Los Angeles County
Metropolitan Transportation Authority

Appendix P Construction Impacts Report

GOLD LINE EASTSIDE TRANSIT CORRIDOR PHASE 2

Prepared for
Los Angeles Metropolitan
Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012

June 2022

Metro

Appendix P

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Prepared for:
Los Angeles County Metropolitan Transportation Authority
One Gateway Plaza
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Acronyms

2020 RTP/SCS	Connect SoCal 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy
AREMA	American Railway Engineering and Maintenance of Way Association
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe
Caltrans	California Department of Transportation
Cal/OSHA	California Occupational Safety and Health Administration
CEQA	California Environmental Quality Act
CIDH	cast-in-drilled-hole
CPUC	California Public Utility Commission
DSA	detailed study area
GSA	general study area
HDD	horizontal directional drilling
I	Interstate
IOS	Initial Operating Segment
LARWQCB	Los Angeles Regional Water Quality Control Board
LRT	light rail transit
LRTP	Long Range Transportation Plan
LRVs	light rail vehicles
Metro	Los Angeles County Metropolitan Transportation Authority
MRDC	Metro Rail Design Criteria
MSE	mechanically stabilized earth
MSF	maintenance and storage facility
MUTCD	Manual of Uniform Traffic Control Devices

NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
OCR	overhead conductor rail
OCS	overhead catenary system
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyls
ROW	right-of-way
Project	Eastside Transit Corridor Phase 2 Project
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SOE	support of excavation
SR	State Route
SUSMP	Standard Urban Stormwater Mitigation Plan
SWPPP	Stormwater Pollution Prevention Plan
TBM	tunnel boring machine
TPSS	traction power substation
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled

1.0 INTRODUCTION

This impacts report discusses the Eastside Transit Corridor Phase 2 Project (Project) setting in relation to construction impacts. It describes methodologies relevant to the construction of the Project and potential impacts from construction of the Build Alternatives. This study was conducted in compliance with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines, California Code of Regulations Section 15000 et seq.

The Project would extend the Los Angeles County Metropolitan Transportation Authority (Metro) L (Gold) Line, a light rail transit (LRT) line, from its current terminus at the Atlantic Station in the unincorporated community of East Los Angeles to the city of Whittier. It would extend the existing Metro L (Gold) Line approximately 3.2 to 9.0 miles, depending on the Build Alternative.

The Project area of analysis includes a general study area (GSA) that is regional in scope and scale, and a detailed study area (DSA) that encompasses an approximately two-mile area from the Project alignment in eastern Los Angeles County. Additionally, specialized study areas were developed, where applicable, for certain environmental impact categories where the potential impacts would occur within an area that varies from the GSA or DSA. All specialized study areas are contained within the GSA. The study area for this impacts report is comprehensive to the GSA, DSA, and all specialized study areas identified within the Eastside Phase 2 Transit Corridor Impacts Reports as they relate to construction impacts.

A diverse mix of land uses are located within the GSA and DSA, including single- and multi-family residences, commercial and retail uses, industrial development, parks and recreational, health and medical uses, educational institutions, and vacant land. The Project would traverse densely populated, low-income, and heavily transit-dependent communities with major activity centers within the Gateway Cities subregion of Los Angeles County.

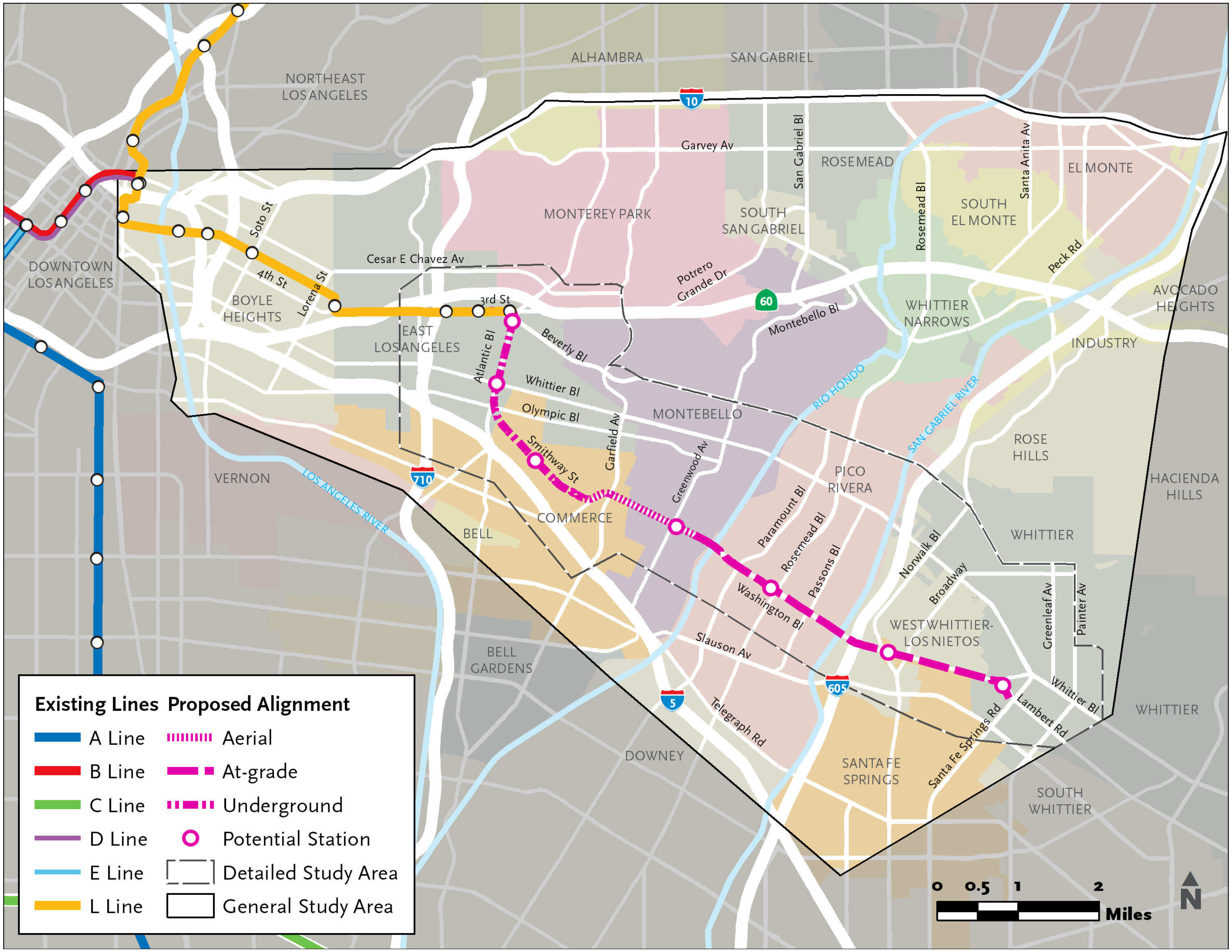
2.0 PROPOSED PROJECT AND ALTERNATIVES

2.1 Project Setting and Description

This impacts report evaluates potential environmental impacts of three Build Alternatives and a No Project Alternative. The Build Alternatives are: Alternative 1 Washington (Alternative 1), Alternative 2 Atlantic to Commerce/Citadel Initial Operating Segment (IOS) (Alternative 2), and Alternative 3 Atlantic to Greenwood IOS (Alternative 3).

For purposes of describing the Project, two study areas have been defined. The GSA is regional in scope and scale, whereas the DSA encompasses an approximately two-mile area from the Project alignment's centerline. The GSA is the same for all three of the Build Alternatives. The purpose of the GSA is to establish the study area for environmental resources that are regional in scope and scale, such as regional transportation, including vehicle miles traveled (VMT) and regional travel demands, population, housing, or employment. The GSA consists of several jurisdictions within Los Angeles County including the cities of Bell, Commerce, El Monte, Industry, Los Angeles, Montebello, Monterey Park, Pico Rivera, Rosemead, South El Monte, Santa Fe Springs, Whittier, unincorporated areas of Los Angeles County, which includes East Los Angeles and West Whittier-Los Nietos, and other cities within the San Gabriel Valley. It is generally bounded by Interstate (I) 10 to the north, Peck Road in South El Monte and Lambert Road in Whittier to the east, I-5 and Washington Boulevard to the south, and I-710 to the west. **Figure 2.1**, **Figure 2.2**, and **Figure 2.3** present the boundaries of the GSA for each of the three Build Alternatives.

The DSA establishes a study area to evaluate environmental resources that are more sensitive to the physical location of the Build Alternatives. The DSA for Alternative 1 Washington generally includes the area within a half-mile to two-mile distance from the guideway centerline, as shown in **Figure 2.1**. It encompasses five cities, Commerce, Montebello, Pico Rivera, Santa Fe Springs, and Whittier, and communities of unincorporated East Los Angeles and Whittier-Los Nietos. The DSA for Alternative 2 Atlantic to Commerce/Citadel IOS and Alternative 3 Atlantic to Greenwood IOS, does not extend as far to the east. As shown in **Figure 2.2** and **Figure 2.3** for Alternative 2 and Alternative 3 respectively, the DSA extends to the Rio Hondo and includes Commerce, Montebello, and unincorporated East Los Angeles.

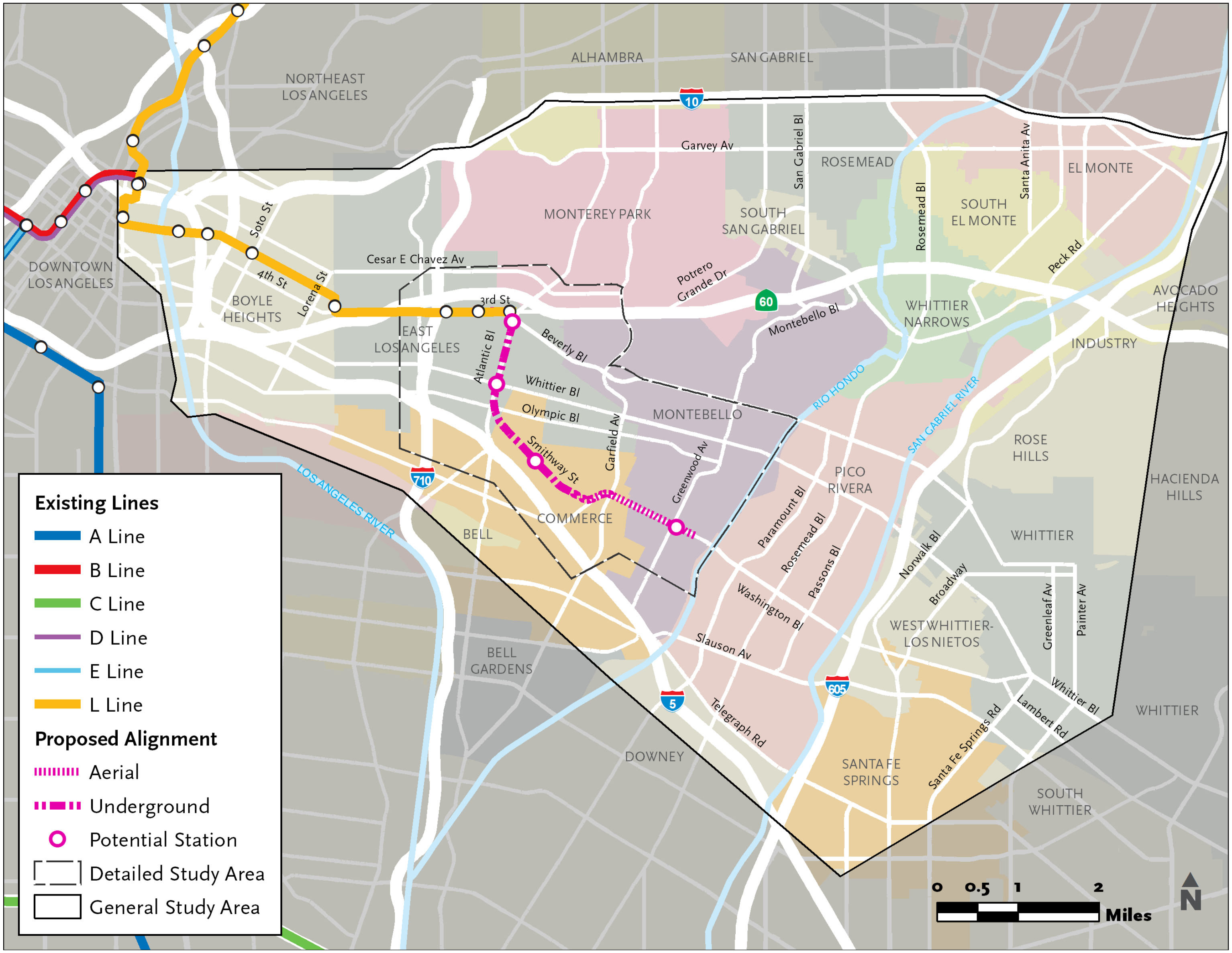


Source: Metro; CDM Smith/AECOM JV, 2021.

Figure 2.1. Alternative 1 Washington GSA and DSA

Source: Metro; CDM Smith/AECOM JV, 2021.

Figure 2.2. Alternative 2 Atlantic to Commerce/Citadel IOS GSA and DSA



Source: Metro; CDM Smith/AECOM JV, 2021.

Figure 2.3. Alternative 3 Atlantic to Greenwood IOS GSA and DSA

2.2 Build Alternatives

This impacts report evaluates the potential environmental impacts of three Build Alternatives which have the same guideway alignment east of the existing terminus at Atlantic Station but vary in length. Alternative 1 has the longest alignment at approximately 9.0 miles with seven stations (one relocated/reconfigured and six new), two maintenance and storage facility (MSF) site options and would terminate at Lambert station on Lambert Road in the city of Whittier. Alternative 2 is approximately 3.2 miles in length with three stations, one MSF site option, and would terminate at the Commerce/Citadel station in the city of Commerce, with non-revenue lead tracks extending further into the city of Commerce to connect to the Commerce MSF site option. Alternative 3 is approximately 4.6 miles in length with four stations, two MSF site options, and would terminate at Greenwood station in the city of Montebello.

There are also design options under consideration for each of the three Build Alternatives that consist of a variation in the design of the relocated/reconfigured Atlantic Station (applicable to Alternatives 1, 2, and 3) and a variation in the station and alignment profile in Montebello (applicable to Alternatives 1 and 3). Construction and operation of one or both design options are considered and evaluated for Alternative 1 and Alternative 3.

