global climate system during the current century. Adverse impacts from global climate change worldwide and in California could include the following (CARB, 2022):

- Declining sea ice and mountain snowpack levels: This decline increases sea levels and sea surface evaporation rates, leading to higher atmospheric water vapor due to the atmosphere's ability to hold more moisture at elevated temperatures.
- Rising average global sea levels: Primarily resulting from thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets.
- Changing weather patterns: Alterations in precipitation, ocean salinity, and wind patterns, along with more extreme weather events, including droughts, heavy precipitation, heatwaves, cold spells, and intensified tropical cyclones.
- Declining Sierra Nevada snowpack levels: The Sierra Nevada snowpack, which accounts for approximately half of California's surface water storage, is projected to decrease significantly over the next century, posing challenges for water resources in the state.
- Increased ozone formation: Higher temperatures can lead to more days conducive to ozone formation (e.g., clear days with intense sunlight), potentially increasing ozone levels in high-ozone areas such as Southern California and the San Joaquin Valley by the end of the 21st century.
- Coastal erosion and seawater intrusion: Rising sea levels may exacerbate erosion along California's coastlines and increase the intrusion of seawater into the Sacramento-San Joaquin Delta and its levee systems, impacting freshwater supplies and infrastructure.

These projected impacts underscore the importance of mitigating GHG emissions and implementing adaptive strategies to address the challenges posed by climate change.

9.2.1 Statewide Greenhouse Gas Emissions Inventory

The California Air Resources Board (CARB) maintains the statewide GHG emission inventory, and Table 9-6 displays GHG emissions from 2013 to 2021 in California by economic sector as defined in the *Climate Change Scoping Plan* (2008 Scoping Plan) (CARB, 2008a). California's GHG emissions have followed a declining trend over the past decade. In 2021, emissions from routine emitting activities statewide were approximately 12.6 million metric tons of carbon dioxide equivalents ($MMTCO_2e$) higher than 2020, but 23.1 $MMTCO_2e$ lower than 2019 levels. As shown in Table 5-1, GHG emissions related to the electric power sector has continually declined as California continues to meet renewable portfolio standard (RPS) goals. The increase and decrease over the 2019 to 2021 timeframe are likely due to impacts of the COVID-19 pandemic (CARB, 2023b). The plurality of California GHG emissions is attributed to automobile exhaust associated with the transportation sector, including public and private vehicles, comprising approximately 40 percent of the total statewide emission inventory. Despite statewide population growth, approximately 4 percent from 2011 to 2021, annual GHG emissions attributed to the transportation sector have remained relatively constant over the last decade. However, in 2020, the transportation sector had the largest decrease compared to 2019, which likely resulted in less light-duty vehicle travel due to shelter-in-place orders in response to the COVID-19 pandemic. Overall, the transportation sector in 2021 was 16.7 $MMTCO_2e$ below pre-pandemic (2019) levels.

Table 9-6. Greenhouse Gas Annual $MMTCO_2e$ Emissions Trends by Sector

Sector	2013	2014	2015	2016	2017	2018	2019	2020	2021
Transportation	156.9	157.6	161.2	165.0	166.4	165.2	162.3	135.6	145.6
Electric Power	94.0	90.3	86.3	70.8	64.4	65.0	60.2	59.5	62.4
Industrial	82.7	85.0	82.7	81.2	81.4	82.0	80.8	73.3	73.9
Commercial/Residential	39.0	35.5	37.2	37.7	38.3	37.5	40.6	38.9	38.8
Agriculture	33.7	33.7	32.6	32.1	31.6	32.1	31.3	31.5	30.9
High GWP Sources	17.0	17.9	18.8	19.4	20.1	20.5	20.7	21.3	21.3
Recycling and waste	8.3	8.1	8.1	7.9	8.2	8.3	8.4	8.6	8.4
Emissions Total	**431.6**	**428.2**	**426.9**	**414.2**	**410.4**	**410.7**	**404.4**	**368.7**	**381.3**

Source: CARB, 2023c

GWP = global warming potential
$MMTCO_2e$ = million metric tons of carbon dioxide equivalents

9.2.2 Southern California Association of Governments Regional Greenhouse Gas Emissions

An element of the Southern California Association of Governments (SCAG) *Connect SoCal 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy* (SCAG, 2024a) is a regional GHG emissions inventory and emissions forecast based on the growth projections and control strategies incorporated into its development. SCAG provides estimates of the regional GHG emissions through the RTP/SCS horizon year accounting for programmed transportation projects, population, employment, and housing growth, and other regional factors. The 2024-2050 RTP/SCS has a horizon year of 2050, but provides data for interim year 2045 to address consistency with other GHG reduction policies. Table 9-7 presents modeled emissions from on-road mobile sources in 2019 and 2045. The data demonstrates that from 2019 to 2045, the regional on-road emissions are anticipated to decrease by 32.4 percent (64.35 $MMTCO_2e$ to 43.52 $MMTCO_2e$ by 2045) with plan implementation.

In addition, SCAG provides the total regional GHG emissions from the three primary sources of GHG emissions within the region: transportation, building energy, and water related energy. Table 9-8 shows that total GHG emissions across the SCAG region are anticipated to decrease by approximately 29.9 percent from 2019 to 2045, and transportation emissions are projected to decrease by 28.9 percent. Expansion of public transportation systems spurring mode shift away from passenger vehicles is a fundamental pillar of regional efforts to reduce GHG emissions and meet regional and statewide GHG emissions reduction targets.

Table 9-7. Greenhouse Gas Emissions from On-Road Emissions in the SCAG Region

Sector	2019 (MMT/Year)			2045 (MMT/Year)		
	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
Light and Medium Duty Vehicles	49.30	0.0025	0.0010	32.91	0.0007	0.0002
Heavy Duty Vehicles	12.64	0.0005	0.0014	9.75	0.0002	0.0005
Buses	1.54	0.0008	0.0001	0.61	0.0001	<0.0001
On-Road Vehicles (Subtotal) in CO_2	63.48	0.0039	0.0026	43.27	0.0010	0.0007
On-Road Vehicles (Subtotal) in CO_2e	63.48	0.0810	0.7943	43.27	0.0212	0.2294
Total Emissions from On-Road Vehicles in CO_2e	**64.35**			**43.52**		

Source: SCAG, 2024b

CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
MMT/Year = million metric tons per year
N_2O = nitrous oxide

Table 9-8. Annual Greenhouse Gas Emissions for the SCAG Region from Three Primary Sectors

Area	2019 ($MMTCO_2e$)	2030 ($MMTCO_2e$)	2045 ($MMTCO_2e$)	2050 ($MMTCO_2e$)	2019 vs 2045
Transportation	66.42	53.38	46.55	47.84	-29.9%
Building Energy	64.64	57.30	47.30	43.97	-26.8%
Water-Related Energy	2.89	2.26	1.40	1.12	-51.6%
Total	**133.95**	**112.94**	**95.26**	**97.8**	**-28.9%**

Source: SCAG, 2024b

$MMTCO_2e$ = million metric tons of carbon dioxide equivalents

9.2.3 Los Angeles County Metropolitan Transportation Authority Transit System Emissions

Metro has prepared detailed emissions inventories to track its progress in displacing GHG emissions from its operations, which include operation of transit services and facilities, and employee commuting. GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage (APTA, 2018). Metro has been tracking its progress since 2008 through 2019 with its annual energy and resource reports. The *2019 Energy and Resource Report* (Metro, 2019b) was the last version in this format. For future sustainability reports, Metro will prepare an overall agency-wide sustainability report as part of Moving Beyond Sustainability. Metro's latest annual sustainability report analyzed the sustainability and environmental performance of its operational activities during the 2019 calendar year. Based on 2019 data, the largest emissions sources for Metro's total operational emissions were bus fleets and rail systems at 54 percent and 20 percent, respectively (Metro, 2020b). Non-modal sources (facility energy consumption, employee commuting, etc.) made up 22 percent of total operational emissions. New fleet technologies powered by renewable energy and reduced building energy usage can reduce Metro's emissions over the long term. Since 2012, emissions resulting from building energy use have decreased by 23 percent while emissions from water consumption have been cut in half. Table 9-9 summarizes Metro's recent progress in displacing GHG emissions from its operations and continually shows an annual net displacement of GHG emissions.

Table 9-9. Metro Operations Annual Greenhouse Gas Emissions Displacement

Category	2014	2015	2016	2017	2018	2019
Total Emissions ($MTCO_2e$)[a]	396,380	391,275	390,840	415,872	371,911	326,953
Total Displacement ($MTCO_2e$)[b,d]	-482,813	-465,101	-448,301	-1,020,485	-987,490	-918,076
Mode Shift to Transit	-482,813	-465,101	-448,301	-207,374	-200,669	-186,515
Land Use[c]	NA	NA	NA	-813,110	-786,820	-731,561
Net Emissions ($MTCO_2e$)	**-86,433**	**-73,827**	**-57,461**	**-604,613**	**-615,579**	**-591,123**

Source: Metro, 2020b

[a]Total emissions represent the GHG emissions generated from Metro's operation of transit services such as buses, rail, and vanpools, as well as operations of facilities, including consumption of electricity, natural gas, and water, refrigerants, and employee commuting.

[b]GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage.

[c]GHG emissions displacement calculations were updated in 2018 to reflect the addition of Land Use as a source of emissions displacement. Reporting of land use emissions began with the 2017 reporting year.

[d]In 2018, Metro updated its 2017 GHG emissions inventory baseline with inclusion of the Land Use category and updated utility emission factors.

GHG = greenhouse gas
$MTCO_2e$ = metric tons of carbon dioxide equivalents
NA = not applicable

9.3 Impact Evaluation

9.3.1 Impact GHG-1: Would the project result in greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

9.3.1.1 Construction Impact

Construction of Alternative 5 would result in GHG emissions from off-road equipment, mobile sources including worker vehicles, vendor trucks, and haul trucks, as well as electricity consumption from TBM usage and on-site portable offices. These emissions sources would be related to constructing the HRT system alignment, stations, MSF, and TPSSs.

As discussed in Section 3.3, CEQA Thresholds of Significance, GHG emissions are measured exclusively as cumulative impacts; therefore, the Alternative 5 construction emissions are considered part of its total GHG emissions in conjunction with operational emissions. In accordance with South Coast Air Quality Management District guidance, the Alternative 5 construction emissions were amortized over its design lifetime of 30 years, then combined with the Alternative 5 annual operational GHG emissions. Table 9-10 summarizes the Alternative 5 GHG emissions throughout the construction period. As shown in Table 9-10, Alternative 5 construction would generate a total of 361,458 $MTCO_2e$ and would result in 12,049

$MTCO_2e$ annually when amortized over the project lifetime of 30 years. Detailed emissions calculations are summarized in Appendix A.

