

Green Line Extension to Torrance

Supplemental Alternatives Analysis

Executive Summary

June 29, 2018



Metro

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ABBREVIATIONS/ACRONYMS

AA	Alternatives Analysis
AMC	Airport Metro Connector 96th Street Transit Center
APM	Automated People Mover
EJ.	Environmental Justice
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
I	Interstate
LAWA	Los Angeles World Airports
LAX	Los Angeles International Airport
LOS.	Level-of-Service
LRT	Light Rail Transit
Metro	Los Angeles County Metropolitan Transportation Authority
O&M.	Operations & Maintenance
ROW.	Right-of-Way
RTP.	Regional Transportation Plan
SAA	Supplemental Alternatives Analysis
SCAG	Southern California Association of Governments
SCS	Sustainable Communities Strategy
TC	Transit Center
VMT.	Vehicle Miles Traveled

ES-1. Introduction

ES-1.1. Project Overview

The Green Line Extension to Torrance (Proposed Project) is a proposed light rail transit (LRT) line that would extend the Metro Green Line from its terminus at the existing Redondo Beach (Marine) Station to the Torrance Transit Park and Ride Regional Terminal, referred to as the Torrance Transit Center (TC) in this report. The Torrance TC is a project by the City of Torrance which is currently under construction.

In 2017, Metro initiated a Supplemental Alternatives Analysis (SAA) for the Proposed Project. The intent of the SAA study is to solicit feedback from corridor cities and stakeholders to refine and update alternatives previously identified in the 2009 Alternatives Analysis (AA) and 2010-2012 Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR). The SAA process refines and recommends preferred alternative(s) for the Metro Board of Directors' consideration for the next steps in project development. This executive summary presents the results of the analysis that evaluates and compares several alternatives to extend the current Metro Green Line to Torrance.

ES-1.2. Summary of Results

According to the SAA evaluation, each Build Alternative would ultimately achieve several project goals similarly, including supporting local and regional land use plans and policies; minimizing environmental impacts; and ensuring equity. Generally, Build Alternatives stood out from one another in the following ways:

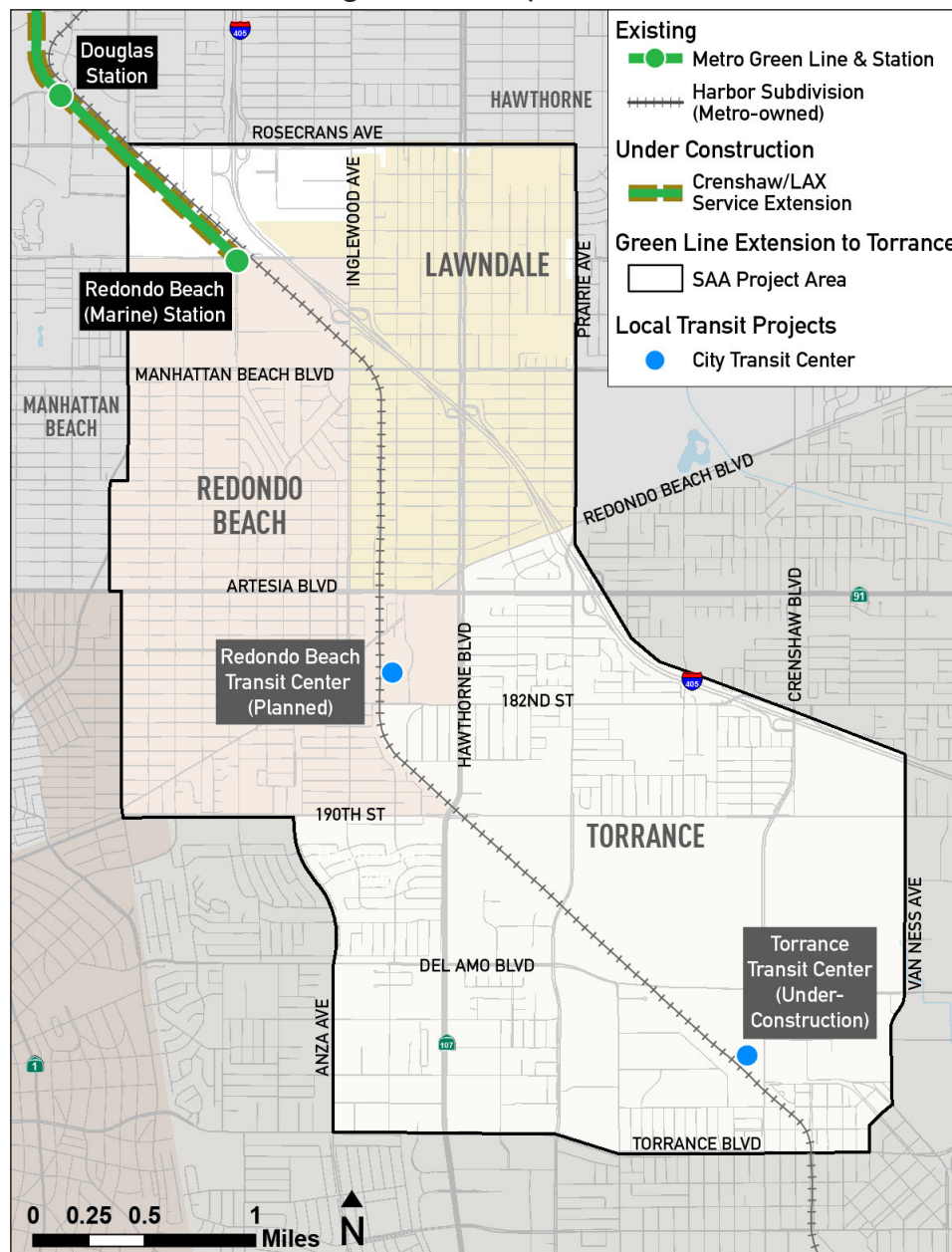
- **Alternative 1** received an overall “high” score. Alternative 1 would best achieve project goals related to improvements in mobility and cost effectiveness and financial feasibility. Alternative 1 received favorable support during the public outreach process.
- **Alternative 2** received a “medium” score. Alternative 2 would achieve the same mobility improvements as Alternative 1 due to their identical alignments. However, Alternative 2 would be less cost effective and financially feasible than Alternative 1. This was due to additional construction costs associated with proposed trenches and related below-grade structures. Additionally, Alternative 2 would be more likely than other alternatives to encounter hazardous waste and materials during extensive construction-related excavation activities proposed in a freight corridor which has been active for decades. Alternative 2 received little support during the public outreach process.
- **Alternative 3** received a “medium” score. Alternative 3 would improve mobility and result in environmental effects primarily along the Hawthorne Boulevard commercial corridor instead of the residential areas along the Metro-owned Harbor Subdivision railroad right-of-way (Metro ROW). Alternative 3 would have the highest potential for economic development out of all alternatives and it received favorable support during the public outreach process.
- **Alternative 4** received a “medium/low” score. Alternative 4 would not be cost effective due to the length of aerial structure required for construction. Travel times under Alternative 4 would be slower than Alternatives 1 and 2 due to design and operational constraints. Alternative 4 received little support during the public outreach process.

ES-1.3. Project Area Overview

The SAA Project Area follows the Metro-owned Harbor Subdivision railroad right-of-way (Metro ROW) along a 4.5-mile north-south corridor from the existing Redondo Beach (Marine) Station to the under-construction Torrance TC. The Project Area includes portions of the cities of Lawndale, Redondo Beach, Torrance, and Hawthorne. However, the Proposed Project itself would only be located in the cities of Lawndale, Redondo Beach, and Torrance.

Currently, there is limited BNSF freight traffic operating within the Metro ROW in the Project Area. The Proposed Project would be constructed to allow for operations of both Metro LRT and freight trains in the Project Area. Figure ES.1 shows an overview of the Project Area.

Figure ES.1. Project Area



ES-1.4. Regional Context

Extending the Metro Green Line into the Project Area provide regional accessibility to South Bay residents via the Metro Rail network. There are a number of regionally significant transportation and other projects which are scheduled to be open before the Proposed Project begins operations.

Related projects within and near the Project Area include:

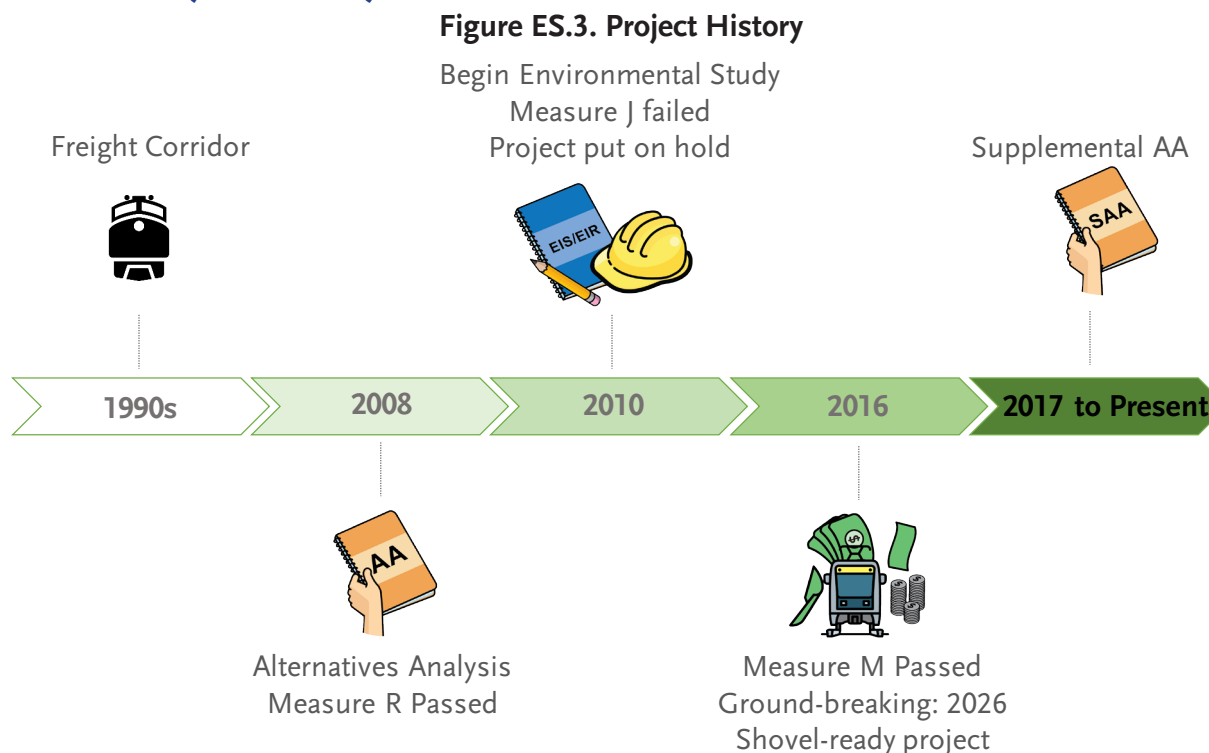
- **Crenshaw/LAX Transit Project:** a new light rail line opening in 2019 which would link the South Bay to Los Angeles International Airport (LAX), destinations in Inglewood, and Santa Monica and downtown Los Angeles via the Metro Expo Line.
- **Airport Metro Connector 96th Street Transit Station (AMC):** a planned station on the Crenshaw/LAX Transit Project, opening in 2023, which would allow for transfers between Metro Rail and the APM.
- **LAWA Automated People Mover (APM):** Los Angeles World Airports (LAWA) is constructing an APM, scheduled to open in 2023, which would connect Metro Rail to terminals and other airport facilities.
- **Redondo Beach TC:** a transit center planned by the City of Redondo Beach, which would serve as a regional bus hub and potentially connect to the Proposed Project.
- **Torrance TC:** a transit center under-construction by the City of Torrance. It would link Metro Rail to points beyond its proposed terminus via bus lines.