To differentiate the impacts evaluation of a Build Alternative with or without the design option(s) incorporated, a Build Alternative without the design option(s) is referred to as the "base Alternative" (i.e., base Alternative 1). A Build Alternative with a design option incorporated is referred to by using the design option name (e.g., Alternative 1 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option). The three Build Alternatives and the design options are described in greater detail below.

2.2.1 Alternative 1 Washington

Alternative 1 would extend the Metro L (Gold) Line LRT approximately 9.0 miles east from the current at-grade station at Atlantic Boulevard to an at-grade terminus at Washington Boulevard/Lambert Road in the city of Whittier. This alternative would include a relocated/reconfigured Atlantic station in an underground configuration and six new stations: Atlantic/Whittier (underground), Commerce/Citadel (underground), Greenwood (aerial), Rosemead (at-grade), Norwalk (at-grade), and Lambert (at-grade). The base Alternative 1 alignment would transition from the existing at-grade alignment to an underground configuration and would transition to an aerial configuration in the city of Commerce before transitioning to at-grade at Montebello Boulevard. The alignment includes approximately 3.0 miles of tunnel, 1.5 miles of aerial, and 4.5 miles of at-grade alignment.

The Alternative 1 alignment crosses the Rio Hondo and San Gabriel River and the Rio Hondo Spreading Grounds. The existing San Gabriel River and Rio Hondo bridges would be replaced with new bridges designed to carry both the LRT facility and the four-lane roadway.

An MSF and other ancillary facilities would also be constructed as part of the Project, including overhead catenary system (OCS), cross passages, ventilation structures, traction power substation (TPSS) sites, crossovers, emergency generators, radio tower poles and equipment shelters, and other supporting facilities along the alignment.

Two design options for Alternative 1 are described below.

2.2.1.1 Guideway Alignment

Under Alternative 1, the guideway would begin at the eastern end of the existing East Los Angeles Civic Center Station, transitioning from at-grade to underground at the intersection of South La Verne Avenue and East 3rd Street. The guideway would turn south and run beneath Atlantic Boulevard to approximately Verona Street and Olympic Boulevard. The underground guideway would then curve southeast, running under Smithway Street near the Citadel Outlets in the city of Commerce. After crossing Saybrook Avenue, the guideway would daylight from underground to an aerial configuration. Depending on the MSF site option that is selected, the aerial guideway would continue parallel to Washington Boulevard, east of Garfield Avenue, and merge into the center median of Washington Boulevard (Commerce MSF site option) or merge into the center median of Washington Boulevard at Gayhart Street (Montebello MSF site option). The alignment would maintain an aerial configuration then transition to an at-grade configuration east of Carob Way and would remain at-grade in the center of Washington Boulevard. The at-grade alignment would terminate at Lambert station in the city of Whittier.

2.2.1.1.1 Design Options

The following design options are being considered for Alternative 1:

Atlantic/Pomona Station Option – The Atlantic/Pomona Station Option would relocate the existing Atlantic Station to a shallow open air underground station with two side platforms and a canopy (**Figure 2.4**). This station design option would be located beneath the existing triangular parcel bounded by Atlantic Boulevard, Pomona Boulevard, and Beverly Boulevard. The excavation depth of the station invert would be approximately 20 to 25 feet from the existing ground elevation.

This option would also impact the guideway alignment and location of the tunnel boring machine (TBM) extraction pit. The underground guideway would be located east of Atlantic Boulevard and require full property acquisitions at its footprint between Beverly Boulevard and 4th Street. The alignment would connect with the base Alternative 2 alignment just north of the proposed Atlantic/Whittier station. The TBM extraction pit would be east of Atlantic Boulevard between Repetto Street and 4th Street. Limits for the excavation would occur between the TBM extraction pit and the intersection of Pomona Boulevard and Beverly Boulevard.

Montebello At-Grade Option – This design option consists of approximately one mile of at-grade guideway along Washington Boulevard between Yates Avenue and Carob Way in the city of Montebello. In this design option, after crossing Saybrook Avenue, the LRT guideway would daylight from underground to an aerial configuration to avoid disrupting existing Burlington Northern Santa Fe (BNSF) Railway tracks. The aerial guideway would continue parallel to Washington Boulevard, then merge into the center median east of Garfield Avenue. At Yates Avenue, the guideway would transition from aerial to an at-grade configuration and remain at-grade until terminating near Lambert Road in the city of Whittier. This design option includes an at-grade Greenwood station located west of Greenwood Avenue. The lead tracks to the MSF site option would also be at-grade. Alternative 1 with the Montebello At-Grade Option would have approximately 3.0 miles of underground, 0.5 miles of aerial, and 5.5 miles of at-grade alignment.

Source: Metro; ACE Team, June 2022.

Figure 2.4. Atlantic/Pomona Station Option

2.2.2 Alternative 2 Atlantic to Commerce/Citadel IOS

Alternative 2 would extend the Metro L (Gold) Line approximately 3.2 miles from the current terminus at Atlantic Boulevard to an underground terminal station at the Commerce/Citadel station in the city of Commerce with lead tracks connecting to the Commerce MSF site option. Alternative 2 would include a relocated/reconfigured Atlantic station and two new stations: Atlantic/Whittier (underground), and Commerce/Citadel (underground). The base Alternative 2 alignment includes approximately 3.0 miles of underground, 0.1 miles of aerial, and 0.1 miles of at-grade alignment.

An MSF and other ancillary facilities would also be constructed as part of the Project, including OCS, tracks, cross passages, ventilation structures, TPSSs, track crossovers, emergency generators, radio tower poles and equipment shelters, and other facilities along the alignment.

2.2.2.1 Guideway Alignment

Under Alternative 2, the guideway would follow the same alignment as under Alternative 1. The guideway would begin at the eastern end of the existing East Los Angeles Civic Center Station, transitioning from at-grade to underground at the intersection of South La Verne Avenue and East 3rd Street. The guideway would turn south and run beneath Atlantic Boulevard to approximately Verona Street and Olympic Boulevard. The underground guideway would then curve southeast, running under Smithway Street near the Citadel Outlets in the city of Commerce. The alignment would terminate at the Commerce/Citadel station with non-revenue lead tracks connecting to the Commerce MSF site option.

2.2.2.1.1 Design Option

One design option, the Atlantic/Pomona Station Option described in **Section 2.2.1.1.1** and shown on **Figure 2.4** is being considered for Alternative 2.

2.2.3 Alternative 3 Atlantic to Greenwood IOS

Alternative 3 would extend the Metro L (Gold) Line approximately 4.6 miles east from the current terminus at Atlantic Boulevard to an aerial terminal station at the Greenwood station in the city of Montebello. This alternative would include a relocated/reconfigured Atlantic station and three new stations: Atlantic/Whittier (underground), Commerce/Citadel (underground), and Greenwood (aerial). The base Alternative 3 alignment includes approximately 3.0 miles of underground, 1.5 miles of aerial, and 0.1 miles of at-grade alignment.

An MSF and other ancillary facilities would also be constructed as part of the Project, including OCS, tracks, cross passages, ventilation structures, TPSSs, track crossovers, emergency generators, radio tower poles and equipment shelters, and other facilities along the alignment.

Two design options for Alternative 3 are described below.

2.2.3.1 Guideway Alignment

Under Alternative 3, the guideway would follow the same alignment as under Alternative 1. The guideway would begin at the eastern end of the existing East Los Angeles Civic Center Station, transitioning from at-grade to underground at the intersection of South La Verne Avenue and East 3rd Street. The guideway would then turn south and run beneath Atlantic Boulevard to approximately Verona Street and Olympic Boulevard. The underground guideway would then curve southeast, running under Smithway Street near the Citadel Outlets in the city of Commerce. After crossing Saybrook Avenue, the guideway would daylight from underground to an aerial configuration. Depending on the MSF site option that is selected, the aerial guideway would continue parallel to Washington Boulevard, east of Garfield Avenue, and merge into the center median of Washington Boulevard (Commerce MSF site option) or merge into the center media of Washington Boulevard at Gayhart Street (Montebello MSF site option). The aerial guideway would terminate at the Greenwood station in the city of Montebello.

2.2.3.1.1 Design Option

Two design options described in **Section 2.2.1.1.1**, the Atlantic/Pomona Station Option and the Montebello At-Grade Option are being considered for Alternative 3. Alternative 3 with the Montebello At-Grade Option would have approximately 3.0 miles of underground, 0.5 miles of aerial, and 1.1 miles of at-grade alignment.

2.3 Maintenance and Storage Facilities

The Project has two MSF site options: the Commerce MSF site option and the Montebello MSF site option. One MSF site option would be constructed. The MSF would provide equipment and facilities to clean, maintain, and repair rail cars, vehicles, tracks, and other components of the system. The MSF would enable storage of light rail vehicles (LRVs) that are not in service and would connect to the mainline with one lead track. The MSF would also provide office space for Metro rail operation staff, administrative staff, and communications support staff. The MSF would be the primary physical employment centers for rail operation employees, including train operators, maintenance workers, supervisors, administrative, security personnel and other roles.

The Commerce MSF site option is located in the city of Commerce, and the Montebello MSF site option is located in the city of Montebello. The Commerce MSF site option is located where it could support any of the three Build Alternatives. The Montebello MSF site option is located where it could support either Alternative 1 or Alternative 3.

2.3.1 Commerce MSF

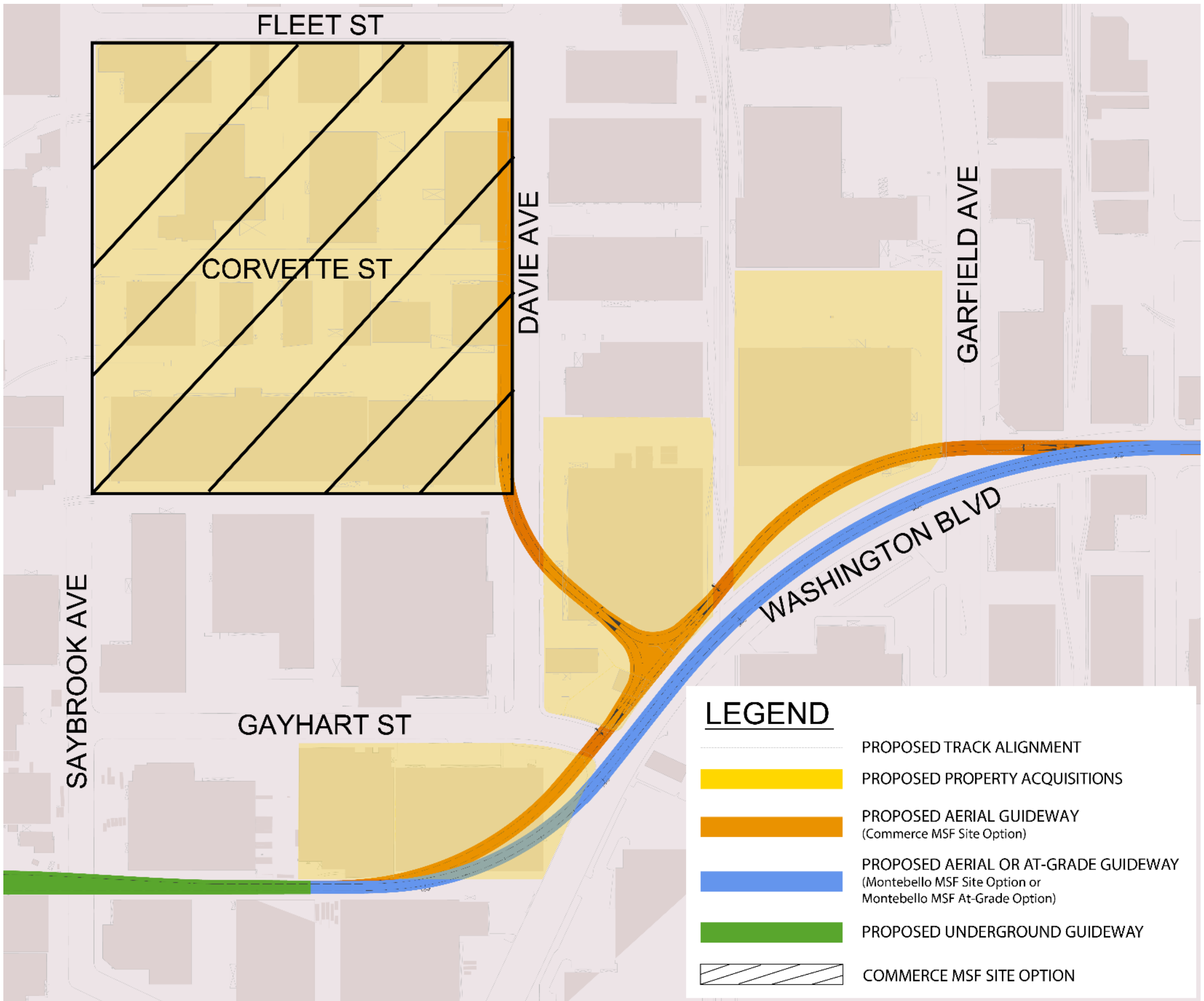
The Commerce MSF site option is located in the city of Commerce, west of Washington Boulevard and north of Gayhart Street. The site is approximately 24 acres and is bounded by Davie Avenue to the east, Fleet Street to the north, Saybrook Avenue to the west, and an unnamed street to the south. Additional acreage would be needed to accommodate the lead track and construction staging. As shown in a dashed line on **Figure 2.5**, the guideway alignment with the Commerce MSF site option would daylight from an underground to aerial configuration west of the intersection of Gayhart Street and Washington Boulevard and would run parallel to Washington Boulevard from Gayhart Street to Yates Avenue. The lead tracks to the Commerce MSF site option would be located northeast of the intersection of Gayhart Street and Washington Boulevard and extend in an aerial configuration and then would transition to at-grade within the MSF after crossing Davie Avenue. To construct and operate the Commerce MSF site option, Corvette Street would be permanently closed between Saybrook Avenue and Davie Avenue. Corvette Street is an undivided two-lane road and is functionally classified as a local street under the California Road System. The facility would accommodate storage for approximately 100 LRVs.

2.3.2 Montebello MSF

The Montebello MSF site option is located in the city of Montebello, north of Washington Boulevard and south of Flotilla Street between Yates Avenue and S. Vail Avenue. The site is approximately 30 acres in size and is bounded by S. Vail Avenue to the east, a warehouse structure along the south side of Flotilla Street to the north, Yates Avenue to the west, and a warehouse rail line to the south. Additional acreage would be needed to accommodate the lead track and construction staging. As shown on in a solid line on **Figure 2.5**, as with the Commerce MSF site option, the guideway alignment with the Montebello MSF site option would daylight from an underground to an aerial configuration west of intersection of Gayhart Street and Washington Boulevard. The alignment would be located further east than the alignment with the Commerce MSF site option. The aerial guideway for the Montebello MSF site option would transition to the median of Washington Boulevard at Gayhart Street. Columns that would provide structural support for the aerial guideway would be installed in the median of Washington Boulevard and would require roadway reconfiguration and striping on Washington Boulevard.