Table 9-10. Alternative 5: Construction Greenhouse Gas Emissions

Construction Year	GHG Emissions ($MTCO_2e$)[a,b]
2026	882
2027	5,136
2028	13,380
2029	32,784
2030	47,960
2031	46,077
2032	32,541
2033	13,580
2034	7,145
2035	4,408
2036	1,267
2037	605
TBM Electricity Consumption	155,593
Portable Office Electricity Consumption	99
Total Construction Emissions	**361,458**
Amortized Construction Emissions (30 Years)	12,049

Source: HTA, 2024

[a]Totals may vary due to rounding.
[b]GHG emissions related to electricity consumption represent the total GHG emissions over the entire construction period.

GHG = greenhouse gas
$MTCO_2e$ = metric tons of carbon dioxide equivalents
TBM = tunnel boring machine

Because construction emission sources would cease once construction is complete, they are considered short term. It should be noted that total and annual construction GHG emissions represent a conservative assessment, because GHG emissions would decrease in future years as the construction industry shifts toward implementation of cleaner fuels (i.e., electrified equipment) and more efficient technologies. Additionally, Metro's Green Construction Policy requires contractors to use renewable diesel, which would reduce upstream GHG emissions related to producing the fuel, as well as reduce GHG emissions from fuel combustion in off-road equipment and trucks as compared to petroleum diesel. GHG emissions for electric-powered equipment such as the TBM and portable offices would also decrease in future years as LADWP continues to increase the amount of renewable energy sources in its power mix to meet state RPS goals. Thus, the annual construction GHG emissions associated with Alternative 5 would decrease with time and are likely to be lower than estimated herein. Alternative 5 construction emissions were amortized over Alternative 5's design lifetime of 30 years, then combined with Alternative 5 annual operational GHG emissions. As shown in Table 9-11, annual operations of Alternative 5 compared to 2045 without Project conditions would result in a net reduction of GHG emissions; therefore, impacts from Alternative 5 construction emissions would be considered less than significant.

9.3.1.2 Operational Impact

Operations of Alternative 5 would generate long-term GHG emissions from direct and indirect sources. Direct sources consist of mobile sources, including regional VMT and employees traveling to and from the MSF, area sources related to landscaping equipment, emergency generator usage during maintenance testing, and refrigerants used in building air conditioning systems. Indirect sources include electricity generation at power plants associated with traction power for the alignment, building electricity consumption, electricity consumption related to water and wastewater conveyance, and waste decomposition at landfills from solid waste generation.

The Alternative 5 annual GHG emissions were estimated for two scenarios: Alternative 5 compared to 2045 without Project conditions and Alternative 5 compared to Existing Conditions 2021. As discussed in Section 3.3, CEQA Thresholds of Significance, GHG impacts would be evaluated based on the net change in emissions between project alternatives in Horizon Year 2045 and 2045 without Project conditions. The comparison for Alternative 5 2045 and Existing Conditions 2021 is presented for informational purposes only. Detailed emissions calculations are summarized in Appendix A.

Table 9-11 summarizes the Alternative 5 annual GHG emissions for each source category compared to the 2045 without Project conditions. As shown in Table 9-11, when compared to 2045 without Project conditions, Alternative 5 would result in a net reduction of annual GHG emissions in Horizon Year 2045. This reduction is primarily related to mobile emissions associated with a reduction in VMT. As stated in the *Sepulveda Transit Corridor Project Transportation Technical Report* (Metro, 2025), implementation of Alternative 5 would reduce regional daily VMT by 775,100 miles per day compared to 2045 without Project conditions.

Table 9-11. Alternative 5: Annual Greenhouse Gas Emissions Compared to 2045 without Project Conditions

Source Category	GHG Emissions ($MTCO_2e$/Year)[a]
Alternative 5	
Area	30
Electricity	6,407
Mobile-VMT Analysis	57,110,766
Mobile-Employee Travel	557
Water	85
Waste	78
Refrigerants	<0.1
Emergency Generators[b]	45
Amortized Construction	12,049
Alternative 5 Total Annual Emissions	**57,130,016**
2045 without Project Conditions	
Mobile – 2045 VMT Analysis Annual Emissions	57,188,730
Net Change in Emissions	**-58,714**

Source: HTA, 2024

[a]Totals may vary due to rounding.
[b]An emergency generator would be located at the maintenance and storage facility. Backup power for underground stations would be provided by a battery system.

GHG = greenhouse gas
$MTCO_2e$/Year = metric tons of carbon dioxide equivalents per year
VMT = vehicle miles traveled

Alternative 5 would support state, regional, and local efforts to reduce GHG emissions by providing an efficient transit system as an alternative mode of transportation for commuters traveling between the Valley and the Westside. Implementation of Alternative 5 would expand Metro's regional transit network with an all-electric transit system, thereby reducing GHG emissions related to regional VMT and providing further contributions to Metro's net displacement of operational GHG emissions. Overall, Alternative 5 would not result in an incremental increase in GHG emissions that would contribute to climate change, but rather would result in an environmental benefit by reducing GHG emissions; therefore, impacts of GHG emissions would be less than significant.

Table 9-12 summarizes the Alternative 5 annual GHG emissions for each source category compared to Existing Conditions 2021. This is presented for informational purposes only. As shown in Table 9-12, when compared to existing conditions, Alternative 5 would result in a net reduction of annual GHG emissions. The primary driver of the net reduction is mobile source emissions, which are a function of VMT and emission factors.

Table 9-12. Alternative 5: Annual Greenhouse Gas Emissions (Horizon Year 2045) Compared to Existing Conditions (Baseline Year 2021)

Source Category	GHG Emissions ($MTCO_2e$/Year)[a]
Alternative 5	
Area	30
Electricity	6,407
Mobile-VMT Analysis[a]	57,110,766
Mobile-Employee Travel	557
Water	85
Waste	78
Refrigerants	<0.1
Emergency Generators[b]	45
Amortized Construction	12,049
Alternative 5 Total Annual Emissions	**57,130,016**
Existing Conditions	
Mobile – 2021 VMT Analysis Annual Emissions	64,691,322
Net Change in Emissions	**-7,561,306**

Source: HTA, 2024

[a]Totals may vary due to rounding.
[b]An emergency generator would be located at the maintenance and storage facility. Backup power for underground stations would be provided by a battery system.

GHG = greenhouse gas
$MTCO_2e$/Year = metric tons of carbon dioxide equivalents per year
VMT = vehicle miles traveled

9.3.2 Impact GHG-2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

9.3.2.1 Construction Impact

Construction of Alternative 5 would generate short-term GHG emissions related to off-road equipment, mobile sources, and electricity consumption. Alternative 5 construction would comply with Metro's Green Construction Policy, which requires idling restrictions for off-road equipment and trucks, using trucks with model years 2007 or newer, requiring contractors to use renewable diesel for all diesel engines, and implementing best management practices, such as using electric-powered equipment in lieu of diesel equipment where available. Upon completion of Alternative 5 construction, these emissions would cease. As GHG emissions are exclusively cumulative impacts, the Alternative 5 amortized construction emissions were included with the long-term operational emissions for Alternative 5. Based on the discussion in Section 9.3.2.2, annual operational emissions, which included amortized construction emissions, were found to not conflict with plans or policies to reduce GHG emissions; therefore, impacts for construction-related GHG emissions would be less than significant.

9.3.2.2 Operational Impact

Plans, policies, and regulations focused on reducing GHG emissions occur at the state, regional, and local levels. At the state level, these efforts are guided primarily by Assembly Bill (AB) 32, Senate Bill (SB) 32, AB 1279, and the *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) (CARB, 2022). At the regional level, the SCAG *Connect SoCal, 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy* (SCAG, 2020a, 2020b) contains strategies for reducing GHG emissions within the Sustainable Development focus area, as well as Metro's *2019 Climate Action and Adaptation Plan* (CAAP) (Metro, 2019c) and the *Moving Beyond Sustainability – Strategic Plan 2020* (Metro, 2020a) (referred to as "Moving Beyond Sustainability"). Lastly at the local level, relevant plans include the City of Los Angeles' *Sustainable City pLAn* and *Mobility Plan 2035* (City of Los Angeles, 2015, 2016). The following sections discuss the consistency of Alternative 5 with these state, regional, and local plans for reducing GHG emissions.

Consistency with AB 32, SB 32, AB 1279, and 2022 Scoping Plan

AB 32, SB 32, and AB 1279 outline the state's GHG emissions reduction targets for 2020, 2030, and 2045, respectively. In 2008 and 2014, CARB adopted the 2008 Scoping Plan and 2014 *First Update to the Climate Change Scoping Plan*, respectively, as a framework for achieving the emissions reduction targets in AB 32 (CARB, 2008a, 2014). These plans outline a series of technologically feasible and cost-effective measures to reduce statewide GHG emissions. CARB adopted *California's 2017 Climate Change Scoping Plan* (CARB, 2017) in November 2017 as a framework to achieve the 2030 GHG reduction goal described in SB 32, which is to reduce statewide GHG emissions to 1990 levels by 2020 and 40 percent below 1990 levels by 2030. Most recently, the 2022 Scoping Plan was adopted in September 2022 and outlines how the state will achieve carbon neutrality and reduce statewide GHG emissions 85 percent below 1990 levels by 2045. The analysis year for Alternative 5 is 2045 (horizon year); therefore, the statewide GHG emissions reduction target for 2045 is the statutory statewide milestone target that is applicable to Alternative 5.

As discussed in Section 0, Existing Conditions, the transportation sector is the largest contributor to statewide GHG emissions. Similarly, the 2022 Scoping Plan focuses heavily on strategies and actions to reduce GHG emissions from the transportation sector, such as reducing VMT through transportation infrastructure that aligns with the state's climate goals. Alternative 5 would be consistent with this objective because it would reduce regional daily VMT by 775,100 miles per day (compared to 2045 without Project conditions), resulting in an overall net reduction in annual GHG emissions.

The 2022 Scoping Plan also focuses on transitioning commercial building energy from fossil fuel sources to non-combustion alternatives. Alternative 5 would be consistent with this effort because it would comply with City of Los Angeles Municipal Code Section 99.04.106.8, which requires all newly constructed buildings to be all-electric buildings. Additionally, Alternative 5 would be designed to meet sustainable certifications for its major components. The entire track alignment, stations, and MSF would be designed in accordance with Envision Version 3, underground stations and the MSF would be designed to meet the Leadership in Energy and Environmental Design (LEED) Version 4 Building Design and Construction (LEED v4 BD+C) and Tier 2 of the California Green Building Standards Code (STCP, 2024). Overall, Alternative 5 would not conflict with the state goals and strategies for reducing GHG emissions.

