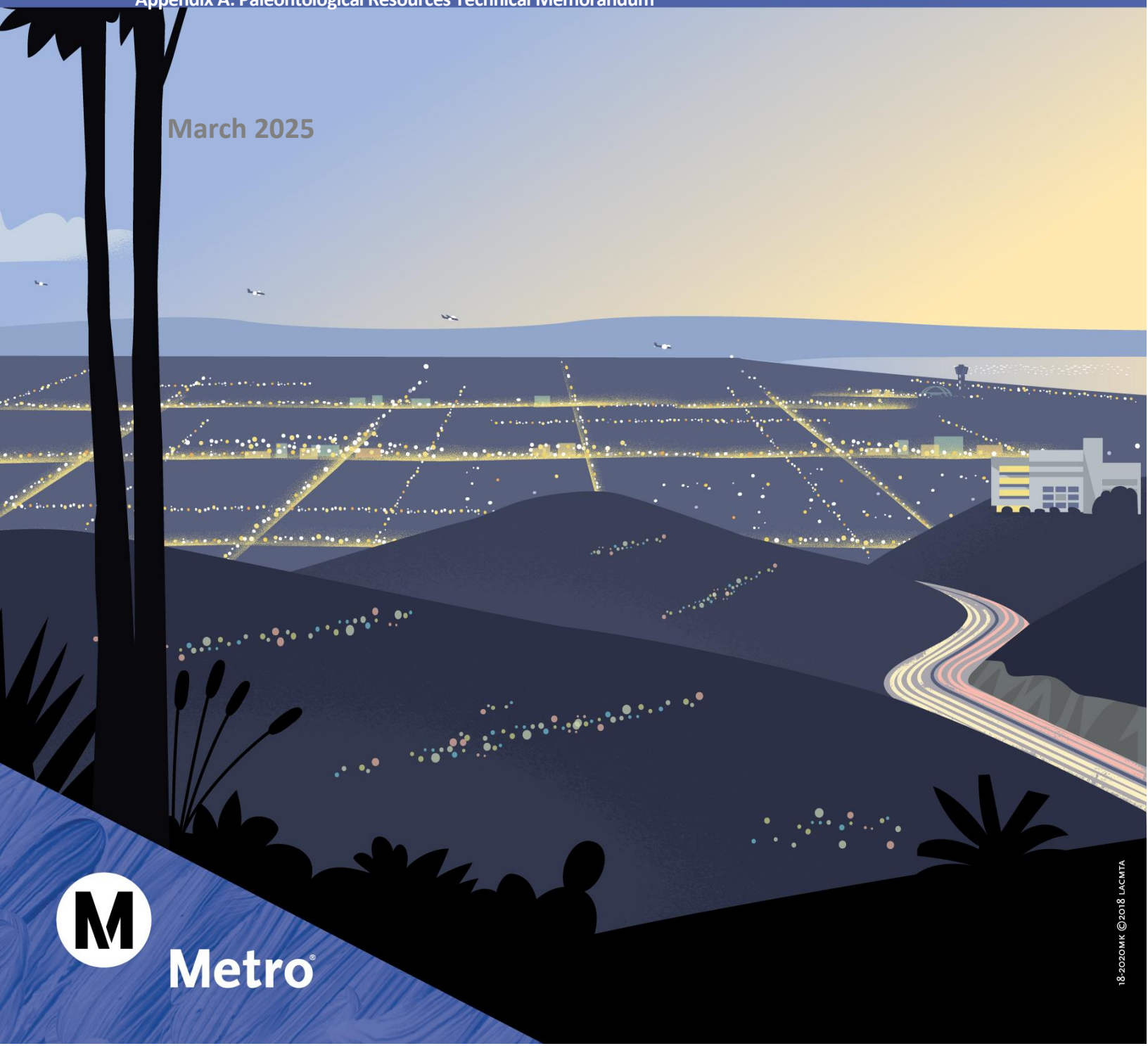
Appendix K. Geotechnical, Subsurface, Seismic, and Paleontological Technical Report Appendix A

SEPULVEDA TRANSIT CORRIDOR PROJECT

Geotechnical, Subsurface, Seismic, and Paleontological Technical Report

Appendix A: Paleontological Resources Technical Memorandum

March 2025



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SEPULVEDA TRANSIT CORRIDOR PROJECT

Contract No. AE67085000

Geotechnical, Subsurface, Seismic, and Paleontological Technical Report Appendix A: Paleontological Resources Technical Memorandum

Task 5.24.11

Prepared for:

Metro

Los Angeles County
Metropolitan Transportation Authority

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Abbreviations and Acronyms

ABC	Accelerated Bridge Construction
APM	automated people mover
bgs	below ground surface
BRT	bus rapid transit
CEQA	California Environmental Quality Act
CIDH	cast-in-drilled-hole
EIR	Environmental Impact Report
ExpressLanes project	I-405 Sepulveda Pass ExpressLanes project
FTIP	Federal Transportation Improvement Program
HRT	heavy rail transit
HTA	HTA Partners
I-10	Interstate 10
I-405	Interstate 405
J	Jurassic
K	Cretaceous
LACM	Natural History Museum of Los Angeles County Paleontological Locality Prefix
LADWP	City of Los Angeles Department of Water and Power
LASRE	LA SkyRail Express
LAX	Los Angeles International Airport
LOSSAN	Los Angeles-San Diego-San Luis Obispo
LRT	light rail transit
Metro	Los Angeles County Metropolitan Transportation Authority
MM	mitigation measure
MOW	maintenance-of-way
MRT	monorail transit
MSF	maintenance and storage facility
NHMLAC	Natural History Museum of Los Angeles County
NOP	Notice of Preparation
PRC	Public Resources Code
Project	Sepulveda Transit Corridor Project
PRIMP	Paleontological Resources Impact Mitigation Program
Q	Quaternary
ROW	right-of-way
RSA	Resource Study Area (Paleontological)
SCAG	Southern California Association of Governments

SCORE	Southern California Optimized Rail Expansion
STCP	Sepulveda Transit Corridor Partners
SVP	Society of Vertebrate Paleontology
T	Tertiary
TBM	tunnel boring machine
TPSS	traction power substation
UCLA	University of California, Los Angeles
US-101	U.S. Highway 101
VA	Veterans Affairs
VSM	vertical shaft sinking machine
Valley	San Fernando Valley
Westside	Westside of Los Angeles

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, 2019), 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, serving UCLA
- Alternative 4: Heavy rail with underground alignment south of Ventura Boulevard and aerial alignment generally along Sepulveda Boulevard in the San Fernando Valley and a southern terminus connecting to the existing Metro E-Line Expo Station
- Alternative 5: Heavy rail with underground alignment, including along Sepulveda Boulevard in the San Fernando Valley and a southern terminus connecting to the existing Metro E-Line Expo Station
- 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, 2024). 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, considered the same for the No Project Alternative and all project alternatives. 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, 2019). 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 paleontological resources. It describes existing paleontological resource 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. Information concerning seismic activity in the Project Study Area, project impacts to soil, topsoil removal, and minerals can be found in the *Sepulveda Transit Corridor Project Geotechnical, Subsurface, Seismic, and Paleontological Technical Report* (Metro, 2025).

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

Paleontological resources in California are protected by several state and local regulations, statutes, and ordinances. Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance.

Paleontology is the study of the remains of past life preserved in geologic formations, referred to as fossils or paleontological resources. Paleontological resources are not only composed of fossil material (e.g., teeth, skeletal material, shell, trackways, and burrows), but also the associated sediments, geologic features, and any organic matter present within said sediments. Additionally, the physical characteristics of the sedimentary matrix associated with fossil material can provide evidence of the past environment the organism(s) lived in.

Prior to 2019, the California Environmental Quality Act (CEQA) categorized paleontological resources as cultural resources and required an impact evaluation for such resources under the cultural resource component of the Environmental Checklist in Appendix G.

2.1 Federal

2.1.1 American Antiquities Act

The American Antiquities Act of 1906 specifies that significant paleontological resources are defined as fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or important to define a particular time frame or geologic strata, or that add to an existing body of knowledge in specific areas, in local formations, or regionally. Paleontological remains are accepted as non-renewable resources significant to our culture and, as such, are protected under provisions of the Antiquities Act of 1906 and subsequent related legislation, policies, and enacting responsibilities.

2.1.2 Paleontological Resources Preservation Act

The Paleontological Resources Preservation Act (Section 5097.5, 30244, 4307, 4308, and 4309) prohibit the removal of any paleontological site or feature from public lands without permission of the jurisdiction agency, define the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of adverse impacts to paleontological resources from development on public (state, county, city, district) lands.

2.2 State

2.2.1 Public Resources Code Section 5097.5 and Section 30244

California Public Resources Code (PRC) Section 5097.5 prohibits excavation, removal, destruction, injury, or defacement of any “vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands.” Public lands are defined to include lands owned by or under the jurisdiction of the state or any city, county, district, authority, or public corporation, or any agency thereof. Section 5097.5 states that any unauthorized disturbance or removal of archaeological, historical, or paleontological materials or sites located on public lands is a misdemeanor.

2.3 Local

2.3.1 City of Los Angeles General Plan

The Conservation Element of the City of Los Angeles General Plan recognizes paleontological resources in Section 3: "Archaeological and Paleontological" (II-3) and identifies protection of paleontological resources as an objective (II-5), stating, "Pursuant to CEQA, if a land development project is within a potentially significant paleontological area, the developer is required to contact a bona fide paleontologist to arrange for assessment of the potential impact and mitigation of potential disruption of or damage to the site. If significant paleontological resources are uncovered during project excavation, authorities are to be notified and the designated paleontologist may order excavations stopped, within reasonable time limits, to enable assessment, removal, or protection of the resources (DCP, 2001; SVP, 2010).

2.3.2 Los Angeles Building Code, Article 4, Public Benefit Projects

The applicant shall retain an independent construction monitor, approved by the Department of Building and Safety (DBS), who shall be responsible for monitoring implementation of the construction standards. The construction monitor shall also prepare documentation of the applicant's compliance with the construction standards during construction every 90 days in a form and manner satisfactory to the DBS. The documentation must be signed by the applicant and the construction monitor. DBS shall verify that the applicant has or will (by having an appropriately qualified expert(s) under contract as may be necessary) comply with the construction standards prior to issuance of any permits.

- No pile driving shall be allowed unless required due to geological conditions. Where piles are needed, they shall be installed through quiet techniques such as vibratory piles.
- If excavating below previously excavated depths, the applicant shall have appropriately qualified experts use all reasonable methods, consistent with professional standards, to determine the potential that archaeological resources, paleontological resources or unique geological feature (resources) are present on the project site, including through record searches and surveys. If a qualified expert determines there is a medium to high potential that resources are on the project site and the project has the potential to impact resources, the qualified expert(s) shall monitor and direct any excavation, grading or construction activities to identify resources and avoid potential impacts to resources.
- If archaeological resources, paleontological resources, or unique geological features (resources) are discovered during excavation, grading or construction activities, applicant shall cease work in the area of discovery until a qualified expert has evaluated the find and the City has taken any necessary measures to preserve and protect the find in accordance with federal, state and local law and guidelines.

2.4 Society for Vertebrate Paleontology

The Society of Vertebrate Paleontology (SVP) has established standard guidelines (SVP, 2010) that outline professional protocols and practices for conducting paleontological resource assessments and surveys; monitoring and mitigation; data and fossil recovery; sampling procedures; and specimen preparation, identification, analysis, and curation. State regulatory agencies with paleontological regulations and standards typically accept and use the professional standards set forth by the SVP.

The SVP defines significant nonrenewable paleontological resources, and significant fossiliferous deposits as:

> *Fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years) (2010).*

Based on the significance definitions of the SVP (2010), all identifiable vertebrate fossils are considered to have significant scientific value. This position is taken because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information on the taxon it represents, its paleoenvironment, or its distribution. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In its "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontological Resources," the SVP (2010) defines three categories of paleontological sensitivity (potential) for sedimentary rock units:

- **High Potential** – Rock units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered are considered to have a high potential for containing significant nonrenewable fossiliferous resources. These units include, but are not limited to, sedimentary formations and some volcanic formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate or botanical, and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas that contain potentially datable organic remains older than recent (present day), including deposits associated with nests or middens and areas that may contain new vertebrate deposits, traces, or trackways are also classified as significant.
- **Low Potential** – Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections.
- **Undetermined Potential** – Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potential.
- **No Potential** – Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites).

In general terms, for geologic units with high potential, full-time monitoring typically is recommended during any Project-related ground disturbance. For geologic units with low potential, protection or salvage efforts typically are not required. For geologic units with undetermined potential, field surveys by a

qualified paleontologist are usually recommended to specifically determine the paleontological potential of the rock units present within the RSA. Rock units with no potential require no protection nor impact mitigation measures relative to paleontological resources.

3 METHODOLOGY

3.1 Paleontological Resource Study Area

The specialized paleontological Resource Study Area (RSA) for this paleontological resource assessment is referred to as the RSA. The RSA was delineated based on the proposed physical configuration of the project alternatives and maintenance and storage facility (MSF) sites.

The RSA is defined as the area necessary to construct, operate, and maintain the project alternatives, and includes all proposed right-of-way and acquisition and construction areas, and all parcels adjacent to permanent site improvements and facilities, including tunnel boring machine launch sites, stations, and power substations; parking facilities; and maintenance yards and buildings.

For paleontological resources, this includes areas where temporary or permanent ground disturbance may occur. Typically, the RSA extends out from the alignment from one to three parcels, depending on parcel sizes, intervening landscape, and buildings, and whether the historic land use is sensitive to the proposed change in setting. Geologic formations exposed within the RSA can be found in Table 3-1. The RSA for paleontological resources is documented on a series of maps provided in Attachment 1.

Table 3-1. Geologic Units Within the Study Area

Geologic Map Unit	Description	Age
Qf	Artificial Fill	Recent
Qa	Very young alluvium	Holocene
Qya$_2$	Young alluvium – unit 2	Holocene
Qof$_2$	Older alluvial fan deposits – unit 2	Pleistocene
Qof$_1$	Older alluvial fan deposits – unit 1	Pleistocene
Qom	Older shallow marine deposits	Pleistocene
Qls	Quaternary landslide debris	Pleistocene
Qvoa	Very old alluvium	Pleistocene
Tmud	Modelo Formation – Undivided	Miocene
Tmd	Modelo Formation – Diatomaceous Shale Member	Miocene
Tmss	Modelo Formation – Sandstone	Miocene
Tt	Topanga Group – Undivided	Miocene
Kt	Tonalite	Cretaceous
Jsm	Santa Monica Slate – Undivided	Late Jurassic
Jsms	Santa Monica Slate – Spotted slate	Late Jurassic
Jsmp	Santa Monica Slate – Phyllite	Late Jurassic

Source: Campbell et al., 2014

3.2 Paleontological Record Search and Literature Review

To better understand the impacts to paleontological resources within the RSA, a record search with a 1-mile buffer from the RSA (Bell, 2023) was conducted on June 11, 2023, through the Natural History Museum of Los Angeles County (NHMLAC). The record search entails a search of specimens from similar geologic conditions to those on the Project, and their respective localities in the NHMLAC database. The results of this record search can be found in Table 3-2, and the record search document has been included for reference as Attachment 2.

Table 3-2. Paleontological Resources Vicinity Records

Locality Number	Location	Formation	Taxa	Depth
LACM VP 1681	Sepulveda Freeway cut, adjacent to where Royal Ridge Road ends	Modelo Formation	Pipefish (*Syngnathus avus*)	Unknown
LACM VP 1894	Beverly Glen Canyon on Beverly Glen Boulevard ¼ mile south of Sumac Road on West side of canyon	Modelo Formation	Fish (Osteichthyes)	Unknown
LACM VP 7879	Penmar Recreation Center; intersection of Penmar Avenue and Rose Avenue; Venice	Unknown formation (Pleistocene; sandy silty clay)	Rodent (Rodentia); ground sloth (*Paramylodon*); horse (*Equus*)	11-130 feet below ground surface (bgs)
LACM VP 5462	2500 block of Michigan Avenue, Santa Monica	Unknown formation (Pleistocene)	American lion (*Felis atrox*)	6 feet bgs
LACM VP 5833	10580 Wilshire Boulevard; south side of street between Thayer and Westholme Avenues in excavation for building called “The Wilshire”	Lakewood Formation (poor to well graded; greyish-brown sand & sandy silt with occasional gravels & grey-black cobbles)	Freshwater snails; rodents (Rodentia); horse (*Equus*)	Unknown
LACM IP 20315, 1302	East side of Stone Canyon Reservoir	Tuna Canyon Formation (Thin bed of limestone above red conglomerate)	Invertebrates (uncatalogued)	Surface
LACM IP 23350	Upper Stone Canyon Reservoir; collected from reservoir bottom; 50-75 feet north of Gate tower	Modelo Formation	Invertebrates (*Mizuhobaris*)	Surface
LACM IP 20343	On a ridge just west of Stone Canyon Reservoir	Topanga Formation	Invertebrates (*Turritella pacheoensis*, *Mesalia martinezensis*)	Surface
LACM IP 20341	North of Stone Canyon Reservoir; about ½ mile northwest of Beverly Glen Boulevard	Topanga Formation	Invertebrates (*Panopea*, *Clementia*, *Turritella*)	Surface
LACM IP 7053	Top of ridge 1¾ miles east and 1½ miles north of southeast corner of Reseda Quadrangle	Possible Modelo Formation	Invertebrates (uncatalogued)	Unknown
LACM VP 65112	Road cut on the east side of the San Diego Freeway; near Del Gado Drive	Modelo Formation	Unspecified vertebrates	Unknown
LACM IP 438	Woodcrest Drive off Sepulveda Boulevard; Encino	Altamira Shale	Invertebrates (*Rhyssematus*)	Unknown
LACM VP 6208, 3263	Burbank Boulevard and Kester Avenue in Van Nuys	Unknown formation (Pleistocene)	Bison (*Bison*); Horse family (*Equidae*)	20 feet bgs

Locality Number	Location	Formation	Taxa	Depth
LACM VP 3822	Calvert Street, south of Sylvan Park School, Van Nuys	Unnamed lacustrine deposit (Pleistocene)	Bison (*Bison*)	Unknown

Source: LACM, 2023

LACM = Natural History Museum of Los Angeles County Paleontological Locality Prefix

Reviews of professional paleontological publications (i.e., peer-reviewed journal articles, geologic maps, etc.) was also conducted. As the record search focuses on the locations of paleontological resources, this review is necessary to inform the paleontologist of the presence, location, and extent of the geologic formations in the area of the Sepulveda Transit Corridor Project (Project). This step is essential in developing paleontological sensitivities and the subsequent mitigation measures (Scott and Springer, 2003; SVP, 2010; Campbell et al., 2014).

3.3 Impact Analysis

California Environmental Quality Act (CEQA) Guidelines include consideration of paleontological resources as part of the analysis of geology and soils by stating the question of whether a project would "directly or indirectly destroy a unique paleontological resource or site or unique geologic feature." Treatment of paleontological resources under CEQA is generally similar to treatment of cultural resources, requiring evaluation of resources, assessment of potential impacts on significant or unique resources, and development of mitigation measures for potentially significant impacts, which may include monitoring combined with data recovery and/or avoidance.

3.3.1 Construction

Construction activities pose the greatest risk of physical demolition, destruction, relocation, or alteration of paleontological resources. Generally, the assessment of impacts to these resources would involve review of the construction footprint and designs for each project alternative to determine if any known paleontological resources are within the construction footprint or subject to construction effects. The potential to impact unknown, buried resources would consist of an assessment of the potential to encounter unknown resources based upon paleontological resource records search results, archival research, and professional judgement.

"Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources" establishes detailed protocols for the assessment of the paleontological resource potential (i.e., "sensitivity") of a Paleontological RSA and outlines measures to follow to mitigate adverse impacts to known or unknown fossil resources during project development. Using baseline information gathered during a paleontological resource assessment, the paleontological resource potential of the geologic unit(s) (or members thereof) underlying a Paleontological RSA can be assigned to a high, undetermined, low, or no paleontological sensitivity category, as defined by the Society of Vertebrate Paleontology (SVP) (2010). This criterion is based on rock units within which vertebrate, or significant invertebrate fossils, have been determined by previous studies to be present or likely to be present. While these standards were specifically written to protect vertebrate paleontological resources, all fields of paleontology have adopted these guidelines.

Paleontological resource impacts for each Project Alternative will be considered significant if the Project Alternative would directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. Impacts would be significant if construction activities result in the destruction, damage,

or loss of scientifically important paleontological resources and associated stratigraphic and paleontological data. The activities may include grading, excavation, or other activities that disturb substantial quantities of the subsurface geologic units with a high potential sensitivity (SVP, 2010).

3.4 CEQA Threshold of Significance

To satisfy the requirements of CEQA, paleontological resource impacts are analyzed in accordance with CEQA Guidelines[1]. Impacts are considered significant if the Project would:

- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

Paleontological resources are defined by SVP (2010) as "fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years)."

[1] "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.

