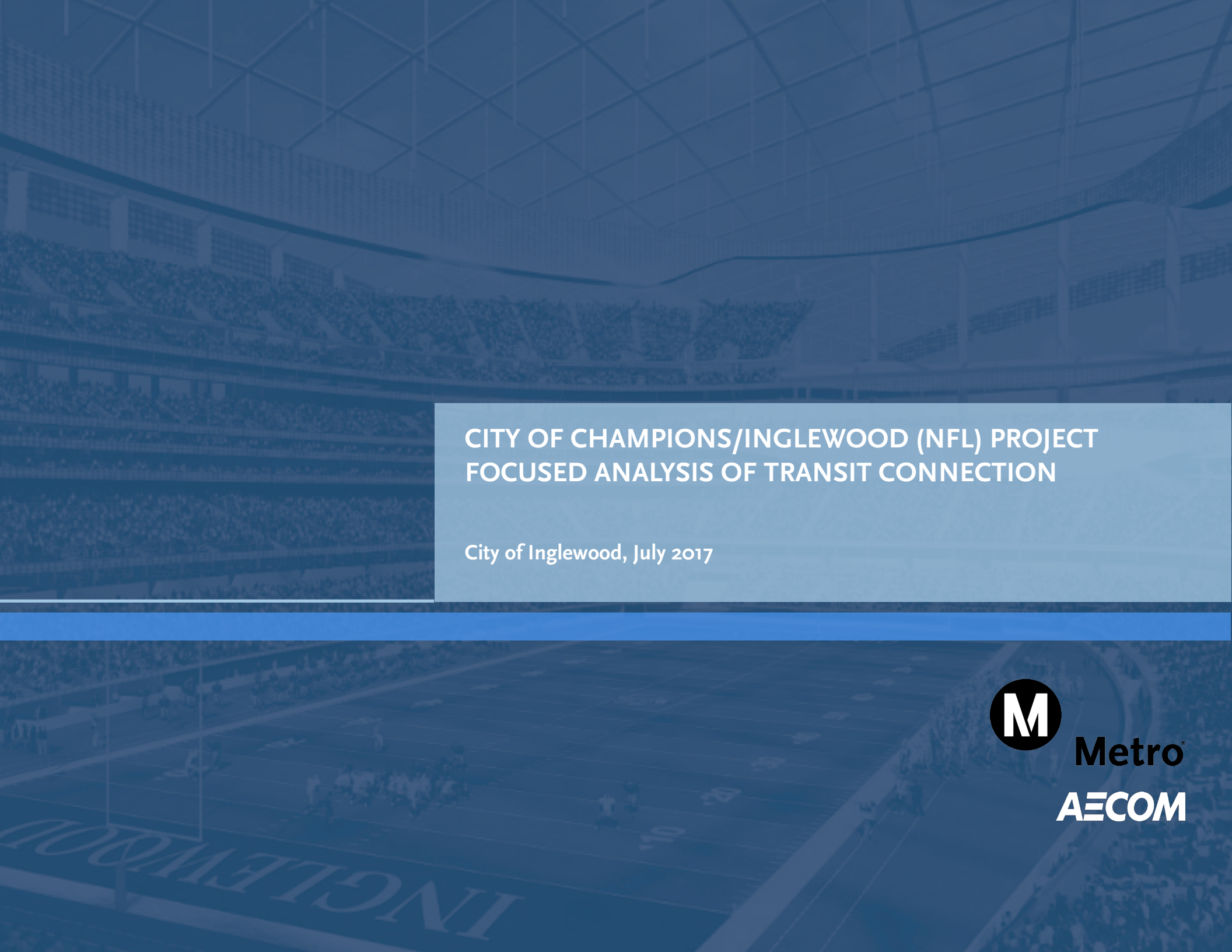
APPENDIX J

City of Champions/Inglewood NFL
Focused Analysis of Transit Connection



CITY OF CHAMPIONS/INGLEWOOD (NFL) PROJECT FOCUSED ANALYSIS OF TRANSIT CONNECTION

City of Inglewood, July 2017

Metro

AECOM

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Cover picture: HKS Architects

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

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Metro

August 8, 2017

Louis A. Atwell, PE
Director of Public Works
City of Inglewood
One Manchester Boulevard
Inglewood, CA 90301

Re: Notice of Study Completion and Transmittal for City of Champions/Inglewood (NFL) Focused Analysis of Transit Connection

Dear Mr. Atwell:

The Los Angeles County Metropolitan Transportation Authority (Metro) prepared the aforementioned Study in the role of a consultant to the City of Inglewood. Metro is transmitting the final deliverable for the Study, with one hardcopy and one electronic copy on CD enclosed. The files in the enclosed CD have also been uploaded to the Dropbox site.

The City requested Metro to prepare a focused analysis study of a transit connection from the Metro Crenshaw/LAX light rail line to the Inglewood NFL Stadium/Hollywood Park mixed-use development. The Study explores how to connect Inglewood's future entertainment/stadium district to Metro's rail system via a high-capacity transit connection:

- Interlined Operability Scenario: studied connection from the Crenshaw/LAX Line in a subway under Prairie Avenue, which also would jointly operate on a portion of the Crenshaw/LAX Line; and
- Independent Operability Scenario: studied three options for independent services that provide a connection to the Metro Rail system at a Metro station.

Metro prepared this Study based on the City's direction that the connection be primarily grade-separated to the maximum extent possible and principally to serve the entertainment district/stadium site. Cost and ridership estimates are provided in the Study. The City and Metro agreed that the Interlined Operability Scenario is infeasible due to its cost and complexity. With regard to the Independent Operability Scenario, other alternatives, which could be considerably less costly, were not studied, because of the City's concern that congestion during peak periods at the entertainment/stadium district could create conflicts with at-grade, fixed-guideway transit service, degrading transit service.

Also, included in this Study was the initial exploration of the potential to establish an Enhanced Infrastructure Financing District (EIFD) to assist the City in funding the capital costs of building the fixed guideway transit connection. This was specifically included to facilitate the City's future consideration of a public-private partnership as a project financing and delivery option. Of the several findings outlined, an essential provision of EIFD formation requires that any included project(s) must be cleared by the appropriate California Environmental Quality Act (CEQA) environmental

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document—likely an Environmental Impact Report (EIR)—prior to the establishment of the EIFD to be eligible for funding. The EIFD should be in place prior to opening the stadium and/or related facilities to capture the value of those improvements to provide maximum financial capacity for the transit connection project.

To explore a transit connection further, Metro recommends that the City of Inglewood should undertake the following steps, which must occur expeditiously for an EIFD to be utilized effectively:

- Determine one or more potential transit connection projects to further evaluate, either from those included in the Independent Operability Scenario set of options, or a new alternative not previously studied;
- Select one or more transit projects to be environmentally-cleared pursuant to CEQA (note that NEPA clearance would also be required should federal funds be sought);
- Initiate the EIFD process concurrently with the CEQA process;
- Establish the EIFD prior to opening the stadium and/or related facilities.

Stakeholder and public outreach are highly recommended. The owner of the Los Angeles Rams and entertainment/stadium district developer, along with the County of Los Angeles, are two crucial stakeholders in the EIFD process.

As a reminder, this potential connection is not included in Metro's Long Range Transportation Plan and as such, no Metro funding is identified for it, including any entitlement and pre-construction activities.

Thank you for the opportunity to prepare the Study. Metro staff would be happy to present the Study to Honorable Mayor and Metro Board Second Vice-Chair James Butts, should you find that helpful. Please contact David Mieger, Executive Officer, at 213-922-3040 to arrange the presentation and to discuss any clarifying questions about the Study.

Sincerely,

Therese McMillan, Chief Planning Officer
Countywide Planning and Development

Enclosures: Final Study Report and Appendices

cc: Honorable Mayor and Vice Chair James Butts, City of Inglewood and Metro Board of Directors
Mike Bohlke, Transportation Deputy for Vice Chair Butts, City of Inglewood
Artie Fields, City Manager, City of Inglewood
Phillip A. Washington, Metro CEO
Stephanie Wiggins, Metro Deputy CEO
Manjeet Ranu, Metro Countywide Planning and Development
Calvin Hollis, Metro Countywide Planning and Development
David Mieger, Metro Countywide Planning and Development
Metro Vendor/Contract Management Contract Administrator

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EXECUTIVE SUMMARY

The Los Angeles County Metropolitan Transportation Authority (Metro), in the role of a consultant to the City of Inglewood, performed a focused analysis (Study) of a 1-2 mile transit connection from the Metro Crenshaw/LAX light rail line to the Inglewood NFL Stadium/Hollywood Park mixed-use development. This study explores the implementation of a convenient, reliable, high-capacity transit service, presents different opportunities for connecting to the regional Metro Rail system, and analyzes potential costs and impacts for two operability scenarios based on the following goals:

- **Reliability:** Convenient service with minimum delay, wait, and travel times
- **Connectivity:** Ease of transferring to and from the Metro Rail system
- **Capacity:** The ability to serve 20,000 passengers/hour event travel demand

The Interlined Operability Scenario looked at a branch from the Crenshaw/LAX Line in a subway under Prairie Avenue. The Independent Operability Scenario looked at three options for services "independent" of, but providing connection to the Metro Rail system.