Consistency with 2024-2050 RTP/SCS

The 2024-2050 RTP/SCS is a long-range planning document that balances future mobility and housing needs with economic, environmental, and public health goals in the SCAG region. One of the key strategies of the plan is to integrate land use, housing, and transportation planning to ensure sustainable regional growth. The SCS portion of the 2024-2050 RTP/SCS includes a combination of transportation and land use strategies to meet GHG reduction goals, such as emphasizing land use patterns that facilitate multimodal access to work, educational and other destinations; focusing on a regional jobs/housing balance to reduce commute times and distances and expand job opportunities near transit and along center-focused main streets; and encouraging design and transportation options that reduce the reliance on solo car trips. Alternative 5 would support these strategies by providing access to a safe, sustainable, and efficient transit system located in dense urban communities with major job centers, including a direct connection with UCLA via the UCLA Gateway Plaza Station.

Implementation of the 2024-2050 RTP/SCS would achieve regional GHG reductions relative to 2005 SCAG areawide levels of approximately 8 percent in 2020 and approximately 19 percent by 2035 (SCAG, 2024a). Additionally, SCAG indicates implementation of the 2024-2050 RTP/SCS would reduce daily VMT per capita by 6.3 percent compared to the SCAG 2050 Baseline scenario. The Baseline scenario represents how the region would perform without implementation of the 2024-2050 RTP/SCS. As shown in Table 9-11, implementation of Alternative 5 would result in a net reduction of GHG emissions and would directly contribute to meeting the objectives and emission reduction targets outlined in the 2024-2050 RTP/SCS. Overall, Alternative 5 would not conflict with the goals and strategies of the 2024-2050 RTP/SCS to reduce VMT and associated GHG emissions.

Consistency with Metro Plans

Metro has developed policies directed toward controlling GHG emissions through a variety of plans over the last decade. The most recent and relevant plans are the 2019 CAAP and Moving Beyond Sustainability, which builds upon the previous commitment to environmental and sustainability stewardship. The 2019 CAAP set a goal of reducing GHG emissions by 79 percent relative to 2017 by 2030, and 100 percent by 2050. Moving Beyond Sustainability also includes goals of reducing GHG emissions by 100 percent relative to 2017 by 2050 and displacing or preventing GHG emissions. As a Metro project, Alternative 5 would inherently be required to be consistent with goals and strategies for each of these plans. As shown in Table 9-11, implementation of Alternative 5 would result in a net reduction in GHG emissions compared to future conditions, thus supporting the GHG reduction goals for both of these plans. Overall, Alternative 5 would not conflict with the goals and strategies of Metro's plans to reduce GHG emissions.

Consistency with Sustainable City pLAn

LA's Green New Deal, Sustainable City pLAn (City of Los Angeles Mayor's Office, 2019) was the first 4-year update to the *Sustainable City pLAn* (2015 pLAn) (City of Los Angeles, 2015) and expands in more detail the vision to achieve a sustainable future that entails a carbon-neutral economy by 2050. *LA's Green New Deal, Sustainable City pLAn* (henceforth referred to as the "2019 updates to the pLAn") accelerates targets from the 2015 pLAn for supplying renewable energy, increasing local water sourcing, reducing building energy, reducing VMT per capita, reducing municipal GHG emissions, increasing the percentage of zero emission passenger and city-fleet vehicles, building new housing near transit, and increasing the number of green jobs.

The 2019 updates to the pLAn would accelerate GHG reductions targets, including reducing GHG emissions by 50 percent by 2025, 73 percent by 2035, and becoming carbon neutral by 2050, all relative to a 1990 baseline. As shown in Table 9-11, implementation of Alternative 5 would result in a net reduction in GHG emissions compared to future conditions, thus supporting the GHG reduction goals. Additionally, Alternative 5 would provide access to a safe and efficient transit system located in close proximity to dense urban communities near major job centers and a direct connection to UCLA, and would be developed to meet sustainable certifications, such as Envision, LEED, and CALGreen building codes. Overall, Alternative 5 would not conflict with the goals and strategies of the 2019 updates to the pLAn to reduce GHG emissions.

Consistency with City of Los Angeles Mobility Plan 2035

Mobility Plan 2035 emphasizes the efficacy of multi-modal street design in reducing GHG emissions through encouraging the use of transit and active transportation, which decreases regional dependence on passenger vehicles (DCP, 2016). Alternative 5 would support these strategies by providing access to a safe, sustainable, and efficient transit system located in dense urban communities with major job centers and UCLA via the UCLA Gateway Plaza Station. Alternative 5 would not conflict with the goals and strategies of *Mobility Plan 2035* to reduce GHG emissions.

Overall, Alternative 5 would not conflict with plans, policies, or regulations adopted for the purpose of reducing GHG emissions; therefore, impacts would be less than significant.

9.4 Mitigation Measures

9.4.1 Construction Impacts

No mitigation measures are required.

9.4.2 Operational Impacts

No mitigation measures are required.

9.4.3 Impacts After Mitigation

No mitigation measures are required; impacts are less than significant.

10 ALTERNATIVE 6

10.1 Alternative Description

Alternative 6 is a heavy rail transit (HRT) system with an underground track configuration. This alternative would provide transfers to five high-frequency fixed guideway transit and commuter rail lines, including the Los Angeles County Metropolitan Transportation Authority's (Metro) E, Metro D, and Metro G Lines, East San Fernando Valley Light Rail Transit Line, and the Metrolink Ventura County Line. The length of the alignment between the terminus stations would be approximately 12.9 miles.

The seven underground HRT stations would be as follows:

1. Metro E Line Expo/Bundy Station (underground)
2. Santa Monica Boulevard Station (underground)
3. Wilshire Boulevard/Metro D Line Station (underground)
4. UCLA Gateway Plaza Station (underground)
5. Ventura Boulevard/Van Nuys Boulevard Station (underground)
6. Metro G Line Van Nuys Station (underground)
7. Van Nuys Metrolink Station (underground)

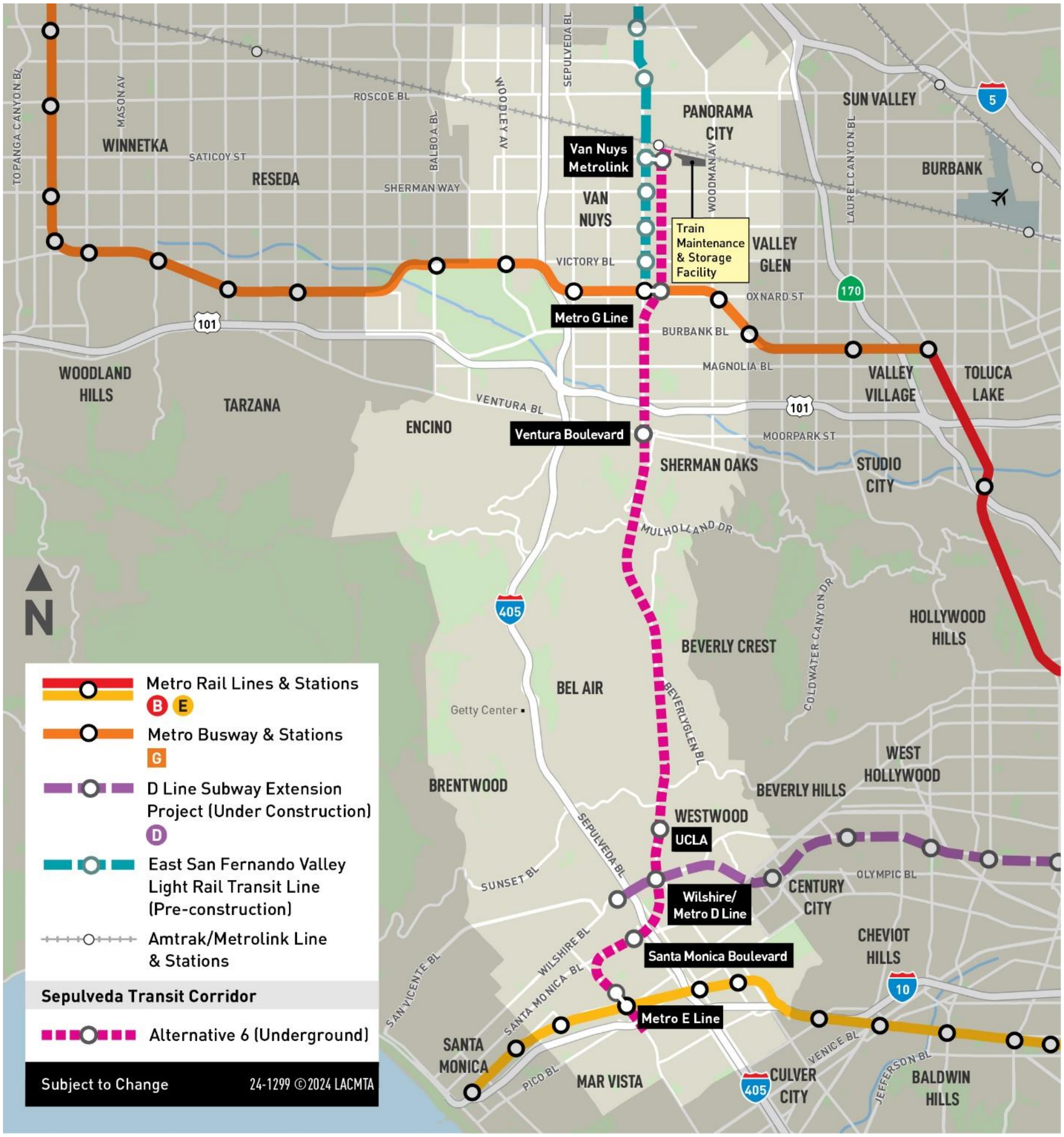
10.1.1 Operating Characteristics

10.1.1.1 Alignment

As shown on Figure 10-1, from its southern terminus station at the Metro E Line Expo/Bundy Station, the alignment of Alternative 6 would run underground through the Westside of Los Angeles (Westside), the Santa Monica Mountains, and the San Fernando Valley (Valley) to the alignment's northern terminus adjacent to the Van Nuys Metrolink/Amtrak Station.

