

Eastside Transit Corridor Phase 2 Post Draft EIS/EIR Technical Study Report



May 2017

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



Metro

**Eastside Transit Corridor Phase 2
Post Draft EIS/EIR Technical Study Report**

This report was prepared by:

CDM Smith/AECOM JV
600 Wilshire Boulevard
Suite 750
Los Angeles, California 90017



TABLE OF CONTENTS

- EXECUTIVE SUMMARY 1**
- 1.0 Introduction..... 1**
 - 1.1 Study Background1
- 2.0 SR 60 North Side Design Variation Light Rail Transit Alternative Technical Studies 2-1**
 - 2.1 SR 60 North Side Design Variation Light Rail Transit Alternative Description2-1
 - 2.2 SR 60 North Side Design Variation Light Rail Transit Alternative Conflicts2-2
- 3.0 Washington Boulevard Light Rail Transit Alternative Technical Study..... 3-1**
 - 3.1 Washington Boulevard Light Rail Transit Alternative3-1
 - 3.2 North-South Washington Boulevard Light Rail Transit Alternative Concepts3-1
 - 3.3 Garfield Routing Concept3-3
 - 3.4 Atlantic Routing Concept3-4
 - 3.5 Arizona Routing Concept.....3-7
 - 3.6 Recommending Atlantic Below-Grade Concept for Incorporation into the Washington Boulevard Light Rail Transit Alternative3-10
 - 3.7 Additional Studies.....3-11
- 4.0 Combined Concept Feasibility Analysis..... 4-1**
 - 4.1 Combined Concept Definition.....4-1
 - 4.2 Existing Rail Junction Constraints4-1
 - 4.3 Potential Wye Junction Concept4-2
 - 4.4 Combined Concept Operation Plan4-3
- 5.0 Community and Stakeholder Outreach 5-1**
 - 5.1 Summary of Public Participation5-1
 - 5.2 What We Heard.....5-1
- 6.0 Findings of the Technical Study 6-1**
 - 6.1 Discussion of Key Findings6-1
- 7.0 Implementation Issues..... 7-1**
 - 7.1 Project Costs7-1
 - 7.2 Funding7-2
 - 7.3 Engineering Challenges7-2
- 8.0 Recommendations and Next Steps 8-1**
 - 8.1 Recommendations for Further Study8-1
 - 8.2 Next Steps8-3



FIGURES

Figure 1-1: Eastside Transit Corridor Phase 2 Project Alternatives Studied in 2014 Draft EIS/EIR1

Figure 2-1: SR 60 North Side Design Variation Light Rail Transit Alternative2-1

Figure 2-2: NSDV Issue Area Locations2-2

Figure 2-3: SR 60 Freeway Paramount Boulevard Interchange and SR 60 NSDV Design Refinements2-3

Figure 2-4: New Beginning Location of Retaining Wall on Pomona Boulevard2-5

Figure 2-5: Tunnel Boring Locations along SR 60 near OII Site.....2-6

Figure 2-6 : Whittier Narrows Dam Flood Control Basin2-10

Figure 2-7: Santa Anita Avenue Conceptual Station Design2-10

Figure 3-1: Universe of Potential Routing Concepts for the North-South Washington Boulevard Light Rail Transit Alternative3-2

Figure 3-2: Potential North-South Washington Routing Concepts3-3

Figure 3-3: Garfield Below-Grade Concept.....3-4

Figure 3-4: Atlantic At-Grade Concept.....3-5

Figure 3-5: Atlantic Below-Grade Concept3-7

Figure 3-6: Arizona At-Grade Concept3-8

Figure 3-7: Arizona Below-Grade Concept3-9

Figure 4-1: Initial Combined Concept Map for Both Light Rail Transit Alternatives4-1

Figure 4-2: Combined Concept (Full Wye)4-4

Figure 5-1: Stakeholder Input Received from Community Meetings5-3

Figure 8-1: Recommended for Further Study – SR 60 North Side Design Variation Light Rail Transit Alternative8-1

Figure 8-2: Recommended for Further Study – Washington Boulevard LRT Alternative8-2

Figure 8-3: Recommended for Further Study – Combined Concept.....8-2

TABLES

Table 3-1: Evaluation Criteria Methodology3-2

Table 3-2: Screening Results of the Washington Boulevard Concepts3-11

Table 7-1: Preliminary Capital Cost Estimate Totals7-1



Purpose of the Post Draft EIS/EIR Technical Study

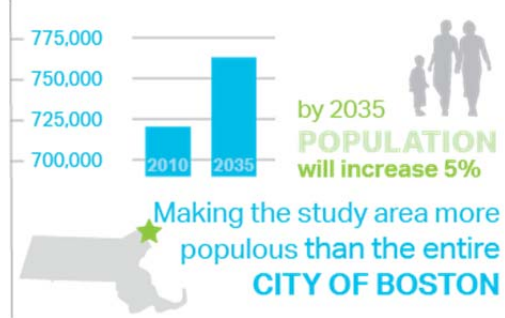
The purpose of this Technical Study is to address issues identified in the November 2014 Board Motion, which the Metro Board of Directors passed subsequent to the release for public review on August 22, 2014 of the Eastside Transit Corridor Phase 2 Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR). The Draft EIS/EIR studied two Build Alternatives to extend the Metro Gold Line east of its current terminus at Atlantic Boulevard in East Los Angeles: the State Route (SR) 60 Light Rail Transit (LRT) Alternative and the Washington Boulevard LRT Alternative. Based on the volume and scope of comments received on the Draft EIS/EIR, the Board deferred the selection of a Locally Preferred Alternative (LPA) and determined that additional technical investigation would be needed to address major areas of concern raised by Cooperating Agencies, corridor cities and stakeholders. In addition, the Board directed staff to identify a new north-south connection for the Washington Boulevard LRT Alternative and explore the feasibility of operating both the SR 60 LRT and Washington Boulevard LRT Alternatives.

This report describes the results of the technical analysis and associated refinements to the project alternatives. In addition, it summarizes feedback received at community meetings, implications on the project scope and presents additional considerations for project implementation, including funding and environmental next steps. The final section presents recommendations for an updated Project Definition for Metro Board consideration. More technical information is provided in further detail in this report and its appendices.

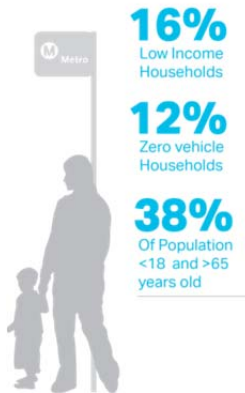


EXECUTIVE SUMMARY

The Eastside Transit Corridor Phase 2 Project Study is evaluating transit alternatives that would extend the existing Metro Gold Line Eastside Extension (MGLEE) into east Los Angeles County. These alternatives would serve a densely populated and highly congested study area, comprised of seven cities whose population is growing to approximately 760,000 residents by 2035.¹



Large, Transit Dependent POPULATION



After a review of over 47 transit connections in the 2009 Alternatives Analysis, the Draft EIS/EIR studied two Build Alternatives: the SR 60 LRT Alternative and the Washington Boulevard LRT Alternative along with the required No Build and Transportation System Management (TSM) alternatives (which may include enhancements to existing services and/or additional bus services). In response to public comments received on the Draft EIS/EIR, the Metro Board directed staff in November 2014 to undertake a technical study to address several issue areas: 1) continue studying the North Side Design Variation (NSDV) as part of the SR 60 LRT Alternative (SR 60 NSDV LRT Alternative) and address comments received from cooperating agencies, 2) eliminate the Garfield Avenue aerial segment between Via Campo and Whittier Boulevard and identify a new north-south connection from the existing MGL EE to the proposed alignment on Washington Boulevard, and 3) explore the feasibility of operating both LRT alternatives (**Figure ES-1**).

Figure ES-1: Metro Board Direction (November 2014)





SR 60 NSDV LRT Alternative

The technical study process undertook a coordinated design refinement effort to address potential conflicts between the SR 60 NSDV LRT Alternative and other plans and existing facilities (**Figure ES-2**). Much of the effort focused on the NSDV segment between Greenwood Avenue and Paramount Boulevard, which was modified to address several areas of concern. The City of Monterey Park expressed concerns that the original NSDV design might obstruct views of the MarketPlace development, a commercial development, under construction just north of the proposed NSDV alignment limits. Metro addressed these concerns by modifying the alignment geometry, lowering the grade profile in front of the proposed MarketPlace development, and relocating the proposed NSDV eastern flyover further east to mitigate the visual obstruction.

Additional design updates included a guideway realignment over the Paramount Boulevard on-ramp to avoid conflicts with the widened on-ramp currently under construction, per the request of the California Department of Transportation (Caltrans). In unincorporated East Los Angeles, the guideway alignment was refined by shifting the proposed retaining wall further east by approximately 350 feet to minimize visual obstruction to the AltaMed's PACE (Program of All-inclusive Care for the Elderly) facility on Pomona Boulevard at Hillview Avenue.

In addition, numerous technical investigations addressed issues arising from comments received from Cooperating Agencies, including:

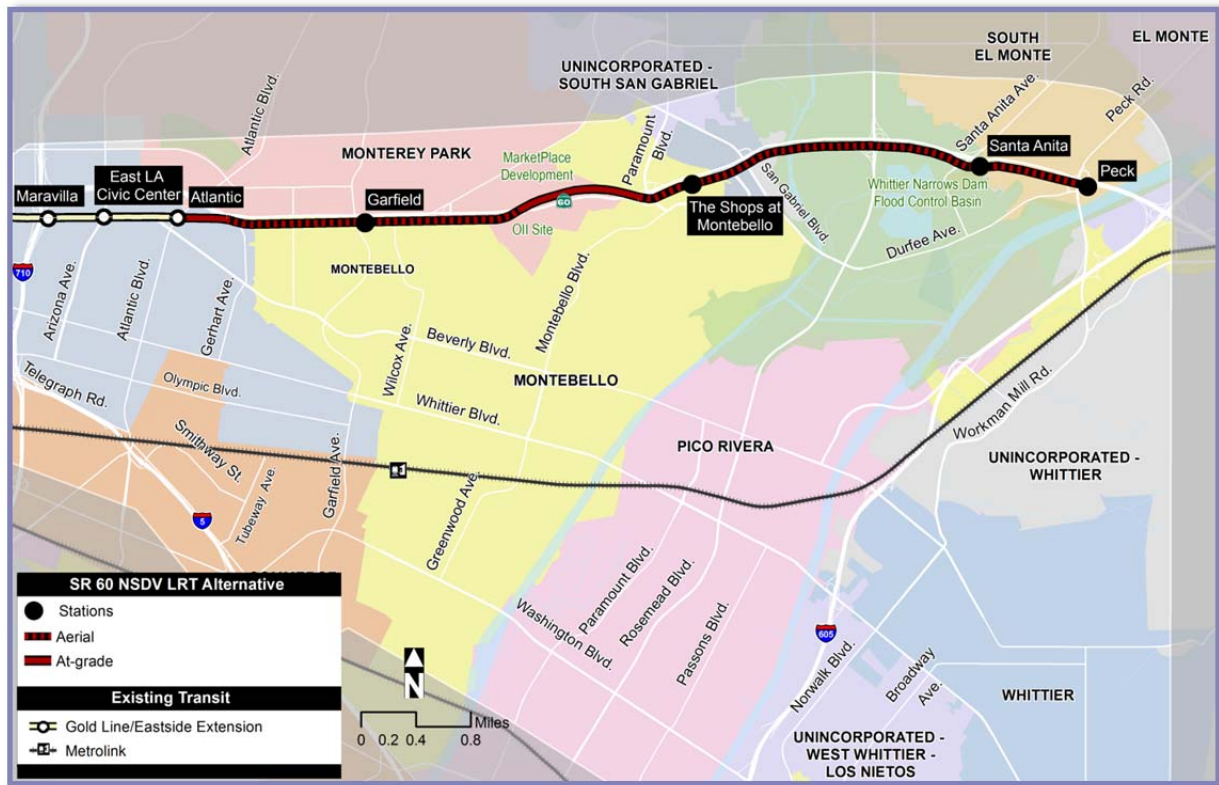
- Subsurface investigation along the western portion of the NSDV guideway alignment to initiate characterization of soil conditions, per the request by the United States Environmental Protection Agency (USEPA);
- Field surveys to confirm the height of Southern California Edison (SCE) transmission lines crossing SR 60 Freeway just east of Paramount Boulevard, to inform the development of a preliminary plan to raise the SCE transmission lines to a height sufficient to remove the clearance conflict, and to provide guidance on a conceptual design refinement to shift the end of line Peck Road Station west to avoid a conflict with transmission lines at the end of the alignment;
- Sensitive species, rare plants and jurisdictional waters surveys, per request by the California Department of Fish and Wildlife (CDFW);
- Advancement of the concept design of the proposed Santa Anita Station and park and ride facility to address issues related to flood management operational flexibility, per the request of the United States Army Corps of Engineers (USACE)

The study process also included extensive consultation with each of the key Cooperating Agencies, including the review of work plans, incorporation of technical feedback received and disclosure of preliminary findings.

Based on the technical investigations, design refinements and feedback received from Cooperating Agencies and key stakeholders, it is recommended that the Project Definition of the Draft EIS/EIR be updated to include the refined SR 60 NSDV LRT Alternative. The technical work performed on the SR 60 NSDV LRT Alternative modified the design of the proposed alignment to address Cooperating Agency comments to a degree sufficient enough to justify studying this refined alternative in a re-initiated environmental document.



Figure ES-2: SR 60 North Side Design Variation Light Rail Transit Alternative



Washington Boulevard LRT Alternative – North-South Connection

The route planning process started with 27 potential connection options to Washington Boulevard, including 17 options from the 2009 Alternatives Analysis (AA) study and 10 new options not previously considered. These route options were evaluated based on several factors including physical constraints, ridership, cost, travel time, access to major activity centers, economic development opportunities, Transit-Oriented Communities (TOC) potential, and consistency with community goals. Three routing concepts – Garfield, Atlantic and Arizona – stood out as most promising and moved into more detailed technical analysis. Three north-south connection options were shared at community meetings held in March 2016, June 2016, and February 2017.

The following discussion highlights key findings and recommendations, which were informed by technical analysis and feedback received from surrounding communities and stakeholders:

- **Garfield Routing Concept:** The design of a below-grade configuration along Garfield Avenue (Garfield Below-Grade Concept) would require a tight horizontal curve west of Via Campo and

North-South Routing Concepts





Wilcox Avenue, which could potentially impact the existing commercial site and the Ford dealership. South of this location, a tunnel would require the relocation of storm drains and sewer lines along Garfield Avenue. It would also require tunneling under a significant number of residential properties compared to other concepts. From a ridership standpoint, the catchment area around a proposed Metro station at Garfield Avenue and Whittier Boulevard lacks the intensity of activity typically associated with a subway station. Moreover, the alignment does not serve the Commerce Citadel and Casino area, the study area's highest ridership catchment area. The construction of a tunnel and station portal would also result in significant impacts during construction, including property acquisition, business disruption and traffic/circulation impacts near SR 60 Freeway. For these reasons, the Garfield Routing Concept was not recommended for further consideration as a potential north-south connection to Washington Boulevard.

- **Arizona Routing Concept:** Although Arizona Avenue is a wide street (108 feet curb-to-curb), it is located in a low-density residential district where on-street parking is an important community asset. A median-running at-grade LRT alignment configuration would require the removal of on-street parking, creating a significant hardship to residents along Arizona Avenue. A junction at 3rd Street and Mednik Avenue proposed to be located west of the existing East LA Civic Center Station and near Griffith Middle School, would pose significant operational challenges. A junction on Arizona Avenue would also necessitate demolition and shifting the LA Civic Center Station east of its current location to a location in close proximity to the Atlantic Station with potential property impacts to the northwest corner of Griffith Middle School.

A below-grade configuration on Arizona Avenue would avoid impacting on-street parking associated with an at-grade LRT configuration, but would require acquisition of numerous residences in the vicinity of 3rd Street and Mednik Avenue, where a large construction site to launch or extract a tunnel boring machine (TBM) and a permanent tunnel portal would be needed. Technical analysis has determined that a below-grade LRT portal and a rail junction on Arizona Avenue could not be constructed and operated without a substantial number of permanent residential property displacements. Due to these constraints along the Arizona Routing Concept, construction of an underground junction would not be feasible.

While there is some potential for economic development around a proposed Metro station at Arizona Avenue and Whittier Boulevard, the existing catchment area lacks the intensity of activity typically needed to justify the investment required for an underground Metro station. Based on the multitude of factors considered above, any LRT extension along Arizona Avenue would not be consistent with community priorities and goals. As a result, the Arizona Routing Concept was not recommended for further consideration as a potential north-south corridor connection to Washington Boulevard.

- **Atlantic Routing Concept:** Atlantic Boulevard features land use characteristics and activity levels well-suited for Metro Rail service. It is a dense commercial/retail corridor that is narrower than Arizona Avenue that intersects with the historic Whittier Boulevard corridor. The catchment area around Atlantic Boulevard and Whittier Boulevard is a vibrant hub of retail activity, and has strong economic development potential. Because Atlantic Boulevard is a major arterial corridor with heavy traffic, it is not a viable corridor for an at-grade LRT configuration, especially given the presence of numerous sensitive uses (schools and churches). A grade crossing analysis concluded that at-grade LRT would potentially result in significant traffic/circulation and access impacts that could not be mitigated. The Technical Study investigated the feasibility of a below-grade configuration (Atlantic Below-Grade Concept), which would connect the Atlantic Station to the thriving Whittier Boulevard commercial corridor and the commercial complex containing the Citadel Shopping Outlets, Commerce Casino and hotel in the City of Commerce, the study area's largest activity center. The Atlantic Below-Grade Concept would offer the benefit of avoiding numerous physical obstacles, including: the Mixmaster (the junction of Atlantic Boulevard, Triggs Street, Telegraph Road, and Union Pacific Railroad tracks), the AltaMed Headquarters



facilities on Camfield Avenue, the SCE transmission towers east of Tubeway Avenue and a number of Burlington Northern Santa Fe (BNSF) Railway rail spurs in the eastern part of the City of Commerce.

Several potential methods of constructing a rail tunnel include: launching a TBM from the south in the City of Commerce and extracting it from the north near Atlantic Boulevard and 3rd Street where a portal is needed to allow trains to daylight from a tunnel. This construction approach could significantly reduce the footprint needed for tunnel construction staging in East Los Angeles. Metro will continue coordinating with the City of Commerce in the next phase of the project to explore opportunity sites for a maintenance facility in the eastern part of the City of Commerce north of Washington Boulevard. For these reasons, the Atlantic Below-Grade Concept is the most promising north-south connection to Washington Boulevard.

The table below summarizes the screening results of the Washington Boulevard routing concepts – Arizona, Atlantic and Garfield – and compares them to the Washington Boulevard LRT Alternative in the Draft EIS/EIR.