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**Error! Reference source not found.** 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

5.1.1 Geologic Context

The Project Study Area stretches from the San Fernando Valley (Valley) in the north, through the Santa Monica Mountains, to the Los Angeles Basin in the south. The Resource Study Area (RSA) encompasses the diversity of geology within the Los Angeles area, with rocks and unconsolidated sediments ranging in age from the Late Jurassic Period (approximately 163.5 to 145 million years ago) to the present (Table 3-1).

The oldest rock formations in the RSA date to the late Jurassic Period and are in the southern Santa Monica Mountains. The late Jurassic Santa Monica Slate are encountered in relatively small, uplifted exposures. The Santa Monica Slate has yielded a small quantity of invertebrate fossils, largely heavily distorted by metamorphic processes (Imlay, 1963). Additionally, the Cretaceous Period Tuna Canyon deposits nearby in the Santa Monica Mountains have similarly yielded small but important invertebrate fossil collections (Saul and Alderson, 2001).

The majority of the Santa Monica Mountains within the RSA consist of uplifted Tertiary rocks of the marine Modelo (*Tmd, Tms*) and Topanga Group Formations (*Tt*), both quite fossiliferous (Campbell et al., 2014). The Modelo Formation has been correlated with the Monterey Formation using biostratigraphy (i.e., radiometric dating and age correlation of geologic units based on contained paleontological material(s) and tephrochronology [i.e., radiometric dating and age correlation of ash layers adjacent to the paleontological resources]), and dates to the upper and middle Miocene, approximately 15 to 8 million years ago (Knott et al., 2022). The formation is particularly notable for its fossil bony fish and whales but has additionally yielded significant fossil invertebrates and vertebrates (Fierstine et al., 2012).

The low-lying areas of the RSA in the Valley and the Los Angeles Basin consist of sedimentary deposits ranging from the Pleistocene to the Holocene. Surface deposits, consisting primarily of artificial fill, shallow deposits of young alluvium (*Qa, Qya*$_2$), and young alluvial fan deposits (*Qyf*$_1$*, Qyf*$_2$), are younger than 10,000 years of age and are, therefore, unlikely to contain significant fossil deposits. However, older Quaternary deposits exist on the surface in the very southern and northern-most portions of the RSA (Campbell et al., 2014). The older Quaternary alluvial deposits (*Qvoa*) have yielded significant vertebrate fossil deposits, including fossils of extinct megafauna (Bell, 2023).

The paleontological sensitivity for each of the geological formations present in the RSA is determined as follows: Young alluvium – unit 2 (*Qya*$_2$), Quaternary landslide deposits (*Qls*), and the Santa Monica Slate (*Jsm, Jsmp*) should be treated as having "No" paleontological sensitivity, with the following caveat: geologic units of metamorphic origin are generally regarded as having no paleontological sensitivity due to the extreme temperatures and pressures they have been subjected to. The Santa Monica Slate,

however, contains portions of low-grade metamorphism (*Jsms*), facilitating the possibility of contained fossils, which have not been distorted enough to preclude identification. When that portion of the Santa Monica Slate (*Jsms*) is encountered, hereby considered "Unknown" paleontological sensitivity, the project paleontologist will need to determine if low-grade metamorphic conditions are present. If that is the case, that portion of the unit (*Jsms*) should be considered "Low" paleontological sensitivity and monitored accordingly (Imlay, 1963). Quaternary very old alluvium (*Qvoa*) and the Modelo Formation (*Tm*, *Tmd*, and *Tmss*) should be considered as having "High" paleontological sensitivity (SVP, 2010; Campbell et al., 2014).

5.2 Operational Impacts

The No Project Alternative would not include construction and operation of the Project, and impacts associated with the Project would not occur. In absence of the Project, the only reasonably foreseeable transit improvement in the Project Study Area would involve changes to Metro Line 761. Operations of the projects associated with the No Project Alternative does not include activities that involve ground disturbance other than bus stop facilities associated with the rerouting of Metro Line 761. Therefore, there would be no operational impacts related to paleontological resources.

5.3 Construction Impacts

The No Project Alternative would not include construction and operation of the Project, and impacts associated with the Project would not occur. The only reasonably foreseeable transportation project under the No Project Alternative is a set of improvements to Metro Line 761, including bus stop facility updates. Bus stop facilities associated with the rerouting of Metro Line 761 would require minor ground disturbance at shallow depths within existing fill and does not involve excavation or use TBM construction. The No Project Alternative would undergo its own environmental evaluation and mitigation measures may be included to reduce impacts related to paleontological resources. Standard paleontological resources mitigation would reduce impacts related to excavation from the surface level. Therefore, the No Project Alternative for construction impacts would result in a less than significant impact.

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

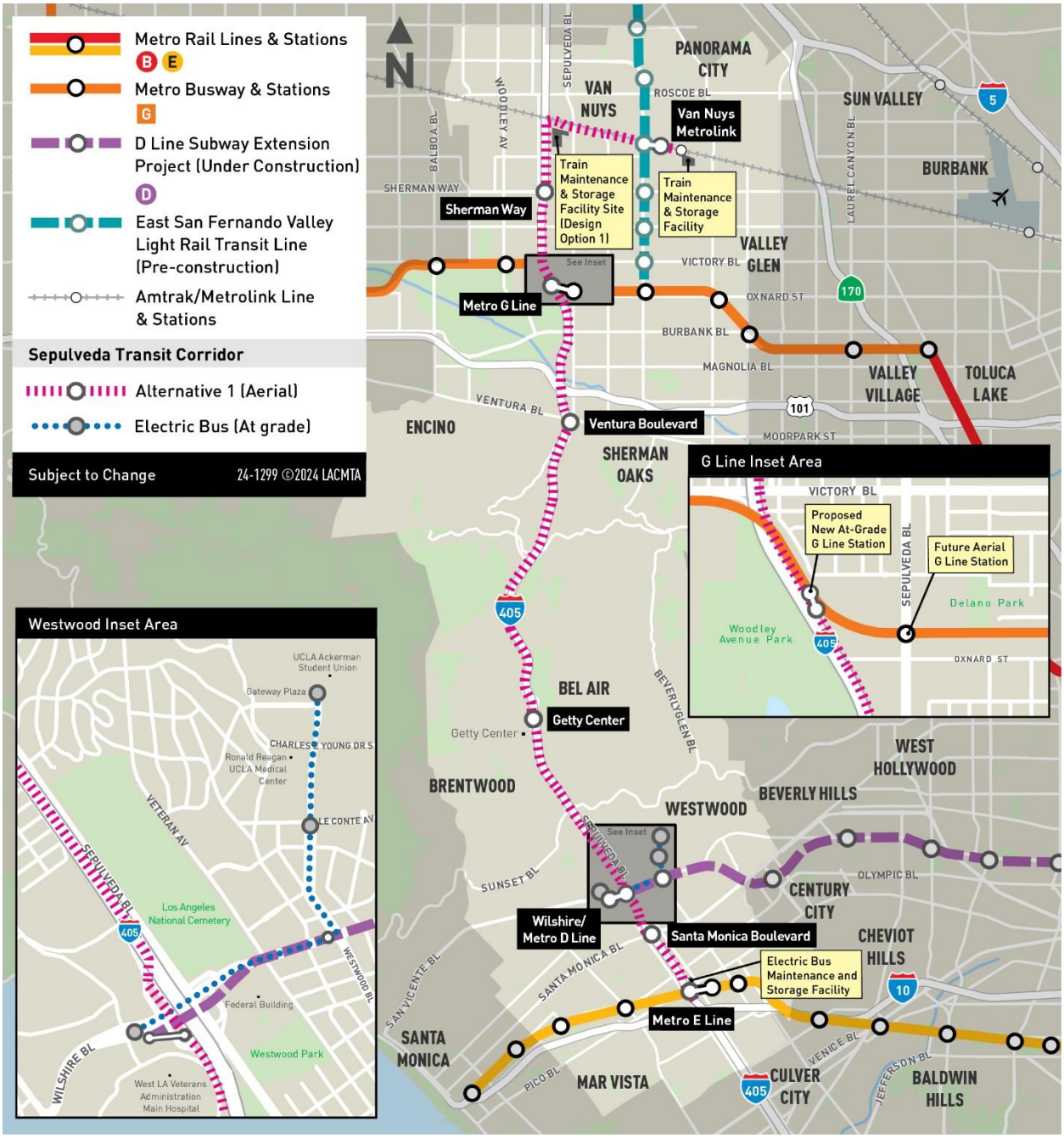
6.1.1.1 Alignment

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 (ROW) 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, 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).

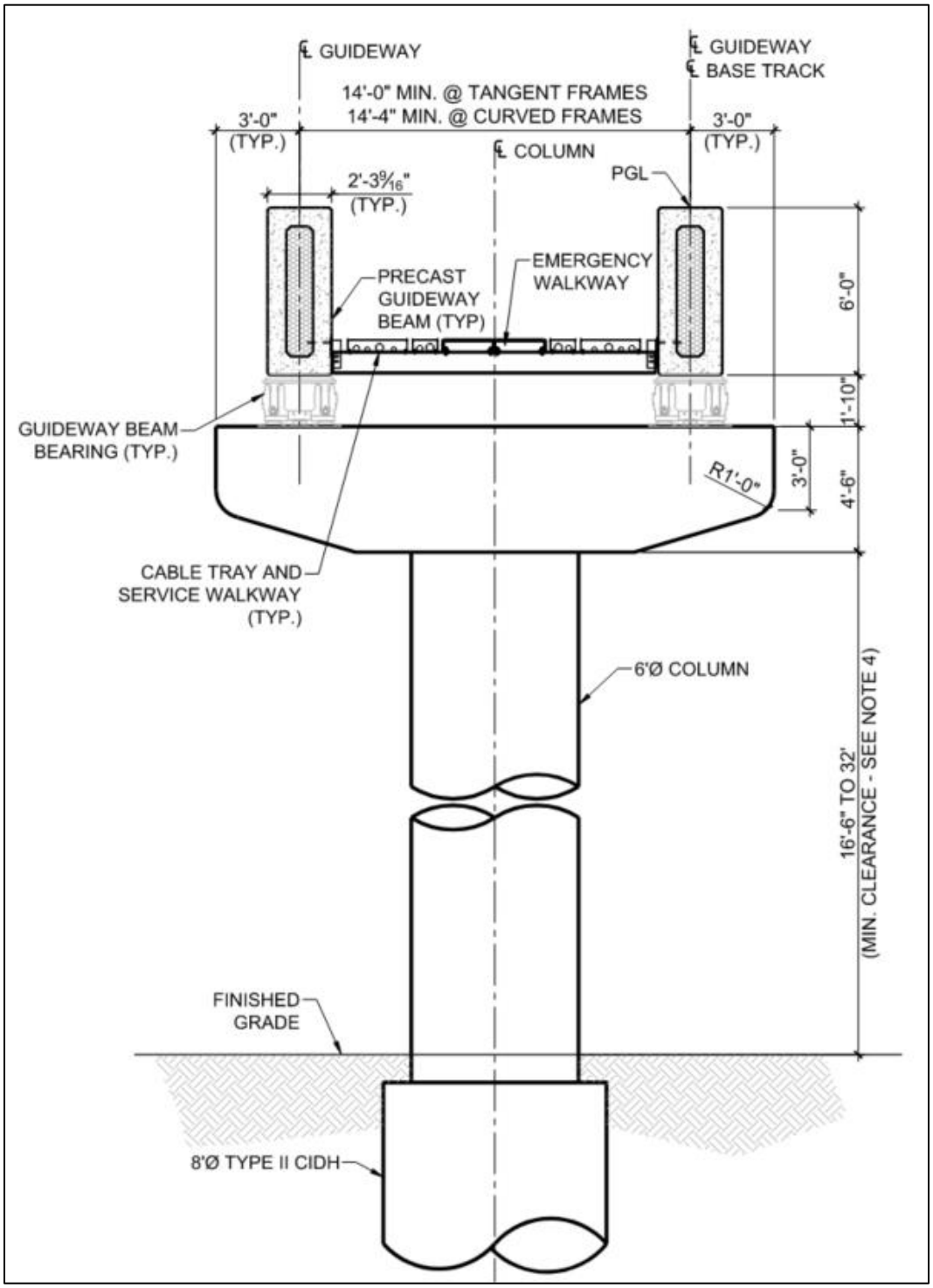
Near Greenleaf Street, the alignment would cross over the northbound freeway lanes and northbound on-ramps toward the proposed Ventura Boulevard Station on the east side of I-405. This station would be located above a transit plaza and would replace an existing segment of Dickens Street adjacent to I-405, 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

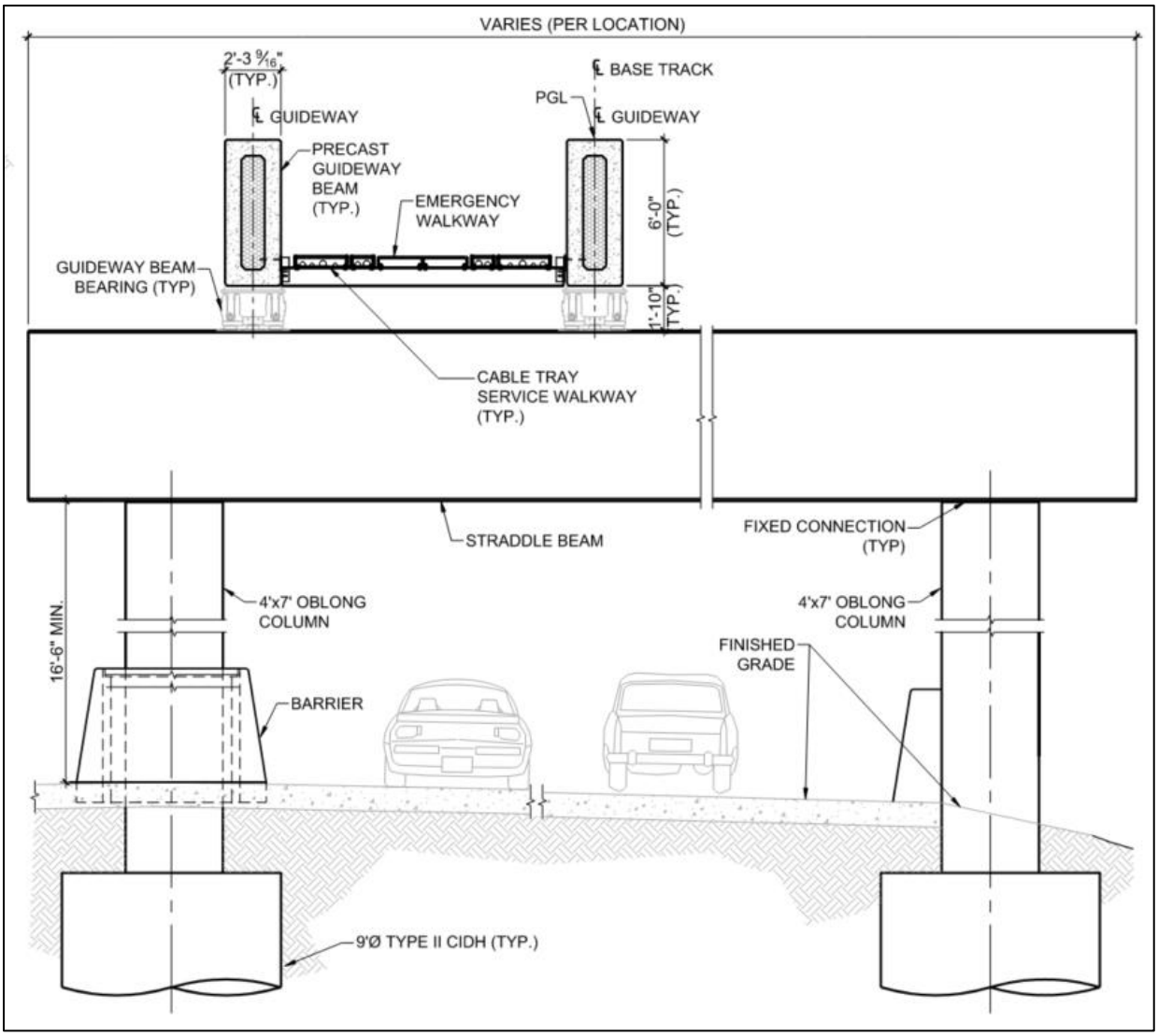


Source: LASRE, 2024

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. All stations for the MRT Alternatives are located outside the I-405 median. 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

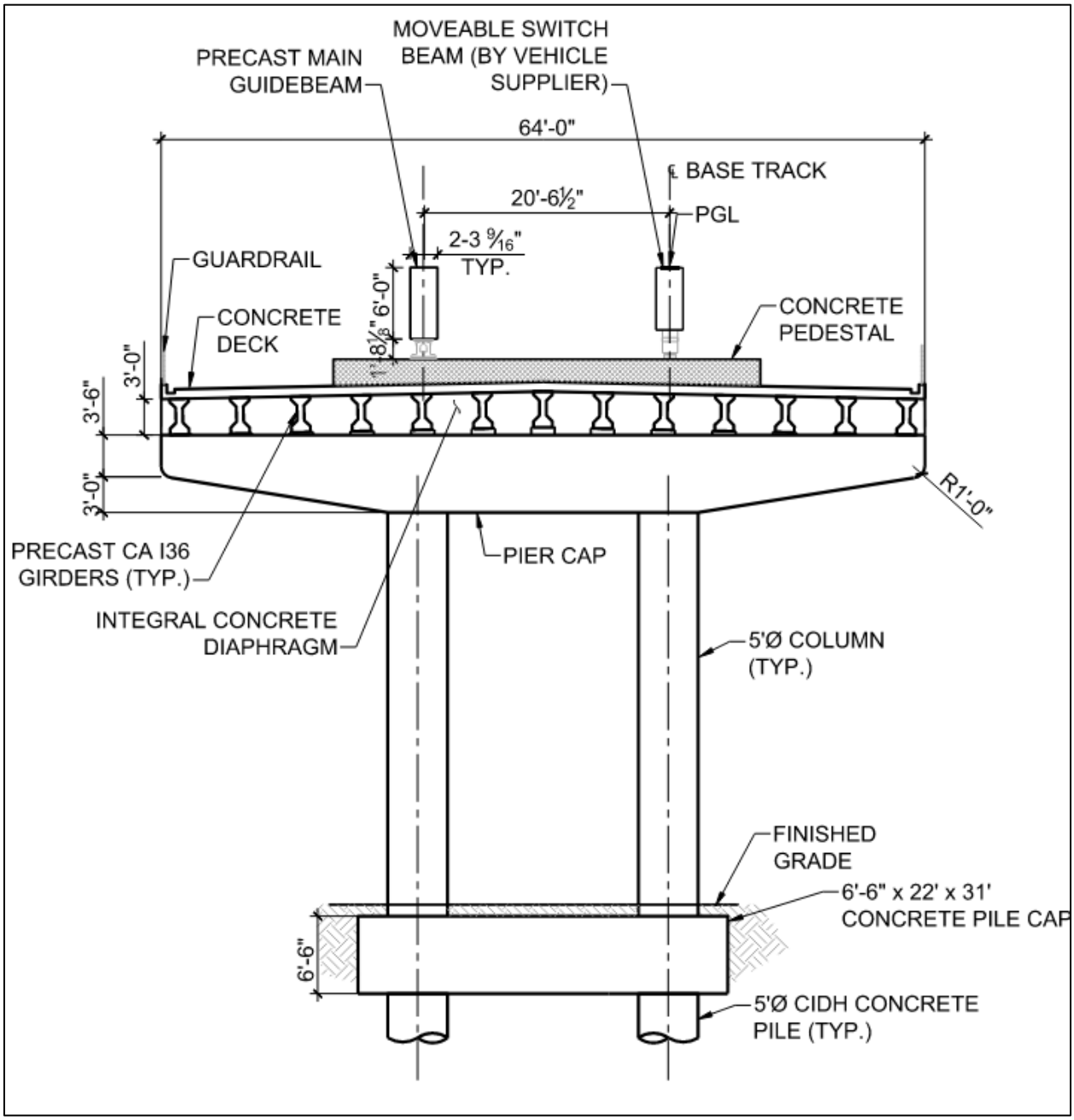
— = no data

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 Facilities

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
- Security or guard entrance

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
- Security or guard entrance

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.