The proposed southern terminus station would be located beneath the Bundy Drive and Olympic Boulevard intersection. Tail tracks for vehicle storage would extend underground south of the station along Bundy Drive for approximately 1,500 feet, terminating just north of Pearl Street. The alignment would continue north beneath Bundy Drive before turning to the east near Iowa Avenue to run beneath Santa Monica Boulevard. The Santa Monica Boulevard Station would be located between Barrington Avenue and Federal Avenue. After leaving the Santa Monica Boulevard Station, the alignment would turn to the northeast and pass under Interstate 405 (I-405) before reaching the Wilshire Boulevard/Metro D Line Station beneath the Metro D Line Westwood/UCLA Station, which is currently under construction as part of the Metro D Line Extension project. From there, the underground alignment would curve slightly to the northeast and continue beneath Westwood Boulevard before reaching the UCLA Gateway Plaza Station.

Figure 10-1. Alternative 6: Alignment



Source: HTA, 2024

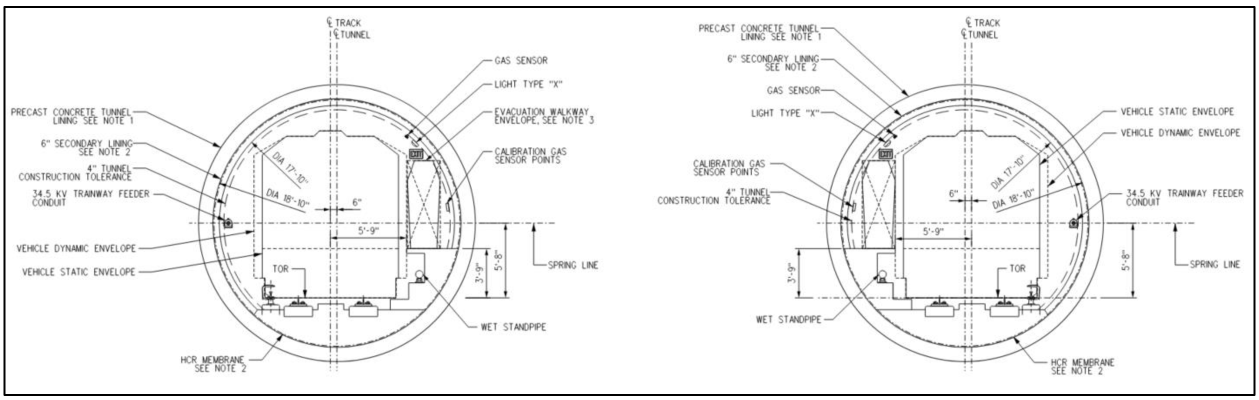
After leaving the UCLA Gateway Plaza Station, the alignment would continue to the north and travel under the Santa Monica Mountains. While still under the mountains, the alignment would shift slightly to the west to travel under the City of Los Angeles Department of Water and Power (LADWP) Stone Canyon Reservoir property to facilitate placement of a ventilation shaft on that property east of the reservoir. The alignment would then continue to the northeast to align with Van Nuys Boulevard at Ventura Boulevard as it enters the San Fernando Valley. The Ventura Boulevard Station would be beneath Van Nuys Boulevard at Moorpark Street. The alignment would then continue under Van Nuys

Boulevard before reaching the Metro G Line Van Nuys Station just south of Oxnard Street. North of the Metro G Line Van Nuys Station, the alignment would continue under Van Nuys Boulevard until reaching Sherman Way, where it would shift slightly to the east and run parallel to Van Nuys Boulevard before entering the Van Nuys Metrolink Station. The Van Nuys Metrolink Station would serve as the northern terminus station and would be located between Saticoy Street and Keswick Street. North of the station, a yard lead would turn sharply to the southeast and transition to an at-grade configuration and continue to the proposed maintenance and storage facility (MSF) east of the Van Nuys Metrolink Station.

10.1.1.2 Guideway Characteristics

The alignment of Alternative 6 would be underground using Metro's standard twin-bore tunnel design. Figure 10-2 shows a typical cross-section of the underground guideway. Cross-passages would be constructed at regular intervals in accordance with Metro Rail Design Criteria. Each of the tunnels would have a diameter of 19 feet (not including the thickness of wall). Each tunnel would include an emergency walkway that measures a minimum of 2.5 feet wide for evacuation.

Figure 10-2. Typical Underground Guideway Cross-Section



Source: HTA, 2024

10.1.1.3 Vehicle Technology

Alternative 6 would utilize driver-operated steel-wheel HRT trains, as used on the Metro B and D Lines, with planned peak headways of 4 minutes and off-peak-period headways ranging from 8 to 20 minutes. Trains would consist of four or six cars and are expected to consist of six cars during the peak period. The HRT vehicle would have a maximum operating speed of 67 miles per hour; actual operating speeds would depend on the design of the guideway and distance between stations. Train cars would be 10.3 feet wide with three double doors on each side. Each car would be approximately 75 feet long with capacity for 133 passengers. Trains would be powered by a third rail.

10.1.1.4 Stations

Alternative 6 would include seven underground stations with station platforms measuring 450 feet long. The southern terminus underground station would be adjacent to the existing Metro E Line Expo/Bundy Station, and the northern terminus underground station would be located south of the existing Van Nuys Metrolink/Amtrak Station. Except for the Wilshire Boulevard/Metro D Line, UCLA Gateway Plaza, and Metro G Line Van Nuys Stations, all stations would have a 30-foot-wide center platform. The Wilshire/Metro D Line Station would have a 32-foot-wide platform to accommodate the anticipated passenger transfer volumes, and the UCLA Gateway Plaza Station would have a 28-foot-wide platform because of the width constraint between the existing buildings. At the Metro G Line Van Nuys Station, the track separation would increase significantly in order to straddle the future East San Fernando Valley Light Rail Transit Line Station piles. The platform width at this station would increase to 58 feet.

The following information describes each station, with relevant entrance, walkway, and transfer information. Bicycle parking would be provided at each station.

Metro E Line Expo/Bundy Station

- This underground station would be located under Bundy Drive at Olympic Boulevard.
- Station entrances would be located on either side of Bundy Drive, between the Metro E Line and Olympic Boulevard, as well as on the northeast corner of Bundy Drive and Mississippi Avenue.
- At the existing Metro E Line Expo/Bundy Station, escalators from the plaza to the platform level would be added to improve inter-station transfers.
- An 80-space parking lot would be constructed east of Bundy Drive and north of Mississippi Avenue. Passengers would also be able to park at the existing Metro E Line Expo/Bundy Station parking facility, which provides 217 parking spaces.

Santa Monica Boulevard Station

- This underground station would be located under Santa Monica Boulevard, between Barrington Avenue and Federal Avenue.
- Station entrances would be located on the southwest corner of Santa Monica Boulevard and Barrington Avenue and on the southeast corner of Santa Monica Boulevard and Federal Avenue.
- No dedicated station parking would be provided at this station.

Wilshire Boulevard/Metro D Line Station

- This underground station would be located under Gayley Avenue, between Wilshire Boulevard and Lindbrook Drive.
- A station entrance would be provided on the northwest corner of Midvale Avenue and Ashton Avenue. Passengers would also be able to use the Metro D Line Westwood/UCLA Station entrances to access the station platform.
- Direct internal station transfers to the Metro D Line would be provided at the south end of the station.
- No dedicated station parking would be provided at this station.

UCLA Gateway Plaza Station

- This underground station would be located underneath Gateway Plaza on the University of California, Los Angeles (UCLA) campus.
- Station entrances would be provided on the north side of Gateway Plaza, north of the Luskin Conference Center, and on the east side of Westwood Boulevard across from Strathmore Place.
- No dedicated station parking would be provided at this station.

Ventura Boulevard/Van Nuys Boulevard Station

- This underground station would be located under Van Nuys Boulevard at Moorpark Street.
- The station entrance would be located on the northwest corner of Van Nuys Boulevard and Ventura Boulevard.
- Two parking lots with a total of 185 parking spaces would be provided on the west side of Van Nuys Boulevard, between Ventura Boulevard and Moorpark Street.

Metro G Line Van Nuys Station

- This underground station would be located under Van Nuys Boulevard, south of Oxnard Street.
- The station entrance would be located on the southeast corner of Van Nuys Boulevard and Oxnard Street.
- Passengers would be able to park at the existing Metro G Line Van Nuys Station parking facility, which provides 307 parking spaces. No additional automobile parking would be provided at the proposed station.

Van Nuys Metrolink Station

- This underground station would be located immediately east of Van Nuys Boulevard, between Saticoy Street and Keswick Street.
- Station entrances would be located on the northeast corner of Van Nuys Boulevard and Saticoy Street and on the east side of Van Nuys Boulevard, just south of the Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor.
- Existing Metrolink Station parking would be reconfigured, maintaining approximately the same number of spaces. Metrolink parking would not be available to Metro transit riders.

10.1.1.5 Station-to-Station Travel Times

Table 10-1 presents the station-to-station distance and travel times for Alternative 6. The travel times include both run time and dwell time. Dwell time is 30 seconds for stations anticipated to have higher passenger volumes and 20 seconds for other stations. Northbound and southbound travel times vary slightly because of grade differentials and operational considerations at end-of-line stations.

Table 10-1. Alternative 6: Station-to-Station Travel Times and Station Dwell Times

From Station	To Station	Distance (miles)	Northbound Station to Station Travel Time (seconds)	Southbound Station to Station Travel Time (seconds)	Dwell Time (seconds)
Metro E Line Station					*20*
Metro E Line	Santa Monica Boulevard	1.1	111	121	—
Santa Monica Boulevard Station					*20*
Santa Monica Boulevard	Wilshire/Metro D Line	1.3	103	108	—
Wilshire/Metro D Line Station					*30*
Wilshire/Metro D Line	UCLA Gateway Plaza	0.7	69	71	—
UCLA Gateway Plaza Station					*30*
UCLA Gateway Plaza	Ventura Boulevard	5.9	358	358	—
Ventura Boulevard Station					*20*
Ventura Boulevard	Metro G Line	1.8	135	131	—
Metro G Line Station					*30*
Metro G Line	Van Nuys Metrolink	2.1	211	164	—
Van Nuys Metrolink Station					*30*

Source: HTA, 2024

— = no data

10.1.1.6 Special Trackwork

Alternative 6 would include seven double crossovers within the revenue service alignment, enabling trains to cross over to the parallel track, with terminal stations having an additional double crossover beyond the end of the platform.

