

**Board Report**

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**File #:** 2015-0994, **File Type:** Informational Report**Agenda Number:** 15.

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**PLANNING AND PROGRAMMING COMMITTEE  
SEPTEMBER 16, 2015****SUBJECT: WEST SANTA ANA BRANCH TRANSIT CORRIDOR****ACTION: RECEIVE AND FILE****RECOMMENDATION**

RECEIVE AND FILE the **West Santa Ana Branch (WSAB) Transit Corridor Technical Refinement Study**.

**ISSUE**

The WSAB Transit Corridor is one of the twelve (12) Measure R Transit corridors and is contained in Metro's 2009 Long Range Transportation Plan with a scheduled revenue service date of 2027. In February 2013, the Southern California Association of Governments (SCAG) approved the Pacific Electric Right of Way (PEROW)/WSAB Alternatives Analysis (AA) Study. This bi-county study explored the 34-mile corridor between Los Angeles Union Station (LAUS) Los Angeles to Santa Ana in Orange County. The AA identified numerous challenges for the Los Angeles portion of the alignment, including the following five key issues: 1) access to LAUS; 2) further analysis of the feasibility of the two recommended alignments accessing LAUS via the West Bank and East Bank of the Los Angeles River; 3) feasibility and impacts of the alternative station locations and alignment reconfiguration requested by the City of Huntington Park; 4) feasibility and challenges of adding a new Metro Green Line Station; and 5) impacts of moving the southern terminus station from the City of Cerritos to the City of Artesia. Attachment B contains a map of the five key issues from the AA Study. In January 2014, Metro initiated the WSAB Technical Refinement Study (the "Refinement Study") to further analyze the challenges identified in the SCAG AA Study. The Refinement Study has been finalized and staff is requesting the Metro Board to receive the Study's findings. Attachment A contains the Executive Summary. The full report can be accessed at <http://www.metro.net/projects/west-santa-ana/>.

**DISCUSSION****Background**

In Los Angeles County, the WSAB corridor stretches approximately 20 miles from the City of Artesia to LAUS. The alignment uses eight miles of Metro owned abandoned Pacific Electric Rail ROW from the Los Angeles/Orange County Border north to the City of Paramount. It extends 12 miles north of the City of Paramount to downtown Los Angeles through nine cities via a combination of local streets

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and private and Metro owned rail ROW. Per Metro Board direction in January 2014, Eco-Rapid Transit participated in the Refinement Study in coordination with the Gateway Cities Council of Governments and the corridor cities.

For the Los Angeles County portion of the corridor, two build alternatives were recommended by SCAG for further study, which included Light Rail Transit (LRT) to LAUS along: the “West Bank” of the Los Angeles River (West Bank 3); and the “East Bank” of the Los Angeles River (East Bank).

The Refinement Study is not a revision to the AA, but rather a focused study that used the SCAG AA recommendations as a starting point to further refine and analyze the challenges identified at the conclusion of the AA. As the Refinement Study is only a technical study, public outreach was not conducted. Coordination and technical meetings with the various affected cities’ staff were held throughout the Refinement Study process. Below is a discussion of the Refinement Study’s five key study areas. Travel forecasting and preliminary cost estimates were provided for each Los Angeles County alignment alternative, and are contained in Attachment C.

#### Northern Terminus at Los Angeles Union Station

Analysis was conducted to determine where within LAUS a new light rail platform could be added to serve as the northern terminus for the WSAB project. In coordination with Metro’s Union Station Master Plan (USMP) and Rail Planning staff, two potential zones for a new WSAB Terminus Station LRT platform were identified: 1) above the recommended relocated bus plaza; or 2) above the Metro Gold Line Station Platform.

#### Northern Alignment Analysis

Further refinement of the two SCAG AA recommended northern alignments was conducted to address issues/challenges along the West Bank and East Bank of the Los Angeles River. The analysis took into consideration alignment variations requested by the City of Huntington Park at the conclusion of the AA Study. As part of this effort, several new alignment options were identified. Based on the analysis, the East Bank Alignment was not recommended for further study based on significant conflicts with operating freight railroads and overhead utility conflicts. However, four variations of the SCAG AA Study West Bank alignment option were recommended for further study. These four new alignment options utilize two corridors: 1) the Pacific Boulevard Corridor through the cities of Huntington Park and Vernon; and 2) the Metro Blue Line/Alameda Street Corridor via the existing Metro Blue Line ROW from Slauson Avenue to Washington Boulevard and heading north along Alameda Street. Both corridors include an Arts District and/or Little Tokyo station option and extend the route to a northern terminus in LAUS. These station locations will require further analysis and consultation with the affected communities, but represent technical refinements to the previous SCAG alignments that can be further improved in cooperation with the Arts District, Little Tokyo, Vernon and the Huntington Park communities.

#### City of Huntington Park Station Locations

At the conclusion of the AA Study, the City of Huntington Park proposed alternate station locations to the ones proposed in the SCAG AA. The proposed alternate locations include a station on Randolph St. east of Pacific Blvd. and a station south of Florence Ave. in the center of Salt Lake Ave. Both alternate station locations were deemed feasible and can be carried forward to replace the previous locations identified in the AA study.

### New Metro Green Line Station

Analysis was conducted to determine the feasibility and challenges associated with a new Metro Green Line Station within the median of the I-105 Freeway east of the I-105/I-710 Interchange. This station would provide a direct transfer to the WSAB project aerial station proposed immediately above it. Based on the conceptual plans, a new Metro Green Line station can feasibly be built within the existing I-105 Freeway and ROW. It is recommended that the station concept be further advanced, including more detailed planning and design evaluations with Caltrans.

### New Southern Terminus Station in the City of Artesia

The SCAG AA originally included a station in the City of Cerritos at Bloomfield Ave. to serve as the southern terminus of the WSAB project. At the request of the City of Cerritos, SCAG removed this station and recommended the City of Artesia as the line's southern terminus. The Refinement Study analyzed how the City of Artesia Pioneer Station, originally conceived as a through-station, would function as a terminus station. Based on the conceptual design, Pioneer Station was deemed feasible as a southern terminus for the WSAB Transit Corridor; however, the anticipated high parking demands will require additional analysis to evaluate reasonable capacities for bus and auto access.

### NEXT STEPS

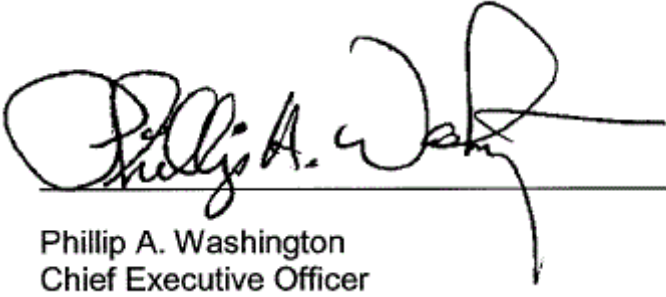
The Refinement Study completed a conceptual level of analysis of the challenges Metro previously identified. The findings will be used to inform the project's environmental process. Staff is proceeding with procuring consultant services for the Environmental Impact Report (EIR) which will further refine ridership and costs, and identify potential project phasing. Staff will return to the Board for contract award.

