Los Angeles County
Metropolitan Transportation Authority

West Santa Ana Branch Transit Corridor

Draft EIS/EIR Chapter 2: Project Description / Alternatives Considered

Metro®

WEST SANTA ANA BRANCH TRANSIT CORRIDOR PROJECT

Draft EIS/EIR Chapter 2: Project Description / Alternatives Considered

July 2021

Draft Environmental Impact Statement/ Environmental Impact Report

LEAD AGENCIES: Federal Transit Administration of the U.S. Department of Transportation; Los Angeles County Metropolitan Transportation Authority

STATE CLEARINGHOUSE NO.: 2017061007

TITLE OF PROPOSED ACTION: West Santa Ana Branch Transit Corridor Project

Additional written comments and/or questions concerning this document should be directed to the following:

Meghna Khanna
Project Manager
Los Angeles County Metropolitan Transportation Authority
One Gateway Plaza, M/S 99-22-4
Los Angeles, CA 90012
Phone: (213) 922-6262
wsab@metro.net

Charlene Lee Lorenzo
Director
Federal Transit Administration Region 9
Los Angeles Office
888 S. Figueroa Street, Suite 440
Los Angeles, CA 90017
Phone: (213) 202-3952

Rusty Whisman
Transportation Program Specialist
Federal Transit Administration Region 9
888 S. Figueroa Street, Suite 440
Los Angeles, CA 90017
Phone: (213) 202-3956

TABLE OF CONTENTS

Tables

Figures

Appendices

ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AA	Alternatives Analysis
ADA	Americans with Disabilities Act
CEQA	California Environmental Quality Act
EIR	environmental impact report
EIS	environmental impact statement
EJ	environmental justice
FTA	Federal Transit Administration
I-	Interstate
LA	Los Angeles
LAUS	Los Angeles Union Station
LPA	Locally Preferred Alternative
LRT	light rail transit
LRV	light rail vehicle
Metro	Los Angeles County Metropolitan Transportation Authority
MOS	minimum operable segment
MSF	maintenance and storage facility
MWD	Metropolitan Water District
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NOP	Notice of Preparation
OCS	overhead catenary system
PEROW	Pacific Electric Rail Right-of-Way
ROW	right-of-way
SCAG	Southern California Association of Governments
TPSS	traction power substation
TRS	Technical Refinement Study
UPRR	Union Pacific Railroad
WSAB	West Santa Ana Branch

2 ALTERNATIVES CONSIDERED/PROJECT DESCRIPTION

This chapter describes the West Santa Ana Branch Transit (WSAB) Corridor Project (Project), including alternatives, studied in this Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR). The Federal Transit Administration (FTA) is the Lead Agency under the National Environmental Policy Act (NEPA) and the Los Angeles County Metropolitan Transportation Authority (Metro) is the Lead Agency under the California Environmental Quality Act (CEQA). The purpose of this Draft EIS/EIR is to analyze and disclose the Project's potential effects on the natural and human environment and identify mitigation measures and alternatives to avoid significant effects. The analysis presented in this Draft EIS/EIR is in compliance with NEPA and FTA's environmental impact-related procedures (23 Code of Federal Regulations, Part 771) and CEQA and the *CEQA Guidelines* (14 Cal. Code. Regs., § 15000 et seq.).

2.1 Introduction

The Project is a proposed light rail transit (LRT) line that would extend from four possible northern termini through southeast Los Angeles (LA) County to a shared southern terminus in the City of Artesia, traversing densely populated and heavily transit-dependent communities.

Metro has identified four Build Alternatives based on a criteria selection process, potential issues for each alternative, and input from interested parties, stakeholders, and communities (see Section 2.4.2 of this Draft EIS/EIR and Appendix A, *West Santa Ana Branch Transit Corridor Project Alternatives Considered*). A reasonable range of possible alternatives that meets the Project's purpose and need were evaluated and determined through the screening and project refinement process (see Section 2.4.2 and Section 2.4.3). These selected alternatives are considered and included in this Draft EIS/EIR. Both NEPA and CEQA recommend identifying the preferred alternative in the Draft EIS/EIR. Based on the findings for the Build Alternatives as evaluated in this Draft EIS/EIR, and in consideration of funding availability, Metro has identified Alternative 3 as the preferred alternative (referred to within this document as the staff preferred alternative) for the Project. This alternative is the favored course of action by Metro in the Draft EIS/EIR considering the benefits, costs, environmental impacts, and financial capacity of the No Build/No Project Alternative and the four Build Alternatives. Additional information on identification of the staff preferred alternative is provided in Section 6.2 of Chapter 6, Evaluation of Alternatives, of this Draft EIS/EIR. The formal adoption of the Locally Preferred Alternative (LPA) by the Metro Board of Directors will occur after the Draft EIS/EIR circulation and the review of public and agency comments. The LPA will be evaluated in the Final EIS/EIR. As part of the Metro Board action, a decision may be made to phase implementation of the LPA. Any such decision would be made in consideration of public comments and funding availability. An environmental reevaluation could be required depending on the phasing selected.

2.2 Goals and Objectives

The Project's overall goals are to provide mobility improvements, support local and regional land use plans and policies, minimize environmental impacts, improve cost effectiveness and financial feasibility, and improve equity.

The Project's overall objective is to provide high-quality reliable transit service to meet the future mobility needs of residents, employees, and visitors who travel within and through the corridor. This new transit service would increase mobility and connectivity for historically underserved and transit-dependent communities, improve travel times on local and regional transportation networks relative to not making this investment, and accommodate substantial future employment and population growth. More specifically, the Project's objectives are as follows:

- Establish a reliable transit service that will enhance the connectivity of the existing transit network and reduce transit travel times to local and regional destinations
- Accommodate future travel demand, including the high number of transit trips made by Study Area residents
- Improve access for the densely populated neighborhoods, major employment centers, and other key regional destinations where future growth is forecasted to occur within the Study Area
- Address mobility and access constraints faced by transit-dependent communities, thereby improving transit equity

Refer to Chapter 1, Purpose and Need, of this Draft EIS/EIR for a full discussion of the purpose and need for the Project.

2.3 Study Area

The Study Area extends from the downtown Los Angeles area to the Gateway Cities subregion of LA County and encompasses an approximately 2-mile buffer from the Project's alignments in order to capture the adjacent cities and ridership area where effects could result from the Project. The greater 98-square-mile Study Area for the Project extends from Elysian Park in the north to the LA County/Orange County line to the south, encompassing downtown Los Angeles, Southeast Los Angeles, and much of the Gateway Cities subregion. The Study Area includes 20 cities—Los Angeles, Vernon, Maywood, Huntington Park, Commerce, Bell, Cudahy, Bell Gardens, South Gate, Lynwood, Compton, Downey, Paramount, Bellflower, Long Beach, Lakewood, Norwalk, Artesia, Cerritos, and Hawaiian Gardens—as well as portions of unincorporated LA County, as shown in Figure 1-1 in Chapter 1, Purpose and Need. Of the 20 cities within the Study Area, the Project would traverse through or be directly adjacent to the Cities of Los Angeles, Vernon, Huntington Park, Bell, Cudahy, South Gate, Downey, Paramount, Bellflower, Cerritos, and Artesia, as well as the unincorporated community of Florence-Firestone of LA County.

2.4 Development of Build Alternatives and Screening Process

2.4.1 Screening Methodology

The screening and selection process for the Build Alternatives presented in this Draft EIS/EIR is based on extensive outreach and workshops with key stakeholders, elected officials, advisory committee members, and communities in which the Project is projected to serve. Beginning in 2010, a number of technical studies and assessments were prepared to support the development of routes, alignments, and station locations. These studies analyzed transit mode (i.e., bus rapid transit, street car transit, LRT, and low speed magnetic levitation [maglev] transit), station locations, alignments, maintenance and storage facility (MSF) site options, and other ancillary facilities (e.g., radio towers and substations). The vision of

transportation improvements in the Study Area was guided by the following goals and objectives:

- Goal 1: Provide Mobility Improvements
- Goal 2: Support Local and Regional Land Use Plans and Policies
- Goal 3: Minimize Environmental Impacts
- Goal 4: Improve Cost Effectiveness and Financial Feasibility
- Goal 5: Improve Equity

2.4.2 Screening Reports and Refinement Studies

Several screening reports and refinement studies were prepared as part of the development of the Project and are summarized in Figure 2-1. Refer to Appendix A for a detailed discussion of each report and the development process for the Project, including the consideration and elimination of alternatives, alignments, and station locations.

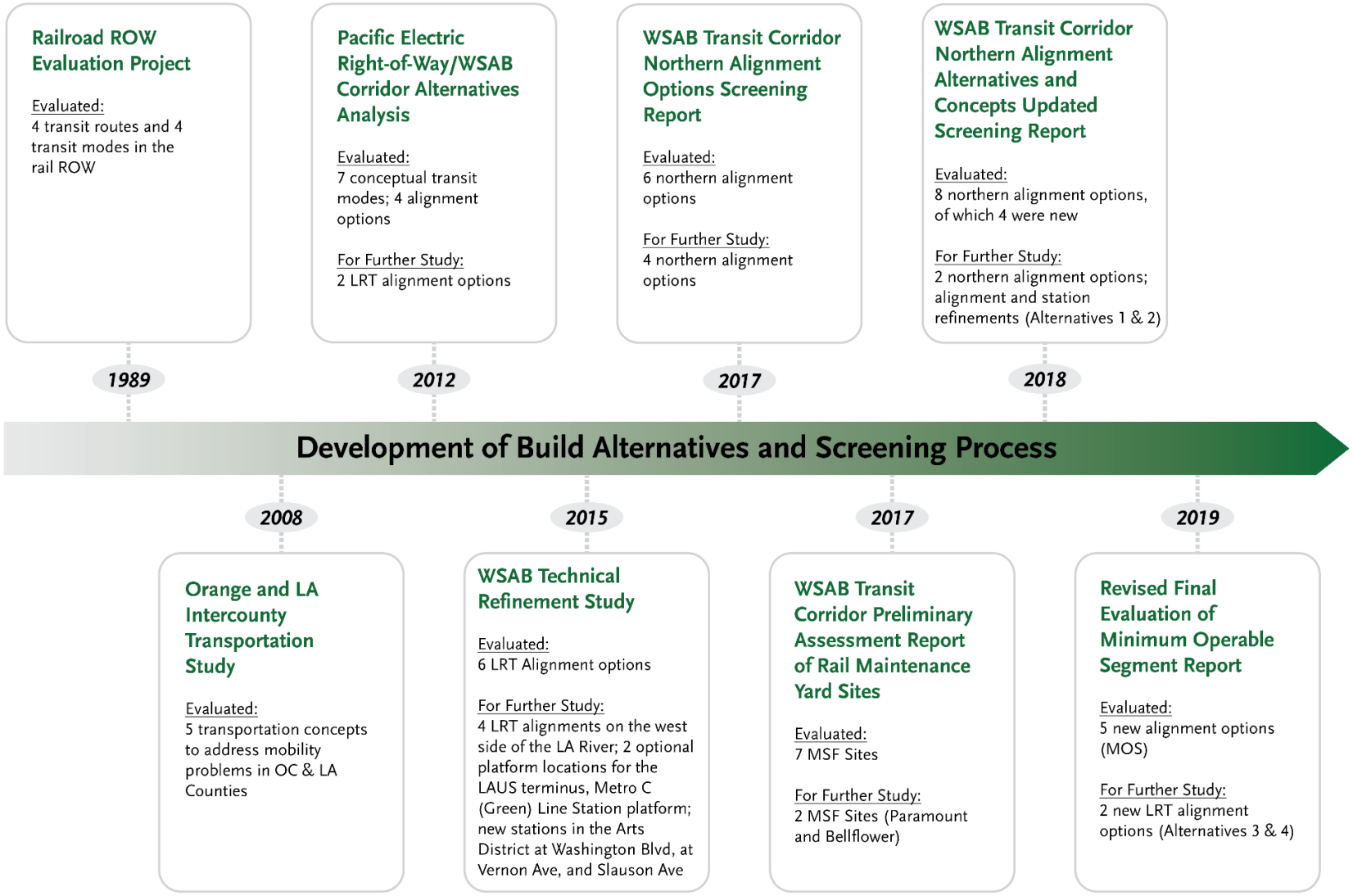
2.4.2.1 Pacific Electric Right-of-Way (PEROW)/West Santa Ana Branch (WSAB) Corridor Alternatives Analysis

Finalized in 2012, the Southern California Association of Governments (SCAG) developed the *Pacific Electric Right-of-Way/West Santa Ana Branch Corridor Alternatives Analysis* (AA Report), a collection of screening studies addressing the feasibility of implementing various modes and exploring opportunities for connecting LA County and Orange County. The AA Report recommended the No Build, Transportation System Management, and two LRT alignments (one on the west side of the Los Angeles River and one on the east side of the river) for further study.

2.4.2.2 West Santa Ana Branch Technical Refinement Study

In 2015, Metro authorized the preparation of the *West Santa Ana Branch Technical Refinement Study* (TRS) (Metro 2015a), which further refined key technical concerns on the alternatives identified in the AA Report. The WSAB TRS also considered the feasibility of additional alignments connecting the PEROW to downtown Los Angeles given constraints and opportunities within the northern segment. The TRS recommended elimination of the rail alignment on the east side of the LA River and further study of four light rail alignments on the west side of the LA River (see Appendix A). In addition, the TRS recommended further study of two optional platform locations for the Los Angeles Union Station (LAUS) terminus, new stations in the Arts District, and further study of the Metro C (Green) Line Station and the Pioneer Station.

Figure 2-1. Development of Build Alternatives and Screening Process



Source: Prepared on behalf of Metro in 2021

2.4.2.3 West Santa Ana Branch Transit Corridor Northern Alignment Options Screening Report

In 2017, the *West Santa Ana Branch Transit Corridor Northern Alignment Options Screening Report* (Northern Alignment Options Screening Report) (Metro 2017a) evaluated four potential rail alignments serving the LAUS terminus of the Project. The evaluation considered opportunities and constraints and included a greater level of engineering detail than prior studies. The Northern Alignment Options Screening Report recommended four light rail alignments to be carried forward into the environmental scoping process.

2.4.2.4 West Santa Ana Branch Transit Corridor Northern Alignment Alternatives and Concepts Updated Screening Report

In response to the issues raised during the public scoping period conducted in 2017, the northern alignments options were revisited in the *West Santa Ana Branch Transit Corridor Northern Alignment Alternatives and Concepts Updated Screening Report* (Metro 2018b). The updated effort included additional connection options in downtown LA and a rail alignment to serve the Arts District. Six alternatives were eliminated for a variety of technical feasibility and operational issues. In May 2018, the Metro Board authorized Alternative E and Alternative G to be carried forward into the Draft EIS/EIR. Alternatives E and G are referred to as Build Alternatives 1 and 2, respectively, in this Draft EIS/EIR.

2.4.2.5 Revised Final Evaluation of Minimum Operable Segment Report

A minimum operable segment (MOS) is a segment of the project alignment that can function as a stand-alone project and not be dependent on other segments or phases to be constructed. The purpose of developing and evaluating MOS options is to identify a segment of Build Alternatives 1 or 2 that can provide a cost-effective solution with the greatest benefits for the Project. The *Revised Final Evaluation of Minimum Operable Segment Report* (MOS Report) (Metro 2019f) identified and evaluated five potential options to determine cost-effective solutions with the greatest benefits for the Project. Referred to as initial operating segments in the September 2019 Metro Board Report, the MOS Report recommended MOS 1: I-105/C Line Station to Pioneer Station (now Alternative 4) and MOS 3: Slauson/A Line Station to Pioneer Station (now Alternative 3) to move forward for study into the Draft EIS/EIR.

2.4.2.6 West Santa Ana Branch Transit Corridor Preliminary Assessment Report of Rail Maintenance Yard Sites

To determine MSF site options for the Project, the *West Santa Ana Branch Transit Corridor Preliminary Assessment Report of Rail Maintenance Yard Sites* (Metro 2017j) was completed in 2017. Initially 21 proposed sites were evaluated and screened, with two MSF site options selected to move forward for study into the Draft EIS/EIR based on their provision of mobility improvements, minimization of environmental impacts, financial feasibility, equity, and preliminary engineering design. The MSF site options are referred to as the Paramount MSF site option and the Bellflower MSF site option in this Draft EIS/EIR.

2.4.3 Public Outreach

FTA published the Notice of Intent (NOI) in the *Federal Register* on June 26, 2017, to initiate the EIS process for the Project. The NOI provided scoping meeting information, contact information,

and project information.[1] Prior to *Federal Register* publication, Metro also issued a Notice of Preparation (NOP) pursuant to CEQA on May 25, 2017, informing the public of the intent to prepare a combined Draft EIS/EIR for the Project and notifying interested agencies and parties of public scoping meetings. A revised NOP was issued on June 14, 2017, to inform the public of the extension of the comment period from July 7, 2017, to August 4, 2017. A second revised NOP was issued on July 11, 2018, informing the public of the Metro Board decision to eliminate some of the northern alignment alternatives considered in the May 25, 2017 NOP and to carry forward two modified northern alignments, one to the Downtown Transit Core and the other to LAUS, into the Draft EIS/EIR process (see Appendix A for details).

A series of public scoping meetings and agency, stakeholder, and community outreach meetings have been conducted since the May 24, 2017 filing of the NOP. The scope of the Draft EIS/EIR, including the goals and objectives, project area, project description, and the environmental impacts to be evaluated, were presented at the public scoping meetings. All meetings were held in Americans with Disabilities Act (ADA)-compliant facilities and language translation services (Spanish and Japanese) were provided. Chapter 7, Public Outreach, Agency Consultation, and Coordination, of this Draft EIS/EIR provides additional information regarding the outreach efforts.

2.4.4 Project Refinements

Project refinements were made following comments received during the scoping period and outreach events and coordination efforts with key stakeholders and affected cities. The Metro Board accepted these project refinements and adopted the updated project definition at its November 2018 meeting. Table 2.1 summarizes the recommended project refinements per the November 2018 Metro Board meeting.

After scoping, Metro also considered three other refinements. The first, reducing the width of the platform for the I-105/C Line infill station, was considered to minimize effects to a historic district. The second refinement was underground alignment concepts based on comments received during scoping. The third considered alignment options that would avoid the Union Pacific railroad right-of-way. These refinements and the reasons they were eliminated, are described as follows.

2.4.4.1 Reduced Width of Platform for I-105/C Line Infill Station

The proposed alignment for each Build Alternative uses a portion of the San Pedro Subdivision freight rail right-of-way (ROW) from approximately Randolph Street in the north (City of Huntington Park) to Rosecrans Boulevard in the south (City of Paramount). The existing freight rail tracks cross the I-105 freeway in a bridge structure along this route. Residences and light industrial business are directly adjacent to the railroad ROW in the areas north and south of the I-105 freeway crossing. To reduce the displacement of existing residents and businesses adjacent to the railroad ROW, the existing freight rail bridge would be demolished and reconstructed to allow room for the construction of a dedicated LRT bridge structure within the existing railroad ROW and corresponding aerial easement over the I-105 freeway. In addition to a new dedicated LRT bridge structure, the Project would also construct a Metro C (Green) Line infill station in the median of the I-105 freeway to facilitate transfers between the WSAB and Metro C (Green) Lines.

[1] *Federal Register*. Vol. 82, No. 121, June 26, 2017.