The regional Metro Rail network in the South Bay and other key projects are shown in Figure ES.2 below.

Figure ES.2. Related Projects



ES-1.5. Project History



Alternatives Analysis (2008-2009)

- Metro completed an AA in 2009, which studied transit alternatives along the Metro ROW between downtown Los Angeles, Los Angeles International Airport (LAX) and the Ports of Los Angeles and Long Beach.
- The AA identified the Green Line Extension from Redondo Beach to Torrance, utilizing the Metro ROW, as the highest-priority project. LRT was identified as the preferred mode.

Environmental Analysis (2010-2012)

- Metro initiated a Draft EIS/EIR in 2010, studying the potential environmental benefits and impacts of the alternatives prioritized in the AA.
- The Draft EIS/EIR studied No Build, Transportation Systems Management, and Light Rail Alternatives. After the failure of Measure J in 2012, this Draft EIS/EIR was put on hold due to funding concerns.

Supplemental Alternatives Analysis (2017 to Present)

- The Proposed Project received new funding with the passage of Measure M in 2016.
- Metro initiated the SAA to revisit the results of the AA study, identify any major new changes or concerns, and reengage cities, stakeholders, and the public.
- Throughout 2017, three new LRT alternatives were developed and analyzed in addition to the LRT alternative from previous studies.

ES-2. Purpose & Need

ES-2.1. Project Need

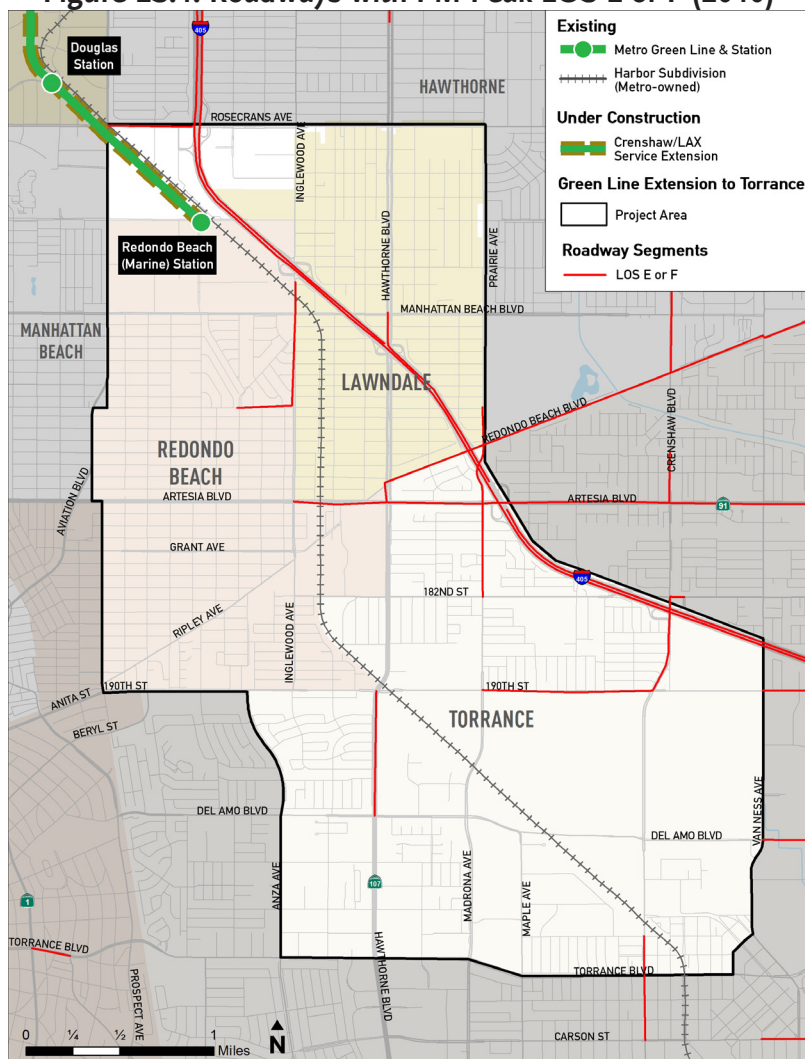
The Project Area currently faces a number of interrelated land use and transportation issues. Due to highly congested traffic conditions on many of the arterial roadways during peak hours, bus routes in the South Bay experience slow travel speeds and variable travel times. There is a lack of connectivity between local bus routes in the Project Area to the regional transit system and to major activity centers. Multiple transfers are often necessary between local and regional bus routes, which create a poor rider experience and increase overall trip time. For most riders traveling from within the Project Area to regional destinations such as LAX or downtown Los Angeles, transit is simply not an efficient or reliable mode.

According to the 2016 Southern California Association of Governments (SCAG) Regional Transportation Plan (RTP)/ Sustainable Communities Strategy (SCS), population and employment within the Project Area are projected to grow by 8% and 21%, respectively, by 2040. The residential and employment densities are currently higher than those of urban Los Angeles County. This, combined with projected rates of growth in the Project Area, suggest an increasing need for mobility options.

According to the 2016 SCAG RTC/SCS, the average daily person-hours of delay on arterials, highways, and high occupancy vehicle lanes in SCAG counties is expected to increase by more than 50 percent from 3.6 to 5.4 million hours between 2012 and 2040.

Figure ES.4 shows roadways projected to have peak hour level-of-service (LOS) E or F by 2040, and illustrates the regional mobility problem in the Project Area. LOS is used to measure traffic congestion and uses letter grades, from A (free-flow operations) through F (congested conditions).

Figure ES.4. Roadways with PM Peak LOS E or F (2040)



ES-2.2. Project Purpose, Goals, and Objectives

The Proposed Project provides an opportunity to improve transit in the South Bay area of Los Angeles County. Proposed alignments through the South Bay generally parallel Interstate 405 (I-405) and several major arterial roadways, connecting important activity centers. The goals and objectives for the Proposed Project are shown in the table below:

Table ES.1. Goals and Objectives

Project Goals	Project Objective	Evaluation Criteria
1. Improve Mobility	<ul style="list-style-type: none"> • Introduce high-frequency transit service options • Enhance and connect with the regional transit network • Provide an alternative mode of transportation for commuters, and serve local and regional trips • Improve transit accessibility for residents of communities along the corridor • Encourage a mode shift to transit 	<ul style="list-style-type: none"> • Travel Time/Reliability • System Connectivity • Ridership • Change in vehicle miles traveled (VMT) • Accessibility
2. Minimize Environmental Impacts	<ul style="list-style-type: none"> • Minimize negative environmental and community effects • Provide environmental and community benefits 	<ul style="list-style-type: none"> • Environmental Topics
3. Ensure Cost Effectiveness and Financial Feasibility	<ul style="list-style-type: none"> • Ensure costs are financially feasible • Provide a cost-effective project 	<ul style="list-style-type: none"> • Capital Costs • Operations & Maintenance (O&M) Costs • Financial Feasibility • Cost per Rider
4. Support Local and Regional Land Use Plans and Policies	<ul style="list-style-type: none"> • Serve major activity centers and regional destinations • Support and is consistent with local and regional plans • Support and encourage opportunities for local economic development, projects, plans, and jobs 	<ul style="list-style-type: none"> • Accessibility • Land Use Consistency • Economic and Fiscal Effects
5. Ensure Equity	<ul style="list-style-type: none"> • Provide benefits to transit-dependent and minority populations • Minimize adverse effects on designated environmental justice (EJ) communities 	<ul style="list-style-type: none"> • Environmental Justice

The SAA utilized a number of evaluation criteria to identify the extent to which each proposed alternative achieves the goals and objectives listed above. These evaluation criteria, and the results of the analysis, are described in Section ES-4.

ES-3. Alternatives

ES-3.1. Overview

The alternatives under consideration are described below. These alternatives were guided by the 2009 AA, detailed environmental analysis between 2010 and 2012, and feedback from outreach efforts to cities and stakeholders from 2017 to 2018. Alternatives under consideration include:

Metro ROW

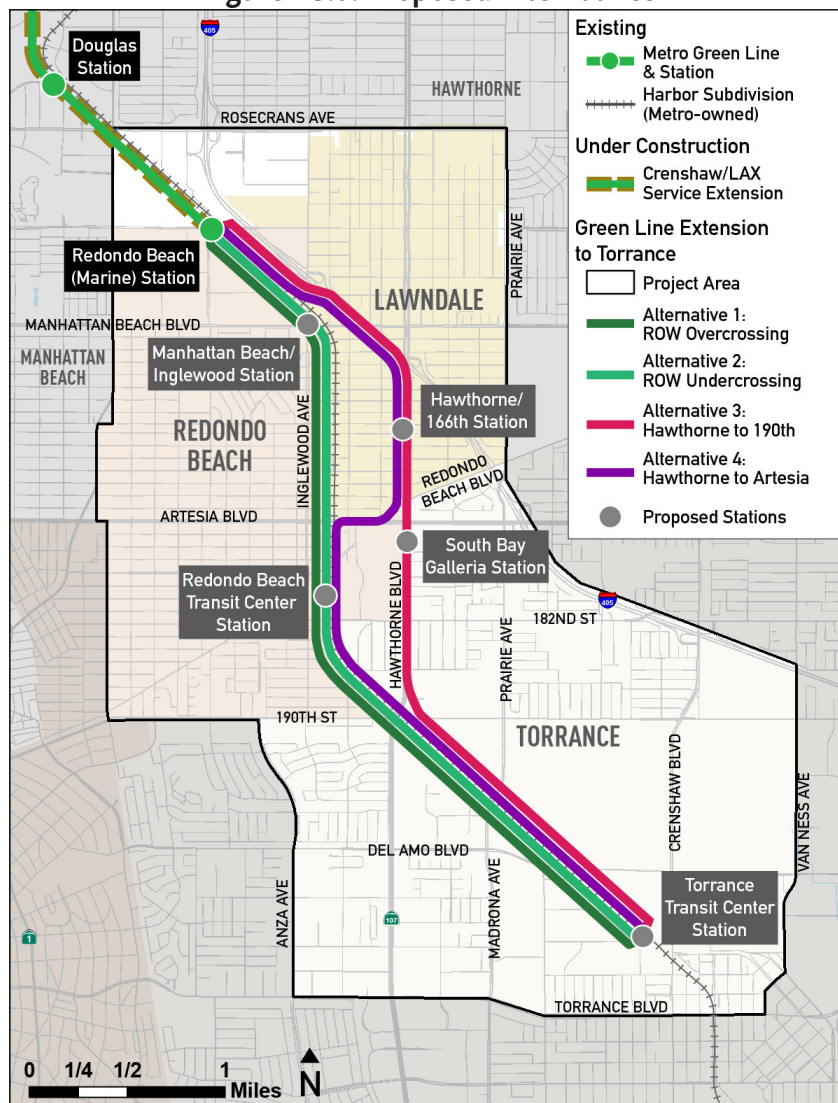
- Alternative 1: ROW Overcrossing
- Alternative 2: ROW Undercrossing

Hawthorne Boulevard

- Alternative 3: Hawthorne to 190th
- Alternative 4: Hawthorne to Artesia

Each alternative would share the same alignment approximately south of 190th Street and terminate at a station serving the Torrance TC. An overview of the Build Alternatives' alignments is shown in Figure ES.5.