Table ES-1: Screening Results of the Washington Boulevard Concepts

Factors	Draft EIS/EIR Washington Boulevard LRT Alternative	Arizona		Atlantic		Garfield
		At-Grade	Below-Grade	At-grade	Below-Grade	Below-Grade
Fundamentally Consistent with Community Goals/Priorities?	NO	NO	NO	NO	YES	NO
Operationally Feasible?	YES	NO	NO	YES	YES	YES
Ridership (Daily Boardings)*	19,920	17,280 to 18,680	18,270 to 19,770	17,950 to 19,280	19,610 to 21,070	19,120
Rough Order-of-Magnitude (ROM) Capital Costs (in 2010 \$)*	\$1.4 to 1.7 billion	+10% to +20%	+60% to +70%	+10% to +20%	+90% to +100%	+80% to +90%
Preliminary Travel Time (in minutes)	18-19 min.	20-21 min	18-19 min.	20-21 min.	17-18 min.	18-19 min.
Potential Traffic/Circulation Impacts	Minimal	Significant	Minimal	Significant	Minimal	Minimal
Recommendation						

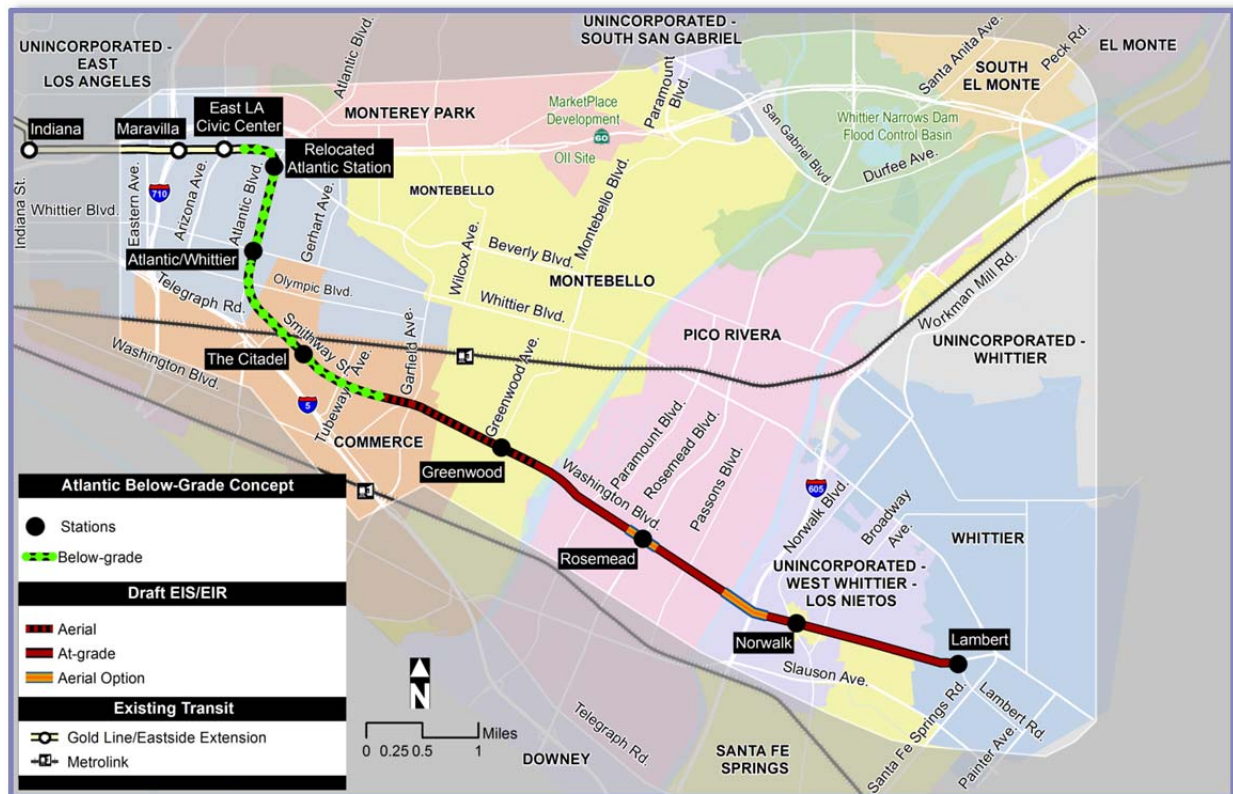
* Cost, travel time and ridership data is subject to change as design refinement and more detailed technical work continues.



The Arizona and Garfield Routing Concepts are fundamentally inconsistent with community goals and priorities. The Atlantic Below-Grade Concept (Figure ES-3) provides the most benefits when compared to other concepts studied for the Washington Boulevard LRT Alternative. The Atlantic Below-Grade Concept performs well on a number of key measures including projected high ridership (19,610 to 21,070 boardings), faster travel time (17-18 minutes), and best meets community goals by minimizing surface operational disruptions and providing connectivity to local and regional destinations and activity centers in East Los Angeles and the City of Commerce. For the above-mentioned reasons, the Atlantic Below-Grade Concept is being recommended for Board approval as part of the new Washington Boulevard LRT Alternative.

The Atlantic Below-Grade Concept would cost more than the Washington Boulevard LRT Alternative in the 2014 Draft EIS/EIR. The cost difference between the Draft EIS/EIR Baseline Alternative and the other route options is attributable to several factors, the most significant of which is the inclusion of below-grade segments. The length of the Atlantic Below-Grade Concept is about 8.8 miles, of which one third of the alignment could be a below-grade segment along Atlantic Boulevard in East Los Angeles and along Smithway Street in the City of Commerce. The cost of the below-grade segment would include elements such as underground stations and right-of-way acquisition near portal construction sites. Other factors include inflation adjustments and higher LRT construction costs in Los Angeles County, per recent construction bid prices reflecting more current market conditions. For these reasons, the cost of the Atlantic Below-Grade Concept is higher than those of the original Draft EIS/EIR Baseline Alternative.

Figure ES-3: Washington Boulevard LRT Alternative - Atlantic Below-Grade Concept



Combined Concept

A total of \$6.0 billion 3in 2015\$ (\$6.3 billion in 2017\$) is available per the Measure M 2016 Expenditure Plan for a first and second alignment of the Eastside Transit Corridor Phase 2 Project, of which \$2.89 billion is not available until after 2053. Initial funds to start construction of the initial segment of the project are scheduled to

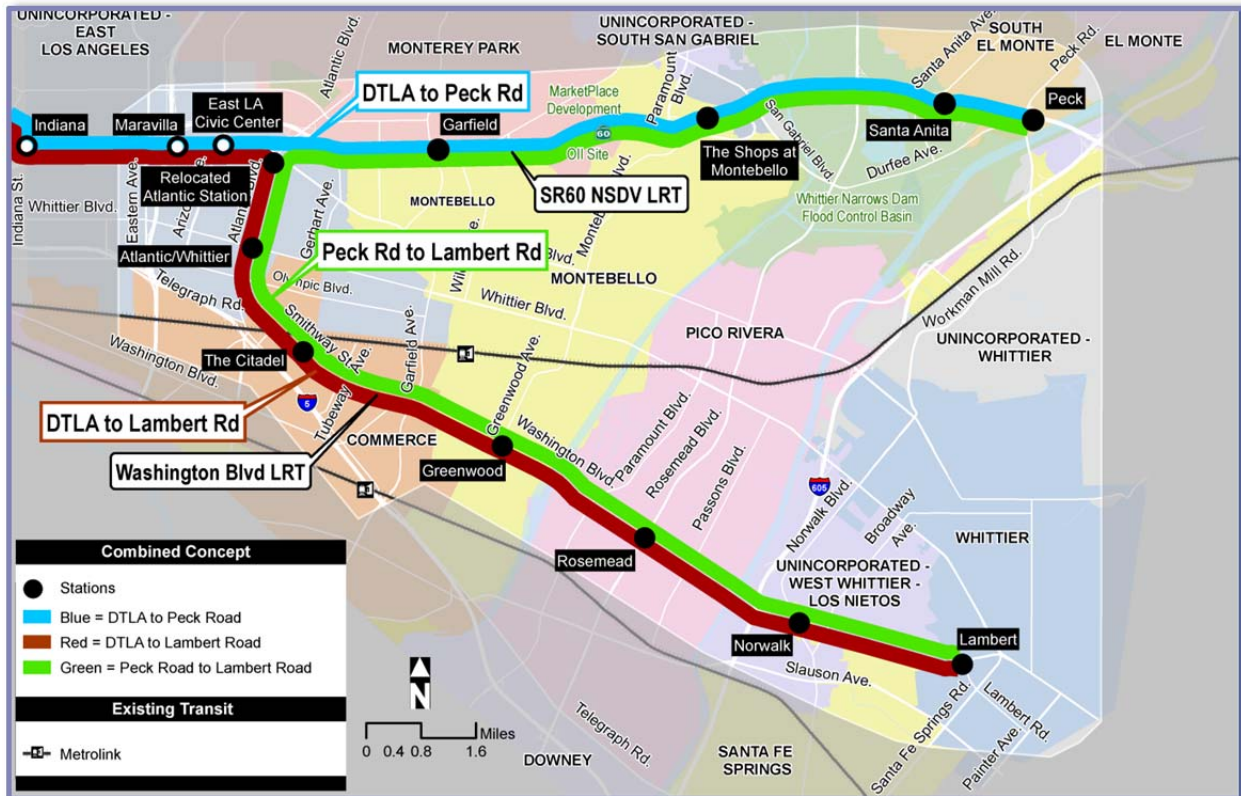


become available in 2029. Based on preliminary cost estimates, the total commitment of \$6.0 billion in 2015\$ (\$6.3 billion in 2017\$) could be enough to cover the cost of both LRT alternatives. The Technical Study explored the feasibility of operating both alternatives (SR 60 NSDV LRT Alternative and Washington Boulevard LRT Alternative), and it determined that operating both segments is feasible, but would require infrastructure and operational elements that would not be required if only one or the other alternative were operated as a 'stand-alone' line.

If both the SR 60 and Washington segments were built, only one maintenance facility would be needed to service rail vehicles operating on both lines. The exact location of the maintenance facility will be determined in the next phase of work but the maintenance facility will need to be assumed to be constructed as part of the first alignment constructed. A potential three-way or wye junction concept (similar to the planned operations at the Crenshaw Line/Green Line merge junction) would be needed to move all Eastside Transit Corridor Phase 2 Project trains serving both branches to a common maintenance facility. A wye junction, potentially below-grade, would allow patrons to travel to points along the SR 60 branch or the Washington branch to Downtown Los Angeles, thereby providing greater connectivity within the project area and to/from the greater Los Angeles region. Another benefit of a wye junction is that it could support a third line from South El Monte to Whittier, potentially allowing for 5-minute service on each branch.

As shown in the analysis, a Combined Concept, which includes both the SR 60 NSDV LRT and Washington Boulevard LRT Alternatives (**Figure ES-4**), has sufficient technical merit to be included as a new alternative in the updated Project Definition. Including the Combined Alternative in the re-initiated environmental process would be the only way to environmentally clear the below-grade wye junction, which would not be needed if only the SR 60 NSDV LRT Alternative or the Washington Boulevard LRT Alternative were built. The physical footprint and design of the rail junction and the associated operating plan will be developed in the next phase of the project.

Figure ES-4: Initial Combined Concept Map for Both Light Rail Transit Alternatives





Community and Stakeholder Outreach

Metro undertook an extensive outreach effort with numerous project stakeholders throughout the study area to provide project updates, receive feedback on the north-south connection options development process and seek feedback on the overall community engagement strategy. Metro held over 110 outreach meetings during the course of the Technical Study, including:

- 10 community meetings (including East Los Angeles (3 meetings), Whittier (2 meetings), Montebello (2 meetings), South El Monte (2 meetings), and Commerce (1 meeting))
- 30 briefings with SR 60 Coalition and Washington Boulevard Coalition, each on monthly basis
- 70 stakeholder briefings with East Los Angeles residents, businesses, neighborhood and community groups, local city staff or city council members, federal and state elected officials, chambers and business associations, major property owners/developers, Councils of Government and Service Councils in the San Gabriel Valley and Gateway Cities.
- Two tours of Metro maintenance facilities in Santa Monica and Monrovia

Metro staff recently provided project updates at five community meetings in February 2017 in the communities of Whittier, Montebello, South El Monte, City of Commerce, and East Los Angeles. A total of 318 persons attended the five meetings, and provided a valuable opportunity to receive critical feedback on the Technical Study findings and recommendations. In general, there is strong support for the Eastside Transit Corridor Phase 2 Project and for re-initiation of the environmental process, based on the recommended Project Definition.

Several key areas of consensus and themes emerged based on survey results and stakeholder and community comments. First, there was strong support expressed for the Atlantic Below-Grade Concept as the new Washington Boulevard LRT Alternative. Of the 235 respondents surveyed at the February 2017 community meetings, 63 percent agreed that the Atlantic Below-Grade Concept has sufficient merit to be recommended as the new Washington Boulevard LRT Alternative. This result was strongly corroborated by sentiments expressed at the community meetings, particularly from attendees who made comments at the East Los Angeles meeting on February 16, 2017. Secondly, there was openness to studying the Combined Concept in the next phase of work, as evidenced by the 50 percent of respondents who felt that the Combined Concept had enough merit to study in the next phase, plus an additional 16 percent of the respondents who expressed the Combined Concept may have some merit for further study.

Participants also supported the SR 60 NSDV LRT Alternative. Several attendees felt it could serve a robust east-west commuter market and have fewer impacts to residential community/businesses during and after construction. While there is strong support for the Eastside Transit Corridor Phase 2 Project overall, participants shared concerns regarding potential impacts during the construction, especially as it relates to traffic and business disruption and/or relocations. Participants also highlighted the importance of designing the stations with ease of access for pedestrians, bike riders and opportunities to park and ride.

Recommendations

An updated Project Definition is recommended for consideration for the Eastside Transit Corridor Phase 2 Project to study three alternatives in the re-initiated environmental clearance phase. The three alternatives are:

- a. SR 60 NSDV LRT Alternative
- b. Washington Boulevard LRT Alternative with Atlantic Below-Grade Concept
- c. Combined Alternative with both SR 60 NSDV LRT and Washington Boulevard LRT Alternatives with Atlantic Below-Grade Concept.



1.0 Introduction

1.1 Study Background

Metro released the Draft EIS/EIR for public comment in August 2014. The Metro Board directed staff in November 2014 to continue to study both alternatives with the following refinements: continue to study the NSDV as part of the SR 60 NSDV LRT Alternative (essentially eliminating the southern alignment traveling through the Operating Industries, Inc. (OI) Superfund Site and, eliminate the Garfield Avenue aerial segment of the Washington Boulevard LRT Alternative (from Via Campo to Whittier Boulevard, **Figure 1-1**).

The Metro Board directed additional studies to 1) initiate addressing public agency comments 2) identify a new north-south connection from the existing MGL to the proposed Washington Boulevard LRT Alternative at Garfield Avenue and Washington Boulevard (replacing the eliminated Garfield Avenue aerial segment between Via Campo and Whittier Boulevard), and 3) explore the operational feasibility of a Combined Concept including operating both LRT Build Alternatives simultaneously. This report documents the recommendations and findings from the additional engineering design studies and community outreach effort.

Figure 1-1: Eastside Transit Corridor Phase 2 Project Alternatives Studied in 2014 Draft EIS/EIR



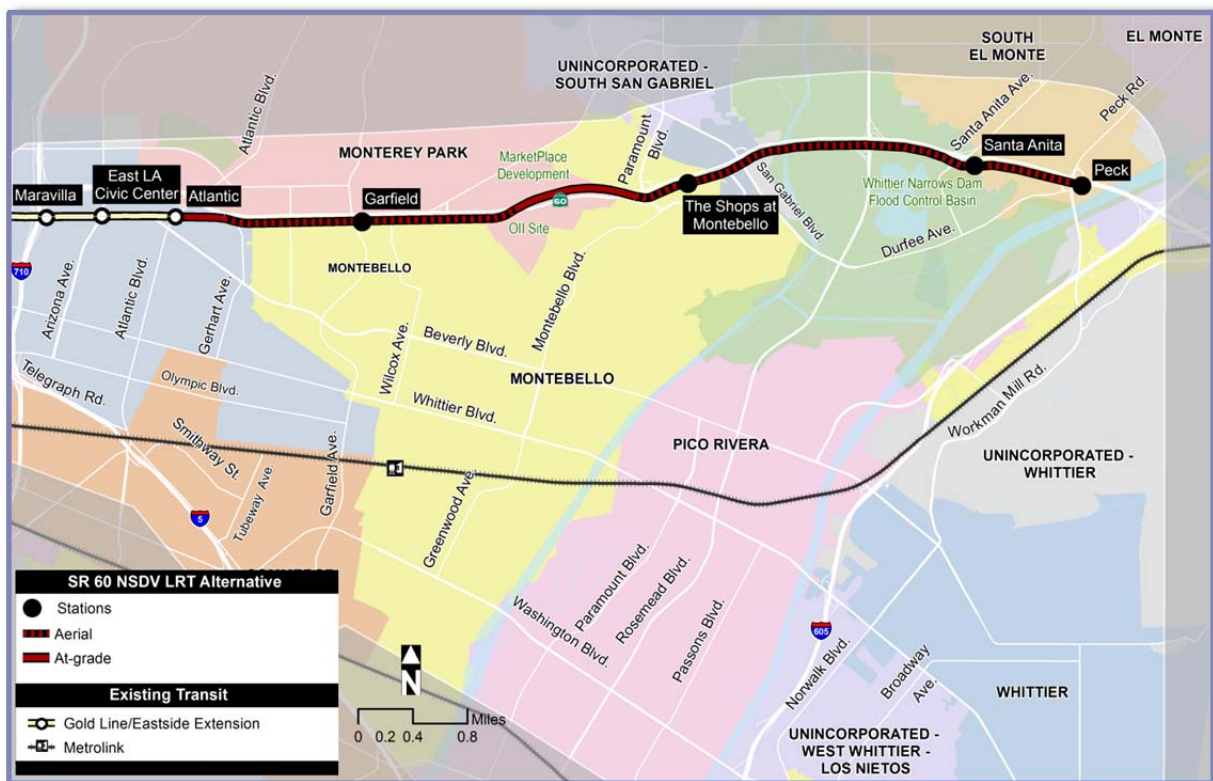
2.0 SR 60 North Side Design Variation Light Rail Transit Alternative Technical Studies

The scope of the technical study included numerous technical investigations and design refinements in response to comments raised by Participating and Cooperating Agencies on the Draft EIS/EIR for the project. This section summarizes the technical studies in response to comments provided by the Caltrans, USEPA, USACE, the CDFW, and SCE for the SR 60 NSDV LRT Alternative.

2.1 SR 60 North Side Design Variation Light Rail Transit Alternative Description

The SR 60 NSDV LRT Alternative, as evaluated in the Draft EIS/EIR, would extend the existing MGLEE from the Atlantic Station, approximately 6.9 miles eastward, to Peck Road in the city of South El Monte. Primarily, it is an aerial alignment with four potential aerial stations: Garfield Station, The Shops at Montebello Station, Santa Anita Avenue Station, and Peck Road Station (**Figure 2-1**). The SR 60 NSDV LRT Alternative alignment would be located primarily along the southern side of the SR 60 Freeway right-of-way (ROW), with the exception of a segment that passes near the Oil Superfund Site in Monterey Park. To avoid potential impacts to the south parcel of the Oil Superfund Site, the SR 60 NSDV LRT Alternative alignment would transition to the north side of the SR 60 Freeway, just west of Greenwood Avenue, continue east within the Caltrans ROW, and then return to the south side of the SR 60 Freeway west of Paramount Boulevard.