Table 2.1. Summary of Project Refinements from the November 2018 Metro Board Meeting

Project Refinement	Reason for Refinement
Elimination of Washington Station and Vernon Station	▪ Low projected ridership at these stations, and duplicative service into downtown LA from the Metro A (Blue) Line ▪ Eliminating the stations would improve travel time along the WSAB alignment
Elimination of 183rd/Gridley Station	▪ Lack of community support, limited ridership potential, and proximity to the Pioneer Station in the City of Artesia
Elimination of Optional Bloomfield Station Extension	▪ Lack of support from stakeholders for a future extension into Orange County
Elimination of Pershing Square Terminus Station Design Option	▪ Provided less connectivity to the regional transit network; produced worse ridership and smaller reductions in vehicle miles traveled; impacted more historic properties; less light rail transit level-of-service compared to 7th St/Metro Center Station; and fewer passenger transfers from the Metro A (Blue) Line to the WSAB Line compared to the 7th St/Metro Center Station
Additional Grade Separations ▪ Firestone Blvd ▪ Imperial Highway/Garfield Ave ▪ Downey Ave ▪ Woodruff Ave/Flower St ▪ 183rd St/Gridley Rd	▪ Additional grade separations, based on Metro's Grade Crossing Safety Policy for Light Rail Transit (Metro 2010a), were included. The key factors included traffic volumes, train frequency, safety considerations, and a variety of special circumstances (e.g., vertical engineering alignment considerations, effects on traffic operations, pedestrian activity, and adjacent land uses)
At-grade profile under the I-10 freeway changed to aerial grade-separated over I-10 freeway	▪ Potential to result in traffic impacts to 15th St and 16th St

Source: Metro Board Report, November 14, 2018; File #2018-0404, Agenda Number:15, Attachment A.

Construction of the I-105/C Line Station platform in the freeway median of I-105 as well the construction of two new bridges (for freight rail and LRT) over the freeway in this location directly interfaces with the proposed I-105 Express Lanes project (refer to LRT Alignment Plan Set in Appendix B). The proposed I-105/C Line Station platform would require that the travel lanes on the freeway be reconfigured to use more of the existing freeway ROW. To maintain the existing freeway lane and shoulder design standards, in addition to Metro's platform width standards, this reconfiguration of lanes would increase the span length of the freight and light rail bridges. In addition, this would require the demolition and reconstruction of two adjacent bridge structures (Façade Avenue Overcrossing and Arthur Avenue Pedestrian Overcrossing) that would currently obstruct relocated travel lanes.

While these changes are deemed feasible from an engineering perspective, the situation is complicated by the recent designation of the I-105 freeway as a National Register of Historic Places historic property, and its existing bridge structures are considered contributing elements to the historic district. Thus, the demolition and reconstruction of three existing

bridges and the construction of one new WSAB LRT bridge would have implications related to the historic resource.

Metro explored options to minimize effects to the historic district. Demolition of the Façade Avenue and Arthur Avenue bridges could be avoided through a combination of a narrower platform width for the I-105/C Line infill station and narrower shoulders on I-105. However, the narrower shoulders would require a design exception and associated evaluations from the California Department of Transportation, which would consider safety implications of a narrower shoulder. Additionally, the narrower platform raised operational and safety concerns associated with the volume of passengers and potential crowding as the station would serve as a transfer point. Specifically, crowding could increase train dwell times and result in delays because it would take longer for passengers to board and exit vehicles. A narrower platform could require modifications to the platform at a later date in order to accommodate future growth in ridership. However, modifications, if feasible, would be highly constrained by the bridge columns. Therefore, the narrower platform was eliminated from further consideration.

2.4.4.2 Underground Alignment Scenarios Not Further Considered

During scoping, some comments were received regarding potential project effects to residences located adjacent to at-grade and aerial light rail operations, particularly in the southern section of the project corridor. Such comments generally raised concerns about potential effects related to noise, vibration, safety, and visual, as well as decreased property values. In response to these comments, several underground alignment scenarios were identified and considered for engineering, cost, and environmental implications: place the entire alignment of the Project underground; underground the alignment in segments south of the I-10 freeway adjacent to residential locations with active freight rail operations and/or where public roads separate light rail from residences; or limit the underground alignment to the Metro-owned PEROW (between Somerset Boulevard and Pioneer Boulevard).

Full Underground Alignment Scenario. The cost of tunnel and underground station construction can vary greatly depending on site conditions, construction methods, and if there is a need to maintain operation of adjacent roads and rail lines. Per Appendix A to the *West Santa Ana Branch Transit Corridor Final Advanced Conceptual Engineering Capital Cost Report* (Metro 2021X) (Appendix P), each mile of track constructed in a tunnel costs approximately 10 times as much as a mile of track constructed at grade. The cost differential for stations is even greater, with each underground station costing more than 30 times as much to construct as an at-grade station. It is anticipated that placing the entire 19-mile length of either Alternative 1 or 2 underground would more than double the total construction cost of those alternatives compared to the cost as currently designed.

Additionally, constructing the entire project alignment underground would introduce additional community and environmental impacts and construction risks, as well as delay project completion for the following reasons:

- Nine additional stations would be placed underground, requiring ADA, fire/life safety, and ventilation requirements.

- Underground construction adjacent to active freight rail could require shoo-flys[2] and additional temporary construction easements, temporary acquisitions outside of the rail ROW with the potential for business and/or residential displacements, and coordination with freight line owners and operators.
- The design and clearances for tunnels and underground stations would have to meet requirements to allow for the continued operation of the adjacent freight rail and could require permanent land acquisitions.
- Areas with a high water table would be affected, requiring dewatering strategies during construction and operation.
- Additional ROW would be required for systems rooms, access structures, and ventilation structures necessitated by the tunnel.
- Hazardous materials and contaminated soils could be encountered, resulting in the potential for additional acquisitions of non-residential properties adjacent to the construction area for waste and debris stockpiling and storage.
- Construction duration would increase.

Construction duration is dependent on a variety of factors related to construction means and methods. The construction approach information presented in Chapter 4, Section 4.19 of this Draft EIS/EIR is based on expectations on how contractors, once they are selected, will complete the work, with assumptions based on Metro practices on other LRT projects. Calculating the duration of construction for a 19-mile underground alignment would depend on a number of assumptions, including the number of tunnel boring machines (TBM) in operation at one time and extent of concurrent work occurring along the alignment. Generally, a TBM could travel 50 feet per day, although this is dependent on ground conditions and site and work area constraints. Alternatively, multiple TBMs could be launched along multiple points of the alignment, but this would increase construction cost and require additional, large staging areas to launch and extract the TBM and remove spoils. Therefore, the construction duration has not been calculated for a full underground alignment.

The high cost and additional impacts outweighed the benefit considering the anticipated ridership levels. Because of both the increase in project risks and additional construction costs, this full underground alignment scenario is not considered fiscally responsible. Therefore, this scenario was dropped from further consideration.

Short Underground Segment Scenario. Shorter underground segments would have a lower construction cost than a full underground alignment scenario but would still increase construction cost compared to the current design of the Build Alternatives. Under this scenario, shorter underground segments south of the I-10 Freeway were considered that specifically focused on locations where there could be proximity effects between residential uses and at-grade or aerial LRT operations. These areas could include portions of Long Beach Avenue, Randolph Street, Salt Lake Avenue (from Gage Avenue to Santa Ana Street and from McCallum Avenue to Wood Avenue), along the San Pedro Subdivision (I-105 Freeway to west of Rosecrans Avenue), and the entire Metro-owned PEROW portion of the corridor (from west of Rosecrans Avenue to Pioneer Boulevard). These above-mentioned areas would all be located in the environmental justice (EJ) communities of Los Angeles, unincorporated Florence-Firestone, Huntington Park, Bell, Cudahy, South Gate, Downey, Paramount, Bellflower, Artesia, and Cerritos. This scenario would result in approximately 9 miles of

[2] Shoo-flys refer to temporary track detours to allow continuation of active freight or transit rail operation during construction.

additional underground LRT alignment compared to Alternatives 1 and 2. Alternative 3 would result in approximately 8 miles of underground LRT alignment (out of a total length of 14.8 miles), and Alternative 4 would result in approximately 6 miles of underground LRT alignment (out of a total length of 6.6 miles).

Despite the reduced lengths of underground alignment, this scenario would delay project completion and introduce additional environmental impacts. These impacts are similar to those described for the full underground alignment scenario but would be reduced due to the shorter length of alignment being constructed underground. Specifically:

- Up to four stations would be placed underground, requiring ADA, fire/life safety, and ventilation requirements, depending on the alternative chosen. Under Alternatives 1, 2, and 3 the Pacific/Randolph, Florence/Salt Lake, Bellflower, and Pioneer Stations would be underground. Under Alternative 4 the Bellflower and Pioneer Stations would be underground.
- Underground construction adjacent to active freight rail could require shoo-flys and additional temporary construction easements, temporary acquisitions outside of the rail ROW with the potential for business and/or residential displacements, and coordination with freight line owners and operators.
- The design and clearances for tunnels and underground stations would have to meet requirements to allow for the continued operation of the freight rail and could require permanent land acquisitions.
- Cut-and-cover tunnel construction, if required, would extend the length of disruption to arterial roadways crossing the tunnel alignment.
- Areas with a high water table would be affected, requiring dewatering strategies during construction and operation.
- LRT transitions from underground to at-grade alignments could require additional construction laydown areas resulting in more acquisitions and business and/or residential displacements.
- Additional ROW would be required for systems rooms, access structures, and ventilation structures necessitated by the tunnel.
- A river channel crossing, if the approaching tunnel is constructed with a cut-and-cover method, requires specialty construction methods that would increase complexity and cost.
- Hazardous materials and contaminated soils could be encountered, resulting in the potential for additional acquisitions of non-residential properties adjacent to the construction area for waste and debris stockpiling and storage.
- Construction duration would increase.

A variation of this scenario would be to underground the alignment for only the Metro-owned PEROW, which would create the shortest underground alignment scenario (approximately 6 miles under all alternatives). This variation would be located in the EJ communities of Paramount, Bellflower, Artesia, and Cerritos. This underground scenario would include areas with residences that have been adjacent to substantially vacant land without disruptive freight rail activity. Under this scenario, the impacts would be similar to those described above for the short underground alignment scenario but would be reduced due to the shorter length of alignment being constructed underground. The impacts would be limited to the PEROW, and therefore the Pacific/Randolph and Florence/Salt Lake Stations would be unaffected compared to current design.

As stated previously, the incremental increase in cost for each mile of underground alignment or station compared to at-grade is substantial, with costs 10 and 30 times greater, respectively. The actual cost in any specific location would depend on a variety of factors, including presence of hazardous materials and extent of remediation required, soil types and conditions, design and clearance requirements related to the adjacent freight rail, additional ROW required, construction method, whether the segment includes a station, and extent of utility relocations required. This estimated cost increase does not account for the additional environmental and construction risks and delays typically associated with underground construction as well as the potential for more costly engineering solutions in vertical transition areas (where the alignment transitions from underground to at-grade or aerial).

As noted in Appendix R, all Build Alternatives would require additional funding as the budget that was established and approved by Los Angeles County voters in Measure M (a 2016 sales tax initiative to improve transportation and ease traffic congestion) would be exceeded for each of the alternatives under consideration. With the inclusion of additional underground segments, the funding shortfall would be further increased. Even these shorter underground segments would continue to require additional funding beyond the adopted Measure M authorization because of the substantial cost differential between constructing LRT underground versus the at-grade or elevated configurations that have been proposed in these areas. As a result, an underground LRT alignment of any length in the southern section of the project corridor would introduce additional substantial project costs and risks making it neither fiscally feasible nor prudent under the Measure M funding constraints; therefore, this alignment is not considered further in the Draft EIS/EIR.

2.4.4.3 Alignments Outside of Union Pacific Railroad (UPRR) ROW Not Further Considered

Initial studies regarding the WSAB in the 1980s and the most recent studies conducted in 2010 by SCAG and the Gateway Cities Council of Governments have considered alignment alternatives as part of the objective of improving mobility within Southeast Los Angeles County, particularly the connection to downtown Los Angeles. As part of these foundation studies carried out by these agencies, substantive consideration was given to the use of public rights-of-way and shared transit use within existing rail corridors.

One of the centerpieces of creating connections to/from Southeast Los Angeles County has been the use of the PEROW, now vacant and owned by Metro since the early 1990s. This right-of-way is approximately 8.1 miles in length from the I-105 and I-710 interchange to the Orange County line. However, the PEROW no longer exists west of the Los Angeles River requiring an evaluation of northwest transit routes to reach downtown Los Angeles as no alterative Metro-owned ROW route exists. The anticipated shared use of railroad freight corridors that intersect with the PEROW, particularly the San Pedro Subdivision, has been considered, beginning with the SCAG AA studies in 2010, as a viable connection opportunity. In five studies conducted between 2010 and 2018 that included alignment alternatives to downtown Los Angeles, the San Pedro Subdivision rail corridor, between the junctions with PEROW and Randolph Street, was consistently identified as the preferred project alignment.

Alternatives to the potential shared use of the San Pedro Subdivision offer substantial challenges, particularly impacts related to the adjacent densely populated minority and low-income neighborhoods, including Huntington Park, Cudahy, South Gate, Downey, and Paramount (designated as EJ communities). Use of public street rights-of-way in these areas

would generate a variety of adverse effects and raise EJ and equity issues, including but not limited to, the following:

- Loss of travel lanes and impairments to community access and circulation on already congested local streets
- Loss of on-street parking, which is highly utilized in these densely populated, multifamily areas
- Proximity noise impacts to sensitive receptors from light rail operations located along streets where mitigation and abatement opportunities are severely limited due to the constrained public right of way
- Private property acquisitions, including residential, resulting from geometric changes along streets, at intersections, or to create additional space needed for station platforms and ancillary facilities

For these reasons, alignment alternatives outside of the San Pedro Subdivision were not considered viable or in keeping with EJ and equity issues and were not considered further. Metro commits to continued coordination with UPRR to address safety, operations, and engineering needs in this segment.

2.5 Alternatives Evaluated in this Draft EIS/EIR

The following sections summarize the alternatives evaluated in this Draft EIS/EIR.

2.5.1 No Build Alternative

The No Build Alternative provides the background transportation network, against which the Build Alternatives' impacts are identified and evaluated under NEPA. The No Build Alternative does not include the Project. Specifically, the No Build Alternative reflects the reasonably foreseeable transportation network in 2042 and includes the existing transportation network and planned transportation improvements that have been committed to and identified in the constrained *Metro 2009 Long Range Transportation Plan* (Metro 2009a) and SCAG *2016-2040 Regional Transportation Plan/Sustainable Communities Strategy* (SCAG 2016a), as well as additional projects funded by Measure M, a sales tax initiative approved by voters in November 2016. The No Build Alternative transportation network is shown in Table 2.2. Figure 1-5 and Figure 1-6 in Chapter 1, Purpose and Need, show the existing bus, rail, and highway networks within the Study Area. Figure 2-2 shows the planned rail and highway improvements in or near the Study Area.

Table 2.2. No Build Alternative (2042) – Existing Transportation Network and Planned Improvements

	Project	To / From	Location Relative to Study Area
Rail (Existing)	Metro Rail System (LRT and Heavy Rail Transit)	Various locations	Within Study Area
	Metrolink System (Southern California Regional Rail Authority)	Various locations	Within Study Area
Rail (Under Construction/ Planned)[1, 5]	Metro Westside D (Purple) Line Extension Project	Wilshire/Western to Westwood/VA Hospital	Outside Study Area
	Metro C (Green) Line Extension Project[2]	96th St Station to Torrance	Outside Study Area
	Metro C (Green) Line (aka Metro Crenshaw/LAX Transit Project)	Norwalk to Expo/Crenshaw[3]	Outside Study Area
	Metro East-West Line/Regional Connector/Eastside Phase 2 (aka Metro Eastside Transit Corridor Phase 2)	Santa Monica to Lambert Santa Monica to Peck Rd	Within Study Area
	Metro North-South Line/Regional Connector/Foothill Extension to Claremont Phase 2B (aka Gold Line Foothill Extension 2B)	Long Beach to Claremont	Within Study Area
	Metro Sepulveda Transit Corridor Project	Metro G (Orange) Line to Metro E (Expo) Line	Outside Study Area
	Metro East San Fernando Valley Light Rail Transit Project	Sylmar to Metro G (Orange) Line	Outside Study Area
	Los Angeles World Airport Automated People Mover	96th St Station to LAX Terminals	Outside Study Area
	Metrolink Capital Improvement Projects	Various projects, including: • Simi Valley Double Track • Burbank Junction Speed Improvements • Chatsworth Station Improvements • Marengo Siding Extension Project	Within Study Area
	California High-Speed Rail	Burbank to LA LA to Anaheim	Within Study Area
	Link Union Station (Link US) Project	LAUS	Within Study Area

	Project	To / From	Location Relative to Study Area
Bus (Existing)	Metro Bus System (including BRT, Express, and local)	Various locations	Within Study Area
	Municipality Bus System[4]	Various locations	Within Study Area
Bus Rapid Transit (Under Construction/ Planned)[5]	Metro G (Orange) Line Bus Rapid Transit Improvement Project	Del Mar (Pasadena) to Chatsworth Del Mar (Pasadena) to Canoga Canoga to Chatsworth	Outside Study Area
	Metro Vermont Transit Corridor	120th St to Hollywood Boulevard	Outside Study Area
	Metro North San Fernando Valley Bus Rapid Transit Corridor Project (North San Fernando Valley BRT)	Chatsworth to North Hollywood	Outside Study Area
	Metro North Hollywood to Pasadena Bus Rapid Transit Corridor Project (NoHo to Pasadena BRT)	North Hollywood to Pasadena	Outside Study Area
Highway (Existing)	Highway System	Various locations	Within Study Area
Highway (Under Construction/ Planned)[5]	High Desert Corridor Project	SR-14 to SR-18	Outside Study Area
	I-5 North Capacity Enhancements	SR-14 to Lake Hughes Rd	Outside Study Area
	SR-71 Gap Closure	I-10 to Rio Rancho Rd	Outside Study Area
	I-405 (Sepulveda Pass) Express Lanes Project	I-10 to US-101	Outside Study Area
	SR-57/SR-60 Interchange Improvements	SR-70/SR-60	Outside Study Area
	I-710 South Corridor Project Phase 1 and 2)	Ports of Long Beach and LA to SR-60	Within Study Area
	I-105 Express Lane	I-405 to I-605	Within Study Area
	I-5 Corridor Improvements	I-605 to I-710	Outside Study Area

Source: Prepared on behalf of Metro in 2021

Notes: [1] Where extensions are proposed for existing Metro rail lines, the origin/destination is defined for the operating scheme of the entire rail line following completion of the proposed extensions and not just the extension itself.

[2] The Metro C (Green) Line extension to Torrance includes new construction from Redondo Beach to Torrance; however, the line will operate from Torrance to 96th Street.