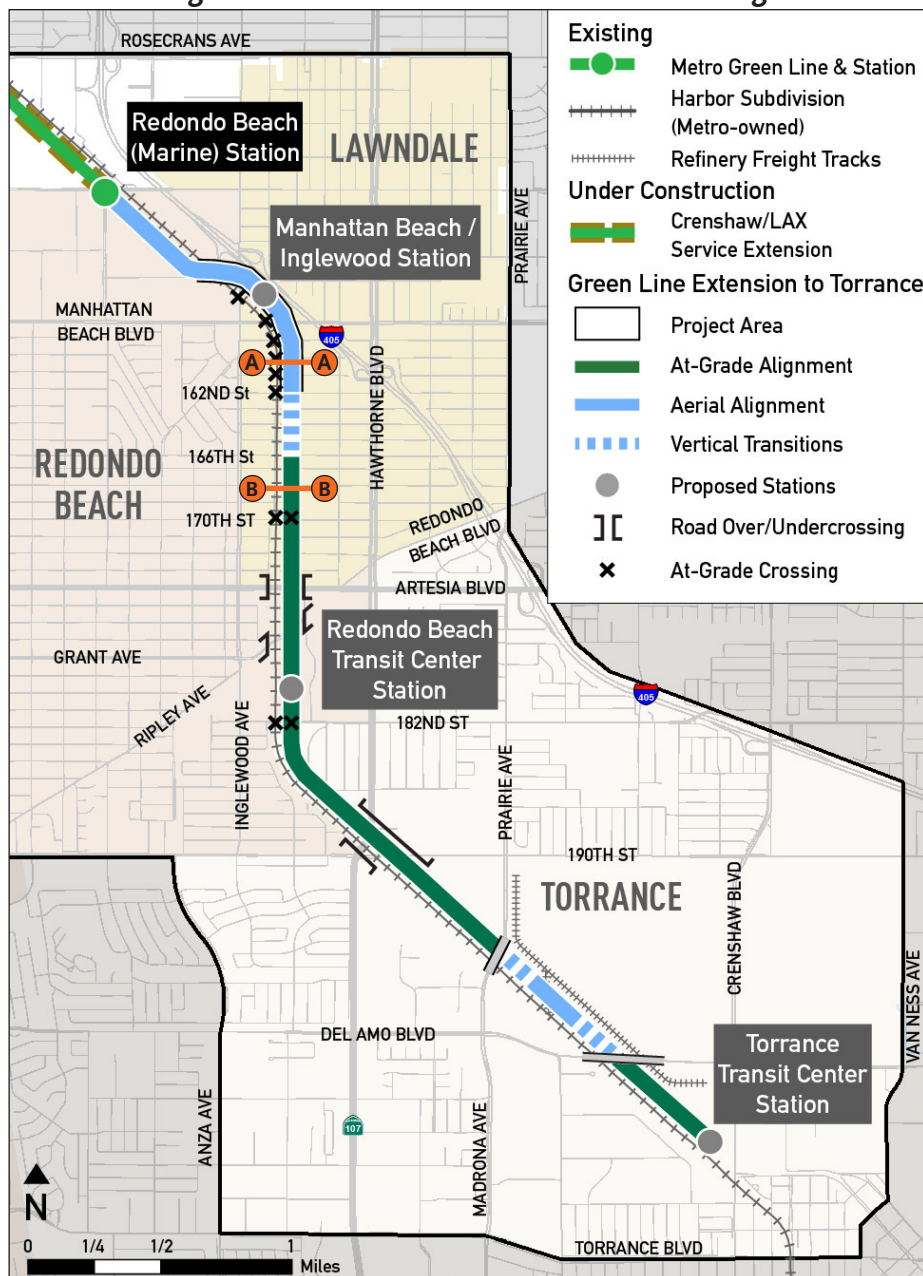
Figure ES.5. Proposed Alternatives



ES-3.2. Alternative 1: ROW Overcrossing

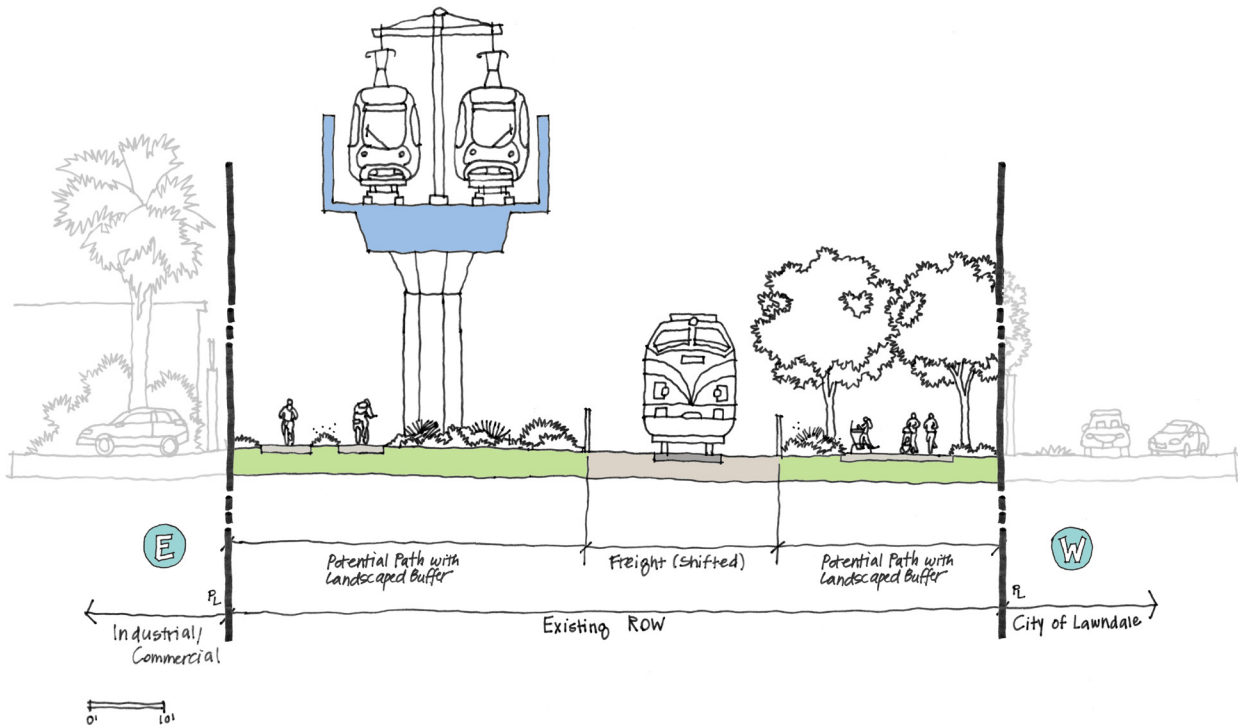
Alternative 1: ROW Overcrossing would follow the existing Metro ROW for the length of the Proposed Project. A grade separation analysis conducted in 2010 determined Inglewood Avenue and Manhattan Beach Boulevard would require grade separation of LRT service. As a result, when crossing Inglewood Avenue and Manhattan Beach Boulevard, Alternative 1 would be in an aerial configuration serving an elevated station at that intersection as shown in Figure ES.6 below. Between Prairie Avenue and Del Amo Boulevard, the alignment would rise on an aerial structure to cross over freight tracks serving the adjacent refinery. Alternative 1 is most similar to the LRT Alternative evaluated in the 2010 environmental analysis. Conceptual cross sections at key locations A-A and B-B are shown on the following page.

Figure ES.6. Alternative 1: ROW Overcrossing



The figures below show conceptual cross-sections at key locations along the alignment of Alternative 1. The locations of these cross-sections are shown by the orange markers on the overview map in Figure ES.6 on the previous page. Figure ES.7 shows the aerial structure south of Manhattan Beach Boulevard in the Metro ROW, and Figure ES.8 shows the alignment in the Metro ROW after it returns to at-grade south of 166th Street.

**Figure ES.7. Alternative 1 Conceptual Cross Section A-A
 (Looking South)**



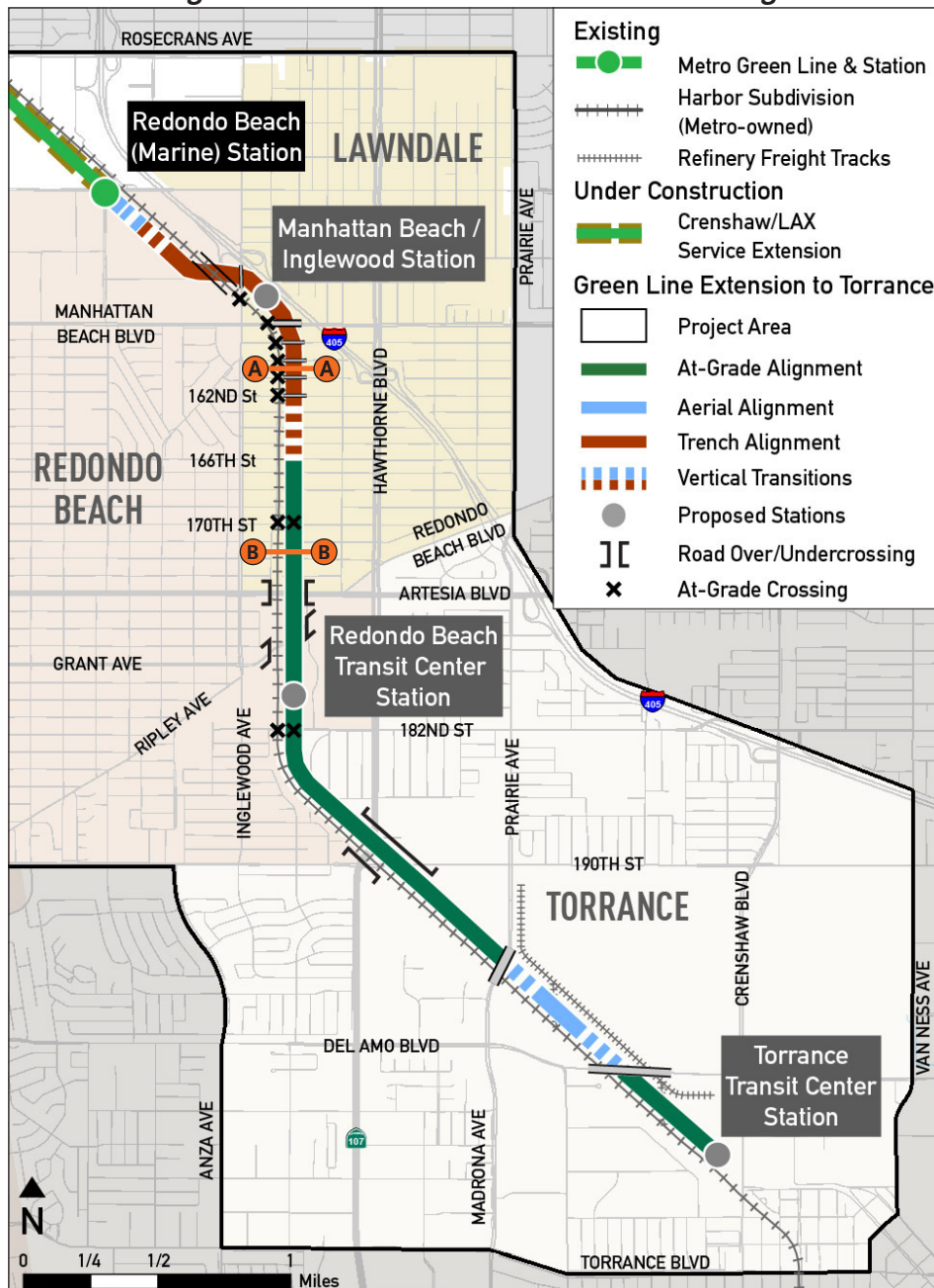
**Figure ES.8. Alternative 1 Conceptual Cross Section B-B
 (Looking South)**