10.1.1.7 Maintenance and Storage Facility

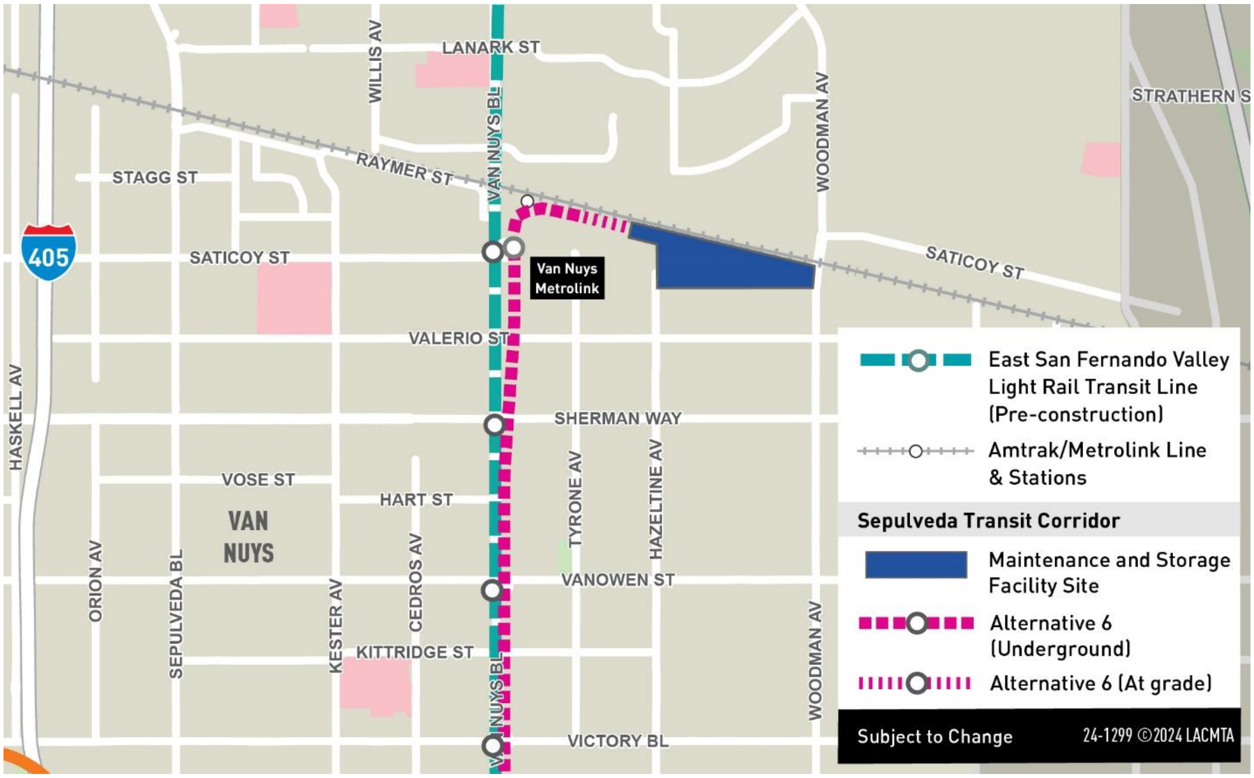
The MSF for Alternative 6 would be located east of the Van Nuys Metrolink Station and would encompass approximately 41 acres. The MSF would be designed to accommodate 94 vehicles and would be bounded by single-family residences to the south, the LOSSAN rail corridor to the north, Woodman Avenue to the east, and Hazeltine Avenue and industrial manufacturing enterprises to the west. Heavy rail trains would transition from underground to an at-grade configuration near the MSF, the northwest corner of the site. Trains would then travel southeast to maintenance facilities and storage tracks.

The site would include the following facilities:

- Two entrance gates with guard shacks
- Maintenance facility building
- Maintenance-of-way facility
- Storage tracks
- Carwash
- Cleaning platform
- Administrative offices
- Pedestrian bridge connecting the administrative offices to employee parking
- Two traction power substations (TPSSs)

Figure 10-3 shows the location of the MSF for Alternative 6.

Figure 10-3. Alternative 6: Maintenance and Storage Facility Site



Source: HTA, 2024

10.1.1.8 Traction Power Substations

TPSSs transform and convert high voltage alternating current supplied from power utility feeders into direct current suitable for transit operation. Twenty-two TPSS facilities would be located along the alignment and would be spaced approximately 1 mile apart, except within the Santa Monica Mountains. Each at-grade TPSS along the alignment would be approximately 5,000 square feet. Table 10-2 lists the TPSS locations for Alternative 6.

Figure 10-4 shows the TPSS locations along the Alternative 6 alignment.

Table 10-2. Alternative 6: Traction Power Substation Locations

TPSS No.	TPSS Location Description	Configuration
1 and 2	TPSSs 1 and 2 would be located immediately north of the Bundy Drive and Mississippi Avenue intersection.	Underground (within station)
3 and 4	TPSSs 3 and 4 would be located east of the Santa Monica Boulevard and Stoner Avenue intersection.	Underground (within station)
5 and 6	TPSSs 5 and 6 would be located southeast of the Kinross Avenue and Gayley Avenue intersection.	Underground (within station)
7 and 8	TPSSs 7 and 8 would be located at the north end of the UCLA Gateway Plaza Station.	Underground (within station)
9 and 10	TPSSs 9 and 10 would be located east of Stone Canyon Reservoir on LADWP property.	At-grade
11 and 12	TPSSs 11 and 12 would be located at the Van Nuys Boulevard and Ventura Boulevard intersection.	Underground (within station)
13 and 14	TPSSs 13 and 14 would be located immediately south of Magnolia Boulevard and west of Van Nuys Boulevard.	At-grade
15 and 16	TPSSs 15 and 16 would be located along Van Nuys Boulevard, between Emelita Street and Califa Street.	Underground (within station)
17 and 18	TPSSs 17 and 18 would be located east of Van Nuys Boulevard and immediately north of Vanowen Street.	At-grade
19 and 20	TPSSs 19 and 20 would be located east of Van Nuys Boulevard, between Saticoy Street and Keswick Street.	Underground (within station)
21 and 22	TPSSs 21 and 22 would be located south of the Metrolink tracks and east of Hazeltine Avenue.	At-grade (within MSF)

Source: HTA, 2024

Figure 10-4. Alternative 6: Traction Power Substation Locations

Source: HTA, 2024

10.1.1.9 Roadway Configuration Changes

In addition to the access road described in the following section, Alternative 6 would require reconstruction of roadways and sidewalks near stations.

10.1.1.10 Ventilation Facilities

Tunnel ventilation for Alternative 6 would be similar to existing Metro ventilation systems for light and heavy rail underground subways. In case of emergency, smoke would be directed away from trains and extracted through the use of emergency ventilation fans installed at underground stations and crossover locations adjacent to the stations. In addition, a mid-mountain facility located on LADWP property east of Stone Canyon Reservoir in the Santa Monica Mountains would include a ventilation shaft for the extraction of air, along with two TPSSs. An access road from the Stone Canyon Reservoir access road would be constructed to the location of the shaft, requiring grading of the hillside along its route.

10.1.1.11 Fire/Life Safety – Emergency Egress

Each tunnel would include an emergency walkway that measures a minimum of 2.5 feet wide for evacuation. Cross-passages would be provided at regular intervals to connect the two tunnels to allow for safe egress to a point of safety (typically at a station) during an emergency. Access to tunnel segments for first responders would be through stations.

10.1.2 Construction Activities

Temporary construction activities for Alternative 6 would include construction of ancillary facilities, as well as guideway and station construction and construction staging and laydown areas, which would be co-located with future MSF and station locations. Construction of the transit facilities through substantial completion is expected to have a duration of 7½ years. Early works, such as site preparation, demolition, and utility relocation, could start in advance of construction of the transit facilities.

For the guideway, twin-bore tunnels would be constructed using two tunnel boring machines (TBM). The tunnel alignment would be constructed over three segments—including the Westside, Santa Monica Mountains, and Valley—using a different pair of TBMs for each segment. For the Westside segment, the TBMs would be launched from the Metro E Line Station and retrieved at the UCLA Gateway Plaza Station. For the Santa Monica Mountains segment, the TBMs would operate from the Ventura Boulevard Station in a southerly direction for retrieval from UCLA Gateway Plaza Station. In the Valley, TBMs would be launched from the Van Nuys Metrolink Station and retrieved at the Ventura Boulevard Station.

The distance from the surface to the top of the tunnels would vary from approximately 50 feet to 130 feet in the Westside, between 120 feet and 730 feet in the Santa Monica Mountains, and between 40 feet and 75 feet in the Valley.

Construction work zones would also be co-located with future MSF and station locations. All work zones would comprise the permanent facility footprint with additional temporary construction easements from adjoining properties. In addition to permanent facility locations, TBM launch at the Metro E Line Station would require the closure of I-10 westbound off-ramps at Bundy Drive for the duration of the Sepulveda Transit Corridor Project (Project) construction.

Alternative 6 would include seven underground stations. All stations would be constructed using a “cut-and-cover” method, whereby the station structure would be constructed within a trench excavated from the surface that is covered by a temporary deck and backfilled during the later stages of station construction. Traffic and pedestrian detours would be necessary during underground station excavation until decking is in place and the appropriate safety measures have been taken to resume cross traffic. In addition, portions of the Wilshire Boulevard/Metro D Line Station crossing underneath the Metro D Line Westwood/UCLA Station and underneath a mixed-use building at the north end of the station would be constructed using the sequential excavation method, as it would not be possible to excavate the station from the surface.

Construction of the MSF site would begin with demolition of existing structures, followed by earthwork and grading. Building foundations and structures would be constructed, followed by yard improvements and trackwork, including paving, parking lots, walkways, fencing, landscaping, lighting, and security systems. Finally, building mechanical, electrical, and plumbing systems, finishes, and equipment would be installed. The MSF site would also be used as a staging site.