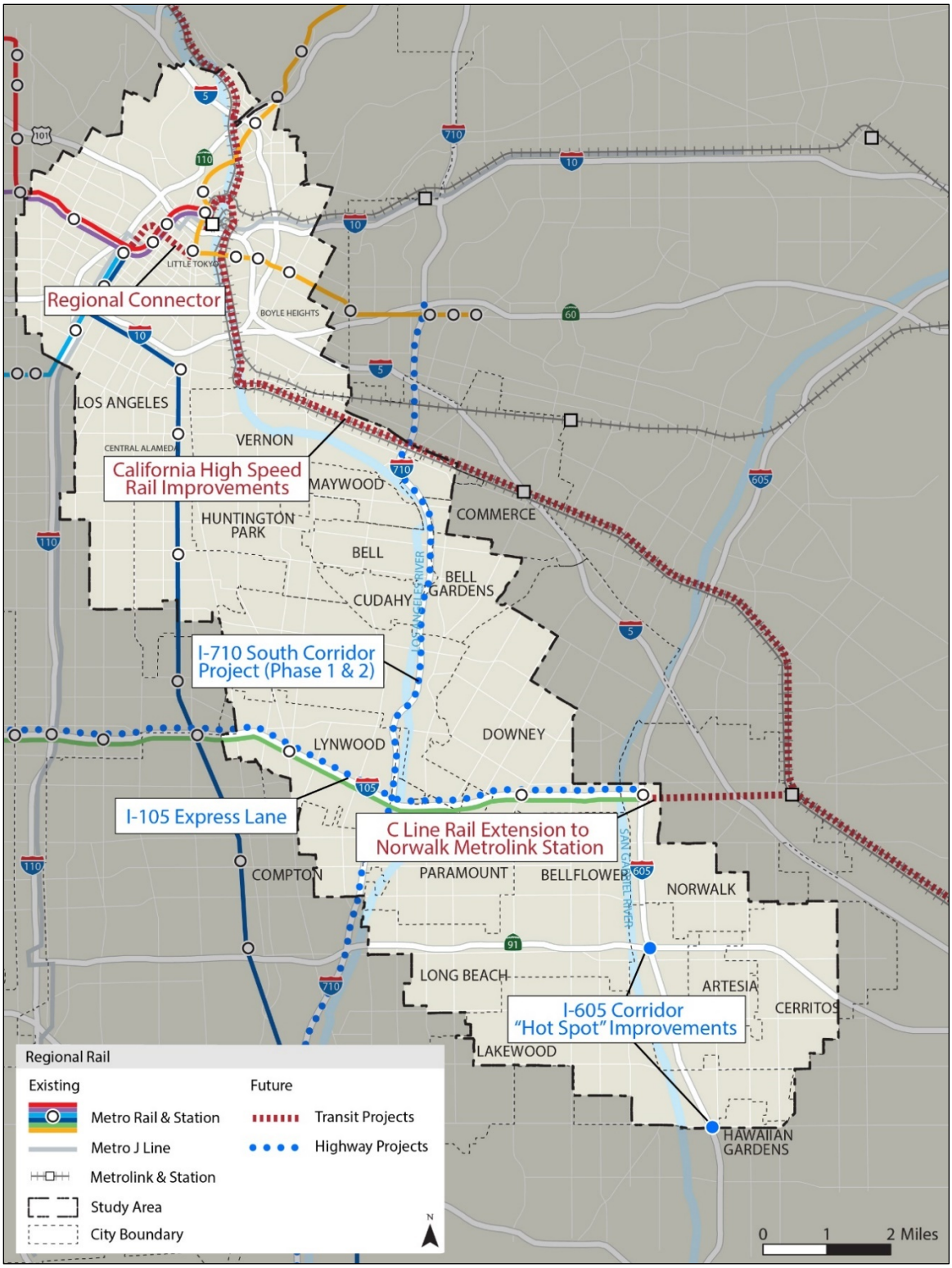
[3] The currently under construction Metro Crenshaw/LAX Line will operate as the Metro C (Green) Line.

[4] The municipality bus network system is based on service patterns for Bellflower Bus, Cerritos on Wheels, Cudahy Area Rapid Transit, Get Around Town Express, Huntington Park Express, La Campana, Long Beach Transit, Los Angeles Department of Transportation, Norwalk Transit System, and Orange County Transportation Authority.

[5] Planned projects may be subject to change.

BRT = bus rapid transit; LA = Los Angeles; LAUS = Los Angeles Union Station; LAX = Los Angeles International Airport; LRT = light rail transit; VA = Veterans Affairs

Figure 2-2. Planned Rail and Highway Improvements in Study Area



Source: Prepared on behalf of Metro in 2021

2.5.2 Build Alternatives

2.5.2.1 Summary of the Build Alternatives

Four Build Alternatives, two design options, and two MSF site options are evaluated in this Draft EIS/EIR.

Build Alternatives and Design Options

- Alternative 1: Los Angeles Union Station to Pioneer Station
  - Design Option 1: Los Angeles Union Station – Metropolitan Water District (MWD)
  - Design Option 2: Addition of Little Tokyo Station
- Alternative 2: 7th St/Metro Center to Pioneer Station
- Alternative 3: Slauson/A Line (Blue) to Pioneer Station (Staff Preferred Alternative)
- Alternative 4: I-105/C Line (Green) to Pioneer Station

Maintenance and Storage Facility

To support the Build Alternatives, a single MSF for rail cars is required. Two optional sites are under consideration:

- Paramount MSF site option
- Bellflower MSF site option

Table 2.3 summarizes the components for each Build Alternative.

Table 2.3. Summary of Build Alternative Project Components

Project Components Alternatives	Build Alternatives			
	Alternative 1	Alternative 2	Alternative 3	Alternative 4s
Alignment length	19.3 miles	19.3 miles	14.8 miles	6.6 miles
Length of underground, at-grade, and aerial	2.3 miles underground; 12.3 miles at-grade; 4.7 miles aerial[1]	2.3 miles underground; 12.3 miles at-grade; 4.7 miles aerial[1]	12.2 miles at-grade; 2.6 miles aerial[1]	5.6 miles at-grade; 1.0 mile aerial[1]
Stations configurations	11 2 underground; 6 at-grade; 3 aerial[3]	12 3 underground; 6 at-grade; 3 aerial	9 6 at-grade; 3 aerial	4 3 at-grade; 1 aerial
Parking facilities	5 (up to approximately 2,795 spaces)	5 (up to approximately 2,795 spaces)	5 (up to approximately 2,795 spaces)	4 (up to approximately 2,180 spaces)
At-grade crossings	31	31	31	11
Elevated street crossings	25	25	15	7
Freight crossings	10	10	9	2

Project Components Alternatives	Build Alternatives			
	Alternative 1	Alternative 2	Alternative 3	Alternative 4s
Freeway crossings	6 (3 freeway undercrossings[2] at I-710; I-605, SR-91)	6 (3 freeway undercrossings[2] at I-710; I-605, SR-91)	4 (3 freeway undercrossings[2] at I-710; I-605, SR-91)	3 (2 freeway undercrossings[2] at I-605, SR-91)
River crossings	3	3	3	1
Radio towers	2	2	0	0
TPSS facilities	22[3]	23	17	7
MSF site options	2	2	2	2
Capital cost (2020$) with MSF[4, 5, 6]	$8.5 billion – $8.8 billion	$9.2 billion – $9.5 billion	$4.9 billion – $5.1 billion	$2.3 billion – $2.6 billion
Annual O&M cost[4] (2020$)	$87 million	$101 million	$67 million	$41 million

Source: Prepared on behalf of Metro in 2021
Notes: [1] Alignment configuration measurements count retained fill embankments as at-grade.
[2] The light rail tracks crossing beneath freeway structures.
[3] Under Design Option 2 – Add Little Tokyo Station, an additional underground station and TPSS site would be added under Alternative 1.
[4] 2020$ refers to dollar values assumed in Fiscal Year 2020.
[5] Costs range from the low end (with the Bellflower MSF site option) to the high end (with the Paramount MSF site option).
[6] The capital cost estimates will be further refined as the project advances through the project development process and more detailed engineering is undertaken.
MSF = maintenance and storage facility; O&M = operation and maintenance; TPSS = traction power substation

Table 2.4 summarizes the station locations for each Build Alternative. Additional detail for each Build Alternative alignment is further discussed in Sections 2.5.2.2 through 2.5.2.5. Figure 2-3 and Figure 2-4 detail the underground, at-grade, and aboveground alignments for the Build Alternatives as it traverses through affected and adjacent cities.

Table 2.4. Summary of Build Alternatives Stations

Build Alternatives	Station Name and Location	Jurisdiction	Type of Station	Max No. of Parking Spaces
1	**LAUS (Forecourt)** LAUS Forecourt	Los Angeles	Underground	—
1	**LAUS MWD (Design Option 1)** East of LAUS and the MWD building, below the baggage area parking facility	Los Angeles	Underground	—
1	**Little Tokyo (Design Option 2)** Alameda St between 1st St/2nd St	Los Angeles	Underground	—

Build Alternatives	Station Name and Location	Jurisdiction	Type of Station	Max No. of Parking Spaces
2	**7th St/Metro Center** 8th St between Figueroa St and Flower St; underground pedestrian connection to existing 7th St/Metro Center Station	Los Angeles	Underground	—
2	**South Park/Fashion District** 8th St between Main St/Santee St	Los Angeles	Underground	—
1, 2	**Arts/Industrial District** Alameda St between 6th St/Industrial St (Alternative 1) Alameda St between 7th St/Center St (Alternative 2)	Los Angeles	Underground	—
1, 2, 3	**Slauson/A Line** Long Beach Ave between Slauson Ave/57th St	Los Angeles; Unincorporated LA County	Aerial	—
1, 2, 3	**Pacific/Randolph** Randolph St between Pacific Ave/Seville Ave	Huntington Park	At-grade	—
1, 2, 3	**Florence/Salt Lake** Salt Lake Ave between Florence Ave/California St	Huntington Park; Cudahy	At-grade	—
1, 2, 3	**Firestone (P)** Between Atlantic Ave and Firestone Ave	South Gate	Aerial	600
1, 2, 3	**Gardendale** Gardendale St/Dakota Av	Downey	At-grade	—
1, 2, 3, 4	**I-105/C Line (P)** Between Century Blvd and Main St; I-105 Freeway/C (Green) Line (platforms on WSAB and Metro C (Green) Line)	South Gate; Paramount	At-grade	326
1, 2, 3, 4	**Paramount/Rosecrans (P)** Paramount Blvd/Rosecrans Ave	Paramount	Aerial	490
1, 2, 3, 4	**Bellflower (P)** Bellflower Blvd/Pacific Ave	Bellflower	At-grade	263
1, 2, 3, 4	**Pioneer (P)** Pioneer Blvd/187th St	Artesia	At-grade	1,100

Source: Prepared on behalf of Metro in 2021
Notes: (P) = station has parking facility
LA = Los Angeles; LAUS = Los Angeles Union Station; MWD = Metropolitan Water District; WSAB = West Santa Ana Branch

Figure 2-3. WSAB Transit Corridor Build Alternatives

Source: Prepared on behalf of Metro in 2021

Figure 2-4. Project Alignment by Alignment Type

Source: Prepared on behalf of Metro in 2021

2.5.2.2 Alternative 1: Los Angeles Union Station to Pioneer Station

Alternative 1 would be a 19.3-mile alignment with a northern terminus located underground at LAUS Forecourt in the City of Los Angeles and a southern terminus located at the Pioneer Station in the City of Artesia. Two design options (Design Option 1: Los Angeles Union Station – MWD, and Design Option 2: Addition of Little Tokyo Station) are proposed for Alternative 1. Details of the ancillary facilities and project components for Alternative 1 are detailed in Table 2.3 and Table 2.4. Figure 2-5 illustrates the Alternative 1 alignment.

Alignment

LAUS Forecourt Station to Arts/Industrial District Station

The Alternative 1 alignment would begin underground in the City of Los Angeles with the tail tracks[3] near the California Endowment Building, followed by an underground northern terminus in the LAUS Forecourt area between two double crossovers at the northern and southern end of the LAUS Forecourt Station. The tail tracks would extend north approximately 1,200 feet of the proposed station box beneath the existing Metro B/D (Red/Purple) Line, Mozaic apartments, Cesar Chavez Avenue, and US Post Office Building. From the southern crossover, the alignment would continue south crossing beneath the El Monte Busway and US-101 freeway, in between two large-diameter foundations of the Metro L (Gold) Line aerial structure, then would swing west to travel beneath Alameda Street. Continuing south beneath Alameda Street, the alignment would cross beneath the Metro Regional Connector wye structure[4] at the intersection of E. 1st Street and N. Alameda Street and would continue underground beneath Alameda Street to the Arts/Industrial District Station on S. Alameda Street between 6th Street and Industrial Street, followed by a double crossover on the south.

Arts/Industrial District Station to Slauson/A Line Station

From the underground Arts/Industrial District Station in the City of Los Angeles, the underground Alternative 1 alignment would continue south under Alameda Street to 8th Street, where the alignment would curve to the west beneath McGarry Street to a tunnel portal located just south of E. Olympic Boulevard. The alignment would begin to transition to an aerial alignment between Olympic Boulevard and just north of the 14th Street/Long Beach Avenue, avoiding the intersection, then crossing over the I-10 freeway in an aerial viaduct structure and continuing south in parallel with the Metro A (Blue) Line track alignment. The existing on/off-ramps for the I-10 freeway would not be changed as part of this Project. The alignment would continue in an aerial configuration along the eastern half of Long Beach Avenue partially within the UPRR-owned Wilmington Branch ROW, east of the existing Metro A (Blue) Line and continue to the aerial Slauson/A Line Station in the City of Los Angeles/unincorporated Florence-Firestone of LA County. The aerial alignment would cross over the existing E. 53rd Street pedestrian bridge (approximately 17 feet above the bridge), which would remain unchanged, and is above the existing freight tracks. A double crossover track to allow the trains to switch from either track to the other in both directions would be located just south of 53rd Street and the existing pedestrian bridge.

[3] Tail tracks are additional track that extend beyond the end of the mainline tracks and can be used for temporarily parking, storing, or reversing the direction of trains.

[4] Wye structure refers to a triangular junction joining three rail lines with a switch to allow an incoming train to travel in either direction, or allow trains to pass from one line to another line.

Figure 2-5. Alternative 1: Los Angeles Union Station to Pioneer Station

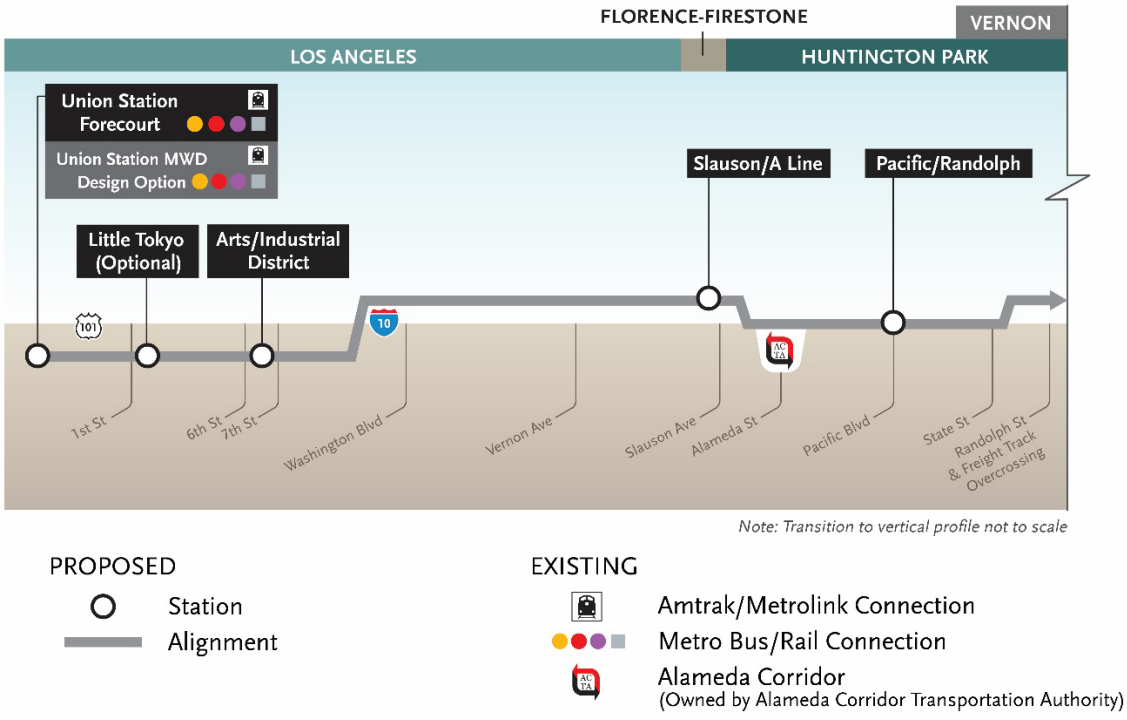
Source: Prepared on behalf of Metro in 2021

The alignment would continue south parallel to the existing aerial Metro A (Blue) Line as it approaches the Slauson/A Line Station and the existing Metro A (Blue) Line Slauson Station. The Slauson/A Line Station would serve as a transfer point to the Metro A (Blue) Line via a pedestrian bridge between the two station platforms. Stairs, escalators, and elevators would connect with the street level on the north and south sides of the station. The Slauson/A Line Station would serve as the northern terminus for Alternative 3 (Section 2.5.2.4).

Slauson/A Line Station to Florence/Salt Lake Station

From the aerial Slauson/A Line Station, the aerial alignment would continue east into the City of Huntington Park and descend to an at-grade configuration as it approaches the intersection of Alameda Street and Randolph Street. Along Randolph Street, the intersections of Wilmington Avenue, Regent Street, Albany Street, Rugby Avenue, and Rita Avenue would be modified to eliminate crossing the tracks. The intersection design of these streets would be altered to a right-in, right-out configuration. The at-grade alignment would continue along Randolph Street to the at-grade Pacific/Randolph Station located east of Pacific Boulevard in the City of Huntington Park. The alignment would be located on the north side of the existing UPRR-owned La Habra Branch ROW in the median of Randolph Street and would require the relocation of existing freight track to the southern portion of the rail ROW with a minimum 20-foot clearance from the freight tracks. Overall, the railroad ROW would be widened by about 15 feet into the street/public ROW to accommodate the two LRT tracks and the relocated freight track. Figure 2-6 illustrates the alignment profile extending from LAUS to the Pacific/Randolph Station.