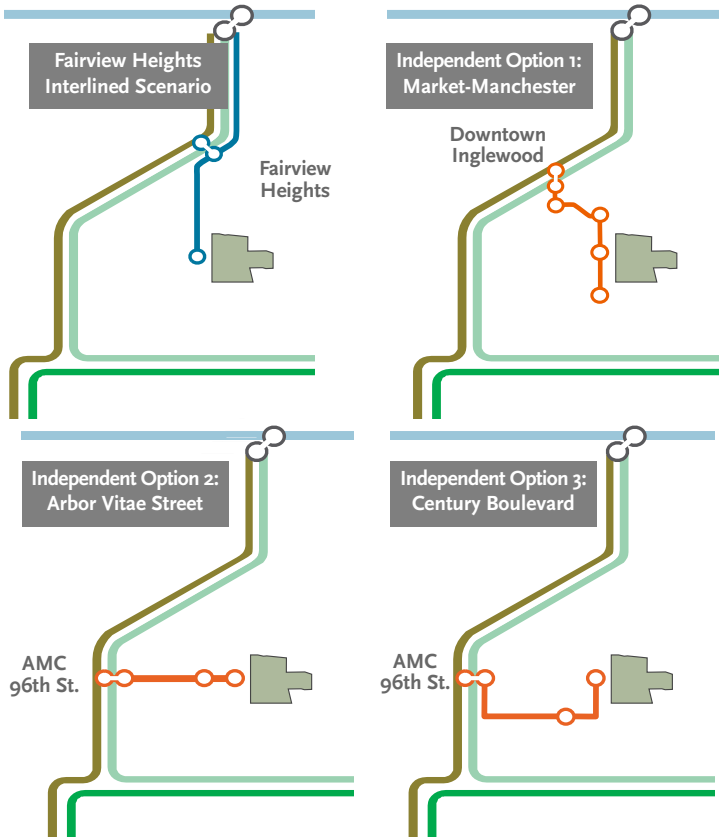
- **Option 1: An independent "urban rail"** transit connection to Downtown Inglewood to leverage Market Street in Inglewood's historic core and promote economic development opportunities in the City.
- **Option 2 & 3: An independent "automated people mover"** transit connection to the Airport Metro Connector 96th Street Transit Station via either Arbor Vitae Street (Option 2) or Century Boulevard (Option 3) to provide connections to LAX and Metro's major multi-modal hub at AMC 96th Street Transit Station.

Scenarios and Options considered for this Study are illustrated in **Figure ES-1**, and the technical specifications of the modes analyzed are summarized in **Table ES-1**.

Modes	Typical Train Length	Weight /Car	Capacity /Train	Speed	Examples
Light Rail	289 Feet (3-Car)	122,250 lb	450	25 - 65 mph	LA Metro LRT
Urban Rail	198 Feet (3-Car)	80,570 lb	450	5 - 55 mph	Rome Tram
APM	252 Feet (6-Car)	52,100 lb	600	5 - 35 mph	DFW Skylink
Monorail	240 Feet (6-Car)	48,000 lb	600	30 - 55 mph	Las Vegas Monorail

Source: AECOM

Table ES-1 Mode Specifications



Source: AECOM

Figure ES-1 Scenarios and Options Considered

The draft final report is divided into three parts:

- Part I - Introduction, Project Goals, and Operability Scenarios defines operability scenarios and options considered for the transit connection
- Part II - Operability Scenarios Evaluation explores impacts caused by the transit connection
- Part III - Funding, Financing, & Delivery presents strategies for implementation

The findings of this study is summarized as below (**Table ES-2**).

		Interlined with Crenshaw/ LAX Line	Independent		
			Option 1: Downtown via Market-Manchester	Option 2: Arbor Vitae Street	Option 3: Century Boulevard
Capacity Goal	Maximum Capacity:	5,400 passengers/hour	13,500 passengers/hour	18,000 passengers/hour	
	Projected Riders[1]:	Average Weekday: 3,734 riders/day	Average Weekday: 3,158 riders/day	Average Weekday: 1,740 - 3,803 riders/day	
		Event: 4,130 - 15,000 attendees/event	Event: 3,900 - 14,300 attendees/event	Event: 6,120 - 24,180 attendees/event	
Cost	Capital Cost (2017$)[2]	$1.333 - $1.960 billion	$497 - 746 million	$561 million - 990 million	$563 million - 1.049 billion
	Operating & Maintenance Cost (2017$)[3]	$13.6 - 22.5 million/year	$11.2 - 17.1 million/year	$9.9 - 14.3 million/year	$11.0 - 17.1 million/year
Technology/Mode		Underground LRT	Urban Rail	APM/Monorail	
Stations		Fairview Heights, Development[4]	Market North, Market South, Manchester, Forum, Development	AMC, La Brea, Development	AMC, La Cienega, La Brea, Century/Prairie, Development
Distance (mi.)		1.8[4]	1.2	2.1	2.8
Average Speed (mi./hr)		35.6[4]	14.9	32.7	24.6
One-Way Travel Time (min.)		3.0[4]	4.8	3.8	6.8
Potential Right-of-Way Acquisition (acres)		22	15	33	19
P3 Opportunities		Low	High	High	High

Note:
1. Range reflects differences in attendance between teams, varying mode splits, and parking utilization (for Independent Option 2&3)
2. Range reflects a low and high capacity operating plan as well as uncertainty and contingency due to current stage of design.
3. Range reflects a low and high capacity operating plan.
4. Based on the new branch from Fairview Heights Station to the Development.

Source: AECOM, Connetics Transportation Group

Table ES-2 Summary of Study Findings

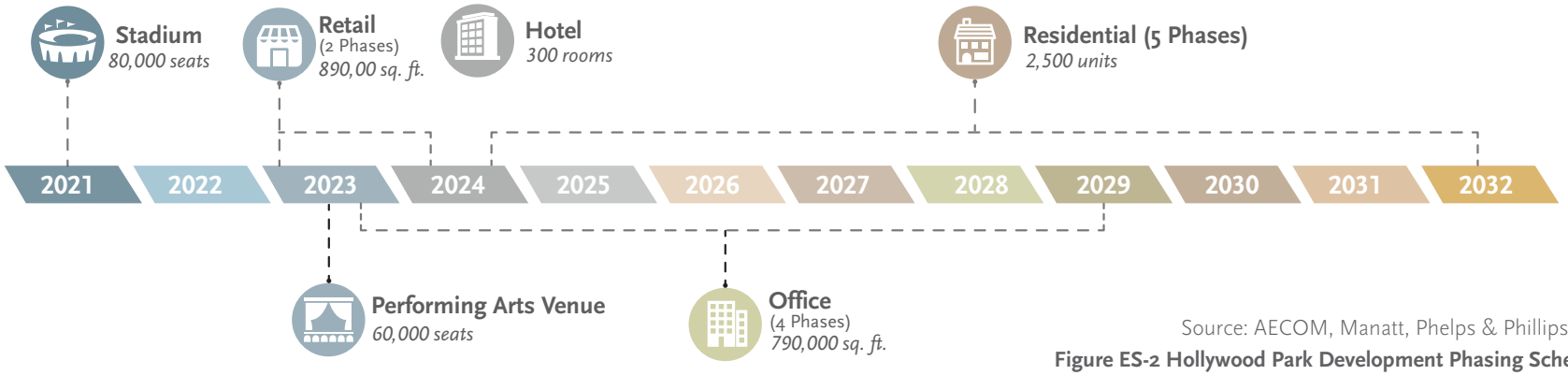
The City and Metro agreed that the Interlined Operability Scenario is infeasible due to its cost and complexity. With regard to the Independent Operability Scenario, other alternatives, which could be considerably less costly, were not studied, because of the City's concern that congestion during peak periods at the Development could create conflicts with at-grade, fixed-guideway transit service, degrading transit service.

The Enhanced Infrastructure Finance District (EIFD)is a new funding tool established in 2014, which has extraordinary flexibility, extensive reach of its powers, and high ability to combine multiple sources of revenue in addition to tax increment, as well as to integrate them into a locally-developed financial business plan. This capacity to bundle multiple revenue streams including development and user fees, bond funds federal and state grants and myriad other sources serves to enhance the revenue available to the EIFD to fund proposed projects.

As a major potential funding source, EIFD was assessed to see if there is sufficient financial capacity available to support operation and maintenance of the transit connection. This will also inform the decision as to whether, when utilized in connection with a project governance vehicle such as a Public Private Partnership (P3) or similar project delivery strategy, this strategy can attract the scale of private investment needed to operate as a stand-alone enterprise.

P3 benefits arise from optimizing risk allocation, aligning incentives for performance, and taking a project life-cycle perspective. Potential funding and P3 delivery options that could support and accelerate the delivery of the transit connection have been explored in this Study.

Implementation of the Hollywood Park Development has a major role on the timing and amount of projected tax increment and project-generated revenue to the City and thus its availability to the EIFD. The current schedule for development phasing is shown in **Figure 3.1-2**. A preliminary approximation of the total amount of potential net bondable proceeds is summarized in **Table 3.1-1**.



Source: AECOM, Manatt, Phelps & Phillips, LLP

Figure ES-2 Hollywood Park Development Phasing Schedule

	Max. 47.9% County and 14% City to EIFD	County 20% and City 14% to EIFD	County 10% and City 14% to EIFD	No County Share and City 14% to EIFD
Projected Year 5 & cum. through year. 4	$158,000,000	$82,000,000	$62,600,000	$33,800,000
Projected Year 10 & cum. through year. 9	$277,600,000	$159,5000,000	$108,400,000	$64,100,000
Projected Year 15 & cum. through year. 14	$428,200,000	$231,700,000	$163,000,000	$100,700,000
Projected Year 20 & cum. through year 19	$574,900,000	$314,400,000	$224,800,000	$128,100,000

Note: Assumes 30 year term and build-out as projected – Assume 1.35 coverage, 6% rate and 12% cost of issuance.