Station and MSF sites would be used for construction staging areas. A construction staging area, shown on Figure 10-5, would also be located off Stone Canyon Road northeast of the Upper Stone Canyon Reservoir. In addition, temporary construction easements outside of the station and MSF footprints would be required along Bundy Drive, Santa Monica Boulevard, Wilshire Boulevard, and Van Nuys Boulevard. The westbound to southbound loop off-ramp of the I-10 interchange at Bundy Drive would also be used as a staging area and would require extended ramp closure. Construction staging areas would provide the necessary space for the following activities:

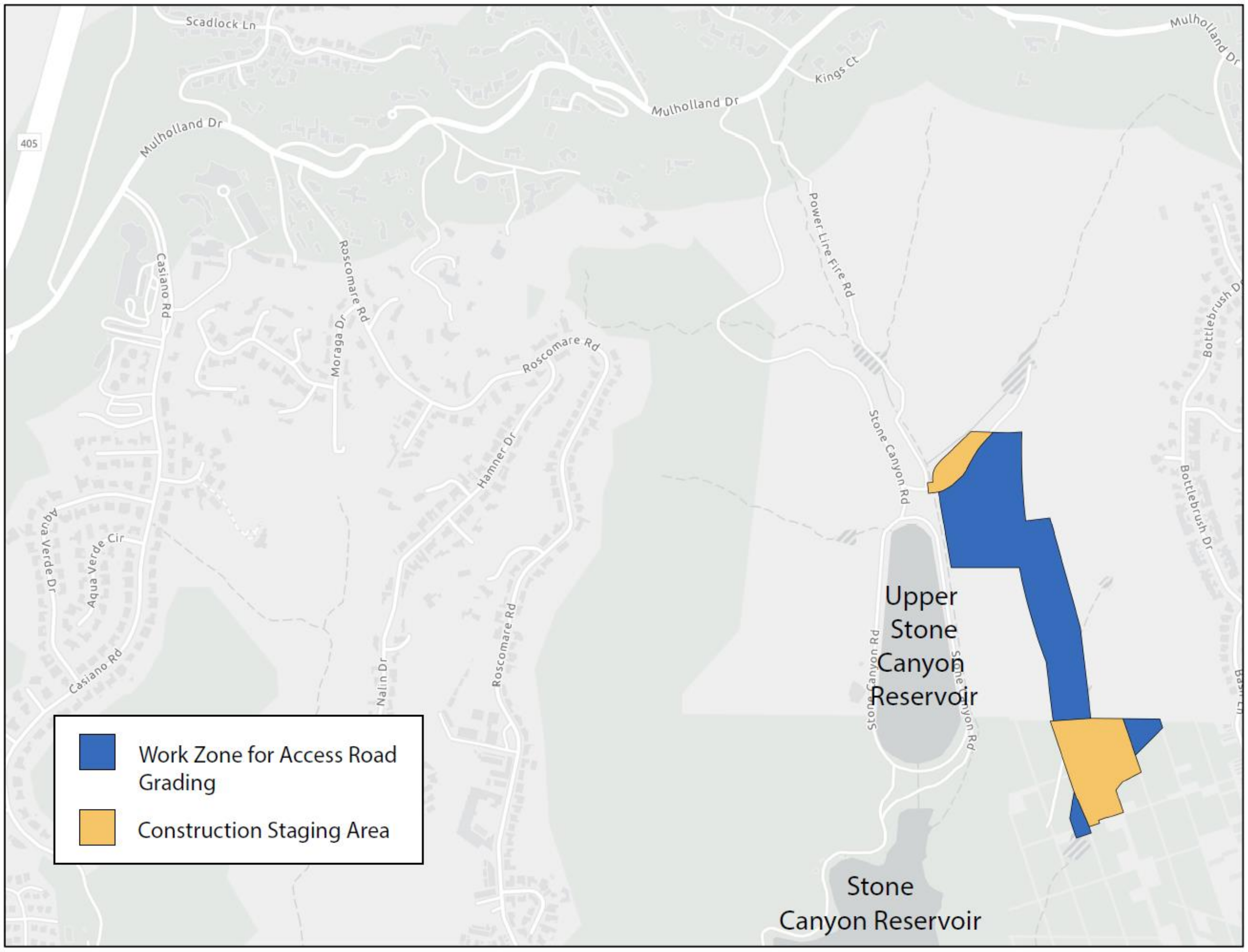
- Contractors' equipment
- Receiving deliveries
- Testing of soils for minerals or hazards
- Storing materials
- Site offices
- Work zone for excavation
- Other construction activities (including parking and change facilities for workers, location of construction office trailers, storage, staging and delivery of construction materials and permanent plant equipment, and maintenance of construction equipment)

The size of proposed construction staging areas for each station would depend on the level of work to be performed for a specific station and considerations for tunneling, such as TBM launch or extraction. Staging areas required for TBM launching would include areas for launch and access shafts, cranes, material and equipment, precast concrete segmental liner storage, truck wash areas, mechanical and electrical shops, temporary services, temporary power, ventilation, cooling tower, plants, temporary construction driveways, storage for spoils, and space for field offices.

Alternative 6 would also include several ancillary facilities and structures, including TPSS structures, a deep vent shaft structure at Stone Canyon Reservoir, as well as additional vent shafts at stations and crossovers. TPSSs would be co-located with MSF and station locations, except for two TPSSs at the Stone Canyon Reservoir vent shaft and four along Van Nuys Boulevard in the Valley. The Stone Canyon Reservoir vent shaft would be constructed using a vertical shaft sinking machine that uses mechanized shaft sinking equipment to bore a vertical hole down into the ground. Operation of the machine would be controlled and monitored from the surface. The ventilation shaft and two TPSSs in the Santa Monica Mountains would require an access road within the LADWP property at Stone Canyon Reservoir. Construction of the access road would require grading east of the reservoir. Construction of all mid-mountain facilities would take place within the footprint shown on Figure 10-5.

Additional vent shafts would be located at each station with one potential intermediate vent shaft where stations are spaced apart. These vent shafts would be constructed using the typical cut-and-cover method, with lateral bracing as the excavation proceeds. During station construction, the shafts would likely be used for construction crew, material, and equipment access.

Figure 10-5. Alternative 6: Mid-Mountain Construction Staging Site



Source: HTA, 2024

Alternative 6 would utilize precast tunnel lining segments in the construction of the transit tunnels. These tunnel lining segments would be similar to those used in recent Metro underground transit projects. Therefore, it is expected that the tunnel lining segments would be obtained from an existing casting facility in Los Angeles County and no additional permits or approvals would be necessary specific to the facility.

10.2 Existing Conditions

The primary effect of rising global concentrations of atmospheric GHGs is an increase in the average global temperature. Since 1982, the Earth's temperature has risen at an average rate of approximately 0.2 degrees Celsius per decade. Climate change modeling indicates that further warming is likely to occur due to the anticipated rise in global atmospheric GHG concentrations from various sources worldwide, including emissions from both developed and developing countries, as well as deforestation. This continued increase in GHGs is expected to induce further changes in the global climate system during the current century. Adverse impacts from global climate change worldwide and in California could include the following (CARB, 2022):

- Declining sea ice and mountain snowpack levels: This decline increases sea levels and sea surface evaporation rates, leading to higher atmospheric water vapor due to the atmosphere's ability to hold more moisture at elevated temperatures.
- Rising average global sea levels: Primarily resulting from thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets.
- Changing weather patterns: Alterations in precipitation, ocean salinity, and wind patterns, along with more extreme weather events, including droughts, heavy precipitation, heatwaves, cold spells, and intensified tropical cyclones.
- Declining Sierra Nevada snowpack levels: The Sierra Nevada snowpack, which accounts for approximately half of California's surface water storage, is projected to decrease significantly over the next century, posing challenges for water resources in the state.
- Increased ozone formation: Higher temperatures can lead to more days conducive to ozone formation (e.g., clear days with intense sunlight), potentially increasing ozone levels in high-ozone areas such as Southern California and the San Joaquin Valley by the end of the 21st century.
- Coastal erosion and seawater intrusion: Rising sea levels may exacerbate erosion along California's coastlines and increase the intrusion of seawater into the Sacramento-San Joaquin Delta and its levee systems, impacting freshwater supplies and infrastructure.

These projected impacts underscore the importance of mitigating GHG emissions and implementing adaptive strategies to address the challenges posed by climate change.

10.2.1 Statewide Greenhouse Emissions Inventory

The California Air Resources Board (CARB) maintains the statewide GHG emission inventory, and Table 10-3 displays GHG emissions from 2013 to 2021 in California by economic sector as defined in the *Climate Change Scoping Plan* (2008 Scoping Plan) (CARB, 2008a). California's GHG emissions have followed a declining trend over the past decade. In 2021, emissions from routine emitting activities statewide were approximately 12.6 million metric tons of carbon dioxide equivalents (MMTCO_2e) higher than 2020, but 23.1 MMTCO_2e lower than 2019 levels. As shown in Table 5-1, GHG emissions related to the electric power sector has continually declined as California continues to meet renewable portfolio standard (RPS) goals. The increase and decrease over the 2019 to 2021 timeframe are likely due to impacts of the COVID-19 pandemic (CARB, 2023b). The plurality of California GHG emissions is attributed to automobile exhaust associated with the transportation sector, including public and private vehicles, comprising approximately 40 percent of the total statewide emission inventory. Despite statewide population growth, approximately 4 percent from 2011 to 2021, annual GHG emissions attributed to the transportation sector have remained relatively constant over the last decade. However, in 2020, the transportation sector had the largest decrease compared to 2019, which likely resulted in less light-duty vehicle travel due to shelter-in place orders in response to the COVID-19 pandemic. Overall, the transportation sector in 2021 was 16.7 MMTCO_2e below pre-pandemic (2019) levels.

Table 10-3. Greenhouse Gas Annual $MMTCO_2e$ Emissions Trends by Sector

Sector	2013	2014	2015	2016	2017	2018	2019	2020	2021
Transportation	156.9	157.6	161.2	165.0	166.4	165.2	162.3	135.6	145.6
Electric Power	94.0	90.3	86.3	70.8	64.4	65.0	60.2	59.5	62.4
Industrial	82.7	85.0	82.7	81.2	81.4	82.0	80.8	73.3	73.9
Commercial/Residential	39.0	35.5	37.2	37.7	38.3	37.5	40.6	38.9	38.8
Agriculture	33.7	33.7	32.6	32.1	31.6	32.1	31.3	31.5	30.9
High GWP Sources	17.0	17.9	18.8	19.4	20.1	20.5	20.7	21.3	21.3
Recycling and waste	8.3	8.1	8.1	7.9	8.2	8.3	8.4	8.6	8.4
Emissions Total	**431.6**	**428.2**	**426.9**	**414.2**	**410.4**	**410.7**	**404.4**	**368.7**	**381.3**

Source: CARB, 2023c

GWP = global warming potential
$MMTCO_2e$ = million metric tons of carbon dioxide equivalents

10.2.2 Southern California Association of Governments Regional Greenhouse Gas Emissions

An element of the Southern California Association of Governments (SCAG) *Connect SoCal 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy* (SCAG, 2024a) is a regional GHG emissions inventory and emissions forecast based on the growth projections and control strategies incorporated into its development. SCAG provides estimates of the regional GHG emissions through the RTP/SCS horizon year accounting for programmed transportation projects, population, employment, and housing growth, and other regional factors. The 2024-2050 RTP/SCS has a horizon year of 2050, but provides data for interim year 2045 to address consistency with other GHG reduction policies. Table 10-4 presents modeled emissions from on-road mobile sources in 2019 and 2045. The data demonstrates that from 2019 to 2045, the regional on-road emissions are anticipated to decrease by 32.4 percent (64.35 $MMTCO_2e$ to 43.52 $MMTCO_2e$ by 2045) with plan implementation.