Figure 2-1: SR 60 North Side Design Variation Light Rail Transit Alternative



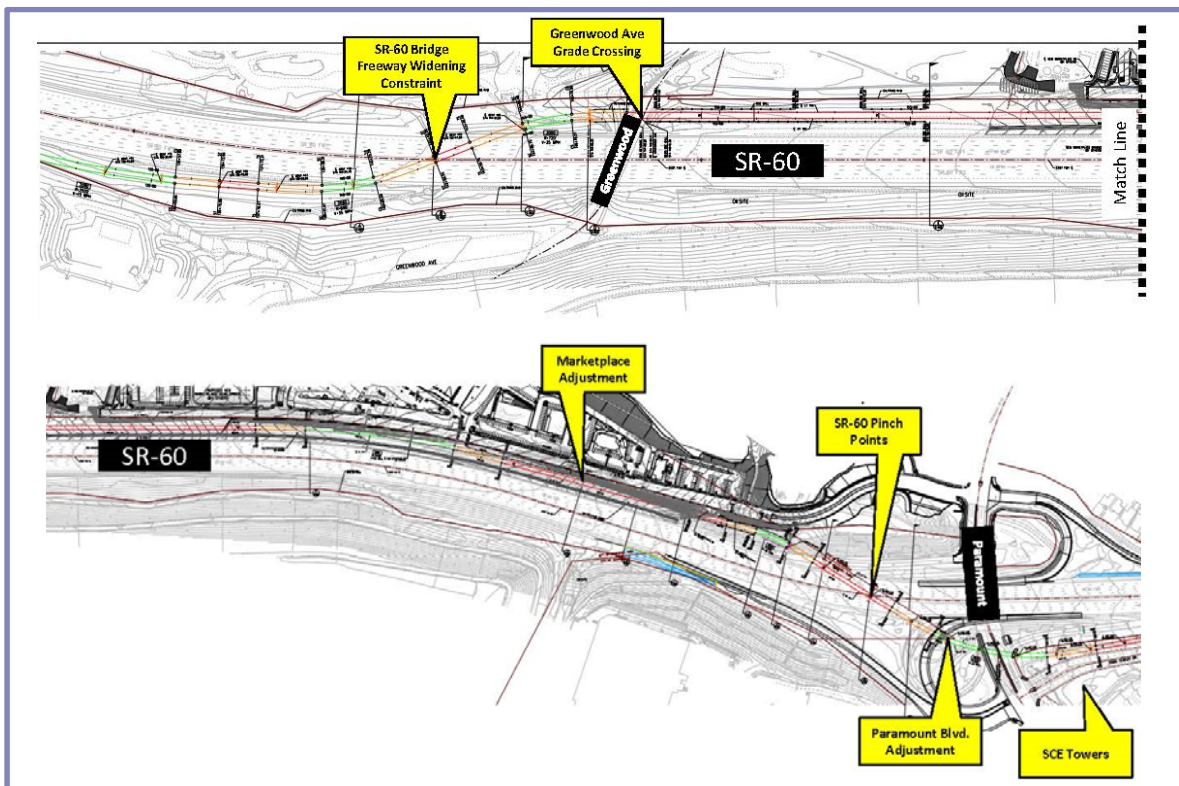
2.2 SR 60 North Side Design Variation Light Rail Transit Alternative Conflicts

2.2.1 SR 60 Right-of-Way Issues

Caltrans submitted comments on the 2014 Draft EIS/EIR and identified two primary concern areas for further study: 1) The implications of the SR 60 NSDV bridges on the ability to add HOV lanes in the future (pinch points) while bringing existing general purpose lanes up to Caltrans current standards; 2) physical conflicts with the new Paramount Boulevard Overcrossing Project (**Figure 2-2**).

Metro and Caltrans held multiple coordination and update meetings throughout the process and conducted conceptual engineering to address these concerns. The technical analysis and discussions with Caltrans resulted in the following refinements to the SR 60 NSDV LRT Alternative²:

Figure 2-2: NSDV Issue Area Locations



- SR 60 Freeway Widening Pinch Points Analysis:** Caltrans raised concerns on September 17, 2015 about how the proposed NSDV alignment may impose non-standard design elements and impact their feasibility for future widening of the SR 60 Freeway. The analysis of the existing SR 60 Freeway within the NSDV project limits found that several existing freeway features do not meet the design standards listed in the current Highway Design Manual. These non-standard features are listed in the Non-Standard Design Features tables of the SR 60 NSDV Caltrans Non-Standard Elements and Pinch Points Technical Memorandum.³ Metro’s project team developed cross-sections along the NSDV segment and analyzed the limits of the NSDV at various pinch points locations. Existing and future non-standard elements that may potentially be imposed with the construction of the NSDV alignment were identified. There were three key findings from the pinch points analysis:



- o Eastbound (EB) SR 60: Widening the shoulder to a standard width may be feasible; however, adding standard 12 foot lane will not be feasible. The proposed structure support of the NSDV alignment could potentially reduce stopping sight distance in the EB direction and may require Caltrans' review of design exception.
 - o Westbound (WB) SR 60: One standard (12 foot) lane and a standard shoulder can potentially be added on the north side of the freeway. The construction of the proposed LRT structure would not impact the existing stopping sight distance in the WB direction.
 - o Construction: If the SR 60 NSDV LRT Alternative design is advanced, then additional coordination with Caltrans would be necessary to establish traffic handling and construction sequencing methodology.
- **Paramount Boulevard Bridge Restoration Project Conflict:** Caltrans provided computer-aided design and drafting (CADD) reference files of the proposed Paramount Boulevard Interchange design improvements project to ensure consistency with the NSDV alignment. These CADD files were overlaid on the NSDV alignment proposed in the Draft EIS/EIR, which helped identify potential conflicts with Caltrans' plans (Figure 2-3). The SR 60 NSDV alignment was modified to place columns of aerial structure in locations that no longer conflict with new SR 60 Freeway ramps at Paramount Boulevard.

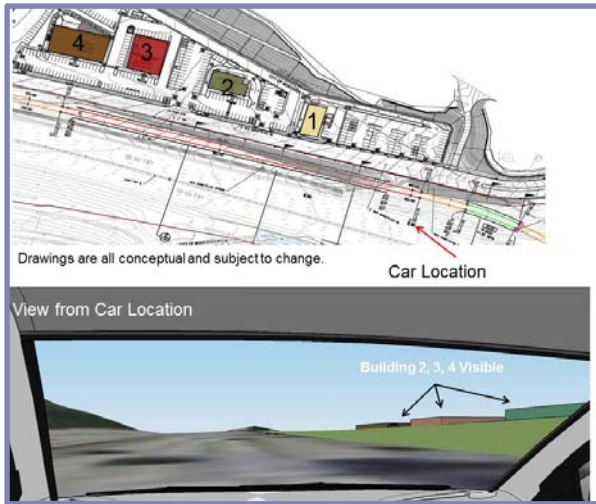
Additional coordination with Caltrans will be required in the next study phase to refine the NSDV concept to minimize the potential impact to Caltrans' operations.

Figure 2-3: SR 60 Freeway Paramount Boulevard Interchange and SR 60 NSDV Design Refinements



2.2.2 MarketPlace Development

Monterey Park Retail Partners, LLC is currently constructing the MarketPlace development in the City of Monterey Park on the OII North Parcel, just north of the proposed SR 60 NSDV LRT Alternative alignment. The City of Monterey Park expressed concern that the SR 60 NSDV LRT Alternative may block the view of the MarketPlace development. The developer is re-grading and reducing the existing berm on the north side of the SR 60 Freeway as part of this project.



Visual Simulation of the MarketPlace

The study reviewed the MarketPlace development and revised the SR 60 NSDV LRT Alternative alignment. The study team also refined the design of the LRT alignment to follow as closely, as possible, the new MarketPlace grading design, thereby avoiding property impacts and minimizing potential visual impacts from drivers traveling along the SR 60 Freeway looking towards the MarketPlace development. This refinement shifted the bridge structure further east closer to Paramount Boulevard and lowered the mechanically stabilized earth (MSE) wall height. The design was also refined to avoid conflicts with Caltrans' proposed Paramount Boulevard Overcrossing Project. This refinement assumed a four percent track profile grade for 900 feet with a transition near the easterly end of the proposed MarketPlace development north of the SR 60 Freeway. The profile depression in this area would decrease the height of proposed retaining structures required to carry the new alignment.⁴

2.2.3 Conflicts with SCE Transmission Lines

SCE's comments on the 2014 Draft EIS/EIR raised concerns about the potential conflicts between the alignment and various SCE infrastructure and transmission lines. Metro and SCE held discussions and exchanged engineering drawings during meetings held on November 3, 2015, February 1, 2016, and June 6, 2016. Based on SCE's review, their remaining concerns pertained to clearances and ROW impacts at specific locations described below. Metro addressed these concerns by conducting a new wire survey to assess the height of the existing wires and evaluated the following clearances from Top of Rail (TOR) to the transmission lines along the SR 60 NSDV LRT Alternative and Washington Boulevard LRT Alternative alignments, based on SCE's input. The analysis relied on established clearance requirements from the California Public Utilities Commission (CPUC) General Order 95 (GO-95). GO-95 mandates a minimum clearance of 41' for 500 kV lines and 34' for 220 kV lines and less during normal and broken wire conditions.

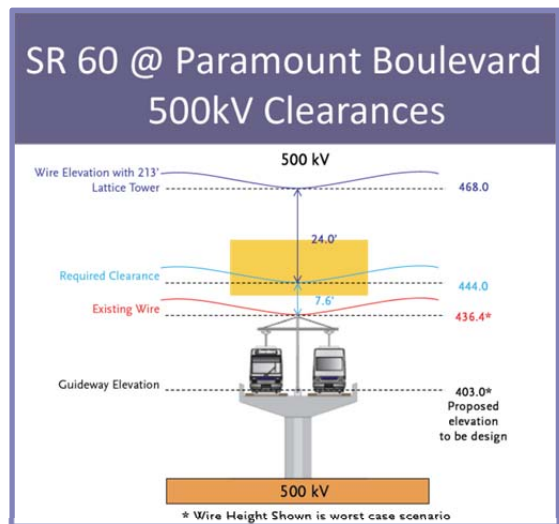


Diagram of SCE 500 kV Wire Clearance Needs

The following describes the specific locations of potential conflicts using the CPUC clearance requirements and proposed mitigations where conflicts arise.⁵

SR 60 Paramount Boulevard Interchange Wire Study:

- The proposed aerial guideway crossing under SCE 500KV, 220KV, and 66KV wires do not conform to CPUC clearance requirements. Based on the wire survey and consultation with SCE, it is recommended that new taller transmission poles be constructed to raise transmission lines in order to provide more than sufficient clearance to meet requirements established by CPUC. The proposed mitigation to meet the required clearance for the 220 kV transmission lines would require raising and transferring the existing wires to a new 198' standard tubular steel pole (approximately 10-12' diameter). The proposed mitigation to meet the required clearances for the 500kv transmission lines would raise and transfer the existing wires to a new



213' lattice tower (approximately 50' by 50'). The lattice tower would comply with Federal Aviation Administration (FAA) requirements to provide flashing lights on top of towers greater than 200' in height. The proposed mitigation to meet the required clearances for the 66kv transmission lines would raise and transfer the existing wires to a new 170' standard tubular steel pole. The proposed tower heights are conceptual and are subject to change as efforts are made to mitigate the heights of the tower. Further detailed designs will be developed and reviewed by SCE.

- In the next phase of work, Metro would need to analyze the ROW and grading requirements for the proposed transmission towers to determine whether the existing SCE property can accommodate the new structures or if property acquisition is necessary to accommodate the new structures.

SR 60 Peck Road Tail Track Study:

- The design drawings of the Peck Road Station tail track developed during the Draft EIS/EIR phase do not conform to the most current CPUC clearance requirements for the SCE 500 kV, 220 kV, and 66 kV Wires. To address this issue, the project team modified the design concept for the Peck Road station and shifted the Peck Road Station and tail track locations west so that the aerial guideway does not encroach onto SCE ROW. This proposed design refinement would no longer have any conflict that would require CPUC clearances.

Finding

Field surveys were conducted to confirm the height of SCE transmission lines crossing the SR 60 Freeway just east of Paramount Boulevard and inform the development of a preliminary plan to raise the SCE transmission lines to a height sufficient to remove the clearance conflict. At Peck Road Station, the proposed design refinement to the station location and tail track location are expected to fully resolve the clearance issue.

2.2.4 AltaMed

Metro staff received feedback from AltaMed, a community medical provider, who identified an issue for medical vehicles to access their facility along Pomona Boulevard due to the location of the MSE wall for the guideway transition. To mitigate this issue, the design proposes to shift the start of the MSE wall structure east of the AltaMed facility building to provide a medical vehicle loading area in front of the main facility (**Figure 2-4**).⁶

Figure 2-4: New Beginning Location of Retaining Wall on Pomona Boulevard



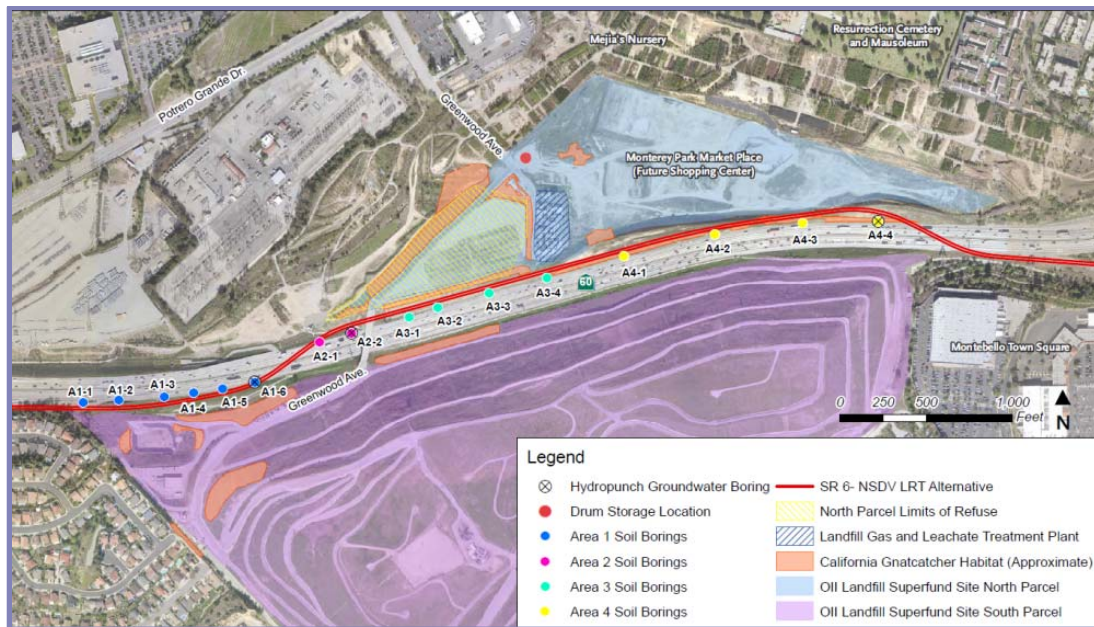


2.2.5 OII Superfund Studies

USEPA requested additional technical studies to address uncertainties associated with potential environmental impacts prior to the project moving forward, including: fill integrity, potential for hazardous waste releases and impacts to groundwater. In addition, there was concern regarding the crossing at the Greenwood Bridge, considering this was the only access to their facility south of the SR 60. To address USEPA comments, a subsurface investigation was conducted in summer 2016 along the Caltrans SR 60 Freeway ROW near the NSDV portion of the SR 60 NSDV LRT Alternative. Additional technical efforts included a grade crossing analysis and grade separation studies at Greenwood Bridge. Metro also held multiple coordination and update meetings with USEPA throughout the process. A separate hazardous materials report and geotechnical report were prepared in response to USEPA's concerns.

The subsurface investigation consisted of surface geophysical surveys, 14 lithologic soil borings, and soil and groundwater sample collection for laboratory analyses in three areas along the NSDV portion of the SR 60 NSDV LRT Alternative within the Caltrans ROW (Figure 2-5).

Figure 2-5: Tunnel Boring Locations along SR 60 near OII Site



Hazardous Material Investigation

The primary objective of the subsurface investigation was to address the hazardous material concerns USEPA raised during the comment period. Specifically, USEPA requested that Metro:

- Identify hazardous materials and limits of landfill waste, if any, along the SR 60 NSDV LRT Alternative in proximity to the OII Superfund site
- Assess the depth to groundwater and water quality to investigate potential impacts of construction of the SR 60 NSDV LRT Alternative, including pile construction and associated construction dewatering; and
- Identify potential conflicts of the SR 60 NSDV LRT Alternative on existing perimeter liquids control containment systems at the OII Superfund site

These soil investigations identified native sediments and fill material in lithologic soil samples. None of the soil borings encountered landfill debris. Native material consisted primarily of sandy gravel with silty sandy gravel



layers with occasional white mottling due to mineralization. The fill material consisted mainly of clays and native sediments that were likely redistributed during construction of the SR 60 Freeway and/or imported for the backfill of the USEPA North Parcel remedy excavation (Consent Decree – 3).

The following highlights emerged from the survey results:

- Surface soil lead results from the six surface samples collected in Area 1 are indicative of non-hazardous soil that could be used as fill with no requirements. A separate aerially deposited lead (ADL) study would be needed to confirm levels in a specific excavation area in the next phase of the project if SR 60 NSDV LRT Alternative is carried forward in the environmental process.
- Slightly elevated concentrations of arsenic, chromium, and thallium were present in subsurface soil samples in Areas 1, 3, and 4 (5 feet bgs or deeper). Concentrations of these three metals exceeded one or more of their respective screening criteria. The screening criteria were intended for guidance and decision making, not as cleanup action levels. The screening criteria included an assumption of commercial/industrial worker exposure scenarios, which is very conservative for LRT passengers passing through the OII Superfund site corridor. Slightly elevated concentrations of all three metals appear to be consistent with regional values for natural soil, and likely represent background concentrations of these naturally occurring compounds.
- Three Volatile Organic Compounds (VOCs) (PCE, TCE, and 1,1,2-TCA) and nickel were detected at concentrations slightly exceeding screening criteria in the one groundwater sample in Area 1. These detections confirm that moderate impacts to groundwater from landfill waste exist in the vicinity; however, groundwater would not be considered Federal or State hazardous waste. Any groundwater extracted or handled during the construction of the LRT would require management and disposal as non-hazardous material; such management measures were included as mitigation.
- If pilings or piers to support the LRT freeway crossings in Areas 1 and 2 are installed by the Cast In Drilled Hole (CIDH) method, soil and groundwater within the drilled hole would need to be removed, and temporary dewatering may be necessary. All water and soil removed from the excavation would require containment and disposal and/or treatment as non-hazardous waste. If the pilings/piers in Areas 1 and 2 are installed by the torqued-down method, no groundwater or soil would be removed and no containment or disposal would be required.
- No, or negligible, impacts to the perimeter liquids control system located at the eastern end of the South Parcel would be anticipated. Groundwater dewatering would be temporary and would occur one time during construction. Therefore, no long-term impacts to the perimeter liquids control system would be expected.

Finding

The results of the soil survey reveal that the soil is not considered hazardous waste and soil samples did not contain landfill material. This investigation identified additional studies and strategies that would avoid or reduce potential environmental or health impacts if the SR 60 NSDV LRT Alternative is selected for further study. The studies include additional geophysical survey, ADL assessment, site investigation, and development of a construction management and material handling plan (CMMHP).



Soil Sampling and Logging



Geotechnical Investigations

Additional geotechnical sampling helped to characterize subsurface conditions and to evaluate the integrity of the fill in the vicinity of the OII site to support the SR 60 NSDV LRT Alternative.

The SR 60 NSDV LRT Alternative would be an aerial structure with columns supported on piles on the north and south side of the SR 60 Freeway at the LRT crossover (west of Greenwood Avenue). These piles would derive most of their support from the native soils below the fill. Project contractors drilled six (6) borings in this segment along the south shoulder of the SR 60 Freeway. The contractor did not excavate on the north side of the freeway west of Greenwood Avenue due to traffic safety concerns and utility conflicts, in concurrence with Caltrans and USEPA.



Drilling for a Soil Boring

The following highlights emerged from the survey results:

- The fill thickness along the south side of the SR 60 Freeway west of Greenwood Avenue varied from eight (8) feet to greater than 21.5 feet thick. The equivalent Standard Penetration Test (SPT) blowcounts (N values) ranged from 5 to more than 40 blows per foot (bpf), with most values ranging between 10 and 30 bpf. These values indicated that the fill conditions range from loose to dense. These investigations encountered lower blowcounts near the western limit of the study area. Some areas under the south shoulder of the freeway may not have been compacted well. All structure foundations west of Greenwood Avenue will be pile supported. Current subsurface conditions encountered would not hinder pile foundations. Further details for the design of deep foundations would be addressed during future phases of the project if the SR 60 NSDV LRT Alternative is carried forward in the environmental process.
- Some historic landslides have been previously noted near the westerly end of this segment. Analyses of landslides or seismic risks were not a part of this evaluation. If the SR 60 NSDV LRT Alternative is carried forward in the environmental process, additional planning level subsurface investigations and evaluations will be needed, followed by more detailed geotechnical work at the design level.
- Immediately east of Greenwood Avenue, the NSDV tracks would be supported on MSE embankment fill or at-grade. Four (4) borings were drilled along the north shoulder of the freeway within this segment, near the previous North Parcel removals. Four (4) additional borings were drilled along the north shoulder of the freeway, further east, before the alignment transitions back to the south side. Fill within this area is reasonably well-compacted as evidenced by the relatively high SPT N values (generally greater than 20 bpf) and appears to have been placed in accordance with current engineering and construction standards. The fill is considered adequate to support the MSE embankment in this segment from a geotechnical perspective. Further evaluation would be performed during future phases of the project if the SR 60 NSDV LRT Alternative is carried forward in the environmental process.