Source: Manatt, Phelps & Phillips, LLP

Table ES-3 City of Inglewood Projected Net Bond Proceeds

To explore a transit connection further, the City of Inglewood should undertake the following steps, which must occur expeditiously for an EIFD to be utilized effectively:

- Determine one or more potential transit connection projects to further evaluate, either from those included in the Independent Operability Scenario set of options, or a new alternative not previously studied;
- Select one or more transit projects to be environmentally-cleared pursuant to California Environmental Quality Act (CEQA) and possibly the National Environmental Protection Act (NEPA) should federal funds be sought;
- Initiate the ElFD process concurrently with the CEQA process;
- Establish the EIFD prior to the stadium opening and/or related development.
- Engage stakeholders and conduct public outreach.The owner of the Los Angeles Rams and the Development developer, along with the County of Los Angeles, are two crucial stakeholders in the El FD process.

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PART I

INTRODUCTION, PROJECT GOALS & OPERABILITY SCENARIOS

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1.1 INTRODUCTION

In November 2016, the Los Angeles County Metropolitan Transportation Authority (Metro), as a consultant to the City of Inglewood (the Project Team), initiated the City of Champions/Inglewood (NFL) Project Focused Analysis of Transit Connection (Study). This study analyzes a potential underground rail transit connection from the under-construction Metro Crenshaw/LAX Fairview Heights At-Grade Light Rail Transit (LRT) station at Florence Avenue south on Prairie Avenue to the City of Champions/Inglewood (NFL) Stadium/ Hollywood Park Development (Development), anticipated to open in 2019 and 2020, respectively, (**Figure 1.1-1**).

This Study evaluates the feasibility of using high capacity transit technology to serve the Development under either of two Operability Scenarios, either as a branch of the Metro transit network ("Interlined") or as a stand-alone system that connects via transfer to the Metro network ("Independent"). Other interim multi-modal and traffic management studies for access to the Development are being performed separately by the City of Inglewood.

The Independent Operability Scenario was expanded to include study of connections to either the Downtown Inglewood or AMC 96th Street stations along the Crenshaw/LAX Line.



Source: Metro, AECOM

Figure 1.1-1 City of Champions/Inglewood (NFL) Project Focused Analysis of Transit Connection Study Area Map

1.1.1 METRO CRENSHAW/LAX LINE

The Metro Crenshaw/LAX LRT Line extends 8.5 miles between the Metro Green Line and Expo Line, and is planned to open in 2019. In the City of Inglewood, the Crenshaw/LAX Line runs primarily at- or above-grade in a former railroad right-of-way (ROW) with two stations (Downtown Inglewood and Fairview Heights) located within the city (Downtown Inglewood and Fairview Heights) . The proposed Airport Metro Connector (AMC) 96th Street Transit Station, being built and operated by Los Angeles World Airport (LAWA) to provide access to future Automated People Mover (AMP), is anticipated to open in 2023.

1.1.2 HOLLYWOOD PARK DEVELOPMENT

The 238-acre Development is located in the City of Inglewood on the site of the former Hollywood Park Racetrack and equestrian training facility. The mixed-used development is proposed to include an 80,000-seat NFL stadium, a 6,000-seat performance venue, 2,500 residential units, retail, office and hotel, as well as recreational amenities (**Figure 1.1-2**, **Table 1.1-1**). The Stadium is expected to be complete in 2020.

In addition to 16-20 regular and pre-season professional football games, the Stadium will accommodate a variety of sporting and entertainment events year-round. The 2022 "Super Bowl" is planned to be held at the Stadium . Also, after a July 2017 vote by the International Olympic Committee, Los Angeles will tentatively host either the 2024 or 2028 Olympic Games. As part of the bid concept, the proposed Stadium will accommodate the opening ceremonies, among other events, with the nearby Forum also serving as a venue. This study also takes into consideration the safety, security and crowd control associated with serving peak major event travel demand.



Source: City of Inglewood

Figure 1.1-2 Hollywood Park Development Site Plan

Type of Use	Capacity / Sq. Footage
Stadium	Up to 80,000 seats
Performance Venue	6,000 seats
Residential	2,500 units
Retail	890,000 SF
Office Space	780,000 SF
Hotel	300 rooms
Neighborhood Parks & Recreational Amenities	25 acres

Source: City of Inglewood

Table 1.1-1 Hollywood Park Development Land Use

1.1.3 CLIPPERS ARENA

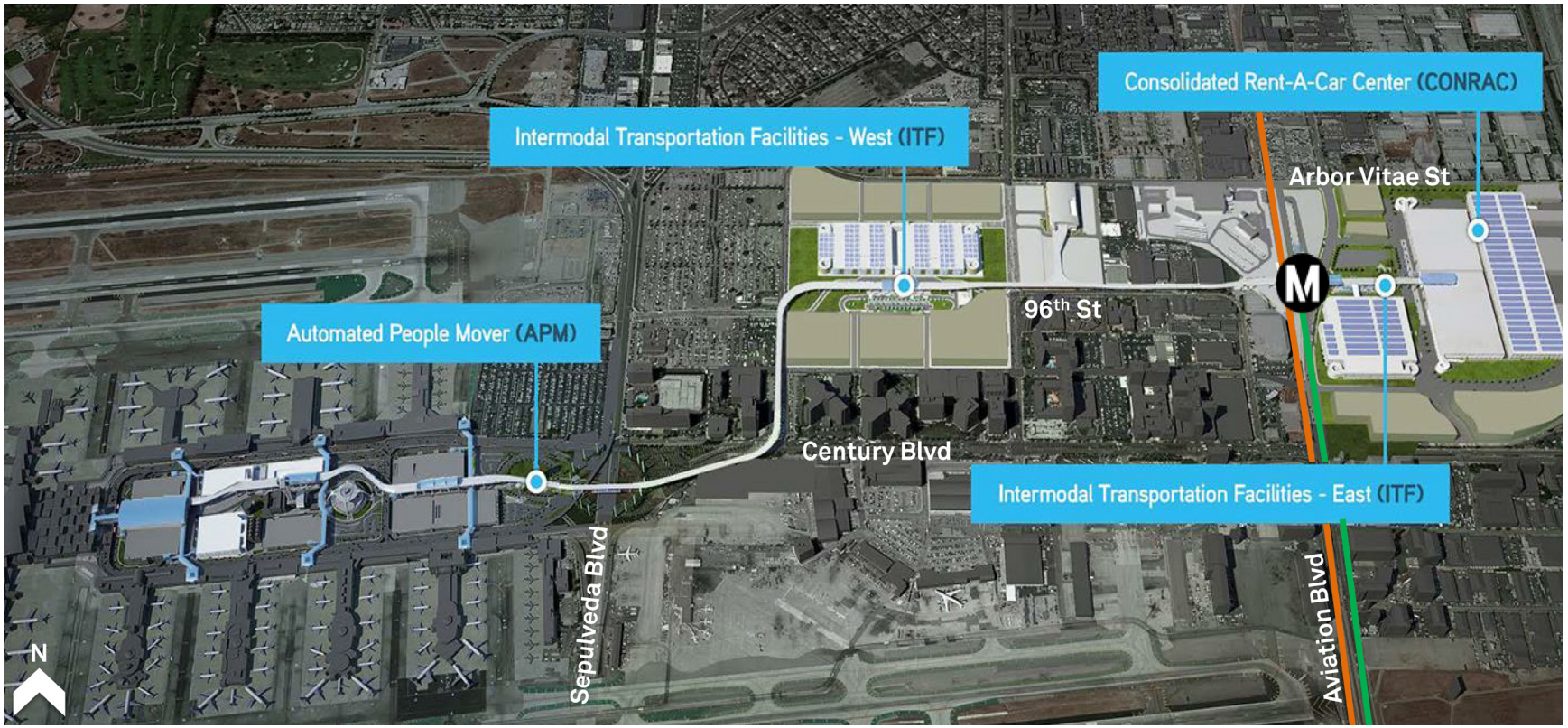
In June 2017, the Clippers National Basketball Association (NBA) Team announced the team is finalizing plans for a new arena that would seat up to 20,000 people located in the City of Inglewood near the intersection of Century Boulevard and Prairie Avenue, adjacent to the Development.

1.1.4 LOS ANGELES INTERNATIONAL AIRPORT

Access challenges and increasing congestion at Los Angeles International Airport (LAX) have prompted Los Angeles World Airports (LAWA) to develop the Landside Access Modernization Program (LAMP). The LAMP proposes to improve the ground transportation system at LAX by introducing an Automated People Mover (APM) to connect the airport terminals to several new multi-modal facilities including parking, a consolidated rental car facility (CONRAC), and the Metro AMC 96th Street Transit Station (**Figure 1.1-3**). The first phase, including the APM, is planned to open in 2023.

Metro will build the AMC 96th Street Transit Station on the Crenshaw/LAX Line to facilitate convenient transfers to the LAMP, also opening in 2023 (**Figure 1.1-4**). The station is planned to include:

- Three light rail platforms to be served by the Crenshaw/LAX Line and an extension of the Metro Green Line
- Metro and municipal bus transfer facility
- Bicycle "hub" with secure parking
- Pedestrian plaza
- Passenger vehicle pick-up and drop-off area
- Metro transit center/terminal building



Source: Los Angeles World Airports' Landside Access Modernization Program Study

Figure 1.1-3 Landslide Access Modernization Program Proposed Improvements



Source: Metro

Figure 1.1-4 AMC 96th Street Transit Station Aerial Rendering

Passengers, visitors, airport employees and others will be able to transfer from the at-grade LRT Platforms to be served by Metro Green & Crenshaw Lines, bus plaza, bike hub and dropoff to the elevated LAWA's APM via an elevated mezzanine.