In addition, SCAG provides the total regional GHG emissions from the three primary sources of GHG emissions within the region: transportation, building energy, and water related energy. Table 10-5 shows that total GHG emissions across the SCAG region are anticipated to decrease by approximately 29.9 percent from 2019 to 2045, and transportation emissions are projected to decrease by 28.9 percent. Expansion of public transportation systems spurring mode shift away from passenger vehicles is a fundamental pillar of regional efforts to reduce GHG emissions and meet regional and statewide GHG emissions reduction targets.

Table 10-4. Greenhouse Gas Emissions from On-Road Emissions in the SCAG Region

Sector	2019 (MMT/Year)			2045 (MMT/Year)		
	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
Light and Medium Duty Vehicles	49.30	0.0025	0.0010	32.91	0.0007	0.0002
Heavy Duty Vehicles	12.64	0.0005	0.0014	9.75	0.0002	0.0005
Buses	1.54	0.0008	0.0001	0.61	0.0001	<0.0001
On-Road Vehicles (Subtotal) in CO_2	63.48	0.0039	0.0026	43.27	0.0010	0.0007
On-Road Vehicles (Subtotal) in CO_2e	63.48	0.0810	0.7943	43.27	0.0212	0.2294
Total Emissions from On-Road Vehicles in CO_2e	**64.35**			**43.52**		

Source: SCAG, 2024b

CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
MMT/Year = million metric tons per year
N_2O = nitrous oxide

Table 10-5. Annual Greenhouse Gas Emissions for the SCAG Region from Three Primary Sectors

Area	2019 ($MMTCO_2e$)	2030 ($MMTCO_2e$)	2045 ($MMTCO_2e$)	2050 ($MMTCO_2e$)	2019 vs 2045
Transportation	66.42	53.38	46.55	47.84	-29.9%
Building Energy	64.64	57.30	47.30	43.97	-26.8%
Water-Related Energy	2.89	2.26	1.40	1.12	-51.6%
Total	**133.95**	**112.94**	**95.26**	**97.8**	**-28.9%**

Source: SCAG, 2024b

$MMTCO_2e$ = million metric tons of carbon dioxide equivalents

10.2.3 Los Angeles County Metropolitan Transportation Authority Transit System Emissions

Metro has prepared detailed emissions inventories to track its progress in displacing GHG emissions from its operations, which includes operation of transit services and facilities, and employee commuting. GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage (APTA, 2018). Metro has been tracking its progress since 2008 through 2019 with its annual energy and resource reports. The *2019 Energy and Resource Report* (Metro, 2019b) was the last version in this format. For future sustainability reports, Metro will prepare an overall agency-wide sustainability report as part of Moving Beyond Sustainability. Metro's latest annual sustainability report analyzed the sustainability and environmental performance of its operational activities during the 2019 calendar year. Based on 2019 data, the largest emissions sources for Metro's total operational emissions were bus fleets and rail systems at 54 percent and 20 percent, respectively (Metro, 2020b). Non-modal sources (facility energy consumption, employee commuting, etc.) made up 22 percent of total operational emissions. New fleet technologies powered by renewable energy and reduced building energy usage can reduce Metro's emissions over the long term. Since 2012, emissions resulting from building energy use have decreased by 23 percent while emissions from water consumption have been cut in half. Table 10-6 summarizes Metro's recent progress in displacing GHG emissions from its operations and continually shows an annual net displacement of GHG emissions.

Table 10-6. Metro Operations Annual Greenhouse Gas Emissions Displacement

Category	2014	2015	2016	2017	2018	2019
Total Emissions ($MTCO_2e$)[a]	396,380	391,275	390,840	415,872	371,911	326,953
Total Displacement ($MTCO_2e$)[b,d]	-482,813	-465,101	-448,301	-1,020,485	-987,490	-918,076
Mode Shift to Transit	-482,813	-465,101	-448,301	-207,374	-200,669	-186,515
Land Use[c]	NA	NA	NA	-813,110	-786,820	-731,561
Net Emissions ($MTCO_2e$)	**-86,433**	**-73,827**	**-57,461**	**-604,613**	**-615,579**	**-591,123**

Source: Metro, 2020b

[a]Total emissions represent the GHG emissions generated from Metro's operation of transit services such as buses, rail, and vanpools, as well as operations of facilities, including consumption of electricity, natural gas, and water, refrigerants, and employee commuting.

[b]GHG emissions are displaced by providing transit services that reduce regional vehicle miles traveled (VMT) and land use efficiency effects, which are related to compact or high-density land use developments that foster communities to encourage more walking and bicycling, and less vehicle usage.

[c]GHG emissions displacement calculations were updated in 2018 to reflect the addition of Land Use as a source of emissions displacement. Reporting of land use emissions began with the 2017 reporting year.

[d]In 2018, Metro updated its 2017 GHG emissions inventory baseline with inclusion of the Land Use category and updated utility emission factors.

GHG = greenhouse gas
$MTCO_2e$ = metric tons of carbon dioxide equivalents
NA = not applicable

10.3 Impact Evaluation

10.3.1 Impact GHG-1: Would the project result in greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

10.3.1.1 Construction Impact

Construction of Alternative 6 would result in GHG emissions from off-road equipment, mobile sources, including worker vehicles, vendor trucks, and haul trucks, as well as electricity consumption from TBM usage and on-site portable offices. These emissions sources would be related to constructing the HRT system alignment, TPSSs, stations, and MSF.

As discussed in Section 3.3, CEQA Thresholds of Significance, GHG emissions are measured exclusively as cumulative impacts; therefore, the Alternative 6 construction emissions are considered part of its total GHG emissions in conjunction with operational emissions. In accordance with South Coast Air Quality Management District guidance, the Alternative 6 construction emissions were amortized over its design lifetime of 30 years, then combined with the Alternative 6 annual operational GHG emissions. Table 10-7 summarizes the Alternative 6 GHG emissions throughout the construction period. As shown in Table 10-7, Alternative 6 construction would generate a total of 211,656 $MTCO_2e$ and would result in 7,055 $MTCO_2e$ annually when amortized over the project lifetime of 30 years. Detailed emissions calculations are summarized in Appendix A.

Table 10-7. Alternative 6: Construction Greenhouse Gas Emissions

Construction Year	GHG Emissions ($MTCO_2e$)[a,b]
2029	8,303
2030	18,321
2031	11,210
2032	10,637
2033	12,118
2034	10,056
2035	13,064
2036	5,868
2037	842
TBM Electricity Consumption	121,166
Portable Office Electricity Consumption	71
Total Construction Emissions	**211,656**
Amortized Construction Emissions (30 Years)	7,055

Source: HTA, 2024

[a]Totals may vary due to rounding.
[b]GHG emissions related to electricity consumption represent the total GHG emissions over the entire construction period.

GHG = greenhouse gas
$MTCO_2e$ = metric tons of carbon dioxide equivalents
TBM = tunnel boring machine

Because construction emission sources would cease once construction is complete, they are considered short term. It should be noted that total and annual construction GHG emissions represent a conservative assessment, because GHG emissions would decrease in future years as the construction industry shifts toward implementation of cleaner fuels (i.e., electrified equipment) and more efficient technologies. Additionally, Metro's Green Construction Policy requires contractors to use renewable diesel, which would reduce upstream GHG emissions related to producing the fuel, as well as reduce GHG emissions from fuel combustion in off-road equipment and trucks as compared to petroleum diesel. GHG emissions for electric powered equipment such as the TBM and portable offices would also decrease in future years as LADWP continues to increase the amount of renewable energy sources in its power mix to meet state RPS goals. Thus, the annual construction GHG emissions associated with Alternative 6 would decrease with time and are likely to be lower than estimated herein. As shown in Table 10-8, annual operations of Alternative 6 compared to 2045 without Project conditions would result in a net reduction of GHG emissions; therefore, impacts from Alternative 6 construction emissions would be considered less than significant.

10.3.1.2 Operational Impact

Operations of Alternative 6 would generate long-term GHG emissions from direct and indirect sources. Direct sources consist of mobile sources, including regional VMT and employees traveling to and from the MSF, area sources related to landscaping equipment, and refrigerants used in building air conditioning systems. Indirect sources include electricity generation at power plants associated with traction power for the alignment, building electricity consumption, electricity consumption related to water and wastewater conveyance, and waste decomposition at landfills from solid waste generation.

The Alternative 6 annual GHG emissions were estimated for two scenarios: Alternative 6 compared to 2045 without Project conditions and Alternative 6 compared to Existing Conditions 2021. As discussed in

Section 3.3, CEQA Thresholds of Significance, GHG impacts would be evaluated based on the net change in emissions between project alternatives in Horizon Year 2045 and 2045 without Project conditions. The comparison for Alternative 6 2045 and Existing Conditions 2021 is presented for informational purposes only. Detailed emissions calculations are summarized in Appendix A.

Table 10-8 summarizes the Alternative 6 annual GHG emissions for each source category compared to 2045 without Project conditions. As shown in Table 10-8, when compared to the 2045 without Project conditions, Alternative 6 would result in a net reduction of annual GHG emissions in Horizon Year 2045. This reduction is primarily related to mobile emissions associated with a reduction in VMT. As stated in the *Sepulveda Transit Corridor Project Transportation Technical Report* (Metro, 2025), implementation of Alternative 6 would reduce regional daily VMT by 695,400 miles per day compared to 2045 without Project conditions.

Table 10-8. Alternative 6: Annual Greenhouse Gas Emissions Compared to 2045 without Project Conditions

Source Category	GHG Emissions ($MTCO_2e$/Year)[a]
Alternative 6	
Area	53
Electricity	2,879
Mobile-VMT Analysis	57,118,782
Mobile-Employee Travel	1,540
Water	34
Waste	32
Refrigerants	<0.1
Emergency Generators[b]	-
Amortized Construction	7,055
Alternative 6 Total Annual Emissions	**57,130,376**
2045 without Project Conditions	
Mobile – 2045 VMT Analysis Annual Emissions	57,188,730
Net Change in Emissions	**-58,354**

Source: HTA, 2024

[a]Alternative 6 would not require emergency generators.
[b]Totals may vary due to rounding.

GHG = greenhouse gas
$MTCO_2e$/Year = metric tons of carbon dioxide equivalents per year
VMT = vehicle miles traveled

Alternative 6 would support state, regional and local efforts to reduce GHG emissions by providing an efficient transit system as an alternative mode of transportation for commuters traveling between the Valley and Westside. Implementation of Alternative 6 would expand Metro's regional transit network with an all-electric transit system, thereby reducing GHG emissions related to regional VMT and providing further contributions to Metro's net displacement of operational GHG emissions. Overall, Alternative 6 would not result in an incremental increase in GHG emissions that would contribute to climate change, but rather would result in an environmental benefit by reducing GHG emissions; therefore, impacts of GHG emissions would be less than significant.