ES-3.3. Alternative 2: ROW Undercrossing

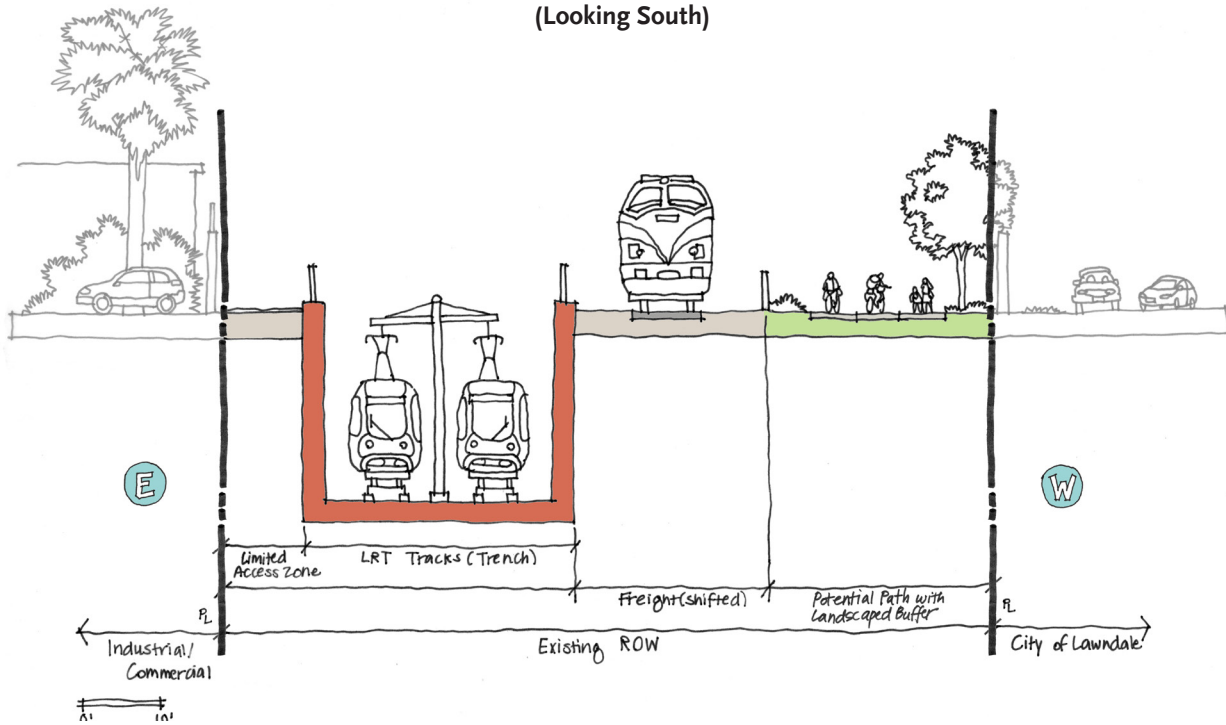
Alternative 2: ROW Undercrossing would follow the existing Metro ROW for the length of the Proposed Project. A grade separation analysis conducted in 2010 determined Inglewood Avenue and Manhattan Beach Boulevard would require grade separation of LRT service. As a result, when crossing Inglewood Avenue and Manhattan Beach Boulevard, Alternative 2 would be in a below-grade configuration, serving a below-grade station at that intersection as shown in Figure ES.9 below. After returning to grade at approximately 166th Street, Alternative 2 would be identical to Alternative 1. Conceptual cross sections at key locations A-A and B-B are shown on the following page.

Figure ES.9. Alternative 2: ROW Undercrossing

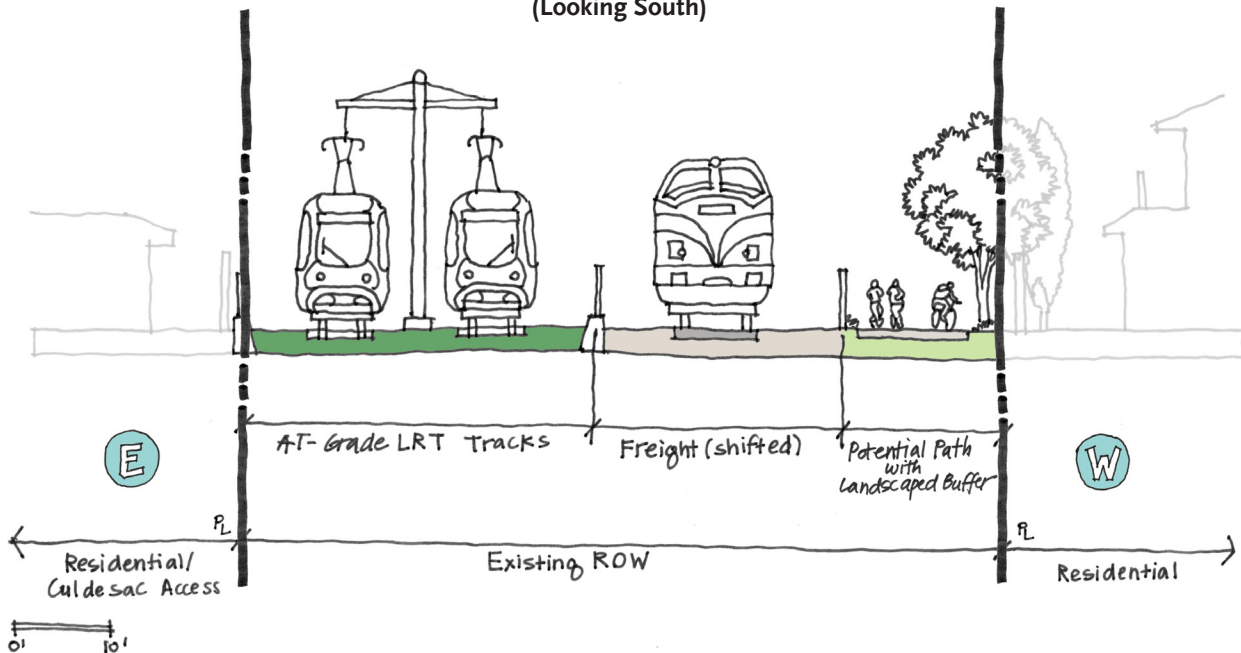


The figures below show conceptual cross-sections at key locations along the alignment of Alternative 2. The locations of these cross-sections are shown by the orange markers on the overview map in Figure ES.9 on the previous page. Figure ES.10 shows the trench structure south of Manhattan Beach Boulevard in the Metro ROW. Figure ES.11 shows the alignment after it returns to at-grade south of 170th Street in a narrow segment of the Metro ROW.

**Figure ES.10. Alternative 2 Conceptual Cross Section A-A
 (Looking South)**



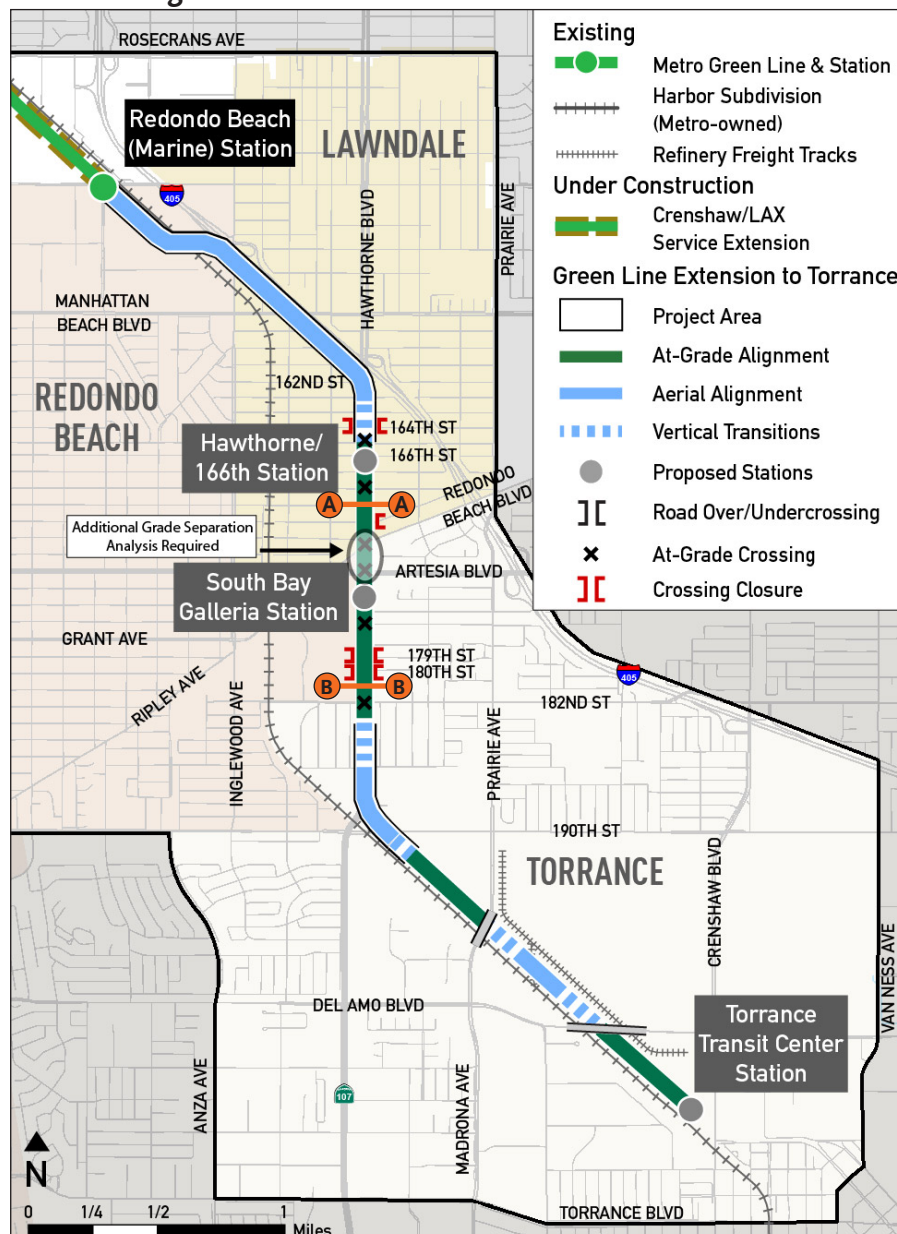
**Figure ES.11. Alternative 2 Conceptual Cross Section B-B
 (Looking South)**