1.2 PROJECT GOALS AND NEED - RELIABILITY, CONNECTIVITY, CAPACITY

Mobility and access to a major new activity center requires special consideration, especially given local and regional goals to increase transportation choice, reduce greenhouse gas emissions, and encourage compact development patterns.

The Development is 1.3 to 2.3 miles from the regional, high capacity rail system (either the Metro Crenshaw/LAX or Green Lines), farther than is reasonably walkable. A transit link would connect thousands of spectators to the rail network, while also providing an alternative to traveling by car via the I-405 freeway and other congested roadways in the area.

In addition, the study considers the compatibility of the options with local and regional plans, and the ability to encourage and support economic development in surrounding areas of Inglewood.

As a starting point, and based on national experience with transit service to major professional sports events, a target capacity was established to serve peak demand at the Development. With the knowledge that Metro served between 14% and 26% of Rams' games attendees at Los Angeles Memorial Coliseum during the 2016 season, and policy goals set at other locations for emptying the stadium after an event within one hour, it was calculated that the service should be able to serve 25% of the stadium capacity per hour. Therefore, for the study the **target capacity was set at** 25% of the 80,000 stadium capacity, or **20,000 passengers per hour.**

1.3 OPERABILITY SCENARIOS CONSIDERED

In developing options for the transit connection, the idea of both "interlined" and "independent" operating scenarios were considered. An **interlined** scenario (**Table 1.3-1**) would function as a branch of the Metro Rail network with Metro-owned-and-operated light-rail service directly to the Development. In order to complete a full set of possible scenarios, options were developed and organized into two sets of categories:

1. Implementation timeline:
   - Short term – minimum investment required to serve Development but often impacts level of service along existing lines
   - Upgrades to Crenshaw/LAX – adds capacity to the Crenshaw/LAX line to serve the Development
   - Long Term – extends the project to connect both north and south

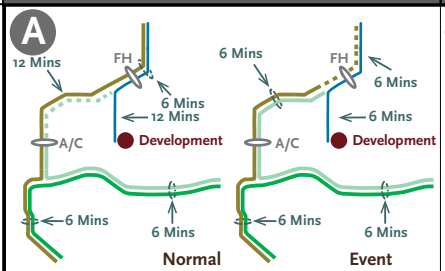
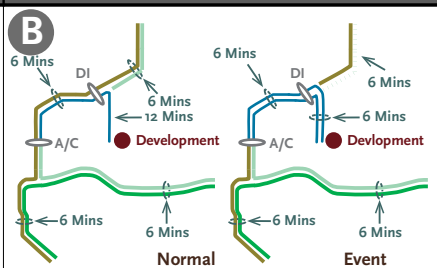
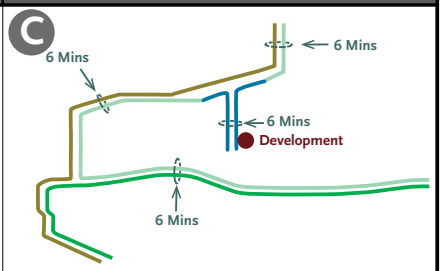
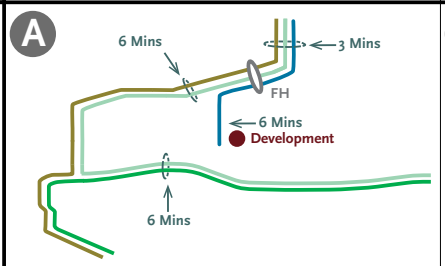
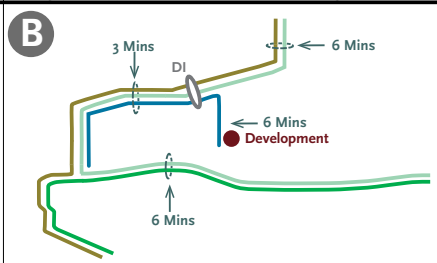
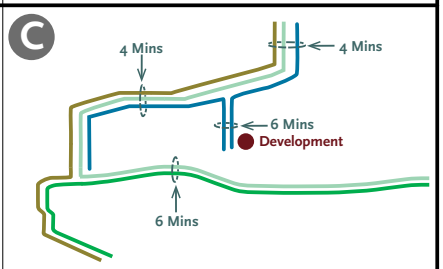
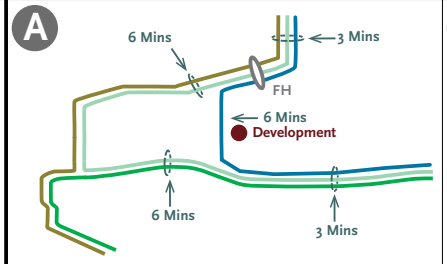
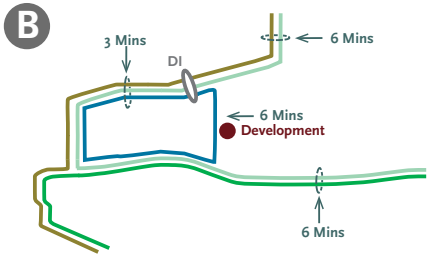
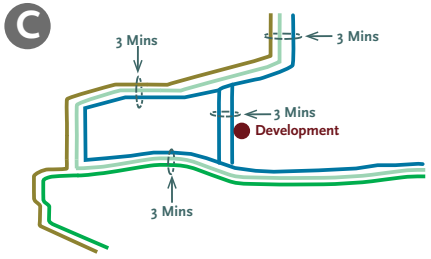
2. Directionality:
   - "A" - east-oriented – interlined via Fairview Heights Station
   - "B" - west-oriented – interlined via Downtown Inglewood Station
   - "C" - both east- and west-oriented

Alternatively, an **independent** scenario (**Table 1.3-2**) would function as a point-to-point service, "shuttling" passengers from the Development to the Metro rail network. Several "operability scenarios" were developed to explore the opportunities and challenges associated with a variety of route options. Future ("Long Term") connections to the Green Line and Hawthorne were identified but not recommended for further study and are not included in this analysis. These connections can be explored at a later date.

These options were screened based on certain criteria to yield the following options considered in the Study. Detailed discussion is provided in Appendix A.

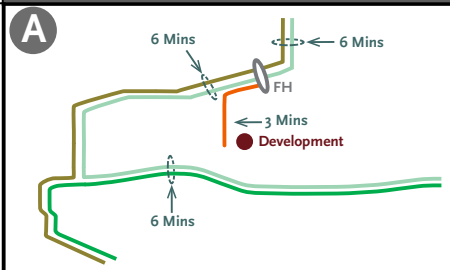
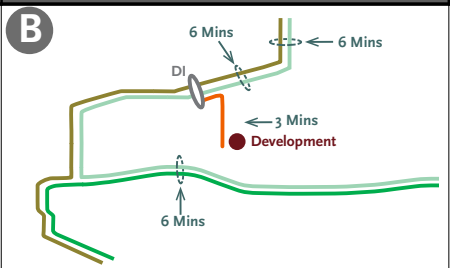
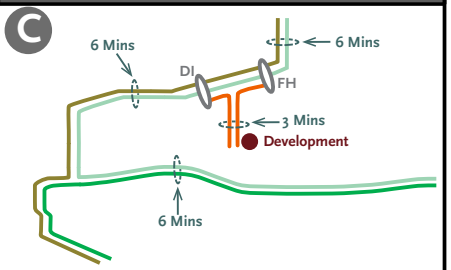
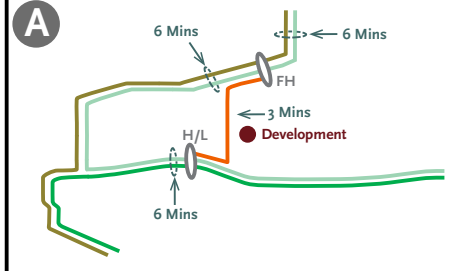
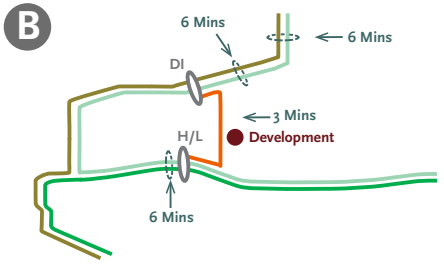
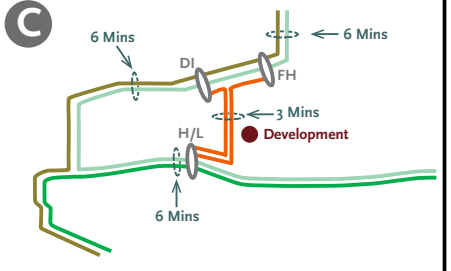
THE PROJECT'S PRIMARY GOALS INCLUDE:

- **RELIABILITY**: Convenient service with minimum delay, wait, and travel time
- **CONNECTIVITY**: Ease of transferring to and from the regional high-capacity transit network
- **CAPACITY**: The ability to serve peak travel demand to and from the Development