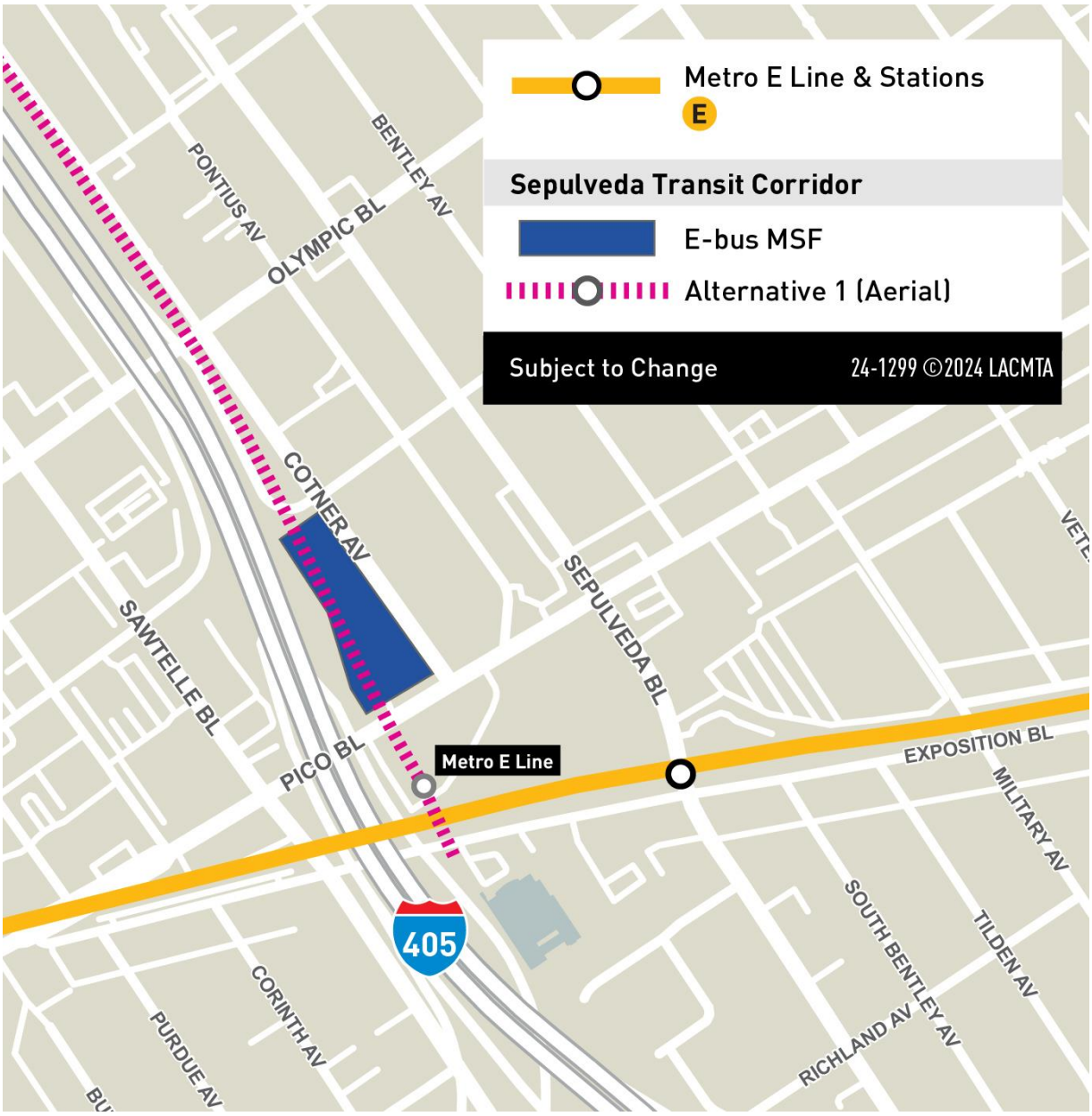
The site would include approximately 45,000 square feet of buildings and include the following facilities:

- 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

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

Location	From	To	Description of Change
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
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 will 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 will 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
- Reviewing and testing of soils for rare minerals and/or geological hazardous materials, as needed
- 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

6.2.1 Geologic Context

The Project Study Area stretches from the Valley in the north, through the Santa Monica Mountains, to the Los Angeles Basin in the south. The Resource Study Area (RSA) encompasses the diversity of geology within the Los Angeles area, with rocks and unconsolidated sediments ranging in age from the Late Jurassic Period (approximately 163.5 to 145 million years ago) to the present (Table 3-1).

The oldest rock formations in the RSA date to the late Jurassic Period and are in the southern Santa Monica Mountains. The late Jurassic Santa Monica Slate are encountered in relatively small, uplifted exposures. The Santa Monica Slate has yielded a small quantity of invertebrate fossils, largely heavily distorted by metamorphic processes (Imlay, 1963). Additionally, the Cretaceous Period Tuna Canyon deposits nearby in the Santa Monica Mountains have similarly yielded small but important invertebrate fossil collections (Saul and Alderson, 2001).

The majority of the Santa Monica Mountains within the RSA consist of uplifted Tertiary rocks of the marine Modelo (*Tmd, Tms*) and Topanga Group Formations (*Tt*), both quite fossiliferous (Campbell et al., 2014). The Modelo Formation has been correlated with the Monterey Formation using biostratigraphy (i.e., radiometric dating and age correlation of geologic units based on contained paleontological material(s) and tephrochronology [i.e., radiometric dating and age correlation of ash layers adjacent to the paleontological resources]), and dates to the upper and middle Miocene, approximately 15 to 8 million years ago (Knott et al., 2022). The formation is particularly notable for its fossil bony fish and whales but has additionally yielded significant fossil invertebrates and vertebrates (Fierstine et al., 2012).

The low-lying areas of the RSA in the Valley and the Los Angeles Basin consist of sedimentary deposits ranging from the Pleistocene to the Holocene. Surface deposits, consisting primarily of artificial fill, shallow deposits of young alluvium (*Qa, Qya*$_2$), and young alluvial fan deposits (*Qyf*$_1$*, Qyf*$_2$), are younger than 10,000 years of age and are, therefore, unlikely to contain significant fossil deposits. However, older Quaternary deposits exist on the surface in the very southern and northern-most portions of the RSA (Campbell et al., 2014). The older Quaternary alluvial deposits (*Qvoa*) have yielded significant vertebrate fossil deposits, including fossils of extinct megafauna (Bell, 2023).

The paleontological sensitivity for each of the geological formations present in the RSA is determined as follows: Young alluvium – unit 2 (*Qya*$_2$), Quaternary landslide deposits (*Qls*), and the Santa Monica Slate (*Jsm, Jsmp*) should be treated as having "No" paleontological sensitivity, with the following caveat: geologic units of metamorphic origin are generally regarded as having no paleontological sensitivity due to the extreme temperatures and pressures they have been subjected to. The Santa Monica Slate, however, contains portions of low-grade metamorphism (*Jsms*), facilitating the possibility of contained fossils, which have not been distorted enough to preclude identification. When that portion of the Santa Monica Slate (*Jsms*) is encountered, hereby considered "Unknown" paleontological sensitivity, the project paleontologist would need to determine if low-grade metamorphic conditions are present. If that is the case, that portion of the unit (*Jsms*) should be considered "Low" paleontological sensitivity and monitored accordingly (Imlay, 1963). Quaternary very old alluvium (*Qvoa*) and the Modelo Formation (*Tm*, *Tmd*, and *Tmss*) should be considered as having "High" paleontological sensitivity (SVP, 2010; Campbell et al., 2014).

6.3 Impacts Evaluation

A paleontological records search from the Natural History Museum of Los Angeles County (NHMLAC) revealed there is a fossil locality (Natural History Museum of Los Angeles County Paleontological Locality Prefix [LACM] VP 1681) recorded within the RSA. The fossil locality is located in the central portion of the RSA, just west of the I-405 Sepulveda freeway cut, adjacent to where Royal Ridge Road ends. LACM VP 1681 produced a fossil Pipefish (*Syngnathus avus*) from within the Miocene Modelo Formation. Pipefish are considered rare in the fossil record and indicators of paleoenvironmental conditions, and thus increases the scientific importance of this locality. The locality was previously sampled by paleontologists and subsequent construction activities (i.e., I-405) have effectively removed the locality, but it is still indicative of the fossiliferous nature of the Modelo Formation (SVP, 2010; Bell, 2023).

Additionally, there are 14 other fossil localities located within 5 miles of the RSA that produced fossil vertebrates and invertebrates (Table 3-2). Excavations for the construction of the monorail structures have the potential to impact paleontological resources, as detailed in Section 6.3.2. With the implementation of mitigation measures (as discussed in Section 6.4), including construction monitoring, the impact to this paleontological resource would be considered less than significant in accordance with CEQA (Scott and Springer, 2003; Bell, 2023).

6.3.1 Operational Impacts

The operation of Alternative 1 does not include activities that involve ground disturbance. Therefore, there would be no operational impacts related to paleontological resources.

6.3.2 Construction Impacts

The construction impacts to the ground surface for this Project would be involved with the access, staging, and laydown areas needed for the construction of the foundations and columns required for the monorail. These impacts include an 8-foot-wide work area required along each guideway beam, an 8-foot-wide work area required on each side of concrete straddle beam, and an 8-foot-wide work area at each column/foundation. Additionally, the construction impact areas extend along the I-405 corridor to provide construction access and staging/laydown areas within and adjacent to California Department of Transportation ROW. The construction impacts of Alternative 1 to high sensitivity formations total 90.4 acres, and low sensitivity formations total 149.4 acres.

Alternative 1 has eight proposed aerial monorail stations and three bus stops. At the monorail station in Wilshire Boulevard, there would be an electric shuttle bus that would operate on the street and connect people to the Metro D line Westwood/VA Station. Construction impacts specific to this alternative are the E-bus connection extending to the roadway limits of Wilshire and Westwood Boulevards (or Kinross Avenue) to accommodate new E-bus stops and to the limits of the Metro Division 7 property.

Most of the impacts from Alternative 1 would result from the construction of the foundation columns for the MRT alignment and the foundations needed for the aerial MRT stations, switch locations, and long-span structures. The columns involved in this alternative range from 6 feet in diameter in the main alignment with a 7-foot-diameter foundation; 4-foot to 7-foot columns with an 8-foot-wide foundation at the I-405 median; 5-foot to 8-foot columns with a 9-foot foundation at the aerial MRT stations; 5-foot-diameter column with a 6-foot foundation at the switch locations; and lastly 10-foot-diameter columns with an 11-foot-diameter foundation for the long-span structures. The CIDH method would be used during the construction of the foundations for the columns. This method does not allow for careful monitoring as it grinds sediments. Consequently, this method would cause potentially significant and

unavoidable impacts to paleontological resources when utilized in paleontologically sensitive geologic formations (Attachment 1, Figure 5). When grading and trenching activities are employed, implementation of the mitigation measures (Section 6.4) would reduce the impact to paleontological resources to less than significant.

6.3.3 Maintenance and Storage Facilities

6.3.3.1 MSF Base Design

The impacts involved with the MSF Base Design include all administrative buildings, maintenance buildings, wash facilities, drive aisles, storage tracks, and columns for the aerial MSF Base Design. The surface rocks of the proposed MSF Base Design are mapped as Qya_2 but at depth may grade into more paleontologically sensitive sediments (Pleistocene) than surface mapping indicates. Construction in the formation identified as Qya_2 could potentially cause significant impacts to paleontological resources. Implementation of Mitigation Measure (MM) GEO-6 to GEO-9 would reduce the impacts to less than significant (SVP, 2010; Bell, 2023).

6.3.3.2 MSF Design Option 1

The impacts involved with the MSF Design Option 1 include all administrative buildings, maintenance buildings, wash facilities, drive aisles, storage tracks, and columns for the aerial MSF Design Option 1. The surface rocks in the underground portions of the proposed MSF Design Option 1 are mapped as *Qya_2,* but at depth may grade into more paleontologically sensitive sediments (Pleistocene) than mapping indicates. There should be a qualified paleontologist to monitor ground disturbance when this unit is encountered (SVP, 2010; Bell, 2023). With implementation of mitigation measures in Section 6.4, impacts associated with the MSF Design Option 1 would be less than significant. Construction in the formation identified as *Qya_2* could potentially cause significant impacts to paleontological resources. Implementation of MM GEO-6 to GEO-9 would reduce the impacts to less than significant.

6.3.3.3 Electric Bus MSF

The type of buildings and uses in the electric bus MSF would not likely require deep excavation. Therefore, no impacts related to paleontological resources would occur.

6.4 Mitigation Measures

MM GEO-6: *The potential to avoid impacts to previously unrecorded paleontological resources shall be avoided by having a qualified Paleontologist or Archaeologist cross-trained in paleontology, meeting the Society of Vertebrate Paleontology Standards retained as the project paleontologist, with a minimum of a bachelor's degree (B.S./B.A.) in geology, or related discipline with an emphasis in paleontology and demonstrated experience and competence in paleontological research, fieldwork, reporting, and curation. A paleontological monitor, under the guidance of the project paleontologist, shall be present as required by the type of earth-moving activities in the Project, specifically in areas south of Ventura Boulevard that have been deemed areas of high sensitivity for paleontological resources. The monitor shall be a trained paleontological monitor with experience and knowledge of sediments, geologic formations, and the identification and treatment of fossil resources.*

MM GEO-7: *A Paleontological Resources Impact Mitigation Program (PRIMP) shall be prepared by a qualified paleontologist. The PRIMP shall include guidelines for developing and implementing mitigation efforts, including minimum requirements, general fieldwork, and laboratory methods, threshold for assessing paleontological resources, threshold for excavation and documentation of significant or unique paleontological resources, reporting requirements, considerations for the curation of recovered paleontological resources into a relevant institution, and process of documents to Metro and peer review entities.*

MM GEO-8: *The project paleontologist or paleontological monitor shall perform a Workers Environmental Awareness Program training session for each worker on the project site to familiarize the worker with the procedures in the event a paleontological resource is discovered. Workers hired after the initial Workers Environmental Awareness Program training conducted at the pre-grade meeting shall be required to take additional Workers Environmental Awareness Program training as part of their site orientation.*

MM GEO-9: *To prevent damage to unanticipated paleontological resources, a paleontological monitor shall observe ground-disturbing activities including but not limited to grading, trenching, drilling, etc. Paleontological monitoring shall start at full time for geological units deemed to have "High" paleontological sensitivity. Geological units deemed to have "Low" paleontological sensitivity shall be monitored by spot checks. No monitoring is required for geologic units identified as having "No" paleontological sensitivity. "Unknown" paleontological sensitivity is assigned to the less metamorphosed portions of the Santa Monica Slate, as detailed below.*

- *The monitor shall be empowered to temporarily halt or redirect construction efforts if paleontological resources are discovered. The paleontological monitor shall flag an area 50 feet around the discovery and notify the construction crew immediately. No further disturbance in the flagged area shall occur until the qualified paleontologist has cleared the area. In consultation with the qualified paleontologist, the monitor shall quickly assess the nature and significance of the find. If the specimen is not significant, it shall be quickly removed, and the area cleared. In the event paleontological resources are discovered and deemed by the project paleontologist to be scientifically important, the paleontological resources shall be recovered by excavation (i.e., salvage and bulk sediment sample) or immediate removal if the resource is small enough and can be removed safely in this fashion without damage to the paleontological resource. If the discovery is significant, the qualified paleontologist shall notify Metro immediately. In consultation with Metro, the qualified paleontologist shall develop a plan of mitigation, which will likely include salvage excavation and removal of the find, removal of sediment from around the specimen (in the laboratory), research to identify and categorize the find, curation of the find in a local qualified repository, and preparation of a report summarizing the find.*

- *Generally, geologic units that have endured metamorphic processes (i.e., extreme heat and pressure over long periods of time) do not contain paleontological resources. The Santa Monica Slate, originally a fossiliferous shale, has been subjected to various levels of metamorphism and thus, in areas of "low-grade metamorphism," paleontological resources may be discovered. Due to the rarity of paleontological resources dating to the Mesozoic (between approximately 65.5 to 252 million years ago) of Southern California, any such materials have high importance to the paleontology of the region. When encountered, the project paleontologist shall assess the levels of metamorphism that portion of the Santa Monica Slate has experienced. The Santa Monica Slate shall be monitored part time where the project paleontologist has determined lower levels of metamorphism have taken place and the preservation of paleontological resources is possible. If exposures of the Santa Monica Slate have been subjected to high levels of metamorphism (i.e., phyllite components of Jsmp), paleontological monitoring in that portion of the formation is not necessary.*
- *Recovered paleontological resources shall be prepared, identified to the lowest taxonomic level possible, and curated into a recognized repository (i.e., Natural History Museum of Los Angeles County). Bulk sediment samples, if collected, shall be "screen-washed" to recover the contained paleontological resources, which will then be identified to the lowest taxonomic level possible, and curated (as above). The report and all relevant field notes shall be accessioned along with the paleontological resources.*

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).

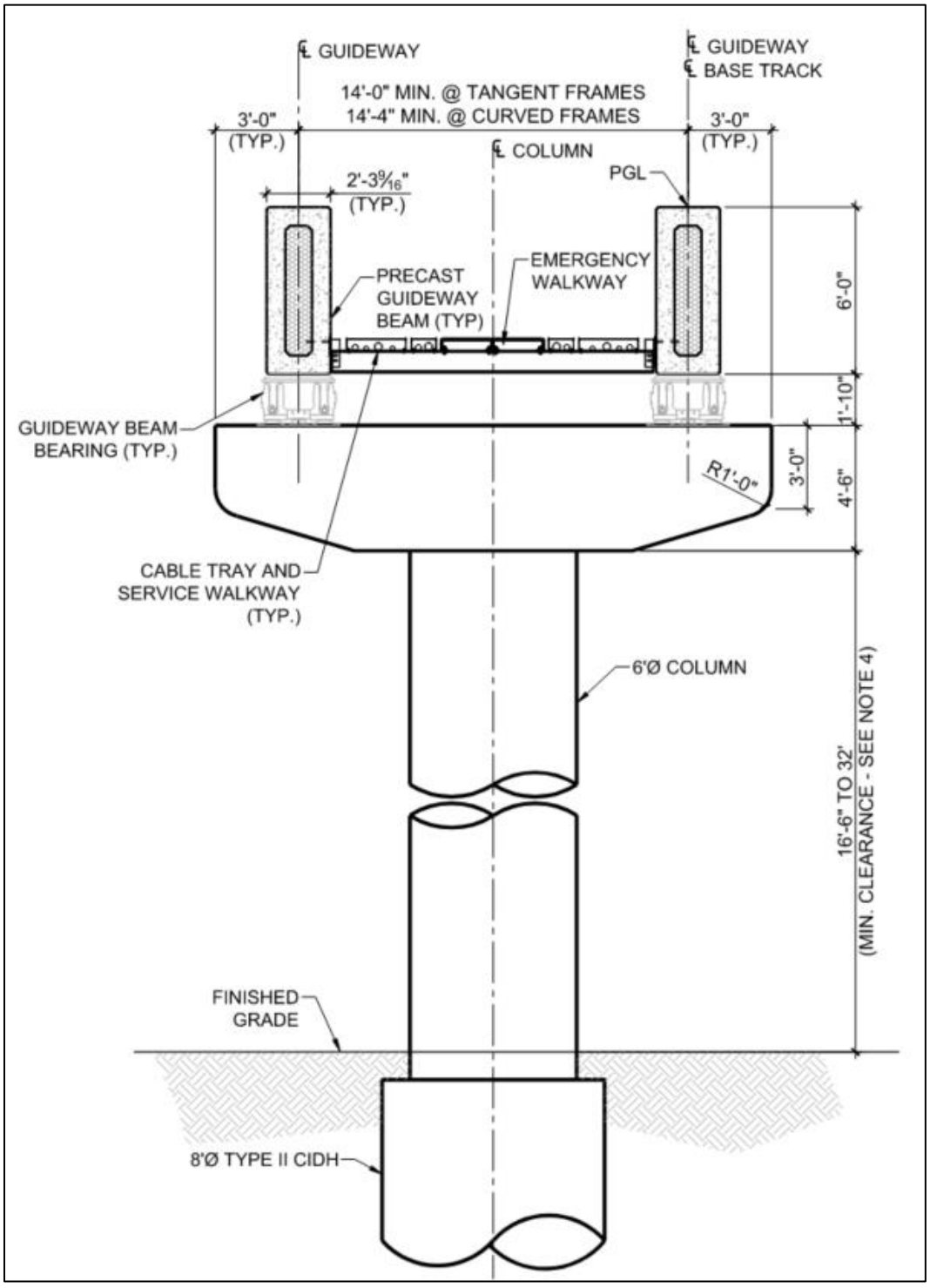
Near Greenleaf Street, the alignment would cross over the northbound freeway lanes and on-ramps toward the proposed Ventura Boulevard Station, on the east side of I-405. This station would be located above a transit plaza and replace an existing segment of Dickens Street adjacent to I-405, just south 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