Figure 2-6. Alignment Profile from Los Angeles Union Station to Pacific/Randolph Station



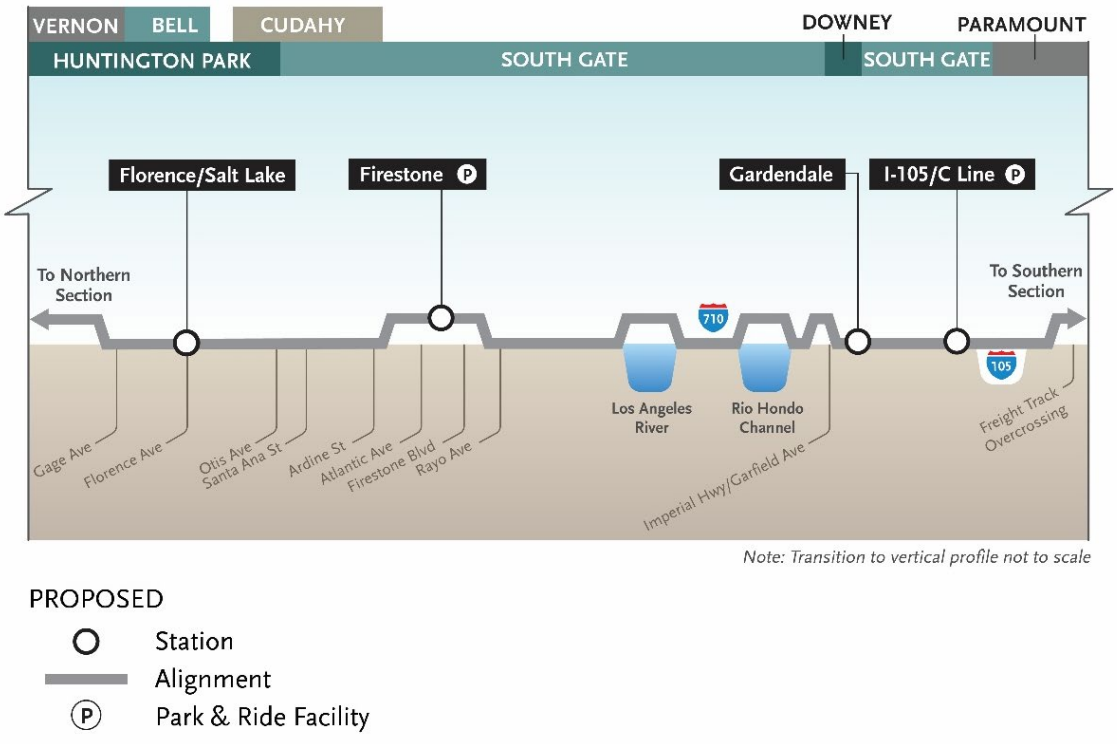
Source: Prepared by Cityworks Design and WSP in 2021

From the Pacific/Randolph Station, the alignment would continue east at-grade within the La Habra Branch ROW. As the alignment approaches the San Pedro Subdivision ROW, the alignment would transition to an aerial configuration and turn south to cross over Randolph Street and the freight track, and then descend back to an at-grade configuration north of Gage Avenue. The at-grade alignment would be located on the east side of the existing San Pedro Subdivision ROW freight track, and the existing track would be relocated to the west side of the ROW. The alignment would continue at-grade within the San Pedro Subdivision ROW to the at-grade Florence/Salt Lake Station located south of the Salt Lake Avenue/Florence Avenue intersection in Huntington Park.

Florence/Salt Lake Station to the I-105/C Line Station

From the at-grade Florence/Salt Lake Station in the City of Huntington Park, the alignment would continue southeast at-grade within the San Pedro Subdivision ROW, crossing Otis Avenue, Santa Ana Street, and Ardine Street. The alignment would be located on the east side of the existing San Pedro Subdivision ROW freight tracks, and the existing freight tracks would be relocated to the west side of the ROW, with a minimum 20-foot clearance from the freight tracks. South of Ardine Street, the alignment would transition to an aerial structure to cross over the existing UPRR tracks and Atlantic Avenue to the aerial Firestone Station located on an aerial structure between Atlantic Avenue and Firestone Boulevard in the City of South Gate, as illustrated in Figure 2-7.

Figure 2-7. Alignment Profile from Florence/Salt Lake Station to I-105/C Line Station



Source: Prepared by Cityworks Design and WSP in 2021

From the aerial Firestone Station, the aerial alignment would transition to an at-grade configuration prior to crossing Rayo Avenue at-grade. The alignment would continue south along the San Pedro Subdivision ROW, crossing at-grade and continuing at-grade until transitioning to an aerial configuration to cross over the LA River. A new LRT bridge would be constructed east of the existing LA River truss bridge to cross the LA River, and the truss bridge would remain unaltered. South of the LA River, the alignment would transition to an at-grade configuration crossing Frontage Road, transecting the I-710 freeway through a new box tunnel structure and then crossing Miller Way. The alignment would then transition to an aerial structure to cross the Rio Hondo Channel. A new LRT bridge would be constructed east of the existing freight bridge that would remain unaltered. South of the Rio Hondo Channel, the alignment would briefly transition to an at-grade configuration before returning to an aerial structure to cross over Imperial Highway and Garfield Avenue. South of Garfield Avenue, the alignment would transition from aerial to an at-grade configuration and continue to the Gardendale Station at the border of the Cities of Downey and South Gate.

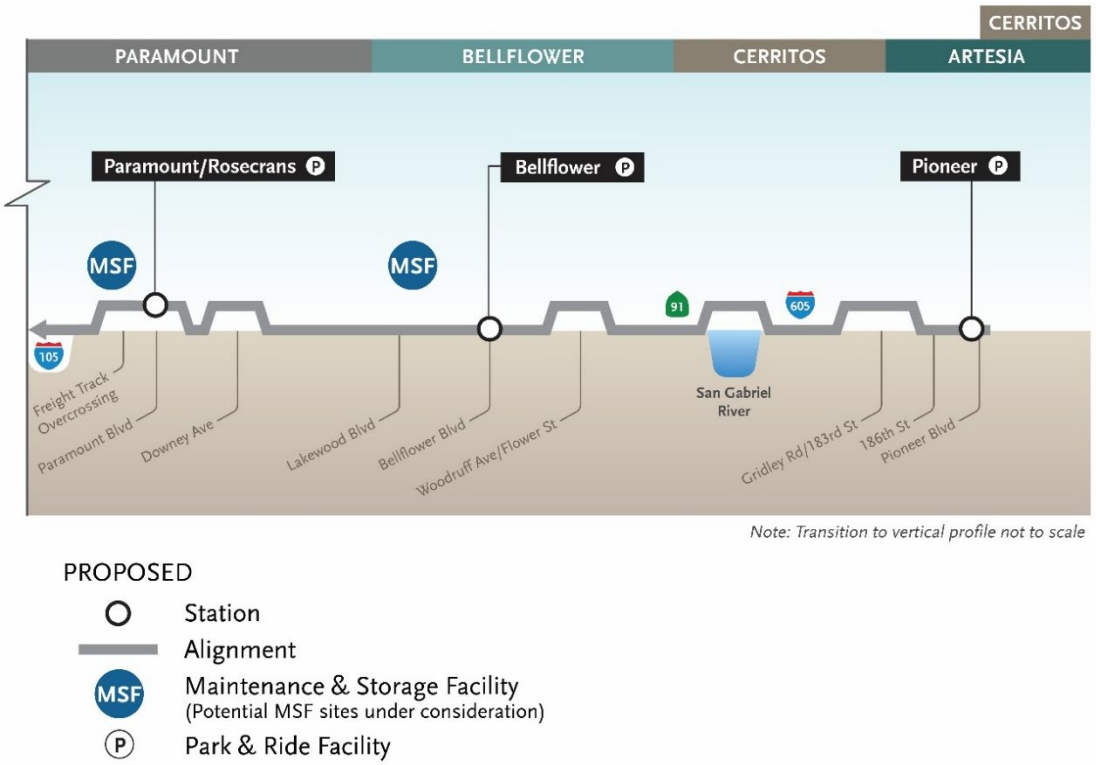
From the Gardendale Station, the alignment would continue south at-grade within the San Pedro Subdivision ROW, crossing Gardendale Street and Main Street to the at-grade I-105/C Line Station located north of Century Boulevard in the City of South Gate. The I-105/C Line Station would serve as the northern terminus for Alternative 4 (Section 2.5.2.5).

I-105/C Line Station to Pioneer Station

From the at-grade I-105/C Line Station platform located north of Century Boulevard, the alignment would cross Century Boulevard and then over the I-105 freeway in an aerial configuration. As described in Section 2.4.4.1, the existing freight bridge, Façade Avenue Overcrossing, and Arthur Avenue Pedestrian Overcrossing would be demolished and reconstructed as part of the Project. The reconstructed freight bridge would have a width of 20 feet, consistent with the current bridge; however, the bridge may be widened up to 35 feet to accommodate a maintenance area for Union Pacific pending further coordination. A new platform along the existing Metro C (Green) Line would be located within the median of the I-105 freeway. To accommodate the construction of the new station platforms, the existing Metro C (Green) Line tracks would be realigned for approximately one-half mile from the existing Garfield Avenue to Paramount Boulevard bridge overpasses. As part of the Metro I-105 Express Lanes Project, the I-105 freeway lanes would be reconfigured. This station would be accessed via stairs and/or escalators and elevators from a pedestrian walkway incorporated into the new LRT bridge on the east end and via stairs and elevators from Façade Avenue on the western end.

South of the I-105 freeway, the alignment would continue at-grade within the San Pedro Subdivision ROW and transition to an aerial configuration as it turns southeast and enters the PEROW to maintain freight operations. The existing freight track would cross beneath the aerial alignment and align on the north side of the PEROW east of the San Pedro Subdivision ROW. As illustrated in Figure 2-8, the alignment would continue in an aerial configuration to the aerial Paramount/Rosecrans Station located west of Paramount Boulevard and north of Rosecrans Avenue in the City of Paramount. The existing freight track would be relocated to the east side of the alignment beneath the station aerial viaduct.

Figure 2-8. Alignment Profile from Paramount Station to Pioneer Station



Source: Prepared by Cityworks Design and WSP in 2021

From the Paramount/Rosecrans Station, the alignment would continue southeast in an aerial configuration over the Paramount Boulevard/Rosecrans Avenue intersection, descend to an at-grade configuration, and transition back to an aerial configuration just east of Paramount Park to cross over Downey Avenue. A pedestrian tunnel to connect Paramount High School and an athletics field at Paramount High School – West Campus is proposed in this ROW. After crossing Downey Avenue, the alignment would descend to an at-grade configuration north of Somerset Boulevard. A freight storage track currently located at the World Energy facility in this portion of the ROW would be displaced to accommodate the new LRT tracks. The freight storage tracks would be reconfigured to provide the same amount of rail vehicle storage capacity as currently exists. There are no active freight tracks south of the World Energy facility. The alignment would cross at-grade from Somerset Boulevard and parallel the existing Bellflower Bike Trail currently aligned on the south side of the PEROW. The alignment would continue at-grade within the PEROW, crossing Lakewood Boulevard, Clark Avenue, and Alondra Boulevard. The Bellflower Bike Trail between Somerset Boulevard and Lakewood Boulevard would move from the south side to the north side of the PEROW.

The at-grade Bellflower Station would be located west of Bellflower Boulevard in the City of Bellflower. East of Bellflower Boulevard, the Bellflower Bike Trail would be realigned to the south side of the PEROW to eliminate an at-grade crossing of the LRT tracks. The bike trail would bypass an existing building located near the southeast corner of Bellflower Boulevard and the PEROW and rejoin the existing bike trail on the south side of PEROW east of the historic train building. The at-grade LRT alignment would continue southeast within the PEROW and transition to an aerial configuration at Cornuta Avenue, crossing over Flower Street and Woodruff Avenue. The aerial alignment would transition to an at-grade

configuration at Walnut Street and continue southeast under the SR-91 freeway in an existing underpass. The alignment would then transition to an aerial configuration to cross over the San Gabriel River via a new bridge replacing the existing abandoned freight bridge. South of the San Gabriel River, the alignment would transition back to an at-grade configuration before crossing Artesia Boulevard at-grade.

The at-grade alignment would continue southeast from Artesia Boulevard and cross under the I-605 freeway in an existing underpass toward Studebaker Road. North of Gridley Avenue, the alignment would transition to an aerial configuration to cross over 183rd Street and Gridley Road. The alignment would then descend to an at-grade configuration at 185th Street, crossing 186th Street and 187th Street at-grade. The at-grade alignment would then pass through the southern terminus of Pioneer Station, located on the west side of Pioneer Boulevard in the City of Artesia. Tail tracks accommodating layover storage for a three-car train would extend approximately 1,000 feet south from the station, crossing Pioneer Boulevard and terminating west of South Street.

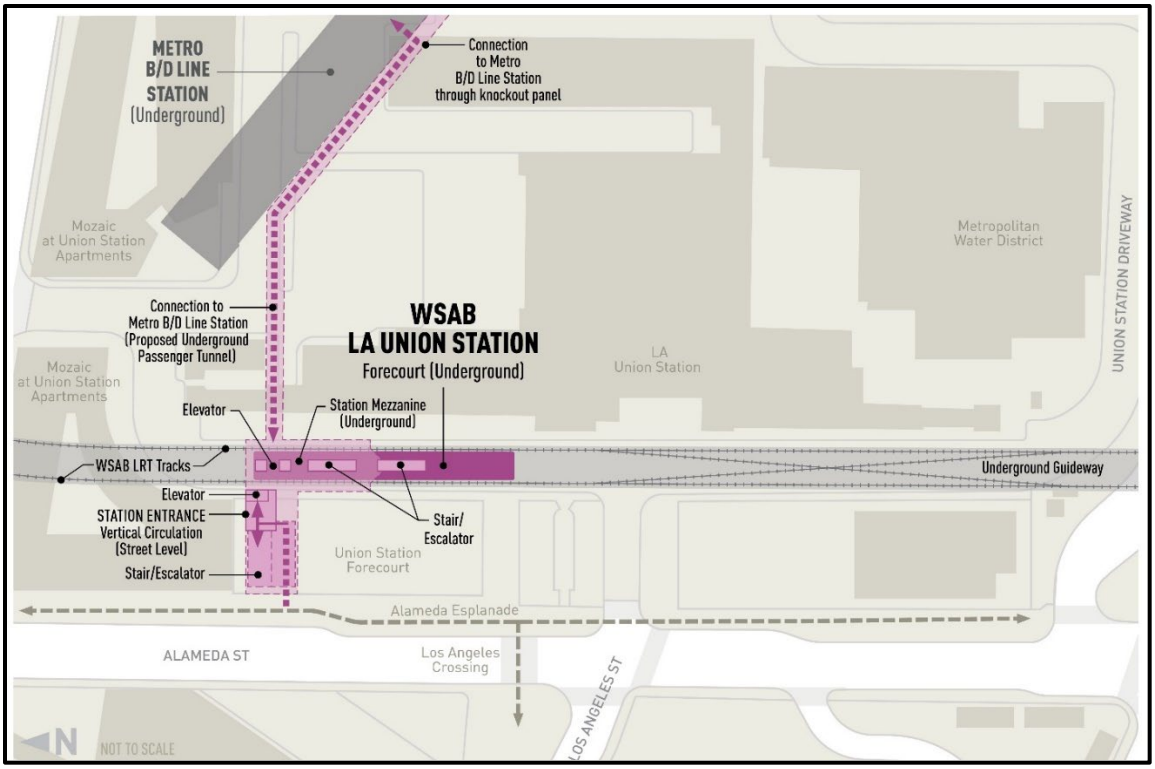
Stations and Park-and-Ride Facilities

Alternative 1 would include 11 station locations, of which 5 would have parking facilities with up to 2,780 parking spaces combined, as summarized in Table 2.4 and described in detail below. Proposed stations would be designed to be consistent with Metro's Systemwide Station Design Standards, or equivalent design criteria[5], and Metro Art Program Policy for design guidance.

Los Angeles Union Station (Forecourt). The LAUS Forecourt Station would serve as the northern terminus for Alternative 1 and would allow for transfers to Metrolink regional commuter rail lines; Amtrak national rail service; Metro's A, B, D, J, and L (Blue, Red, Purple, Silver, and Gold) Lines; and other local and regional bus lines. As shown in Figure 2-9, the underground station box would be located west of LAUS, under the Forecourt driveway. The station would be accessed through an entrance with stairs and escalators from Alameda Street, and elevators would be located within the LAUS Forecourt. A second entrance would be provided through an approximately 500-foot-long pedestrian tunnel from the LAUS Forecourt Station to the existing Metro B/D (Red/Purple) Line station. The pedestrian tunnel would be 15 feet wide and 12 feet high and would cross beneath the existing LAUS Railway Express Agency building and run parallel and adjacent to the existing Metro B/D (Red/Purple) Line station structure. The pedestrian tunnel would be connected to the Metro B/D (Red/Purple) Line station through a knock-out panel, allowing pedestrians to transfer between the WSAB Line and the existing Metro B/D lines. LAUS currently has a parking facility with approximately 2,000 spaces. No additional parking spaces at LAUS are proposed as part of the Project.

[5] Flexibility for the development of other performance criteria, perhaps in support of a Public-Private Partnership procurement, is provided. The ultimate criteria used will achieve the same performance standards as those established in the Metro guidance.

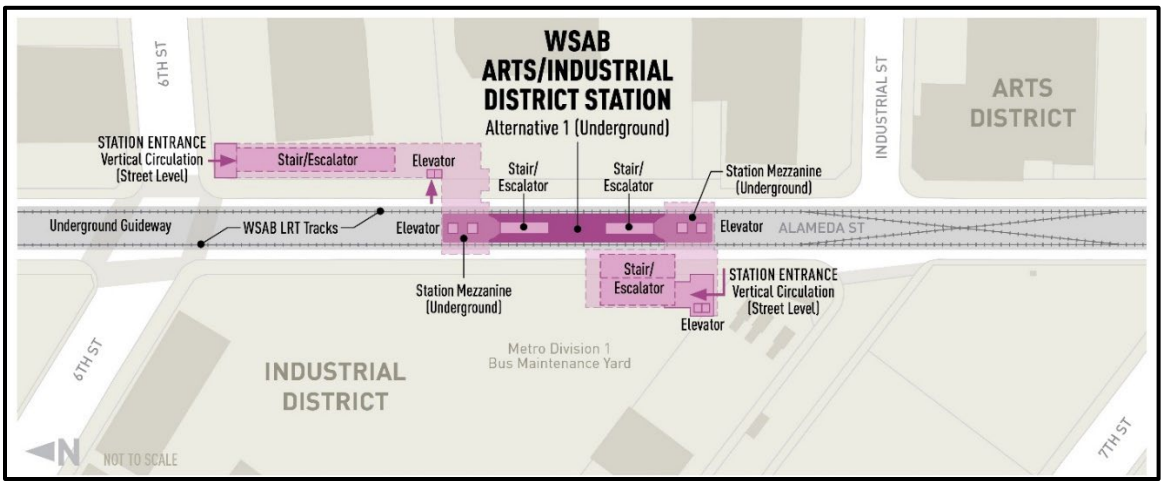
Figure 2-9. Los Angeles Union Station Forecourt Station



Source: Prepared by Cityworks Design and WSP in 2021

Arts/Industrial District Station. The underground Arts/Industrial District Station would be located under Alameda Street between 6th Street and Industrial Street (Figure 2-10). A station entrance would be located on the west side of Alameda Street, north of Industrial Street. A second entrance would be located on the east side of Alameda Street, south of 6th Street. Each entrance would consist of a set of stairs, escalators, and elevators. No parking facility is proposed at this station.