ES-3.4. Alternative 3: Hawthorne to 190th

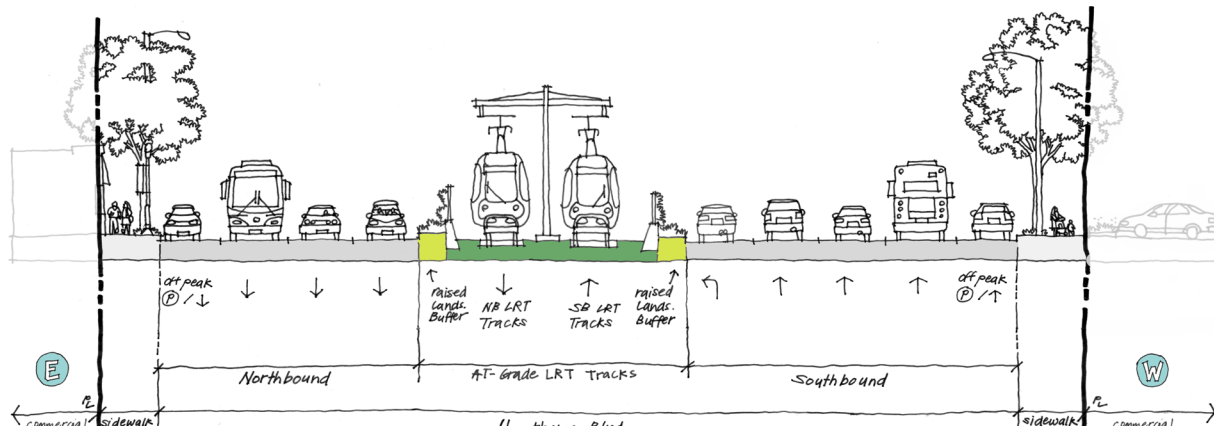
Alternative 3: Hawthorne to 190th would start within the existing Metro ROW, and would leave the Metro ROW to parallel I-405. The alignment would then travel at-grade along Hawthorne Boulevard between 162nd Street in Lawndale and 190th Street in Torrance before rejoining the Metro ROW. Alternative 3 would serve two stations along Hawthorne Boulevard, as shown in Figure ES.12 below. Along the at-grade segment of Alternative 3 along Hawthorne Boulevard, trains would follow existing signal cycles at crossings. The introduction of LRT service in the median of Hawthorne Boulevard would also close several locations allowing traffic to cross Hawthorne Boulevard. These locations are described as “crossing closures” and shown in Figure ES.12. South of 190th Street, Alternative 3 would be identical to Alternative 1. Conceptual cross sections at key locations A-A and B-B are shown on the following page.

Figure ES.12. Alternative 3: Hawthorne to 190th

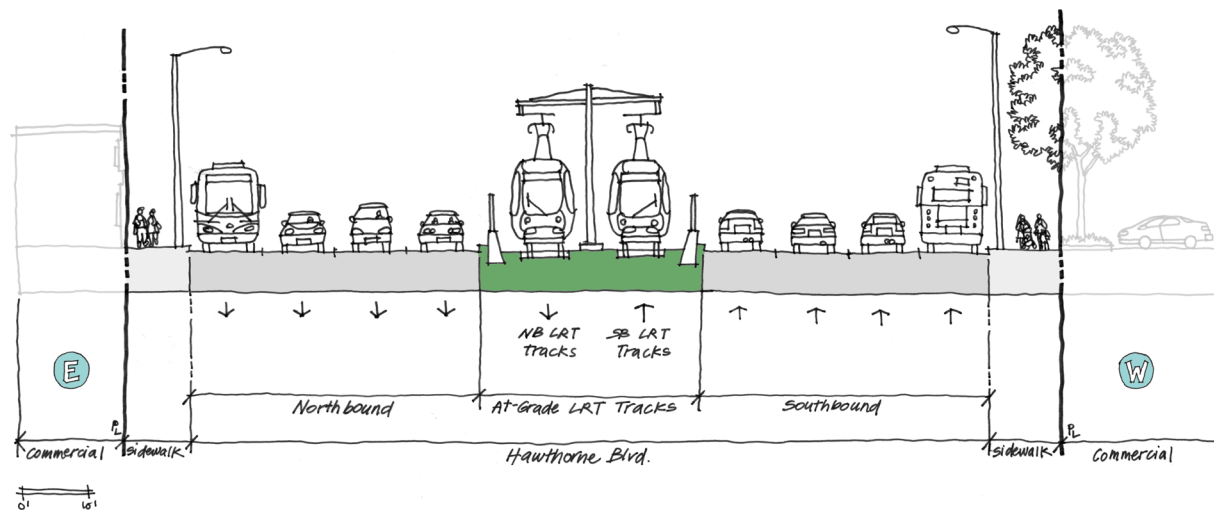


The figures below show conceptual cross-sections at key locations along the alignment of Alternative 3. The locations of these cross-sections are shown by the orange markers on the overview map in Figure ES.12 on the previous page. Figure ES.13 shows the at-grade alignment of Alternative 3 in the median of Hawthorne Boulevard north of Artesia Boulevard. Figure ES.14 shows the alignment in the median of Hawthorne Boulevard south of Artesia Boulevard, where the existing public ROW is narrower.

**Figure ES.13. Alternative 3 Conceptual Cross Section A-A
 (Looking South)**



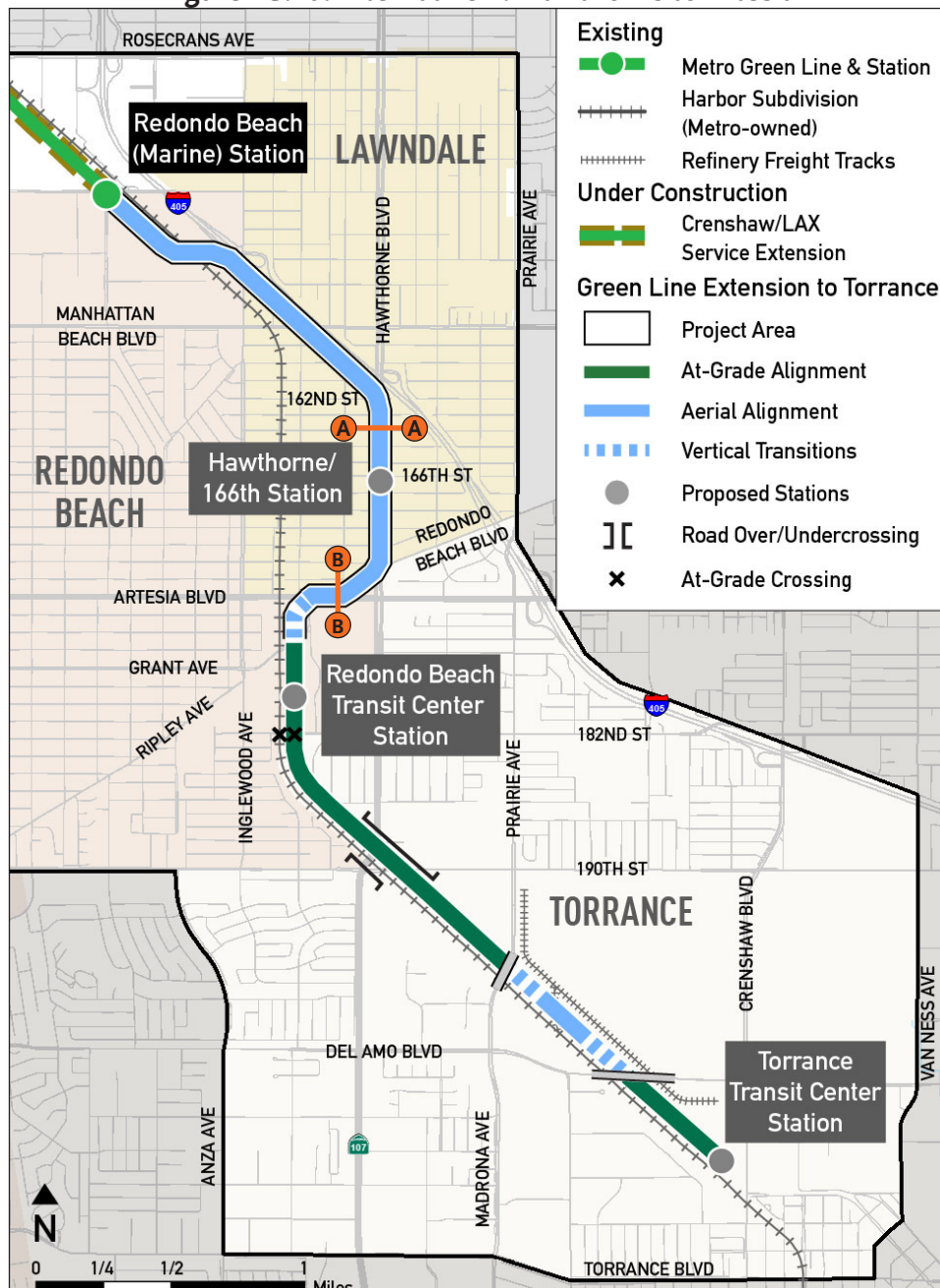
**Figure ES.14. Alternative 3 Conceptual Cross Section B-B
 (Looking South)**



ES-3.5. Alternative 4: Hawthorne to Artesia

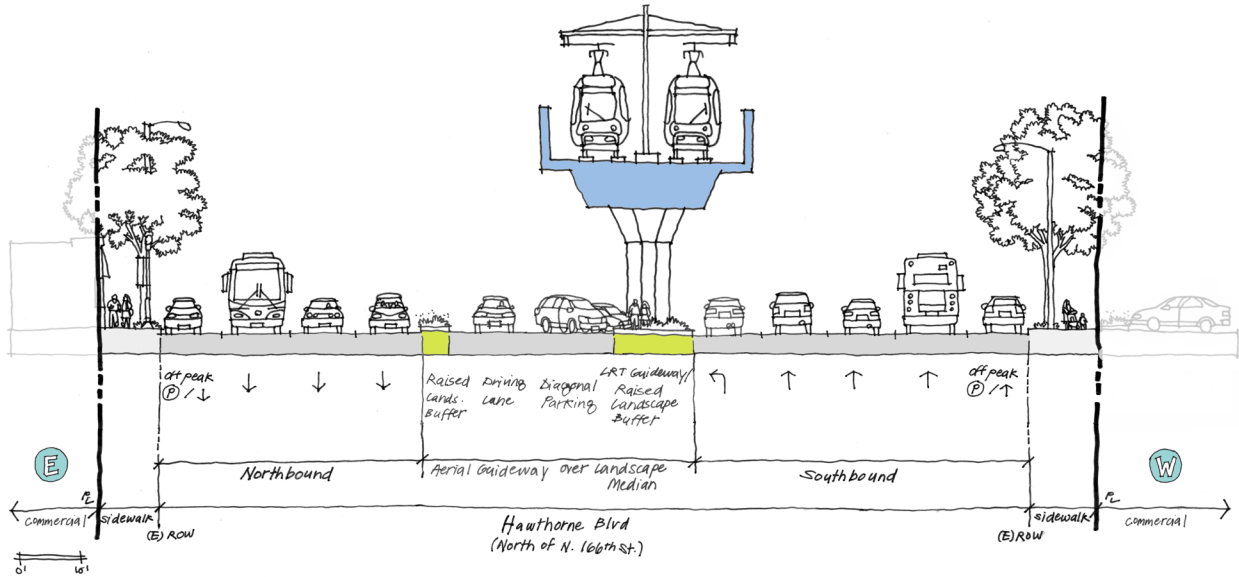
Alternative 4: Hawthorne to Artesia would start within the existing Metro ROW, and would leave the Metro ROW to parallel I-405. The alignment would travel on an aerial structure along Hawthorne Boulevard between 162nd Street and Redondo Beach Boulevard in Lawndale, serving an aerial station on Hawthorne Boulevard. The aerial alignment would turn west along Redondo Beach Boulevard and Artesia Boulevard before turning south to rejoin the Metro ROW at Artesia Boulevard, as shown in Figure ES.15 below. South of Artesia Boulevard, Alternative 4 would be identical to Alternative 1. Conceptual cross sections at key locations A-A and B-B are shown on the following page.