The lead tracks would be in an aerial configuration from Washington Boulevard, parallel S. Vail Avenue, and then transition to at-grade as it approaches the MSF. The facility would accommodate storage for approximately 120 LRVs.

The Montebello MSF At-Grade Option includes an at-grade configuration for the lead tracks to the Montebello MSF. This design option would be necessary if the Montebello At-Grade Option is selected under Alternative 1 or Alternative 3. In this design option, the lead tracks would be in an at-grade configuration from Washington Boulevard, paralleling S. Vail Avenue and remain at-grade to connect to the Montebello MSF site option. For this design option, through access on Acco Street to Vail Avenue would be eliminated and cul-de-sacs would be provided on each side of the lead tracks to ensure that access to businesses in this area is maintained. Acco Street is an undivided two-lane road and is functionally classified as a local street under the California Road System.



Source: Metro; ACE Team, June 2022.

Figure 2.5. Montebello MSF S-Curve Alignment

2.4 Ancillary Facilities

The Build Alternatives would require a number of additional elements to support vehicle operations, including but not limited to the OCS, tracks, crossovers, cross passages, ventilation structures, TPSS, train control houses, electric power switches and auxiliary power rooms, communications rooms, radio tower poles and equipment shelters, and an MSF. Alternatives 1, 2, and 3 would have an underground alignment of approximately 3 miles in length between La Verne and Saybrook Avenue. Per Metro's Fire Life Safety Criteria, ventilation shafts and emergency fire exits would be installed along the tunnel portion of the alignment. These would be located at the underground stations or public right-of-way (ROW). The alignment for Alternative 1 and Alternative 3 would travel along the median of the roadway for most of the route. The precise location of ancillary facilities would be determined in a subsequent design phase.

2.5 Proposed Stations

The following stations would be constructed under Alternative 1:

- Atlantic (Relocated/Reconfigured) – The existing Atlantic Station would be relocated and reconfigured to an underground center platform station located beneath Atlantic Boulevard south of Beverly Boulevard in East Los Angeles. The existing parking structure located north of the 3rd Street and Atlantic Boulevard intersection would continue to serve this station.
  - Atlantic Pomona Station Option – The Atlantic/Pomona Station Option would relocate the existing Atlantic Station to a shallow underground open-air station with two side platforms and a canopy. This station design option would be located beneath the existing triangular parcel bounded by Atlantic Boulevard, Pomona Boulevard, and Beverly Boulevard. The existing parking structure located north of the 3rd Street and Atlantic Boulevard intersection would continue to serve this station.
- Atlantic/Whittier – This station would be underground with a center platform located beneath the intersection of Atlantic and Whittier Boulevards in East Los Angeles. Parking would not be provided at this station.
- Commerce/Citadel – This station would be underground with a center platform located beneath Smithway Street near the Citadel Outlets in the city of Commerce. Parking would not be provided at this station.
- Greenwood – This station would be aerial with a side platform located in the median of Washington Boulevard east of Greenwood Avenue in the city of Montebello. This station would provide a surface parking facility near the intersection of Greenwood Avenue and Washington Boulevard.
  - Under the Montebello At-Grade Option, Greenwood station would be an at-grade station located west of the intersection at Greenwood and Washington Boulevard.
- Rosemead – This station would be at-grade with a center platform located in the center of Washington Boulevard west of Rosemead Boulevard in the city of Pico Rivera. This station would provide a surface parking facility near the intersection of Rosemead and Washington Boulevards.
- Norwalk – This station would be at-grade with a center platform located in the median of Washington Boulevard east of Norwalk Boulevard in the city of Santa Fe Springs. This station would provide a surface parking facility near the intersection of Norwalk and Washington Boulevards.
- Lambert – This station would be at-grade with a center platform located south of Washington Boulevard just west of Lambert Road in the city of Whittier. This station would provide a surface parking facility near the intersection of Lambert Road and Washington Boulevard.

Alternative 2 would include Atlantic (Relocated/Reconfigured), Atlantic/Whittier, and Commerce/Citadel stations as described above.

Alternative 3 would include Atlantic (Relocated/Reconfigured), Atlantic/Whittier, Commerce/Citadel, and Greenwood stations as described above.

Station amenities would include items in the Metro Systemwide Station Standards Policy (Metro 2018) such as station pin signs, security cameras, bus shelters, benches, emergency/information telephones, stairs, map cases, fare collection, pedestrian and street lighting, hand railing, station landscaping, trash receptacles, bike racks and lockers, emergency generators, power boxes, fire hydrants, and artwork. Escalators and elevators would be located in aerial and underground stations. Station entry portals would be implemented at underground stations. Station access would be ADA-compliant and also have bicycle and pedestrian connections. Details regarding most of these items, including station area planning and urban design, would be determined at a later phase.

2.6 Description of Construction

Construction of the Project would include a combination of elements dependent upon the locally preferred alternative. The major construction activities include guideway construction (at-grade, aerial, underground); decking and tunnel boring for the underground guideway; station construction; demolition; utility relocation and installation work; street improvements including sidewalk reconstruction and traffic signal installation; retaining walls; LRT operating systems installation including TPSS and OCS; parking facilities; an MSF; and construction of other ancillary facilities. Alternative 1 would include construction of bridge replacements over the San Gabriel and Rio Hondo Rivers.

In addition to adhering to regulatory compliance, the development of the Project would employ conventional construction methods, techniques, and equipment. All work for development of the LRT system would conform to accepted industry specifications and standards, including Best Management Practices (BMP). Project engineering and construction would, at minimum, be completed in conformance with the regulations, guidelines, and criteria, including, but not limited to, Metro Rail Design Criteria (MRDC) (Metro 2018), California Building Code, Metro Operating Rules, and Metro Sustainability Principles.

The construction of the Project is expected to last approximately 60 to 84 months. Construction activities would shift along the corridor so that overall construction activities should be relatively short in duration at any one point. Most construction activities would occur during daytime hours. For specialized construction tasks, it may be necessary to work during nighttime hours to minimize traffic disruptions. Traffic control and pedestrian control during construction would follow local jurisdiction guidelines and the Manual of Uniform Traffic Control Devices (MUTCD) standards. Typical roadway construction traffic control methods and devices would be followed including the use of signage, roadway markings, flagging, and barricades to regulate, warn, or guide road users. Properties adjacent to the Project's alignment would be used for construction staging. The laydown and storage areas for construction equipment and materials would be established in the vicinity of the Project within parking facilities, and/or on parcels that would be acquired for the proposed stations and MSF site options. Construction staging areas would be used to store building materials, construction equipment, assemble the TBM, temporary storage of excavated materials, and serve as temporary field offices for the contractor.

2.7 Description of Operations

The operating hours and schedules for Alternatives 1, 2, and 3 would be comparable to the weekday, Saturday and Sunday, and holiday schedules for the Metro L (Gold) Line (effective 2019). It is anticipated that trains would operate every day from 4:00 am to 1:30 am. On weekdays, trains would operate approximately every 5 to 10 minutes during peak hours, every 10 minutes mid-day and until 8:00 pm, and every 15 minutes in the early morning and after 8:00 pm. On weekends, trains would operate every 10 minutes from 9:00 am to 6:30 pm, every 15 minutes from 7:00 am to 9:00 am and from 6:30 pm to 7:30 pm, and every 20 minutes before 7:00 am and after 7:30 pm. These operational headways are consistent with Metro design requirements for future rail services.

2.8 No Project Alternative

The No Project Alternative establishes impacts that would reasonably be expected to occur in the foreseeable future if the Project were not approved. The No Project Alternative would maintain existing transit service through the year 2042. No new transportation infrastructure would be built within the GSA aside from projects currently under construction or funded for construction and operation by 2042 via the 2008 Measure R or 2016 Measure M sales taxes. The No Project Alternative would include highway and transit projects identified for funding in Metro's 2020 Long Range Transportation Plan (LRTP) and Southern California Association of Governments (SCAG) *Connect SoCal 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy* (2020 RTP/SCS). The No Project Alternative includes existing projects from the regional base year (2019) and planned regional projects in operation in the horizon year (2042).

3.0 METHODOLOGY

3.1 Industry Standards

Construction of the Project would include a combination of various alignment configurations (at-grade, aerial, and/or underground) dependent upon the Build Alternative.

In addition to adhering to regulatory requirements, development of the Project would employ conventional construction methods, techniques, and equipment. Project engineering and construction would, at minimum, be completed in conformance with the following regulations, guidelines, and criteria:

- Metro Rail Design Criteria (Metro 2018a)
- Metro Systemwide Station Design Standards Policy (Metro 2018b)
- California MUTCD (California Department of Transportation [Caltrans]) (Caltrans 2021)
- Greenbook: Standards for Public Works Construction (Public Work Standards et al. 2021)
- California Building Code (California Building Standards Commission 2021)
- California Green Building Standards Code Title 24, Part 11, Section 5.408.3 (CalGreen 2019)
- National Fire Protection Association (NFPA) Standard for Fixed Guideway Transit and Passenger Rail Systems (NFPA 2019; NFPA 2020)
- National Electrical Code (NFPA 70)
- American Railway Engineering and Maintenance of Way Association (AREMA) Standards (AREMA 2019)
- Metro Operating Rules
- California Public Utility Commission (CPUC) General Orders (Including but not limited to 88, 95, 143-B, and 164-D)
- Metro Sustainability Principles (Metro 2020)
- South Coast Air Quality Management District (SCAQMD) Rule 403 (SCAQMD 2005)
- SCAQMD Clean Air Act Rule 1403—asbestos regulation (SCAQMD 2019)
- National Pollutant Discharge Elimination System (NPDES) (United States Environmental Protection Agency [USEPA] (USEPA 2021)
- Standard Urban Stormwater Mitigation Plan (SUSMP) (Los Angeles Regional Water Quality Control Board 2000)

- Stormwater Pollution Prevention Plan (SWPPP) (USEPA 2021)

Metro's contractor would establish construction quality and safety programs for the Project. A quality assurance program detailing inspector oversight and approval protocols would be produced to ensure Project elements are built as designed by the Engineer of Record and therefore to the standards set forth by the MRDC, building codes, and regulatory frameworks as it relates to the construction activity's design discipline. To reduce the risk related to bodily injury and fatalities of construction workers, Metro's contractor would establish a construction safety program that would conform at a minimum to the provisions set forth by the Occupational Safety and Health Administration (OSHA) and the California Occupational Safety and Health Administration (Cal/OSHA). Additionally, Metro's contractor would ensure the orderly management of construction materials, tools, and equipment at job sites and staging areas (i.e., house-keeping) to reduce the risk of injury related to slips, trips, and falls.

3.2 Construction Sequencing

The construction of the Project is expected to last approximately 60 to 84 months since all Build Alternatives have a tunneling component that is anticipated to take the longest to build.

Preconstruction would include geotechnical and hazardous material field surveys to identify potential hazards and constraints related to the design and construction of the Project. Construction would then commence with utility and site preparation. After demolition and site clearing, conflicting utilities would be relocated or protected-in-place, followed by any temporary roadway reconfiguration or restriping to accommodate temporary or permanent design elements related to the Project. The launching of the TBM machine would occur west of Saybrook Avenue and south of Gayhart Street under the base Alternatives. Depending on the alternative, the aerial alignment construction would commence along Washington Boulevard. Cut-and-cover excavation, roadway decking, temporary shoring, mass excavation, and underground construction would occur along Smithway Street at the TBM launching pit and then the TBM receiving pit west of Atlantic Boulevard and south of Pomona Boulevard. Tunnel boring could occur simultaneously with aerial and at-grade construction. It is estimated that tunnel boring would occur at a minimum rate of approximately 30 feet per day, aerial construction would occur in roughly 0.5-mile segments, and at-grade construction would occur in roughly 1-mile segments. Stations would be built simultaneously with guideway construction. Track installation and LRT operating systems including elements such as OCS, TPSS, train control house (among others) would generally occur during and after station construction. Station art and ancillary facilities, final street improvements, and landscaping would typically follow guideway construction.

Most construction activities would occur during daytime hours. For specialized construction tasks, it may be necessary to work during nighttime hours to minimize traffic disruptions; construction work during nighttime hours would be conducted in accordance with community input. Traffic and pedestrian control measures during construction would follow local jurisdiction guidelines and MUTCD standards. Industry standard roadway construction traffic control methods and devices would be followed including the use of signage and barricades to regulate, warn, or guide road users.

Table 3-1 provides a summary of typical construction activities to support LRT construction, describing the activity, typical duration, description of construction activities, and equipment required. This summary is meant to be representative, not all inclusive.