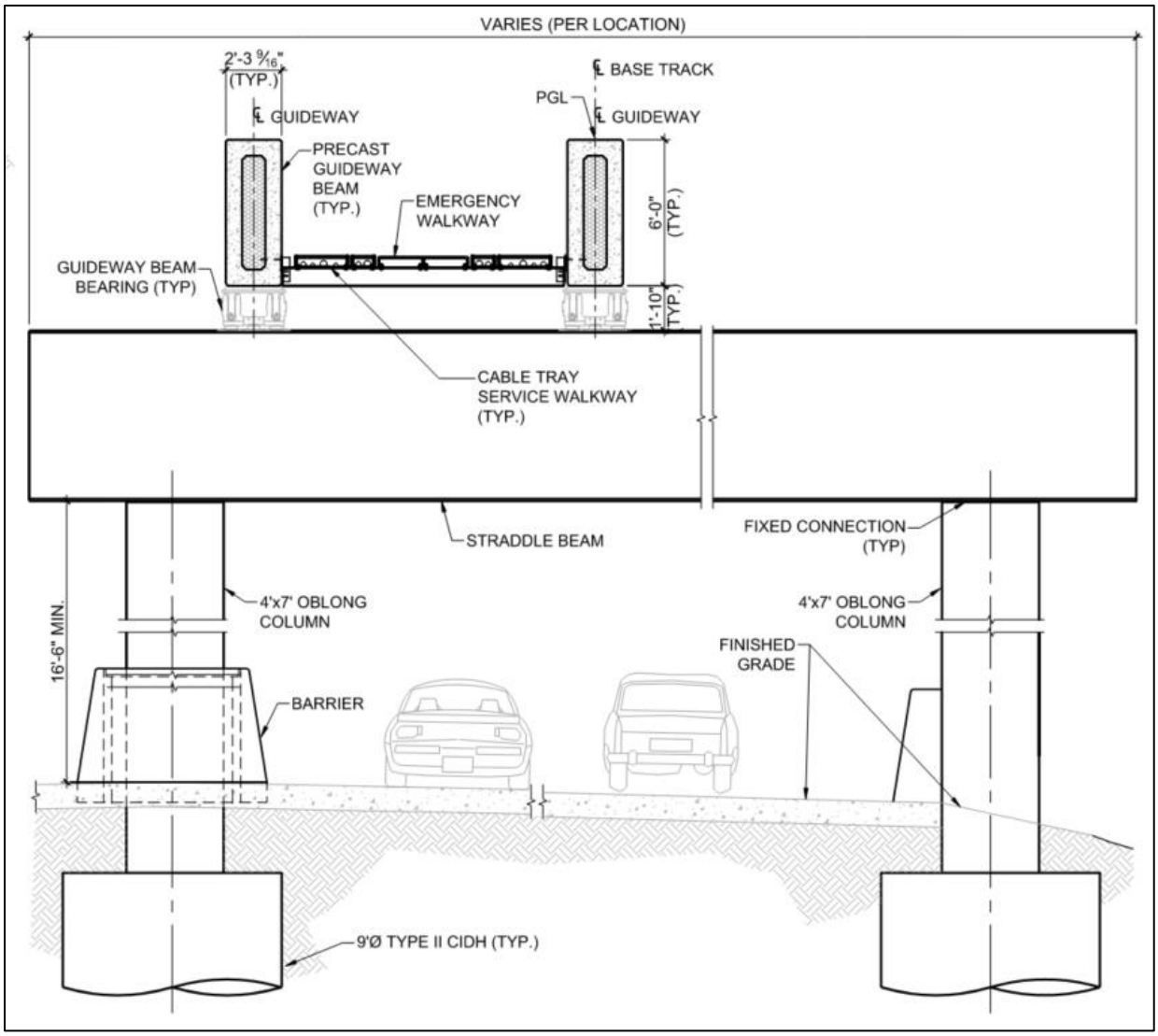


Source: LASRE, 2024

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

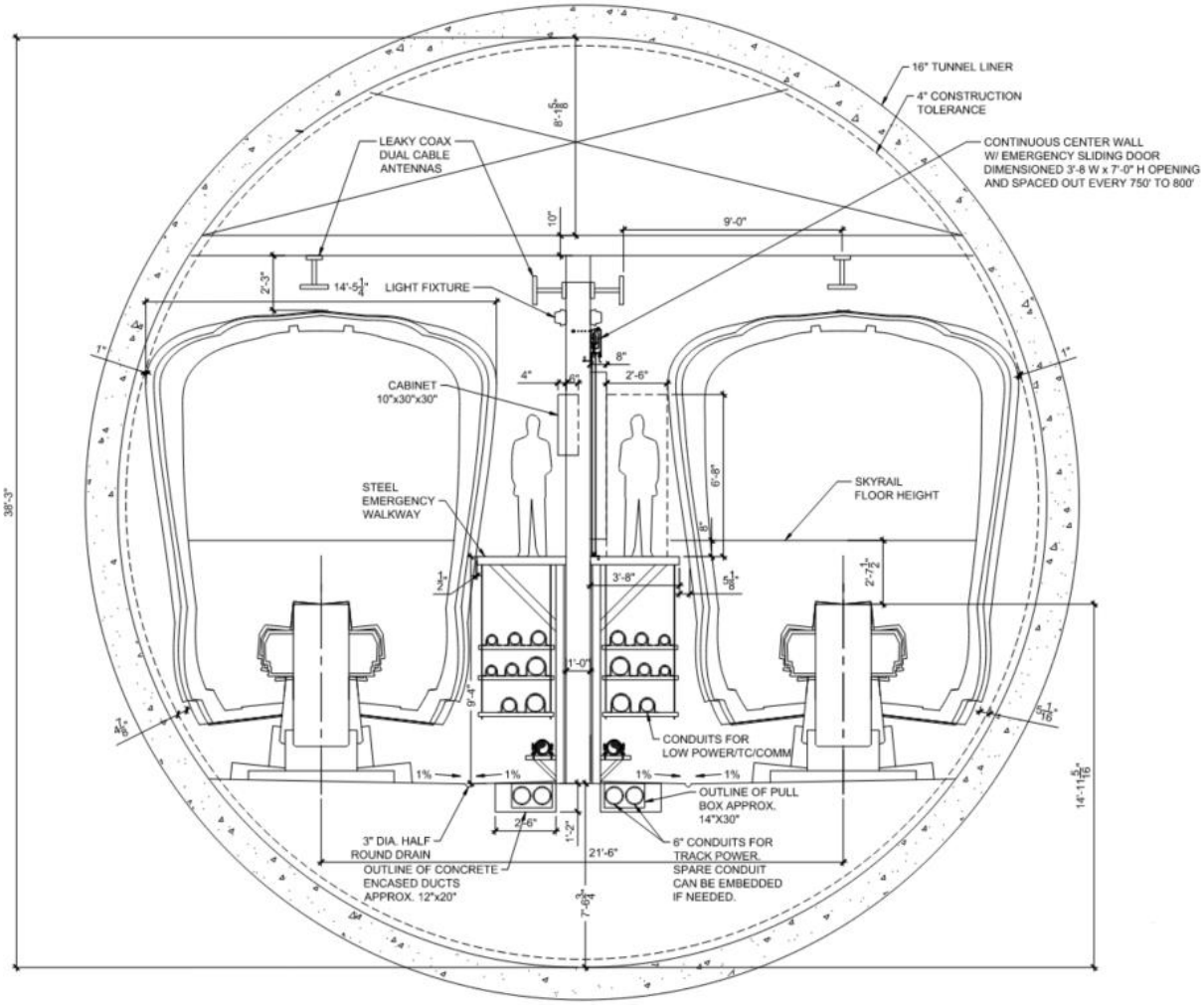


Source: LASRE, 2024

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 a 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 includes 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

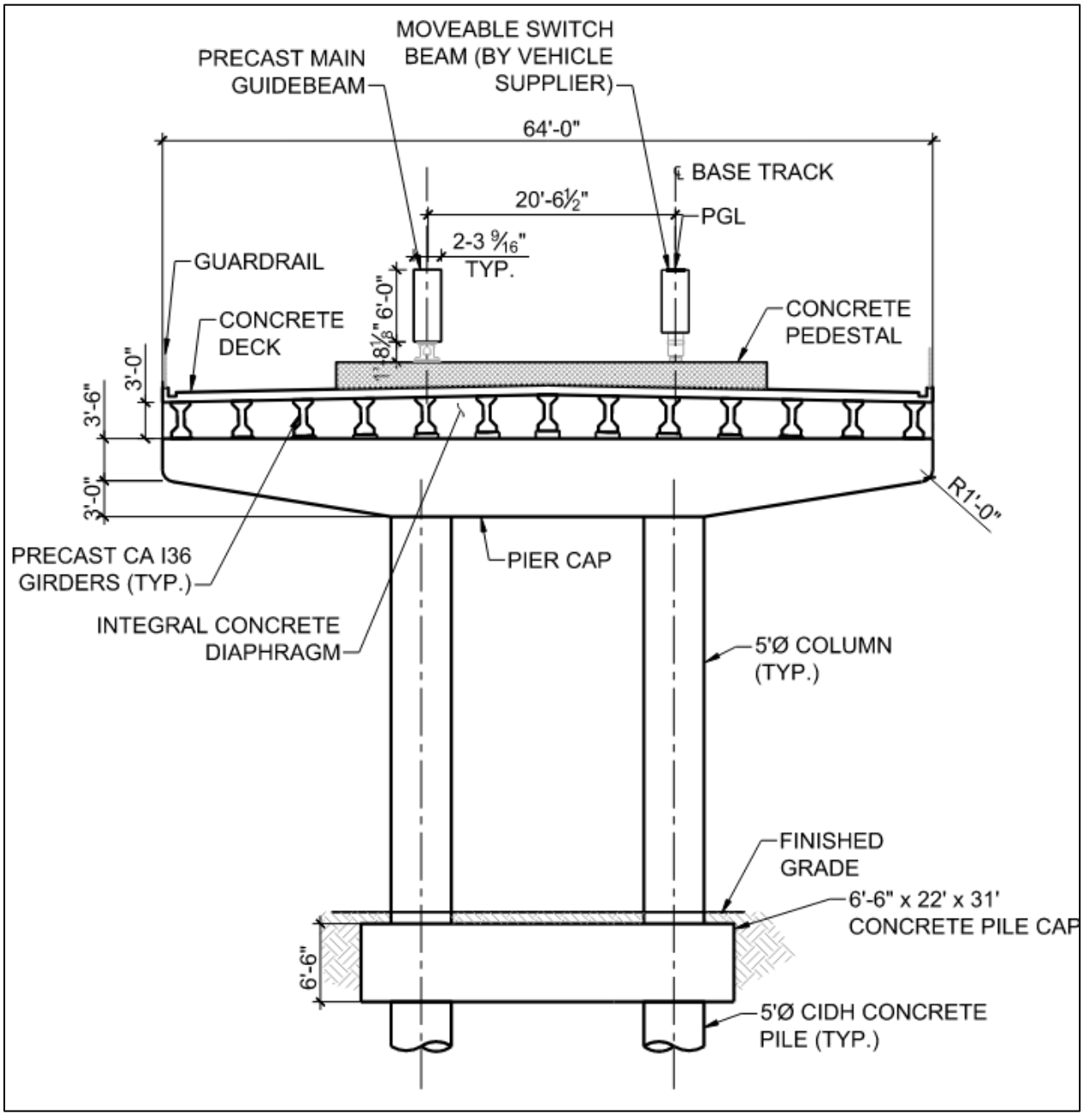
— = no data

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 Facilities

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
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 will 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 will 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

7.2.1 Geologic Context

The Project Study Area encompasses the diversity of geology within the Los Angeles area, with rocks and unconsolidated sediments ranging in age from the late Jurassic Period (approximately 163.5 to 145 million years ago) to the present (Table 3-1).

The oldest rock formations in the Project Study Area date to the late Jurassic Period and are in the southern Santa Monica Mountains. The late Jurassic Santa Monica Slate are encountered in relatively small, uplifted exposures. The Santa Monica Slate has yielded a small quantity of invertebrate fossils, largely heavily distorted by metamorphic processes (Imlay, 1963). Additionally, the Cretaceous Period Tuna Canyon deposits nearby in the Santa Monica Mountains have similarly yielded small but important invertebrate fossil collections (Saul and Alderson, 2001).

The majority of the Santa Monica Mountains within the RSA consist of uplifted Tertiary rocks of the marine Modelo Formation, and Topanga Group formations (Campbell et al., 2014). The Modelo Formation has been correlated to the Monterey Formation using biostratigraphy and tephrochronology and dates to the upper and middle Miocene, approximately 15 to 8 million years ago (Knott et al., 2022). The formation is particularly notable for its fossil bony fish and whales and has yielded significant fossil invertebrates and vertebrates (Fierstine et al., 2012).

The low-lying areas of the Project Study Area in the Valley and the Los Angeles Basin consist of depositional environments with sedimentary deposits ranging from the Pleistocene to the Holocene. Surface deposits mostly consist of artificial fill, shallow deposits of young alluvium (*Qya_2*) and young alluvial fan deposits (*Qyf_1, Qyf_2*) and are younger than 10,000 years of age and, therefore, unlikely to contain significant fossil deposits. However, older Quaternary deposits exist on the surface in the very most southern and northern portions of the Paleontological Resource Study Area (RSA) (Campbell et al., 2014). These older Quaternary deposits (*Qvoa*) have yielded significant vertebrate fossil deposits, including fossils of extinct megafauna, and depth within these units will increase the paleontological sensitivity (SVP, 2010; Bell, 2023).

The paleontological sensitivity for each of the geological formations present in the RSA is determined as follows: Young alluvium – unit 2 (*Qya_2*), Quaternary land slide deposits (*Qls*), and the Santa Monica Slate (*Jsms, Jsmp*) should be treated as having "No" paleontological sensitivity, with the following caveat: Geologic units of metamorphic origin are generally regarded as having no paleontological sensitivity due to the extreme temperatures and pressures they have been subjected to. The Santa Monica Slate, however, contains portions of low-grade metamorphism (*Jsms*), facilitating the possibility of contained fossils that have not been distorted enough to preclude identification. When the Santa Monica Slate (*Jsms, Jsmp*) is encountered, the project paleontologist would need to determine if low-grade metamorphic conditions are present, and thus has been divided according to level of metamorphism on the geologic map for this project (Attachment 1). If this is the case, that portion of the unit (*Jsms*) should be considered "Low" paleontological sensitivity and monitored accordingly (Imlay, 1963). Exposures of the Modelo Formation (*Tm*, *Tmd*, and *Tmss*) should be considered as having "High" paleontological sensitivity (SVP, 2010; Campbell et al., 2014).

7.3 Impacts Evaluation

Alternative 3 has the same footprint as Alternatives 1 and 2 just north of the Getty Center. However, the Project footprint transitions below grade just south of Wilshire Boulevard. The Project footprint

returns above grade within the I-405 Corridor just south of the proposed Getty Center Station. The Project footprint for Alternative 3 impacts the same area where Natural History Museum of Los Angeles County Paleontological Locality Prefix (LACM) VP 1681 is located. LACM VP 1681 is in the central portion of the RSA, just west of the I-405 Sepulveda freeway cut, adjacent to where Royal Ridge Road ends. A fossil Pipefish (*Syngnathus avus*) was recovered from locality LACM VP 1681. The locality was previously sampled by paleontologists in the past and subsequent construction activities (i.e., I-405) have effectively removed the locality, but it is still indicative of the fossiliferous nature of the Modelo Formation (Bell, 2023).

Additionally, there are 14 other fossil localities located within 5 miles of the proposed RSA that produced fossil vertebrates and invertebrates (Table 3-2).

With implementation of mitigation measures (Section 7.4), including construction monitoring, the impact to these paleontological resources would be considered less than significant (Scott and Springer, 2003; Bell, 2023).

7.3.1 Operational Impacts

The operation of this Alternative does not include activities that involve ground disturbance. Therefore, there would be no operational impacts related to paleontological resources.

7.3.2 Construction Impacts

All underground components of this alternative have the potential to impact paleontological resources. Deeper portions of any paleontologically sensitive unit have the potential to produce rare or scientifically important taxa (SVP, 2010).

The footprint for Alternative 3 is the same as Alternative 1 north of the Getty Center Station and south of the Wilshire Boulevard/Metro D Line Station. The portion of the Project that lies between these two stations has a 3.7-mile underground alignment and is located to the east of the I-405 corridor. The underground alignment would go north of Wilshire Boulevard, and travel underneath Westwood Village and UCLA, before returning to the I-405 corridor just south of the proposed Getty Center Station. The underground alignment would require a 43-foot-wide single bore tunnel and 28-foot-wide walkways/drive aisles flanking the tunnel. The tunnel would descend to a maximum of 440 feet below ground surface level before making its ascent to the surface. Additionally, Alternative 3 has two underground MRT stations planned, the Wilshire Boulevard/Metro D Line Station and the UCLA Gateway Station. Construction of the underground MRT stations involves MRT platforms and all vertical circulation elements required to facilitate pedestrian entrances and connections to the local roadways and Metro D Line subway station. Construction impact areas also include proposed station entrances that would include modifications to the existing surface at street level. The geologic units that would be disturbed by construction of the tunnel and two MRT stations would be Qya_2, *Tmss*, and *Tt*. The units listed are not representative of what can be encountered below the surface level. Qya_2 can vary in thickness from 20 feet to several hundred feet below the surface (Campbell et al., 2014). Additionally, it is difficult to say for certain which units lie beneath Qof_2 and Qya_2. Unit *Tmss* has a high paleontological sensitivity due to potentially preserved paleontological resources.

The subsurface area that would be disturbed under Alternative 3 would be similar to Alternative 1, and involve the access, staging, and laydown areas needed for the construction of the foundations and columns required for the monorail. These disturbed areas include an 8-foot-wide work area required along each guideway beam, an 8-foot-wide work area required on each side of concrete straddle beam, and an 8-foot-wide work area at each column/foundation. Additionally, the construction would disturb

subsurface areas that extend along the I-405 corridor to provide construction access and staging/laydown areas within and adjacent to California Department of Transportation right-of-way (ROW). Due to unknown subsurface geologic conditions with potential changes to the necessary grading, specific impacts considering excavation depths for the construction of the monorail columns are currently not known. The construction impacts of Alternative 3 to high sensitivity formations total 69.65 acres, and low sensitivity formations total 115.19 acres.

The areas of subsurface that are specific to Alternative 3 also include the staging areas and activity that would also occur at the two underground portal locations (General Services Administration property and East Side of I-405, across from Getty Center), UCLA Gateway Plaza, and within the underground easement proposed for the MRT system.

Most of the impacts from Alternative 3 would result from the construction of the foundation columns for the MRT alignment and the foundations needed for the aerial MRT stations, switch locations, and long-span structures. The columns involved in this alternative range from 6 feet in diameter in the main alignment with a 7-foot-diameter foundation; 4-foot to 7-foot columns with an 8-foot-wide foundation at the I-405 median; 5-foot to 8-foot columns with a 9-foot foundation at the aerial MRT stations; 5-foot-diameter column with a 6-foot foundation at the switch locations; and lastly 10-foot-diameter columns with an 11-foot-diameter foundation for the long span structures. The CIDH method would be used during the construction of the foundations for the columns. This method does not allow for careful monitoring as it grinds sediments during operation. Consequently, this method would cause potentially significant and unavoidable impacts to paleontological resources when utilized in paleontologically sensitive geologic formations (Attachment 1, Figure 5). When grading and trenching activities are employed, observation of the mitigation measures (Section 7.4) would reduce the impact to paleontological resources to less than significant.

7.3.2.1 Tunnel Boring

A TBM would be excavating the tunnels for the underground portion of Alternative 3. The TBM would excavate sediments to the dimensions of the finished tunnel, remove the sediments from the forward portion of the TBM via an internal conveyer belt, and erect the segmental, precast concrete tunnel liner. Therefore, the impact to paleontological resources in the tunnels would be significant and unavoidable. The operation of the TBM does not allow the monitor to view the sediments as they are being excavated or the walls of the tunnel following removal of excess sediments and prior to the installation of the tunnel's concrete liner. For these reasons, monitoring paleontological resources adjacent to the TBM is not possible. Thus, in consideration of CEQA, excavations for tunnel construction would result in significant and unavoidable impacts to paleontological resources in paleontologically sensitive geologic units (Attachment 1, Figure 5) (SVP, 2010; Scott and Springer, 2003).

When considering Quaternary aged deposits, deeper (i.e., older) portions of paleontologically sensitive geologic units are generally more sensitive from a scientific point of view. Thus, a mapped geologic unit considered low paleontological sensitivity at the surface has the potential to become more sensitive paleontologically, at depth. Excavations for launching and extracting the TBM would occur at points along the ROW. Therefore, the impact to paleontological resources at TBM launching and extracting sites would be less than significant. When excavations such as these take place in paleontologically sensitive units (Attachment 1, Figure 4), monitoring shall be present to reduce the impact to paleontological resources to less than significant (SVP, 2010; Scott and Springer, 2003).

7.3.3 Maintenance and Storage Facilities

7.3.3.1 MSF Base Design

Subsurface disturbance that would occur under Alternative 3 would be at the locations of all administrative buildings, maintenance buildings, wash facilities, drive aisles, and storage tracks. The surface rocks in the underground portions of the proposed MSF Base Design are mapped as Qya_2 but may be more paleontologically sensitive (older) than indicated, at depth. This impact would be significant and unavoidable; therefore, mitigation measures are required to ensure that a qualified paleontologist is present to monitor excavation activities. There should be a qualified paleontologist to monitor ground disturbance when this unit is encountered (SVP, 2010; Bell, 2023). With implementation of mitigation measures in Section 7.4, impacts associated with the MSF Base Design would be less than significant.