Finding

The geotechnical investigations indicated that the fill in the vicinity of Greenwood Avenue is reasonably adequate and it would not hinder the design and construction of the SR 60 NSDV LRT Alternative. Metro would apply generally accepted geotechnical engineering standards during future planning, design and construction to accommodate the project needs.

Greenwood Bridge Crossing

USEPA raised concerns that the placement of an at-grade rail crossing at Greenwood Avenue would affect the existing access to the OII Superfund site. Using the Metro Grade Crossing Safety Policy (2010), the analysis



concluded that at-grade operations for the alignment would be feasible, taking into consideration the existing and anticipated future traffic volumes on Greenwood Avenue. There is neither an apparent sight distance issue nor a queuing issue with the proposed at-grade crossing. The analysis recommended that Metro develop and implement an emergency operations plan prior to the commencement of LRT operations. The plan would outline the required protocols for direct communication among landfill operators, first responders in the area, and Metro's Rail Operations Center and/or Emergency Security Operations Center to control LRT operations in the event of an emergency at the landfill that requires either 1) emergency vehicle access to the site, or 2) evacuation of the site.

In addition, Metro investigated the feasibility of a potential grade separation at Greenwood Avenue by constructing a structure beneath the road allowing LRT trains to traverse beneath the Greenwood Bridge. This investigation evaluated three potential structure types, including: a concrete slab bridge supported on high cantilevered abutments, a cast-in-place concrete box structure; and a prefabricated proprietary system for the superstructure. A grade separation at Greenwood would require reconstructing of the existing Greenwood bridge abutment and utility relocation. Metro shared the findings of the underpass study with USEPA and USEPA concurred that a grade separation at Greenwood may require disturbing the buried waste and, therefore, it would be a "No-Go."

Metro does not recommend the three underpass designs for further study due to the findings of the grade crossing analysis and the constraints of the site related to existing sensitive below-grade facilities.⁷

Finding

The results of the Milestone 1 Grade Crossing analysis and the Underpass Study indicate that an at-grade LRT crossing would be feasible at Greenwood Avenue and a grade separation would not be required. This is due to low traffic volumes (approximately 30 cars – mostly trucks - per peak hour lane), which did not meet Metro's Grade Crossing Safety Policies requiring grade separation.

2.2.6 Whittier Narrows Flood Basin

A portion of the SR 60 NSDV LRT Alternative passes through the Whittier Narrows Flood Basin (**Figure 2-6**), including approximately 1.6 miles of aerial guideway and an aerial station at Santa Anita Avenue. The Whittier Narrows Flood Basin is a water conservation storage area which collects uncontrolled drainage from the Rio Hondo and San Gabriel Rivers. The basin area has recreational areas for public use as well as natural areas with no public access. USACE, the managing agency, provided comments on the Draft EIS/EIR presenting concerns of permanent impacts to the flood basin due to the proposed project. Metro held coordination meetings with USACE to discuss the approach and data available to respond to USACE comments on the Draft EIS/EIR.⁸ In the next phase of the project, Metro will continue to work with USACE for preparation of a whitepaper that outlines the Section 408 permit requirements for the proposed Eastside Transit Corridor Phase 2 project in compliance with the USACE Section 14 of the Rivers and Harbors Act of 1899 and codified in 33 U.S. Code 408 (Section 408). In order to grant permission under Section 408, USACE must determine that the proposed alteration does not impair the usefulness of the USACE Project or be injurious to the public interest.



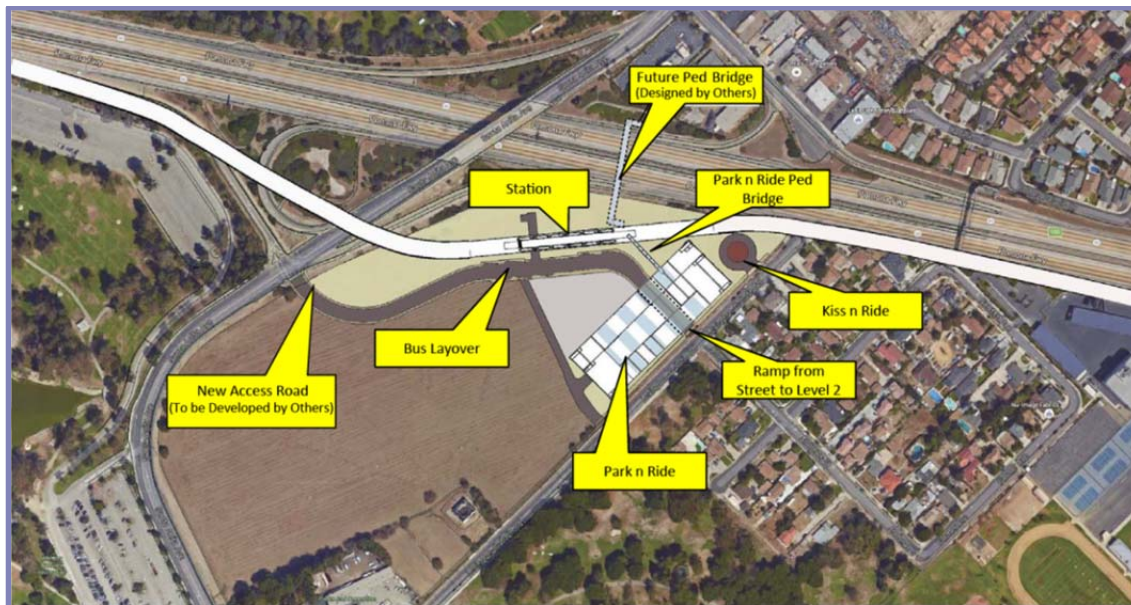
Figure 2-6 : Whittier Narrows Dam Flood Control Basin



2.2.7 Santa Anita Avenue Conceptual Station Design

USACE raised concerns regarding evacuation at the proposed Santa Anita Avenue Station during a flood event. A design refinement of the project alignment, station and adjacent park-and-ride structure addressed these concerns. This refinement included adding an access point to the platform from the access road (to be developed by others). The updated design also featured an elevated parking structure with no parking on the ground level while the Lexington-Gallatin Road entrance would include a ramp leading directly to the second level. Other design elements include a pedestrian connector walkway from the parking structure to the LRT platform. **Figure 2-7** illustrates the modified design.

Figure 2-7: Santa Anita Avenue Conceptual Station Design





Finding

Metro presented a refined conceptual design of the proposed Santa Anita Avenue Station to USACE for review. Although Metro is not requesting approvals during this phase of work, the refined design is progressing with USACE involvement and coordination. Metro staff will continue to coordinate with USACE on project refinements and to obtain regulatory approvals should the Metro Board select this alternative to progress into the next phase of work.

2.2.8 Sensitive Habitats

CDFW’s comments focused on rare natural communities, the area of potential effect used in the Draft EIS/EIR, sensitive species, state and federal-listed species, vegetation mapping, rare plants, impacts to Waters of the State, and the adequacy of mitigation. Metro held a pre-survey coordination meeting with CDFW and conducted additional biological surveys in May 2016. An additional study conducted thereafter provided an additional evaluation of potential impacts on terrestrial and aquatic resources from proposed construction and operation of the two Build Alternatives based on the results of the survey.



SR 60 Freeway Crossing over Rio Hondo

For the terrestrial resources evaluation, field activities included mapping of vegetation communities, assessment of potential habitat for state and federally listed species, and focused surveys for sensitive wildlife species, rare and natural communities, and rare plants. This evaluation utilized a separate evaluation (conducted by others in 2016) of protocol-level surveys for federally listed species within the project area. Project staff conducted a wetland investigation along both Build Alternative alignments as part of the aquatic resources evaluation.

Based on the evaluation, construction of the SR 60 NSDV LRT Alternative would result in temporary and permanent impacts to vegetation, including one sensitive vegetation community (coastal sage [California buckwheat] scrub). Approximately 1.6 acres of coastal sage scrub would be temporarily impacted and 2.8 acres would be permanently impacted. Construction and future maintenance activities could potentially impact federally listed wildlife species, including California gnatcatcher and Least Bell’s vireo. Construction and maintenance activities may also potentially create impacts on bats and migratory birds. The spread of invasive plants could also occur during construction of the project, which would result in impacts.

Finding

This study identified mitigation measures that would be required during construction and maintenance activities for the SR 60 NSDV LRT Alternative to avoid or reduce impacts on vegetation communities, federally listed wildlife species, bats, and migratory birds. Other identified mitigation measures would reduce impacts from the spread of invasive plant species. Compensatory mitigation would likely be required for the permanent loss of coastal sage scrub vegetation.

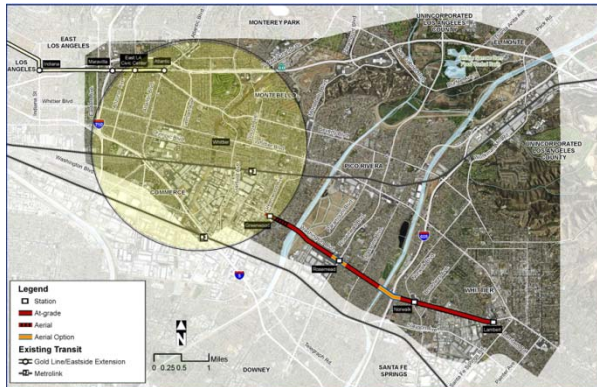
The study also delineated wetlands and waters of the State and U.S. within the area adjacent to the Rio Hondo channel at the SR 60 Freeway crossing over the Rio Hondo.

Based on the delineation and construction information known at this time, this study determined that no temporary impacts on wetlands or waters would result from construction of the SR 60 NSDV LRT Alternative. The design of the SR 60 NSDV LRT Alternative alignment would avoid permanent impacts on wetlands and waters. Columns supporting the aerial track across the Rio Hondo would be placed outside of the river channel and the associated riparian zone. The aerial track would also span the river channel itself such that there would be no permanent impacts below an elevation of approximately 205 feet.



3.0 Washington Boulevard Light Rail Transit Alternative Technical Study

3.1 Washington Boulevard Light Rail Transit Alternative



The Metro Board eliminated the aerial segment of the Washington Boulevard LRT Alternative along Garfield Avenue between Via Campo and Whittier Boulevard from further consideration upon reviewing comments received on the Eastside Transit Corridor Phase 2 Draft EIS/EIR. This study focuses on identifying a new north-south connection from the existing MGLTE to the Washington Boulevard LRT Alternative segment that runs from Garfield Avenue (south of Whittier Boulevard) and Washington Boulevard to Lambert Road.

The segment of the Washington Boulevard LRT Alternative (along Washington Boulevard between

Garfield Avenue and Lambert Road) would remain the same as defined in the Draft EIS/EIR. The Draft EIS/EIR defined this segment as an aerial alignment returning to an at-grade configuration just east of Greenwood Avenue. From Greenwood Avenue, the alignment would remain at-grade within the center median until Lambert Road with stations at Greenwood Avenue, Rosemead Boulevard, Norwalk Boulevard and Lambert Road.

3.2 North-South Washington Boulevard Light Rail Transit Alternative Concepts

The route concept study began with 27 potential routing concepts, as documented in the *Washington Boulevard Routing Concept and Community Outreach Report* (May 2016).⁹ This report recommended further study of three routing concepts for conceptual engineering analysis along Garfield Avenue, Atlantic Boulevard, and Arizona Avenue. The evaluation conducted therein eliminated other corridors from consideration primarily because of narrow street geometries, incompatibility with community priorities and cumulative impacts to sensitive receptors. The following section provides a detailed description and discussion on the three north-south routing concepts for the Washington Boulevard LRT Alternative. These routing concepts then underwent a secondary round of screening (**Figure 3-1**).

The *Assessment of North-South Washington Routing Concepts Technical Memorandum* (January 2017)¹⁰ further defines and evaluates the Garfield, Atlantic and Arizona routing concepts (**Figure 3-2**). This study included conceptual engineering and a planning analysis and presented a summary of stakeholder and outreach activities, comparative evaluation of routing concepts and a recommendation of a concept for further study. **Table 3-1** details the evaluation criteria used to screen the potential routing concepts and to arrive at a recommended concept.



Figure 3-1: Universe of Potential Routing Concepts for the North-South Washington Boulevard Light Rail Transit Alternative

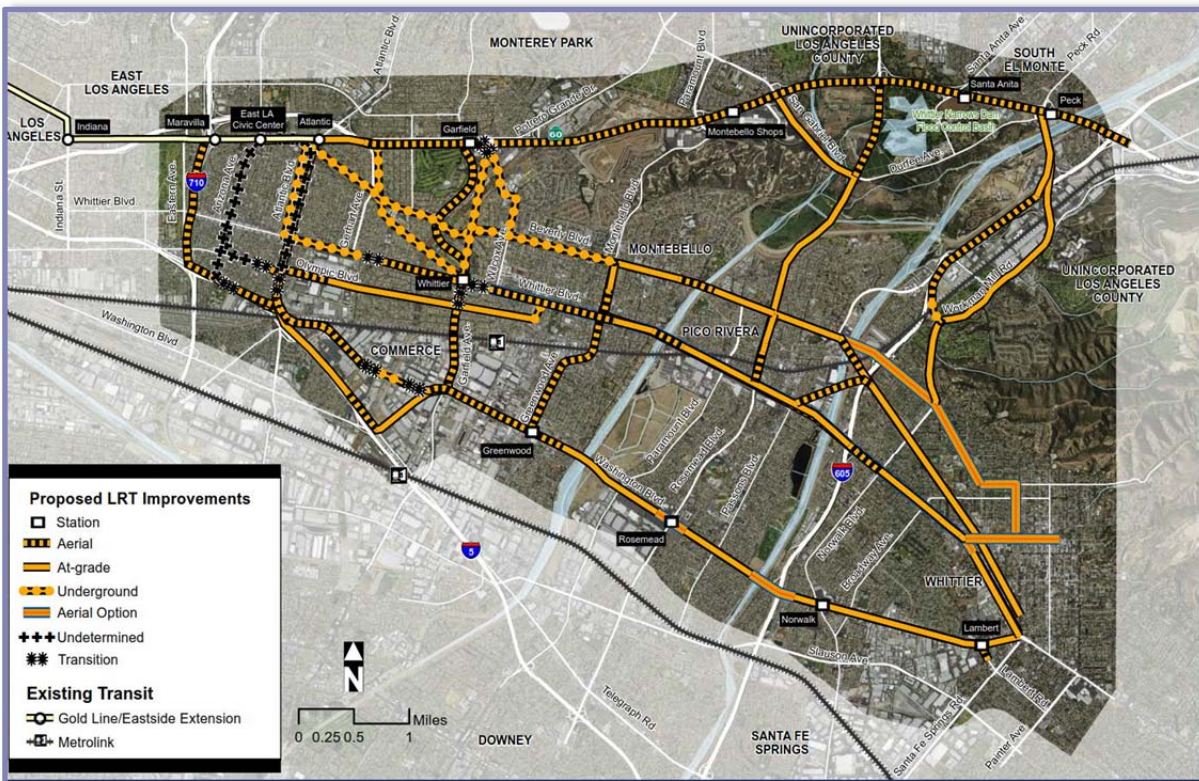
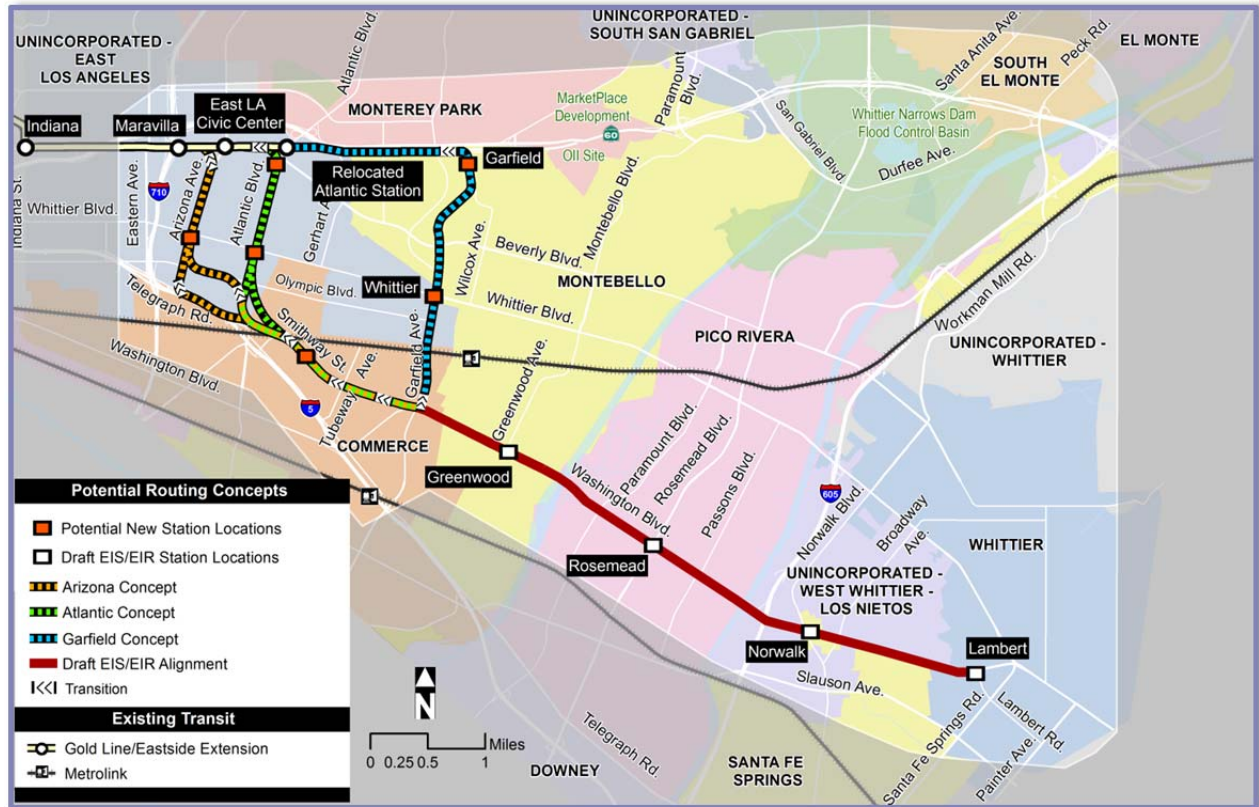


Table 3-1: Evaluation Criteria Methodology

Evaluation Criteria	Description
Transit Benefits	Ability to improve transit access and attract riders
ROM Capital Cost	Rough-order-of-magnitude cost estimates of total capital cost.
Supporting Adopted Community Plans and Goals	Consistency with adopted city, community land use plans and policies
TOC and Economic Development Potential	Potential for economic development opportunities to support transit-oriented communities (TOC)
Transportation and Circulation	Potential traffic and right-of-way impacts to the transportation system
Environmental Effects	Environmental effects on the surrounding communities and sensitive receptors
Operational Feasibility	Operational feasibility of preliminary designs, including junctions, train movements and headways
Constructability	Ability to construct the routing concept as envisioned and an analysis of construction impacts.