Figure ES.15. Alternative 4: Hawthorne to Artesia

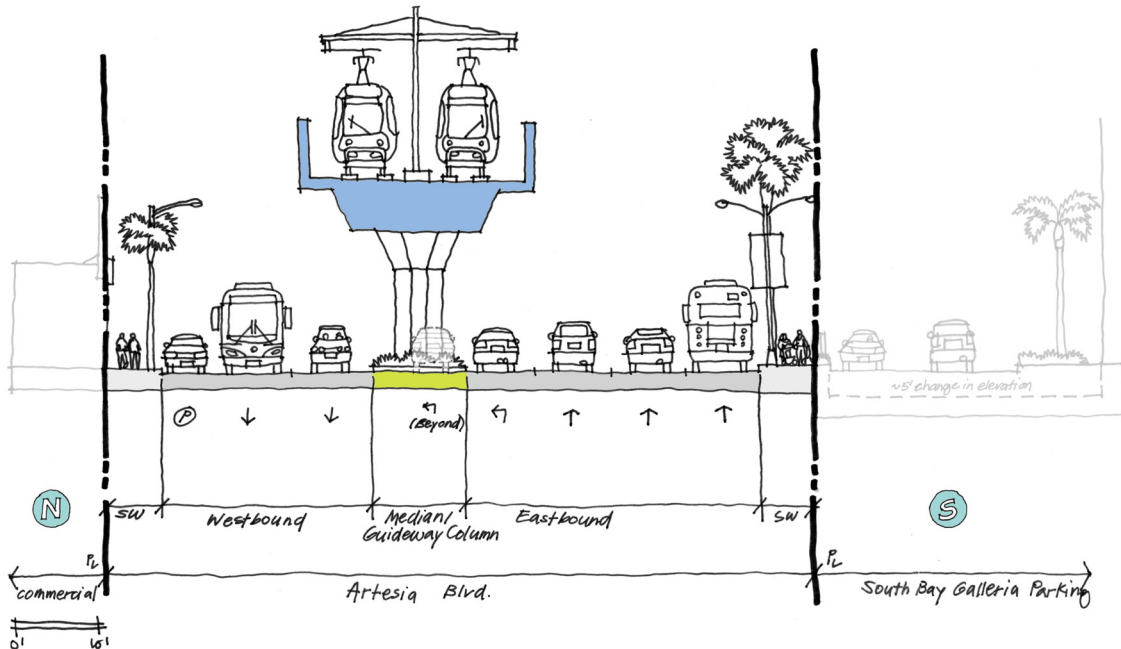


The figures below show conceptual cross-sections at key locations along the alignment of Alternative 4. The locations of these cross-sections are shown by the orange markers on the overview map in Figure ES.15 on the previous page. Figure ES.16 shows the aerial alignment of Alternative 4 in the median of Hawthorne Boulevard north of 166th Street. Figure ES.17 shows the alignment in the median of Artesia Boulevard after the alignment turns west to rejoin the Metro ROW.

**Figure ES.16. Alternative 4 Conceptual Cross Section A-A
 (Looking South)**



**Figure ES.17. Alternative 4 Conceptual Cross Section B-B
 (Looking East)**



ES-4. Evaluation of Alternatives

ES-4.1. Methodology

The SAA compared the four Build Alternatives using evaluation criteria which reflect the Proposed Project's goals and objectives, described in more detail below. Community Input is considered throughout the entire decision-making process.



Goal 1: Improve Mobility analyzes potential improvements to the regional transportation system. Its evaluation criteria are:

- Travel Time/Reliability
- System Connectivity
- Ridership
- Change in VMT
- Accessibility



Goal 2: Minimize Environmental Impacts analyzes 19 environmental topics in accordance with national and California environmental review standards, such as air quality, construction effects, economic and fiscal effects, and safety and security. Some of these 19 topics overlap with the evaluation criteria for other project goals.



Goal 3: Ensure Cost Effectiveness and Financial Feasibility analyzes and compares the relative costs and benefits of each Build Alternative. Its evaluation criteria are:

- Capital Costs (construction)
- Operations & Maintenance (O&M) Costs
- Cost per Rider
- Financial Feasibility



Goal 4: Support Local and Regional Land Use Plans and Policies analyzes the relationship between the Build Alternatives and the existing land uses and plans surrounding their proposed alignments and stations. Its evaluation criteria are:

- Accessibility (also evaluated under Goal 1)
- Land Use Consistency
- Economic and Fiscal Effects



Goal 5: Ensure Equity analyzes the proposed alignments and stations of the Build Alternatives to determine the presence of nearby environmental justice (EJ) communities, which include populations of over 50 percent low-income, minority, or limited English proficiency.



Community Input is an important factor in the decision-making process, as it takes into account public and stakeholder preferences and concerns, and is considered in addition to the evaluation criteria. Public input received is available in the full SAA document and its appendices.

The Build Alternatives were assigned scores, based on how the evaluation criteria performed in achieving project goals and objectives. The scores are represented with Harvey Balls, as shown in the table below. An empty Harvey Ball represents the lowest performance, and a full Harvey Ball represents the highest performance, as each alternative performed related to achieving the project purpose, goals, and objectives. No weighting was applied.

Table ES.2. Evaluation Rating System

	Low Performance	Medium Performance	High Performance
Rating	○	◐	●



ES-4.2. Goal 1: Improve Mobility

Evaluation Criterion: Travel Time/Reliability

Each alternative varies in its travel time and reliability due to factors such as design, alignment, surrounding context, operations, safety, and grade separations. The travel times of each Build Alternative from the Redondo Beach (Marine) Station to the proposed Torrance TC Station are shown in the figure below.

Figure ES.18. Travel Times



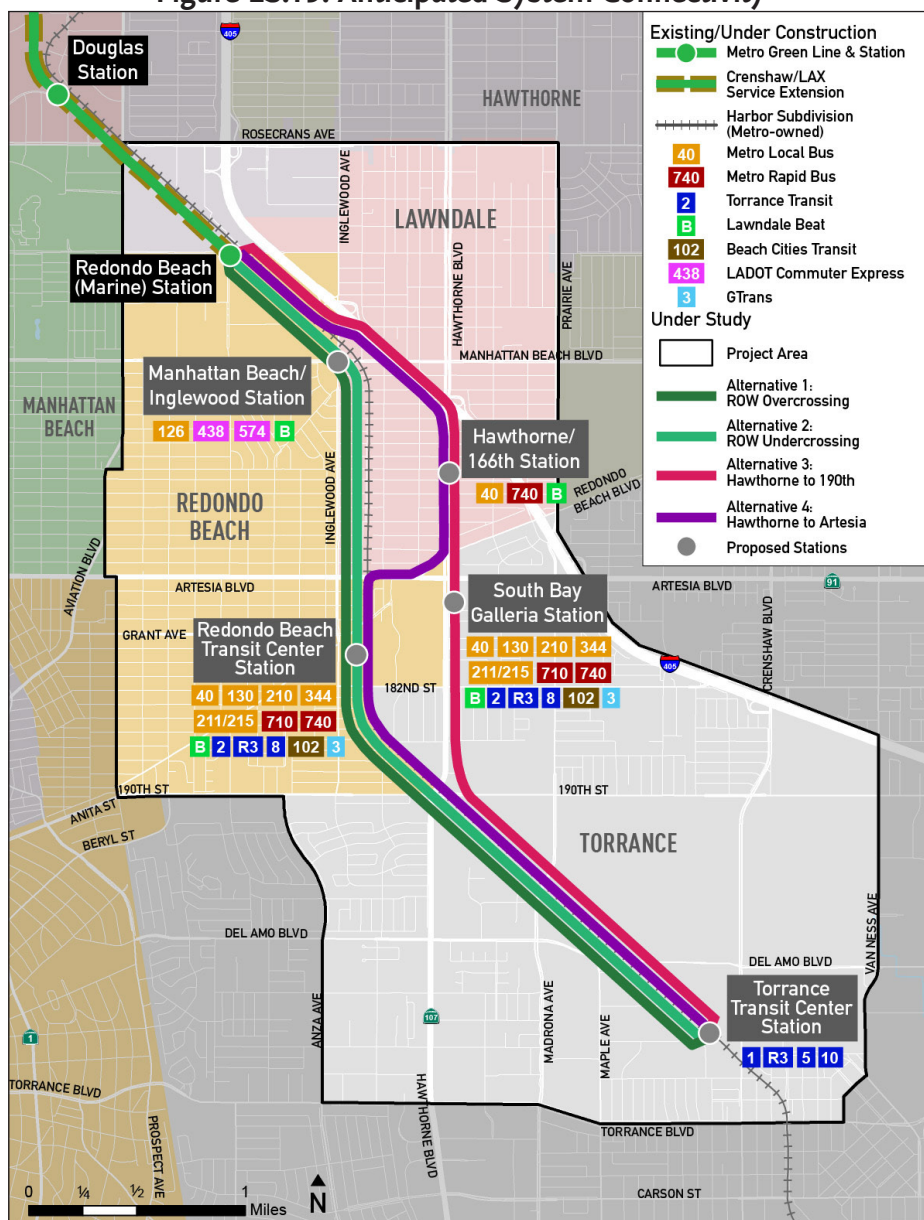
- Alternatives 1 and 2 would have the shortest travel times of the Build Alternatives due to use of the Metro ROW and its direct route to the terminus at the Torrance TC.
- Alternative 3 would have the longest travel time due to slower speeds along Hawthorne Boulevard, and less travel time reliability due to potential stops at signalized intersections.
- Alternative 4 would be entirely grade separated, but would have the longest track alignment of the Build Alternatives. Alternative 4 would face speed constraints due to track curvature where the alignment rejoins the Metro ROW at Artesia Boulevard.

Evaluation Criterion: System Connectivity

System Connectivity examines the anticipated bus routes serving proposed stations, and the potential for creating transit connectivity between Metro Rail and bus service in the Project Area.

As shown in the map below, the Build Alternatives would connect to a similar number of bus lines. However, transfers at transit centers are more convenient for rail passengers due to passenger amenities. The Redondo Beach TC Station would offer a waiting area, public restrooms, and an information center, making it a more comfortable environment to connect to other transit lines. Alternatives 1, 2, and 4 would serve the Redondo Beach TC, while Alternative 3 would not.

Figure ES.19. Anticipated System Connectivity

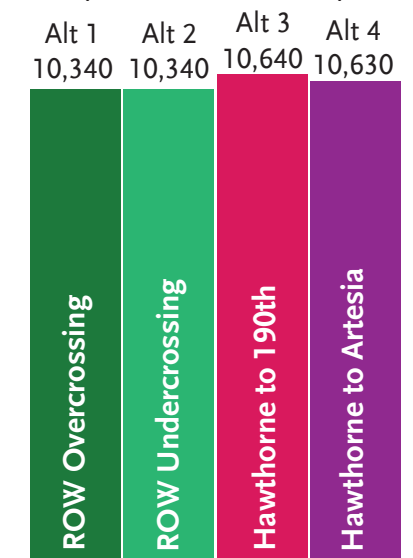


Evaluation Criterion: Ridership

Ridership estimates are derived from factors such as land uses, regional trip data, socioeconomic characteristics, existing transportation networks, market share of various transportation modes, and trip routes throughout the Project Area. Ridership also takes into account estimates of how many people might use the new LRT service instead of a private vehicle, which relates to VMT estimates.

Ridership estimates in the figure at right represent daily ridership on the Proposed Project only - between the Redondo Beach (Marine) Station and the Torrance TC Station. Ridership estimates are similar across all Build Alternatives.