7.3.3.2 MSF Design Option 1

The impacts involved with the MSF Design Option 1 include all administrative buildings, maintenance buildings, wash facilities, drive aisles, and storage tracks. The surface rocks in the underground portions of the proposed MSF Design Option 1 are mapped as Qya_2 but may be more paleontologically sensitive (older) than indicated, at depth. There should be a qualified paleontologist to monitor ground disturbance when this unit is encountered (SVP, 2010; Bell, 2023). With implementation of mitigation measures in Section 7.4, impacts associated with the MSF Design Option 1 would be less than significant.

7.4 Mitigation Measures

MM GEO-6: *The potential to avoid impacts to previously unrecorded paleontological resources shall be avoided by having a qualified Paleontologist or Archaeologist cross-trained in paleontology, meeting the Society of Vertebrate Paleontology Standards retained as the project paleontologist, with a minimum of a bachelor's degree (B.S./B.A.) in geology, or related discipline with an emphasis in paleontology and demonstrated experience and competence in paleontological research, fieldwork, reporting, and curation. A paleontological monitor, under the guidance of the project paleontologist, shall be present as required by the type of earth-moving activities in the Project, specifically in areas south of Ventura Boulevard that have been deemed areas of high sensitivity for paleontological resources. The monitor shall be a trained paleontological monitor with experience and knowledge of sediments, geologic formations, and the identification and treatment of fossil resources.*

MM GEO-7: *A Paleontological Resources Impact Mitigation Program (PRIMP) shall be prepared by a qualified paleontologist. The PRIMP shall include guidelines for developing and implementing mitigation efforts, including minimum requirements, general fieldwork, and laboratory methods, threshold for assessing paleontological resources, threshold for excavation and documentation of significant or unique paleontological resources, reporting requirements, considerations for the curation of recovered paleontological resources into a relevant institution, and process of documents to Metro and peer review entities.*

MM GEO-8: *The project paleontologist or paleontological monitor shall perform a Workers Environmental Awareness Program training session for each worker on the project site to familiarize the worker with the procedures in the event a paleontological resource is discovered. Workers hired after the initial Workers Environmental Awareness Program training conducted at the pre-grade meeting shall be required to take additional Workers Environmental Awareness Program training as part of their site orientation.*

MM GEO-9: *To prevent damage to unanticipated paleontological resources, a paleontological monitor shall observe ground-disturbing activities including but not limited to grading, trenching, drilling, etc. Paleontological monitoring shall start at full time for geological units deemed to have "High" paleontological sensitivity. Geological units deemed to have "Low" paleontological sensitivity shall be monitored by spot checks. No monitoring is required for geologic units identified as having "No" paleontological sensitivity. "Unknown" paleontological sensitivity is assigned to the less metamorphosed portions of the Santa Monica Slate, as detailed below.*

- *The monitor shall be empowered to temporarily halt or redirect construction efforts if paleontological resources are discovered. The paleontological monitor shall flag an area 50 feet around the discovery and notify the construction crew immediately. No further disturbance in the flagged area shall occur until the qualified paleontologist has cleared the area. In consultation with the qualified paleontologist, the monitor shall quickly assess the nature and significance of the find. If the specimen is not significant, it shall be quickly removed, and the area cleared. In the event paleontological resources are discovered and deemed by the project paleontologist to be scientifically important, the paleontological resources shall be recovered by excavation (i.e., salvage and bulk sediment sample) or immediate removal if the resource is small enough and can be removed safely in this fashion without damage to the paleontological resource. If the discovery is significant, the qualified paleontologist shall notify Metro immediately. In consultation with Metro, the qualified paleontologist shall develop a plan of mitigation, which will likely include salvage excavation and removal of the find, removal of sediment from around the specimen (in the laboratory), research to identify and categorize the find, curation of the find in a local qualified repository, and preparation of a report summarizing the find.*
- *Generally, geologic units that have endured metamorphic processes (i.e., extreme heat and pressure over long periods of time) do not contain paleontological resources. The Santa Monica Slate, originally a fossiliferous shale, has been subjected to various levels of metamorphism and thus, in areas of "low-grade metamorphism," paleontological resources may be discovered. Due to the rarity of paleontological resources dating to the Mesozoic (between approximately 65.5 to 252 million years ago) of Southern California, any such materials have high importance to the paleontology of the region. When encountered, the project paleontologist shall assess the levels of metamorphism that portion of the Santa Monica Slate has experienced. The Santa Monica Slate shall be monitored part time where the project paleontologist has determined lower levels of metamorphism have taken place and the preservation of*

paleontological resources is possible. If exposures of the Santa Monica Slate have been subjected to high levels of metamorphism (i.e., phyllite components of Jsmp), paleontological monitoring in that portion of the formation is not necessary.

- *Recovered paleontological resources shall be prepared, identified to the lowest taxonomic level possible, and curated into a recognized repository (i.e., Natural History Museum of Los Angeles County). Bulk sediment samples, if collected, shall be "screen-washed" to recover the contained paleontological resources, which will then be identified to the lowest taxonomic level possible, and curated (as above). The report and all relevant field notes shall be accessioned along with the paleontological resources.*

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

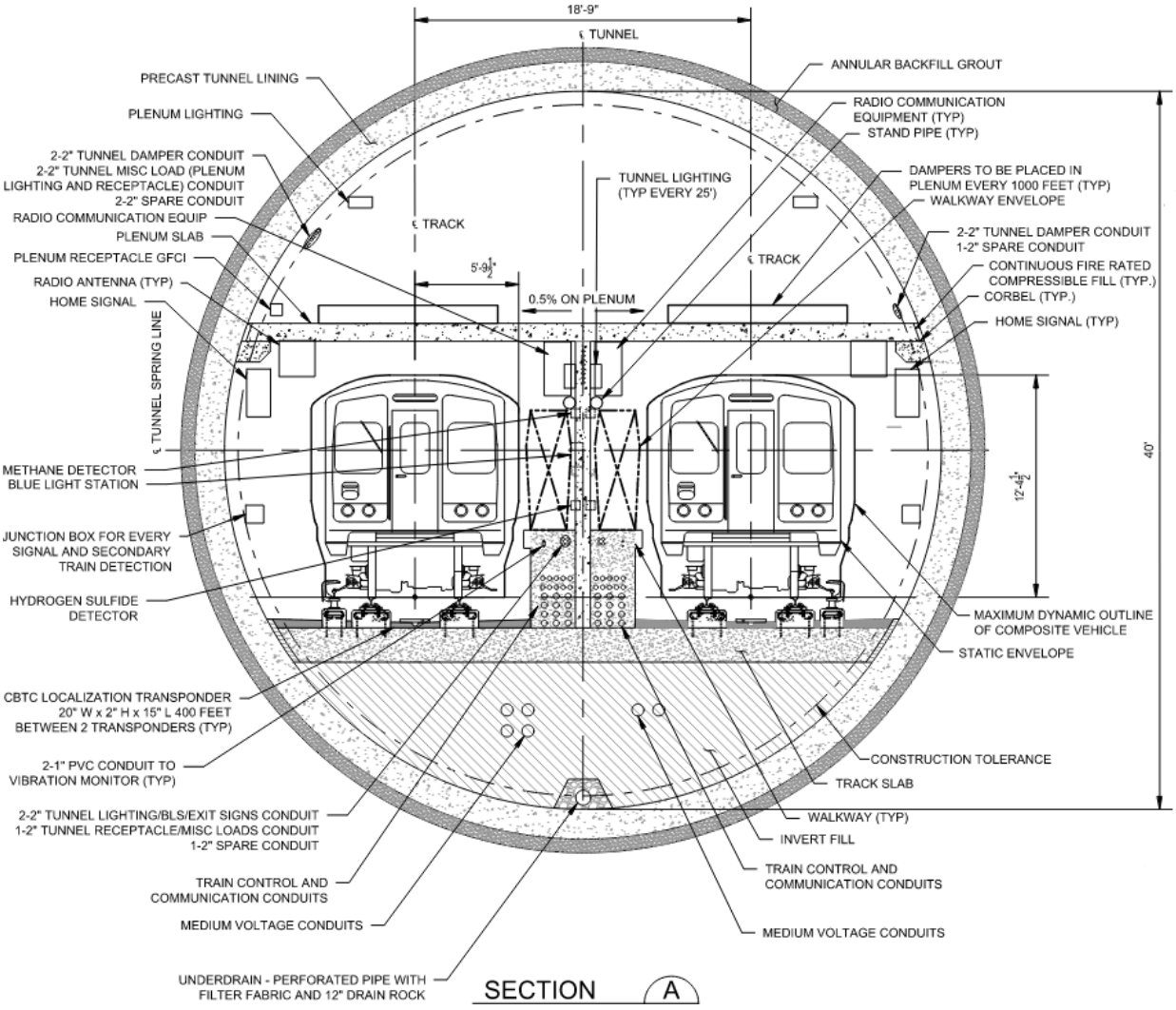
Station located over Dickens Street, immediately west of the Sepulveda Boulevard and Dickens Street intersection. North of the station, the aerial guideway would transition to the center median of Sepulveda Boulevard. The aerial guideway would continue north on Sepulveda Boulevard and cross over U.S. 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

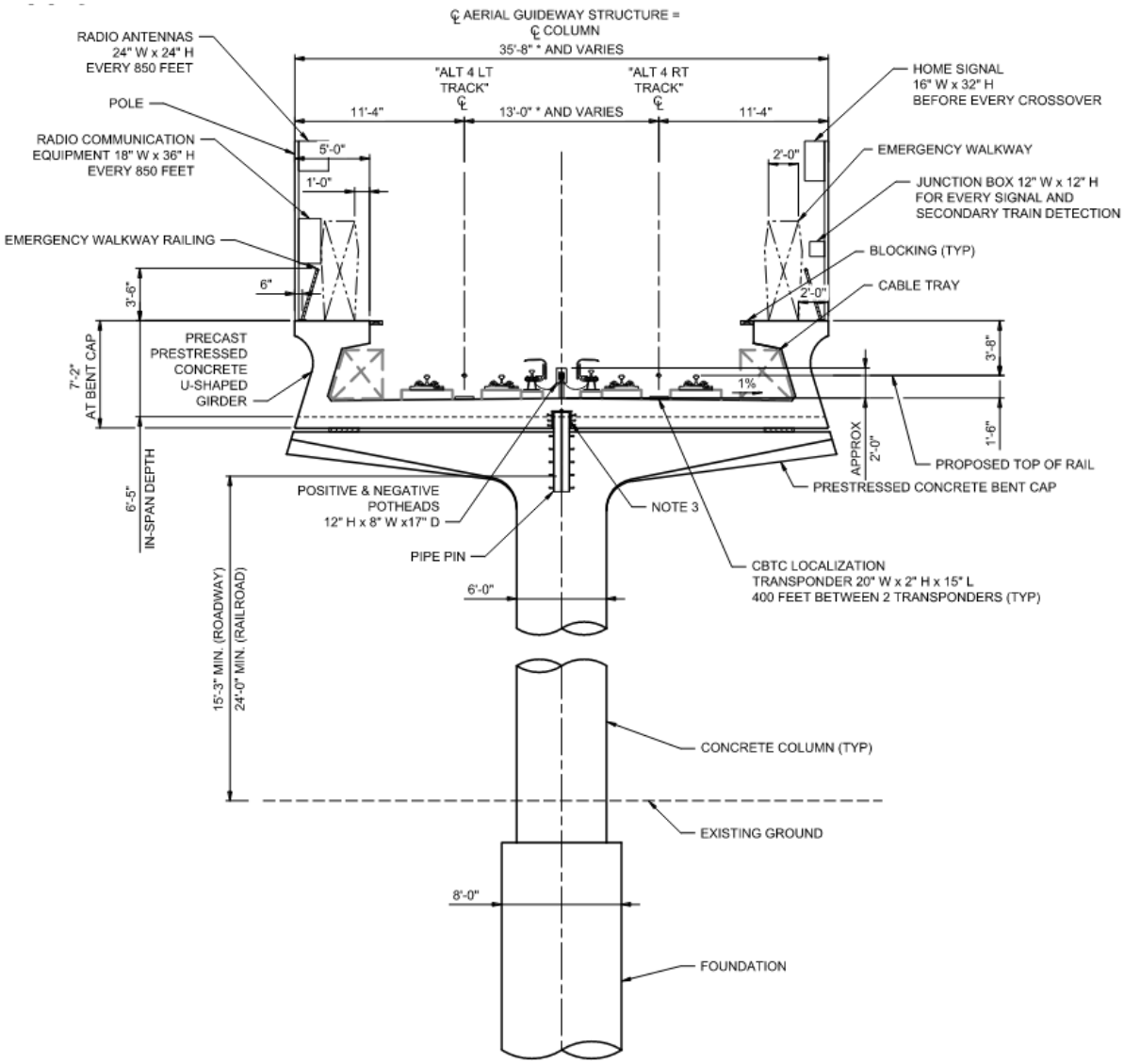


Source: STCP, 2024

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 aerial guideway 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.

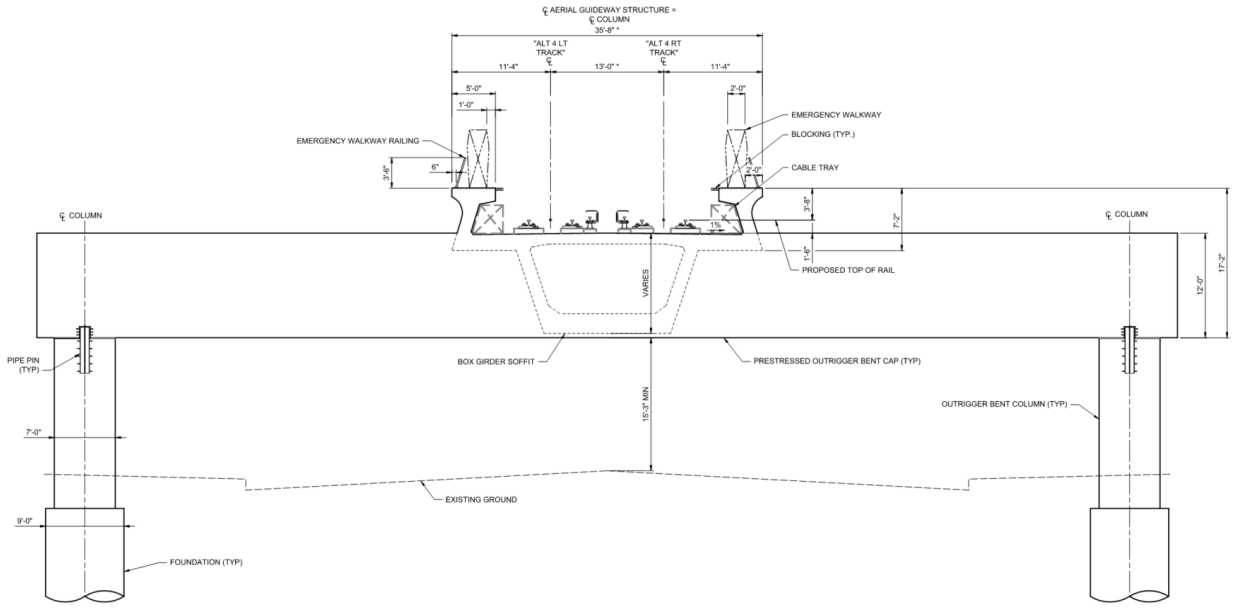
Figure 8-3. Typical Aerial Guideway Cross-Section



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.

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.

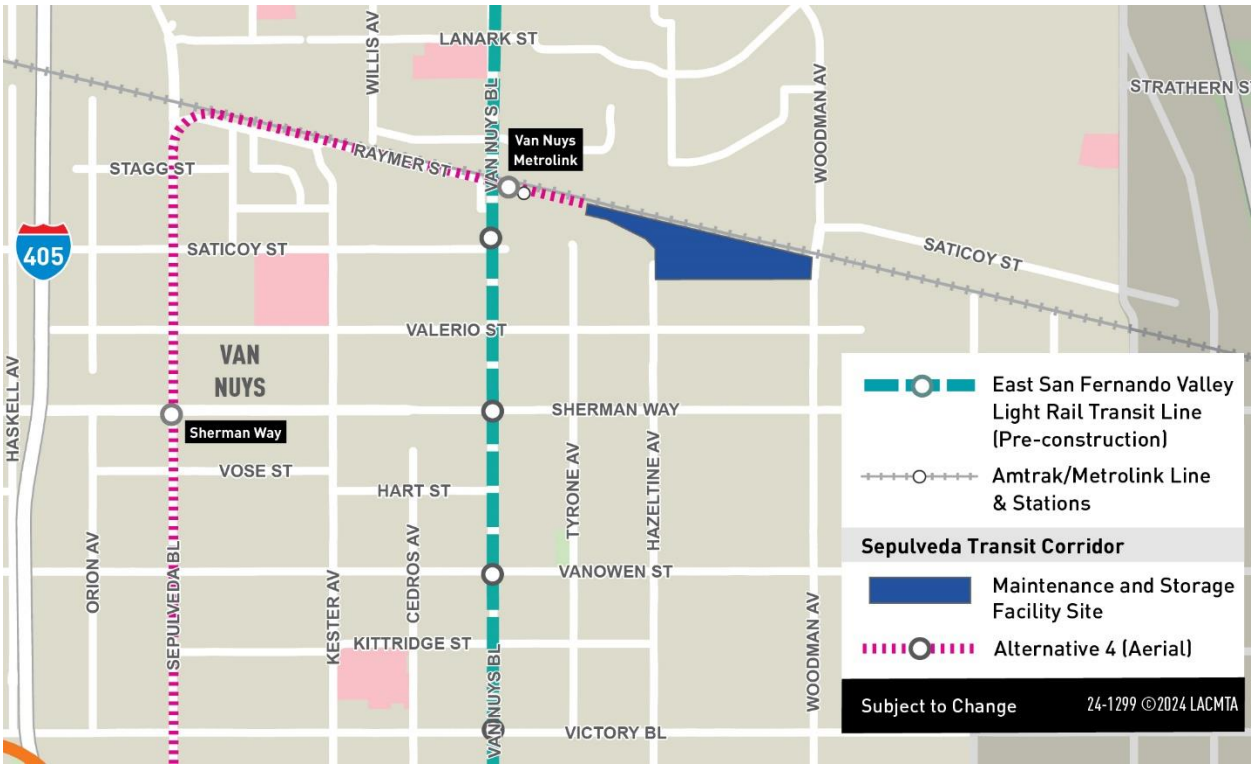
The site would include the following facilities:

- 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

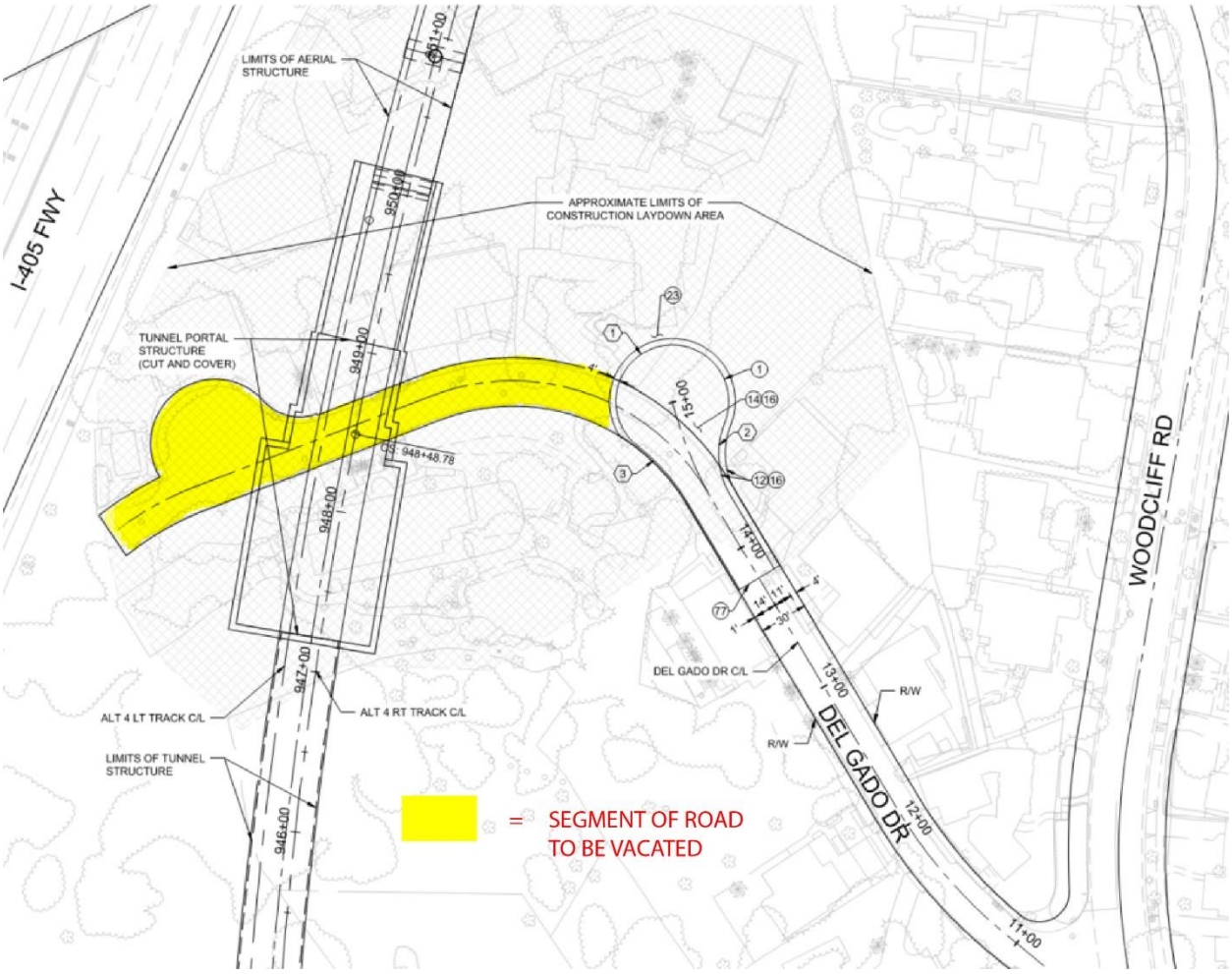
Location	From	To	Description of Change
Del Gado Drive	Woodcliff Road	Not Applicable	Vacation of approximately 325 feet of Del Gado Drive east of I-405 to accommodate tunnel portal
Sepulveda Boulevard	Ventura Boulevard	Raymer Street	Construction of raised median and removal of all on-street parking on 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	Keswick Street	Reconstruction resulting in narrowing of width and removal of parking on the westbound side of the street 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 stand-alone 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 will 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

8.2.1 Geologic Context

The records search found the project footprint for Alternative 4 is mapped over the location where the locality Natural History Museum of Los Angeles County Paleontological Locality Prefix (LACM) VP 1894 is located. LACM VP 1894 is 0.25 mile south of the intersection of Sumac Drive and Beverly Glen Boulevard, on the west side of Beverly Glen Canyon. LACM VP 1894 produced a fossil bony fish (Osteichthyes) from within the Modelo Formation (Bell, 2023).