Figure 3-2: Potential North-South Washington Routing Concepts



3.3 Garfield Routing Concept

The Garfield Below-Grade Routing Concept would extend the existing MGLEE approximately 9.6 miles from the existing MGLEE Atlantic Station in East Los Angeles to the proposed Washington/Lambert Station in the City of Whittier (Figure 3-3). The existing MGLEE alignment would extend at-grade along 3rd Street, from the Atlantic Station to Hillview Avenue. It would then transition from at-grade to an aerial configuration along Pomona Boulevard/Via Campo and remain aerial until Garfield Avenue. The alignment would then transition from aerial to a below-grade, or underground, configuration to Wilcox Avenue. The proposed Garfield Station would be an underground or at-grade station south of Via Campo and west of Wilcox Avenue. South of Via Paseo, the alignment would be below-grade, generally following the SCE ROW with an underground station at Garfield Avenue and Whittier Boulevard. Continuing below-grade, the alignment would travel south under the Union Pacific Railroad (UPRR) tracks until Flotilla Street and then travel east to the intersection of Garfield Avenue and Washington Boulevard to join with the Washington Boulevard LRT Alternative alignment as defined in the Draft EIR/EIS, which terminates

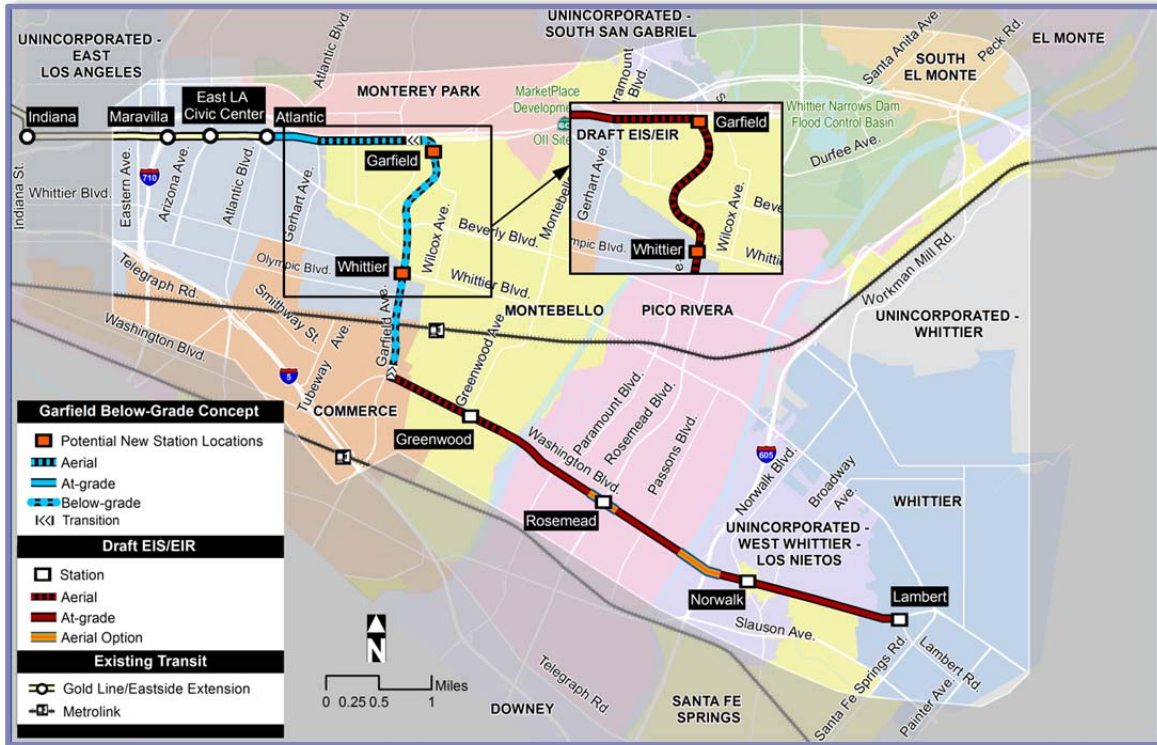


Garfield Avenue and Whittier Boulevard



just west of Lambert Road.

Figure 3-3: Garfield Below-Grade Concept



This concept would result in several engineering challenges and community impacts. The proposed at-grade to below-grade transition from Via Campo to Wilcox Avenue would be a difficult transition that could affect commercial and residential properties. Other potential impacts include the below-grade segments south of Via Campo that would require tunneling under a significant number of residences, with impacts extending into surrounding neighborhoods. Significant utility infrastructure, including overhead and below-grade transmission lines located adjacent to and intersecting the Garfield Below-Grade Concept alignment, poses another engineering challenge. These challenges would significantly constrain the below-grade and aerial portions of this alignment.

Below-grade stations are proposed at Via Campo and Wilcox, and at Garfield and Whittier; however, these stations would not effectively serve the key activity centers located within the study area and would not justify the high investment for a below-grade station.

3.4 Atlantic Routing Concept

3.4.1 Atlantic At-Grade Concept

The Atlantic At-Grade Concept is a double-track guideway that would extend the existing MGLLE approximately 8.9 miles from the current MGLLE East LA Civic Center Station in East Los Angeles to the proposed Washington/Lambert Station in the City of Whittier (Figure 3-4). The Atlantic At-Grade Concept would relocate the existing Atlantic Station on 3rd Street to west of Woods Avenue, and extend the MGLLE alignment south on Beverly Boulevard at-grade within the median of Beverly Boulevard. The alignment would then run south in the median along Atlantic Boulevard to Olympic Boulevard. South of Olympic Boulevard, the Atlantic At-Grade Concept alignment would rise to an aerial configuration south of Union Pacific Avenue. Continuing south along Atlantic Boulevard, the alignment would run towards the five-legged intersection of Atlantic Boulevard, Telegraph

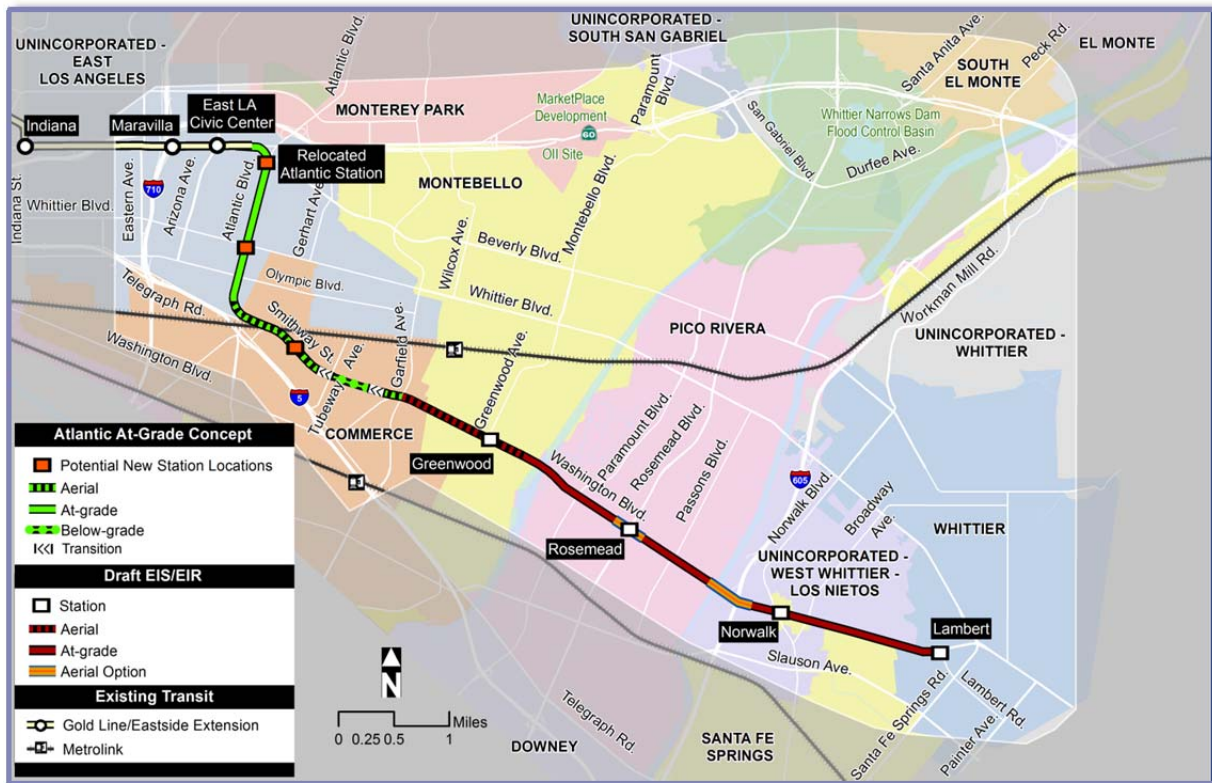


Road, Ferguson Drive, Goodrich Boulevard and Triggs Street (known as the “Mixmaster”), then cross in a southeasterly direction over the UPPR tracks to Smithway Street. The alignment would continue along Smithway Street in an aerial configuration. East of the Citadel, the alignment on Smithway Street would transition below-grade below Tubeway Avenue, commercial businesses, SCE transmission lines, and BNSF railroad segments. The alignment would rise again to an aerial configuration between Saybrook Avenue and Garfield Avenue to connect to Washington Boulevard at Garfield Avenue. The alignment would continue east along Washington Boulevard to join with the Washington Boulevard LRT Alternative alignment as defined in the Draft EIR/EIS, which terminates just west of Lambert Road. Tail tracks for proposed storage would extend south and adjacent to Lambert Road. This concept would be designed not to preclude trains from continuing east from Atlantic and Pomona Boulevards, as proposed under the SR 60 NSDV LRT Alternative, should Metro decide to develop the infrastructure necessary to later construct a second alignment as part of the Combined Concept.



Atlantic Blvd, Northbound

Figure 3-4: Atlantic At-Grade Concept



Proposed at-grade stations along the Atlantic At-Grade Concept would provide direct access to key destinations, activity centers and corridors including the Historic Whittier Boulevard, Atlantic Boulevard, Citadel Shopping Center and the Commerce Casino, further strengthening ridership potential. However, this concept would have some engineering challenges and community impact considerations. An at-grade configuration on Atlantic Boulevard would require elimination of on-street parking utilized by nearby commercial businesses. Property acquisition may also be required to accommodate an LRT facility in the median of Atlantic Boulevard, which would affect the surrounding community and local businesses. Additionally, the southern end of the Atlantic At-Grade Concept is constrained near the Mixmaster intersection as the alignment must be grade-separated to



avoid significantly affecting complex traffic movements. To the east of the Mixmaster intersection, there are SCE transmission lines that further constrain an Atlantic At-Grade Concept as only a below-grade configuration would avoid utility infrastructure conflicts.

3.4.2 Atlantic Below-Grade Concept

The Atlantic Below-Grade Concept is a double-track guideway that would extend the MGL EE approximately 9.0 from the existing MGL EE Atlantic Station in East Los Angeles to the proposed Washington/Lambert station in the City of Whittier (Figure 3-5).

From the existing MGL EE, the alignment would transition from west of Woods Avenue to below-grade west of Atlantic Boulevard. The alignment would then turn south on Beverly Boulevard between 3rd Street and Atlantic Boulevard. The Atlantic Below-Grade concept would relocate the existing Atlantic Station on Pomona Boulevard to a below-grade station south of 3rd Street and west of Atlantic Boulevard. The below-grade alignment would then run south beneath Atlantic Boulevard to Olympic Boulevard. A below-grade station is proposed near the intersection of Atlantic Boulevard/Whittier Boulevard.

South of Olympic Boulevard, the alignment would continue below-grade beneath Atlantic Boulevard and transition to Smithway Street. Two station concept options were studied for the proposed Commerce station on Smithway Street. Both station options would have direct access to the Citadel Shopping Center. Option A assumes an aerial station on Smithway Street and Option B assumes an underground station. Option B allows for a more direct cross-country below-grade segment between the East Los Angeles community and the industrial/commercial uses in the City of Commerce. Option B is recommended to be carried forward for further analysis as the Atlantic Below-Grade Concept for the purpose of this report



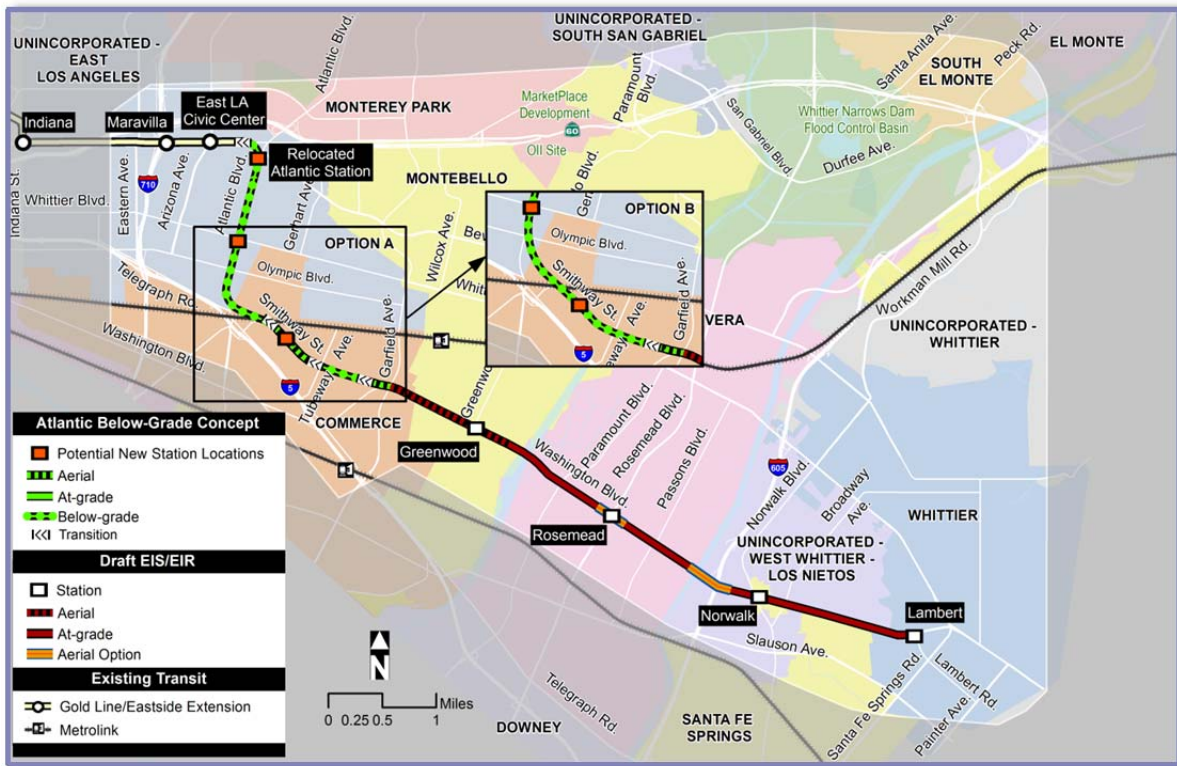
Historic Whittier Boulevard Corridor

East of the Citadel, the alignment would continue below-grade beneath Tubeway Avenue, SCE transmission lines, and BNSF railroad segments. The alignment would then rise to an aerial configuration between Saybrook Avenue and Garfield Avenue, to Washington Boulevard at Garfield Avenue. At this location, the alignment would join with the Washington Boulevard LRT Alternative alignment as defined in the Draft EIR/EIS, which terminates just west of Lambert Road. Tail tracks for proposed storage would extend south and adjacent to Lambert Road.

The Atlantic Below-Grade Concept would avoid complex areas including the Mixmaster intersection and nearby SCE transmission lines. The proposed two mid-line stations at Atlantic/Whittier and at the Commerce Citadel would also provide opportunities to boost transit oriented community development with direct access to key destinations, activity centers and corridors, including the Historic Whittier Boulevard, Atlantic Boulevard, Citadel Shopping Center and the Commerce Casino, further strengthening ridership potential. However, there would be some major engineering challenges as the existing MGL EE Atlantic Station may need to be relocated. This would require significant operational consideration, investment, and construction activities/sequencing.



Figure 3-5: Atlantic Below-Grade Concept



3.5 Arizona Routing Concept

3.5.1 Arizona At-Grade Concept

The Arizona At-Grade Concept is a double-track guideway that would extend the existing MGLEE approximately 9.2 miles from just west of the East LA Civic Center Station in East Los Angeles to the proposed Washington/Lambert Station in the City of Whittier (Figure 3-6). The Arizona At-Grade Concept would include an at-grade double junction, the trackwork necessary to accommodate two sets of track merging into one set of tracks, just west of the intersection of 3rd Street and Mednik Avenue. The alignment would then turn south onto Mednik Avenue near Strang Street and would run within the median of Arizona Avenue, just south of 4th Street. The alignment would continue south for approximately one mile within the median until Olympic Boulevard.



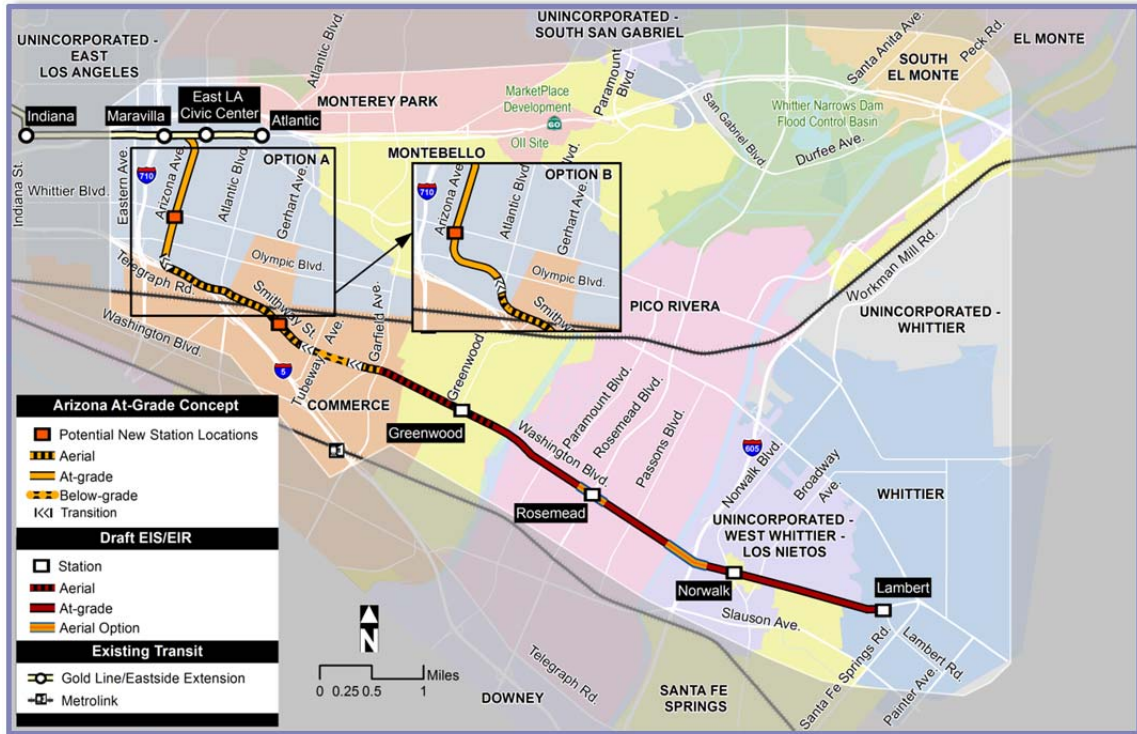
Arizona Avenue

South of Olympic Boulevard, there are two options (Options A and B) to approach the Mixmaster intersection. Option A would avoid potential conflicts, traveling eastward along Telegraph Road. Option B would travel eastward on Olympic Boulevard. Both Arizona At-Grade Concept options would continue as an aerial configuration, crossing in a southeasterly direction over the UPRR railroad tracks and continuing along Smithway Street. East of the Citadel Outlets, the alignment on Smithway Street would begin transitioning to below-grade beneath Tubeway Avenue, SCE transmission lines, and BNSF railroad segments. The alignment would rise again to an aerial configuration between Saybrook Avenue and Garfield Avenue and then connect to Washington Boulevard at Garfield Avenue to join with the



Washington Boulevard LRT Alternative alignment as defined in the Draft EIR/EIS, which terminates just west of Lambert Road. Tail tracks for proposed storage would extend south and adjacent to Lambert Road.

Figure 3-6: Arizona At-Grade Concept



This concept would have significant engineering challenges and community impact considerations. The Arizona At-Grade Concept would require reduction of existing travel lanes and eliminate a substantial amount of on-street parking along Arizona Avenue. These changes would impact community and local residents who live along the alignment. Additionally, an at-grade junction located at the intersection of 3rd Street and Mednik Avenue has been determined infeasible from both an operational and environmental standpoint due to the slanted configuration of the intersection. Construction of this junction would require property acquisition, significant traffic impacts, and a re-configuration of the intersection, which is located adjacent to sensitive uses including schools and churches.