### ATTACHMENTS

- Attachment A - Executive Summary, WSAB Transit Corridor Technical Refinement Study
- Attachment B - Five Key Issues Map
- Attachment C - Travel Forecasts and Preliminary Cost Estimates

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July 2015

# West Santa Ana Branch Transit Corridor Technical Refinement Study







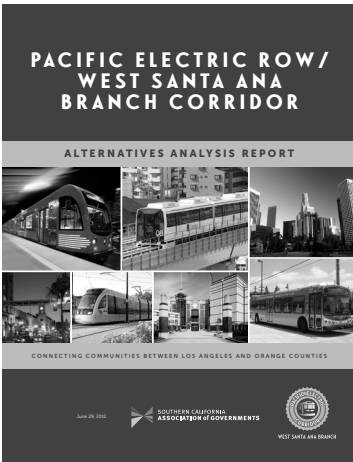
# Executive Summary

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**Building upon the Southern California Association of Governments (SCAG) “Pacific Electric ROW / West Santa Ana Branch Corridor Alternatives Analysis Report”, the Los Angeles County Metropolitan Transportation Authority (Metro) commissioned the “West Santa Ana Branch Technical Refinement Study” to focus on five specific areas of concern. This section summarizes the five issues, analysis performed, and study findings for future light rail service between Artesia and Los Angeles Union Station.**

# Introduction

The West Santa Ana Branch (WSAB) Transit Corridor is one of twelve (12) transit projects funded by Measure R; a one-half cent sales tax approved by Los Angeles County voters in November 2008, and is contained in the Los Angeles County Metropolitan Transportation Authority's (Metro) 2009 Long Range Transportation Plan (LRTP) with a revenue service date of 2027. In March 2010, Southern California Association of Governments (SCAG) initiated the Pacific Electric Right-of-Way/West Santa Ana Branch (PEROW/WSAB) Alternative Analysis (AA) Study in coordination with the affected cities, Orangeline Development Authority (OLDA, now known as Eco-Rapid Transit), the Gateway Cities Council of Governments (COG), Metro, the Orange County Transportation Authority (OCTA), and the owners of the right-of-way (ROW). The AA Study evaluated a wide variety of transit connections and modes for the thirty-four (34) mile corridor from Union Station in Downtown Los Angeles to the City of Santa Ana in Orange County. The modes included low speed magnetic levitation (maglev), heavy rail (like the Metro Red and Purple Lines), light rail (like the Metro Blue and Green Lines), streetcar, and Bus Rapid Transit or BRT (like the Metro Orange Line).



SCAG's Alternatives Analysis Report provided a basis for Metro's Technical Refinement Study

**Los Angeles County Metropolitan Transportation Authority (Metro)** is the transportation agency that serves as transportation planner and coordinator, designer, builder and operator for one of the country's largest, most populous counties. More than 9.6 million people – nearly one-third of California's residents – live, work, and play within its 1,433-square-mile service area.

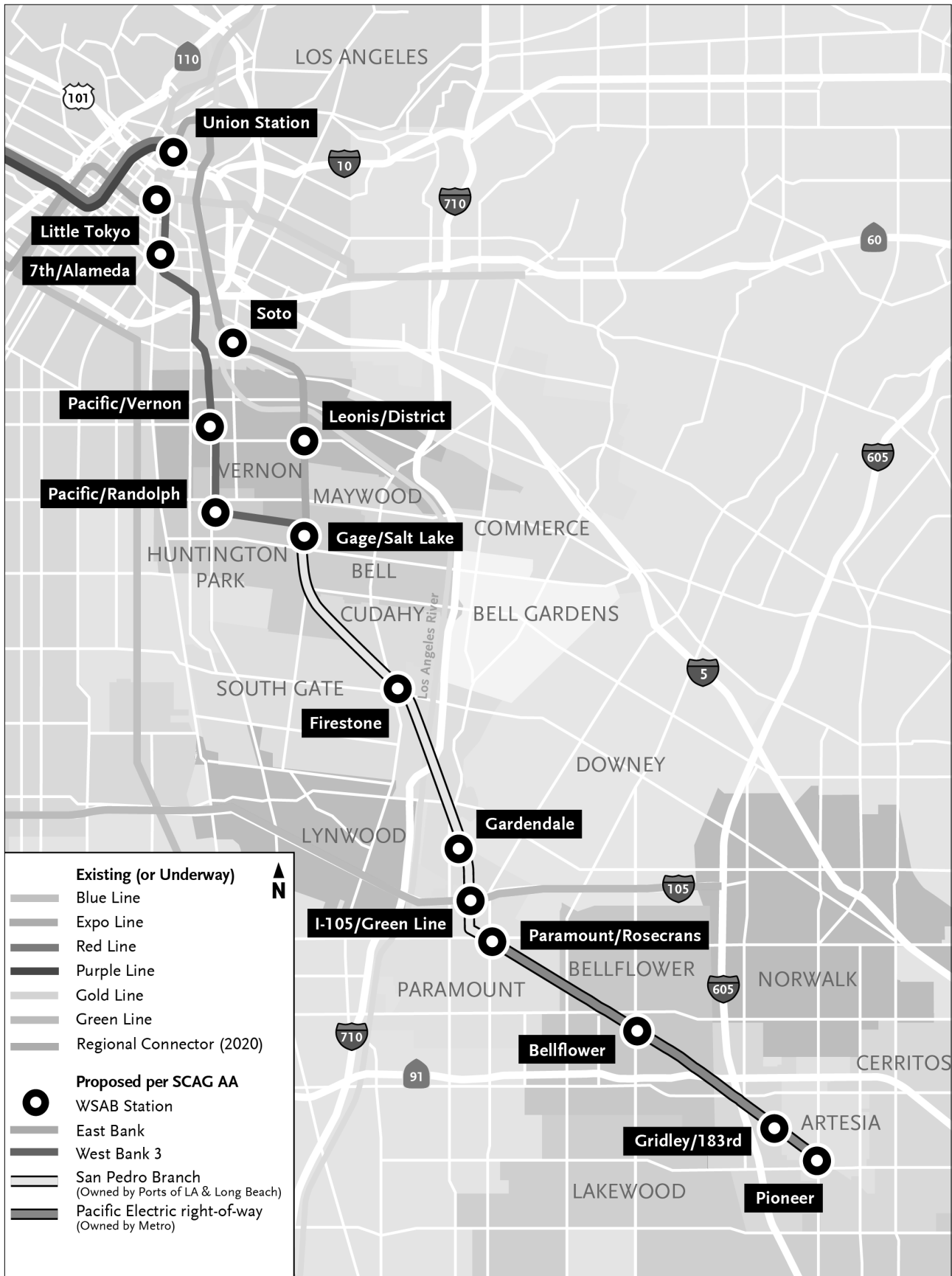
During the SCAG AA study, Metro provided comments to SCAG that would require resolution through additional studies at a future date. A general overview of the Metro comments included request for clarification of access into Union Station; clarification of determination for the grade crossing configurations; concern for impacts to the Metro Green and Blue Lines capacity; and, verification of cost estimates and funding availability.

In February 2013, SCAG completed the PEROW/WSAB AA study and recommended two light rail alternatives for further study; the West Bank Option 3 (West Bank 3) and the East Bank. Figure ES-1 shows the two SCAG AA recommended alternatives and the entire WSAB corridor study area for Los Angeles County. The West Bank 3 alignment was recommended since it accessed a greater number of key cities and destinations that resulted in higher ridership along with good connections to the existing Metro rail system. The alignment also had stronger support from the cities and agencies. The East Bank was also recommended because it terminated at Union Station and while it had challenges, it had less issues than the other alternatives and was deemed a viable second alternative.

Metro decided to follow through with the SCAG AA recommendations by conducting a Technical Refinement Study (Study) of the WSAB corridor. This Study is not a revision to the PEROW/WSAB AA, but rather a focused study on key issues from the SCAG AA. These key issues involve alignment alternatives and station locations. The analysis and findings from this study are documented in the technical reports listed in the Bibliography and summarized in this report. Coordination and technical meetings with the various affected stakeholders (i.e., Eco-Rapid Transit, corridor cities, and Caltrans) were conducted throughout the Study process. Meeting minutes and presentations from these meetings can be found in the technical reports. Public participation was not included as part of this Study as it was a focused technical analysis. The public will be given opportunity to participate in the process and provide input during the next phase.