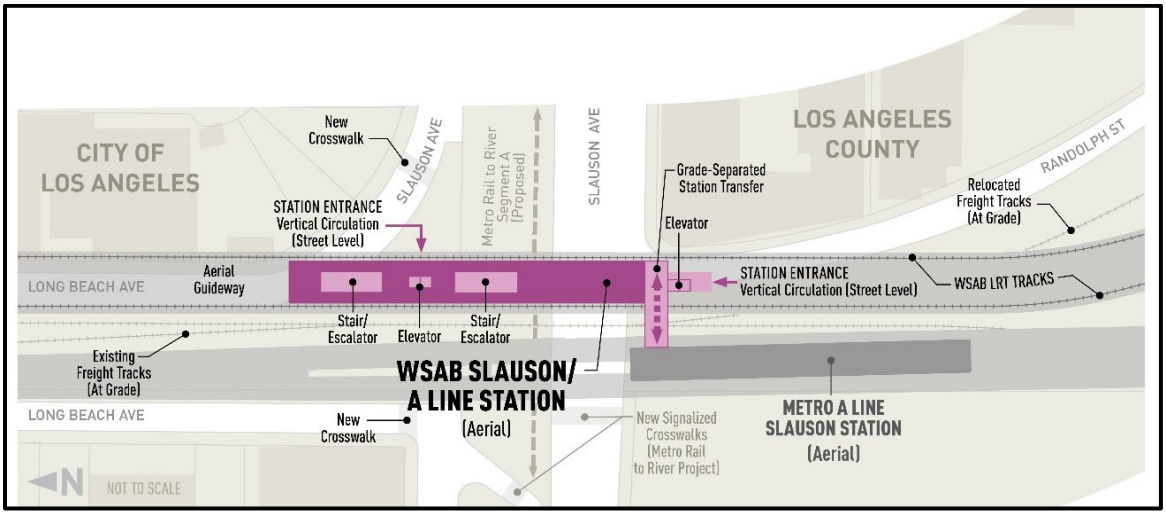
Figure 2-10. Arts/Industrial District Station



Source: Prepared by Cityworks Design and WSP in 2021

Slauson/A Line Station. The Slauson/A Line Station would be a major transfer point to the Metro A (Blue) Line. The Slauson/A Line Station would operate on a single platform and would be located parallel and east of the Metro A (Blue) Line Slauson Station platform and above the Wilmington Branch ROW, as shown in Figure 2-11. Access to the station from the street would be via an entrance on the northeast and southeast corner of Long Beach Avenue and Slauson Avenue. The two entrances would consist of a set of stairs, an escalator, and an elevator. A pedestrian bridge would be located on the southern end of the platform that connects to a mezzanine level and would provide a connection between the two station platforms. No parking facility is proposed at this station.

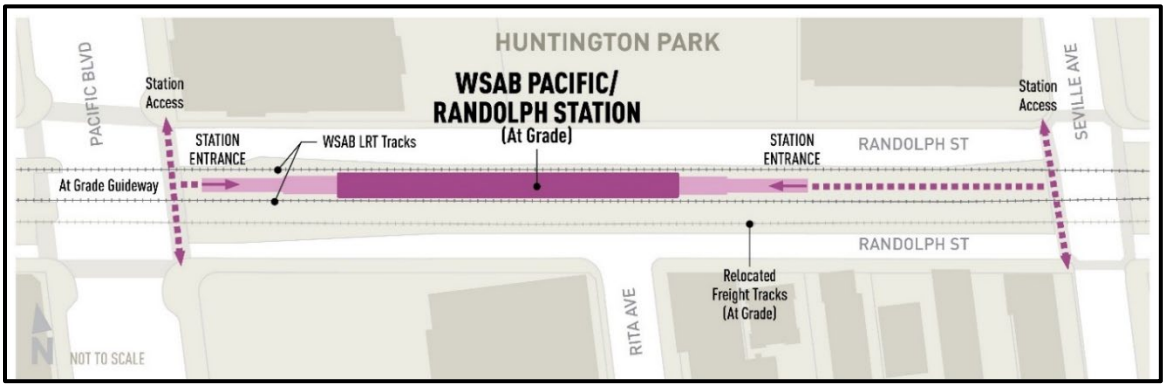
Figure 2-11. Slauson/A Line Station



Source: Prepared by Cityworks Design and WSP in 2021

Pacific/Randolph Station. The Pacific/Randolph Station would be located at-grade within the La Habra Branch ROW along the Randolph Street median between Pacific Boulevard and Seville Avenue (Figure 2-12). Access to the station would be via pedestrian crossings from the north and south side of Randolph Street east of Pacific Boulevard and the north and south side of Randolph Street west of Seville Avenue. No parking facility is proposed at this station.

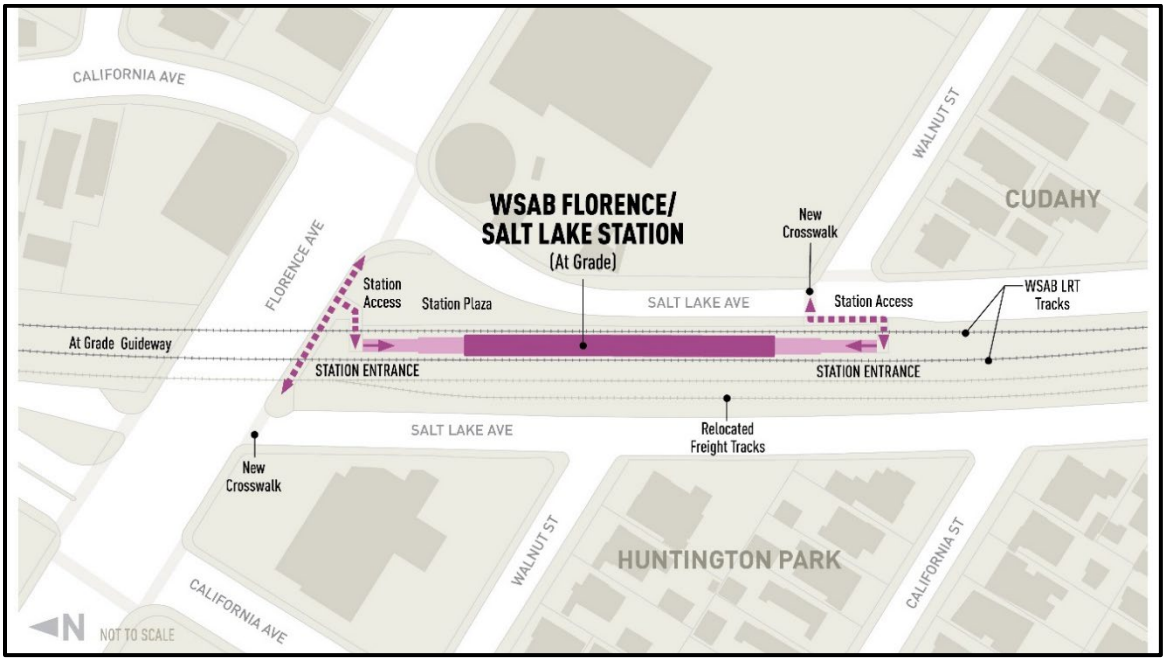
Figure 2-12. Pacific/Randolph Station



Source: Prepared by Cityworks Design and WSP in 2021

Florence/Salt Lake Station. The Florence/Salt Lake Station would be located at-grade within the San Pedro Subdivision ROW between Florence Avenue and California Avenue (Figure 2-13). Access to the station would be via a pedestrian walkway north and south of the station platform. The pedestrian walkway on the north side of the station platform would connect to a reconfigured sidewalk on the south side of the Florence Avenue and Salt Lake Avenue intersection. To maintain existing sidewalks and roadway lane configurations, the existing water well east of Salt Lake Avenue would need to be relocated. Existing freight tracks within the San Pedro Subdivision ROW would be relocated to the west to accommodate the proposed station platform and tracks. No parking facility is proposed at this station.

Figure 2-13. Florence/Salt Lake Station

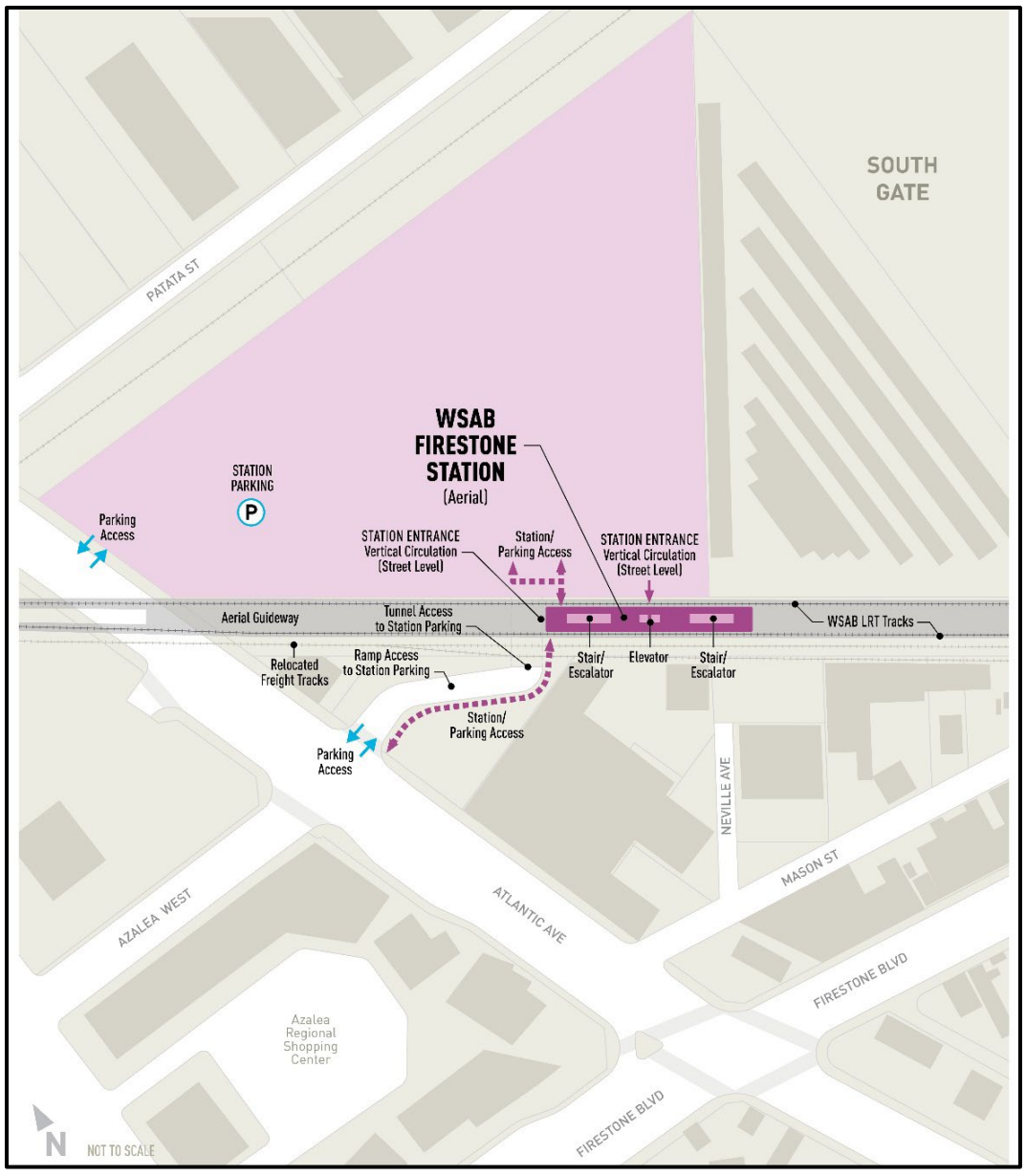


Source: Prepared by Cityworks Design and WSP in 2021

Firestone Station. The aerial Firestone Station would be located on an elevated structure within the existing San Pedro Subdivision ROW between Atlantic Avenue and Firestone Boulevard (Figure 2-14). Access to the station would be from the proposed park-and-ride lot and via a new pedestrian walkway from Atlantic Avenue to a pedestrian crossing across the at-grade freight tracks.

A 9.1-acre parking facility with up to 600 parking spaces is proposed at this station. Access to the parking facility would be via two driveways from Atlantic Avenue; the southernmost driveway would be accessed from Atlantic Avenue and would pass under the Firestone Station to the parking facility. Pedestrian access between the station platforms and the parking facility would be via a new pedestrian walkway extending from Atlantic Avenue to a pedestrian crossing across the at-grade freight tracks, north of the Firestone Station platform. The platform would be accessed via two elevators, two sets of stairs, and escalators. Existing freight tracks within the San Pedro Subdivision ROW would be relocated to the west to accommodate the proposed station platform and tracks.

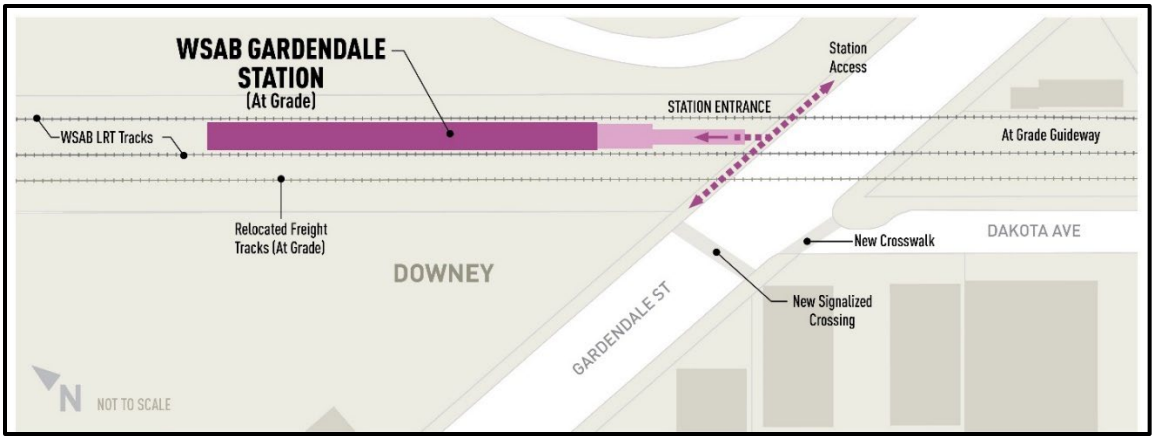
Figure 2-14. Firestone Station



Source: Prepared by Cityworks Design and WSP in 2021

Gardendale Station. The at-grade Gardendale Station (Figure 2-15) would be located within the San Pedro Subdivision ROW, just north of Gardendale Street. Access to the station would be via a new pedestrian walkway on the south end of the platform that would connect to the sidewalk on the north side of Gardendale Street. Emergency egress would be provided on the north end of the platform. Within the San Pedro Subdivision ROW, existing freight tracks would be relocated to the west to accommodate the station platform and tracks. No parking facility is proposed at this station.

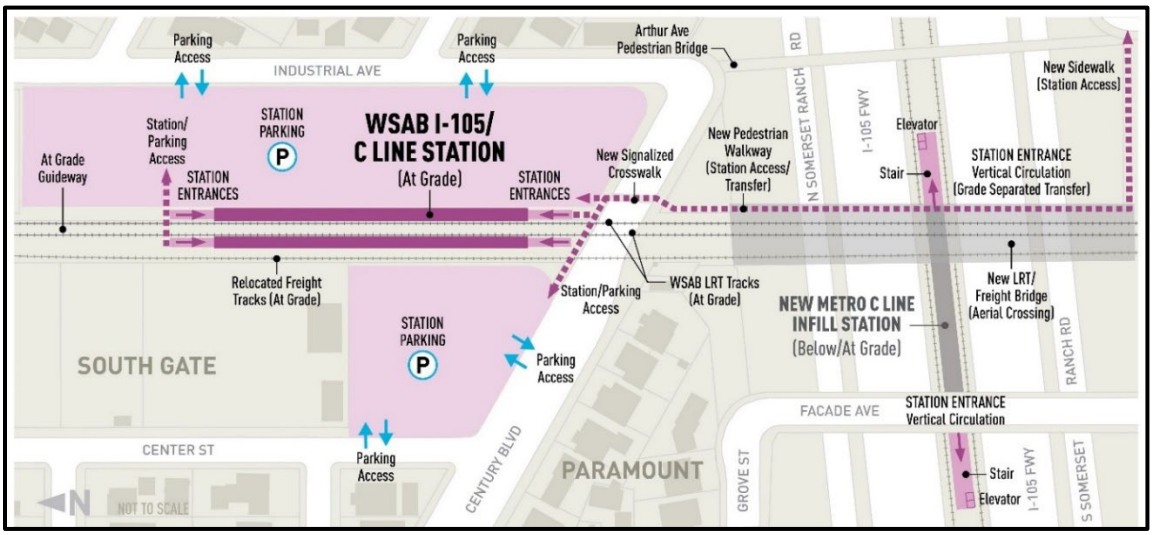
Figure 2-15. Gardendale Station



Source: Prepared by Cityworks Design and WSP in 2021

I-105/C Line Station. The I-105/C Line Station would provide a connection with the Metro C (Green) Line via a new station platform in the Metro C (Green) Line alignment within the I-105 freeway median. The I-105/C Line Station would be located at-grade within the rail ROW, north of Century Boulevard within the City of South Gate, as shown in Figure 2-16. This station would consist of two side platforms with access at the north and south ends of the station platform. A pedestrian crossing would be located at the northern end of the station platforms with access to the two proposed parking facilities. Access from the southern end of the platform would be provided via a pedestrian walkway to Century Boulevard. To accommodate the station platforms, the existing freight track would be relocated to the west, which requires demolition of the existing freight bridge and construction of a new freight bridge.

Figure 2-16. I-105/C Line Station



Source: Prepared by Cityworks Design and WSP in 2021

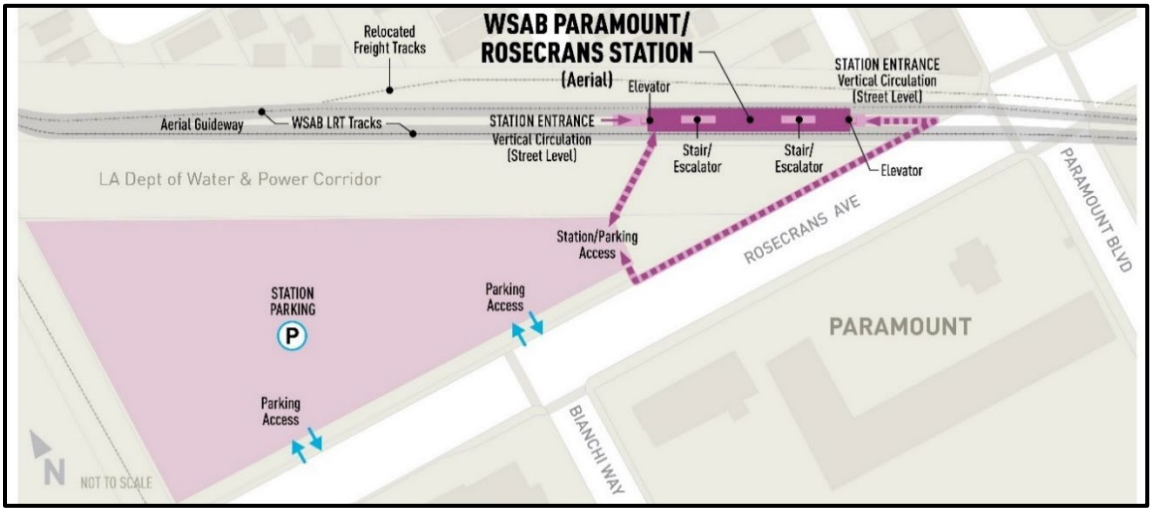
A new station along the existing Metro C (Green) Line would be located within the median of the I-105 freeway within the City of Paramount. The Metro C (Green) Line would be realigned to provide space for the new center platform. This station would be accessed via stairs and/or escalators and elevators from a pedestrian walkway incorporated into the new LRT bridge on the east end and via stairs and elevators from Façade Avenue on the west end.

The pedestrian bridge would be connected on the north side of the freeway to the walkway at Century Boulevard. On the south side of the freeway, the pedestrian bridge would connect to a pedestrian walkway between the San Pedro Subdivision ROW and Arthur Avenue to the east. The existing Façade Avenue overpass bridge and the Arthur Avenue pedestrian bridge would also be reconstructed as two-span structures to accommodate both the WSAB and Metro I-105 Express Lanes projects.