3.5.2 Arizona Below-Grade Concept

The Arizona Below-Grade Concept is a double-track guideway that would extend the existing MGLTE approximately 9.2 miles from just west of the East LA Civic Center Station in East Los Angeles to the proposed Washington/Lambert Station in the City of Whittier (Figure 3-7). The below-grade concept would begin just west of the intersection of Arizona and 3rd Street with a portal in the center of the street. The distance required for a transition to connect to the existing at-grade configuration would eliminate the existing East LA Civic Center Station. As a result, the existing MGLTE from Arizona Avenue to the Atlantic Station would be discontinued because construction of a below-grade alignment would effectively cut-off service to the existing at-grade alignment. The alignment would transition south from 3rd Street to Mednik and Arizona below-grade, continuing beneath Arizona Avenue for approximately one mile until Olympic Boulevard.



East LA Civic Center Station



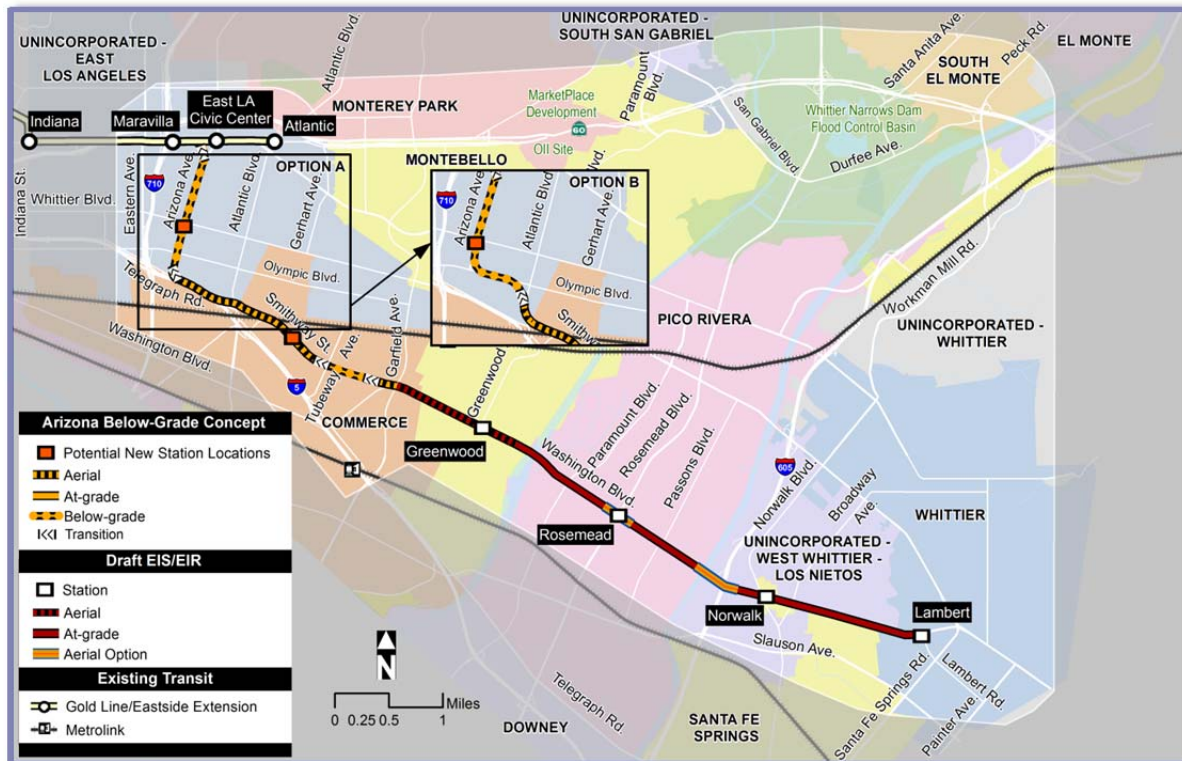
Mednik Avenue and 3rd Street

The concept features two options (Options A and B) south of Olympic Boulevard to approach the Mixmaster intersection. Option A would avoid potential conflicts, traveling eastward along Telegraph Road. Option B would travel eastward on Olympic Boulevard. East of the Mixmaster, the Arizona Below-Grade Concept (both Option A and Option B) would continue as an aerial configuration, crossing in a southeasterly direction over the UP railroad tracks to Smithway Street with an elevated structure along Smithway Street. East of the Citadel, the alignment would begin transitioning to below-grade beneath Tubeway Avenue, SCE transmission lines, and BNSF railroad segments. The alignment would then rise to an aerial configuration between Saybrook Avenue and Garfield Avenue, connecting to Washington Boulevard at Garfield Avenue and joining with the Washington Boulevard LRT Alternative alignment in the Draft EIR/EIS, which terminates just west of Lambert Road. Tail tracks for

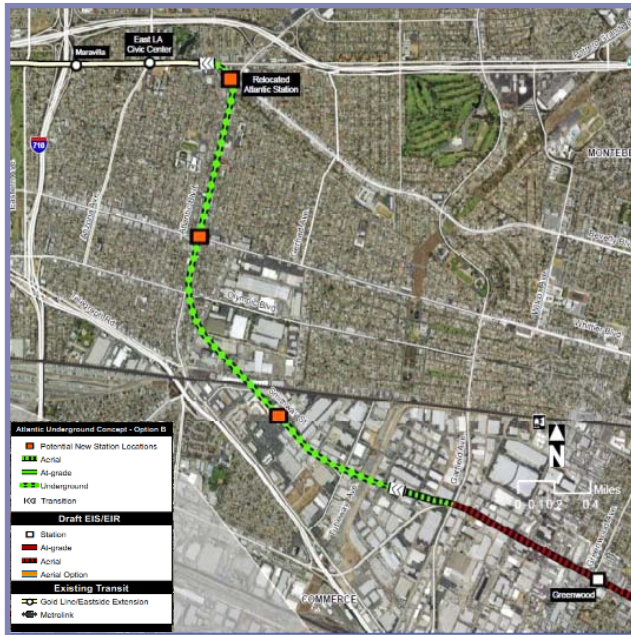
proposed storage would extend south and adjacent to Lambert Road.

This route concept could potentially be designed not to preclude future construction of an SR 60 Freeway alignment. This would require adding a below-grade junction at Arizona Avenue that could facilitate trains continuing east. A below-grade configuration at this junction would require approximately 3 to 5 acres for construction, which would result in a significant number of residential property acquisitions and substantial disruption to the surrounding neighborhood and the sensitive land uses adjacent to the alignment, including Griffith Middle School and East LA Civic Center. Additionally, the construction of a below grade junction would require lowering the existing MGLFE to an underground configuration starting from just west of Mednik Avenue and relocating the existing East LA Civic Center Station and Atlantic Station.

Figure 3-7: Arizona Below-Grade Concept



3.6 Recommending Atlantic Below-Grade Concept for Incorporation into the Washington Boulevard Light Rail Transit Alternative









The Atlantic Below-Grade Concept is recommended for further study as the new north-south connection for the Washington Boulevard LRT Alternative, based on the screening results of the north-south routing concepts. The Atlantic Below-Grade Concept provides a more direct connection between East Los Angeles and Washington Boulevard, serving a vibrant regional commercial center located in the City of Commercesburg and supporting the historically and culturally important commercial center in East Los Angeles at Whittier Boulevard. This concept also would minimize construction impacts along the alignment.

The other routing concepts (Arizona and Garfield concepts) were not recommended for further consideration as they are fundamentally inconsistent with community goals. The Garfield Routing Concept would require several transitions that would impact the adjacent commercial and residential uses nearby and would likely conflict with utility infrastructure. Overall, the Garfield Below-Grade Concept would not

serve the key activity centers and destinations within the study area. The Arizona Routing Concept, for both at-grade and below-grade concepts, would create a significant design challenge for constructing a junction at the intersection of 3rd Street and Mednik Avenue. This junction would also require significant property acquisition and would likely impact the surrounding neighborhood and sensitive land uses adjacent to the alignment.

Table 3-2 presents key characteristics for each concept⁷⁷. The Atlantic Below-Grade Concept performs well on a number of key measures including projected high ridership (19,610 to 21,070 boardings) and faster travel time (17-18 minutes). This concept also would minimize surface construction impacts along the alignment. Furthermore, based on outreach efforts conducted during this phase of study, stakeholders and representative from local jurisdictions indicated their support for the Atlantic Below-Grade Concept.

Table 3-2: Screening Results of the Washington Boulevard Concepts

Factors	Draft EIS/EIR Washington Boulevard LRT Alternative	Arizona		Atlantic		Garfield
		At-Grade	Below-Grade	At-grade	Below-Grade	Below-Grade
Fundamentally Consistent with Community Goals/Priorities?	NO	NO	NO	NO	YES	NO
Operationally Feasible?	YES	NO	NO	YES	YES	YES
Ridership (Daily Boardings)*	19,920	17,280 to 18,680	18,270 to 19,770	17,950 to 19,280	19,610 to 21,070	19,120
Rough Order-of- Magnitude (ROM) Capital Costs (in 2010 \$)*	\$1.4 to 1.7 billion	+10% to +20%	+60% to +70%	+10% to +20%	+90% to +100%	+80% to +90%
Preliminary Travel Time (in minutes)	18-19 min.	20-21 min	18-19 min.	20-21 min.	17-18 min.	18-19 min.
Potential Traffic/Circulation Impacts	Minimal	Significant	Minimal	Significant	Minimal	Minimal
Recommendation						

* Cost, travel times and ridership data is subject to change as design refinement and more detailed technical work continues.

3.7 Additional Studies

Additional studies focused on responding to other technical comments received from Cooperating Agencies on the Draft EIS/EIR for the Washington Boulevard LRT Alternative. The additional studies completed are listed below:

- **SCE Wire Survey Report**¹² : In response to SCE’s comments on the Washington Boulevard LRT Alternative from the Draft EIS/EIR, Metro conducted a wire survey to confirm the height of the existing wires at two locations:
 - *Garfield Avenue Union Pacific and Flotilla Street Intersections:* The proposed LRT aerial guideway tail track does not conform to CPUC clearance requirements under four sets of SCE wires. The wire survey findings concluded that seven wires at the railroad crossing and five wires at Flotilla Street did not achieve the necessary clearance heights. Design refinements



changed the guideway configuration to be below-grade rather than aerial, which will eliminate the conflict at this location.

- *Intersection of Washington Boulevard and Paramount Boulevard & West of I-605*: The wire surveys concluded that the design in the Draft EIS/EIR (33' to 50' clearances from Top-Of-Rail) met the required CPUC clearances and no conflict exists.
- **Washington Boulevard Soil Vapor Investigation Report** (March 2017): A soil vapor investigation was conducted in response to USEPA comments on the Draft EIS/EIR to evaluate the potential for vapor intrusion into the Lambert Road station and parking structure associated with the Washington Boulevard LRT Alternative. Based on the soil vapor sample results and evaluation, the vapor intrusion risks are low and the use of soil vapor barriers, passive or active sub-slab ventilation systems, or active monitoring at the site would not be required under current USEPA guidelines. There is no evidence to suggest that the Washington Boulevard LRT Alternative alignment and Lambert Road Station will have any impact on the Operating Unit 1 (OU1) remedy or implementation of the Operating Unit 2 (OU2) remedy. The study identified mitigation measures such as reevaluation of concentrations prior to preparation of structural designs, elimination of subsurface vapor migration pathways during construction, and preparation of a Phase 1 Environmental Site Assessment.
- **Terrestrial and Aquatic Biological Resource Technical Memorandums** (January 2017)¹³: Additional terrestrial and aquatic resource surveys were conducted in response to CDFW comments on the Draft EIS/EIR. The additional studies determined that construction of the Washington Boulevard LRT Alternative would result in temporary impacts on vegetation; however, there would be no impacts on sensitive vegetation communities. There would be no impacts on federally listed wildlife species. There is the potential for impacts on special-status bats and migratory birds during construction and future maintenance activities. In addition, there could be impacts related to the spread of invasive plants. If modification of the existing Washington Boulevard bridges over the Rio Hondo and San Gabriel Rivers is necessary for the Washington Boulevard LRT Alternative, there could be temporary and permanent impacts of waters of the U.S. Construction work at both river crossings on Washington Boulevard during the dry season, when there is no water present at the bridge crossings, would avoid many potential temporary impacts. A hydraulic analysis would be conducted, if the Washington Boulevard LRT Alternative is selected as the LPA, to quantify any permanent impacts and compensatory mitigation would be provided. The additional studies identified mitigation measures that would be required during construction and maintenance activities for the Washington Boulevard LRT Alternative to avoid or reduce impacts on vegetation communities, bats, and migratory birds. Mitigation measures would also be required to reduce impacts from the spread of invasive plant species.



4.0 Combined Concept Feasibility Analysis

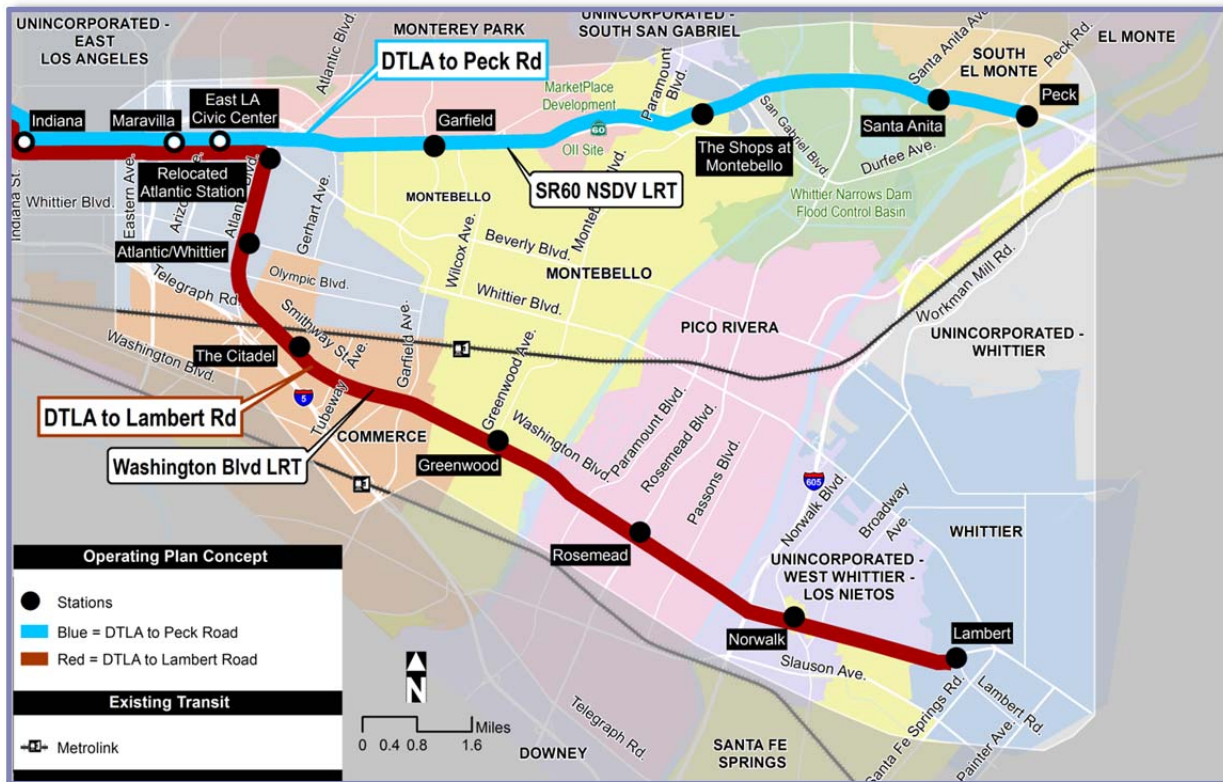
4.1 Combined Concept Definition

The Combined Concept is defined as the complete build-out of both the SR 60 NSDV LRT Alternative and the Washington Boulevard LRT Alternative – Atlantic Below-Grade Concept. The Metro Board requested analysis to determine the operability of building both LRT Alternatives. The Technical Study analyzed various configurations and operating scenarios and indicated that operating both segments (SR 60 and Washington Boulevard) is feasible, but would require additional infrastructure¹⁴. The following describes the current systemwide junction capacity and constraints, the study process that led to the development of an acceptable and feasible potential configuration and operating plan for a Combined Concept, and potential infrastructure and operational elements that would not be required if only one or the other alternative were operated as a ‘stand-alone’ line.

4.2 Existing Rail Junction Constraints

With the Combined Concept operating scenario and the anticipated completion of the Regional Connector project in Downtown Los Angeles, it was assumed that trains originating at Peck Road on the SR 60 branch line and/or Lambert Road on the Washington branch line could both travel west through the MGLEE, through Downtown Los Angeles between Little Tokyo Station and 7th/Metro Station along the Regional Connector alignment, and then west along the Exposition line alignment terminating at Downtown Santa Monica Station. However, the merging of two branch lines into a trunk line at the Atlantic Station (**Figure 4-1**) poses two unique operational issues, including: 1) Conflicts with Metro Rail Design Criteria for peak headways, and; 2) Reverse train movement at a junction to access a maintenance yard.

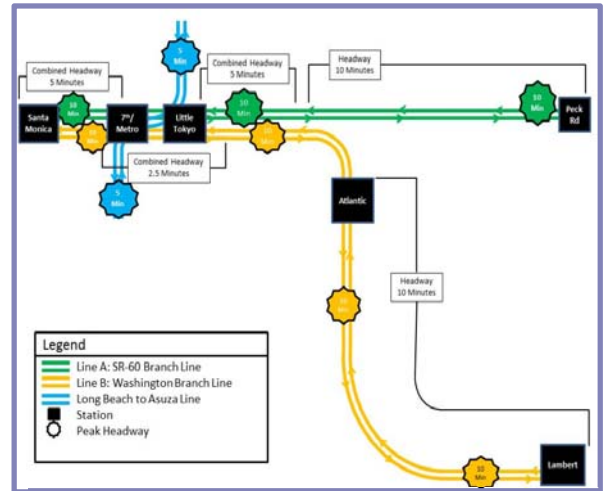
Figure 4-1: Initial Combined Concept Map for Both Light Rail Transit Alternatives



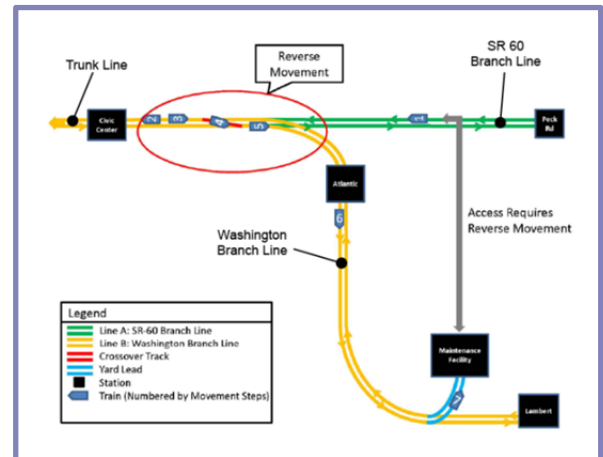
By year 2021, completion of the Regional Connector will affect current operating plans and could provide train service between East Los Angeles and Santa Monica at potentially a minimum of five minutes and between Long Beach and Azusa at a minimum headway of five minutes. The design capacity of the Regional Connector provides for headways of two and a half minutes from Little Tokyo/Arts District Station and Washington Boulevard and Flower Street. With the construction of both branches of the Eastside Phase 2 Transit Project, the Regional Connector segment would function as a trunk line serving three individual lines (two Eastside Transit Corridor Phase 2 Project lines and the Long Beach to Azusa line).

The future capacity of the Regional Connector trunk line would dictate the minimum headways of the three lines and pose restriction of certain train movements between the two Eastside Transit Corridor Phase 2 Project branch lines. Trains operating on both branches would be limited to 10-minute headways due to the current system-wide junction capacity between East Los Angeles Station, Little Tokyo Station and Union Station. This headway does not conform to Metro Rail Design Criteria for service levels (5 minutes) for light rail projects. Another scenario in which trains operate every five minutes but half of the trains from each branch line terminate (or 'shortlined') at Atlantic Station would not conform to Metro Rail Design Criteria for service levels because every other train heads into Downtown Los Angeles while the other trains conduct a reverse move and return to the end of the branch line.