OPPOSITE  
Figure ES-1: WSAB Corridor Study Area as defined by SCAG AA





## SCAG Alternatives Analysis

In March 2010, SCAG initiated the PEROW/WSAB AA Study in coordination with the affected cities, Eco-Rapid Transit, the COGs, Metro, OCTA, and the owners of the ROW. The AA Study evaluated a wide variety of transit connections and modes for the thirty-four (34) mile corridor from Union Station in Downtown Los Angeles to the City of Santa Ana in Orange County. The modes included low speed magnetic levitation (maglev), heavy rail (like the Metro Red and Purple Lines), light rail (like the Metro Blue and Green Lines), streetcar, and Bus Rapid Transit or BRT (like the Metro Orange Line).

During the SCAG AA study, Metro provided comments to SCAG that would require resolution through additional studies at a future date. A general overview of the Metro comments included request for more details about the configuration of the alignment options; clarification of access into Union Station and its vehicle capacity; the need for coordination with other railroads; operational concerns; clarification of determination for the grade crossing configurations; concern for impacts to the Metro Green and Blue Lines capacity; verification of cost estimates and funding availability, and concern for impacts to the Metro Green Line and I-105 freeway.



Figure ES-2: SCAG AA's East Bank alignment option

SCAG recommended two options (both utilizing light rail technology) to carry forward for further consideration by Metro and OCTA. These two options were the East Bank (Figure ES-2) and West Bank 3 alignments (Figure ES-3). The term East Bank refers to the alignment proposed within a ROW east of the Los Angeles River, and West Bank refers to the alignment proposed west of the Los Angeles River. Both alignments converge in the City of Huntington Park and continue south within existing rail ROW until the City of Artesia (Figure ES-4). Note that the SCAG AA study included the Los Angeles County southern terminus in the City of Cerritos at the Bloomfield Station; additional information can be found in Section 2.5. The West Bank 3 alignment was recommended since it accessed a greater number of key cities and destinations that resulted in higher ridership along with good connections to the existing Metro rail system. The alignment also had stronger support from the cities and agencies. The East Bank was also recommended because it terminated at Union Station and while it had challenges, it had less issues than the other alternatives and was deemed a viable second alternative.



Figure ES-3: SCAG AA's West Bank 3 alignment option

## Purpose of the Technical Refinement Study

This Study is not a revision to the PEROW/WSAB AA, but rather a focused study on key issues from the SCAG AA. The analysis and findings from this study are documented in the technical reports listed in the Bibliography and summarized in this report. Coordination and technical meetings with the various affected stakeholders (i.e., Eco-Rapid Transit, corridor cities, and Caltrans) were conducted throughout the Study process. Meeting minutes and presentations from these meetings can be found in the technical reports. This Study was more of a focused technical analysis so public participation will be included during the scoping for the environmental phase.

The key issues from the SCAG AA analyzed in this report involve alignment alternatives and station locations along with the development of travel forecast and preliminary cost estimates of the alternatives. The key issues concern five specific areas shown in Figure ES-4 and are listed below. Metro will use these results to help decide which alternative(s) and stations to carry forward into the next phase.

### **1. Los Angeles Union Station – Northern Terminus**

Access and enter the northern terminal station, Los Angeles Union Station.

### **2. Northern Alignment Options**

Develop options for the northern alignment segment between City of Huntington Park and Union Station.

### **3. Huntington Park Alignment & Stations**

Study the City of Huntington Park's request for potential relocation and modification of the planned stations and alignment.

### **4. New Green Line Station**

Feasibility of adding a new Metro Green Line Station east of the I-105/I-710 freeway interchange.

### **5. Southern Terminus**

Study the potential change to the southern terminal station from the City of Cerritos to the City of Artesia.

An overview of the analysis and findings for each of these key issues is documented in this report and presented in four study areas; alignments, stations, travel forecast, and preliminary cost estimate. The alignment and station analysis include existing site context and factors considered in the study followed by a discussion of the findings, including options, challenges, and issues that will need further analysis in the next phase of the project. The travel forecast and preliminary cost estimate provide pertinent information to assist with the decision-making process of the alignment and station alternatives. For additional information beyond what is presented in this report, there are separate technical reports for each key issue; see the Bibliography for references to these reports.

## OPPOSITE

Figure ES-4: Five Key Issues addressed in this study

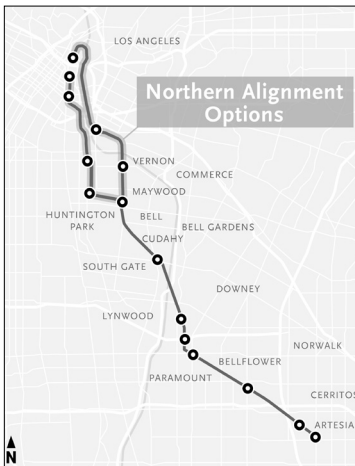


## Stakeholder Coordination

During the Study process, Metro and the consulting team met regularly with the Eco-Rapid Transit Executive Director, Caltrans, and cities directly affected by the five key issues, which included the Cities of Los Angeles, Vernon, Huntington Park, South Gate, Paramount, Cerritos, and Artesia. Each city's input was critical to validating the results of the Study as the team's findings were measured alongside their local knowledge of planned projects, insights on the team's assumptions, and general feasibility of design options considered. Gathering input from Caltrans and each city will continue to be an important part of the project in subsequent phases.

Coordination typically consisted of technical meetings with Caltrans, city staff (City Manager, Planning, Public Works and/or Transportation) to review preliminary findings, provide feedback, discuss design options, and review draft and final reports. Meetings were held with Caltrans, the Cities of Los Angeles, Vernon, Huntington Park, South Gate, Paramount, Artesia and Cerritos.

Other meetings included coordination with Metro personnel to discuss projects that may affect WSAB, such as the Union Station Master Plan (USMP), Southern California Regional Interconnector Project (SCRIP) and California High Speed Rail (CAHSR). Meetings were held with various Metro departments, such as Operations, Engineering, Estimating, and Real Estate, to discuss and confirm assumptions as well as give them WSAB project updates.



Key plan showing location of alignment study conducted for the northern portion of WSAB study area

## Study Summation

### Summation of Alignment Studies

The SCAG AA recommended two alignments (both utilizing light rail technology) for the WSAB project be carried forward for further analysis by Metro or OCTA; the East Bank and West Bank 3 alignments (Figure ES-1). The term East Bank refers to the alignment proposed within a ROW east of the Los Angeles River, and West Bank refers to the alignment proposed west of the Los Angeles River. Both alignments converge in the City of Huntington Park and continue south within existing rail ROW to the City of Artesia (Figure ES-4). Note that initially both alignments had a station within the City of Cerritos, called the Bloomfield Station, which was the last station within Los Angeles County. The City of Cerritos requested the elimination of this station during the SCAG AA development and by default the Pioneer Station in the city of Artesia became the last station. The West Bank 3 alignment was recommended since it accessed a greater number of key cities and destinations that resulted in higher ridership along with good connections to the existing Metro rail system. The alignment also had stronger support from the cities and agencies. The East Bank was also recommended because it terminated at Union Station and while it had challenges, it had less issues than the other alternatives and was deemed a viable second alternative.

The alignment studies included both SCAG AA alignments and new alignment options (Figure ES-5). Study findings based on 5% design are in the Section 1.0, Alignment Options.