The oldest rock formations in the Project Study Area date to the late Jurassic Period and are in the southern Santa Monica Mountains. The late Jurassic Santa Monica Slate are encountered in relatively small, uplifted exposures. The Santa Monica Slate has yielded a small quantity of invertebrate fossils, largely heavily distorted by metamorphic processes (Imlay, 1963). Additionally, the Cretaceous Period Tuna Canyon deposits nearby in the Santa Monica Mountains have similarly yielded small but important invertebrate fossil collections (Saul and Alderson, 2001).

The majority of the Santa Monica Mountains within the Project Study Area consist of uplifted Tertiary rocks of the marine Modelo Formation and Topanga Group Formations (Campbell et al., 2014) The Modelo Formation has been correlated to the Monterey Formation using biostratigraphy and tephrochronology and dates to the upper and middle Miocene, approximately 15 to 8 million years ago (Knott et al., 2022). The formation is particularly notable for its fossil bony fish and whales and has yielded significant fossil invertebrates and vertebrates (Fierstine et al., 2012).

The low-lying areas of the Study Area in the Valley and the Los Angeles Basin consist of depositional environments with sedimentary deposits ranging from the Pleistocene to the Holocene. Surface deposits mostly consist of artificial fill, shallow deposits of young alluvium (*Qa*, Qya_2) and young alluvial fan deposits (Qyf_1, Qyf_2) and are younger than 10,000 years of age and, therefore, unlikely to contain significant fossil deposits. However, older Quaternary deposits exist on surface in the very most southern and northern portions of the Resource Study Area (RSA) (Campbell et al., 2014). These older Quaternary deposits (*Qom* and *Qvoa*) have yielded significant vertebrate fossil deposits, including fossils of extinct megafauna (Bell, 2023).

The paleontological sensitivity for each of the geologic formations present in the RSA is determined as follows: Young alluvium – unit 2 (Qya2), Quaternary land slide deposits (Qls), and the Santa Monica Slate – Phyllite (Jsmp) should be treated as having “No” paleontological sensitivity, with the following caveat: geologic units of metamorphic origin are generally regarded as having no paleontological sensitivity due

to the extreme temperatures and pressures they have been subjected to. The Santa Monica Slate, however, contains portions of low-grade metamorphism (Jsms), facilitating the possibility of contained fossils that have not been distorted enough to preclude identification. When the Santa Monica Slate (Jsms) is encountered, the project paleontologist would need to determine if low-grade metamorphic conditions are present, and thus the Jsms has been divided into two sub-units according to level of metamorphism on the geologic map for this alternative (Attachment 1). If that is the case, that portion of the unit (Jsmp) should be considered "Low" paleontological sensitivity and monitored accordingly (Imlay, 1963). Quaternary older shallow marine deposits (Qom), Quaternary very old alluvium (Qvoa), and the Modelo Formation (Tm, Tmd, and Tmss) should be considered as having "High" paleontological sensitivity (SVP, 2010; Campbell et al., 2014; Bell, 2023).

8.3 Impact Evaluation

A paleontological records search from the Natural History Museum of Los Angeles County (NHMLAC) revealed no fossil locality located directly within the RSA. However, the paleontological records search from NHMLAC has revealed that there are 14 fossil localities located within 5 miles of the proposed RSA that produced fossil vertebrates and invertebrates in similar geologic units found within the project footprint (Table 3-2). With implementation of mitigation measures (Section 8.4), including construction monitoring, the impact to these paleontological resources would be considered less than significant under the California Environmental Quality Act (CEQA) (Scott and Springer, 2003; Bell, 2023).

8.3.1 Operational Impacts

The operation of Alternative 4 does not include activities that involve ground disturbance. Therefore, there would be no operational impacts related to paleontological resources.

8.3.2 Construction Impacts

All underground components of this alternative have the potential to impact paleontological resources. Deeper portions of any paleontologically sensitive unit have the potential to produce rare or scientifically important taxa (SVP, 2010).

Alternative 4 involves a heavy rail system. Alternative 4 has more than half of the rail it proposes to be located under the ground surface. The proposed tunnel is going to be nearly 9 miles long and begin in a tunnel that is just east of Sepulveda Boulevard and south of National Boulevard; it would have four underground stations and transition from a tunnel to an elevated guideway that goes from Sepulveda Boulevard until Raymer Street, where it turns southeast and runs along the south side of the Amtrak/Metrolink corridor to Van Nuys Boulevard. The surface sediments that the elevated guideway overlie are mapped as *Qa*, *Qyf$_1$*, *Qyf$_2$*. However, these units are not representative of what can be encountered below the surface level. *Qa*, *Qyf$_1$*, and *Qyf$_2$* vary in thickness from 20 feet to several hundred feet below the surface (Campbell et al., 2014).

It is difficult to say for certain which units lie beneath these surface sediments. The areas where the heavy rail transitions to a tunnel would have a depth that would vary from 80 to 100 feet below ground surface. The sediments mapped at the surface of where the tunnel system would go for Alternative 4 are mapped as *Qya$_2$*, *Tm*, *Tmss*, *Tmd*, *Jsms*, *Jsm*, and *Jsmp*. As previously stated, knowing what is at depth is difficult to discern using only surface data. Geologic units such as the Santa Monica Slate (*Jsms*) do not have any paleontological sensitivity to preserve fossil material. Santa Monica Slate is a geologic unit comprised of metamorphic rock, which undergoes intense pressure and temperature limiting fossil preservation potential. This metamorphic process usually destroys and deforms any fossil material that

could have been located within, but due to the relatively low grade of metamorphism, enough relevant features of the fossils were preserved (Imlay, 1963). Additionally, The Quaternary young alluvium (*Qya*$_2$) has a low sensitivity due to limited potential for preserving fossil material, as this unit is too young to have preserved any significant fossil material. The Modelo Formation labelled *Tm*, *Tmss*, and *Tmd* all have a high sensitivity for preserving fossil material due to their age, and the fossil localities found within the same map units nearby (SVP, 2010; Bell, 2023). The construction impacts of Alternative 4 to high sensitivity formations totals 69.65 acres, and low sensitivity formations totals 115.19 acres.

Possible construction impacts involved with Alternative 4 would all be a result of access, staging, and lay down areas that would be required for placing the heavy rail track and excavating the tunnel. The CIDH method would be used during the construction of the foundations for the columns. This method does not allow for careful monitoring, as it grinds the soil. Consequently, this method would cause potentially significant and unavoidable impacts to paleontological resources when utilized in paleontologically sensitive geologic formations (Attachment 1, Figure 5). Additionally, there would also be significant impacts to surrounding sediments for staging areas and access pathways for all four of the underground stations that are planned for this alternative (Metro E Line/Sepulveda, Santa Monica Boulevard, Wilshire Boulevard/Metro D Line, UCLA Gateway Plaza).

8.3.2.1 Tunnel Boring

An automated TBM would be excavating the tunnels for the underground portion of Alternative 4. The TBM would excavate sediments to the dimensions of the finished tunnel, remove the sediments from the forward portion of the TBM via an internal conveyer belt, and erect the segmental, precast concrete tunnel liner. Therefore, the impact to paleontological resources in the tunnels would be significant and unavoidable. The operation of the TBM does not allow the monitor to view the sediments as they are being excavated, or the walls of the tunnel following removal of excess sediments and prior to the installation of the tunnel's concrete liner. For these reasons, monitoring paleontological resources adjacent to the TBM is not possible. Thus, in consideration of CEQA, excavations for tunnel construction would result in significant and unavoidable impacts to paleontological resources in paleontologically sensitive geologic units (Attachment 1, Figure 5; Project Paleontological Sensitivity) (SVP, 2010; Scott and Springer, 2003).

When considering Quaternary aged deposits, deeper (i.e., older) portions of paleontologically sensitive geologic units are generally more sensitive from a scientific point of view. Thus, a mapped geologic unit considered low paleontological sensitivity at the surface has the potential to become more sensitive paleontologically at depth. Therefore, the impact to paleontological resources at TBM launching and extracting sites can be mitigated to less than significant (Attachment 1, Figure 5). When excavations such as these take place in paleontologically sensitive units, monitoring shall be present to reduce the impact to paleontological resources to less than significant (SVP, 2010; Scott and Springer, 2003).

8.3.3 Maintenance and Storage Facilities

The impacts involved with the MSF include all administrative buildings, maintenance buildings, wash facilities, drive aisles, and storage tracks. The surface rocks in the underground portions of the proposed MSF are mapped as *Qya*$_2$ but may be more paleontologically sensitive (older) than indicated, at depth. There should be a qualified paleontologist to monitor ground disturbance when this unit is encountered (SVP, 2010; Bell, 2023). With implementation of mitigation measures in Section 8.4, impacts associated with the MSF would be less than significant.

8.4 Mitigation Measures

MM GEO-6: *The potential to avoid impacts to previously unrecorded paleontological resources shall be avoided by having a qualified Paleontologist or Archaeologist cross-trained in paleontology, meeting the Society of Vertebrate Paleontology Standards retained as the project paleontologist, with a minimum of a bachelor's degree (B.S./B.A.) in geology, or related discipline with an emphasis in paleontology and demonstrated experience and competence in paleontological research, fieldwork, reporting, and curation. A paleontological monitor, under the guidance of the project paleontologist, shall be present as required by the type of earth-moving activities in the Project, specifically in areas south of Ventura Boulevard that have been deemed areas of high sensitivity for paleontological resources. The monitor shall be a trained paleontological monitor with experience and knowledge of sediments, geologic formations, and the identification and treatment of fossil resources.*

MM GEO-7: *A Paleontological Resources Impact Mitigation Program (PRIMP) shall be prepared by a qualified paleontologist. The PRIMP shall include guidelines for developing and implementing mitigation efforts, including minimum requirements, general fieldwork, and laboratory methods, threshold for assessing paleontological resources, threshold for excavation and documentation of significant or unique paleontological resources, reporting requirements, considerations for the curation of recovered paleontological resources into a relevant institution, and process of documents to Metro and peer review entities.*

MM GEO-8: *The project paleontologist or paleontological monitor shall perform a Workers Environmental Awareness Program training session for each worker on the project site to familiarize the worker with the procedures in the event a paleontological resource is discovered. Workers hired after the initial Workers Environmental Awareness Program training conducted at the pre-grade meeting shall be required to take additional Workers Environmental Awareness Program training as part of their site orientation.*

MM GEO-9: *To prevent damage to unanticipated paleontological resources, a paleontological monitor shall observe ground-disturbing activities including but not limited to grading, trenching, drilling, etc. Paleontological monitoring shall start at full time for geological units deemed to have "High" paleontological sensitivity. Geological units deemed to have "Low" paleontological sensitivity shall be monitored by spot checks. No monitoring is required for geologic units identified as having "No" paleontological sensitivity. "Unknown" paleontological sensitivity is assigned to the less metamorphosed portions of the Santa Monica Slate, as detailed below.*

- *The monitor shall be empowered to temporarily halt or redirect construction efforts if paleontological resources are discovered. The paleontological monitor shall flag an area 50 feet around the discovery and notify the construction crew immediately. No further disturbance in the flagged area shall occur until the qualified paleontologist has cleared the area. In consultation with the qualified paleontologist, the monitor shall quickly assess the nature and significance of the find. If the specimen is not significant, it shall be quickly removed, and the area cleared. In the event paleontological resources are discovered and deemed by the*

project paleontologist to be scientifically important, the paleontological resources shall be recovered by excavation (i.e., salvage and bulk sediment sample) or immediate removal if the resource is small enough and can be removed safely in this fashion without damage to the paleontological resource. If the discovery is significant, the qualified paleontologist shall notify Metro immediately. In consultation with Metro, the qualified paleontologist shall develop a plan of mitigation, which will likely include salvage excavation and removal of the find, removal of sediment from around the specimen (in the laboratory), research to identify and categorize the find, curation of the find in a local qualified repository, and preparation of a report summarizing the find.

- *Generally, geologic units that have endured metamorphic processes (i.e., extreme heat and pressure over long periods of time) do not contain paleontological resources. The Santa Monica Slate, originally a fossiliferous shale, has been subjected to various levels of metamorphism and thus, in areas of "low-grade metamorphism," paleontological resources may be discovered. Due to the rarity of paleontological resources dating to the Mesozoic (between approximately 65.5 to 252 million years ago) of Southern California, any such materials have high importance to the paleontology of the region. When encountered, the project paleontologist shall assess the levels of metamorphism that portion of the Santa Monica Slate has experienced. The Santa Monica Slate shall be monitored part time where the project paleontologist has determined lower levels of metamorphism have taken place and the preservation of paleontological resources is possible. If exposures of the Santa Monica Slate have been subjected to high levels of metamorphism (i.e., phyllite components of Jsmp), paleontological monitoring in that portion of the formation is not necessary.*
- *Recovered paleontological resources shall be prepared, identified to the lowest taxonomic level possible, and curated into a recognized repository (i.e., Natural History Museum of Los Angeles County). Bulk sediment samples, if collected, shall be "screen-washed" to recover the contained paleontological resources, which will then be identified to the lowest taxonomic level possible, and curated (as above). The report and all relevant field notes shall be accessioned along with the paleontological resources.*

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

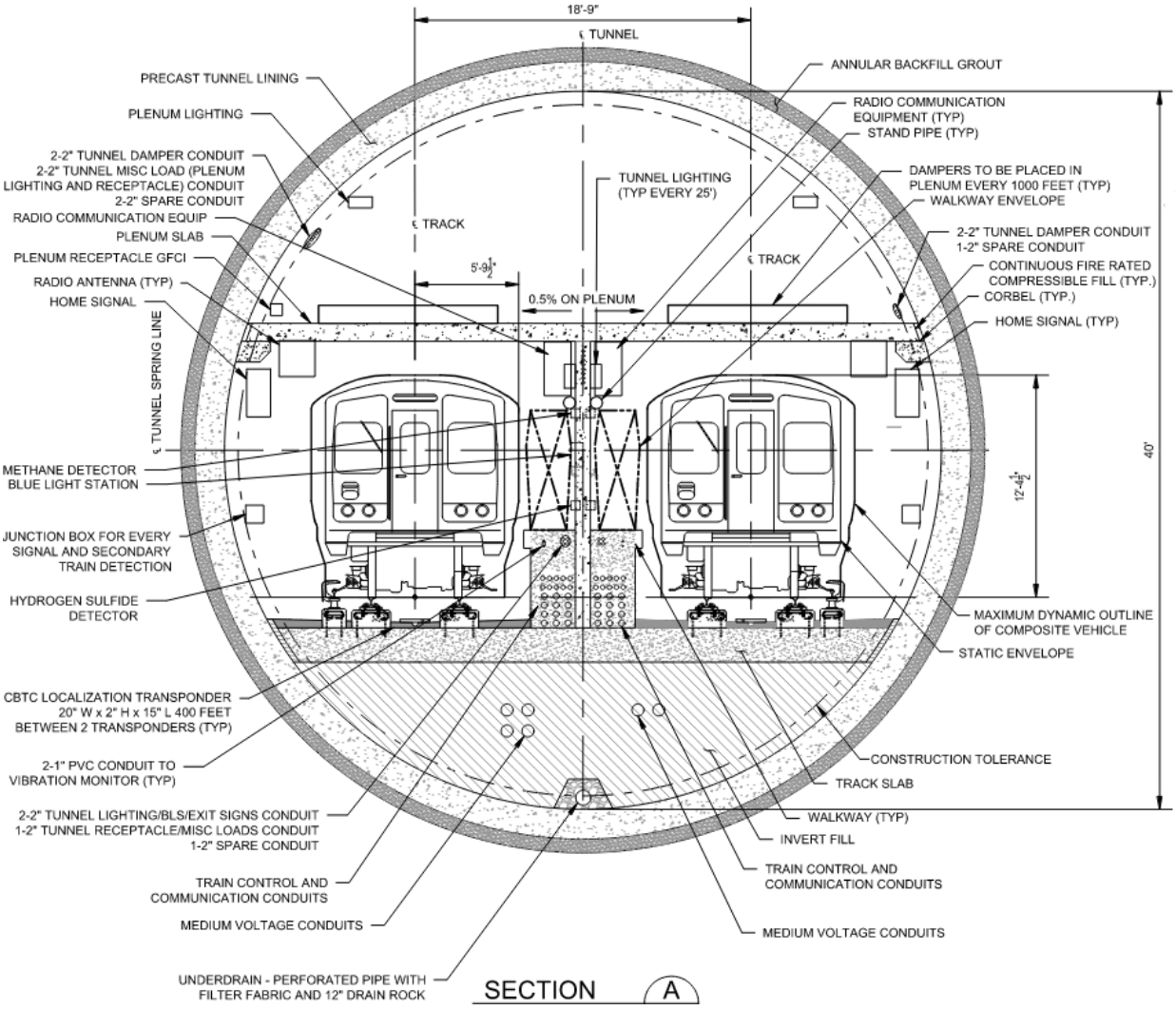
From the UCLA Gateway Plaza Station, the alignment would turn to the northwest beneath the Santa Monica Mountains to the east of Interstate 405 (I-405). South of Mulholland Drive, the alignment would curve to the north, aligning with Saugus Avenue south of Valley Vista Boulevard. The Ventura Boulevard 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.