Secondly, provision of a common maintenance yard to serve rail vehicles for both branches is another infrastructure requirement under the Combined Alternative. Access to a common maintenance yard would require trains from one branch to travel into the MGLER trunk line and perform a reverse movement into the branch line where the maintenance yard is located. Metro's Operations Department deemed this complex train movement as unacceptable due to delays and potential conflicts that would be incurred to revenue service trains. Thus all preliminary operational scenarios that would not facilitate inter-line movements between the lines were eliminated from further consideration.



Initial Operating Plan Diagram (not feasible)



Reverse Movement (not feasible)

4.3 Potential Wye Junction Concept

Operating both segments could be feasible, but would require infrastructure and operational elements that would not be required if only one or the other alternative were operated as a 'stand-alone' line. The following section presents a case of how a potential wye junction at the point where the two lines join could be one of the potential engineering design solutions that could address the operational issues.

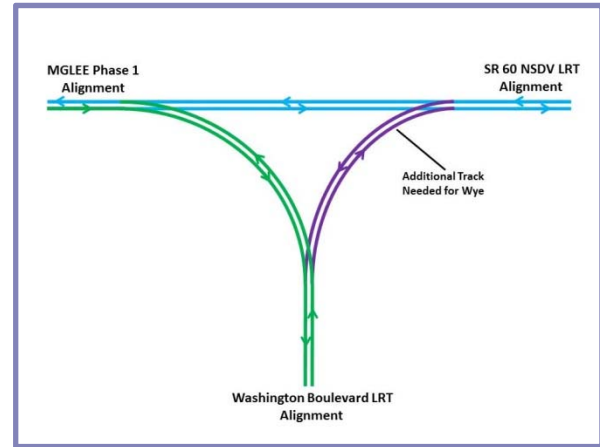
A full wye junction could potentially be considered in the proximity of the existing MGLER Atlantic Station. This junction may potentially be designed in a below-grade configuration for the following reasons:

- The Washington Boulevard LRT Alternative would run below-grade along this segment of Atlantic Boulevard, and



- The surface traffic configuration between Pomona Boulevard, Atlantic Boulevard and Beverly Boulevard is highly complex and congested.

The junction may include double track connections between each rail line with appropriate space for switches, signals, and other design elements. This wye junction would allow trains to travel between the MGL EE trunk line and the SR 60 NSDV LRT Alternative and Washington Boulevard LRT Alternative – Atlantic Below-Grade Concept lines. It would also facilitate travel between the SR 60 NSDV LRT Alternative and the Washington Boulevard LRT Alternative – Atlantic Below-Grade Concept. This junction-type would enable a connection to a common maintenance yard, to be located along either branch line, in an operationally acceptable manner that would not delay revenue service trains. Service to the Atlantic Station area by all rail lines would also require removing the existing MGL EE Atlantic Station and replacing it with a below-grade station outside of the wye junction.



Combined Concept Wye Junction

4.4 Combined Concept Operation Plan

The Combined Concept operating plan featuring a wye junction would consist of simultaneous operations of the following three sets of interdependent train service lines (Figure 4-2).

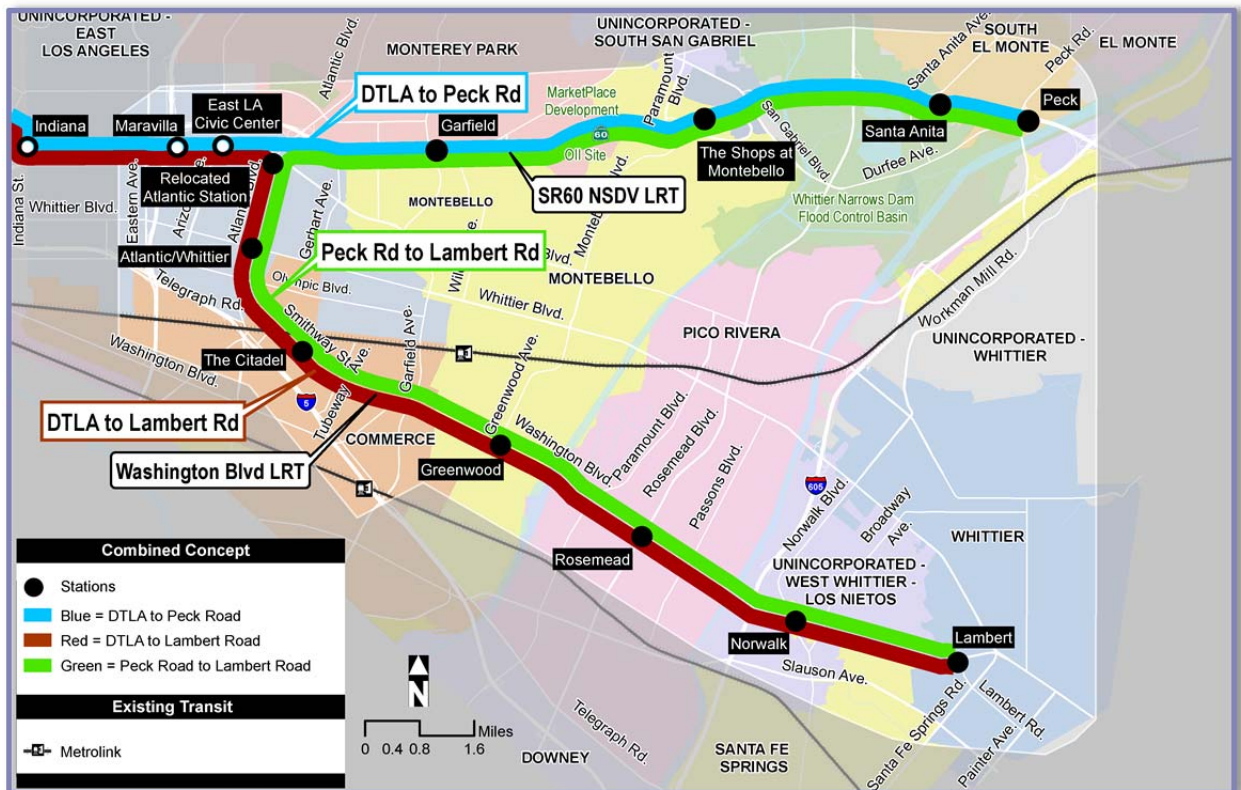
- **Downtown Los Angeles to Peck Road Line:** Consists of operating trains along the SR 60 NSDV LRT Alternative alignment. It would extend from the existing MGL EE line, from the East Los Angeles Civic Center Station through a below-grade wye, and then continue to the terminus of the SR 60 NSDV LRT Alignment with stops at all remaining proposed stations. Trains would operate at 10-minute peak headways between Peck Road Station and Downtown Los Angeles. Combined with the Downtown Los Angeles to Lambert Road Line below, peak headways on the MGL EE trunk line would be 5-minutes from East LA Civic Center to Downtown Los Angeles.
- **Downtown Los Angeles to Lambert Road Line:** Consists of operating trains along the Washington Boulevard LRT Alternative – Atlantic Below-Grade Concept alignment. It would extend the existing MGL EE line from the East Los Angeles Civic Center Station through a below-grade wye junction, continuing to the terminus of the Washington Boulevard LRT alignment with stops at all remaining proposed stations. Trains would operate at 10-minute peak headways between the Lambert Road Station in the City of Whittier and Downtown Los Angeles. Combined with the Downtown Los Angeles to Peck Road Line above, peak headways on the MGL EE trunk line would be 5-minutes from East LA Civic Center to Downtown Los Angeles.
- **Peck Road to Lambert Road Line:** Consists of operations between the SR 60 NSDV LRT Alternative and the Washington Boulevard LRT Alternative – Atlantic Below-Grade Concept alignments. Patrons boarding this line could travel to/from all stations between the terminating stations at Peck Road and Lambert Road without transferring. Trains would operate at 10-minute peak headways between these two stations. Combined with the lines servicing Downtown Los Angeles described above, 5-minute peak headway train service would operate between the Atlantic Station and the terminus station of the Washington Boulevard LRT Alternative – Atlantic Below-Grade Concept at Lambert Road, and between the East LA Civic Center Station and the terminus station of the SR 60 NSDV LRT Alternative at Peck Road.



Operating all three lines simultaneously will allow 5-minute headways between the Atlantic Station and the end of that particular line, and between the Atlantic Station and Downtown Los Angeles. Longer distance operations from stations on either branch line into the MGLLE to Downtown Los Angeles, or from stations on one branch line to the other stations on the branch line, will operate every 10 minutes, allowing five-minute headways when combined with interlining service. The existing Atlantic Station may need to be relocated as an underground station due to the construction of a potential wye junction. Additional study is recommended to develop the station platform and systems design that best provides service to the various proposed lines.

The Combined Concept operating plan would allow for both branch lines to utilize the same maintenance facility. The wye junction would facilitate train movements between branch lines without the need for reverse movements around the junction. If the maintenance facility is located along the SR 60 branch line, trains terminating on the Washington branch line would have non-revenue travel north through the junction to a maintenance facility. If a maintenance facility is located along the Washington branch, trains terminating on the SR 60 branch line would have non-revenue travel south through the wye and to the maintenance facility. If the project is to be constructed in phases, a maintenance yard would be needed along the initial phase of the alignment. In the next phase, Metro would initiate conceptual design studies for the wye junction and other potential junction options, determine the physical footprint of the junction, and conduct more detailed rail simulation/operational analysis to define the associated operating plan (headways, fleet size, and maintenance yard).

Figure 4-2: Combined Concept (Full Wye)





5.0 Community and Stakeholder Outreach

5.1 Summary of Public Participation

The purpose of the stakeholder and community engagement plan was to coordinate outreach efforts throughout the study area to provide project updates, receive feedback on the route concept development process, and seek guidance on the overall community engagement strategy. Metro held over 110 briefings throughout the study area and hosted two tours of Metro facilities and construction sites. Engagement efforts focused not only on general project awareness, but also on engaging the Washington Boulevard Coalition, SR-60 Coalition as well as the County of Los Angeles unincorporated East Los Angeles resident, business, neighborhood and community groups. Other participating stakeholders include: City Council members and staff, State and Local Elected Officials, Chambers & Business Associations, Major Property Owners/Developers, and Councils of Government and Service Councils (San Gabriel Valley and Gateway Cities).



Metro also hosted two rounds of public meetings (10 meetings total). The first round of public meetings occurred in March and June of 2016, and the second in February 2017. Meetings were held in the following communities: East Los Angeles (3 meetings), Whittier (2 meetings), Montebello (2 meetings), South El Monte (2 meeting), Commerce (1 meeting). Collectively the meetings were well attended by 735 participants with 106 written comments received. More information regarding the community and stakeholder outreach efforts and individual meeting summaries is included in a separate report, *Eastside Transit Corridor Phase 2 Technical Study Community Outreach Summary Report* (April 2017).¹⁵

5.2 What We Heard

The overarching themes below emerged from the stakeholder and community feedback:

- Overwhelming support for the Eastside Transit Corridor Phase 2 Project, including Washington Boulevard LRT Alternative via the Atlantic Below-Grade Concept, SR 60 NSDV LRT Alternative, and the Combined Concept
- Interest in connecting communities and improving access to employment centers and Metro’s regional transit system
- Concerns regarding impacts to businesses during construction
- Interest in potential economic development opportunities along the corridor
- Emphasis on improving station accessibility and safety





5.2.1 Round One Community Meeting Summary

The first round of community meetings took place in March and June 2016 in the communities of Whittier, Montebello, South El Monte, and East Los Angeles. A total of 325 persons attended and provided valuable feedback on Technical Study findings and recommendations. Metro presented an update on the progress made on the SR 60 NSDV LRT Alternative refinement and the three preliminary north-south connection routing concepts for the Washington Boulevard LRT Alternative (Arizona, Atlantic, and Garfield). Metro received a wide range of comments, including support for each or both of the potential alternatives and suggestions on how to better serve the communities. Community feedback centered on three categories: 1) sentiment in favor of a particular concept or alternative, 2) environmental issues/concerns, and 3) objections to specific routing and grade configuration.



Overall, attendees expressed strong support for both the SR 60 NSDV and Washington Boulevard LRT Alternatives. The community provided extensive feedback on the Washington Boulevard LRT Alternative, covering several key areas such as pedestrian safety, traffic disruptions during construction, access to properties, loss of on-street parking, noise and vibration effects, air pollution, and local business impacts. Attendees generally agreed that Atlantic Boulevard would be a better option than Arizona Avenue, due to the high concentration of residences along Arizona Avenue and potential impacts to residents both during and after construction. Additionally, attendees expressed strong opposition to at-grade or aerial alignments on either Arizona Avenue or Atlantic Boulevard. There were also numerous concerns raised about the Garfield Below-Grade Concept, primarily as it related to property displacement, business loss and traffic/circulation disruption during construction. The feedback was instrumental in confirming the team’s understanding of key issues for each routing concept, and focusing the conceptual design studies.

In terms of SR 60 NSDV LRT Alternative, several attendees pointed to its higher state of project readiness and fewer impacts to residential community/businesses during and after construction. Supporters also highlighted the demand for commuter-oriented park-and-ride transit service along the SR 60 corridor, and the potential for transit-oriented community development around proposed stations.

5.2.2 Round Two Community Meeting Summary



During the second round of community meetings in early-mid February 2017 in the communities of Whittier, Montebello, South El Monte, City of Commerce, and East Los Angeles, a total of 318 people attended and provided a valuable opportunity to receive critical feedback on Technical Study findings and recommendations. In general, there is strong support for the Eastside Transit Corridor Phase 2 Project and re-initiation of the environmental process, based on the recommended Project Definition.

Several key areas of consensus and themes emerged based on survey results and comments. First, there was strong support expressed for the Atlantic Below-Grade



Concept as the new Washington Boulevard LRT Alternative. Of 235 respondents surveyed at the February 2017 community meetings, 63 percent agreed that the Atlantic Below-Grade Concept has sufficient merit to be recommended as the new Washington Boulevard LRT Alternative. This result was strongly corroborated by sentiments expressed at the Community Meetings, particularly from attendees who made comments at the East Los Angeles meeting on February 16, 2017. Second, there was openness to studying the Combined Alternative in the next phase of work, as evidenced by the 50 percent of respondents who felt that the Combined Alternative had enough merit to study in the next phase plus an additional 16 percent of the respondents who expressed that the Combined Alternative may have some merit for further study.

There was also support for the SR 60 NSDV LRT Alternative, which several attendees felt could serve a robust east-west commuter market and result in fewer impacts to residential community/businesses during and after construction. While there is strong support for the Eastside Transit Corridor Phase 2 Project overall, participants shared concerns regarding potential impacts during construction, especially as it relates to traffic and business disruption and/or relocation. Participants also highlighted the importance of designing the stations with ease of access for pedestrians, bike riders and park and ride.

Figure 5-1: Stakeholder Input Received from Community Meetings

Stakeholder Input





6.0 Findings of the Technical Study

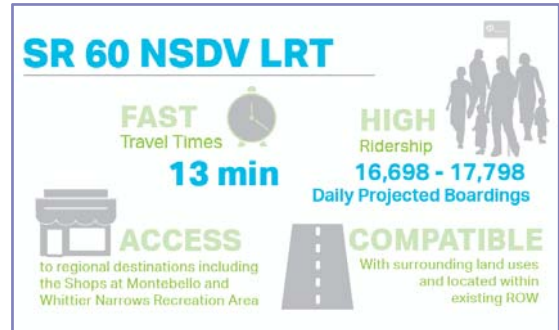
6.1 Discussion of Key Findings

This section presents key findings from the studies on each of the three alternatives under evaluation: SR 60 NSDV LRT Alternative, Washington Boulevard LRT Alternative, and the Combined Concept.

6.1.1 SR 60 NSDV LRT Alternative

There was extensive coordination with Caltrans, USEPA, USACE, CDFW and SCE on the design of the SR 60 NSDV LRT Alternative to address these agencies' respective comments on the Draft EIS/EIR throughout the technical study process. Some of the issues that Metro discussed with resource agencies throughout the technical study include:

- Addressing concerns related to the former OII Superfund site,
- Minimizing impacts to adjacent developments such as the MarketPlace,
- Minimizing potential impacts to the ability to add HOV lanes to the SR 60 Freeway,
- Avoiding impacts to the on and off ramps at Paramount Boulevard,
- Mitigating conflicts with transmission lines, and
- Preserving the ability to develop a station and park and ride structure on Santa Anita Avenue.



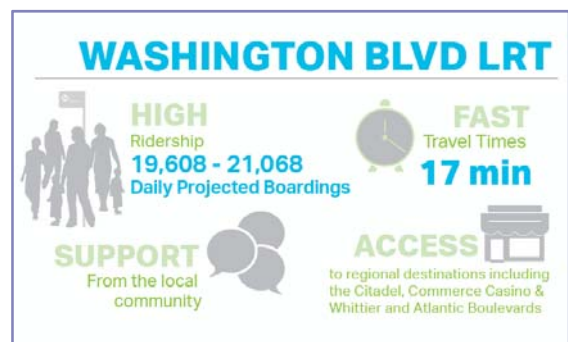
Metro held detailed discussions with coordinating agencies during the current phase of study to obtain concurrence on conceptual design and potential project implementation. The SR 60 NSDV LRT Alternative performs well on a number of key measures, including providing faster travel time (13 minutes), high ridership (16,698 to 17,798 daily projected boardings) and lower costs (\$2.27 billion in 2017\$). These performance measures highlight the need to resolve agency comments as an essential requirement for the SR 60 NSDV LRT Alternative.

The SR 60 NDSV LRT Alternative alignment is located mostly within the SR 60 Freeway ROW, which minimizes transportation and environmental impacts to the adjacent communities. The alignment also serves activity centers, including the Shops at Montebello and the Whittier Narrows Recreation Area. Stakeholders from local jurisdictions voiced support and interest in moving the SR 60 NSDV LRT Alternative forward. For these reasons, Metro staff recommends the SR 60 NSDV LRT Alternative for further study.

6.1.2 Washington Boulevard LRT Alternative

The Atlantic Below-Grade Concept is recommended to be incorporated as the new Washington Boulevard LRT Alternative. The Atlantic Concept would operate in a north-south alignment along Atlantic Boulevard in a below-grade configuration. This alternative would provide more benefits than the other Washington Boulevard Alternative routing concepts studied, including:

- Provides a connection to the busy regional commercial center in the City of Commerce;
- Connects to a thriving historic commercial corridor on Atlantic and Whittier Boulevards;



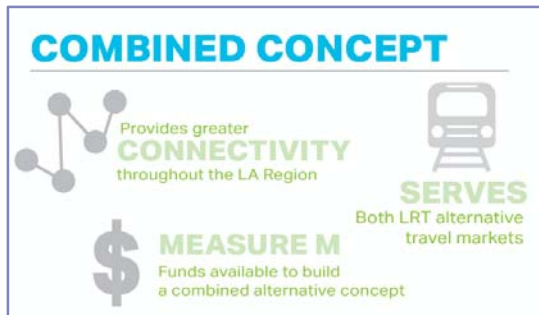


- Minimizes surface construction and operational disruptions and;
- Provides a more direct route to the Washington Boulevard LRT Alternative.

The Washington Boulevard LRT Alternative – Atlantic Below-Grade Concept also performs well on several key measures, including proving faster travel time (17 minutes), high ridership (19,608 - 21,068 daily projected boardings), and meeting community goals by enhancing connectivity to local and regional destinations and activity centers.

Stakeholders and representatives from local jurisdictions have indicated their support for this alternative, as expressed throughout Metro’s outreach efforts in this phase of study. For these reasons, the Washington Boulevard LRT Alternative – Atlantic Below-Grade Concept is recommended to move forward into the next phase of study.

6.1.3 Combined Concept



The Combined Concept is defined as the complete build-out of both the SR 60 NSDV LRT Alternative and the Washington Boulevard LRT Alternative – Atlantic Below-Grade Concept. The Combined Concept would connect the existing MGLLE to communities along both Alternatives, serving both travel markets.