Two parking facility sites totaling approximately 3.7 acres and accommodating up to 326 parking spaces would be located on the west and east sides of the I-105/C Line Station platforms along the project alignment north of Century Boulevard. The western parking facility is approximately 1.2 acres with vehicle access via Century Boulevard and Center Street. The eastern parking facility is approximately 2.5 acres with vehicle access via two driveways from Industrial Avenue. Pedestrian pathways between the parking facilities and the station platform would be provided from Century Boulevard and from the north end of the platform to the eastern parking facility.

Paramount/Rosecrans Station. The aerial Paramount/Rosecrans Station would be within the PEROW northwest of the intersection of Paramount Boulevard and Rosecrans Avenue, as shown in Figure 2-17. Street-level access would be provided via a pedestrian walkway along the north side of Rosecrans Avenue to an at-grade plaza where two sets of stairs, two sets of escalators, and two sets of elevators would provide access to the boarding platform.

Figure 2-17. Paramount/Rosecrans Station

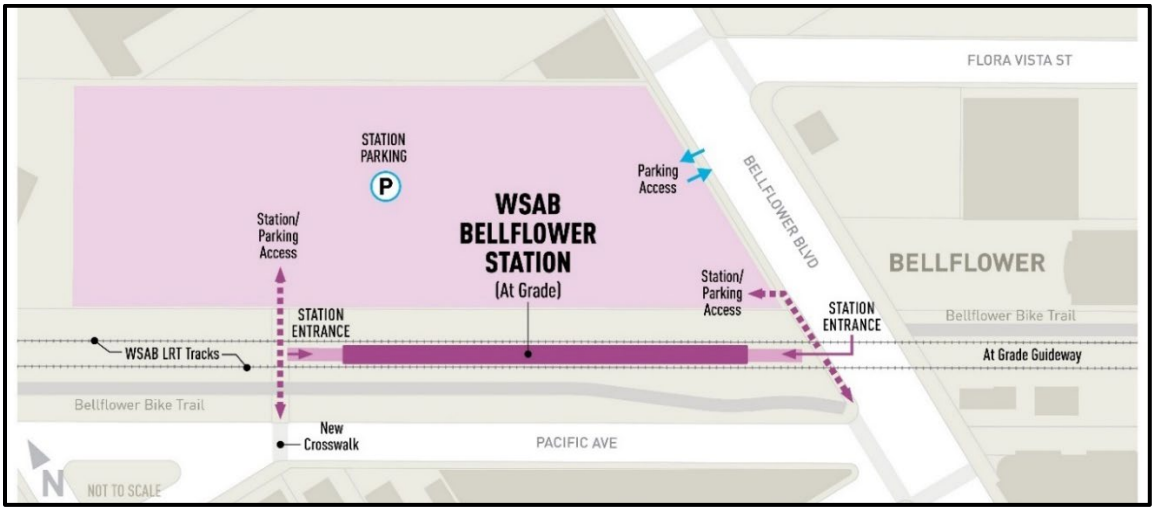


Source: Prepared by Cityworks Design and WSP in 2021

A 3.8-acre parking facility with up to 490 parking spaces would be located southwest of the Paramount/Rosecrans Station adjacent to a utility property. Access to the parking facility would be via two separate driveways on Rosecrans Avenue. Pedestrian access between the parking facility and station platform would be via a pedestrian pathway connecting the northern end of the station platform to the eastern corner of the parking facility and the sidewalk along Rosecrans Avenue. The existing at-grade freight tracks would be realigned to the north within the PEROW to accommodate the station platform and provide access to the World Energy industrial facility.

Bellflower Station. The at-grade Bellflower Station would be within the PEROW, west of Bellflower Boulevard, as shown in Figure 2-18. Access to the station would be via a pedestrian walkway on the southeast end of the platform, connecting to the sidewalk on Bellflower Boulevard. Pedestrian access would be provided from both ends of the station platform. On the northwest end of the station platform, pedestrian access would be provided by a crossing to Pacific Avenue or directly to the proposed parking facility north of the station. On the southeast end of the station platform, pedestrian access would be provided to Bellflower Boulevard. A bus stop and the Bellflower Bike Trail would be realigned within the PEROW to accommodate the station platform and tracks.

Figure 2-18. Bellflower Station



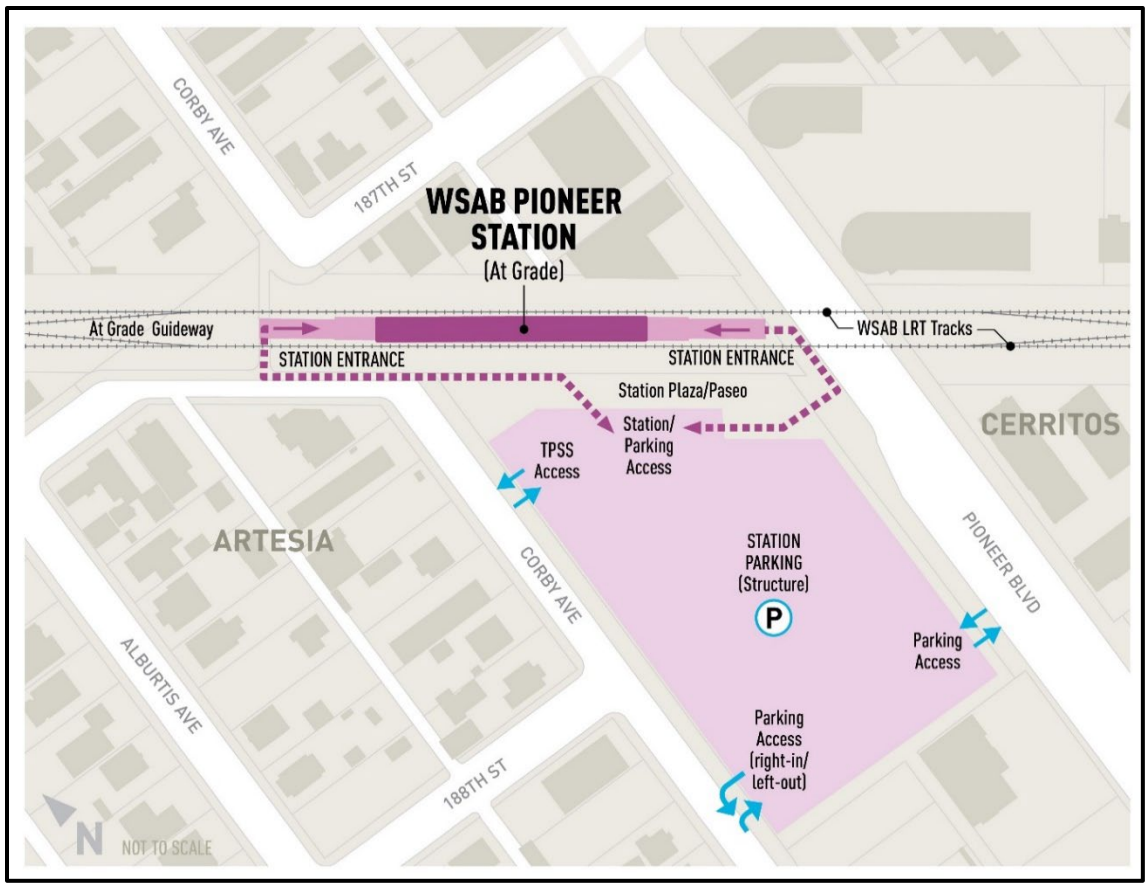
Source: Prepared by Cityworks Design and WSP in 2021

A 2.5-acre parking facility with up to 263 parking spaces would be located on the north side of the Bellflower Station. The parking facility would be accessed via a driveway from Bellflower Boulevard. Pedestrian access from the parking facility to the station would be provided via a pedestrian pathway from Bellflower Boulevard.

Pioneer Station. The at-grade Pioneer Station would be the southern terminus for each Build Alternative. Located near the southern boundary of Artesia, the Pioneer Station would be located west of Pioneer Boulevard and south of 187th Street, as shown in Figure 2-19. Access to the station would be via pedestrian walkways on both the northwest and southeast ends of the platform. The pedestrian walkway on the northwest would connect directly to 187th Street, and the walkway on the southeast would connect directly to Pioneer Boulevard. Bus bays along Pioneer Boulevard would be provided to accommodate future bus connections.

A 3.3-acre, 4-story parking structure with up to 1,100 parking spaces would be located south of the Pioneer Station. Access to the parking facility and station platform would be via Pioneer Boulevard and Corby Avenue. Pedestrian access from Pioneer Boulevard to the parking facility would be via Pioneer Boulevard from the southeast end of the station platform.

Figure 2-19. Pioneer Station



Source: Prepared by Cityworks Design and WSP in 2021

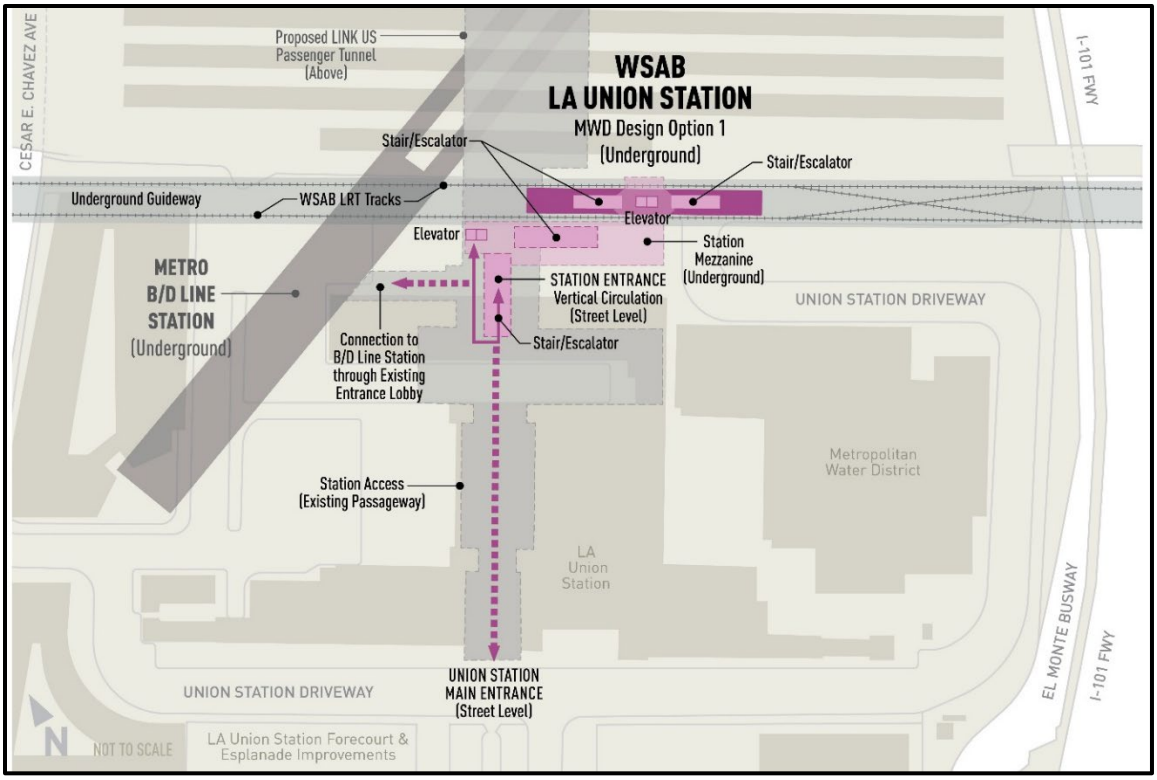
Design Options

Two design options are proposed for Alternative 1. No design options are proposed for Alternatives 2, 3, and 4.

Design Option 1: Los Angeles Union Station – MWD

Design Option 1 (MWD) would be a design option for the LAUS Forecourt Station and its alignment configuration. Design Option 1 (MWD) would commence with the tail tracks near the California Endowment Building, followed by an underground crossover with the underground station located east of the existing MWD building and below the LAUS passenger concourse, as shown in Figure 2-20. South of the station platform would be another underground crossover with the alignment continuing south crossing under the US-101 freeway and the Metro L (Gold) Line. Design Option 1 (MWD) converges with Alternative 1 on S. Alameda Street south of E. 1st Street. The station would be accessed through a single entrance within the existing LAUS building via stairs, a set of escalators, and elevators. A second set of stairs, escalators, and elevators would connect the mezzanine to the platform level. The station platform would be about 105 feet deep with a minimum of 10 feet from the Metro B/D (Red/Purple) Line station. No parking facility is proposed at this station.

Figure 2-20. LAUS MWD Station

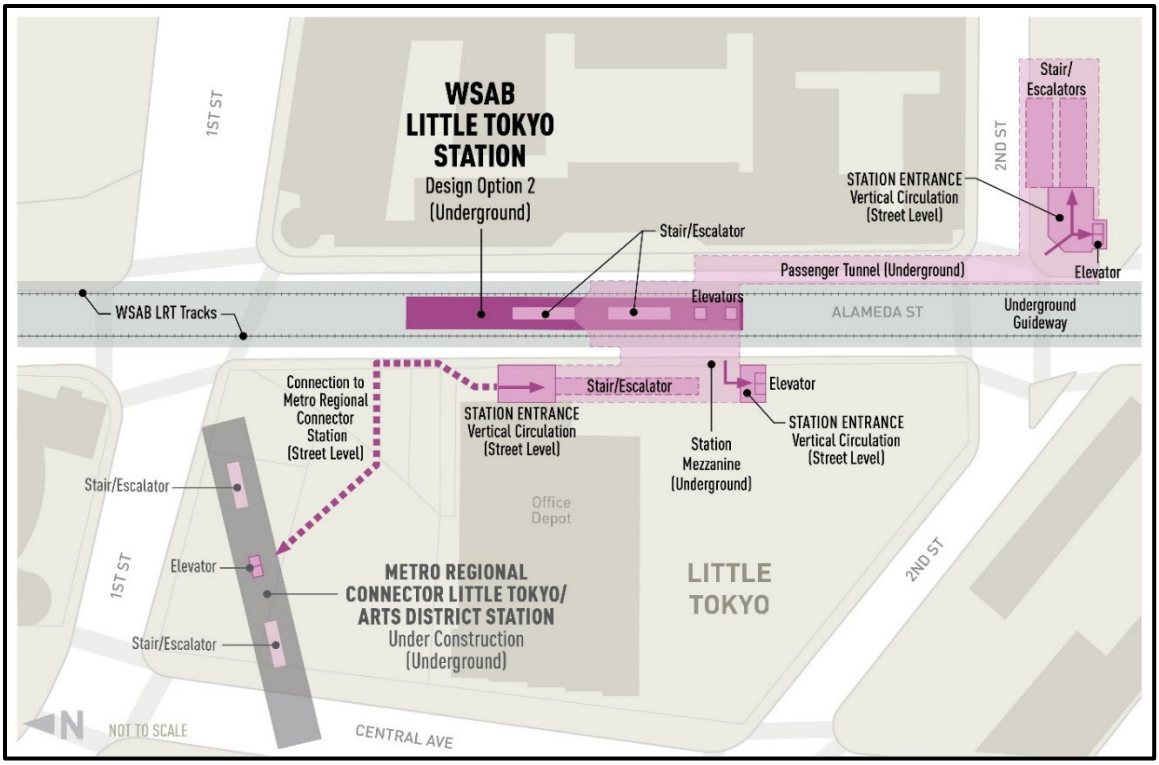


Source: Prepared by Cityworks Design and WSP in 2021

Design Option 2: Addition of Little Tokyo Station

Design Option 2 would construct the underground Little Tokyo Station for Alternative 1 between the LAUS and Arts/Industrial District Stations in the Little Tokyo community of Los Angeles. The underground Little Tokyo Station would be located beneath Alameda Street between 1st Street and 2nd Street, as shown in Figure 2-21. It would allow transfers to the Regional Connector Little Tokyo/Arts District Station and the Metro rail lines it serves. Two station entrances are proposed: the northern entrance would be between the western side of Alameda Street and an existing retail store; the southern entrance would be at the southeastern corner of E. 2nd Street and Alameda Street. The northern entrance would include a set of stairs, one escalator, and elevators. The southern entrance would include a set of stairs, escalators, and two elevators. No parking facility is proposed at this station.

Figure 2-21. Little Tokyo Station



Source: Prepared by Cityworks Design and WSP in 2021

2.5.2.3 Alternative 2: 7th St/Metro Center to Pioneer Station

Alternative 2 would be a 19.3-mile alignment with a northern terminus at a new 7th St/Metro Center Station, located underground at 8th Street between Figueroa Street and Flower Street near the existing 7th St/Metro Center Station, and a southern terminus located at the Pioneer Station in the City of Artesia. Alternative 2 consists of 12 stations and 5 parking facilities (Firestone, I-105/C Line, Paramount/Rosecrans, Bellflower, and Pioneer) totaling approximately 2,780 parking spaces.

Details of the ancillary facilities and project components for Alternative 2 are provided in Table 2.3 and Table 2.4. Figure 2-22 illustrates the Alternative 2 alignment.

Figure 2-22. Alternative 2: 7th St/Metro Center to Pioneer Station

Source: Prepared on behalf of Metro in 2021

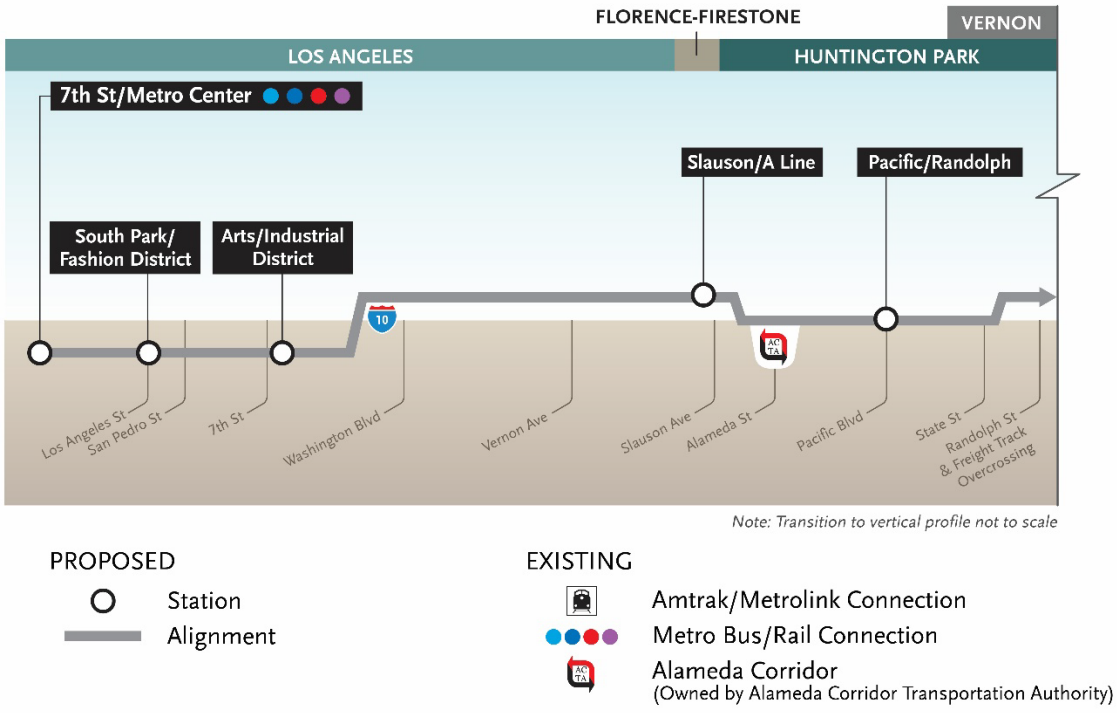
Alignment

7th St/Metro Center Station to Arts/Industrial District Station

The Alternative 2 alignment would begin underground at a northern terminus at the WSAB 7th St/Metro Center Station to be located underground beneath 8th Street between Figueroa Street and Flower Street. A pedestrian tunnel beneath Figueroa Street would provide a connection to the existing 7th St/Metro Center Station. Tail tracks, including a double crossover, would extend underground approximately 90 feet under the I-110 freeway. From the 7th St/Metro Center Station, the underground alignment would continue southeast beneath 8th Street to the underground South Park/Fashion District Station, located southwest of Main Street beneath 8th Street.