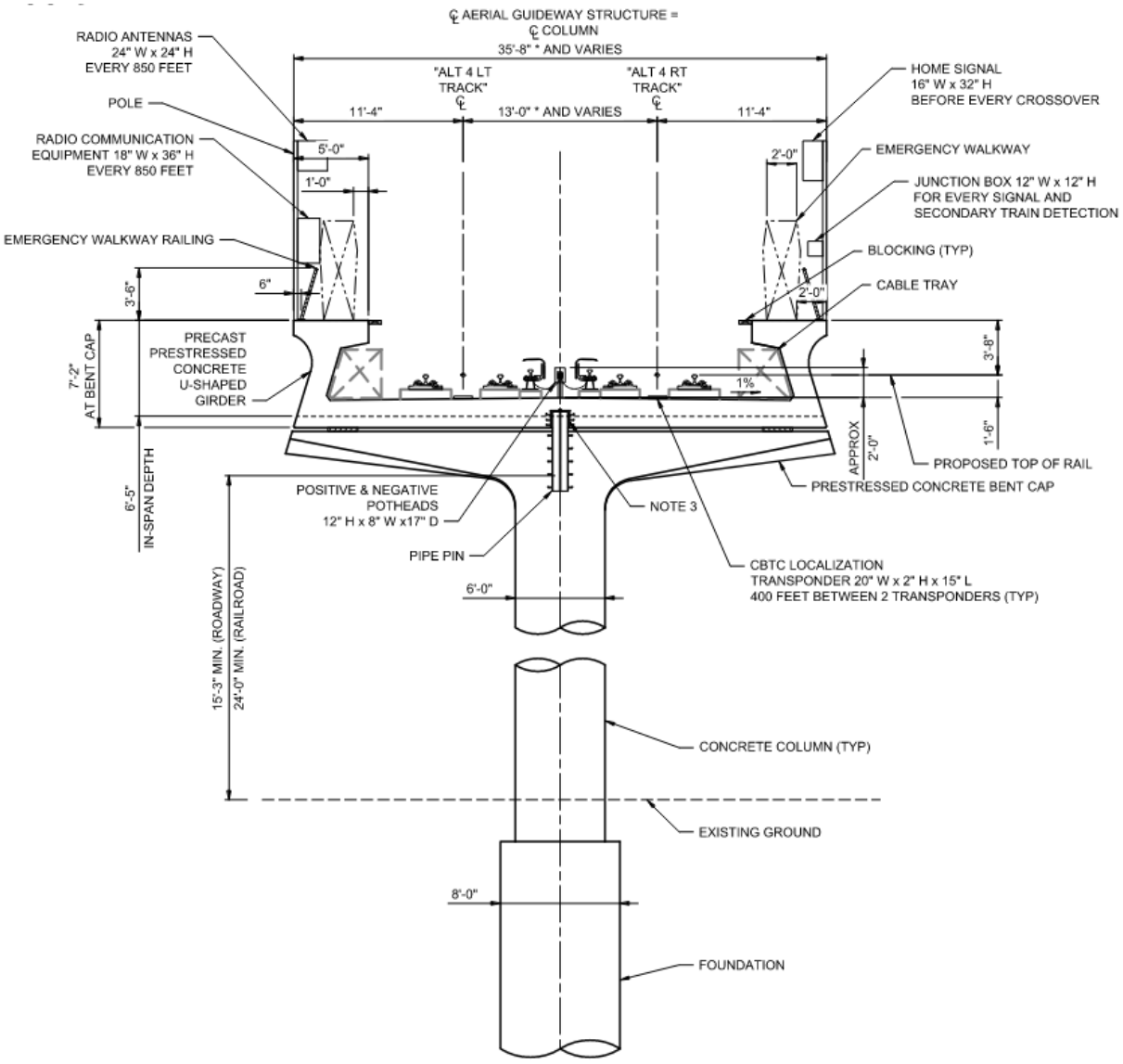
Figure 9-2. Typical Underground Guideway Cross-Section



Source: STCP, 2024

In aerial sections adjacent to Raymer Street and the LOSSAN rail corridor, the guideway would consist of single-column piers. The single-column piers 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. 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

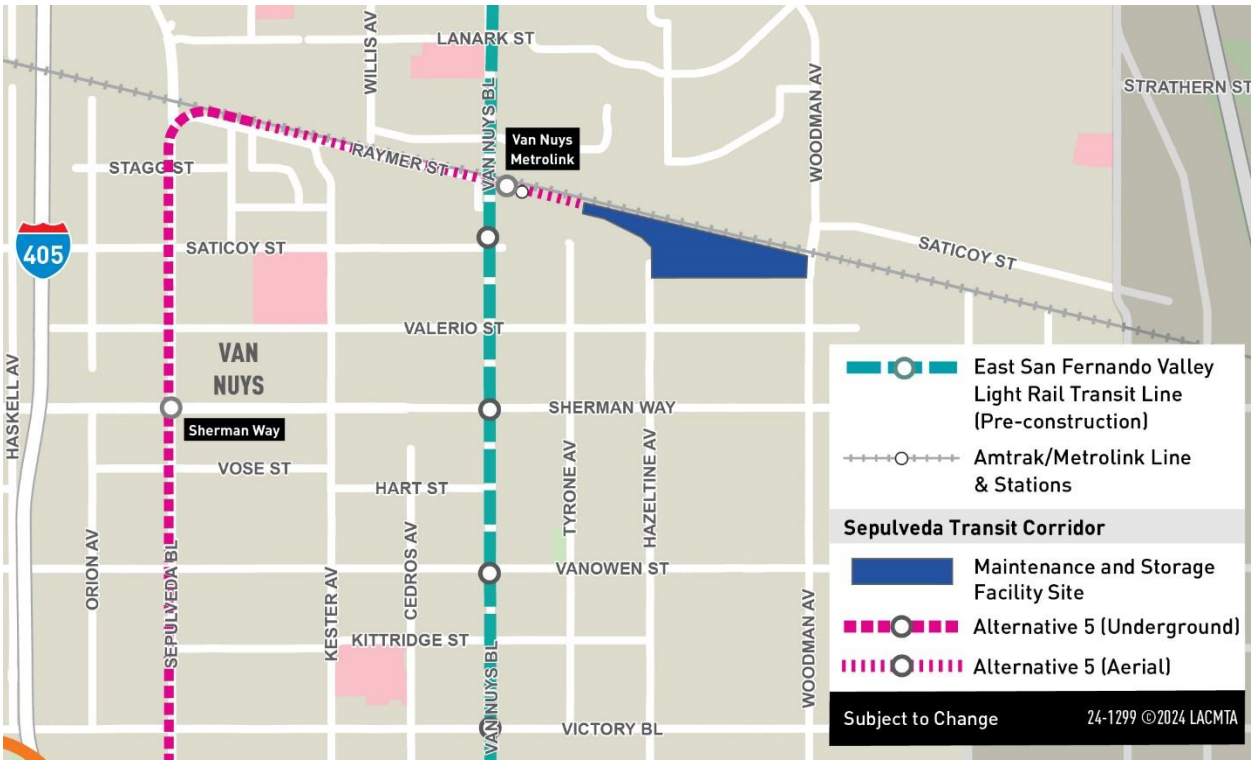
The MSF for Alternative 5 would be located east of the Van Nuys Metrolink Station and would encompass approximately 46 acres. The MSF would be designed to accommodate 184 rail cars and would be bounded by single-family residences to the south, the LOSSAN rail corridor to the north, Woodman Avenue on 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 (within station)
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.	Underground (within station)
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 (TBM) 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 will 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

9.2.1 Geologic Context

The Project Study Area encompasses the diversity of geology within the Los Angeles area, with rocks and unconsolidated sediments ranging in age from the late Jurassic Period (approximately 163.5 to 145 million years ago) to the present (Table 3-1).

The oldest rock formations in the Project Study Area date to the late Jurassic Period and are in the southern Santa Monica Mountains. The late Jurassic Santa Monica Slate are encountered in relatively small, uplifted exposures. The Santa Monica Slate has yielded a small quantity of invertebrate fossils, largely heavily distorted by metamorphic processes (Imlay, 1963). Additionally, the Cretaceous Period Tuna Canyon deposits nearby in the Santa Monica Mountains have similarly yielded small but important invertebrate fossil collections (Saul and Alderson, 2001).

The majority of the Santa Monica Mountains within the RSA consist of uplifted Tertiary rocks of the marine Modelo Formation and Topanga Group formations (Campbell et al., 2014). The Modelo Formation has been correlated to the Monterey Formation using biostratigraphy and tephrochronology and dates to the upper and middle Miocene, approximately 15 to 8 million years ago (Knott et al., 2022). The formation is particularly notable for its fossil bony fish and whales and has yielded significant fossil invertebrates and vertebrates (Fierstine et al., 2012).

The low-lying areas of the Project Study Area in the Valley and the Los Angeles Basin consist of depositional environments with sedimentary deposits ranging from the Pleistocene to the Holocene. Surface deposits mostly consist of artificial fill, shallow deposits of young alluvium (*Qya*$_2$), and young alluvial fan deposits (*Qyf*$_1$, *Qyf*$_2$) and are younger than 10,000 years of age and, therefore, unlikely to contain significant fossil deposits. However, older Quaternary deposits exist on the surface in the very most southern and northern portions of the Resource Study Area (RSA) (Campbell et al., 2014). These older Quaternary deposits (*Qvoa*) have yielded significant vertebrate fossil deposits, including fossils of extinct megafauna, and depth of excavation would increase the paleontological sensitivity (SVP, 2010; Bell, 2023).

The paleontological sensitivity for each of the geological formations present in the RSA is determined as follows: Young alluvium – unit 2 (*Qya*$_2$), Quaternary land slide deposits (*Qls*), and the Santa Monica Slate (*Jsms, Jsmp*) should be treated as having “No” paleontological sensitivity, with the following caveat: geologic units of metamorphic origin are generally regarded as having no paleontological sensitivity due to the extreme temperatures and pressures they have been subjected to. The Santa Monica Slate,

however, contains portions of low-grade metamorphism (*Jsms*), facilitating the possibility of contained fossils that have not been distorted enough to preclude identification. When the Santa Monica Slate (*Jsms, Jsmp*) is encountered, the project paleontologist would need to determine if low-grade metamorphic conditions are present, and thus has been divided according to level of metamorphism on the geologic map for this alternative (Attachment 1). If this is the case, that portion of the unit (*Jsms*) should be considered "Low" paleontological sensitivity and monitored accordingly (Imlay, 1963). Exposures of the Modelo Formation (*Tm*, *Tmd*, and *Tmss*) should be considered as having "High" paleontological sensitivity (SVP, 2010; Campbell et al., 2014).

9.3 Impact Evaluation

A paleontological records search from the Natural History Museum of Los Angeles County (NHMLAC) revealed no fossil locality located directly within the paleontological RSA. However, the records search from NHMLAC has revealed that there are 14 fossil localities located within 5 miles of the proposed RSA that produced fossil vertebrates and invertebrates in similar geologic units found within the project footprint (Table 3-2). With implementation of mitigation measures (Section 9.4), including construction monitoring, the impact to these paleontological resources would be considered less than significant (Scott and Springer, 2003; Bell, 2023).

9.3.1 Operational Impacts

The operation of Alternative 5 does not include activities that involve ground disturbance. Therefore, there would be no operational impacts related to paleontological resources.

9.3.2 Construction Impacts

All underground components of this alternative have the potential to impact paleontological resources. Deeper portions of any paleontologically sensitive unit have the potential to produce rare or scientifically important taxa (SVP, 2010).

Alternative 5 utilizes a heavy rail system like Alternative 4 and has a similar project profile. However, Alternative 5 has nearly its entire heavy rail system underground. Alternative 5 extends the tunnel system north along Sepulveda Boulevard. The tunnel then becomes an elevated guideway at the intersection of Raymer Street and Sepulveda Boulevard. Alternative 5 has seven underground stations (Sherman Way, Metro G Line, Ventura Boulevard, UCLA Gateway Plaza, Wilshire Boulevard/Metro D Line, Santa Monica Boulevard, Metro E Line/Sepulveda) and one aerial station (Van Nuys Metrolink Station). Alternative 5 would mostly affect sediments that are located below the ground surface. As stated before, knowing for certain what geologic units would be impacted at depth is difficult to say for certain without someone monitoring the sediments in any given working area. However, the sediments mapped at the surface of where the tunnel system would be emplaced for Alternative 5 are mapped as *Qya*$_2$, *Qyf*$_1$, *Qyf*$_2$, *Tm*, *Tms*, *Tmd*, *Jsms*, *Jsm*, and *Jsmp*. Generally, geologic units such as the Santa Monica Slate (*Jsmp*) do not have any paleontological sensitivity to preserve fossil material. The Santa Monica Slate is a geologic unit comprised of metamorphic rock, which undergoes intense pressure and temperature. This metamorphic process usually destroys and deforms any fossil material that could have been located within; however, because of the relatively low grade of metamorphism, enough relevant features of the fossils were preserved in portions of the Santa Monica Slate. When the Santa Monica Slate (*Jsms, Jsmp*) is encountered, the project paleontologist would need to determine if low-grade metamorphic conditions are present. If that is the case, that portion of the unit (*Jsms*) may be considered "Low" paleontological sensitivity and monitored accordingly (Imlay, 1963). Additionally, the

Qyf₁, *Qyf₂*, and *Qya₂* have a "Low" sensitivity for preserving fossil material, as these units are too young to have preserved any significant fossil material. The geologic map unit labelled as *Tm*, *Tms*, and *Tmd* all have a high sensitivity for preserving fossil material due to their age, and the fossil localities found within the same map units nearby (SVP, 2010; Campbell et al., 2014; Bell, 2023).

Construction of all seven of the underground stations that are planned for this alternative (Sherman Way, Metro G Line Sepulveda, Ventura Boulevard, UCLA Gateway Plaza, Wilshire Boulevard/Metro D Line, Santa Monica Boulevard, Metro E Line/Sepulveda) would also result in significant and unavoidable impacts where the TBM is used, and less than significant impacts with mitigation where the cut-and-cover method is used. The construction impacts of Alternative 5 to high sensitivity formations total 19.53 acres, and low sensitivity formations total 46.37 acres.

9.3.2.1 Tunnel Boring

An automated TBM would be excavating the tunnels for the underground portion of this alternative. The TBM would excavate sediments to the dimensions of the finished tunnel, remove the sediments from the forward portion of the TBM via an internal conveyer belt, and erect the segmental, precast concrete tunnel liner. Therefore, the impact to paleontological resources in the tunnels would be significant and unavoidable. The operation of the TBM does not allow the monitor to view the sediments as they are being excavated, or the walls of the tunnel following removal of excess sediments and prior to the installation of the tunnel's concrete liner. For these reasons, monitoring paleontological resources adjacent to the TBM is not possible. Thus, in consideration of the California Environmental Quality Act, excavations for tunnel construction would result in significant and unavoidable impacts to paleontological resources in paleontologically sensitive geologic units (Attachment 1, Figure 5) (SVP, 2010; Scott and Springer, 2003).

When considering Quaternary aged deposits, deeper (i.e., older) portions of paleontologically sensitive geologic units are generally more sensitive from a scientific point of view. Thus, a mapped geologic unit considered low paleontological sensitivity at the surface has the potential to become more sensitive paleontologically at depth. Therefore, the impact to paleontological resources at TBM launching and extracting sites can be mitigated to less than significant. When excavations such as these take place in paleontologically sensitive units (Attachment 1, Figure 5), monitoring shall be present to reduce the impact to paleontological resources to less than significant (SVP, 2010; Scott and Springer, 2003).

9.3.3 Maintenance and Storage Facilities

The impacts involved with the MSF include all administrative buildings, maintenance buildings, wash facilities, drive aisles, and storage tracks. The surface rocks in the underground portions of the proposed MSF are mapped as Qya_2 but may be more paleontologically sensitive (older) than indicated at depth. There should be a qualified paleontologist to monitor ground disturbance when this unit is encountered (SVP, 2010; Bell, 2023). With implementation of mitigation measures in Section 9.4, impacts associated with the MSF would be less than significant.

9.4 Mitigation Measures

MM GEO-6: *The potential to avoid impacts to previously unrecorded paleontological resources shall be avoided by having a qualified Paleontologist or Archaeologist cross-trained in paleontology, meeting the Society of Vertebrate Paleontology Standards retained as the project paleontologist, with a minimum of a bachelor's degree (B.S./B.A.) in geology, or related discipline with an emphasis in paleontology and demonstrated*

experience and competence in paleontological research, fieldwork, reporting, and curation. A paleontological monitor, under the guidance of the project paleontologist, shall be present as required by the type of earth-moving activities in the Project, specifically in areas south of Ventura Boulevard that have been deemed areas of high sensitivity for paleontological resources. The monitor shall be a trained paleontological monitor with experience and knowledge of sediments, geologic formations, and the identification and treatment of fossil resources.

MM GEO-7: *A Paleontological Resources Impact Mitigation Program (PRIMP) shall be prepared by a qualified paleontologist. The PRIMP shall include guidelines for developing and implementing mitigation efforts, including minimum requirements, general fieldwork, and laboratory methods, threshold for assessing paleontological resources, threshold for excavation and documentation of significant or unique paleontological resources, reporting requirements, considerations for the curation of recovered paleontological resources into a relevant institution, and process of documents to Metro and peer review entities.*

MM GEO-8: *The project paleontologist or paleontological monitor shall perform a Workers Environmental Awareness Program training session for each worker on the project site to familiarize the worker with the procedures in the event a paleontological resource is discovered. Workers hired after the initial Workers Environmental Awareness Program training conducted at the pre-grade meeting shall be required to take additional Workers Environmental Awareness Program training as part of their site orientation.*

MM GEO-9: *To prevent damage to unanticipated paleontological resources, a paleontological monitor shall observe ground-disturbing activities including but not limited to grading, trenching, drilling, etc. Paleontological monitoring shall start at full time for geological units deemed to have "High" paleontological sensitivity. Geological units deemed to have "Low" paleontological sensitivity shall be monitored by spot checks. No monitoring is required for geologic units identified as having "No" paleontological sensitivity. "Unknown" paleontological sensitivity is assigned to the less metamorphosed portions of the Santa Monica Slate, as detailed below.*

- *The monitor shall be empowered to temporarily halt or redirect construction efforts if paleontological resources are discovered. The paleontological monitor shall flag an area 50 feet around the discovery and notify the construction crew immediately. No further disturbance in the flagged area shall occur until the qualified paleontologist has cleared the area. In consultation with the qualified paleontologist, the monitor shall quickly assess the nature and significance of the find. If the specimen is not significant, it shall be quickly removed, and the area cleared. In the event paleontological resources are discovered and deemed by the project paleontologist to be scientifically important, the paleontological resources shall be recovered by excavation (i.e., salvage and bulk sediment sample) or immediate removal if the resource is small enough and can be removed safely in this fashion without damage to the paleontological resource. If the discovery is significant, the qualified paleontologist shall notify Metro immediately. In consultation with Metro, the qualified paleontologist shall develop a plan of mitigation, which will likely include salvage excavation and removal of the find,*

removal of sediment from around the specimen (in the laboratory), research to identify and categorize the find, curation of the find in a local qualified repository, and preparation of a report summarizing the find.

- *Generally, geologic units that have endured metamorphic processes (i.e., extreme heat and pressure over long periods of time) do not contain paleontological resources. The Santa Monica Slate, originally a fossiliferous shale, has been subjected to various levels of metamorphism and thus, in areas of "low-grade metamorphism," paleontological resources may be discovered. Due to the rarity of paleontological resources dating to the Mesozoic (between approximately 65.5 to 252 million years ago) of Southern California, any such materials have high importance to the paleontology of the region. When encountered, the project paleontologist shall assess the levels of metamorphism that portion of the Santa Monica Slate has experienced. The Santa Monica Slate shall be monitored part time where the project paleontologist has determined lower levels of metamorphism have taken place and the preservation of paleontological resources is possible. If exposures of the Santa Monica Slate have been subjected to high levels of metamorphism (i.e., phyllite components of Jsmp), paleontological monitoring in that portion of the formation is not necessary.*
- *Recovered paleontological resources shall be prepared, identified to the lowest taxonomic level possible, and curated into a recognized repository (i.e., Natural History Museum of Los Angeles County). Bulk sediment samples, if collected, shall be "screen-washed" to recover the contained paleontological resources, which will then be identified to the lowest taxonomic level possible, and curated (as above). The report and all relevant field notes shall be accessioned along with the paleontological resources.*

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

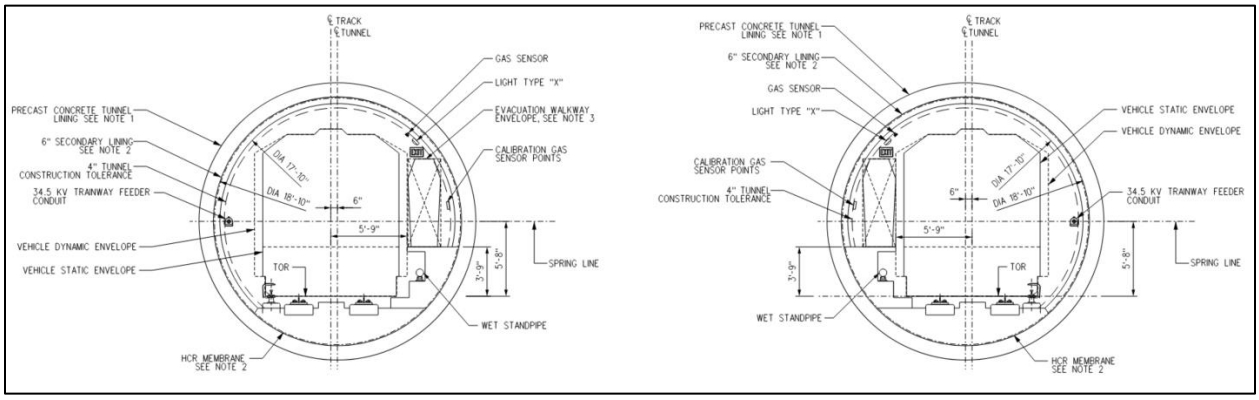
After leaving the UCLA Gateway Plaza Station, the alignment would continue to the north and travel under the Santa Monica Mountains. While still under the mountains, the alignment would shift slightly to the west to travel under the City of Los Angeles Department of Water and Power (LADWP) Stone Canyon 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, 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 (MRDC). 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