Table 10-9 summarizes the Alternative 6 annual GHG emissions for each source category compared to Existing Conditions 2021. This is presented for informational purposes only. As shown in Table 10-9, when compared to existing conditions, Alternative 6 would result in a net reduction of annual GHG emissions. The primary driver of the net reduction is mobile source emissions, which are a function of VMT and emission factors.

Table 10-9. Alternative 6: Annual Greenhouse Gas Emissions (Horizon Year 2045) Compared to Existing Conditions (Baseline Year 2021)

Source Category	GHG Emissions ($MTCO_2e$/Year)[a]
Alternative 6	
Area	53
Electricity	2,879
Mobile-VMT Analysis	57,118,782
Mobile-Employee Travel	1,540
Water	34
Waste	32
Refrigerants	<0.1
Emergency Generators[b]	-
Amortized Construction	7,055
Alternative 6 Total Annual Emissions	**57,130,376**
Existing Conditions	
Mobile – 2021 VMT Analysis Annual Emissions	64,691,322
Net Change in Emissions	**-7,560,946**

Source: HTA, 2024

[a]Alternative 6 would not require emergency generators.
[b]Totals may vary due to rounding.

GHG = greenhouse gas
$MTCO_2e$/Year = metric tons of carbon dioxide equivalents per year
VMT = vehicle miles traveled

10.3.2 Impact GHG-2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

10.3.2.1 Construction Impact

Construction of Alternative 6 would generate short-term GHG emissions related to off-road equipment, mobile sources, and electricity consumption. Alternative 6 construction would comply with Metro's Green Construction Policy, which requires idling restrictions for off-road equipment and trucks, using trucks with model years 2007 or newer, requiring contractors to use renewable diesel for all diesel engines, and implementing best management practices, such as using electric-powered equipment in lieu of diesel equipment where available. Upon completion of Alternative 6 construction, these emissions would cease. As GHG emissions are exclusively cumulative impacts, the Alternative 6 amortized construction emissions were included with the long-term operational emissions for Alternative 6. Based on the discussion below, annual operational emissions, which included amortized construction emissions, were found to not conflict with plans or policies to reduce GHG emissions; therefore, impacts for construction-related GHG emissions would be less than significant.

10.3.2.2 Operational Impact

Plans, policies, and regulations focused on reducing GHG emissions occur at the state, regional, and local levels. At the state level, these efforts are guided primarily by Assembly Bill (AB) 32, Senate Bill (SB) 32, AB 1279, and the *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) (CARB, 2022). At the regional level, the SCAG *Connect SoCal, 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy* (SCAG, 2020a, 2020b) contains strategies for reducing GHG emissions within the Sustainable Development focus area, as well as Metro's *2019 Climate Action and Adaptation Plan* (CAAP) (Metro, 2019c) and the *Moving Beyond Sustainability – Strategic Plan 2020* (Metro, 2020a) (referred to as "Moving Beyond Sustainability"). Lastly at the local level, relevant plans include the City of Los Angeles' *Sustainable city pLAn and Mobility Plan 2035* (City of Los Angeles, 2015, 2016). The following sections discuss the consistency of Alternative 6 consistency with these state, regional, and local plans for reducing GHG emissions.

Consistency with AB 32, SB 32, AB 1279, and 2022 Scoping Plan

AB 32, SB 32, and AB 1279 outline the state's GHG emissions reduction targets for 2020, 2030, and 2045, respectively. In 2008 and 2014, CARB adopted the 2008 Scoping Plan and the 2014 *First Update to the Climate Change Scoping Plan*, respectively, as a framework for achieving the emissions reduction targets in AB 32 (CARB, 2008a, 2014). These plans outline a series of technologically feasible and cost-effective measures to reduce statewide GHG emissions. CARB adopted *California's 2017 Climate Change Scoping Plan* (CARB, 2017) in November 2017 as a framework to achieve the 2030 GHG reduction goal described in SB 32, which is to reduce statewide GHG emissions to 1990 levels by 2020 and 40 percent below 1990 levels by 2030. Most recently, the 2022 Scoping Plan was adopted in September 2022 and outlines how the state will achieve carbon neutrality and reduce statewide GHG emissions 85 percent below 1990 levels by 2045. The analysis year for Alternative 6 is 2045 (horizon year); therefore, the statewide GHG emissions reduction target for 2045 is the statutory statewide milestone target that is applicable to Alternative 6.

As discussed in Section 0, Existing Conditions, the transportation sector is the largest contributor to statewide GHG emissions. Similarly, the 2022 Scoping Plan focuses heavily on strategies and actions to reduce GHG emissions from the transportation sector, such as reducing VMT through transportation infrastructure that aligns with the state's climate goals. Alternative 6 would be consistent with this objective because it would reduce regional daily VMT by 695,400 miles per day (compared to 2045 without Project conditions), resulting in an overall net reduction in annual GHG emissions.

The 2022 Scoping Plan also focuses on transitioning commercial building energy from fossil fuel sources to non-combustion alternatives. Alternative 6 would be consistent with this effort because it would comply with the City of Los Angeles Municipal Code Section 99.04.106.8, which requires all newly constructed buildings to be all-electric buildings. Additionally, Alternative 6 would comply with design requirements for components outlined in Moving Beyond Sustainability, such as achieving Leadership in Energy and Environmental Design (LEED) sustainable certifications (or Envision Version certification [currently version 3] where LEED is not applicable) and Tier 2 of the California Green Building Standards Code. Overall, Alternative 6 would not conflict with the state goals and strategies for reducing GHG emissions.

Consistency with 2024-2050 RTP/SCS

The 2024-2050 RTP/SCS is a long-range planning document that balances future mobility and housing needs with economic, environmental, and public health goals in the SCAG region. One of the key strategies of the plan is to integrate land use, housing, and transportation planning to ensure sustainable regional growth. The SCS portion of the 2024-2050 RTP/SCS includes a combination of transportation and land use strategies to meet GHG reduction goals, such as emphasizing land use patterns that facilitate multimodal access to work, educational and other destinations; focusing on a regional jobs/housing balance to reduce commute times and distances and expand job opportunities near transit and along center-focused main streets; and encouraging design and transportation options that reduce the reliance on solo car trips. Alternative 6 would support these strategies by providing access to a safe, sustainable, and efficient transit system located in dense urban communities with major job centers, including a direct connection with UCLA via the UCLA Gateway Plaza Station.

Implementation of the 2024-2050 RTP/SCS would achieve regional GHG reductions relative to 2005 SCAG areawide levels of approximately 8 percent in 2020 and approximately 19 percent by 2035 (SCAG, 2024a). Additionally, SCAG indicates implementation of the 2024-2050 RTP/SCS would reduce daily VMT per capita by 6.3 percent compared to the SCAG 2050 Baseline scenario. The Baseline scenario represents how the region would perform without implementation of the 2024-2050 RTP/SCS. As shown in Table 10-8, implementation of Alternative 6 would result in a net reduction of GHG emissions and would directly contribute to meeting the objectives and emission reduction targets outlined in the 2024-2050 RTP/SCS. Overall, Alternative 6 would not conflict with the goals and strategies of the 2024-2050 RTP/SCS to reduce VMT and associated GHG emissions.

Consistency with Metro Plans

Metro has developed policies directed toward controlling GHG emissions through a variety of plans over the last decade. The most recent and relevant plans are the 2019 CAAP and Moving Beyond Sustainability, which builds upon previous commitment to environmental and sustainability stewardship. The 2019 CAAP set a goal of reducing GHG emissions by 79 percent relative to 2017 by 2030, and 100 percent by 2050. Moving Beyond Sustainability also includes goals of reducing GHG emissions by 100 percent relative to 2017 by 2050 and displacing or preventing GHG emissions. As a Metro project, Alternative 6 would inherently be required to be consistent with goals and strategies for each of these plans. As shown in Table 10-8, implementation of Alternative 6 would result in a net reduction in GHG emissions compared to future conditions, thus supporting the GHG reduction goals for both of these plans. Overall, Alternative 6 would not conflict with the goals and strategies of Metro's plans to reduce GHG emissions.

Consistency with Sustainable City pLAn

LA's Green New Deal, Sustainable City pLAn (City of Los Angeles Mayor's Office, 2019) was the first 4-year update to the *Sustainable City pLAn* (2015 pLAn) (City of Los Angeles, 2015) and expands in more detail the vision to achieve a sustainable future that entails a carbon-neutral economy by 2050. *LA's Green New Deal, Sustainable City pLAn* (henceforth referred to as the "2019 updates to the pLAn") accelerates targets from the 2015 pLAn for supplying renewable energy, increasing local water sourcing, reducing building energy, reducing VMT per capita, reducing municipal GHG emissions, increasing the percentage of zero emission passenger and city-fleet vehicles, building new housing near transit, and increasing the number of green jobs.

The 2019 updates to the pLAn would accelerate GHG reductions targets, including reducing GHG emissions by 50 percent by 2025, 73 percent by 2035, and becoming carbon neutral by 2050, all relative to a 1990 baseline. As shown in Table 10-8, implementation of Alternative 6 would result in a net reduction in GHG emissions compared to future conditions, thus supporting the GHG reduction goals. Additionally, Alternative 6 would provide access to a safe and efficient transit system located in close proximity to dense urban communities near major job centers and a direct connection to UCLA, and would be developed to meet sustainable certifications, such as Envision, LEED, and CALGreen building codes. Overall, Alternative 6 would not conflict with the goals and strategies of the 2019 updates to the pLAn to reduce GHG emissions.

Consistency with City of Los Angeles Mobility Plan 2035

Mobility Plan 2035 emphasizes the efficacy of multi-modal street design in reducing GHG emissions through encouraging the use of transit and active transportation, which decreases regional dependence on passenger vehicles (DCP, 2016). Alternative 6 would support these strategies by providing access to a safe, sustainable, and efficient transit system located in dense urban communities with major job centers and UCLA via the UCLA Gateway Plaza Station. Alternative 6 would not conflict with the goals and strategies of *Mobility Plan 2035* to reduce GHG emissions.

Overall, Alternative 6 would not conflict with plans, policies, or regulations adopted for the purpose of reducing GHG emissions; therefore, impacts would be less than significant.

10.4 Mitigation Measures

10.4.1 Construction Impacts

No mitigation measures are required.

10.4.2 Operational Impacts

No mitigation measures are required.

10.4.3 Impacts After Mitigation

No mitigation measures are required; impacts are less than significant.

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Appendix A. Air Quality and Greenhouse Gas Emissions Modeling Files