From the underground South Park/Fashion District Station, the underground alignment would continue under 8th Street to San Pedro Street, where the alignment would turn east toward 7th Street and cross under privately owned properties. The alignment would curve north, crossing under E. 7th Street and then curving south beneath S. Alameda Street. The alignment would continue beneath S. Alameda Street, entering the Arts/Industrial District Station between E. 7th Street and Center Street. A double crossover is proposed at the southern end of the proposed Arts/Industrial District Station. Figure 2-23 illustrates the alignment profile extending from 7th St/Metro Center to Pacific/Randolph Station.

Figure 2-23. Alignment Profile from 7th St/Metro Center to Pacific/Randolph Station



Source: Prepared by Cityworks Design and WSP in 2021

Alternative 2 reaches the Arts District area at a location south of the proposed Arts/Industrial District Station for Alternative 1. South of the Arts/Industrial District Station for Alternative 2, Alternatives 1 and 2 converge and continue south on S. Alameda Street, eventually curving west beneath McGarry Street to a tunnel portal located just south of E. Olympic Boulevard.

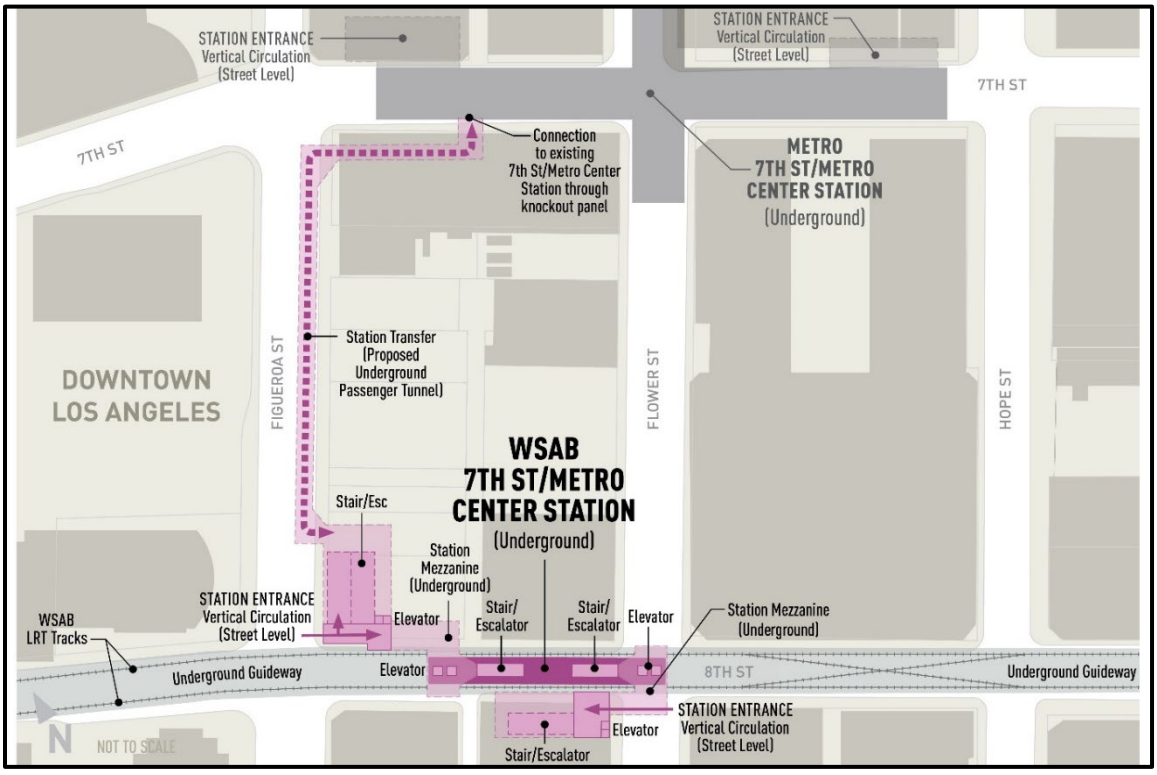
The alignment south of the Arts/Industrial District Station to Pioneer Station would be the same as described under Alternative 1 (see Section 2.5.2.2).

Stations and Park-and-Ride Facilities

Alternative 2 includes 12 station locations. The 7th St/Metro Center Station, South Park/Fashion District Station, and Arts/Industrial Station are specific to Alternative 2.

7th St/Metro Center Station. The WSAB 7th St/Metro Center Station would serve as the northern terminus for Alternative 2 and would provide riders with a connection to the Metro A, B, D, and E (Blue, Red, Purple, and Expo) Lines. The WSAB 7th St/Metro Center Station would be located underground near the 8th Street and Flower Street intersection in the City of Los Angeles with a proposed underground pedestrian tunnel connection to the existing 7th St/Metro Center Station, as shown in Figure 2-24. The 90-foot-deep station box would be located beneath 8th Street southeast of Figueroa Street, crossing under Flower Street with access via an entrance on the northeast corner of 8th Street and Figueroa Street and an entrance on the southwest corner of 8th Street and Flower Street. Each entrance would consist of a set of stairs, escalators, and two elevators. A proposed pedestrian tunnel beneath Figueroa Street would provide a connection from the proposed WSAB 7th St/Metro Center Station to the existing 7th St/Metro Center Station. No parking facility is proposed at this station.

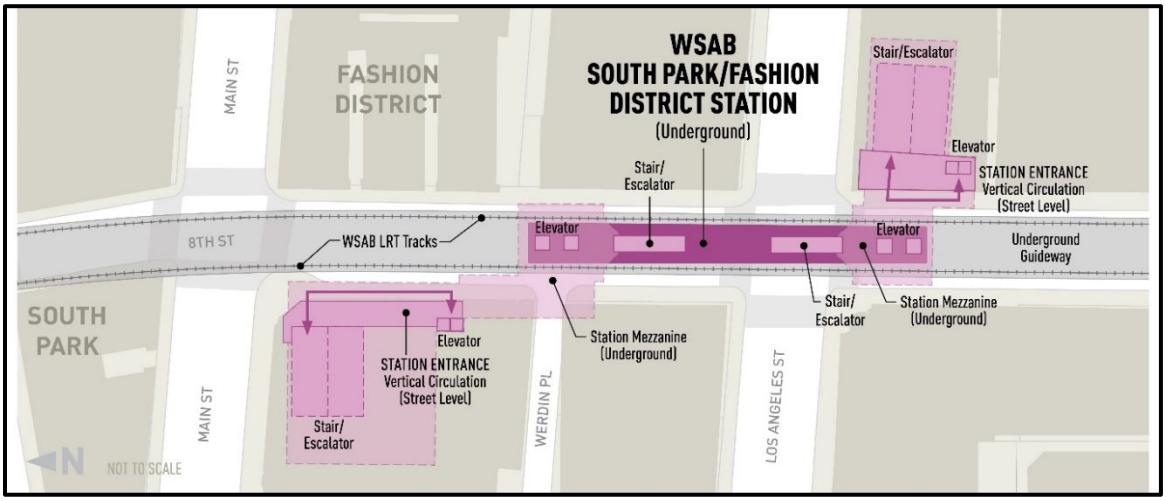
Figure 2-24. 7th St/Metro Center Station



Source: Prepared by Cityworks Design and WSP in 2021

South Park/Fashion District Station. The underground South Park/Fashion District Station would be located beneath 8th Street as it intersects Los Angeles Street in the City of Los Angeles, as shown in Figure 2-25. The station access would be via an entrance at the southeast corner of Main Street and 8th Street and an entrance on the northeast corner of Los Angeles Street and 8th Street. Each station entrance would consist of a set of escalators, a set of stairs, and two elevators. No parking facility is proposed at this station.

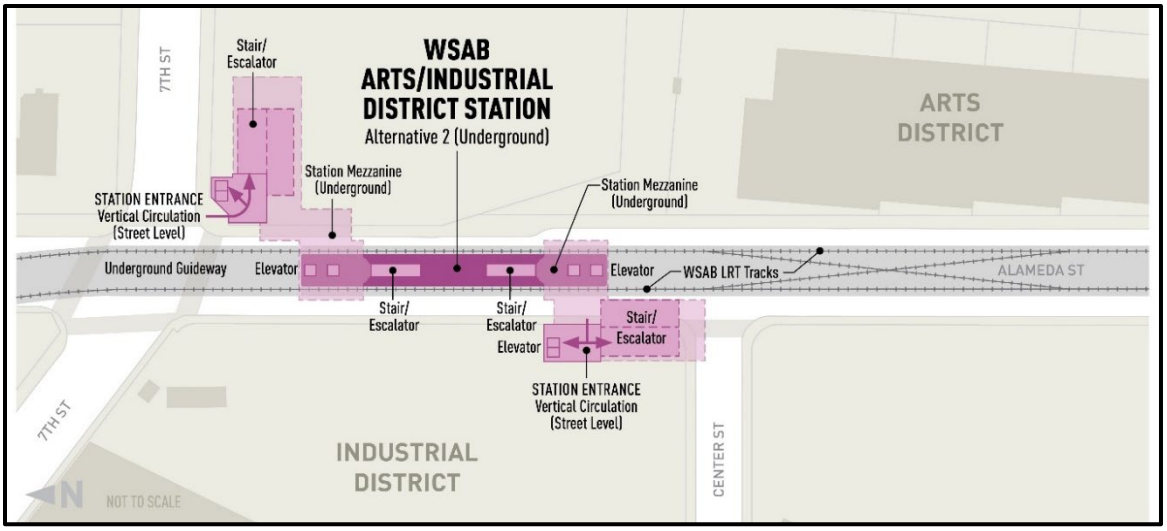
Figure 2-25. South Park/Fashion District Station



Source: Prepared by Cityworks Design and WSP in 2021

Arts/Industrial District Station. The underground Arts/Industrial District Station would be located under Alameda Street between 7th Street and Center Street in the City of Los Angeles, as shown in Figure 2-26. This is approximately 1,000 feet south of the location proposed for this station under Alternative 1. Access to the station would be via an entrance at the northwest corner of Alameda Street and Center Street and an entrance on the southeast corner of Alameda Street and 7th Street. Each entrance would consist of a set of stairs, a set of escalators, and two elevators. A double crossover would be located south of the station box. No parking facility is proposed at this station. Descriptions for the remaining stations are the same as described under Alternative 1 (see Section 2.5.2.2).

Figure 2-26. Arts/Industrial District Station



Source: Prepared by Cityworks Design and WSP in 2021

2.5.2.4 Alternative 3: Slauson/A Line to Pioneer Station

Alternative 3 would be a 14.8-mile alignment with a northern terminus at the Slauson/A Line Station in the City of Los Angeles/Florence-Firestone community of LA County and a southern terminus at the Pioneer Station in the City of Artesia. Alternative 3 consists of 9 stations (Slauson/A Line, Pacific/Randolph, Florence/Salt Lake, Firestone, Gardendale, I-105/C Line, Paramount/Rosecrans, Bellflower, and Pioneer Station) and 5 parking facilities (Firestone, I-105/C Line, Paramount/Rosecrans, Bellflower, and Pioneer) totaling approximately 2,780 parking spaces. Based on funding and other fiscal constraint considerations, Alternative 3 has been identified as the Staff Preferred Alternative. Figure 2-27 illustrates the Alternative 3 alignment. Descriptions for the alignment and the stations are the same as described under Alternative 1 (see Section 2.5.2.2). Alternative 3 ancillary facilities and project components are detailed in Table 2.3 and Table 2.4.

2.5.2.5 Alternative 4: I-105/C Line to Pioneer Station

Alternative 4 would be a 6.6-mile alignment with a northern terminus at the I-105/C Line Station in South Gate and a southern terminus at the Pioneer Station in the City of Artesia. Alternative 4 consists of 4 stations (I-105/C Line, Paramount/Rosecrans, Bellflower, and Pioneer) each with parking facilities for a total of approximately 2,180 parking spaces. Figure 2-28 illustrates the Alternative 4 alignment. Descriptions for the alignment and the stations are the same as described under Alternative 1 (see Section 2.5.2.2). Details of the ancillary facilities and project components for Alternative 4 are provided in Table 2.3 and Table 2.4.

Figure 2-27. Alternative 3: Slauson/A Line to Pioneer Station

Source: Prepared on behalf of Metro in 2021

Figure 2-28. Alternative 4: I-105/C Line Station to Pioneer Station

Source: Prepared on behalf of Metro in 2021

2.5.3 Maintenance and Storage Facility

To support the Build Alternatives, a single MSF for rail cars with accommodations for maintenance and operation work staff and their equipment is required. Two sites are under consideration for this MSF: the Paramount MSF site option and the Bellflower MSF site option. Figure 2-29 identifies the location of proposed MSF site options.

Figure 2-29. Maintenance and Storage Facility Options

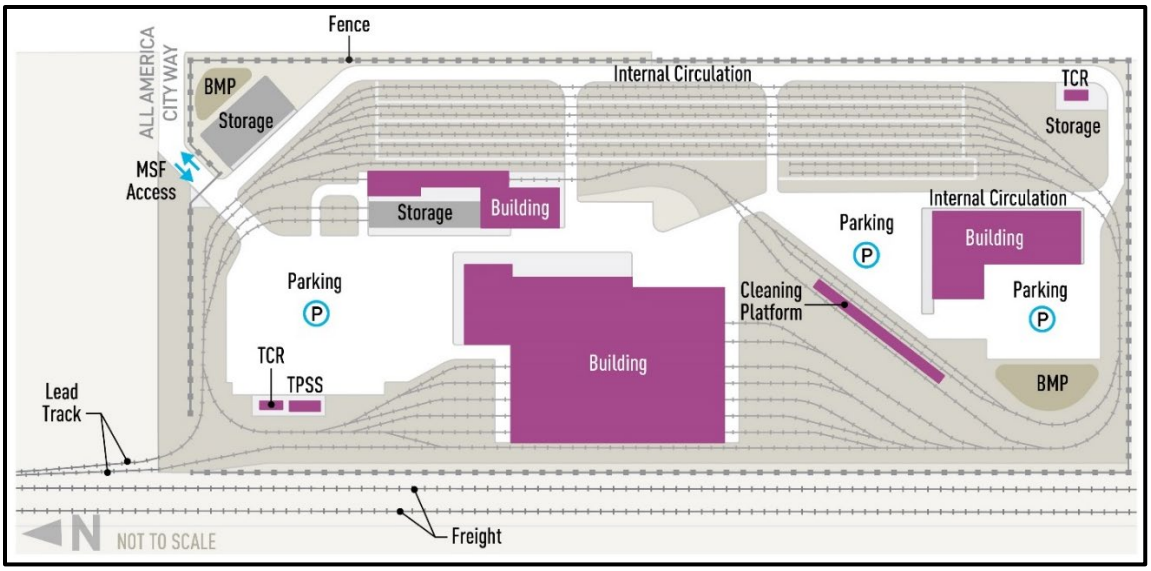
Source: Prepared by WSP on behalf of Metro in 2021

MSFs accommodate daily servicing and cleaning, inspection and repairs, and storage of light rail vehicles (LRVs). Activities may occur in the MSF throughout the day and night depending upon train schedules, workload, and the maintenance requirements. The MSF would have storage tracks, each with sufficient length to store three-car train sets (referred to as a consist) and maintenance-of-way vehicle storage. The facility would include a main shop building with administrative offices, a cleaning platform, a traction power substation (TPSS), employee parking, a vehicle wash facility, a paint and body shop, and other facilities as needed. The yard lead track (i.e., the tracks leading from the mainline to the facility) would have sufficient length for a three-car consist[6].

2.5.3.1 Paramount MSF Site Option

The Paramount MSF site option is a 22-acre rectangular site located in the City of Paramount. The MSF site currently consist of the Paramount Swap Meet, Paramount Drive-in Theatre and its associated parking, and industrial properties. Vehicular access to the proposed site is currently provided from All American City Way. At full capacity, the MSF would be designed to store up to 80 LRVs and provide over 200 parking spaces for MSF staff. Lead tracks[7] to the MSF site option would enter the site along its western edge approximately 0.3 mile south of the Project's mainline track. Figure 2-30 shows the layout.

Figure 2-30. Paramount MSF Site Layout



Source: Prepared by Cityworks Design and WSP in 2021
Notes: BMP = Best Management Practice; MSF = Maintenance and Storage Facility; TCR = Train Control Room; TPSS = Traction Power Substation

2.5.3.2 Bellflower MSF Site Option

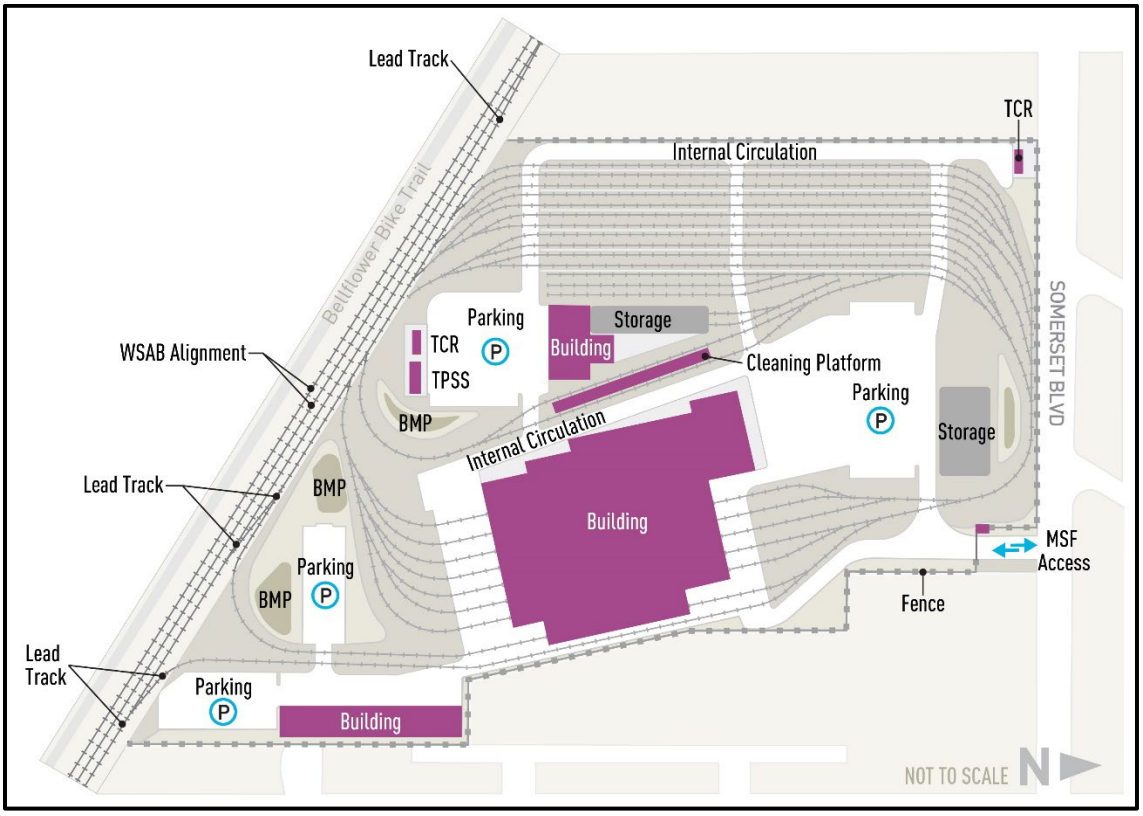
The Bellflower MSF site option is a 21-acre site located in the City of Bellflower. The city-owned site is currently developed with a recreational commercial business (the Hollywood Sports Paintball and Airsoft Park and Bellflower BMX). Vehicular access to the proposed site

[6] Consist refers to multiple train units of cars that are coupled into sets. Passengers can typically move between the consist of train cars.