The analysis considered the following factors:

- Current context
- Metro Rail Design Criteria, Standard & Directive Drawings
- In process projects for Metro, corridor cities, and private developers
- Site and corridor constraints
- Input from stakeholders
- Construction feasibility



OPPOSITE  
Figure ES-5 Six alignment options for the northern segment of the WSAB Transit Corridor

**Six alignment options for the WSAB Alignment were studied.** Two of the alignment options were carried over from the SCAG AA and the other four were new options. The new alignment options consist of two corridors: the Pacific Boulevard Corridor and the Metro Blue Line/Alameda Street Corridor. The Pacific Boulevard Corridor uses Pacific Boulevard in the Cities of Vernon and Huntington Park for the light rail tracks within the street, while the Metro Blue Line/Alameda Street Corridor utilizes the existing Metro Blue Line ROW for separate light rail tracks. The six options (Figure ES-6) are:

### SCAG AA Options

#### East Bank

- This alignment starts at Union Station and continues south on the eastern side of the Los Angeles River within existing Metro ROW. It then continues further south within existing railroad ROW owned by others starting at approximately Soto station until the southern terminus in the City of Artesia.

#### West Bank 3

- This alignment starts south of Union Station within the Little Tokyo district and continues south above or within existing streets, under private property, and within Metro ROW until the center of the City of Huntington Park. From here it transitions to existing railroad ROW owned by others to the southern terminus in the City of Artesia.

### Pacific Boulevard Corridor Options

#### West Bank - Pacific/Alameda (New)

- This alignment starts at Union Station and continues south along various streets (mostly within Alameda Street, 4th Street, Santa Fe Avenue, and Pacific Boulevard) until the center of the City of Huntington Park. From here it transitions to existing railroad ROW owned by others until the southern terminus in the City of Artesia.

#### West Bank - Pacific/Vignes (New)

- This alignment starts at Union Station and continues south along various streets (mostly within Vignes Avenue, Santa Fe Avenue, and Pacific Boulevard) until the center of the City of Huntington Park. From here it transitions to existing railroad ROW owned by others until the southern terminus in the City of Artesia.

### Metro Blue Line/Alameda Street Corridor Options

#### West Bank - Alameda (New)

- This alignment starts at Union Station and continues south along Alameda Street until the I-10 freeway where it transitions into the Metro Blue Line ROW until the west side of the City of Huntington Park. From here it transitions to existing railroad ROW until owned by others the southern terminus in the City of Artesia.

#### West Bank - Alameda/Vignes (New)

- This alignment starts at Union Station and continues south along various streets (mostly within Vignes Street, Santa Fe Avenue, and Alameda Street) until the I-10 freeway where it transitions into the Metro Blue Line ROW until the west side of the City of Huntington Park. From here it transitions to existing railroad ROW owned by others until the southern terminus in the City of Artesia.

Figure ES-6: Enlarged map of six alignment options





Table ES-1 provides some key alignment characteristics for comparison of the options, which include the total number of stations, total length of the alignment, and land use characteristics. The study findings for each alignment alternative can be found in the subsequent Section 1.6.

**Table ES-1: Key Alignment Characteristics**

Alternative	Number of Stations	Length (miles)	Land Use
East Bank	11	18.5	Institutional Industrial Manufacturing
West Bank 3	12	17.8	Commercial Multi-family residential Industrial Single-family residential
West Bank - Pacific/Alameda	13	18.3	Institutional Commercial Multi-family residential Industrial Live-work
West Bank - Pacific/Vignes	12	18.1	Industrial Live-work Multi-family residential Commercial Single-family residential
West Bank - Alameda	15	19.0	Institutional Commercial Multi-family residential Industrial Single-family residential
West Bank - Alameda/Vignes	15	19.1	Industrial Live-work Single-family residential Multi-family residential

### Summation of Station Studies

The SCAG AA recommended station locations along the East Bank and West Bank 3 alignment alternatives. Additional alignment alternatives were developed, as described in the previous section, along with new station locations. This section summarizes the additional analysis completed for specific station locations due to potential challenges, stakeholder recommendations to adjust station locations, and new location(s) not studied within the SCAG AA. The study findings for each station are expanded upon in Section 2.0, Station Studies.

## Los Angeles Union Station - Northern Terminus

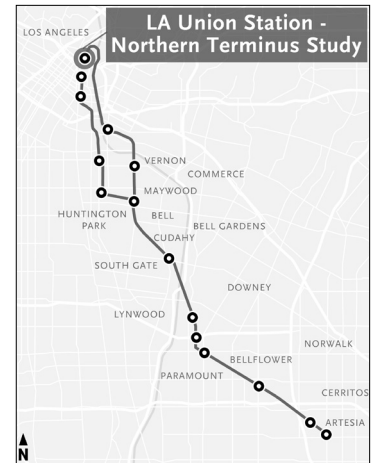
This study considered where a new light rail platform could be added to serve as the north terminus of the WSAB project within Los Angeles Union Station. Analysis based on 5% design, urban design considerations, and meetings with the USMP and SCRIP teams resulted in the identification of potential station locations. Study findings are expanded upon in Section 2.1.

The analysis considered the following factors:

- Current context
- Metro Rail Design Criteria, Standard & Directive Drawings, “Kit of Parts” approach
- In process projects, such as USMP, SCRIP, and CAHSR
- Site constraints

Two potential zones for a new WSAB Terminus Station light rail platform were identified. Both locations are centralized and provide close proximity to Amtrak and Metrolink platforms, Metro Red/Purple Lines and Gold Line Stations, and the USMP recommended relocated bus plaza as shown in Figure ES-7:

- **Over the USMP recommended relocated bus plaza.** An aerial station could be built one-level above the relocated bus plaza and share some vertical circulation elements (elevators, escalators, stairs). This location is also a future development pad per the USMP (identified as an Office Building). It is unknown when a building could be financed and developed in this location.
- **Over the Metro Gold Line Platform.** An aerial station could be built one-level above the existing station platform and share some vertical circulation elements (elevators, escalators, stairs). This location does not coincide with any development pads and does not conflict with SCRIP or CAHSR.



Key plan showing location of Los Angeles Union Station Northern Terminus



Metro’s Station Design Review Report includes a “Kit of Parts” standardized approach which was the basis for each station study

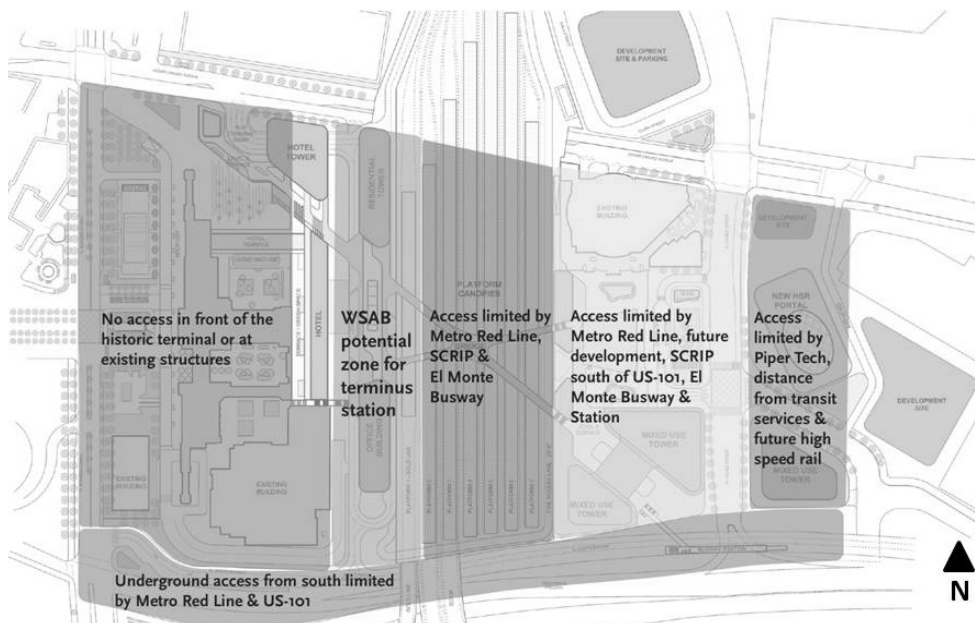


Figure ES-7: Los Angeles Union Station will undergo changes due to implementation of the Master Plan, SCRIP and a future CAHSR Station. The orange area (shown over the Union Station Master Plan) contains two potential sites for a WSAB terminus station.