Figure ES.20. Daily Ridership
(Forecast Year 2040)



Evaluation Criterion: Change in Vehicle Miles Traveled

VMT is an estimate of the amount of vehicular travel in a given area. The change in VMT in the Project Area is directly related to projected ridership under each alternative. Changes in VMT often occurs as a result of introducing high-quality transit in a transit-poor area such as the Project Area, as people switch from private automobile use to transit for trips. As private vehicles emit greenhouse gases (GHG), whereas Metro trains use electric power, reductions in VMT are also correlated with improvements in air quality. The figure at right displays projected change in VMT per Build Alternative.

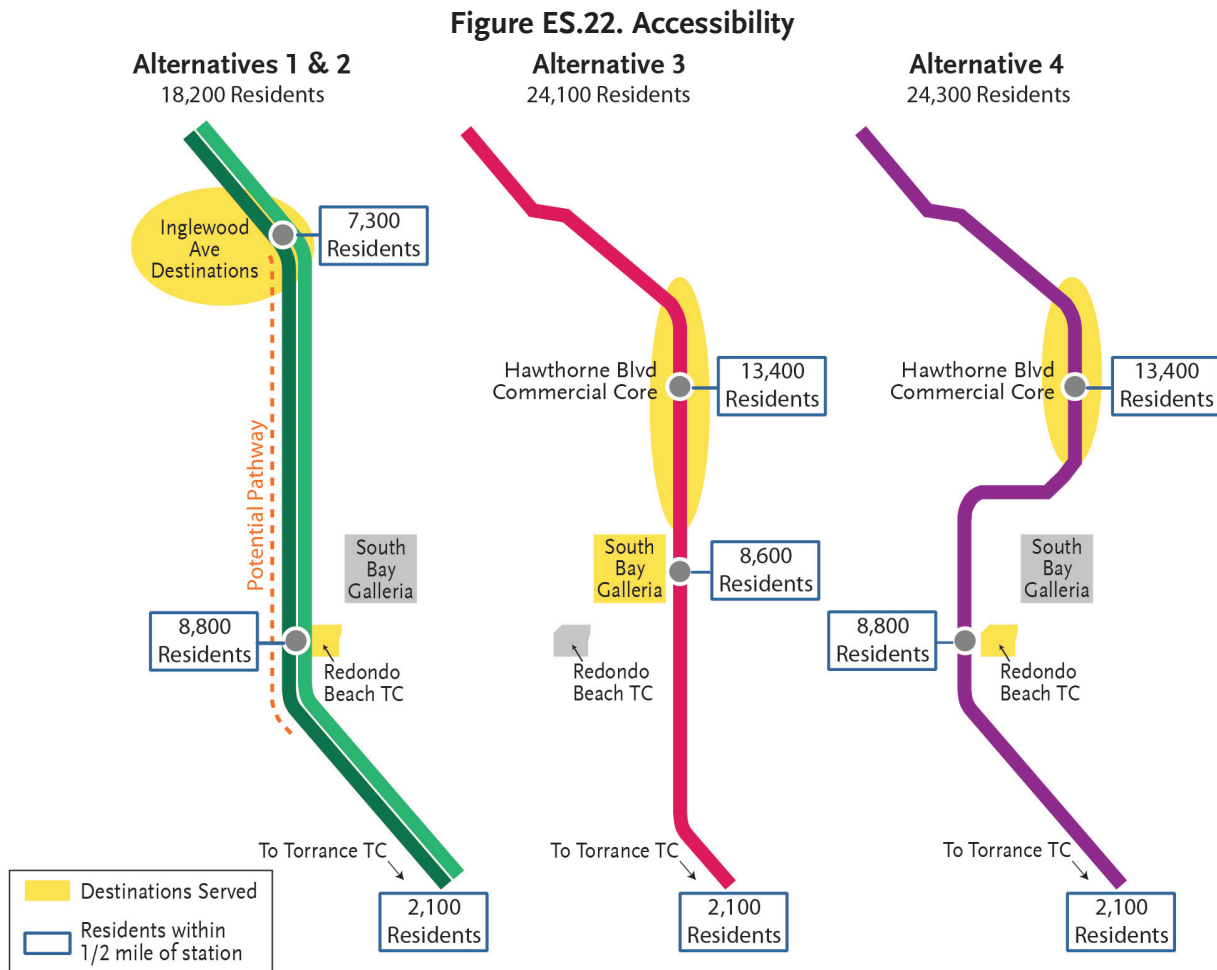
- Alternatives 1, 2, and 4 would result in similar reductions in VMT.
- Alternative 3 would result in a smaller reduction in VMT due to its anticipated use by existing transit riders along Hawthorne Boulevard who currently ride buses. As these potential riders already use transit, this would result in a smaller overall shift from private vehicle use to transit use, compared to other Build Alternatives' capture of new transit riders.

Figure ES.21. Change in VMT (Daily)



Evaluation Criterion: Accessibility

Accessibility would include providing direct connections to high-quality transit, as well as connections to key destinations in the Project Area. The figure below shows the various destinations served by the alternatives, as well as the number of residents within walking distance (defined as a half-mile) of Metro Rail stations.



- Alternatives 1 and 2 would serve commercial destinations near Inglewood Avenue, as well as the Redondo Beach TC. Alternatives 1 and 2 would provide rail accessibility to the fewest residents within a half-mile of the stations, at approximately 18,200 residents. However, Alternatives 1 and 2 would be able to accommodate a pathway in the Metro ROW, which would provide additional station accessibility via active transportation.
- Alternative 3 would serve the Hawthorne Boulevard commercial corridor north of Artesia Boulevard, as well as the South Bay Galleria and adjacent retail center. It would provide rail accessibility to approximately 24,100 residents, which is more residents than Alternatives 1 and 2. However, Alternative 3 would not accommodate a pathway.
- Alternative 4 would serve the Hawthorne Boulevard commercial corridor north of Artesia Boulevard, as well as the Redondo Beach TC. Alternative 4 would provide rail accessibility to approximately 24,300 residents, which is more than any other alternative. Alternative 4 would not accommodate a pathway.



ES-4.3. Goal 2: Minimize Environmental Impacts

Evaluation Criteria: Environmental Topics

There would be potential environmental effects, both positive and negative, associated with implementing a new transit service. The SAA performed a preliminary analysis of 19 topics, which are consistent with national and California standards.

The Build Alternatives would result in different potential effects under certain key topics. There are a number of key project elements that differentiate the alternatives. The differentiating project elements, and the environmental topics most associated with those elements, are summarized in the table below. The SAA contains a more complete description of the potential effects in all 19 environmental topics examined, in addition to the key topics listed in the following tables.










Table ES.3. Key Environmental Topics

Project Element	results in differences in →	Environmental Topics
Alignment Location (Metro ROW vs outside of ROW)	→	<ul style="list-style-type: none"> • Communities and Neighborhoods • Construction Effects • Displacement and Relocations • Noise and Vibration • Transportation • Visual Resources and Aesthetics
Number of At-Grade Crossings	→	<ul style="list-style-type: none"> • Air Quality • Noise and Vibration • Safety and Security • Transportation
Crossing Closures	→	<ul style="list-style-type: none"> • Communities and Neighborhoods • Transportation
Alignment Configuration (At-Grade, Elevated, Trench)	→	<ul style="list-style-type: none"> • Construction Effects • Transportation • Visual Resources and Aesthetics • Noise and Vibration
Ridership/ Change in VMT	→	<ul style="list-style-type: none"> • Air Quality • Climate Change

Key Environmental Topic Descriptions

Build Alternatives would affect the surrounding environment based on their project elements. Table ES.4 below compares elements of each Build Alternative which would affect the corresponding key environmental topics identified in Table ES.3 on the previous page.

Table ES.4. Project Elements & Key Environmental Effects

Key Environmental Topic	Alternative 1	Alternative 2	Alternative 3	Alternative 4
 Air Quality	-48,230 VMT (Daily)	-48,230 VMT (Daily)	-42,810 VMT (Daily)	-47,810 VMT (Daily)
 Climate Change	4 yrs construction emissions	4.5 yrs construction emissions	4.5 yrs construction emissions	5 yrs construction emissions
 Communities and Neighborhoods	Accommodates new pathway in Metro ROW	Accommodates new pathway in Metro ROW	Would not accommodate new pathway in Metro ROW	Would not accommodate new pathway in Metro ROW
 Construction Effects	Construction in existing Metro ROW	Construction in existing Metro ROW	Construction requires additional ROW	Construction requires additional ROW
 Displacement and Relocations	Up to 13 parcels affected	Up to 13 parcels affected	Up to 34 parcels affected	Up to 32 parcels affected
 Noise and Vibration	Next to residential land uses	Next to residential land uses	Next to commercial land uses	Next to commercial and residential land uses
 Safety and Security	2 at-grade crossings	2 at-grade crossings	6 at-grade crossings	1 at-grade crossing
 Transportation	0 crossing closures, 0 parking spaces removed	0 crossing closures, 0 parking spaces removed	4 crossing closures, ~85 parking spaces removed	0 crossing closures, ~100 parking spaces removed
 Visual Resources and Aesthetics	Greater changes in residential areas compared to Alts 3 & 4	Greater changes in residential areas compared to Alts 3 & 4	Greater changes in commercial areas compared to Alts 1 & 2	Changes in both commercial and residential areas.



ES-4.4. Goal 3: Ensure Cost Effectiveness and Financial Feasibility

Evaluation Criterion: Capital Costs

- Capital costs reflect construction costs.
- Alternative 1 would cost the least due to its use of existing Metro ROW.
- Alternative 2 would also use the ROW, but would cost more than Alternative 1 due to excavation work for the proposed trench.
- Alternatives 3 and 4 would also cost more than existing funding levels due to additional ROW acquisitions and aerial structures.

Evaluation Criterion: O&M Costs

- O&M costs reflect ongoing costs such as vehicle maintenance and general administration. O&M costs are compared to the No Build Alternative.
- Alternatives 3 and 4 would have higher O&M costs than Alternatives 1 and 2 due to larger fleet requirements as a result of maintaining similar headways with longer alignment lengths and travel times.

Evaluation Criterion: Financial Feasibility

- Only Alternative 1 is financially feasible based on existing funding levels. Other Build Alternatives would require additional funding.

Evaluation Criterion: Cost per Rider

- Annual cost per rider divides annualized capital and O&M costs by total riders on the Proposed Project. By this metric, Alternative 1 would be most cost effective, followed by Alternatives 2, 3, and 4, respectively.
- Capital cost per new rider divides total capital cost by new riders who would use the Proposed Project instead of cars. By this metric, Alternative 1 would still be most cost effective, but Alternative 3 would perform better than Alternatives 2 and 4.