[7] A lead track is a track that connects an MSF rail yard to the portion of the alignment that provides service to passengers. This track allows an LRV to transition between the alignment for passenger service and the MSF facility for maintenance and/or storage.

is currently provided from Somerset Boulevard. At full capacity, the MSF site option would be designed to store up to 80 LRVs and provide over 200 parking spaces. The MSF site is adjacent to the project alignment, and lead tracks would be constructed within the Metro-owned PEROW. Figure 2-31 shows the layout of the Bellflower MSF site.

Figure 2-31. Bellflower MSF Site Layout



Source: Prepared by Cityworks Design and WSP in 2021
Notes: BMP = Best Management Practice; MSF = Maintenance and Storage Facility; TCR = Train Control Room; TPSS = Traction Power Substation

2.5.4 System Components and Ancillary Facilities

The LRT system components would adhere to the Metro Rail Design Criteria (Metro 2020h), or equivalent design criteria, and would use a similar design as existing Metro LRT lines, such as the Metro E (Expo) Line. The following summarizes the system components and ancillary facilities required for the Project (see Appendix B, *Final Advanced Conceptual Alignment Design* and Appendix C, *West Santa Ana Branch Transit Corridor Project System Components and Ancillary Facilities*, for more detail).

LRT Guideways (at-grade, aerial, underground). The distance between the at-grade LRT track centerlines would be a minimum of 14 feet, and the distance between the nearest realigned freight track centerline and LRT track centerline would be a minimum of 20 feet.

Aerial LRT guideways would be supported by retained fill embankments, columns, or straddle bents. Typical aerial structures would be approximately 35 feet wide with aerial structure columns placed along the edge of the street ROW in approximately 120-foot intervals and in varying intervals due to infrastructure constraints. The aerial guideway spanning over the UPRR ROW would have a minimum vertical clearance of 24 feet over

freight and a minimum of 15 feet over roadways as measured between the bottom of the bridge and the top of the rail.

Underground guideway segments would consist of tracks in two side-by-side parallel tunnels that are approximately 20 feet in diameter with minimum depth of approximately 50 feet and a maximum depth of approximately 100 feet from ground elevation to the top of the tunnel.

Overhead Catenary System (OCS). The OCS electrically powers the LRT through a contact wire suspended above the track, approximately 20 feet above the track, that is supported by poles spaced at an average interval of 150 feet. The catenary poles would be generally located in the center of the project alignment or located on both sides of the tracks in some locations.

Tail Tracks. Tail tracks allow for train storage, reversing direction, and short-lining of service if a pocket track is provided along the alignment.

Crossovers. A track crossover allows a train to reverse direction and use an adjacent track to continue operation.

Cross Passages. Cross passages are short tunnel segments that connects two parallel tunnels. These passages allow emergency access from one tunnel to another. Cross passages for the Project would be approximately 15 feet high and 10 feet wide and would be located approximately every 800 feet along tunnel alignments.

Ventilation Structures. Ventilation structures allow for climate control and emergency ventilation of tunnels and underground stations. These structures would be included within the underground stations and would have ventilation gratings on sidewalks (or other public areas) typically on both sides of all underground stations.

Traction Power Substations. The TPSSs provide power to the OCS and are typically metal prefabricated buildings approximately 15 feet wide by 40 feet long by 15 feet high. Each TPSS site would require an area approximately 80 feet by 45 feet or equivalent in different configurations. Of the 42 TPSS site options, up to 23 TPSS facilities are proposed for the Build Alternatives. See Appendix C, *West Santa Ana Branch Transit Corridor Project System Components and Ancillary Facilities* for a summary of TPSS locations.

Train Control House and Electric Power Switches. The train control house contains signal equipment and electric power switches (contained in metal box-like enclosures) that would transmit electric power from the Los Angeles Department of Water and Power electric grid to the underground traction power and other rail systems.

Radio Towers. Radio towers would be installed along the alignment to support communications between the transmitter and receiver. The primary site radio tower would be 35 to 60 feet in height from ground level, or two 35-foot-tall poles could be substituted. Radio towers located adjacent to an at-grade alignment or in an aerial viaduct alignment would require a 35-foot by 15-foot radio house. For radio towers located adjacent to an underground station, the transmission equipment would be located below ground in an ancillary room. Seven potential radio tower sites are proposed, in which only two would be constructed. See Appendix C, *West Santa Ana Branch Transit Corridor Project System Components and Ancillary Facilities* for a summary of the radio tower locations.

Grade Crossings. A grade crossing can be either at-grade or a physical separation between the railroad tracks and a roadway and consists of roadway crossings, freeway crossings, railroad crossings, and waterway crossings. Typical at-grade crossings would include the following

features, as applicable: roadway crossing gates, pedestrian crossing gates, new sidewalks, ADA-compliant ramps, sidewalks, bulb-outs, raised medians, and/or other intersection amenities. Grade separations for the Project are summarized in Table 2.3. See Appendix C, *West Santa Ana Branch Transit Corridor Project System Components and Ancillary Facilities* for a summary of the grade crossing locations.

The alignment would cross the following existing concrete-lined flood channels adjacent to existing railroad bridge crossings:

- **LA River Channel.** New LRT bridge to be constructed east of the existing LA River truss bridge to cross the LA River; existing truss bridge would remain unaltered.
- **Rio Hondo Channel.** New LRT bridge to be constructed next to the existing bridge; existing bridge would remain operational.
- **San Gabriel Channel.** New LRT bridge would be reconstructed in the same location as the existing abandoned freight bridge; existing abandoned freight bridge would be demolished.

Freight Track Realignment. The Build Alternatives would be located parallel to active freight track(s) in portions of the UPRR-owned Wilmington Branch ROW (between approximately Martin Luther King, Jr. Boulevard along Long Beach Avenue to Slauson Avenue), UPRR-owned La Habra Branch ROW (between Slauson Avenue along Randolph Street to Salt Lake Avenue), Ports of Los Angeles and Long Beach-owned San Pedro Subdivision ROW (between Randolph Street to approximately Paramount Boulevard), and the Metro-owned PEROW (between its intersection with the San Pedro Subdivision ROW from approximately Paramount Boulevard to Somerset Street). Along the Wilmington Branch ROW, the LRT would be in an aerial viaduct that would overhang the ROW, thereby requiring an aerial easement. The Build Alternatives would require the following realignments of freight track(s) to accommodate the alignment and maintain existing freight operations:

- Relocation to the south of the project alignment within the La Habra Branch ROW
- Relocation to the west of the project alignment within the San Pedro Subdivision ROW
- Relocation to the north of the project alignment within Metro-owned PEROW

The Project would provide a minimum 20-foot clearance between the track centerlines of the closest LRT and freight track. Table 2.5 details the length of freight relocation by Build Alternative. Figure 2-32 identifies where the freight relocations would occur.

Table 2.5. Freight Track Realignment

Rail ROW	Shared ROW with Freight (miles)	Freight Relocation by Build Alternatives (miles)			
		Alternative 1	Alternative 2	Alternative 3	Alternative 4
Wilmington Branch	1.8	0.1	0.1	0.1	—
La Habra Branch	2.3	2.0	2.0	2.0	—
San Pedro Subdivision	6.1	5.4	5.4	5.4	0.7
Metro-owned PEROW	1.2	0.6	0.6	0.6	0.6
Total	**11.4**	**8.1**	**8.1**	8.1	1.3

Source: Prepared by WSP on behalf of Metro in 2021
Notes: PEROW = Pacific Electric Right-of-Way; ROW = right-of-way

Figure 2-32 Existing Rail Right-of-Way Ownership

Source: Prepared on behalf of Metro in 2021

Pedestrian Facilities. Pedestrian facilities include tunnels, bridges, and undercrossings.

- Pedestrian Tunnels
  - Alternative 1 (LAUS Forecourt Station) to connect with Metro B (Red) and D (Purple) Lines
  - Alternative 1 Design Option 1 (MWD) to connect with Metro B (Red) and D (Purple) Lines
  - Design Option 2 to connect WSAB station with the Regional Connector in Little Tokyo
  - Alternative 2 to connect the WSAB 7th St/Metro Center Station and the existing 7th St/Metro Center Station
- Pedestrian Bridges
  - At Slauson/A Line Station (Alternatives 1, 2, and 3) to connect between the WSAB station and the Metro A (Blue) Line platform
  - At I-105/C Line Station (Alternatives 1, 2, 3, and 4), reconstruct the Arthur Avenue pedestrian bridge crossing I-105 to accommodate an infill Metro C (Green) Line Station
- Pedestrian Access
  - Access between the WSAB I-105/C Line Station and the proposed infill I-105/C Line Station would be provided via a pedestrian walkway on the WSAB LRT bridge over the freeway to vertical circulation elements connecting to the proposed infill station
  - For I-105/C Line Station (Alternatives 1, 2, 3, and 4), reconstruct the Façade Avenue bridge over the I-105 freeway to accommodate construction of the new infill Metro C (Green) Line Station
  - Construct pedestrian undercrossing at Paramount High School to connect the existing athletic fields at Paramount Park to Paramount High School

Bicycle Facilities. A portion of the Bellflower Bike Trail, a Class I bike path along the PEROW between Paramount Park and Somerset Boulevard in the City of Paramount, would be altered to accommodate the Build Alternatives. The bike trail between Somerset Boulevard and Lakewood Boulevard would be relocated from the south side to the north side of the ROW to accommodate the LRT alignment.

Bike hubs are proposed at station locations near bikeways for access to and from local destinations based on the demand. The bike hubs may include bicycle racks, lockers, and secure bike parking in addition to on-call mechanics and access to on-site Metro staff.

Metro Public Art. The Project would include the integration of public art at stations and related transit facilities. Metro would collaborate with the surrounding neighborhoods to create an aesthetic design and incorporate public art to promote a sense of place in the surrounding neighborhoods.

2.5.5 Rail Operating Characteristics

The operating hours and schedule assumptions for the Project were developed based on typical Metro LRT operating characteristics. The Build Alternatives would operate approximately 22 hours daily, seven days per week, from about 4:00 a.m. to 2:00 a.m.

Table 2.6 summarizes the proposed headways for the Build Alternatives. The Build Alternatives would operate with weekday peak headways of 5 minutes and would have 10-minute headways during the off-peak hours. Headways specified for other periods and weekends are modeled after the Metro A (Blue) Line schedule because it is the nearest and somewhat parallel LRT line to the WSAB. Therefore, weekday early evening headways of 10 minutes are set at the same headway as the base period, tapering to 20 minutes during the late evening, night, and early morning time periods. For weekends, the Build Alternatives would operate with 10-minute headways during most of the day, tapering to 20 minutes for the late evening, night, and early morning periods.

Table 2.6. Proposed Build Alternatives Headways by Time Period

Day of Week	Headway (in minutes)						
	Early	AM Peak[1]	Base	PM Peak[1]	Early Eve	Late Eve	Night
Mon – Fri	15	2.5 – 5	10	2.5 – 5	10	20	20
Sat/Sun	20	10	10	10	10	20	20

Source: Prepared on behalf of Metro in 2021
Note: [1] 2.5-minute headways are proposed for Alternative 2 during one hour of weekday peak periods for the section between the 7th St/Metro Center Station and the Slauson/A Line Station.

To accommodate ridership projections, only Alternative 2 would require additional service between the proposed 7th St/Metro Center Station and the Slauson/A Line Station, operating at 2.5-minute headways, during one hour of the weekday peak periods. Because these trains would be scheduled in between the regular 5-minute peak-period headways, this would result in selected 2.5-minute peak-hour headways for this segment only. The Draft EIS/EIR evaluates this operation.

Table 2.7 shows proposed train consists (cars per train) for the Build Alternatives. Three-car train consists are assumed for weekdays and one-car trains are assumed during late evening and night service. Two-car train consists are assumed for weekends and holidays, with one-car trains operating during late evening and night service.

Table 2.7. Proposed Build Alternatives Train Consist by Time Period

Day of Week	Train Consist[1] (Cars per Train)						
	Early	AM Peak	Base	PM Peak	Early Eve	Late Eve	Night
Mon – Fri	3	3	3	3	3	2	2
Sat/Sun	2	2	2	2	2	2	2

Source: Prepared on behalf of Metro in 2021
Note: [1] Consist refers to multiple train units of cars that are coupled into sets. Passengers can typically move between the consist of train cars.

2.5.6 Construction Activities

Major construction activities of the Project would involve the following:

- Preparation and demolition of structures on construction support sites
- Support of excavation
- Excavation for tunneling
- Tunnel construction
- Subterranean station excavation
- Freight relocation
- Utility relocation
- At-grade and aerial guideway system construction, including rail systems components
- Subterranean, at-grade, and aerial station construction
- Street-modifications
- Demolition of existing rail, road, and/or pedestrian bridges and reconstruction of replacement bridges
- Construction of parking facilities
- Construction of an MSF

All construction activities would typically be located within the public and/or rail ROW, or on private property that would be acquired for project components such as parking facilities, the MSF, underground station entrances, or TPSS sites. Proposed construction staging and laydown areas would also be located either within the public and/or rail ROW or on private property acquisitions.

It is anticipated that several construction activities identified would occur simultaneously along the project alignment, accommodating activities requiring lengthy construction times such as utility relocation, tunnels, below ground stations, and aerial segments. Simultaneous construction may also reduce the overall construction duration. Working hours of construction would vary to meet the type of work being performed and to meet local ordinance restrictions. Nighttime and weekend construction may be required to mitigate potential impacts to the commute period and traffic congestion, and to accommodate construction scheduling for specific work activities. Such nighttime and weekend construction activities may include, but are not limited to, construction within freeway ROW, tunneling operations, trackwork construction, grade separation construction, catenary wire installation, and construction of other cut-and-cover sections.

Construction activities are anticipated to occur over the course of approximately six years, commencing in 2022 and ending in 2028. Revenue service is expected to begin in 2028. Further information on construction means and methods and the locations of construction staging areas is provided in Chapter 4, Section 4.19 Construction Impacts of this Draft EIS/EIR.

2.5.7 Anticipated Permits, Discretionary Actions, and Agency Approvals

The Build Alternatives would require various environmental permits and/or approvals as summarized in Table 2.8 for each Build Alternative.

Table 2.8 Permits and Approvals

	Build Alternatives	Agency/Jurisdiction	Permit/Approval Required	Anticipated Phase
Federal Agencies	1, 2, 3, 4	Federal Transit Administration	Approval of EIS as Lead Agency under NEPA	End of Environmental Phase
	1, 2, 3, 4	United States Army Corps of Engineers	Section 404	Construction Phase; Final Design
	1, 2, 3, 4		Section 408[1]	Construction Phase; Final Design
	1, 2, 3, 4		Section 10 Bridge Permit (if required)	Construction Phase; Final Design
State Agencies	1, 2, 3, 4	State Historic Preservation Officer	Section 106 consultation and concurrence	Environmental Phase; prior to Construction Phase
	1, 2, 3, 4	California Department of Fish and Wildlife	1602 Streambed Alteration Agreement	Construction Phase; Final Design
		California Department of Transportation	Permits approvals for encroachment on several freeways: I-101 (Alt.1); I-10 (Alt. 2); I-710, I-105, SR-91, I-605 (Alt. 1, 2, 3, 4)	Construction Phase; Final Design
	1, 2, 3, 4	State Department of Toxic Substance Control	Hazardous materials cleanup	Construction Phase
	1, 2, 3, 4	State Water Resources Control Board	NPDES Dewatering Permit	Construction Phase; Final Design
	1, 2, 3, 4		LA County MS4 NPDES Package	Construction Phase; Final Design
	1, 2, 3, 4		Industrial General Permit	Construction Phase; Final Design
	1, 2, 3, 4		Construction General Permit and SWPPP	Construction Phase; Final Design
	1, 2, 3, 4	California Public Utilities Commission	Grade Separations, Crossings, State Safety Oversight	Construction Phase; Final Design; End of Construction, Testing and Start Up

	Build Alternatives	Agency/Jurisdiction	Permit/Approval Required	Anticipated Phase
Regional Jurisdiction	1, 2, 3, 4	Los Angeles County Metropolitan Transportation Authority Board of Directors	Certification of the EIR, adoption of Findings and Statement of Overriding Considerations, adoption of the Mitigation Monitoring and Reporting Program as Lead Agency under CEQA	End of Environmental Phase
	1, 2, 3, 4	Regional Water Quality Control Boards	Section 401	Construction Phase; Final Design
	1, 2, 3, 4	South Coast Air Quality Management District	Consultation to identify best practices for construction emissions. Clean Air Act Title V permit (if required)	Construction Phase
	1, 2, 3, 4	Ports of Long Beach and Los Angeles – San Pedro Subdivision	Real estate transaction; Approval of track relocations	Construction Phase; Final Design
	1, 2, 3, 4	BNSF Railroad	Approval of track relocations	Construction Phase; Final Design
	1, 2, 3, 4	Union Pacific Railroad	Approval of track relocations; Real estate transaction	Construction Phase; Final Design
	1, 2, 3, 4	Southern California Edison	Permits and real estate transaction	Construction Phase; Final Design
	1, 2, 3, 4	Los Angeles County Flood Control District	Permits and real estate transaction	Construction Phase; Final Design
	1, 2, 3, 4	Los Angeles County Department of Public Works	Permits	Construction Phase; Final Design

	Build Alternatives	Agency/Jurisdiction	Permit/Approval Required	Anticipated Phase
Local Jurisdictions	1, 2, 3, 4	Los Angeles Department of Transportation	Permits and/or discretionary actions required	Environmental Phase; prior to Construction Phase
	1, 2, 3, 4	Los Angeles Department of Water and Power	Permits and real estate transaction	Construction Phase; Final Design
	1, 2, 3, 4	Los Angeles Fire Department	Discretionary actions required	Environmental Phase; prior to Construction Phase
	1, 2, 3	City of Los Angeles County of Los Angeles City of Huntington Park City of Bell City of Cudahy City of Vernon	Permits and/or discretionary actions required	Environmental Phase; prior to Construction Phase
	1, 2, 3, 4	City of South Gate City of Downey City of Paramount City of Bellflower City of Artesia City of Cerritos	Permits and/or discretionary actions required	Environmental Phase; prior to Construction Phase

Source: Prepared on behalf of Metro by WSP in 2021
Notes: [1] Maintained by Los Angeles County Flood Control District
CEQA = California Environmental Quality Act; EIR = environmental impact report; EIS = environmental impact statement; MS4 = municipal separate storm sewer system; NEPA = National Environmental Policy Act; NPDES = National Pollutant Discharge Elimination System; SWPPP = Stormwater Pollution Prevention Plan