	North-Oriented (Fairview Heights Connection)	South-Oriented (Downtown Inglewood Connection)	2-Way Oriented (North and South Connection)
Short-term			
Normal Headways	12 Minutes	12 Minutes	6 Minutes
Event Headways	6 Minutes	6 Minutes	6 Minutes
Max Train Length	2 - 3 Cars	2 - 3 Cars	2 - 3 Cars
Opportunities & Challenges	- Major cost to upgrade FH Station for turning and terminating - Accommodation for major transfers at FH Station on Game Day	- Major cost to upgrade DI Station for turning and terminating - Accommodation for major transfers at DI Station on Game Day - Integration opportunities with businesses in Inglewood	- Major cost for the 3-way junction at Prairie/Florence - Does not require upgrades to DI or FH Stations
Upgrades to Crenshaw/LAX			
Normal Headways	12 Minutes	12 Minutes	6 Minutes
Event Headways	3 - 6 Minutes	3 - 6 Minutes	3 Minutes
Max Train Length	3 - 5 Cars	3 - 5 Cars	3 - 5 Cars
Opportunities & Challenges	- Upgrades to tunnel & signaling systems and/or platform length on Crenshaw/LAX line north of Fairview Heights Station - Tail tracks required at Expo/Crenshaw	- Upgrades to tunnel & signaling systems and/or platform length on Crenshaw/LAX and Green Line south of DI Station	- Upgrades to tunnel & signaling systems and/or platform length on all lines in this area
Long-term			
Normal Headways	12 Minutes	12 Minutes	6 Minutes
Event Headways	3 - 6 Minutes	3 - 6 Minutes	3 Minutes
Max Train Length	3 - 5 Cars	3 - 5 Cars	3 - 5 Cars
Opportunities & Challenges	- Upgrades to tunnel & signaling systems and/or platform length on both Crenshaw/LAX and Green Line - Tail tracks required at Expo/Crenshaw and Green Line Stations	- Upgrades to tunnel & signaling systems and/or platform length on both Crenshaw/LAX and Green Line	- Upgrades to tunnel & signaling systems and/or platform length on both Crenshaw/LAX and Green Line

Source: AECOM

Table 1.3-1 Range of Interlined Operability Scenarios

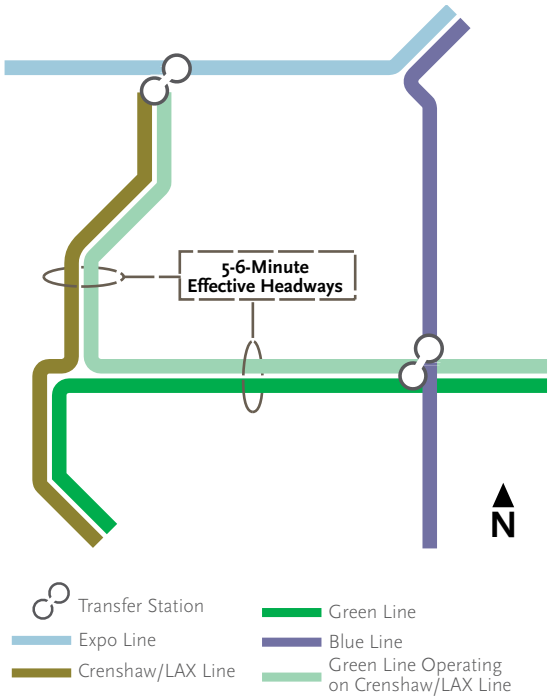
	North-Oriented (Fairview Heights Connection)	South-Oriented (Downtown Inglewood Connection)	2-Way Oriented (North and South Connection)
Short-term			
Normal Headways	6 Minutes	6 Minutes	6 Minutes
Event Headways	3 Minutes	3 Minutes	3 Minutes
Max Train Length	3 - 5 Cars	3 - 5 Cars	3 - 5 Cars
Opportunities & Challenges	- Major cost to upgrade FH Station for turning and terminating - Accommodation for major transfers at FH Station	- Major cost to upgrade DI Station for turning and terminating - Accommodation for major transfers at DI Station - Integration opportunities with businesses in Inglewood	- Major cost for the 3-way junction at Prairie/Florence - Accommodation for transfers at both Stations - Low cost effectiveness due reduced headways at split
Long-term			
Normal Headways	6 Minutes	6 Minutes	6 Minutes
Event Headways	3 Minutes	3 Minutes	3 Minutes
Max Train Length	3 - 5 Cars	3 - 5 Cars	3 - 5 Cars
Opportunities & Challenges	- Major cost to upgrade FH Station for turning and terminating - Accommodation for major transfers at FH Station - Major junction at Green Line and/or stations' expansions	- Major cost to upgrade DI Station for turning and terminating - Accommodation for major transfers at DI Station - Major junction at Green Line and/or stations' expansions	- Major cost for the 3-way junction at Prairie/Florence - Accommodation for major transfers at both Stations - Low cost effectiveness due reduced headways at split

Source: AECOM

Table 1.3-2 Range of Independent Operability Scenarios

1.3.1 INTERLINED SCENARIO

Existing and proposed operations on the Metro Crenshaw/LAX and Green Lines constrain the modification or expansion of service required to serve the Development. The Crenshaw/LAX Line is designed to support up to 5-minute minimum headways. The existing Green Line is also designed to operate at minimum 5-minute headways. The base network assumes the combined Crenshaw/LAX and Green Lines operate as three services on three branches terminating at Expo/Crenshaw, Redondo Beach, and Norwalk (**Figure 1.3-1**). As shown, each of the three services would operate at 10-12 minute headways, for effective headways on each branch of 5-6 minutes. This maximizes the service potential for these lines but **does not allow for additional capacity to serve a branch to the Development.** Therefore, any scenario involving integration with the Crenshaw/LAX Line or the Green Line requires upgrades to accommodate increased train frequency to provide service to the Development. An interlined LRT service to the Expo Line connecting the Development via the Fairview Heights Station along Prairie Avenue and requiring upgrades to the Crenshaw/LAX Line alignments and stations (**Figure 1.3-2**) was selected for the Study evaluation by the Project Team, because it is the most direct branch alignment from the Crenshaw/LAX Line and serves significant travel demand from the Westside, Central Los Angeles, and points further north and east via Downtown Los Angeles.



Source: AECOM
Figure 1.3-1 Base Metro Network

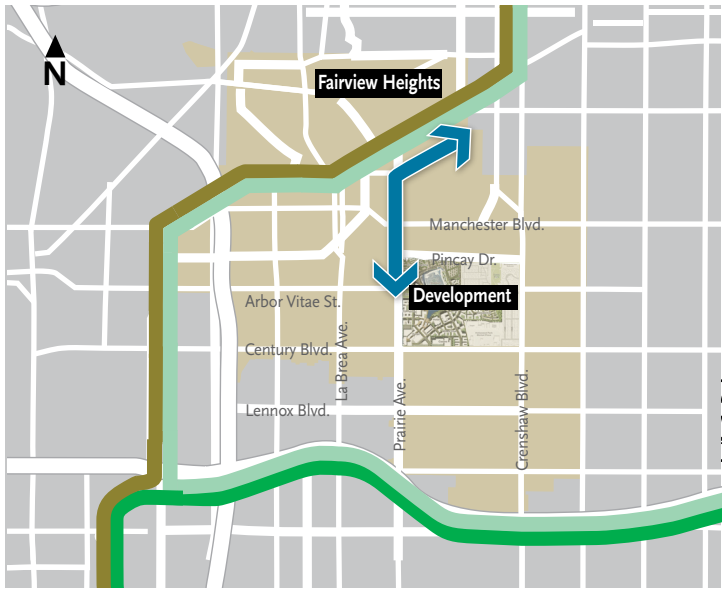
1.3.2 INDEPENDENT SCENARIO

Independent scenarios operate with the primary objective of providing reliable point-to-point service between the Crenshaw/LAX Line and the Development. Connections south to the Green Line and Hawthorne were identified as opportunities for future extension but not specifically included in this analysis.

The screened independent options include the following:

- Option 1 (Market-Manchester)
  Option 1 connects the Downtown Inglewood Station to the Development via Market St and Manchester Blvd. This option is recommended for study because it presents an opportunity for integration with local economic activity, transit-oriented development, and other initiatives in the area (**Figure 1.3-3**).
- Option 2 (Arbor Vitae)
  Option 2 connects the Metro AMC 96th Street Transit Station to the Development Station along the shortest route via Arbor Vitae Street (**Figure 1.3-4**). This option presents an opportunity to connect to a planned regional multi-modal hub served by both Metro's Crenshaw/LAX and Green Lines 13 different Metro and municipal lines, and LAWA's APM system.
- Option 3 (Century)
  Option 3 connects the Metro AMC 96th Street Transit Station to the Development Station via Century Boulevard (**Figure 1.3-5**). Century Boulevard is a major arterial, which is more compatible with a potential transit service. In addition to the AMC 96th Street Transit Station, this option presents the opportunity to connect to hotels and businesses along Century Boulevard.

An independent connection to the Fairview Heights station along the same alignment as the Interlined Scenario was not considered, as Fairview Heights is not an ideal location for event crush- or peak-load transfers and does not provide access to significant activity centers, multi-modal options, and is biased towards trips coming from the north (transfers from the Green Line and points south to the stadium would be circuitous via Fairview Heights).