Table 3-1. Summary of Typical Light Rail Transit Construction Activities

Activity	Typical Duration (Total Months)	Description	Equipment Required
At-Grade Alignment			
Utility Relocation	16-24	Relocate utilities from temporary and permanent elements related to the construction and/or operation of the Project.	Saw cutter, backhoes, jackhammers, excavators, hydro excavation trucks, dump trucks, cement trucks, asphalt pavers, forklift, manlift, cranes, bucket trucks, cable-pull trucks
Construction Staging Laydown Yard	3-6	Demolish existing buildings to store construction equipment and materials including the TBM, office space.	Bulldozer, excavators, dump trucks, backhoes
Roadway	12-36	Reconfigure roadway, demolition of existing roadway installation of curb and gutter and other public ROW improvements. Install relocated traffic signals and stripe roadway.	Excavators, backhoes, compactors, milling machines, jackhammers, asphalt pavers, pavement breakers, manlifts, forklifts, dump trucks, cement trucks, road-striping trucks
Guideway	24	Install slab and track.	Forklift, dump trucks, excavators, cement trucks, rail installation equipment, and truck mounted welders
Station Construction	12-18	Install mechanical, electrical, and plumbing (MEP), canopies, faregates, ticketing, finishes, stairs, walkways, and station artwork.	Forklifts, generator sets, loaders, welders, cement trucks, cranes, manlifts
Light Rail Transit Systems Installation	8-12	Install OCS, OCS electrical and communication ducts, OCS foundations, TPSS, and gate-arms.	Excavators, backhoes, forklifts, Hi-Rail vehicles, cranes, manlifts
Parking Facilities	3-6	Parking facilities and landscaping	Cranes, forklifts, cement trucks, pavement breakers, diamond saws, compressors, paving machines, loaders, haul trucks
Maintenance and Storage Facility	18-24	Install mechanical, electrical, and plumbing (MEP), special track, specialized washing equipment, and rebar installation, and concrete pours.	Crane, forklifts, cement trucks

Activity	Typical Duration (Total Months)	Description	Equipment Required
Aerial Alignment			
Utility Relocation	12-18	Relocate underground and/or overhead utilities from temporary and permanent elements related to the construction and/or operation of the Project	Saw cutter, backhoes, jackhammers, excavators, hydro excavation trucks, dump trucks, cement trucks, asphalt pavers, cranes, bucket trucks, forklift, manlift, cable-pull trucks
Civil Roadway	12-24	Reconfigure roadway to accommodate aerial guideway. Demolish existing roadway installation of curb and gutter, sidewalks and drainage. Install relocated traffic signals and stripe roadway.	Excavators, backhoes, compactors, milling machines, jackhammers, asphalt pavers, pavement breakers, manlifts, forklifts, dump trucks, cement trucks, road-striping
Mechanically Stabilized Earth Walls	6-12	Structure would allow for transition from underground or at-grade into an aerial configuration.	Excavators, cranes, compactors, cement truck, forklifts, dump trucks
Station Construction	18-24	Install rebar, MEP, fire and life safety systems, canopies, faregates, ticketing, finishes, elevators, escalators, concrete pours, and station artwork. Construction of pedestrian bridge connection for Greenwood station.	Forklifts, cranes, generator sets, loaders, welders, cement trucks, manlifts
Elevated Guideway	12-18	Install foundation columns, falsework, track slabs, track, and elevated sections.	Cast-in-drilled-hole (CIDH) drill rig or pile driver, cranes, forklifts, compressors, haul trucks, manlifts, loaders, cement trucks
Bridges	12-18	Install bridges for Alternative 1 over the Rio Hondo and San Gabriel River. Install foundation, excavate abutment, approach slab, erect falsework, install rebar, pour concrete for the superstructure.	Drill rig or pile driver, cranes, forklifts, haul trucks, manlifts, loaders, cement trucks, and grouting equipment
Light Rail Transit Systems Installation	8-12	Install catenary overhead wire system, TPSS, and gate arms.	Excavators, backhoes, forklifts, Hi-Rail vehicles, cable pull truck, cranes, manlifts

Activity	Typical Duration (Total Months)	Description	Equipment Required
Underground Alignment			
Utility Relocation	12-18	Relocate and hang underground utilities from temporary and permanent elements related to the construction and operation of the Project.	Saw cutter, backhoes, jackhammers, excavators, hydro excavation trucks, dump trucks, cement trucks, pavers, forklift, manlift, jack and bore, horizontal directional drilling (HDD) drill
Cut and Cover Construction	18-24	Supports the construction of the TBM launching and receiving pit, underground stations. Install soldier piles for beam and lag support of excavation (SOE) and excavation. Cover excavation with temporary decking.	Mobile cranes tower cranes, excavators, CIDH drill rigs or pile drivers, skid steers, backhoes, loaders, dump trucks
Bored Tunnel	15-16 (3-4 Month Lag on Starting 2nd Bore)	Underground guideway construction.	TBM, rail mounted equipment and material/labor/tunnel liner delivery vehicles, spoil retrieval conveyors, earth moving vehicles, substation, air compressor, grouting plant, soil conditioning plant, cranes, drilling rigs, concrete mixers and pumping equipment, flatbed trucks, electric power supply equipment, tunnel ventilation equipment, sand and gravel delivery trucks, dump trucks, ripper teeth or roadheader mounted excavators, drill jumbo, grouting equipment, shotcrete pump and nozzle
Station Construction	36-48	Install MEP, rebar, canopies, faregates, ticketing, finishes, elevators, escalators, and station artwork.	Tower crane, skid steer, CIDH drill rig or pile driver, Forklifts, generator sets, loaders, welders
Light Rail Transit Systems Installation	8-12	Install TPSS, and signal switches.	Forklifts, skid steer, Hi-Rail vehicles
Underground Guideway	12-18	Install special trackwork and track.	Forklifts, compressors

Source: CDM Smith/AECOM JV and HNTB/Cordova JV, 2021.
Key:
CIDH = cast-in-drilled hole; HDD = horizontal directional drilling; MEP = mechanical, electrical, and plumbing;
OCS = overhead catenary system; SOE = support of excavation; TBM = tunnel boring machine

3.3 Construction Scenarios

This section provides an overview of the typical construction activities and sequencing that would occur to build an LRT system based on the Advanced Conceptual Design of this Recirculated Draft EIR (Volume 2). These methods are consistent with how other Metro LRT projects have been built. Final design and actual construction methods, sequencing, and equipment may vary, depending in part on how contractors choose to implement their work to be most cost-efficient, within the parameters set forth in bid.

Construction of the Project would include a combination of various alignment configurations (at-grade, aerial, and/or underground) dependent upon the Build Alternative and design option(s). The major construction activities include guideway construction (at-grade, aerial, underground); decking and tunnel boring for the underground guideway; station construction; street improvements including sidewalk reconstruction and traffic signal installation; mechanically stabilized earth (MSE) walls; LRT operating systems installation including TPSS and OCS; parking facilities; an MSF; demolition; utility relocation and installation work; and construction of other ancillary facilities. Alternative 1 would include construction of bridge replacements over the Rio Hondo and the San Gabriel River.

Construction could occur simultaneously on different parts of an alignment to minimize construction times. Working hours would be varied to meet any special circumstances. An increase in noise level would occur during construction of the Build Alternatives, the MSF options, and design options. The predicted corridor-wide noise impacts are summarized in the Eastside Transit Corridor Phase 2 Noise and Vibration Impacts and Attachment A of the report. The section further describes and illustrates representative noise sensitive receptors, construction noise impacts, and the mitigation measures incorporated to reduce these noise impacts to less than significant.

3.3.1 Guideway Construction

3.3.1.1 At-Grade Guideway

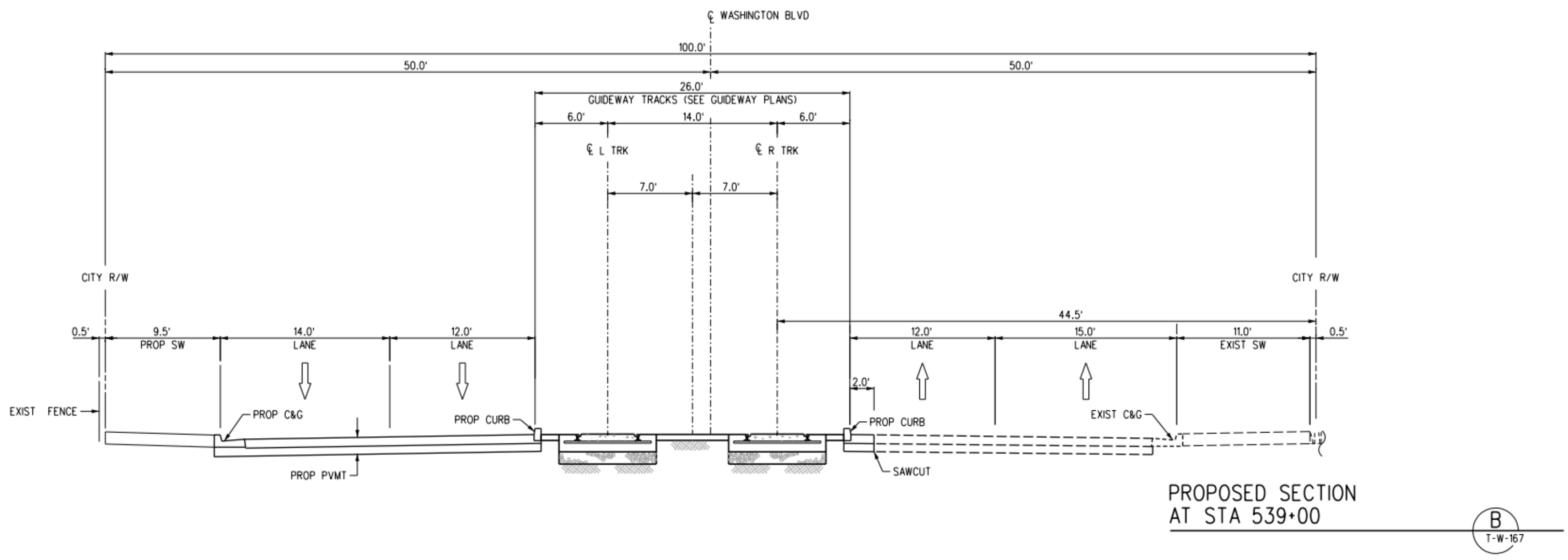
The at-grade guideway would be located at or slightly above the existing ground elevation. The base Alternative 1 would have an at-grade guideway from Montebello Boulevard to the terminus at Lambert station. The location for constructing the at-grade guideway is illustrated on **Figure 2.1**. If the Montebello At-Grade Option is selected under Alternative 1 or Alternative 3, the at-grade guideway would begin at Yates Avenue. The construction of the at-grade guideway would involve the use of embedded track and possibly ballasted track (**Figure 3.1** through **Figure 3.3**). It is anticipated that embedded track would be used for the majority of the guideway with some use for ballasted track.

Source: Metro; CDM Smith/AECOM JV, 2019.

Figure 3.1. Example of At-Grade Guideway with Embedded Trackwork through Intersection on Existing Eastside Line

Source: Metro; CDM Smith/AECOM JV, 2019.

Figure 3.2. Example of At-Grade ROW with Ballast Track



Source: HNTB/Cordova JV, 2021.

Figure 3.3. Example of an At-Grade Guideway Cross Section in Street ROW with Embedded Track

The construction method for embedded track (**Figure 3.1**) would begin with demolition of the existing median or roadway section. In those locations where embedded track is planned to be installed within the street, construction would involve excavation of the existing median paving and subgrade material, compaction or replacement with imported soils, and preparation of the rail subgrade. The center median would be sectioned off from the rest of the street with k-rail, and construction staging would occur in the center median. One-mile construction segments are likely to be recommended to minimize cost and schedule. A similar construction method has been employed on other Metro LRT Projects. Equipment would generally consist of rubber-tired excavators, loaders, rubber-tired compactors, graders and small bulldozers, and water trucks for dust control. Construction vehicles may temporarily impede traffic mobility in the areas of construction. Traffic detour and designated truck routes would be required during construction. To minimize any disruptions to traffic, traffic management and traffic control measures would be implemented with coordination and involvement from various jurisdictions before construction would occur. Refer to the Eastside Transit Corridor Project Phase 2 Transportation and Traffic Impacts Report for further details.

Construction of embedded track would then proceed by placement of rebar (reinforcing metal bars) and the first layer of concrete. The rails would then be positioned over the first layer of the track slab supported on steel ties. The rails would be lined in an elastomeric boot (i.e., rubber boot or rail boot), thereby encapsulating the rail surfaces except for the head and gauge face. This would provide stray current protection. The second layer of the track slab would then be placed between and to the sides of the rails. Equipment requirements would include transit mix concrete trucks and concrete pumps, and flatbed trucks to deliver the rails and reinforcing steel. The rails and ties would be placed with specialized rubber-tired equipment.

For locations where a dedicated ROW median is to be created and ballasted track installed, construction would involve excavation of the existing paving and subgrade material, compaction or replacement with imported soils, and preparation of the rail subgrade. Equipment would generally consist of rubber-tired excavators, loaders, rubber-tired compactors, graders and small bulldozers, and water trucks for dust control. The construction method for ballasted track would consist of one layer of compacted subbase material plus ballast. Ballast would be imported by truck and tamped in place with special equipment. Rails and ties would be imported by truck and then placed with specialized rubber-tired equipment. Local rail storage areas would be necessary for necessary for short-term storage and to facilitate placement and welding of rail.

3.3.1.2 Aerial Guideway

Aerial structures would typically be constructed of reinforced cast-in-place concrete, but steel girders or other specialized construction methods might be used for long spans or in special circumstances. The rail would be fastened directly to the concrete plinths on a cast-in-place concrete bridge deck, or a separately placed slab on a steel beam bridge, or a pre-cast concrete bridge. The locations of aerial guideway construction are illustrated on **Figure 2.1** (Alternative 1) and **Figure 2.3** (Alternative 3).

Aerial structures (**Figure 3.4** and **Figure 3.5**) are constructed in several stages. The first stage involves sectioning off the road with k-rail and then installing piles that would support the weight of the structure and the loads that would be carried on it. The piles are either long steel or reinforced concrete poles (typically about 12 to 15 inches in diameter) that are driven into the ground by vibratory or pile driving equipment or, alternatively, CIDH piles. CIDH pile construction involves the drilling of shafts that are up to ten feet in diameter, inserting a rebar cage inside the shaft with casing dependent on soil conditions, filling it with concrete, and extracting the casing as concrete is placed.

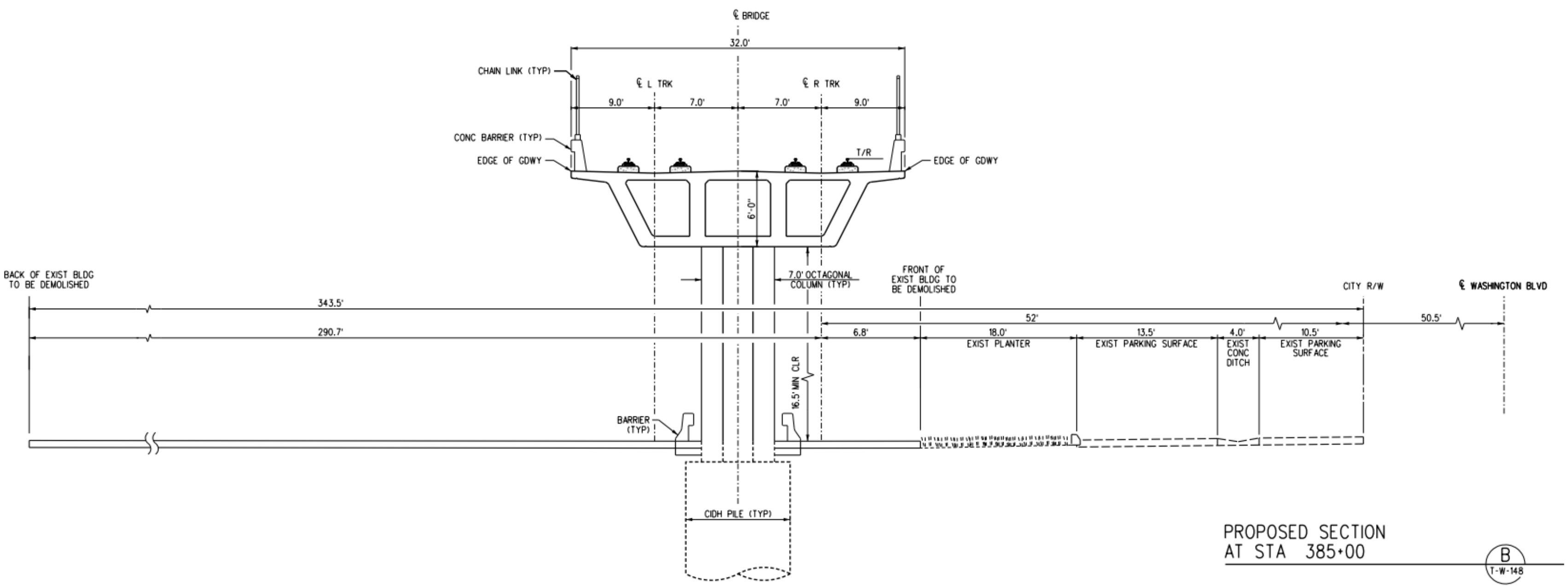
If driven piles are utilized, the second stage of construction involves the construction of the pile cap that joins all the piles. The pile cap is constructed of reinforced concrete and is approximately four to five feet thick. CIDH piles may or may not require a pile cap depending upon the structural loads to be supported.[1]

The third stage involves the construction of the columns. Columns are constructed using reinforced concrete, which is typically poured inside a reusable steel form. The shape of the column can vary; however, a circular column approximately seven to nine feet in diameter is generally used.