Figure ES.23. Capital Costs
(2017 \$)

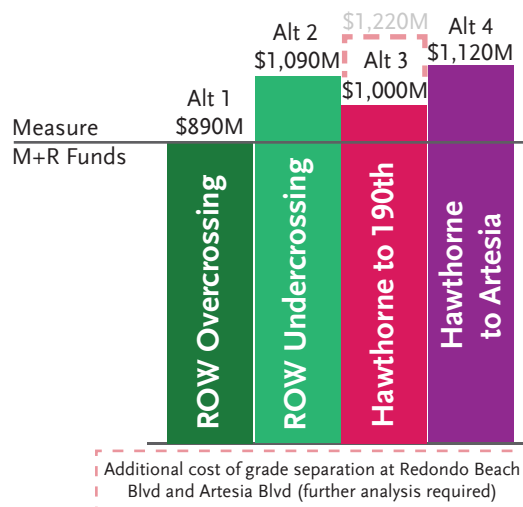


Figure ES.24. O&M Costs
(2017 \$)

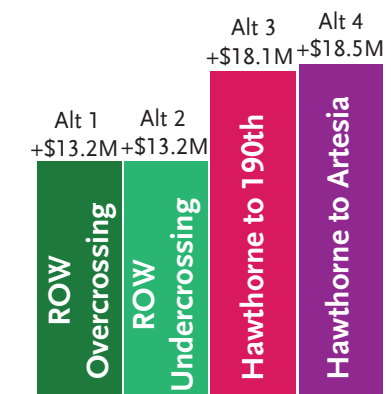
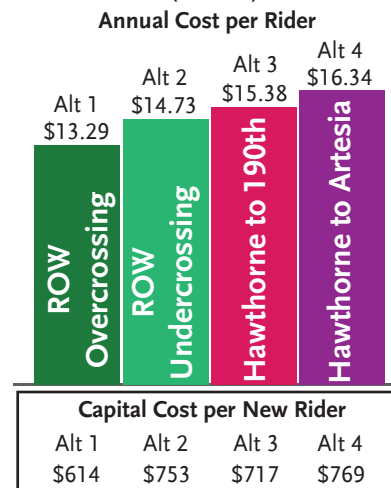


Figure ES.25. Cost per Rider
(2017 \$)





ES-4.5. Goal 4: Support Local and Regional Land Use Plans and Policies

Evaluation Criterion: Accessibility

Accessibility refers to the number of residents served by proposed stations of the Proposed Project. Accessibility is also evaluated under Goal 1: Improve Mobility in Section ES-4.2.

Evaluation Criterion: Land Use Consistency

Land use consistency refers to the compatibility of the Build Alternatives with existing agency land use plans, as well as if the Proposed Project would result in a new barrier which would divide existing communities.

- Alternatives 1 and 2 are consistent with existing local land use plans, as the Metro ROW is currently zoned for transportation uses.
- Alternatives 3 and 4 are less consistent with existing plans, as the ROW required for these two alternatives are not currently zoned for transportation uses.
- Alternative 3 would not connect to the planned Redondo Beach TC, and is most likely to create a new physical barrier due to its proposed crossing closures along Hawthorne Boulevard.

Evaluation Criterion: Economic and Fiscal Effects

Economic and Fiscal Effects refers to the short term effects of construction on businesses, as well as long-term benefits of economic growth potential due to new LRT service.

- Construction timelines would vary, with Alternative 1 at four years, Alternatives 2 and 3 at four and a half years, and Alternative 4 at five years.
- Alternative 3 would be most surrounded by commercial land uses, and is most likely to affect businesses during construction.
- Alternative 3 is also most likely to result in long-term economic development potential, as it would serve the existing Hawthorne Boulevard commercial corridor for a longer distance (to 190th Street) than the other Build Alternatives. Alternatives 1, 2 and 4 would not provide the same level of access to commercial opportunities.



ES-4.6. Goal 5: Ensure Equity

Evaluation Criterion: Environmental Justice

The EJ evaluation criterion prepares analysis to comply with federal executive orders, Title VI of the Civil Rights Act, and state guidance to ensure that EJ populations - defined in the SAA as populations of over 50 percent minority, low-income, or limited-English proficiency (LEP) - are not affected at a disproportionately high and adverse rate as a result of the Proposed Project. Analysis in the SAA examined census tracts within a half-mile of the Proposed Project, and found that all Build Alternatives would run primarily through EJ communities. The Proposed Project would be consistent with the recently-adopted Metro Equity Platform Framework, which would also guide the full evaluation of equity in the next phase of project

ES-4.7. Summary of Comparative Analysis

The SAA evaluated the Build Alternatives based on their respective performance in achieving the project goals and objectives. Based on this analysis, each alternative received a Harvey Ball rating for each project goal, as well as an overall qualitative rating based on the “low,” “medium,” and “high” scale. The table below displays the ratings for each Build Alternative. The overall ratings apply to the evaluation criteria described in Section ES-4. Community input is considered in addition to these ratings for selection of an alternative(s) to advance to the next phase of project development.

Table ES.5. Build Alternative Ratings

Project Goals	Alternative 1: ROW Overcrossing	Alternative 2: ROW Undercrossing	Alternative 3: Hawthorne to 190th	Alternative 4: Hawthorne to Artesia
1. Improve Mobility	●	●	◐	◐
2. Minimize Environmental Impacts	◐	◐	◐	◐
3. Ensure Cost Effectiveness and Financial Feasibility	●	◐	◐	○
4. Support Local and Regional Land Use Plans and Policies	◐	◐	●	◐
5. Ensure Equity	◐	◐	◐	◐
Overall Ratings	High	Medium	Medium	Medium/ Low

- Alternative 1 performed well under Goal 1: Improve Mobility due to factors such as its short travel time and its accommodation of a potential pathway, and performed well under Goal 3: Ensure Cost Effectiveness and Financial Feasibility due to its lower capital and O&M costs, and availability of existing funds.
- Alternative 2 performed similarly to Alternative 1, but was less cost effective due to high capital costs required for excavation activities to construct a proposed trench.
- Alternative 3 received a high score under Goal 4: Support Local and Regional Land Use Plans and Policies due to performing comparatively well under the Accessibility and Economic and Fiscal Effects criteria. It would serve the existing Hawthorne Boulevard commercial corridor for a longer distance (to 190th Street) than the other Build Alternatives, thereby providing greater access to existing and future commercial opportunities. Alternative 3 received a medium score for the remaining project goals.
- Alternative 4 received medium scores for most project goals. For example, Alternative 4 received a medium score under Goal 1: Improve Mobility due to long travel times resulting from operational challenges. However, Alternative 4 received a low score under Goal 3: Ensure Cost Effectiveness and Financial Feasibility, as its capital and O&M costs were high and more additional funding would be required than under other alternatives.

ES-5. Community Outreach

ES-5.1. Overview

This section discusses the outreach efforts conducted throughout the SAA process, which included stakeholder meetings; tours for residents and elected officials to experience areas of the Metro Rail system similar to the Proposed Project; and community meetings.

Community input received from each of these outreach efforts is summarized in the SAA document, and all public comments received are in Appendix B. These comments are reviewed by Metro staff and are an important factor in the recommendations of the Metro Board of Directors regarding which alternative(s) to advance to the environmental review phase.



ES-5.2. Stakeholder Meetings

In November 2016, Los Angeles County voters passed Measure M, which included funding for the Proposed Project. At this time, Metro began an outreach process to stakeholders and cities in the South Bay to identify any major new changes or concerns since the project was paused in 2012 to incorporate those concerns in an update of the environmental analysis. Cities and stakeholders engaged during this period included:

- City of Lawndale
- City of Redondo Beach
- City of Torrance
- North Redondo Business Association
- South Bay Association Chambers of Commerce
- South Bay Bicycle Coalition
- South Bay Council of Governments
- South Bay Galleria/Forest City
- South Bay Service Council
- Torrance Chamber of Commerce
- Right of Say community group



ES-5.3. Community Tours

In spring 2018, Metro invited residents, stakeholders, and elected officials from the Project Area to tour the Metro Rail system. Three tours were conducted that focused on locations along the Metro Gold Line and Expo Line, attended by 73 total participants. The tours highlighted stations or segments of rail lines which have similar local conditions to the Proposed Project.

The Metro Rail system tours allowed attendees to experience riding Metro trains and see how the trains interact with their surroundings. Attendees expressed interest in Metro Rail projects, integration of Metro Rail into surrounding communities, and environmental impacts such as safety and noise.

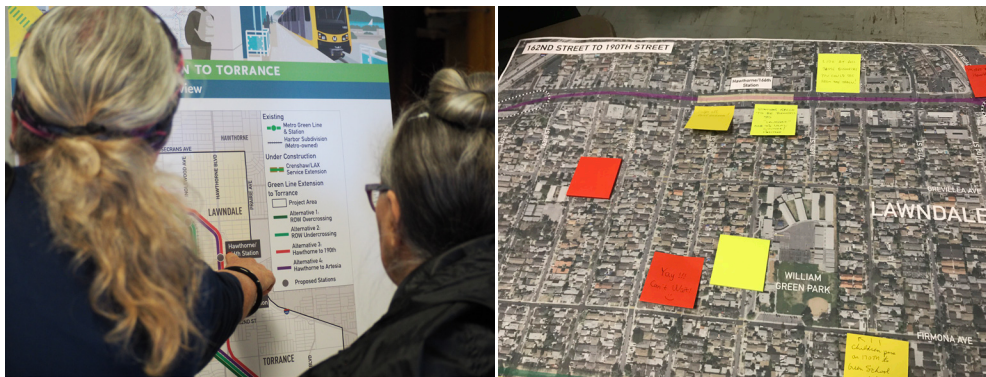


Each of the tours visited the South Pasadena Station area. At left, elected officials listen to a discussion at the station. At right, residents visit a low-medium density development adjacent to the station.



ES-5.4. Community Meetings

In April-May 2018, Metro held four community meetings, with at least one meeting in each corridor city. These meetings included a presentation from Metro, a public comment period, and an open house where attendees provided written comments via comment cards, sticky notes on roll plot maps of the Proposed Project, and had an opportunity to speak with the Metro team.



At left, residents examine the proposed alternatives. At right, attendees provided written comments on roll-plot maps of the alternatives.

Over 300 comments were submitted from the community meetings. Attendees generally expressed support for Alternatives 1 and 3, and voiced concerns over aesthetics, noise, property impacts, safety, and traffic. Generally, key issues raised during the stakeholder and public outreach mirrored those from public outreach efforts during the 2010-2012 environmental analysis. These issues are summarized in the table below:

Table ES.6. Outreach Feedback

Quality of Life	Transportation	Stations Connections
<ul style="list-style-type: none"> Noise/vibration Crossing safety Property values Visual impacts Station wayfinding/ pedestrian integration 	<ul style="list-style-type: none"> Parking Traffic Grade separations Bike facilities 	<ul style="list-style-type: none"> Transit centers Commercial areas Major destinations

ES-6. Next Steps

The next steps for the project are summarized below.

- **Select SAA Alternatives for Environmental Review:** This SAA provided a means to conduct a preliminary analysis of the four Build Alternatives's performance. Using the results of the technical analysis and the community input received, the Metro Board of Directors will select alternative(s) for further environmental review.
- **Environmental Impact Report and Additional Design:** After the selection of the preferred alternative(s), Metro would advance the engineering and initiate an EIR to further study potential environmental benefits and impacts. The No Build Alternative would also be carried forward for evaluation in the EIR. The EIR is expected to be initiated in early 2019.
- **Selection of Preferred Alternative:** Upon completion of the EIR and additional design, the Metro Board of Directors would select a Preferred Alternative for implementation. Selection of a Preferred Alternative is expected to occur after completion of the public comment period of the Draft EIR.



The Green Line Extension to Torrance would connect South Bay residents to a large network of rail-accessible destinations. Above, a Metro Green Line train travels past construction of the junction near LAX which would connect the Green Line to the AMC Station. The junction is under construction as part of the Crenshaw/LAX Transit Corridor Project. Below, a test train travels along the most recently-opened section of the Metro Gold Line, between the Sierra Madre Villa and Azusa Pacific University/Citrus College stations.



Los Angeles County
Metropolitan Transportation Authority

Contact Information

Project website: <https://www.metro.net/greenlineextension>

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Metro