Source: AECOM

Figure 1.3-2 Interlined Scenario



Source: AECOM

Figure 1.3-3 Option 1: Market-Manchester



Source: AECOM

Figure 1.3-4 Option 2: Arbor Vitae



Source: AECOM

Figure 1.3-5 Option 3: Century



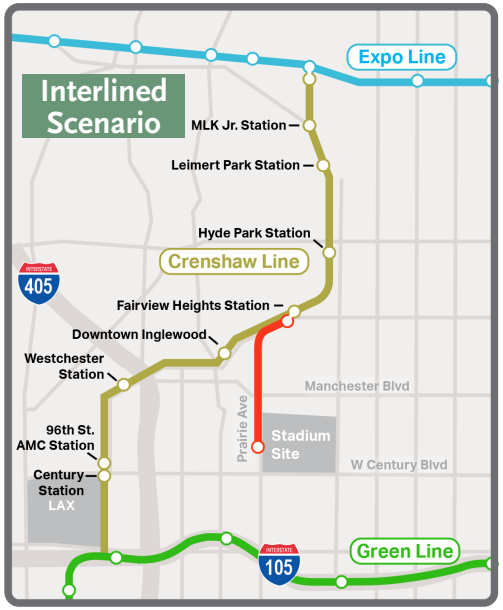
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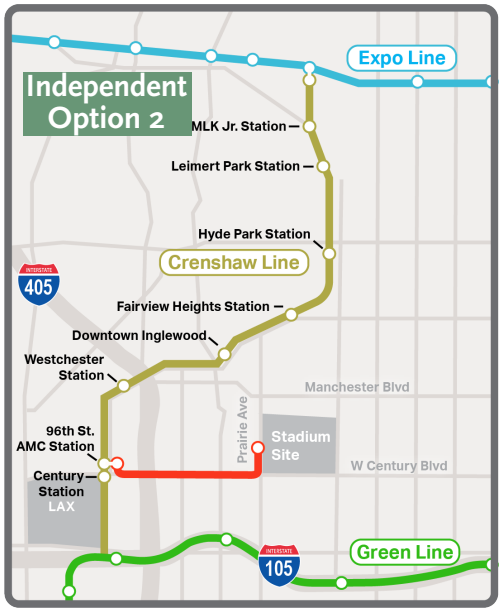
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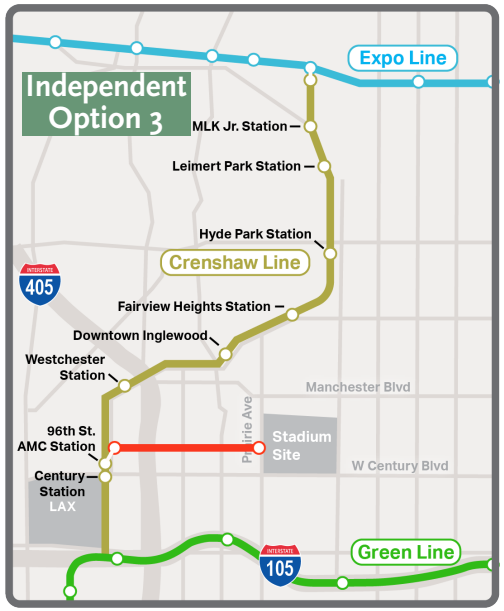
OPERABILITY SCENARIOS EVALUATION

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The Operability Scenarios discussed in Part I were evaluated on several technical areas of study that would assist in providing more information to determine the most reliable, effective and efficient transit service that also meets the goals of the Project. Below includes discussions for both the Interlined and Independent Operability Scenarios and the related options on the following technical areas: Guideway Configuration and Mode, Station Design and Connectivity, Operating Capacity, Ridership, Construction Methods and Impacts, Traffic Impacts, Maintenance and Storage Facilities, Right-of-Way Acquisition, Utility Conflicts and Relocation, Rail Systems, Environmental Scan and Potential Mitigation Requirements, Safety and Security, Capital and Operating Costs.

A summary of the findings of these technical areas can be found in Section 2.14.

2.1 Guideway Configuration and Mode

The initial definition of the interlined and independent options considered was based on the need to provide a reliable transit service that minimizes delay, wait and travel times. This is accomplished primarily through definition of the guideway configuration and technology characteristics. Discussion of the guideway configurations and technology modes are discussed in this section.

2.1.1 Guideway Configuration

The following section describes how reliable transit connection options were developed by determining the best location and configuration for the transit "guideway" or track structure.



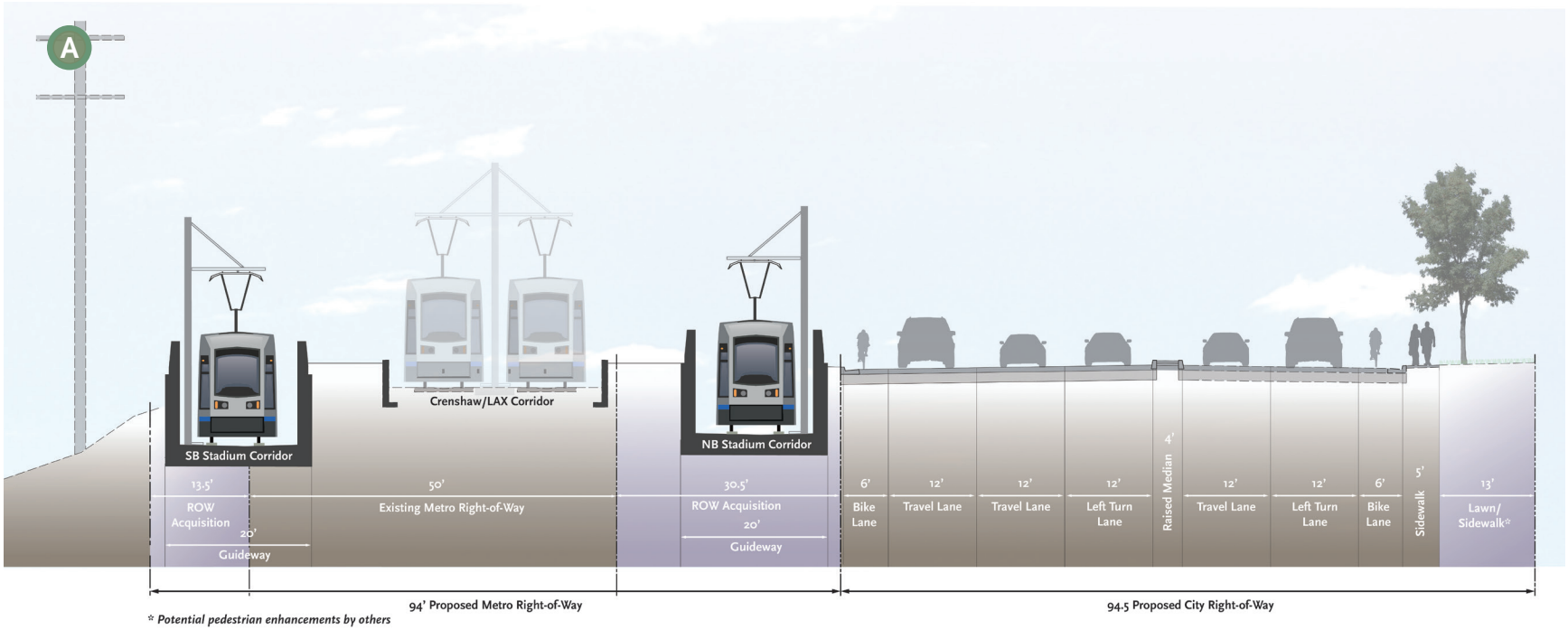
Source: AECOM

Figure 2.1-1 Fairview Heights Interlined Option

Interlined Scenario

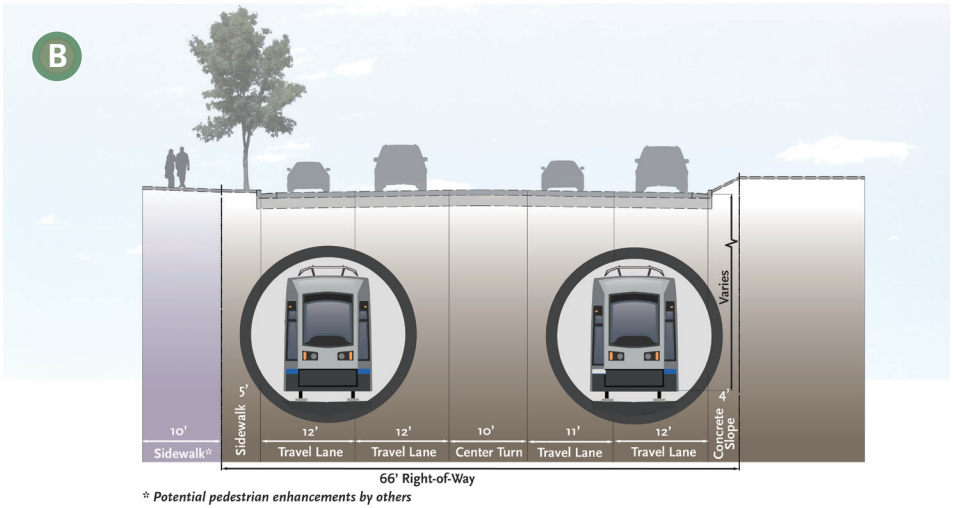
The Fairview Heights Interlined Scenario is assumed to include a fully exclusive, underground guideway from the junction point with the Metro Crenshaw/LAX Line to the Development (**Figure 2.1-1**, **Figure 2.1-2**, **Figure 2.1-3**). By being fully underground, the guideway:

- Avoids traffic impacts and delays along Prairie Avenue and at intersections with Florence Avenue, Manchester Boulevard, Pincay Drive, and Arbor Vitae Street
- Reduces noise, vibration, and visual impacts to residential neighborhoods along Prairie Avenue, The Forum, and the Inglewood Park Cemetery