The fourth stage of construction involves the placement of the aerial girders (pre-cast concrete) or cast-in-place spans. The girders provide the horizontal support for the guideway. The pre-cast girders are lifted into place by large cranes and secured to the columns. Erection of these girders over active roadways is typically done at night to minimize traffic disruptions. Heavy cranes, generally rubber-tired, would be used for the erection of the girders. Due to their size, special staging areas close to the site would be needed to set up the cranes and to temporarily store the girders. Once the girders have been placed, a concrete slab would be placed, and the rails affixed to it.

Cast-in-place concrete spans would require the erection of falsework (framing) to support the forms into which concrete is poured. Depending on the length of the spans, falsework can be several feet deep. If the bridge is spanning an active roadway, then the bridge must be designed with sufficient clearance under the falsework to allow traffic to pass. Alternatively, clearance might be temporarily reduced during construction and trucks and other large vehicles may need to be detoured.

1 Regular CIDH piles may require a pile cap just like driven piles. The purpose of the pile cap is to distribute the structural load to two or more piles. However, large diameter CIDH piles which do not require a pile cap are sometimes used. These piles can be as large as, or even larger than, the column it supports; in these situations, a single pile is designed to withstand all the forces from the column and there is no need to build a pile cap. These piles can be as large as, or even larger than, the column it supports; in these situations, a single pile is designed to withstand all the forces from the column and there is no need to build a pile cap.



Source: HNTB/Cordova JV, 2021.

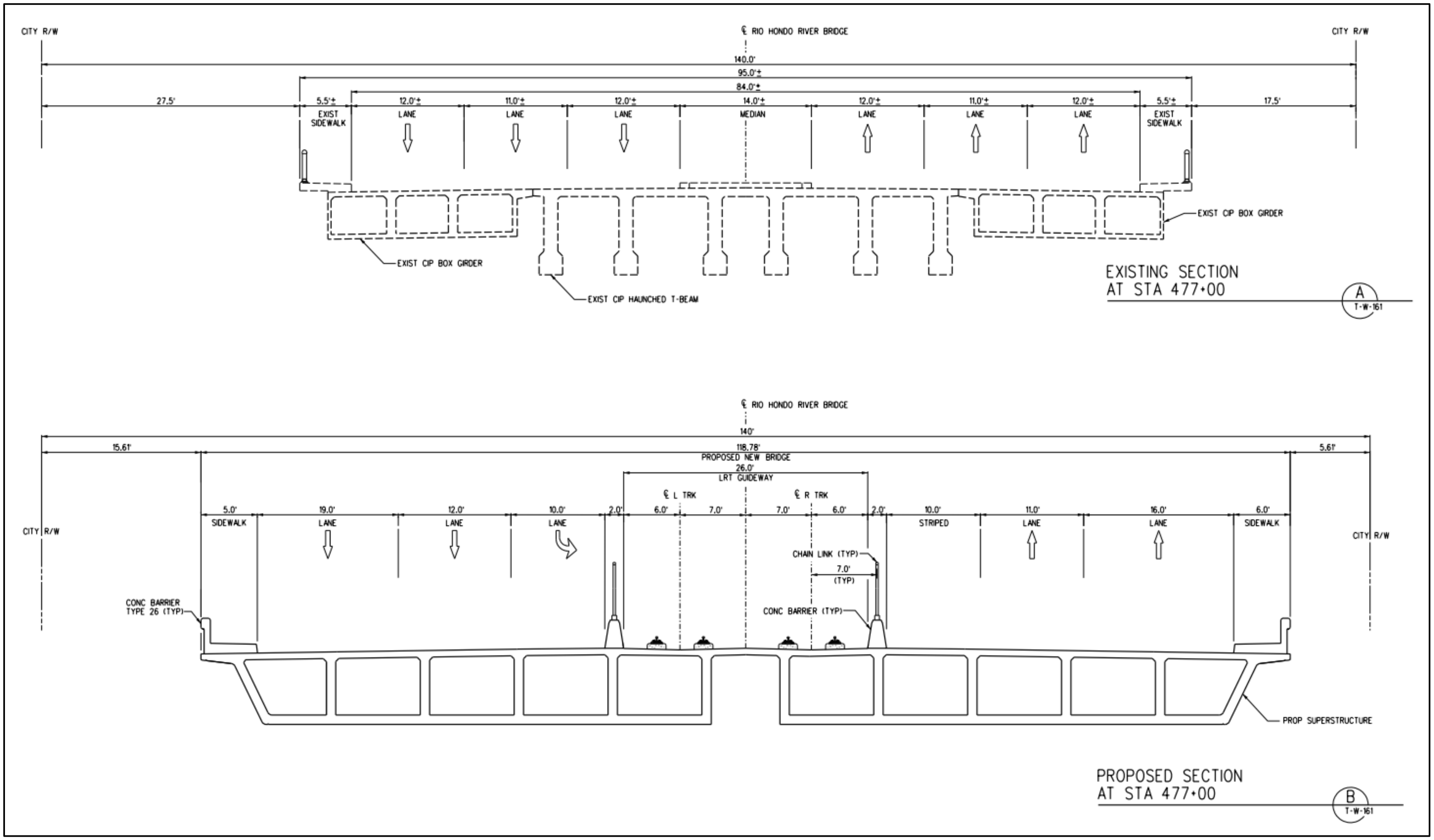
Figure 3.4. Example of an Aerial Structure Cross Section

Figure 3.5. Example of an Aerial Structure

Equipment required for aerial guideway construction would include drilling rigs, possibly specialized water jet excavators, trucks to remove excavated soil, transit mix concrete trucks and concrete pumps, specialized truck trailers to deliver pre-cast concrete beams, cranes, trucks to deliver forms, reinforcing steel, pavement saws, pre-cast concrete post tensioning jacks and related equipment, and water trucks for dust control. Construction vehicles may temporarily impede traffic mobility in the areas of construction. Traffic detours and truck routes would be required during construction. To minimize any disruptions to traffic, mitigation of potential traffic adverse effects and traffic management and control measures would be implemented with coordination and involvement from the various jurisdictions within the DSA before construction would occur.

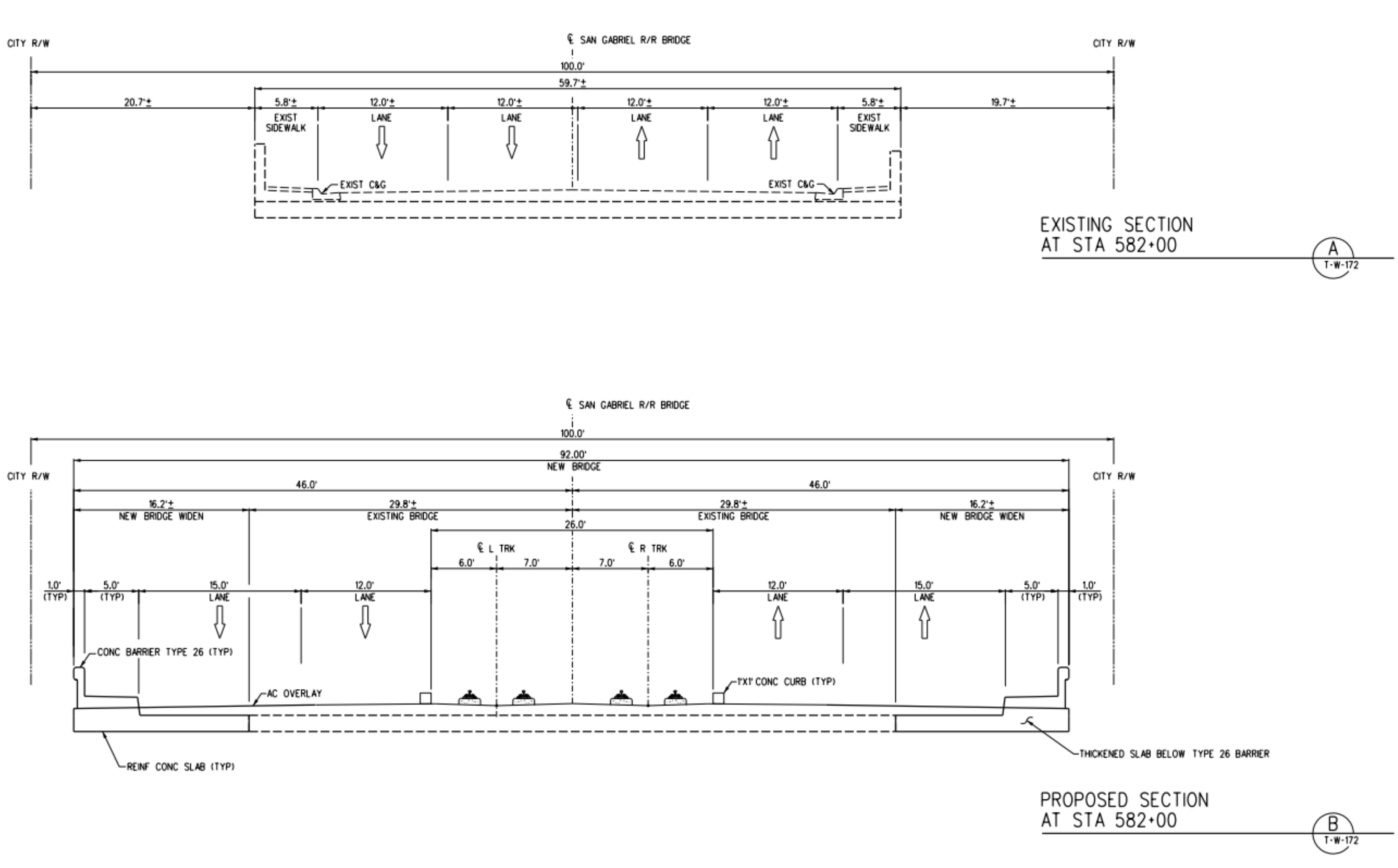
3.3.1.2.1 Bridges over Waterways

Replacement of bridges over the Rio Hondo and San Gabriel River would be required for Alternative 1. Construction for both bridges would involve removal of the existing bridge and construction of a new structure to carry both the LRT guideway and the roadway (**Figure 3.6** and **Figure 3.7**). An example of construction of an LRT bridge over a waterway is shown in **Figure 3.8**.



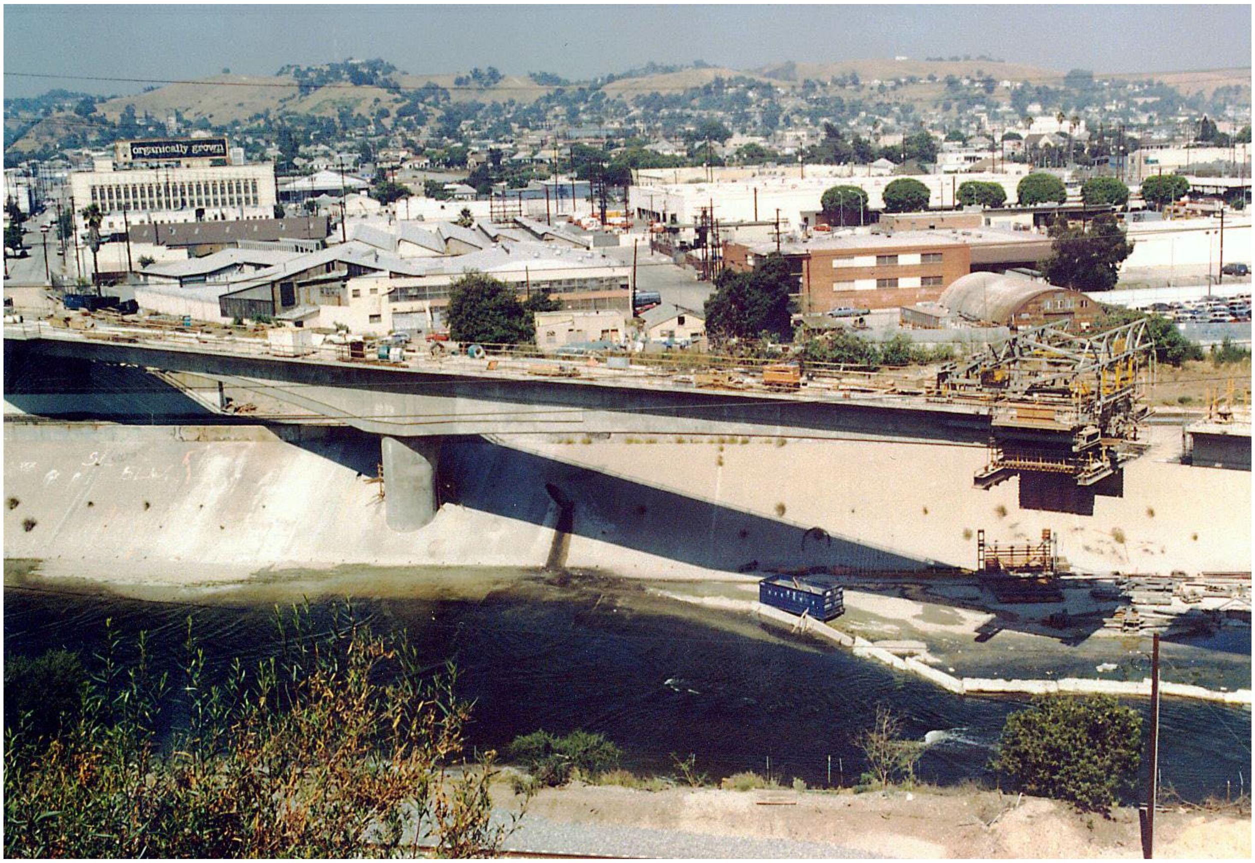
Source: HNTB/Cordova JV, 2021.