Key plan showing study area for new stations that arose during the refinement of alignment alternatives

### New Stations for New Alignment Alternatives

During the refinement of alignment alternatives, new station locations were identified that were not previously included in the SCAG AA and should be considered in the next phase of analysis. The new stations that arose while developing the West Bank alternatives include:

- Arts District Station (3 potential locations: One Santa Fe, 3rd or 4th Streets)
- Washington Station (at Metro Blue Line)
- Vernon Station (at Metro Blue Line)
- Slauson Station (at Metro Blue Line)
- Potential Station between Arts District Station and Pacific/Vernon Station (3 potential locations: 6th Street, Santa Fe and Olympic, or Washington Boulevard) on the two alignment options “West Bank – Pacific/Alameda”, and “West Bank – Pacific/Vignes”

Study findings are expanded upon in Section 2.2. For the analysis of Florence Station in Huntington Park, and the new Green Line Station in Paramount, see the following sections.



Figure ES-8: Map showing the new stations that arose during the Technical Refinement Study not previously considered in the SCAG AA.

### City of Huntington Park Stations

This study analyzed the feasibility, potential challenges, and solutions for two stations in City of Huntington Park proposed by the City in alternative locations from what was shown in the SCAG AA.

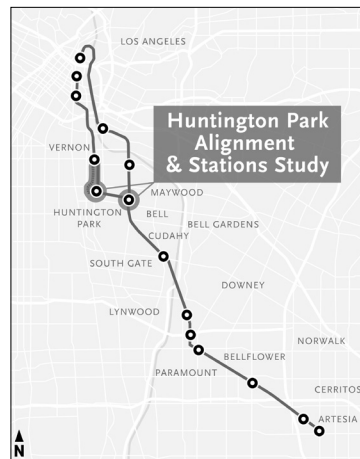
1. In lieu of a Pacific/Randolph Station (in the center of Pacific Boulevard north of Randolph Street) the City asked Metro to study a station on Randolph Street east of Pacific Boulevard. See Figure ES-9 for concept plan.
2. In lieu of a Gage Station (north of Gage Avenue along Salt Lake Avenue in the rail ROW) the City asked Metro to study a station south of Florence Avenue in the center of Salt Lake Avenue. See Figure ES-9 for concept plan.

Study findings based on 5% design and urban design considerations are expanded upon in Section 2.3.

The analysis considered the following factors:

- Cities of Huntington Park and Vernon letters and meeting input
- Metro Rail Design Criteria, Standard & Directive Drawings, “Kit of Parts” approach
- Randolph Street ROW
- Salt Lake Avenue ROW

The alternative station locations on Randolph Street (east of Pacific Boulevard) and Salt Lake Avenue (south of Florence Avenue) were deemed feasible.



Key plan showing location of Huntington Park Alignment and Station studies (above) and the City of Huntington Park’s 2012 map with proposed modifications to two stations (shown in black below).

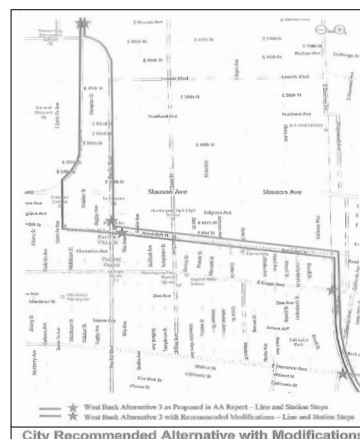
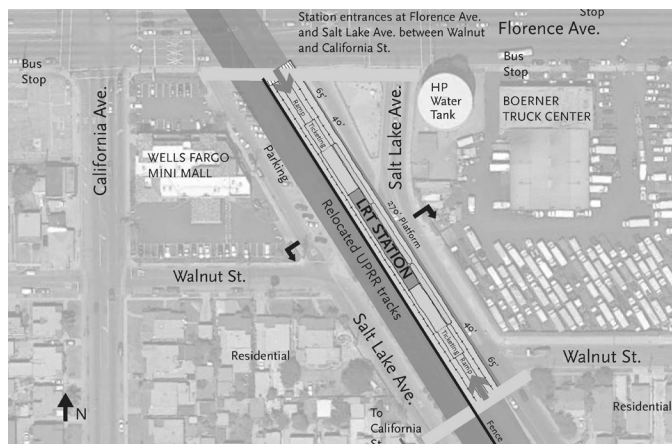
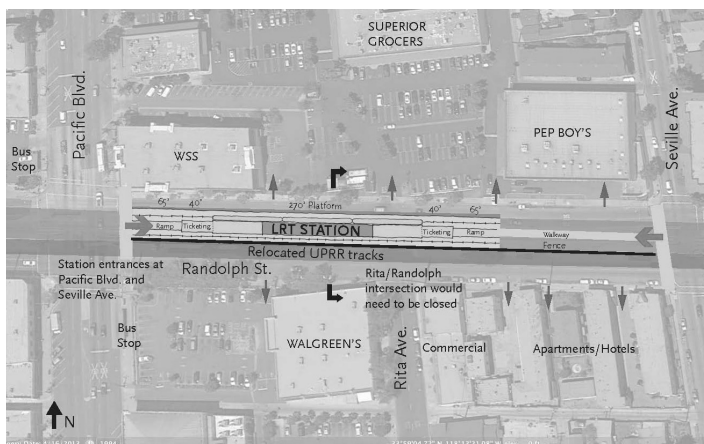


Figure ES-9: Concept plans for Pacific/Randolph Station and Florence/Salt Lake Station in Huntington Park





Key plan showing location of New Metro Green Line Station study

## New Metro Green Line Station

This study focused on the feasibility and challenges associated with a new Metro Green Line Station within the median of the I-105 Freeway east of the I-105/I-710 interchange to provide a direct transfer between the new Green Line station and the new WSAB station, which is proposed immediately above it. The study addressed preliminary construction and operational impacts to both the existing I-105 Freeway and Metro Green Line and Blue Line operations as a result of building a new Metro Green Line station, and identified potential solutions for minimizing service disruptions. A conceptual cross-section drawing of the two new station platforms is shown in Figure ES-10.

Study findings based on 5% design and urban design considerations are expanded upon in the Section 2.4.

The analysis considered the following factors:

- WSAB Station over the I-105 Freeway per SCAG AA
- Metro Rail Design Criteria, Standard & Directive Drawings, “Kit of Parts” approach
- Metro Green Line Operations
- Station context
- Caltrans ROW
- UPRR bridge and ROW

Based on the conceptual plans, it was determined that a new Metro Green Line station connecting with the WSAB project can feasibly be built within the existing I-105 Freeway and ROW.