The Technical Study explored the feasibility of operating both Alternatives and determined that operating both segments is feasible, but would require infrastructure and operational elements that would not be required if only one or the other

alternative were operated as a ‘stand-alone’ line.

If both the SR 60 and Washington segments were built, only one maintenance facility would be needed to service rail vehicles operating on both lines. The exact location of the maintenance facility will be determined in the next phase of work. To move all Eastside Transit Corridor Phase 2 Project trains serving both branches to that maintenance facility, a potential wye junction concept (similar to the planned operations at the Crenshaw Line/Green Line merge junction) would be needed. The provision of a wye junction, potentially below-grade, would allow patrons to travel to points along either the SR 60 branch or the Washington Boulevard branch, thereby offering greater connectivity with the project area and to/from the greater Los Angeles region. Another benefit of a wye junction is that it could support a third line from South El Monte to Whittier, potentially allowing for 5-minute service on each branch.

Note that including a Combined Alternative in the re-initiated environmental process would be the only way to environmentally clear the underground wye junction, which would not be needed if only SR 60 NSDV LRT Alternative or Washington Boulevard LRT Alternative were built. Therefore, the Combined Concept has sufficient merit to be included as a new Alternative in the updated Project Definition. For the Combined Alternative, Metro will explore and identify maintenance yard sites that serve both lines. The ultimate location of the maintenance facility will be considered in determinations related to project phasing.

In the next phase, Metro would initiate the development and advancement of the wye junction design, define the associated operating plan and determine its physical footprint.



7.0 Implementation Issues

This section presents several factors to consider for informing the next steps for implementing the recommended project alternatives. This includes information on proposed project costs, available funding sources, cost containment and possible phasing strategies for the SR 60 NSDV LRT Alternative, Washington Boulevard LRT Alternative and the Combined Concept.

7.1 Project Costs

The rough-order-of-magnitude (ROM) capital costs for the previous SR 60 NSDV LRT Alternatives and Washington Boulevard LRT Alternative via Garfield Avenue from the 2014 Draft EIS/EIR were updated to reflect the updated project definition and design modifications and recent change in unit prices.

This technical study refined the SR 60 NSDV LRT Alternative guideway along the NSDV segment. Although the scope grew to include one maintenance yard for each alternative, only one yard would be carried forward in support of the Combined Concept. The project team escalated unit prices from 2010 estimates in the Draft EIS/EIR to the current year of 2017, base year dollar (BYD), and then unit pricing adjustments for specific elements per recent bid results of similar Metro projects.

The cost estimate for the Washington Boulevard LRT Alternative via Garfield Avenue from the 2014 Draft EIS/EIR was approximately \$1.4 to \$1.7 billion (2010\$). The cost differential between the Draft EIS/EIR Baseline Alternative and the new Washington Boulevard LRT Alternative is attributable to several factors, the most significant of which is the inclusion of below-grade segments. The length of the new Washington Boulevard LRT Alternative is about 8.8 miles, of which one third of the alignment could be a below-grade segment along Atlantic Boulevard in unincorporated East Los Angeles and then along Smithway Street in the City of Commerce. The cost of the below-grade segment would include elements such as below-grade stations and right-of-way acquisition near portal construction sites. Other factors include inflation adjustments and higher LRT construction costs in Los Angeles County, per recent construction bid prices reflecting more current market conditions. For these reasons, the cost estimate of the Atlantic Below-Grade Concept is higher than that of the original Draft EIS/EIR Baseline Alternative.

Table 7-1 shows the updated ranges of capital cost estimates in base year (2017\$) for the three scenarios, including: SR 60 NSDV LRT Alternative (standalone), Washington Boulevard LRT Alternative with Atlantic Below-Grade Concept (standalone), and a Combined Concept with extension to both South El Monte and Whittier.

Table 7-1: Preliminary Capital Cost Estimate Totals

ALIGNMENT	2017 BYD			
	COST (Billions)		COST/MILE (Millions)	
	LOW	HIGH	LOW	HIGH
	Column A	Column B	Column C	Column D
SR-60 NSDV Alternative	\$2.27	\$2.69	\$324	\$384
Washington Alternative (Atlantic Underground Option B)	\$4.24	\$4.40	\$482	\$500
Combined Concept	\$6.30	\$6.90	\$399	\$437

*These cost estimates are preliminary and are based on initial levels of design and current economic conditions. Various factors, including fluctuations in the overall U.S. economy, local prices for construction labor and materials, project refinements based on higher levels of design, and cost containment strategies will result in changes to these estimates in subsequent project phases.



Columns A and B show the cost estimate ranges for the alternatives in billion dollars (2017\$) and Columns C and D show the total project cost per mile in (2017\$) Depending on design refinements, the high range represents a more conservative approach for applying unit prices and higher contingency cost assumptions.

These cost estimates indicate that the SR 60 NSDV LRT Alternative is the lower cost individual alternative and the Washington Boulevard LRT Alternative is higher cost individual alternative. The Combined Concept costs slightly less than the sum of both individual alternatives. The Combined Concept includes the additional cost for a wye junction; however, the Combined Concept only includes one maintenance yard, while the SR 60 NSDV LRT and Washington Boulevard LRT Alternatives include one yard each.

7.2 Funding

The Eastside Transit Corridor Phase 2 Project is part of Metro’s Expenditure Plan and is included in LA County tax measures, Measure R and Measure M, approved in 2008 and 2016, respectively. Measure M funding for the Eastside Transit Corridor Phase 2 Project includes a total of \$6.0 billion in 2015\$ (approximately \$6.3 billion in 2017\$). The Measure M Expenditure Plan includes a groundbreaking date of fiscal year 2029 for one alignment and a groundbreaking date of fiscal year of 2053 for a second alignment. More information about the funding is identified for the project per the LA County Transportation Expenditure Plan¹⁶ in 2016.

7.3 Engineering Challenges

Upon Metro Board approval of the updated project definition for the three alternatives, staff would prepare a revised draft environmental document and conduct advanced conceptual engineering. Several engineering challenges would need to be resolved during the next phase of work to help develop constructible and operable solutions. The following locations feature specific engineering challenges for both the SR 60 NSDV LRT Alternative and the Washington Boulevard LRT Alternative:

- SR 60 NSDV LRT Alternative Guideway Bridges – Design for the guideway bridges crossing the SR 60 Freeway and Santa Anita Avenue conceptual station design to accommodate flooding per the USACE design requirements for structures located in a flood plain.
- Washington Boulevard LRT Alternative Atlantic Below-Grade Concept North and South Portal Locations– For the North portal, design a new transition on 3rd Street, MGLLE Atlantic Station replacement, and a TBM launching site. For the South Portal, design for an underground alignment and station through the City of Commerce traveling under SCE ROW and a transition to an aerial configuration at the intersection of Washington Boulevard and Garfield Avenue.
- Combined Concept Junction Design– A new transition on 3rd Street to a below-grade configuration, MGLLE Atlantic Station replacement, and a tunnel boring machine (TBM) launching site.
- Maintenance Yard – Identifying maintenance yard locations and design for two standalone alternatives and for one common maintenance yard for the Combined Concept.



8.0 Recommendations and Next Steps

8.1 Recommendations for Further Study

Based on the findings from the technical studies, the updated Project Definition is recommended for the Eastside Transit Corridor Phase 2 project to include three (3) Build Alternatives (Figure 8-1, Figure 8-2 and Figure 8-3):

- **SR 60 NSDV LRT Alternative** – includes refining the LRT alignment to the north of the SR 60 Freeway across from the Oil Site, at Paramount Boulevard, and at Peck Road, and a maintenance yard.
- **Washington Boulevard LRT Alternative – Atlantic Below-Grade Concept** – includes a new north-south connection from east of the East LA Civic Center Station, transitioning from west of Woods Avenue to below-grade west of Atlantic Boulevard, and turning southward to connect to the Washington Boulevard LRT Alternative. It would include a new station at the Citadel in the City of Commerce and at the intersection of Whittier Boulevard and Atlantic Boulevard, and a maintenance yard.
- **Combined Concept** – introduces a new Combined Concept that includes the SR 60 NSDV LRT Alternative and the Washington Boulevard LRT Alternative – Atlantic Below-Grade Concept. This alternative would require modification to the existing MGLLE Atlantic Station by introducing a wye junction to meet operational headways of 5-minutes. The SR 60 NSDV LRT Alternative and Washington Boulevard LRT Alternative - Atlantic Below-Grade Concept each serve different travel markets, thereby providing new connections to Metro’s regional rail network via the MGLLE. A common maintenance yard to serve each line would also be required. The Combined Concept would provide an additional benefit of serving destinations within and throughout the study area.

Figure 8-1: Recommended for Further Study – SR 60 North Side Design Variation Light Rail Transit Alternative

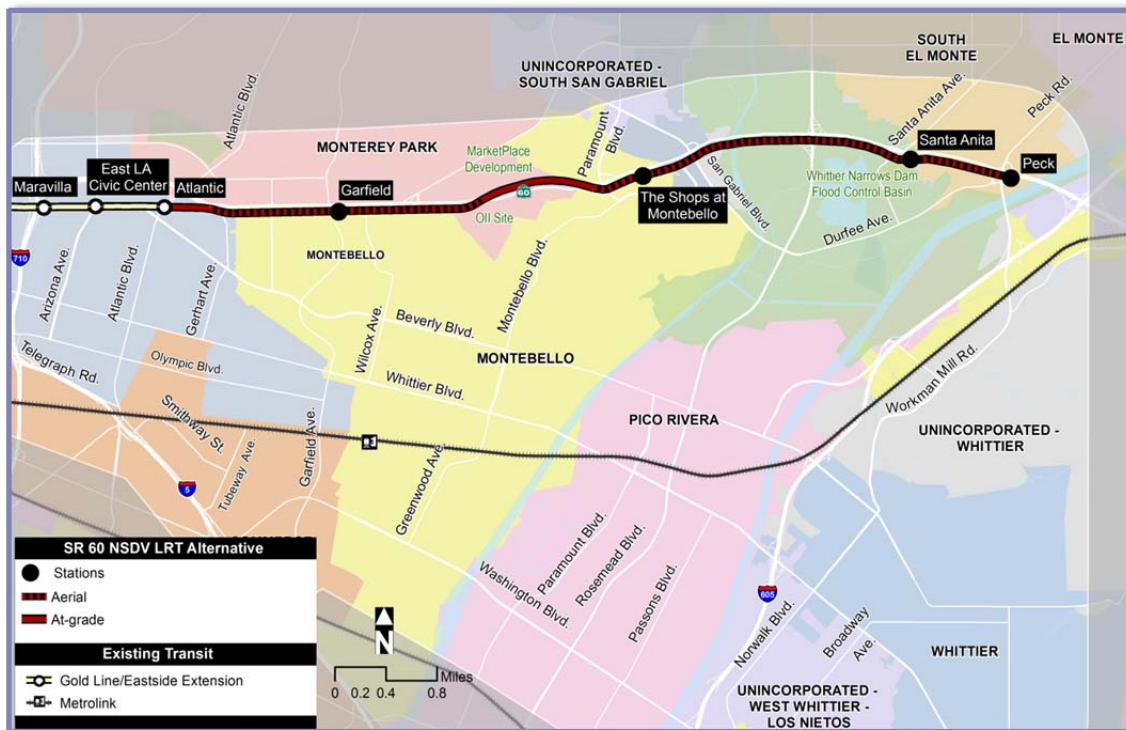




Figure 8-2: Recommended for Further Study – Washington Boulevard LRT Alternative

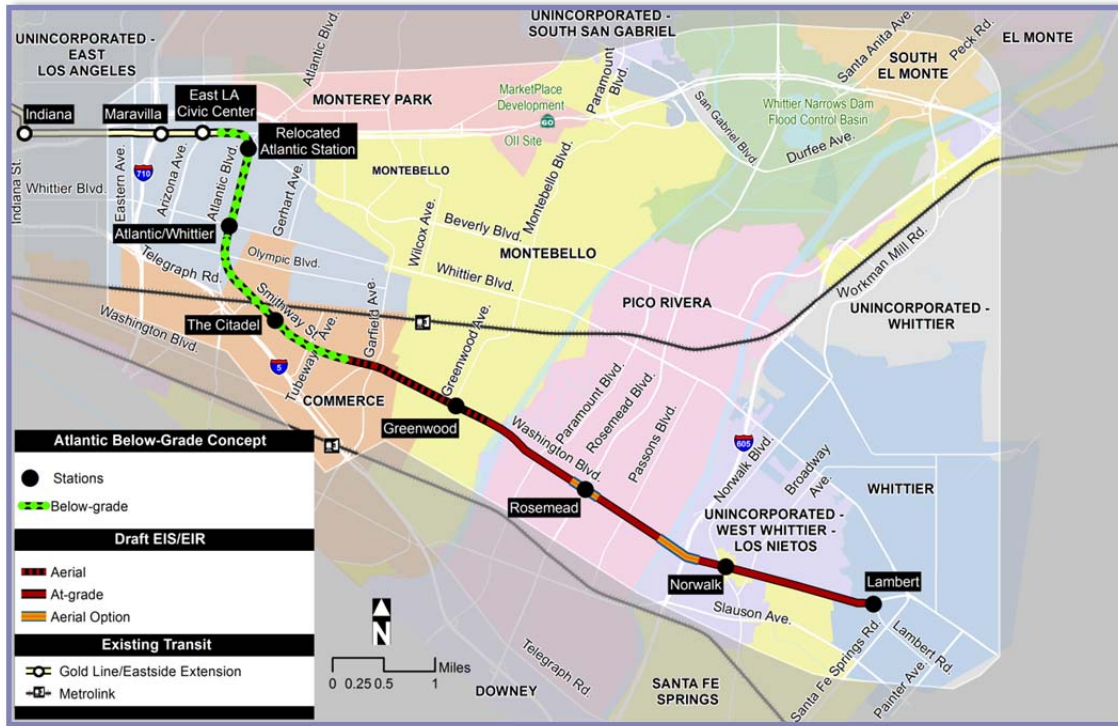
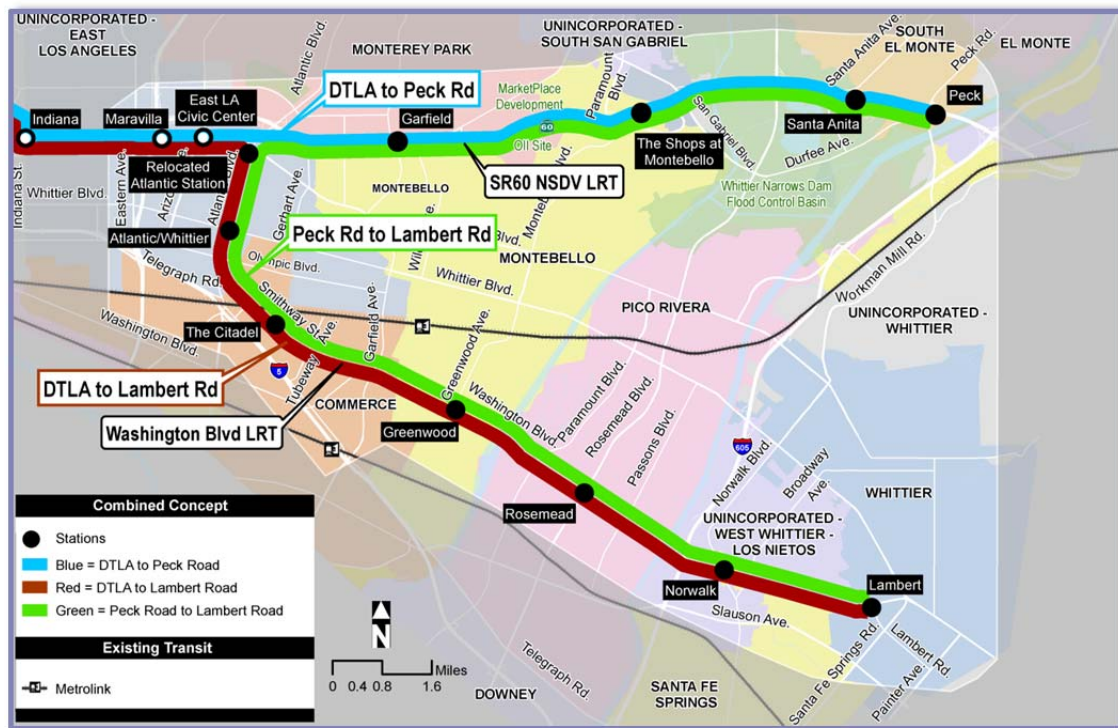


Figure 8-3: Recommended for Further Study – Combined Concept





8.2 Next Steps

Next steps for the following phase of the Eastside Transit Corridor Phase 2 Project includes additional environmental analysis and coordination with third party agencies, engineering analysis and refinements, and continued outreach to key stakeholders and communities.

- **Environmental Analysis:** Additional environmental analysis will be performed to assess the potential environmental impacts associated with the refinements for the two previously evaluated alternatives (SR 60 NSDV LRT Alternative and Washington LRT Boulevard Alternative via Atlantic Below-Grade Concept) and the Combined Concept. The re-initiation of a Draft EIS/EIR would document these potential impacts, develop potential phasing options, and conclude with the recommendation of the Locally Preferred Alternative (LPA). Following public circulation of the Draft EIS/EIR and the selection of an LPA, a Final EIR/EIS will be prepared followed by project implementation if a LPA is selected. Metro will also continue coordination with third party agencies to incorporate their feedback on the environmental analysis throughout the re-initiated environmental process.
- **Engineering Refinements:** As part of the August 2014 Draft EIS/EIR document, preliminary conceptual design drawings were developed for the SR 60 NSDV LRT and Washington Boulevard LRT Alternatives. Metro will conduct additional engineering studies in support of the environmental analysis to better assess potential environmental impacts, operations, cost, ridership, and overall project benefits for the refined project alternatives. More advanced conceptual engineering drawings will be developed for the three alternatives to be studied in the re-initiated environmental clearance.
- **Community Outreach:** Metro will continue providing project status updates to key stakeholders, cities, and communities in tandem with the preparation of the updated Draft EIS/EIR and prior to public circulation. These outreach efforts will ensure that the Metro Board selects an LPA that the community has evaluated and desires.



References

- ¹ Eastside Transit Corridor Phase 2 Project Draft Environmental Impact Statement/Environmental Impact Report. “Chapter 1: Purpose and Need”. August 2014. Page 1-1 to 1-6
http://media.metro.net/projects_studies/eastside_phase2/images/draft_eiseir/report_eastside_chapter1purpose.pdf.
- ² Engineering Studies Prepared for California Department of Transportation (September 6, 2016)
- ³ Engineering Studies Prepared for California Department of Transportation (September 6, 2016)
- ⁴ Engineering Studies Prepared for California Department of Transportation (September 6, 2016)
- ⁵ Southern California Edison Technical Memorandum (February 2017)
- ⁶ SR 60 NSDV Alternative Proposed Design Modification and Cross-Section Exhibit for Pomona Boulevard at Hillview Street (September 2016)
- ⁷ Engineering Studies Prepared for California Department of Transportation (September 6, 2016)
- ⁸ SR 60 NSDV LRT Alternative – Santa Anita Conceptual Design Drawings (September 2016)
- ⁹ Washington Boulevard Routing Concept and Community Outreach Report (May 2016)
- ¹⁰ Assessment of North-South Washington Routing Concepts Draft Technical Memorandum (December 2016)
- ¹¹ Assessment of North-South Washington Routing Concepts Draft Technical Memorandum (December 2016)
- ¹² Southern California Edison Technical Memorandum (February 2017)
- ¹³ SR 60 NSDV LRT Alternative Terrestrial Biological Resources Draft Final Technical Memorandum (January 2017); SR 60 NSDV LRT Alternative - Aquatic Biological Resources Draft Final Technical Memorandum (January 2017)
- ¹⁴ Combined Alternative Technical Memorandum (March 2016)
- ¹⁵ Eastside Transit Corridor Phase 2 Post Draft EIS/EIR Technical Study Community Outreach Summary Report (April 2017)
- ¹⁶ http://theplan.metro.net/wp-content/uploads/2016/09/measurment_ordinance_16-01.pdf.