Figure 3.6. Alternative 1 over Rio Hondo – Bridge Replacement



Source: HNTB/Cordova JV, 2021.

Figure 3.7. Alternative 1 over San Gabriel River – Bridge Replacement



Source: Metro; CDM Smith/AECOM JV, 2019.

Figure 3.8. Example of LRT Bridge Construction over a Waterway over the Los Angeles River at Chinatown

Demolition of the existing substructure and construction of the bridge would be sequenced to maintain traffic on Washington Boulevard. During the construction of the new bridge, portions of the existing substructure would remain in place with a temporary reduction of lanes to maintain traffic. Temporary or permanent shoring would be required for construction of the bridge abutments. Construction of cast-in-place concrete box girder bridge would require placement of temporary falsework supports. Pre-cast girder or steel girder construction may be completed from the channel banks and causeway(s) within the riverbanks but could be facilitated with temporary supports.

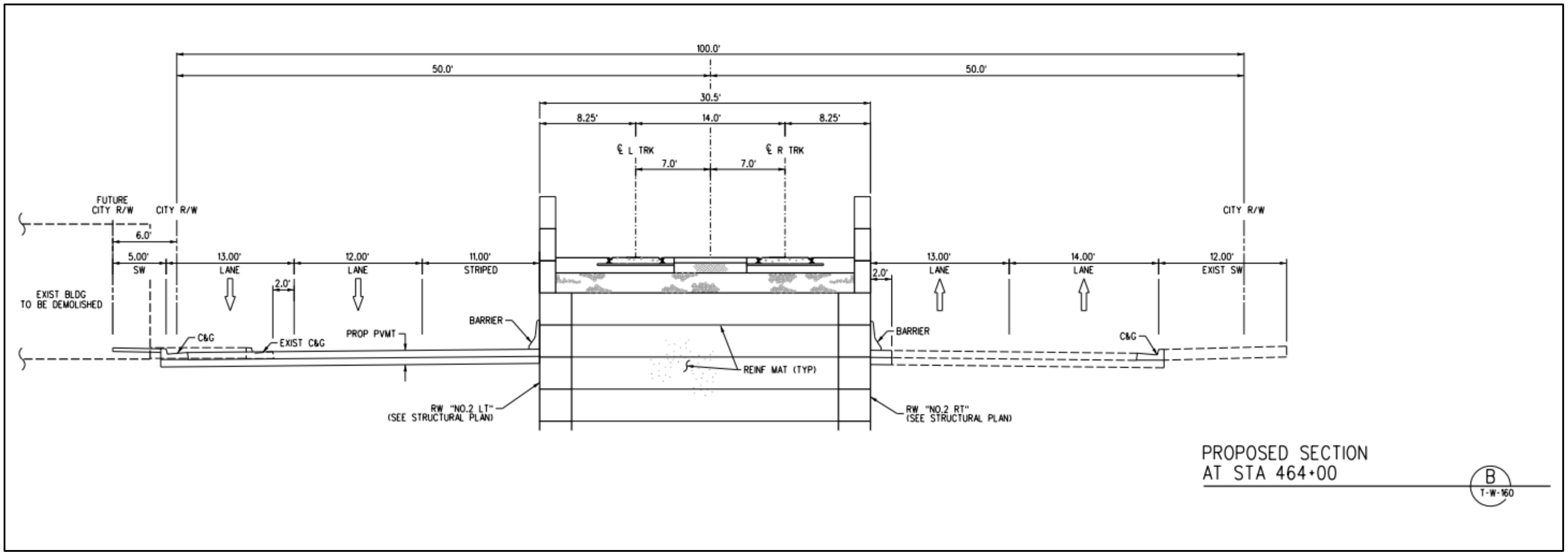
The aerial bridge substructures for the Rio Hondo and San Gabriel River bridges would require deep foundations. The proposed Rio Hondo bridge replacement would be wider than the existing bridge by approximately 12 feet on both sides and would include one column in the Rio Hondo river channel and one column in the spreading grounds. The San Gabriel River bridge replacement would be wider than the existing bridge by approximately 16 feet on both sides. A total of four bridge piers within the San Gabriel River would be replaced but may be located out of the main river channel. If groundwater is encountered during excavation for replacement bridge piers, the walls of the excavation would be supported with the use of drilling muds, or the "wet method of construction." With this method, the hole is kept filled with a drilling fluid during the entire operation of drilling the hole and placing the reinforcing and concrete. The drilling fluid may consist of water if the hole is stable against collapse, or a prepared slurry designed to maintain stability of the hole. The drilling slurry is formed by adding either mineral bentonite or synthetic polymers to water and is maintained inside the drilled hole at least five or more feet higher than the groundwater level. Mitigation measures supporting bridge construction are identified in the Eastside Transit Corridor Phase 2 Hydrology and Water Quality Impacts Report.

Environmental permits would be required for the construction of bridges over the waterways and potentially include the list below. Additionally, mitigation measures that would lessen potential impacts on roosting bats and migratory birds during bridge construction are identified in the Eastside Transit Corridor Phase 2 Biological Resources Impacts Report.

- United States Army Corps of Engineers Section 404/408 Permits
- United States Fish and Wildlife Service
- Department of Fish and Wildlife Lake and Streambed Alteration Notification (Sect. 1601 of the California Fish and Game Code)
- Los Angeles Regional Water Quality Control Board (LARWQCB)
- County of Los Angeles, Department of Public Works Flood Control District

3.3.1.2.2 Retained Fill Guideway Construction

Sections of retained fill guideway (**Figure 3.9**) would be constructed at the transitions between the aerial and at-grade segments, or in the central portion of an extensive aerial structure. In general, the transitions would be about 800 to 1,000 feet in length. Concrete retaining walls or MSE walls (or other similar materials) would be constructed on the sides of the guideway. Fill material would be placed between the retaining walls to provide a surface for the guideway.



Source: HNTB/Cordova JV, 2021.

Figure 3.9. Typical Retained Fill Guideway Cross Section

Retaining Walls

Concrete retaining wall construction would commence with excavation for wall footings. This excavation would normally be performed with backhoes or bulldozers. Due to seismic design or wall height requirements, retaining wall foundations may require pile foundations. The piles would be driven into the ground by vibratory or pile driving equipment, or CIDH piles would be used. CIDH pile construction would involve the drilling of shafts up to ten feet in diameter, inserting a rebar cage inside the shaft, and filling it with concrete. The walls would be constructed by erecting forms (wood or pre-fabricated), then placing and securing the necessary reinforcing steel, and then filling the forms with concrete. Reinforcing steel is generally fabricated, pre-bent, and delivered to sites where it is installed by cranes. Prefabricated forms would be set in place with cranes. Wood forms would be constructed on-site. Concrete would be delivered in truck mixers and is usually pumped into the forms.

In the case of retained fill guideway, once the retaining walls on either side of the guideway are completed, the space between the walls is filled with embankment material delivered by truck or other earth-moving equipment. The fill material is compacted with sheep's-foot and rubber-tired rollers. In the case of standalone retaining walls, the space behind the wall would be backfilled after construction of the wall to meet the original ground level. The excess material would be excavated using bulldozers, earthmovers, front-end loaders and tractor-trailer rights. Excess material would be transported to nearby Metro-approved disposal sites.

Alternative types of retaining walls such as MSE (or other similar materials) would not require forms, reinforcing steel, or concrete. With these walls, the embankment material forms a part of the structure and is constructed in conjunction with the walls.

3.3.1.3 Underground Guideway Construction

The locations of underground guideway construction are illustrated on **Figure 2.1** (Alternative 1), **Figure 2.2** (Alternative 2), and **Figure 2.3** (Alternative 3). There are two types of underground construction methods that are typically utilized for Metro rail projects, cut and cover construction and bored tunnel construction.

3.3.1.3.1 Cut and Cover Construction

Cut and cover activities involve the excavation of a shallow underground guideway from the existing street surface followed by the building of a temporary roadway surface to allow cross traffic (i.e., decking) while the remainder of the underground construction continues. Such activities are used for construction of underground stations, tunnel boring launch sites and excavation pits, and for short tunnel segments typically less than one mile. Underground construction is typically only used when construction of at-grade or aerial guideway is not possible due to constraints. The following are the main construction elements and activities for cut and cover guideway construction:

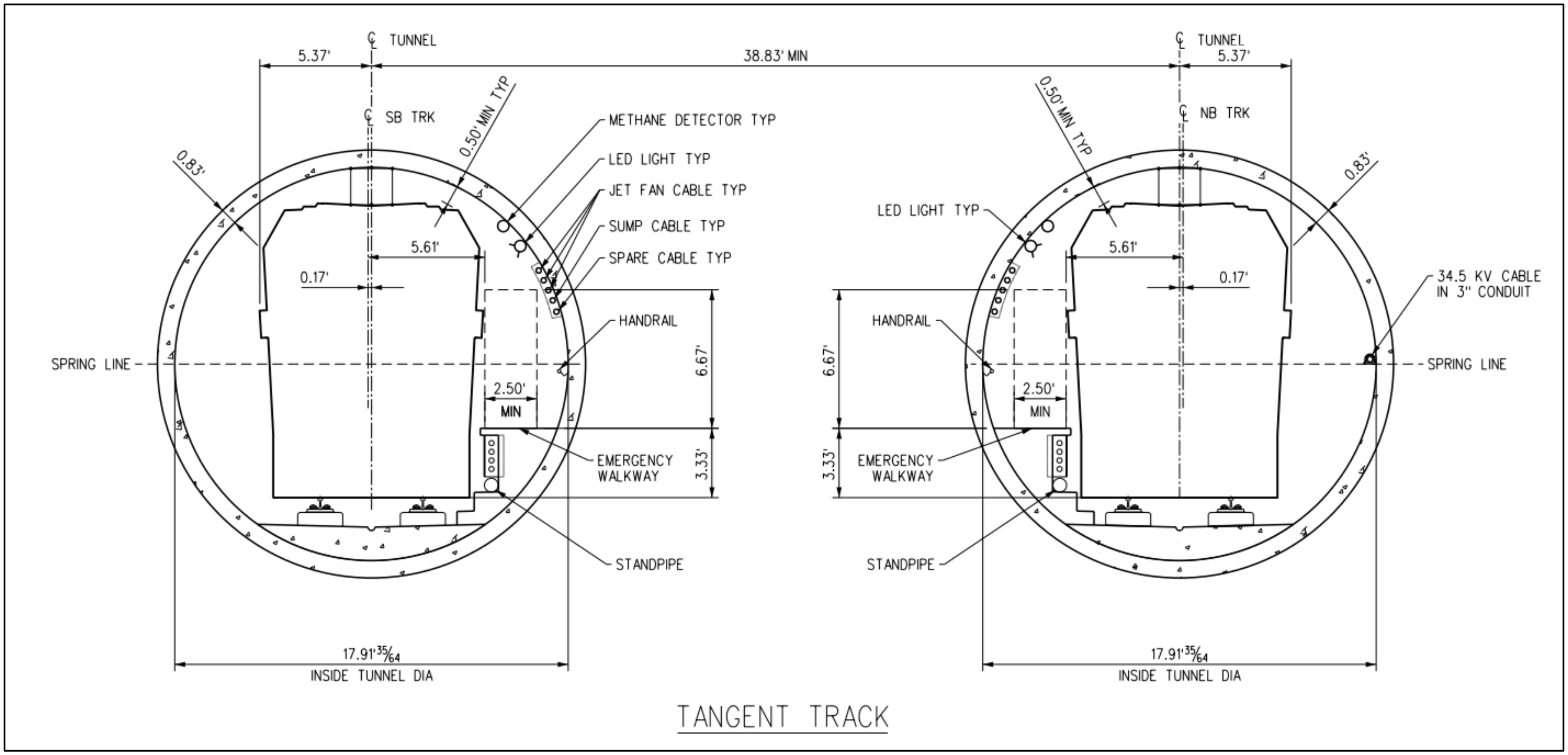
- Utility relocation or protection-in-place and hanging where cut and cover method would be used
- Temporary traffic reconfiguration and demolition of existing street along cut and cover segments
- Soldier pile installation involving shoring on both sides of the roadway to support the roadways and adjacent building foundations during construction
- Deck installation involving 12 feet of excavation below grade and construction of reinforced concrete suspended slab supported by beams and girders
- Initial station excavation from surface using large excavators, installation of struts
- Initial station excavation from below the surface and installation of lagging
- Stockpiling of excavated material that is deemed suitable for reuse as backfill material.
- Station excavation to lower levels
- Construction of tunnel and/or underground station facilities
- Backfilling and restoring the surface once the facilities are completed
- Imported fill supported by soldier pile and lagging with permanent retaining walls constructed where the guideway transitions from at-grade to underground
- Installation of duct bank and underdrains in cut and cover segment as required
- Installation of embedded trackwork and special trackwork as required
- Overhead conductor rail (OCR), signaling, train control and communications
- Testing and start up

Cut and cover construction includes impacts along the entire alignment during the early stages of construction, including reduced lanes and detours. After the deck has been constructed, impacts could be reduced to little or no impact.