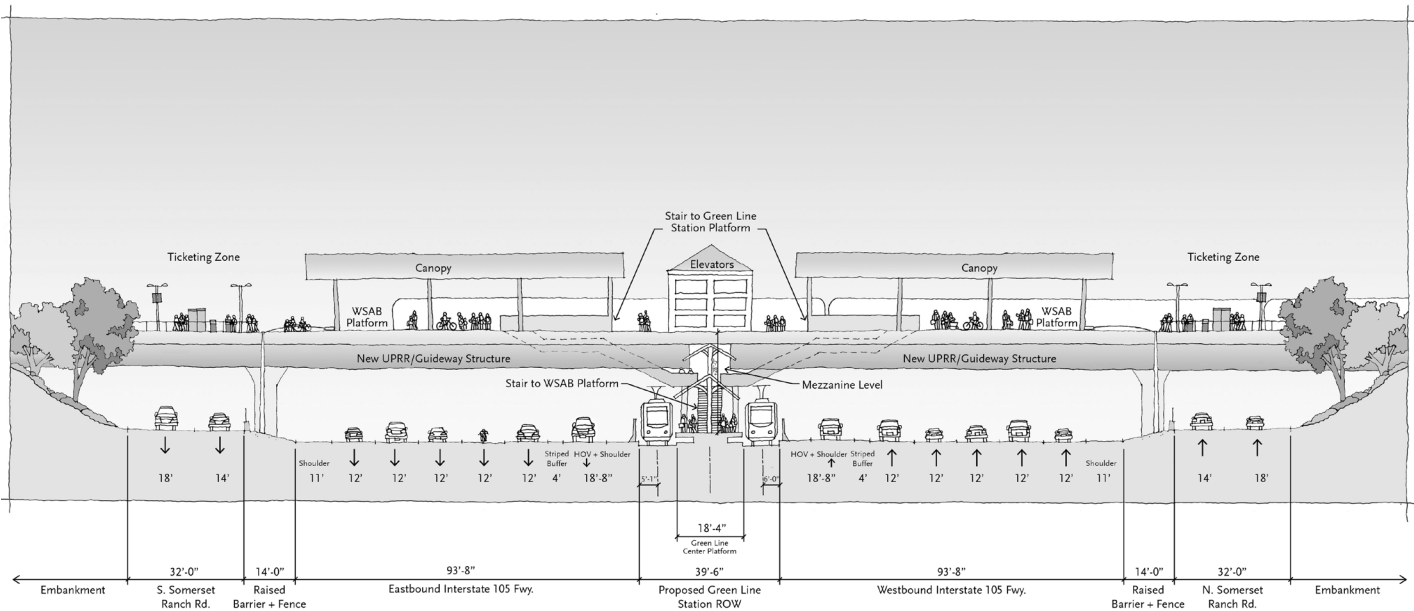


Figure ES-10: Conceptual cross-section drawing (looking west) for a New Metro Green Line Station below a new WSAB Station at Florine Ave. and Century Blvd. in the City of Paramount

City of Artesia – New Southern Terminus

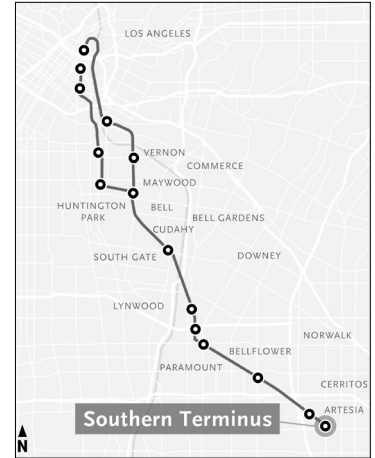
This study analyzed how the Pioneer Station would function as the new southern terminus for the WSAB project in lieu of the City of Cerritos Bloomfield Station. The SCAG AA included a Bloomfield Station in the City of Cerritos to serve as the southern terminus for Los Angeles County. Upon the City of Cerritos' request, the Bloomfield Station was removed from further consideration. The next station to the north is the Pioneer Station in the City of Artesia; assumed to function as a through-station by SCAG.

The Pioneer Station location (Figure ES-11) was analyzed for its feasibility to determine what kind of challenges may exist based on no more than 5% level of design. Study findings based on 5% level of design and urban design considerations are expanded upon in the Section 2.5.

The analysis considered the following factors:

- City of Artesia meeting input and planned project documents
- City of Cerritos meeting input
- Metro Rail Design Criteria, Standard & Directive Drawings, "Kit of Parts" approach
- Metro Operational needs for terminus station
- Urban design analysis
- ROW

Pioneer Station was deemed feasible as the new southern terminus for the WSAB project.



Key plan showing location of new Southern Terminus study in Artesia

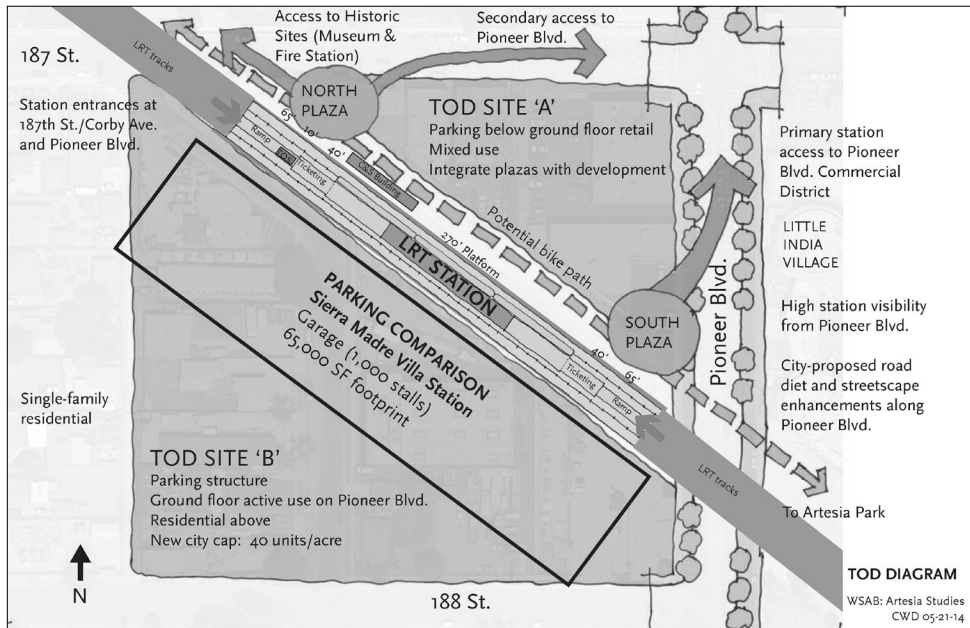


Figure ES-11: Concept sketch of a potential transit-oriented development (TOD) at the Southern Terminus Station in Artesia, shows the City of Artesia's preferred station platform location between 187th St. and Pioneer Blvd.

## Ridership

The travel forecasting results for the six alternatives were developed using a horizon year of 2040 and presented as new transit trips and project boardings for each alternative.

Below are the assumptions per alternative used within the travel demand model; see Table ES-2. In the next phase, these assumptions will be revisited as they are dependent upon the types of guideway and stations (i.e., at-grade, aerial, and underground) assumed within this study.

Table ES-2: Summary of Assumptions per Alternative

Alternative	Number of Stations	Length (miles)	Travel Time (minutes)
East Bank	11	18.5	34.4
West Bank 3	12	17.8	32.4
West Bank - Pacific/Alameda	13	18.3	33.0
West Bank - Pacific/Vignes	12	18.1	33.2
West Bank - Alameda	15	19.0	33.2
West Bank - Alameda/Vignes	15	19.1	34.3

Another important assumption is station parking, which was analyzed starting with the SCAG AA recommended quantities and adjusted with input from the cities. The following Table ES-3 represents the station parking spaces used in the travel forecast process. The parking spaces in the table reflect the constrained amount, which refers to the amount that can be accommodated based upon existing conditions. The actual parking demand is higher. Note the 200 parking spaces listed for Union Station are existing while the remainder of the parking spaces are new and therefore will be constructed as part of this project.

Table ES-3: Station Parking Spaces (Constrained)

Station	Parking Spaces
Union Station	200 (existing)
Firestone	150
WSAB-Green Line (combined)	300
Paramount	200
Bellflower	270
Gridley	400
Pioneer	300
TOTAL	1,820

Therefore, during the next phase of the project, the amount of station parking spaces will be studied further to determine if additional spaces are feasible and how this will affect the travel forecast balanced with other factors, such as cost, ROW impacts, and traffic impacts.