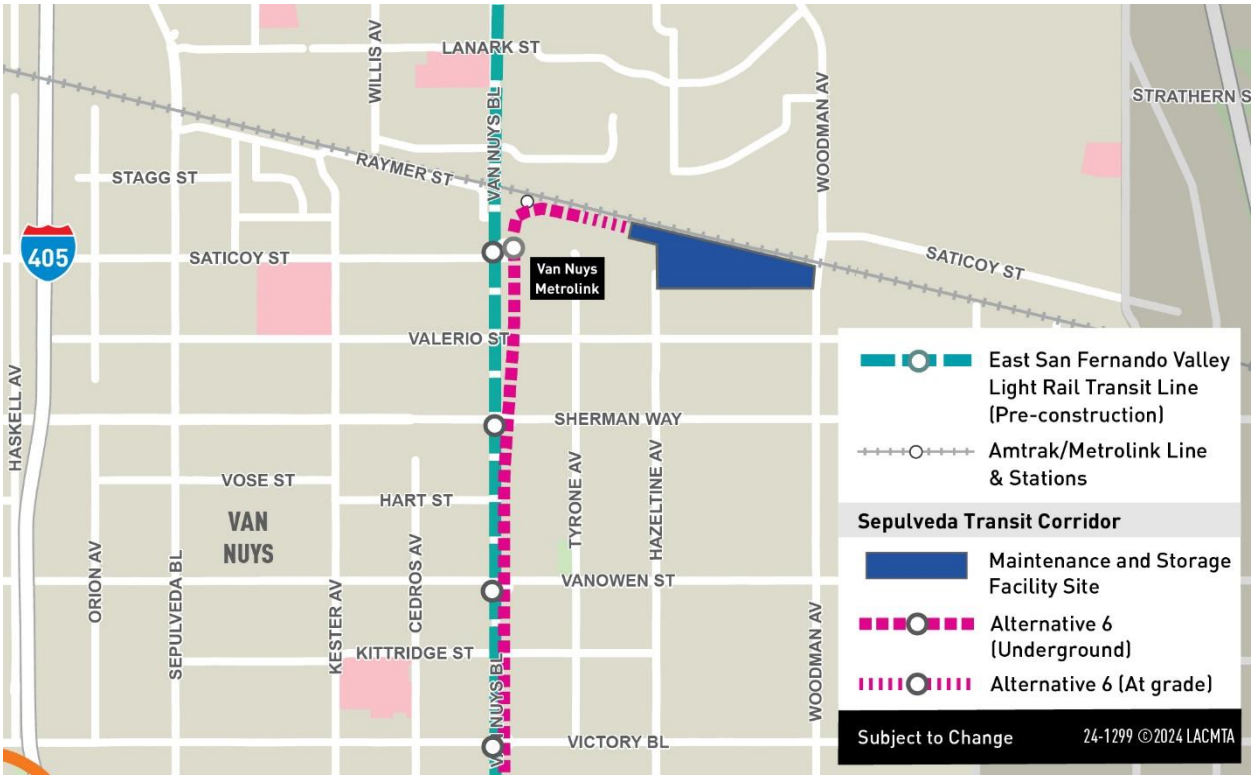
The MSF for Alternative 6 would be located east of the Van Nuys Metrolink Station and would encompass approximately 41 acres. The MSF would be designed to accommodate 94 vehicles and would be bounded by single-family residences to the south, the LOSSAN rail corridor to the north, Woodman Avenue to the 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 (TPSS)

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 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:

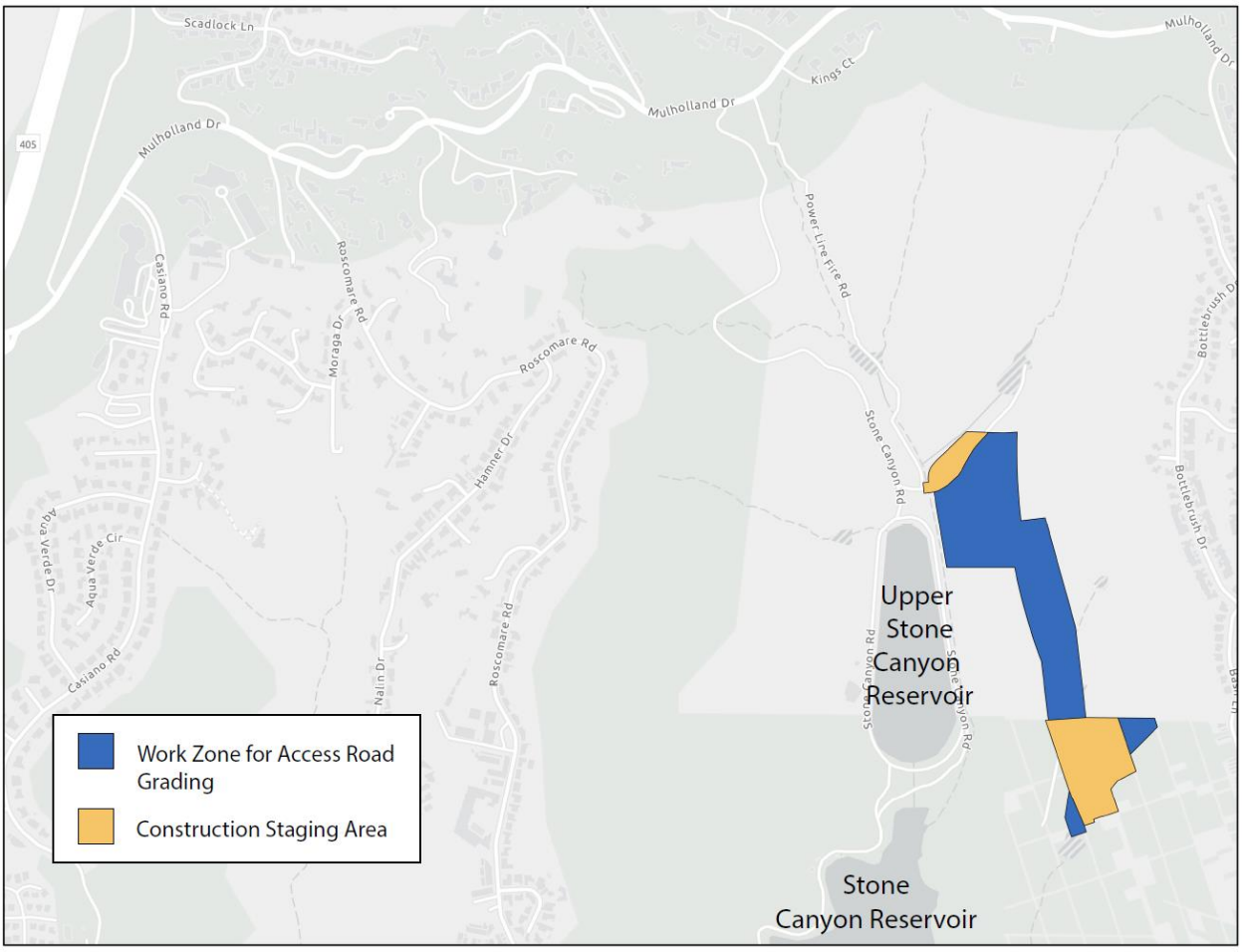
- Contractors' equipment
- Receiving deliveries
- Testing of soils for minerals or hazards
- Storing materials
- Site offices
- Work zone for excavation
- Other construction activities (including parking and change facilities for workers, location of construction office trailers, storage, staging and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

10.2.1 Geologic Context

The Project Study Area encompasses the diversity of geology within the Los Angeles area, with rocks and unconsolidated sediments ranging in age from the late Jurassic Period (approximately 163.5 to 145 million years ago) to the present (Table 3-1).

The oldest rock formations in the Project Study Area date to the late Jurassic Period and are in the southern Santa Monica Mountains. The late Jurassic Santa Monica Slate are encountered in relatively small, uplifted exposures. The Santa Monica Slate has yielded a small quantity of invertebrate fossils, largely heavily distorted by metamorphic processes (Imlay, 1963). Additionally, the Cretaceous Period

Tuna Canyon deposits nearby in the Santa Monica Mountains have similarly yielded small but important invertebrate fossil collections (Saul and Alderson, 2001).

The majority of the Santa Monica Mountains within the RSA consist of uplifted Tertiary rocks of the marine Modelo Formation and Topanga Group formations (Campbell et al., 2014). The Modelo Formation has been correlated to the Monterey Formation using biostratigraphy and tephrochronology and dates to the upper and middle Miocene, approximately 15 to 8 million years ago (Knott et al., 2022). The formation is particularly notable for its fossil bony fish and whales and has yielded significant fossil invertebrates and vertebrates (Fierstine et al., 2012).

The low-lying areas of the Project Study Area in the Valley and the Los Angeles Basin consist of depositional environments with sedimentary deposits ranging from the Pleistocene to the Holocene. Surface deposits mostly consist of artificial fill, shallow deposits of young alluvium (*Qya*$_2$) and young alluvial fan deposits (*Qyf*$_1$, *Qyf*$_2$) and are younger than 10,000 years of age and, therefore, unlikely to contain significant fossil deposits. However, older Quaternary deposits exist on the surface in the very most southern and northern portions of the Resource Study Area (RSA) (Campbell et al., 2014). These older Quaternary deposits (*Qvoa*) have yielded significant vertebrate fossil deposits, including fossils of extinct megafauna, and depth of excavation will increase the paleontological sensitivity (SVP, 2010; Bell, 2023).

The paleontological sensitivity for each of the geological formations present in the RSA is determined as follows: Young alluvium – unit 2 (*Qya*$_2$), Quaternary land slide deposits (*Qls*), and the Santa Monica Slate (*Jsms, Jsmp*) should be treated as having "No" paleontological sensitivity, with the following caveat: geologic units of metamorphic origin are generally regarded as having no paleontological sensitivity due to the extreme temperatures and pressures they have been subjected to. The Santa Monica Slate, however, contains portions of low-grade metamorphism (*Jsms*), facilitating the possibility of contained fossils that have not been distorted enough to preclude identification. When the Santa Monica Slate (*Jsms, Jsmp*) is encountered, the project paleontologist would need to determine if low-grade metamorphic conditions are present, and thus has been divided according to level of metamorphism on the geologic map for this alternative (Attachment 1). If this is the case, that portion of the unit (*Jsms*) should be considered "Low" paleontological sensitivity and monitored accordingly (Imlay, 1963). Exposures of the Modelo Formation (*Tm*, *Tmd*, and *Tmss*) should be considered as having "High" paleontological sensitivity (SVP, 2010; Campbell et al., 2014).

10.3 Impact Evaluation

A paleontological records search from the Natural History Museum of Los Angeles County (NHMLAC) revealed a fossil locality directly within the Resource Study Area. Alternative 6 is a heavy rail, underground system, and transitions underground at Exposition Boulevard (Metro E Line) to just south of the Ventura Boulevard Station (Bell, 2023).

The records search found the project footprint for Alternative 6 is mapped over the location where the locality Natural History Museum of Los Angeles County Paleontological Locality Prefix (LACM) VP 1894 is located. LACM VP 1894 is 0.25 mile south of the intersection of Sumac Drive and Beverly Glen Boulevard, on the west side of Beverly Glen Canyon. LACM VP 1894 produced a fossil bony fish (Osteichthyes) from within the Modelo Formation (Bell, 2023).

Additionally, there are 14 other fossil localities located within 5 miles of the proposed RSA that produced fossil vertebrates and invertebrates (Table 3-2). With implementation of mitigation

measures (Section 10.4), including construction monitoring, the impact to these paleontological resources would be considered less than significant (Scott and Springer, 2003; Bell, 2023).

10.3.1 Operational Impacts

The operation of Alternative 6 does not include activities that involve ground disturbance. Therefore, there would be no operational impacts related to paleontological resources.

10.3.2 Construction Impacts

All underground components of this alternative have the potential to impact paleontological resources. Deeper portions of any paleontologically sensitive unit have the potential to produce rare or scientifically important taxa (SVP, 2010).

The geologic units mapped within the Project footprint for Alternative 6 are *Qya*$_2$, *Qyf*$_{1,}$ *Qyf*$_2$, *Tm*, *Tms*, *Tt*, *Tmd*, *Kt*, *Jsms*, and *Jsmp*. Cretaceous tonalite (*Kt*) was formed by the cooling of molten rock and thus cannot contain fossils; the Santa Monica Slate – Phyllite (*Jsmp*) and artificial fill (*af*) have "No" paleontological sensitivity. As stated before, knowing for certain what geologic units would be impacted at depth is difficult to say for certain without someone monitoring the sediments in any given working area. However, the sediments mapped at the surface of where the tunnel system would go for Alternative 6 are mapped as *Qya*$_2$, *Qyf*$_{1,}$ *Qyf*$_2$, *Tm*, *Tms*, *Tt*, *Tmd*, *Jsms*, *Jsm*, and *Jsmp*. Generally, geologic units such as the Santa Monica Slate (*Jsms*, *Jsmp*) do not have any paleontological sensitivity to preserve fossil material. The Santa Monica Slate is a geologic unit comprised of metamorphic rock, which undergoes intense pressure and temperature, chemically altering it from the original form. This metamorphic process usually destroys and deforms any fossil material that could have been located within; however, because of the relatively low grade of metamorphism, enough relevant features of the fossils were preserved in portions of the Santa Monica Slate. When the portion of the Santa Monica Slate with "Unknown" sensitivity (*Jsms*) is encountered, the project paleontologist would need to determine if low-grade metamorphic conditions are present. If that is the case, that portion of the unit (*Jsms*) may be considered "Low" paleontological sensitivity and monitored accordingly (Imlay, 1963). Additionally, The *Qyf*$_1$, *Qyf*$_2$, and *Qya*$_2$ have a "Low" sensitivity for preserving fossil material, as these units are too young to have preserved any significant fossil material. The geologic map units labelled as *Tm*, *Tms*, *Tmd*, and *Tt* all have a high sensitivity for preserving fossil material due to their age, and the fossil localities found within the same map units nearby (Bell, 2023).

Construction of all seven of the underground stations that are planned for this alternative (Metro E Line Expo/Bundy Station, Santa Monica Boulevard Station, Wilshire Boulevard/Metro D Line Station, UCLA Gateway Plaza Station, Ventura Boulevard/Van Nuys Boulevard Station, Metro G Line Van Nuys Station, Van Nuys Metrolink Station) would also result in significant and unavoidable impacts where the TBM is used, and less than significant impacts with mitigation where cut-and-cover method is used. The construction impacts of Alternative 6 to high sensitivity formations totals 93.17 acres, and low sensitivity formations totals 81.26 acres.

10.3.2.1 Tunnel Boring

An automated TBM would be excavating the tunnels for the underground portion of Alternative 6. The TBM would excavate sediments to the dimensions of the finished tunnel, remove the sediments from the forward portion of the TBM via an internal conveyer belt, and erect the segmental, precast concrete tunnel liner. Therefore, the impact to paleontological resources in the tunnels would be significant and unavoidable. The operation of the TBM does not allow the monitor to view the sediments as they are being excavated, or the walls of the tunnel following removal of excess

sediments and prior to the installation of the tunnel's concrete liner. For these reasons, monitoring paleontological resources adjacent to the TBM is not possible. Thus, in consideration of the California Environmental Quality Act (CEQA) and the mitigation measures, excavations for tunnel construction would result in significant and unavoidable impacts to paleontological resources in paleontologically sensitive geologic units (Attachment 1, Figure 5) (SVP, 2010; Scott and Springer, 2003).

When considering Quaternary aged deposits, deeper (i.e., older) portions of paleontologically sensitive geologic units are generally more sensitive from a scientific point of view. Thus, a mapped geologic unit considered low paleontological sensitivity at the surface has the potential to become more sensitive paleontologically at depth. Therefore, the impact to paleontological resources at TBM launching and extracting sites can be mitigated to less than significant. When excavations such as these take place in paleontologically sensitive units (Attachment 1, Figure 5), monitoring shall be present to reduce the impact to paleontological resources to less than significant (SVP, 2010; Scott and Springer, 2003).

10.3.3 Maintenance and Storage Facilities

The impacts involved with the MSF include all administrative buildings, maintenance buildings, wash facilities, drive aisles, and storage tracks. The surface rocks in the underground portions of the proposed MSF are mapped as *Qya_2* but may be more paleontologically sensitive (older) than indicated at depth. There should be a qualified paleontologist to monitor ground disturbance when this unit is encountered (SVP, 2010; Bell, 2023). With implementation of mitigation measures in Section 10.4, impacts associated with the MSF would be less than significant.

10.4 Mitigation Measures

MM GEO-6: *The potential to avoid impacts to previously unrecorded paleontological resources shall be avoided by having a qualified Paleontologist or Archaeologist cross-trained in paleontology, meeting the Society of Vertebrate Paleontology Standards retained as the project paleontologist, with a minimum of a bachelor's degree (B.S./B.A.) in geology, or related discipline with an emphasis in paleontology and demonstrated experience and competence in paleontological research, fieldwork, reporting, and curation. A paleontological monitor, under the guidance of the project paleontologist, shall be present as required by the type of earth-moving activities in the Project, specifically in areas south of Ventura Boulevard that have been deemed areas of high sensitivity for paleontological resources. The monitor shall be a trained paleontological monitor with experience and knowledge of sediments, geologic formations, and the identification and treatment of fossil resources.*

MM GEO-7: *A Paleontological Resources Impact Mitigation Program (PRIMP) shall be prepared by a qualified paleontologist. The PRIMP shall include guidelines for developing and implementing mitigation efforts, including minimum requirements, general fieldwork, and laboratory methods, threshold for assessing paleontological resources, threshold for excavation and documentation of significant or unique paleontological resources, reporting requirements, considerations for the curation of recovered paleontological resources into a relevant institution, and process of documents to Metro and peer review entities.*

MM GEO-8: *The project paleontologist or paleontological monitor shall perform a Workers Environmental Awareness Program training session for each worker on the project site to familiarize the worker with the procedures in the event a paleontological resource is discovered. Workers hired after the initial Workers Environmental Awareness Program training conducted at the pre-grade meeting shall be required to take additional Workers Environmental Awareness Program training as part of their site orientation.*

MM GEO-9: *To prevent damage to unanticipated paleontological resources, a paleontological monitor shall observe ground-disturbing activities including but not limited to grading, trenching, drilling, etc. Paleontological monitoring shall start at full time for geological units deemed to have "High" paleontological sensitivity. Geological units deemed to have "Low" paleontological sensitivity shall be monitored by spot checks. No monitoring is required for geologic units identified as having "No" paleontological sensitivity. "Unknown" paleontological sensitivity is assigned to the less metamorphosed portions of the Santa Monica Slate, as detailed below.*

- *The monitor shall be empowered to temporarily halt or redirect construction efforts if paleontological resources are discovered. The paleontological monitor shall flag an area 50 feet around the discovery and notify the construction crew immediately. No further disturbance in the flagged area shall occur until the qualified paleontologist has cleared the area. In consultation with the qualified paleontologist, the monitor shall quickly assess the nature and significance of the find. If the specimen is not significant, it shall be quickly removed, and the area cleared. In the event paleontological resources are discovered and deemed by the project paleontologist to be scientifically important, the paleontological resources shall be recovered by excavation (i.e., salvage and bulk sediment sample) or immediate removal if the resource is small enough and can be removed safely in this fashion without damage to the paleontological resource. If the discovery is significant, the qualified paleontologist shall notify Metro immediately. In consultation with Metro, the qualified paleontologist shall develop a plan of mitigation, which will likely include salvage excavation and removal of the find, removal of sediment from around the specimen (in the laboratory), research to identify and categorize the find, curation of the find in a local qualified repository, and preparation of a report summarizing the find.*
- *Generally, geologic units that have endured metamorphic processes (i.e., extreme heat and pressure over long periods of time) do not contain paleontological resources. The Santa Monica Slate, originally a fossiliferous shale, has been subjected to various levels of metamorphism and thus, in areas of "low-grade metamorphism," paleontological resources may be discovered. Due to the rarity of paleontological resources dating to the Mesozoic (between approximately 65.5 to 252 million years ago) of Southern California, any such materials have high importance to the paleontology of the region. When encountered, the project paleontologist shall assess the levels of metamorphism that portion of the Santa Monica Slate has experienced. The Santa Monica Slate shall be monitored part time where the project*

paleontologist has determined lower levels of metamorphism have taken place and the preservation of paleontological resources is possible. If exposures of the Santa Monica Slate have been subjected to high levels of metamorphism (i.e., phyllite components of Jsmp), paleontological monitoring in that portion of the formation is not necessary.

- *Recovered paleontological resources shall be prepared, identified to the lowest taxonomic level possible, and curated into a recognized repository (i.e., Natural History Museum of Los Angeles County). Bulk sediment samples, if collected, shall be "screen-washed" to recover the contained paleontological resources, which will then be identified to the lowest taxonomic level possible, and curated (as above). The report and all relevant field notes shall be accessioned along with the paleontological resources.*

11 PREPARERS OF THE TECHNICAL REPORT

Name	Title	Experience (Years)
Brian Kussman	Principal Paleontologist	27

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Attachment 1. Project Maps

Attachment 2. Results of Paleontological Records Search (NHMLAC)