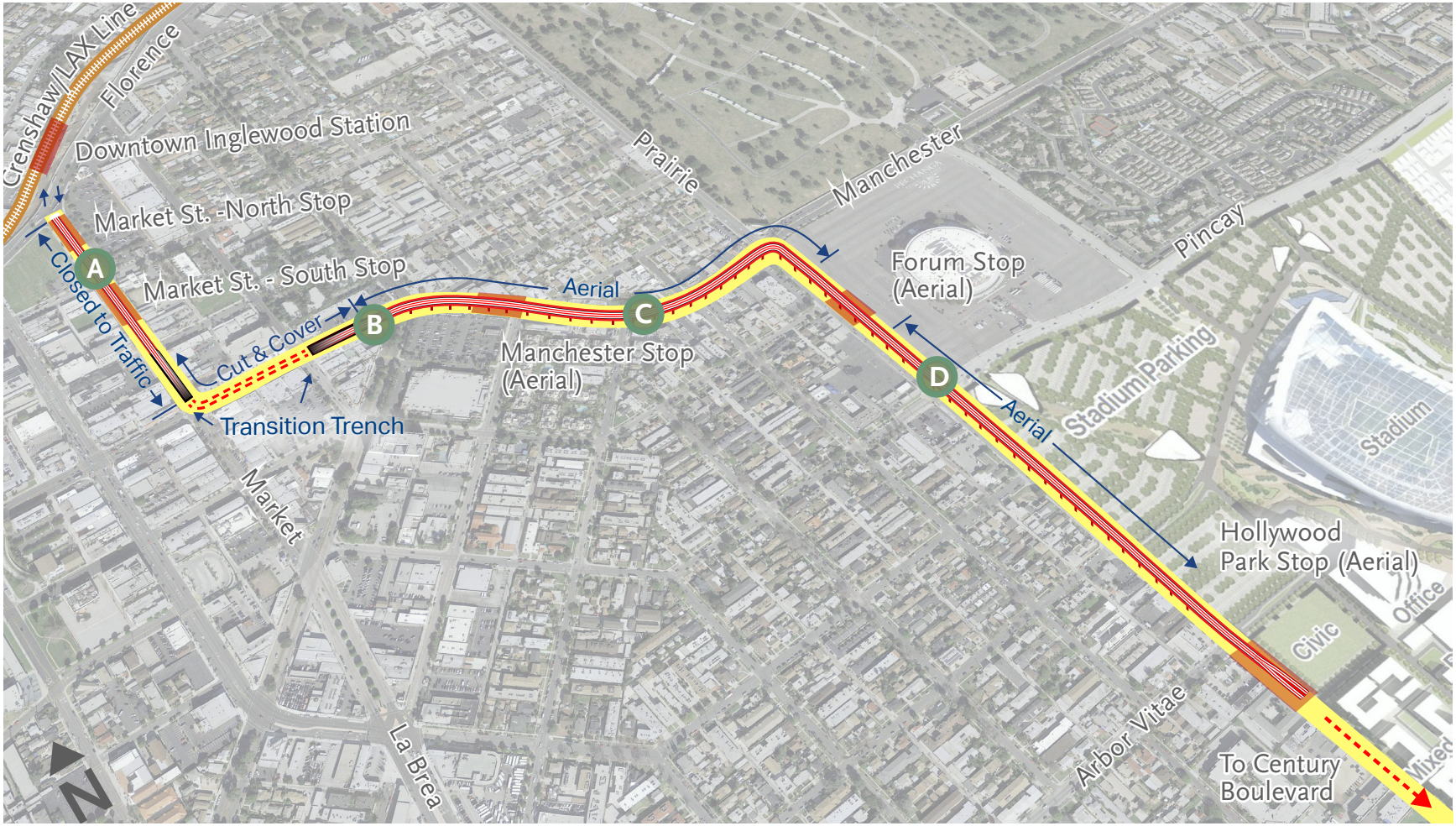
Source: AECOM

Figure 2.1-2 Florence Avenue Looking Northeast



Source: AECOM

Figure 2.1-3 Prairie Avenue North of Manchester Boulevard Looking North



Source: AECOM

Figure 2.1-4 Option 1: Market-Manchester

Independent Scenario

Option 1: Market-Manchester

Option 1 was developed to connect to Downtown Inglewood Station along the Crenshaw/LAX Line. It is the shortest distance from the Development to the Crenshaw/LAX line and would create additional economic activity in Inglewood's historic center.

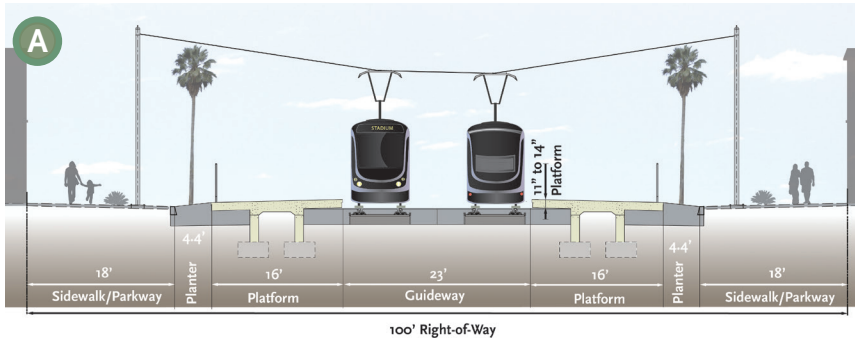
The guideway configurations were assumed to be:

Market Street: At-grade in a new pedestrian and transit mall to be compatible with urban environment and help encourage economic activity (**Figure 2.1-6**)

Market Street - Manchester Boulevard turn: Underground tunnel to avoid traffic impacts at intersection with Manchester Boulevard and visual impacts to Market Street (**Figure 2.1-7**)

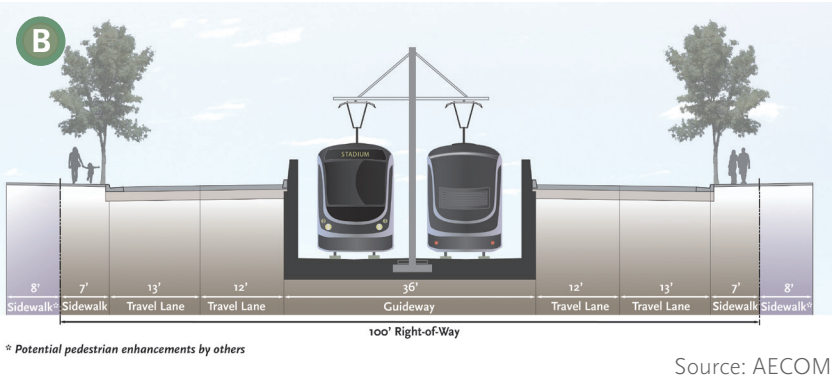
Manchester Boulevard: Elevated, aerial guideway to avoid traffic impacts on Manchester Boulevard and at intersections (**Figure 2.1-5**)

Prairie Avenue: Elevated, aerial guideway to avoid traffic impacts on Prairie Avenue and at intersections (**Figure 2.1-8**)