### Daily New Transit Trips and Project Boardings

In order to evaluate the ridership for the six alternatives, several measurements were considered to understand the factors influencing why one alignment is anticipated to perform better than another. The first measurement is boardings. Boardings represent each time a person enters a transit vehicle; for example, one ride with a transfer to reach a destination equates to two boardings. New transit trips are another important measurement because they represent people who would likely opt to take a trip using the WSAB line rather than drive a car to reach their destination; for example, travel out to a destination and a return back represents two trips taken.

Based upon the travel forecast results, the alignment options that show higher boardings are the West Bank – Alameda and West Bank – Alameda/Vignes, which parallel the Metro Blue Line and share multiple station locations between Union Station and Slauson Station. The boardings are higher for these two options due to transfers from/to the existing Metro Blue Line. For new transit trips, the highest alignments are the East Bank, West Bank – Pacific/Alameda and West Bank-Pacific/Vignes, which demonstrates that more people are shifting modes to take advantage of the new transportation option. Figure ES-12 shows the boardings and new transit trips per alignment option and illustrates how the two measurements relate. Below the figure is a discussion of the factors that affect these numbers.

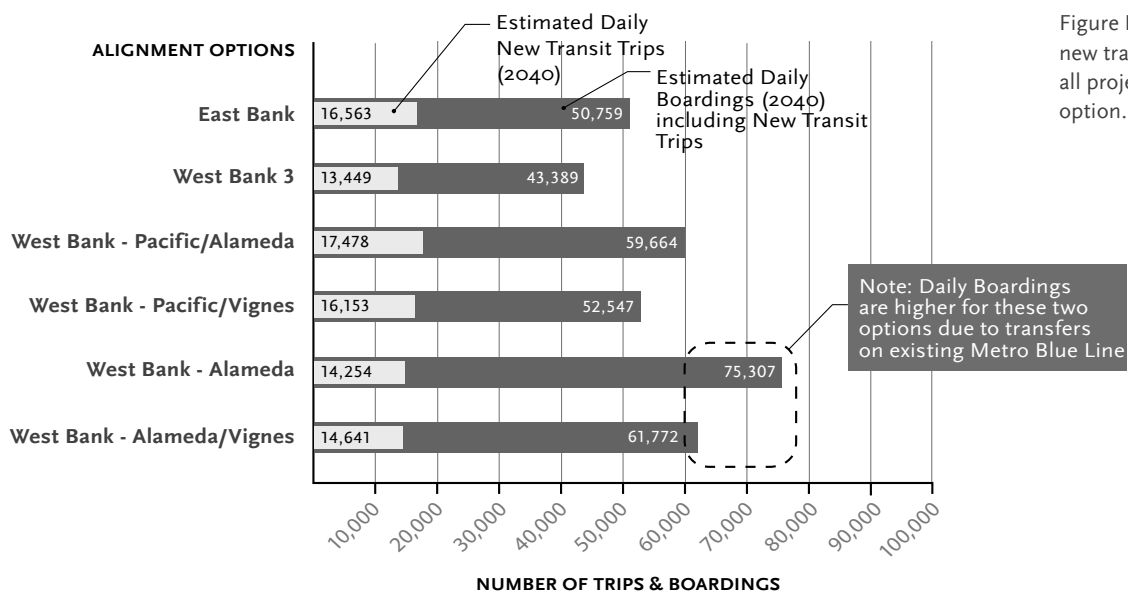


Figure ES-12: Graph showing daily new transit trips as a portion of all project boardings by alignment option.

Overall there are three factors that affect the number of “new transit trips” and “daily boardings” each alternative is capable of generating. The key issues that arose during this Study and that are the biggest differentiators between the six alternatives are:

#### 1. Terminating in Union Station

The only alternative that didn’t terminate at Union Station at its northernmost point is the West Bank 3 and it resulted in the lowest total number of new transit trips and boardings. The ability for WSAB riders to access other Metro rail lines, Metro buses, other operator bus lines, Metrolink and Amtrak is a significant benefit that was revealed in the total number of forecasted new transit trips and boardings. New transit trips went up 20-30% for the other alternatives that assumed Union Station as the northernmost terminus. Therefore, the ability to reach Union Station is critical for maximizing ridership and the West Bank 3 alignment that terminates in Little Tokyo is not comparable because it requires a forced transfer.



Terminating WSAB at Union Station brings significant benefits to riders.



Alignments that included a station in Little Tokyo near 1st/Central, and stations alongside the Metro Blue Line reflected higher boardings.

## 2. Capturing East-West Transfers in Little Tokyo

Alternatives that included a station in Little Tokyo near 1st/Central and continuing into the Los Angeles Union Station generated more boardings because they allowed for transfers to the Metro Gold Line via the future Metro Regional Connector. These alternatives included West Bank – Pacific/Alameda and West Bank – Alameda. A WSAB station within Little Tokyo gives riders the opportunity to transfer to the Metro Gold Line to reach points further east (Boyle Heights, East Los Angeles, and Whittier when Metro Gold Line Eastside Phase II is realized) and west when the Regional Connector opens (Downtown Los Angeles, Mid-City and Santa Monica). Locating a station at 1st/Central can increase boardings by approximately 14% or increase new transit trips by 8% from what would otherwise be forecasted on a similar alternative that didn't have a stop at 1st/Central and continued into the Los Angeles Union Station.

## 3. Following the Metro Blue Line

The alternatives proposed alongside the Metro Blue Line connecting Slauson Station and Union Station reflect a higher number of boardings due to “forced transfers”. These alternatives include the West Bank – Alameda and West Bank – Alameda/Vignes. Typically forced transfers are viewed negatively because transferring adds travel time and can be a deterrent if the delay is significant and the rider has other options. However, in this case the WSAB alternatives provide the Metro Blue Line riders a faster means to reach Union Station since the WSAB alternatives are more direct. For comparison, the travel time from Slauson Station to Union Station by Metro Blue Line is approximately 22 minutes; and by WSAB the travel time will only be approximately 9 minutes. The addition of WSAB between Slauson Station and Union Station can relieve demands on the Metro Blue Line which is currently operating at its full capacity.

## Preliminary Cost Estimates

Table ES-4 presents the preliminary cost estimates associated with each of the alternatives in 2015 dollars. The preliminary cost estimates include cost contingency to cover unexpected cost increases, which is consistent with FTA recommendations for transit projects at the 5% level of design. The preliminary cost estimates will be further refined in the next phase.

Table ES-4: Preliminary Cost Estimates

Alternatives	Total Cost (in millions, 2015 dollars)
East Bank	\$3,796.3
West Bank 3	\$4,315.5
West Bank - Pacific/Alameda	\$4,420.5
West Bank - Pacific/Vignes	\$4,416.2
West Bank - Alameda	\$4,309.4
West Bank - Alameda/Vignes	\$4,621.3

The SCAG AA cost estimates for the East and West Bank alignments were lower than the updated preliminary cost estimates due to cost escalation between 2010, which is the base year for the SCAG AA, and 2015, the base year for WSAB. Additionally, the WSAB preliminary cost estimates include costs for parking facilities, route footage increases, additional sitework, train control, signaling and communications systems, land acquisition, professional services, related permits and other associated fees.

## Study Findings

Table ES-5 is a summary of the key characteristics for the six alternatives analyzed during this Study. The following sections expand upon the study findings for the alignments and stations (Figure ES-13) along with the key issues to be analyzed and resolved in the next phase of the project.