3.3.1.3.2 Bored Tunnel Construction with Tunnel Boring Machine

The underground guideway would typically contain two twin bored tunnels (**Figure 3.10**). These bored tunnels would be constructed using a TBM. TBMs are large-diameter horizontal drills that continuously excavate circular tunnel sections (**Figure 3.11**). Bored tunnel construction activities at the surface would typically be limited to the TBM launch sites, extraction sites, and at stations (**Figure 3.12**). The following are the main construction elements and activities for bored tunnel construction:

- Utility relocation at TBM launch and extraction sites
- Temporary traffic reconfiguration and demolition of existing street at TBM launch and extraction sites
- Excavation of tunnel boring launch site four to six acres or greater, which can be located at the site of an underground station or crossover box
- For each tunnel lining installed, the TBM is advanced a small distance (four to five feet) using hydraulic jacks, which pushes against the previously installed tunnel lining ring; jacks are retracted, and another tunnel lining ring is erected
- TBM advances about 30 feet per day
- TBM is advanced and process is repeated until the entire length of the tunnel has been excavated
- TBM is extracted at the end of the tunnel segment at an underground station or crossover construction site or at an extraction pit
- Construction of underground stations is typically by cut and cover construction methods
- Cross passages between tunnels are typically mined using a sequential excavation method
- MSE retaining walls are constructed where the guideway transitions from at-grade to aerial
- Transition from at-grade to underground in trench requiring soldier pile and lagging SOE and reinforced concrete structure
- Installation of duct bank and underdrains as required
- Install embedded trackwork
- OCR, signaling, train control, and communications
- Testing and start up when used over a short distance

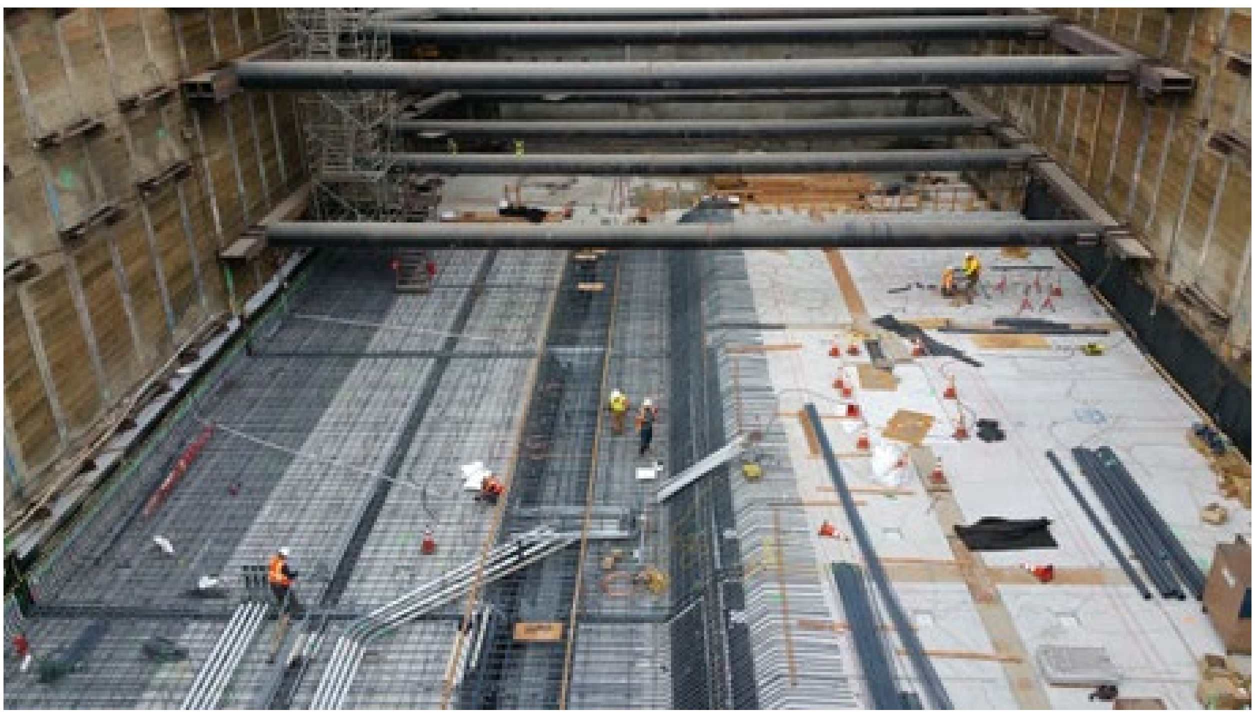


Source: HNTB/Cordova JV, 2021.

Figure 3.10. Typical Twin Bored Tunnel Guideway Cross Section

Source: CDM Smith/AECOM JV, 2019.

Figure 3.11. Tunnel Boring Machine



Source: CDM Smith/AECOM JV, 2019.

Figure 3.12. Example of Metro TBM Launch Site

There are construction activities at tunnel portals, stations, and crossovers locations. Nearby structures close to station locations, tunnels and other underground structures may require protection, such as special excavation support systems, underpinning or grouting or other activities to avoid soil settlement. The condition and type of the surrounding structures and foundations would determine the type of building protection and support systems used during construction.

Tunnel Boring Machine Launch and Extraction Sites

The TBM would be launched from the southern limit of the tunnel located near Saybrook Avenue and Gayhart Street west of Washington Boulevard. This location is within one to two blocks from I-5 and is an efficient location for hauling material. The TBM would then be extracted from the northern limit of the tunnel located near the intersection of Atlantic Boulevard and E. 4th Street. Property would need to be acquired at either end of the tunnel alignment for construction activities.

3.3.2 Station Construction

3.3.2.1 At-Grade Stations

There would be three at-grade stations under Alternative 1: Rosemead station, Norwalk station, and Lambert station. The locations are illustrated on **Figure 2.1**. No at-grade stations would be constructed under the base Alternative 2 or Alternative 2 with the Atlantic/Pomona Station Option, or the base Alternative 3. If the Montebello At-Grade Option is selected under Alternative 1 or Alternative 3, the Greenwood station would be at-grade. The at-grade stations would be located at or slightly above the existing ground elevation. At-grade stations would either have a center platform configuration, where one platform is located between the two tracks and serves both tracks, or a side platform configuration where two platforms are constructed in mirror image, one serving each track. A split platform station is a variation of a side platform station with two platforms staggered instead of mirrored. The platforms, per MRDC, would be approximately 270 feet long and depending upon projected demand, 16 to 23 feet wide in the case of center platform stations, and 12 feet wide in the case of side platform stations.

Construction of the at-grade stations would involve cast-in-place concrete or pre-cast panels to construct an approximately 40-inch-high platform along with ramps and stairs. Station furnishings, including canopy, railings, lighting, seating, signage, and fare vending equipment, would then be installed. The stations would be constructed of standard building materials such as concrete, steel, and other materials per MRDC. Steel-wheeled or rubber-tired compactors, graders, and small bulldozers would be required for subgrade preparation below the platform. Construction of the stations would also require trucks for the removal of excavated soil; transit mix concrete trucks and concrete pumps; trucks to deliver forms, reinforcing steel, and other materials; and water trucks for dust control. An example of a typical completed at-grade station is shown on **Figure 3.13**.

Source: CDM Smith/AECOM JV, 2022.

Figure 3.13. Example of Metro At-Grade Station

3.3.2.2 Aerial Stations

There would be one aerial station under the base Alternative 1 and base Alternative 3: Greenwood station. The location of the aerial station is illustrated on **Figure 2.1** (Alternative 1) and **Figure 2.3** (Alternative 3). The aerial station would be approximately 30 feet above the existing ground with either having a center or side platform configuration. The platforms, per MRDC, would be approximately 270 feet long and, depending upon projected demand, 16 feet wide to 30 feet wide in the case of center platform stations. An example of a typical completed aerial station is shown on **Figure 3.14**.

Source: CDM Smith/AECOM JV, 2022.

Figure 3.14. Example of Metro Aerial Station

Construction of the aerial station would involve construction techniques similar to those for aerial guideways described in **Section 3.3.1.2** (Aerial Guideway). Foundations and columns would be constructed to support the platform. The station platform would typically be constructed of cast-in-place concrete with falsework. Forms would be erected, reinforcing steel would be put in place, and concrete would be placed into the forms to construct the columns and the platform slab. Ancillary facilities would then be added including stairs, elevators, canopy, railings, lighting, seating, signage, and fare vending equipment.

Equipment required for aerial station construction would include drilling rigs, possibly specialized water jet excavators, trucks to remove excavated soil, concrete trucks and concrete pumps, specialized truck trailers to deliver pre-cast concrete beams (if used), cranes, trucks to deliver forms, reinforcing steel, pavement saws, pre-cast concrete post tensioning jacks, and related equipment.

For the base Alternative 1 and base Alternative 3, the alignment would travel on top of an MSE wall as it transitioned from the median of Washington Boulevard to the aerial Greenwood station platform and again on an MSE wall before returning to at-grade configuration along Washington Boulevard.

3.3.2.3 Underground Stations

Under all Build Alternatives, there would be three underground stations: Atlantic (relocated/reconfigured) station or Atlantic/Pomona Station Option, Atlantic/Whittier station, and Commerce/Citadel station. The locations of underground stations are illustrated on **Figure 2.1** (Alternative 1), on **Figure 2.2** (Alternative 2), and on **Figure 2.3** (Alternative 3). Construction of underground stations and crossovers would occur using cut and cover construction methods as described in **Section 3.3.1.3.1.** Refer to **Figure 3.15** for a typical Metro project site for an underground station. The station elements are similar to an aerial station but underground.

Source: CDM Smith/AECOM JV, 2019.

Figure 3.15. Example of an Underground Station Under Construction via Cut and Cover

3.3.3 Construction Staging Areas

The laydown and storage areas for construction equipment and materials would be established in the vicinity of the Project within parking facilities, and/or on parcels that would be acquired for the proposed stations, TPSS sites, and MSF site options. There would be potential future joint development opportunities within these areas after Metro is finished with construction. Construction staging areas would be used to store building materials and construction equipment, assemble the TBM, provide temporary storage of excavated materials, and serve as temporary field offices for the contractor. Heavy duty steel track out grates (i.e., rumble plates) would be staged at the entrance of the construction staging areas to capture dirt and soil debris from the wheels of trucks and construction equipment. This is a house-keeping BMP that would minimize a public nuisance that can result from soil and mud tracks on the public roadway. For security purposes, construction staging areas would be equipped with fences, lighting, security cameras, and guards to prevent vandalism and theft.

Staging areas would be needed at underground, aerial, and at-grade station locations; MSF site options; TPSS sites; grade separations; new bridge crossings; and intermittently along the at-grade and aerial alignment. Temporary easements would be required to allow construction staging on public sidewalks, streets, and in some cases, private property if necessary. Site clearance and demolition of existing structures at the construction staging areas would begin before major construction activity.

MRDC for siting staging areas include consideration of the following: proximity and access to support construction; issues related to property acquisition; jurisdiction planning goals; and potential future joint development after Metro is finished with construction. Use of construction staging areas is temporary. Staging areas are typically located at the MSF site, adjacent to future station locations, project-related parking facilities, and at TPSS sites. The size for a construction staging site ranges from approximately 0.7 acres (29,865 square feet) to 14.5 acres (632,337 square feet). Staging areas supporting the underground segment would require additional space compared to the at-grade and aerial segments to accommodate activities including, but not limited to, tunneling, assembling, and launching and extraction of the TBM, and decking operations.

At the TBM launching site, the staging area would also be used for storage and preparation of pre-cast concrete segments, temporary spoil storage, ventilation lines, shaft support (air, water, electricity, spoil hoisting), workshops, mixing and processing slurry for excavation support or tunnel excavation, and post-excavation slurry treatment (separation), which would include filters, centrifuges, and vibrator equipment. Temporary easements, typically a portion of the sidewalk, traffic lanes, and parking areas, may be required at various locations for staging. It is estimated that the contractor would employ up to 630 construction workers at the peak of construction activities. Temporary parking would be included at the staging areas to support the contractor's field offices. However, crew members, inspectors, construction management, and other third parties related to construction may park along the alignment in temporary street closures and sometimes public parking spaces to build and oversee construction activities. Such arrangements would be negotiated with appropriate local jurisdictions and Los Angeles County.

Most of the potential staging area sites also have a nearby optional site, which provides an alternative staging area location. The intention is to acquire only one of the alternative sites for construction. Potential construction staging areas related to the Build Alternatives are listed below. Further detail on construction staging areas can be found in Volume 2.

- Atlantic/Pomona station
- Atlantic/Pomona Station Option
- TBM Extraction Site
- Atlantic/Whittier Station Construction Staging Area
- Commerce/Citadel station
- TBM Launching Site
- Commerce MSF site option

- Montebello MSF site option
- Greenwood station
- Rio Hondo Bridge Replacement
- Rosemead station
- San Gabriel River Bridge Replacement
- Norwalk station
- Lambert station

The relocated/reconfigured Atlantic station and the TBM extraction pit would either be located on three commercial parcels to the west of the alignment or on three parcels to the east of the alignment. These two construction staging area options would be common to all base Alternatives. However, if the open-air Atlantic/Pomona station option is selected, the Project would utilize the three parcels to the east of the alignment as construction staging areas. As a result, the TBM extraction pit would be located to the east if the Atlantic/Pomona Station Option is selected.

3.3.4 Other Facilities and Construction Activities

3.3.4.1 Maintenance and Storage Facilities

An MSF is needed for the Project. The construction of an MSF would include standard methods associated with construction of trackwork and buildings, including demolition of existing facilities, leveling of land, utilities and construction of new sheds and maintenance buildings, fencing, pavement and landscaping, as well as track work, traction power, and OCS for storage of LRVs.

3.3.4.2 Parking Facilities at Stations

Parking facilities would be available at all stations,[2] except for the following locations:

- Atlantic/Pomona station (a parking facility currently exists, so an additional facility would not be built)
- Atlantic/Whittier station
- Commerce/Citadel station

Construction of the surface parking facilities would involve subgrade preparation of the parking area, paving, and striping. Concrete curbs, lighting, driveways, sidewalks, and landscaping would be installed as necessary. Equipment used for construction of surface parking facilities would include

[2] No new parking facilities would be constructed at the Atlantic station (relocated/reconfigured) or the Atlantic/Pomona Station Option. The existing parking structure would continue to serve this station.

diamond saws, pavement breakers, jackhammers, compressors, concrete pumping equipment, paving machines, dump trucks, front-end loaders, and water trucks for dust control.

In those areas where existing structures and pavement are present, demolition would be required. Equipment typically involved in demolition includes crawler cranes, crawler dozers/loaders, pavement breakers, rubber-tired loader/bob cats, trucks, excavator/backhoes, generator/compressors, and water trucks for dust control.

3.3.4.3 Street Widening and Reconstruction

Some streets along the alignments would need to be either reconstructed or widened to accommodate the guideway. In these locations, Metro would require full and/or partial acquisition of properties and removal of structures and vegetation. Additional street reconstruction work would be required at all at-grade crossing locations to allow for placement of the track slab and rails and modification of existing curbs, gutters, and sidewalks to accommodate the rail crossing.

The locations of street widenings and/or reconstruction are illustrated in the Street Improvement section of Volume 2. Where applicable, existing curbs, gutters, sidewalks, landscaping, and structures would need to be demolished and utilities relocated. Equipment typically involved in demolition includes crawler cranes, crawler dozers/loaders, pavement breakers, rubber-tired loader/bobcats, trucks, excavator/backhoes, generator/compressors, and water trucks for dust control. construction of new curb and gutter, sidewalks, and roadway would then proceed. Full replacement of the roadway would consist of demolition and removal of the existing asphalt, excavation to the designed subgrade, backfilling and compaction of the subbase, application of a tack coat or binder, and installation of the new asphalt using a heavy roller. Roadway improvements on the Project would occasionally require the lowering of the existing roadway, typically one to six inches lower than the existing surface. In these instances, excavation to the proposed subgrade would be lower than the existing subgrade. As a result, utilities with a compromised vertical clearance (typically less than 18 inches from the top of the utility to the asphalt) would be protected-in-place or relocated. The contractor would proceed with the full replacement of the roadway as outlined in the steps above. This scenario would occur for the at-grade guideway in Alternative 1, where Washington Boulevard crosses under the I-605. Lowering of the roadway would provide the necessary clearance between the top of the proposed OCS system and the soffit of the I-605 undercrossing. An alternative to a full replacement is the grind and overlay methodology; this would consist of grinding existing asphalt by a few inches (typically one to two inches), application of a tack coat or binder, and overlaying the roadway with new pavement. Other components of roadway reconstruction include the installation of lighting, signage, striping, and landscaping as necessary. Equipment used for construction would include excavators, small bulldozers, compactors, graders, transit mix concrete trucks, concrete pumping equipment, pavers, and rollers.

3.3.4.4 Traction Power Substations

TPSSs are electrical substations that would typically be placed every one- to one-and-a-half miles to provide electrical power needed for the LRT vehicles. TPSSs would be located at points along the alignment where maximum power draw is expected (such as at stations and on inclines). Separate TPSS would be required for the maintenance buildings at the MSF site option. Eight TPSS sites would be built for the Washington Alternative, three TPSS sites for the Atlantic to Commerce/Citadel IOS

Alternative, and four TPSS sites for the Atlantic to Greenwood IOS Alternative. The locations are subject to refinement during Preliminary Engineering and Final Design.

Each TPSS site would be cleared and graded, and a concrete slab would be constructed with the utility connections to an above ground switch gear. A grounding mat would be installed around the perimeter of the site. The TPSS is a prefabricated structure containing electrical and electronic equipment and is approximately 60 feet by 80 feet and about 12 to 14 feet high. It would be delivered, mounted on the slab, and connected to the utilities. Fencing or other type of barrier would be installed around the perimeter of the site, and architectural and landscaping treatments would be applied as feasible and in accordance with MRDC. Graders, bobcats, forklifts, cranes, and concrete and materials/equipment trucks would be required.

3.3.4.5 Overhead Catenary System

The OCS would consist of a set of two copper wires—a contact wire and a messenger wire—supported by steel poles mounted on reinforced concrete foundations. OCS poles would be spaced along the Build Alternatives, between or adjacent to the tracks, at a typical spacing of 150 feet.

Construction of the OCS would initially involve constructing the foundations for the OCS poles. This would be accompanied by construction of duct banks and conduit for the underground electrical feeder lines from the TPSSs, followed by installation of the OCS poles. The final stage would involve installation of the TPSS feeder cables and overhead catenary lines, which would occur subsequent to guideway construction. Construction of the foundations and ducts, and installation of the poles and feeder cables, would require augers, cranes, back hoes, and concrete and materials trucks. The overhead wires would be installed from the guideway using special vehicles, such as high-rail.

The OCR would be applied to the underground portion of the guideway. Interchangeable to the OCS system, the OCR would also distribute electrification and communication to the LRT system. However, overhead wires would be hung from the tunnel ceiling instead of OCS poles.

3.3.4.6 Utility Relocation and Installation

Utility relocation work would be required throughout the alignments of the Build Alternatives. The impacted utilities include storm drains, sanitary sewers, waterlines, gas pipelines, oil pipelines, overhead power lines, electrical duct banks, lighting, irrigation conduits, fiber optic lines, telephone, and communication lines. To the extent possible, the Build Alternatives have been located to avoid conflicts with the space occupied by major utilities. Nevertheless, in certain instances, the positioning of the guideway, station and other facilities would require that conflicting utilities be relocated, modified, or protected-in-place. Metro would coordinate relocations, modifications, and protection-in-place, with all impacted utilities under the terms of each provider's franchise or other agreements defining the provisions for such matters.

In addition to relocation, various new utilities would be installed as part of the Build Alternatives, including fiber optic communication lines, electrical duct banks, drainage facilities such as pipelines, catch basins, water supply lines, irrigation lines and lighting. Temporary interruptions in services (several hours) may be experienced during the relocation and rerouting of utilities.

Relocation and protection of underground lines would require excavation of soil to the depth of the existing utility line and installation of a replacement utility in a new location, backfill of soil or slurry, and reconstruction of pavement or surface improvements above the excavation. This would occur within the affected ROW and on nearby streets as required. Aerial guideways would require relocation of utility support poles to reroute the lines around the project facilities or in some cases elimination of the poles by underground relocation of the utilities. Relocation of utilities would generally be performed before construction of the guideway, station or other facilities. Construction equipment typically required for relocation and restoration includes saw cutters, backhoes, excavators, hydro excavation trucks, dump trucks, forklift, manlift, cranes, bucket trucks, and cable-pull trucks. Asphalt trucks, asphalt pavers, rollers, and power compactors are typically required for street restoration.

3.3.4.7 Temporary Street and Lane Closures

Street and lane closures may be necessary during construction of the project including potential closures during nights or on weekends. The extent and duration of the closures would depend on several factors, including the construction contract limits and individual contractors' choices, and would be coordinated with the appropriate city jurisdiction and Los Angeles County (unincorporated). Restrictions on the extent and duration of the closures can be incorporated into the project construction specifications. In some cases, short-term full closures might be substituted for extended partial closures to reduce overall impacts. As discussed in the Eastside Transit Corridor Phase 2 Traffic and Transportation Impacts Report, Metro would provide traffic control plans, designated haul routes, and a Traffic Management Plan to minimize disruption during construction. Metro would also coordinate with local transit agencies in advance to communicate closures and information on any changes to bus service that would result from construction activities.

3.3.4.8 Haul Routes

The method of removing the material for hauling away from the job site is a choice made by the contractor. Some of this material may be used in the retained fill embankments depending on its suitability. Excavated material would be loaded into trucks and transported along the Eastside Transit Corridor ROW and/or major streets to construction staging areas or to or from the nearest freeway (e.g., SR-60, I-5, and I-605). Some fill material may also have to be trucked to the site if sufficient material is not available or suitable for use. Actual volumes of material and specific routes would depend on a number of factors, including the construction contract limits, individual contractor's choices, and coordination with the appropriate local jurisdictions and Los Angeles County. Cooperation with the corridor cities and Los Angeles County would occur throughout the construction process. Restrictions on haul routes can be incorporated into the construction specifications. Estimates of the total number of haul trucks per alternative and per alignment configuration are provided in **Table 3-2**.

Table 3-2. Total Number of Haul Trucks per Alternative

Alternative	Configuration	Total Number of Trucks
Alternative 1 Washington	Aerial	959
	At-Grade	3,350
	Underground	36,287
Alternative 2 Atlantic to Commerce/Citadel IOS	Aerial	69
	At-Grade	57
	Underground	36,287
Alternative 3 Atlantic to Greenwood IOS	Aerial	948
	At-Grade	57
	Underground	36,287

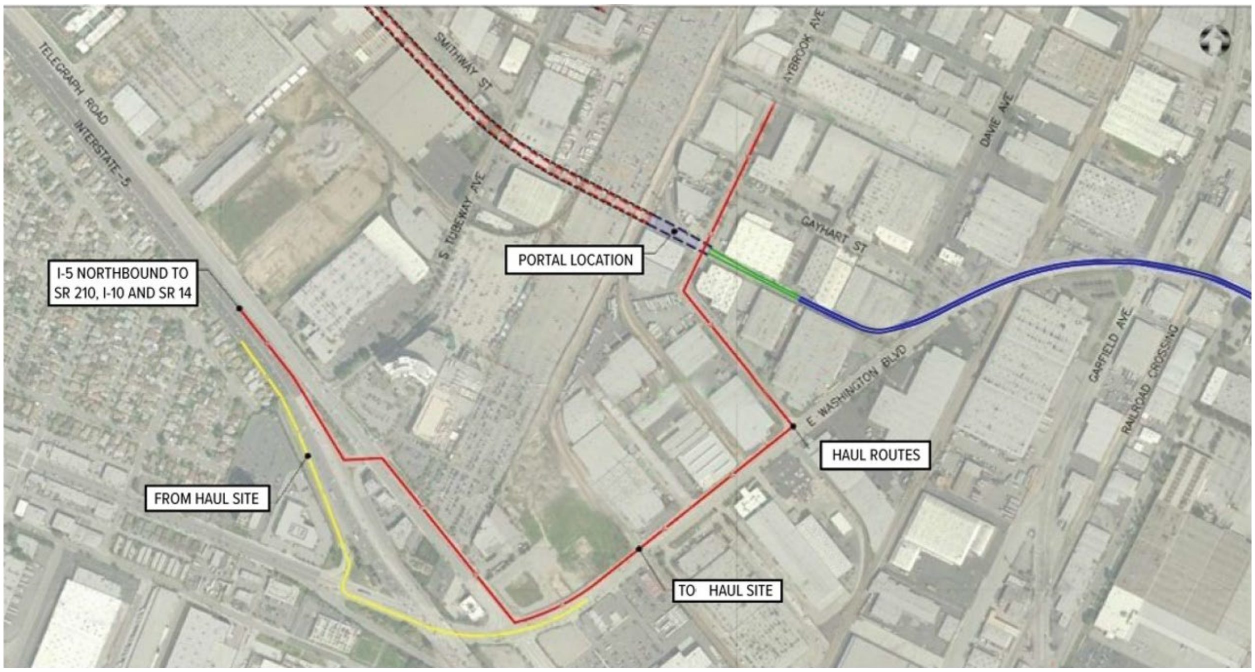
Source: CDM Smith/AECOM JV, 2022.

The contractor would follow required regulations and employ BMPs when transporting material to or from the Project, such as drying out the soil prior to loading the trucks, covering the soil with tarps in loaded trucks, etc. Some of the soil would be stockpiled within the DSA limits so that it is available to use in retained fill embankments. Excess soil would be hauled to an off-site location where it may be available for other projects requiring fill material. Potential haul routes would be identified based on the locations of the construction with respect to major streets leading to freeway.

Excavated material from major Los Angeles construction sites is typically disposed of at sites on the I-10 corridor or accessed from State Route (SR) 14. The northern haul routes are shown on **Figure 3.16**. The southern haul routes, which would be where the TBM is launched, are shown on **Figure 3.17**.

Source: CDM Smith/AECOM JV, 2019.

Figure 3.16. Northern Haul Routes



Source: CDM Smith/AECOM JV, 2019.

Figure 3.17. Southern Haul Routes

Alternatives 1 and 3 would utilize the I-605 as a haul route during construction activities. Consistent with local plans, truck routes that may be used for transporting and hauling construction-related materials include Washington Boulevard, Atlantic Boulevard, Whittier Boulevard, Saybrook Avenue, Telegraph Road, Paramount Boulevard, Rosemead Boulevard, and Slauson Avenue. For the twin bore tunnel, tunneling would generate an average of 900 cubic yards of soil from each bored tunnel each day. End dump trucks with a capacity of 12 cubic yards and bottom dump trucks with a capacity of 14 cubic yards would require 152 and 130 round trips, respectively per day to haul spoil from two operating TBMs.

Excavated material may be transported to local landfill site(s) if it is not suitable for fill or contains contaminated soils, hazardous building materials, including asbestos, lead, and polychlorinated biphenyls (PCB) and other hazardous wastes. As discussed in the Eastside Transit Corridor Phase 2 Hazards and Hazardous Materials Impacts Report, transportation of hazardous materials would comply with State regulations governing hazardous materials transport included in the California Vehicle Code (Title 13 of the California Code of Regulations), the State Fire Marshal Regulations (Title 19 of the California Code of Regulations), and Title 22 of the California Code of Regulations. Cooperation with the corridor cities would occur throughout the construction process. Restrictions on haul routes can be incorporated into the construction specifications according to local permitting requirements.

3.3.4.9 Landscaping

Landscaping common to all station plazas and selected portions of the guideway for the Build Alternatives would include trees and plant wells to cultivate community outdoor spaces for the neighborhoods surrounding the Project. The Project would select native and drought tolerant plant species responsive to the Project's microclimate. Additional sustainable efforts may include construction of stormwater management infrastructure that would capture water runoff on-site and/or the use of reclaimed water for irrigation (Metro 2015, Metro 2021).

Landscaping is typically among one of the final construction activities as it would follow the buildout of the station structure and LRT guideway. Site preparation would include clearing and grading of the site. Excavation of trenches would occur and be followed by the laying and backfilling of water service connection for irrigation and drainage infrastructure. The contractor would fine grade the site to establish a tie-in connection from the planters to the storm drain system. Fine grading is the precise grading of ground to prepare the site for seeding, planting, and paving. Hardscaping activities would consist of forming and pouring of concrete cast-in-place planter walls. Planters would be backfilled partially with soil prior to the installation of irrigation lines. Trees and plants would be planted and backfilled with biofiltration plant material. Further information on landscaping can be found in Volume 2 of the Recirculated Draft EIR.

4.0 IMPACTS

Project related construction impacts are described in each of the environmental topics analyzed in the Eastside Transit Corridor Phase 2 Recirculated Draft EIR (Chapter 3) and detailed in the Impacts Reports (Attachments B through R). if significant construction impacts for the Build Alternatives, design options, and/or MSF site options would occur, project measures and mitigation measures are identified to reduce the impact. The project measures and mitigation measures are identified Chapter 3 and the impacts report for the corresponding environmental topic. The Recirculated Draft EIR evaluates the following environmental topics 3. The topics that have significant construction impacts are shown in bold.

- Aesthetics
- Air Quality
- **Biological Resources**
- **Cultural Resources**
- Energy
- **Geology, Seismicity, Soils, and Paleontological Resources**
- Greenhouse Gas Emissions
- **Hazards and Hazardous Materials**
- **Hydrology and Water Quality**
- Land Use and Planning
- **Noise and Vibration**
- Population and Housing
- Public Services and Recreation
- **Transportation and Traffic**
- **Tribal Cultural Resources**
- Utilities and Service Systems
- Growth Inducing Impacts
- **Cumulative Impacts**

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