Table ES-5: Key Characteristics for Six Alternatives

	Number of Stations	Length (miles)	Travel Time (minutes)	Estimated Daily Boardings (2040)	Preliminary Cost Estimate (in millions, 2015 dollars)
East Bank	11	18.5	34.4	50,759	\$3,796.3
West Bank 3	12	17.8	32.4	43,389	\$4,315.5
West Bank - Pacific/Alameda	13	18.3	33.0	59,664	\$4,420.5
West Bank - Pacific/Vignes	12	18.1	33.2	52,547	\$4,416.2
West Bank - Alameda	15	19.0	33.2	75,307	\$4,309.4
West Bank - Alameda/Vignes	15	19.1	34.3	61,772	\$4,621.3

### Alignments

This section is an overview of the alignment study findings described in more detail in Section 5.2, Alignment Findings.

**East Bank:** Benefits include direct connection to Union Station. Challenges include ROW constraints of existing railroad usage and adjacent high-tension power lines to the west and commercial buildings to the east that make expansion of the ROW expensive and/or unattainable.

**West Bank 3:** Benefits include stations in key destinations. Challenges include northern terminus falling short of Union Station and therefore ridership is less due to the lack of direct access to other regional transit services available at Union Station.

**West Bank - Pacific/Alameda and West Bank – Pacific/Vignes:** Benefits include direct connection to Union Station and stations in key destinations. Challenge includes concern from the cities of Vernon and Huntington Park for impact to truck traffic along Pacific Boulevard.

**West Bank – Alameda and West Bank – Alameda/Vignes:** Benefits include direct connection to Union Station, stations in key destinations, and potential cost savings by utilizing the existing Metro Blue Line ROW. Challenges include potential impacts to private property and the widening of Metro ROW utilized by the Blue Line.

Based on the analysis, the East Bank alignment is not recommended to go forward due to right-of-way constraints from existing railroad usage. In addition, the adjacent high-tension power lines to the west and commercial buildings to the east make expansion of the right-of-way expensive and/or unattainable. The West Bank 3 alignment also is not recommended to go forward because its northern terminus falls short of Union Station and results in low-ridership due to the lack of direct access to other regional transit services available at Union Station. The newer Pacific and Alameda Corridor alternatives would proceed north to Union Station and are warranted for further study.

## Stations

This section is a synopsis of station study findings described in more detail in Section 5.3, Station Findings.

### Los Angeles Union Station - Northern Terminus

- Both station locations in Union Station are feasible to serve as WSAB's North Terminus:
  - Over the Relocated Bus Plaza, and
  - Over the Metro Gold Line platform
- Both options will require further coordination efforts with adjacent projects, such as USMP, CAHSR, and SCRIP.

### New Stations for Alignment Option

The next phase will study all new station locations (not previously identified in the SCAG AA) in greater detail, including those identified in the Arts District, Metro Blue Line transfer stations, and east-west transfer opportunities on Santa Fe/Pacific alignment options.

### Huntington Park Stations

- The alternative light rail station on Randolph Street will better serve Downtown Huntington Park and is initially preferred by the Cities of Huntington Park and Vernon over the proposed Pacific Boulevard location described in the SCAG AA.
- Metro understands Huntington Park's second light rail station location is preferred by the cities of Huntington Park, Bell, Cudahy, and Bell Gardens at Florence and Salt Lake Avenues due to the potential development and connections to other adjacent cities over the proposed Gage Avenue location described in the SCAG AA.

### New Metro Green Line Station

- Based on the conceptual plans, a new Metro Green Line station connecting with the WSAB project can feasibly be built within the existing I-105 Freeway and ROW.
- While the freeway ROW is sufficient to accommodate the new Metro Green Line station, further analysis is required if the I-105 ExpressLanes is also introduced in the freeway corridor.
- Based on initial travel forecast results, there does not appear to be any long-term systemwide operational impacts to either the Metro Green Line or the Metro Blue Line but may instead be positive in the sense of relieving the other lines by giving passengers other options.
- Pedestrian access to the station from the south should be studied further.

### Artesia - Southern Terminus

- Pioneer Station is feasible as a Southern Terminus and recommended for its platform west of Pioneer Boulevard.
- Station parking must be studied further based on demands.

OPPOSITE

Figure ES-13: Study findings for alignments and stations.



## Key Issues to Resolve During the Next Phase

The next phase will analyze the potential environmental impacts and mitigations for specific study areas. Also, the design will advance along with development of the operational and maintenance program. Based upon the 5% level of design, the following are key issues that will need to be analyzed during the next phase:

### 1. Traffic/Parking

All of the alignment options propose portions of the guideway within public streets. The guideway placement within the public streets will require reconfiguration of the traffic lanes, street parking, left turn pockets, etc. This will be done in conjunction with the traffic analysis in order to develop a solution that will not generate or minimize the potential impact to the traffic and parking.

### 2. Real Estate

There are specific areas where the guideway will be within the ROW owned by others that will require early coordination efforts due to the potential amount of time to reach an agreement on the design, compensation (if any), and coordination. This includes the following:

- The aerial guideway from Union Station over the 101 freeway that will require approval from Caltrans.
- The aerial or at-grade guideway within the existing railroad corridors will require early coordination, such as with UPRR, Southern California Regional Rail Authority (SCRRA) and Ports of Long Beach and Los Angeles.
- The various corridor cities will need to approve the guideway within (i.e., at-grade, aerial, or underground) their public streets.

### 3. Utilities

There are potential impacts to utilities for the alignment options and most will occur within the public streets where the guideway is proposed. Existing utilities will need to be located and mitigated, especially in areas with an aerial structure or underground guideway.

### 4. Soil Conditions

Investigation of the existing soil conditions is required for all underground structures, such as the foundations for aerial structures and underground guideway sections. In some areas, such as the alignments near the Los Angeles River, a higher water table may be encountered due to the proximity to the river.

### 5. Existing Underground Structures

For the alignment options proposed to be underground, the design will need to address existing structures that are within or adjacent to the proposed alignment. For example, for the West Bank – Pacific/Vignes alignment, when the guideway crosses under the 1st Street bridge, guideway design will be coordinated with the existing bridge piers. Also for the West Bank – Alameda/Vignes alignment when it transitions from the Vignes alley to 3rd Street, underpinning of adjacent buildings may be required.

**6. Coordination with California Public Utilities Commission (CPUC)**

The CPUC is an important stakeholder as they will ultimately approve the project before it can be put into service. Therefore, it is critical to begin coordination early for information sharing and these types of meetings continue throughout the project development.

**7. Locate the Maintenance Facility**

The exact location, size, configuration, and functions will need to be decided for the maintenance facility. The SCAG AA identified some potential locations and these may be analyzed along with identification of new locations after the facility size and configuration is determined based upon the number of vehicles to be stored at the site and the facility functions.

**8. Resolve Station Parking Demand**

The station parking spaces used within the travel demand model are constrained and do not reflect the actual demand. Therefore, during the next phase of the project, the amount of station parking spaces will be studied further to determine if additional spaces are feasible and how this will affect the travel forecast balanced with other factors, such as cost, ROW impacts, and traffic impacts.



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### Travel Forecasts and Preliminary Cost Estimates

	Number of Stations	Length (miles)	Travel Time (minutes)	Estimated Daily Boardings (2040)	Preliminary Cost Estimate (in millions, 2015\$)
<b>East Bank</b>	11	18.5	34.4	50,759	\$3,796.3
<b>West Bank 3</b>	12	17.8	32.4	43,389	\$4,315.5
<b>Pacific/Alameda *</b>	13	18.3	33	59,664	\$4,420.5
<b>Pacific/Vignes *</b>	12	18.1	33.2	52,547	\$4,416.2
<b>Alameda *</b>	15	19	33.2	75,803 **	\$4,309.4
<b>Alameda/Vignes *</b>	15	19.1	34.3	61,772 **	\$4,621.3

\* Higher Performing Alternatives

\*\* Forced Transfers