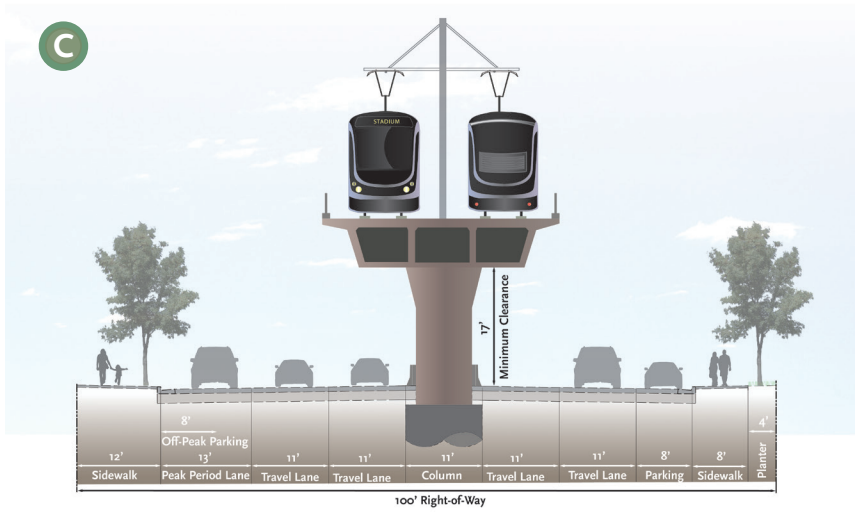
Source: AECOM

Figure 2.1-5 Market St. Looking North



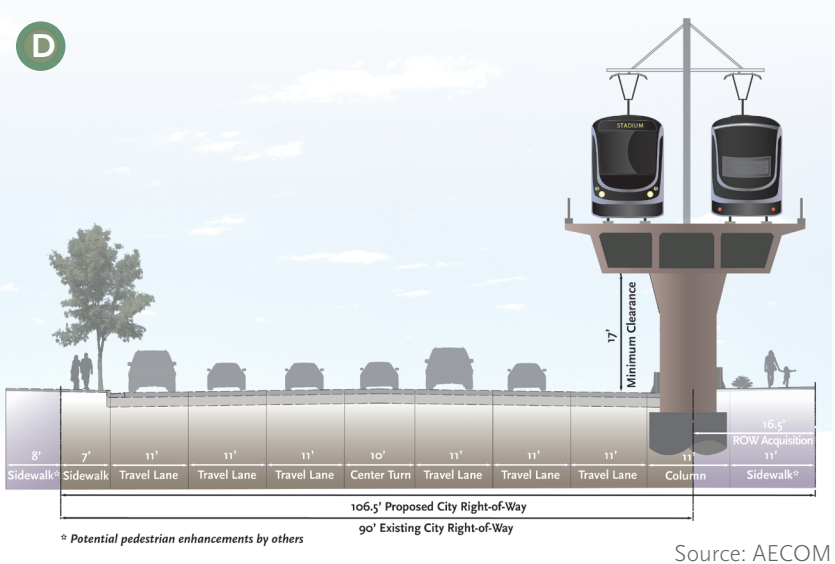
Source: AECOM

Figure 2.1-6 Manchester Blvd. Near Hillcrest Blvd. Looking West



Source: AECOM

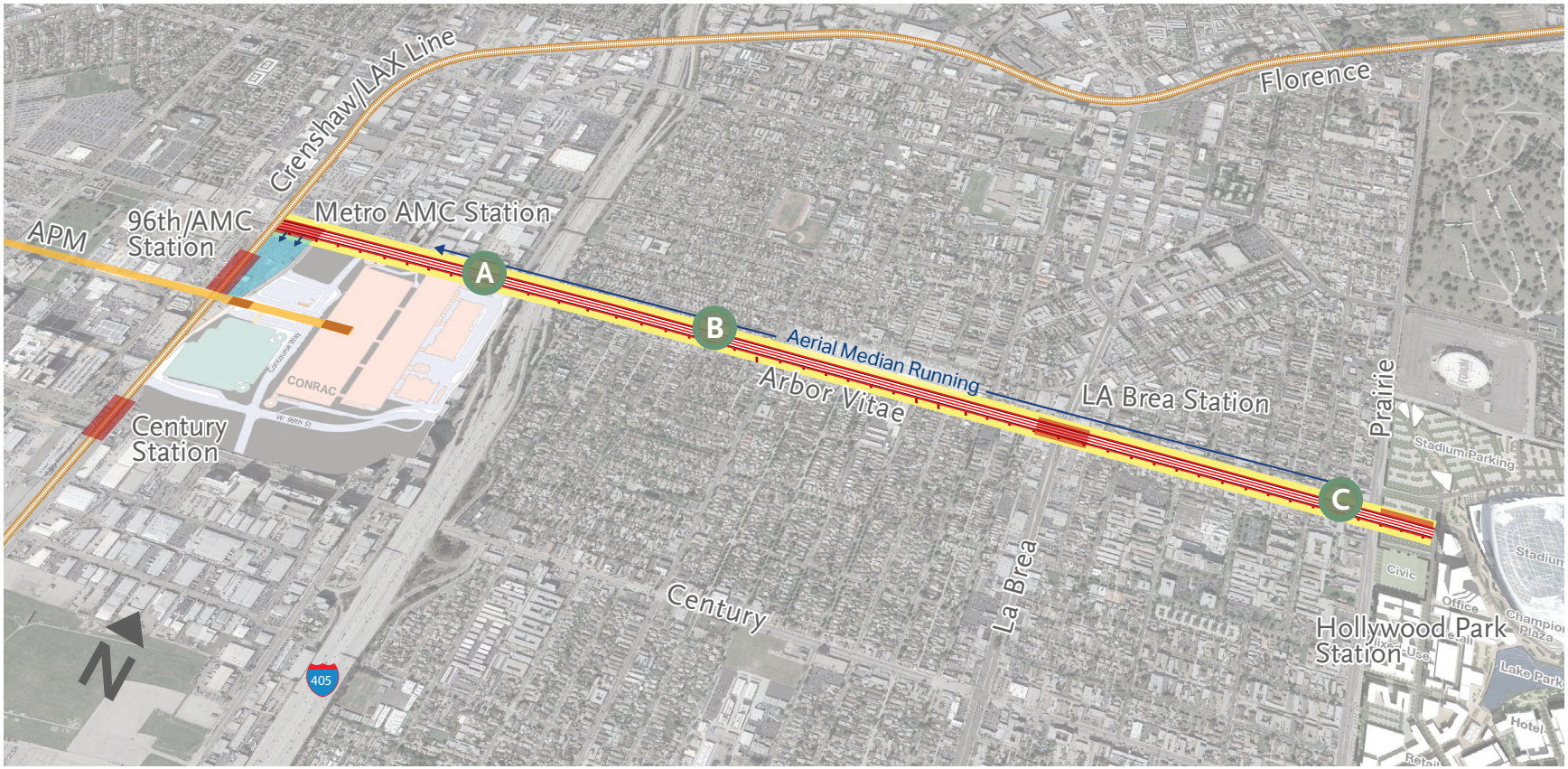
Figure 2.1-7 Manchester Blvd. Looking West



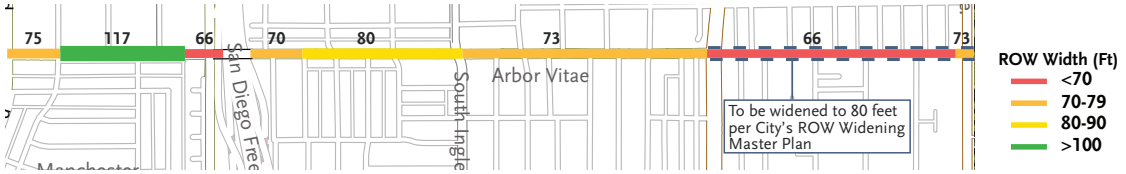
Source: AECOM

Figure 2.1-8 Prairie Ave. S. of Manchester Blvd. Looking North

Aerial guideways minimize operational impacts to the transit service but can cause impacts at guideway column locations to existing medians and/or turning lanes and have aesthetic impacts. The underground turn onto Market Street from Manchester Boulevard avoids impacting Market Street visually, but has "transition trenches" where the guideway enters and exits the tunnel which will impact traffic lane geometry on Manchester Boulevard. It is not anticipated that any through traffic capacity would be impacted, but lane widths and parking may be affected. On Prairie Avenue, the aerial guideway can be located within or on the east side of the ROW within the Forum and Development properties to minimize.



Source: AECOM
Figure 2.1-9 Option 2: Arbor Vitae

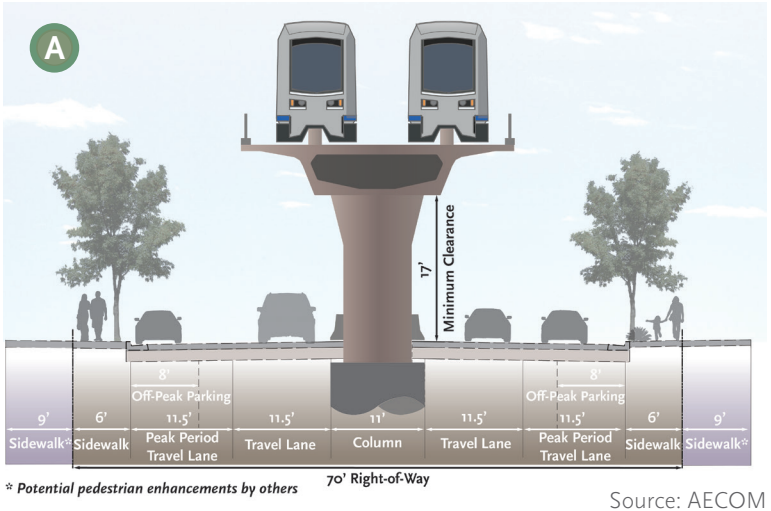


Source: AECOM
Figure 2.1-10 Arbor Vitae ROW Widths

Independent Scenario

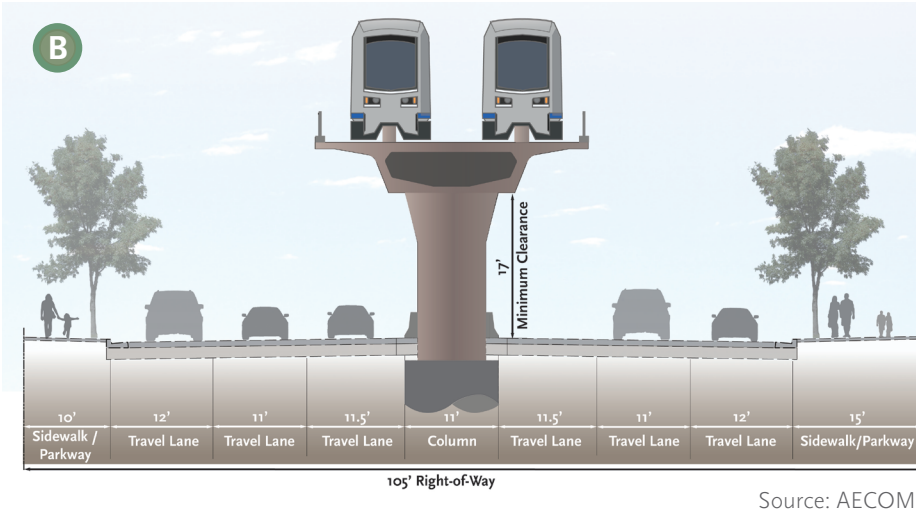
Option 2: Arbor Vitae

The Arbor Vitae option is the most direct connection from the Development to the AMC 96th Street Transit Station. It is assumed to feature a completely exclusive, elevated aerial guideway (**Figure 2.1-9** through **Figure 2.1-14**). Neighborhood-scale commercial and residential uses line Arbor Vitae. To be cost-effective, an underground guideway was not considered for this option. This option requires further noise, vibration, and visual impacts evaluation as part of the environmental review to be prepared by the City of Inglewood.



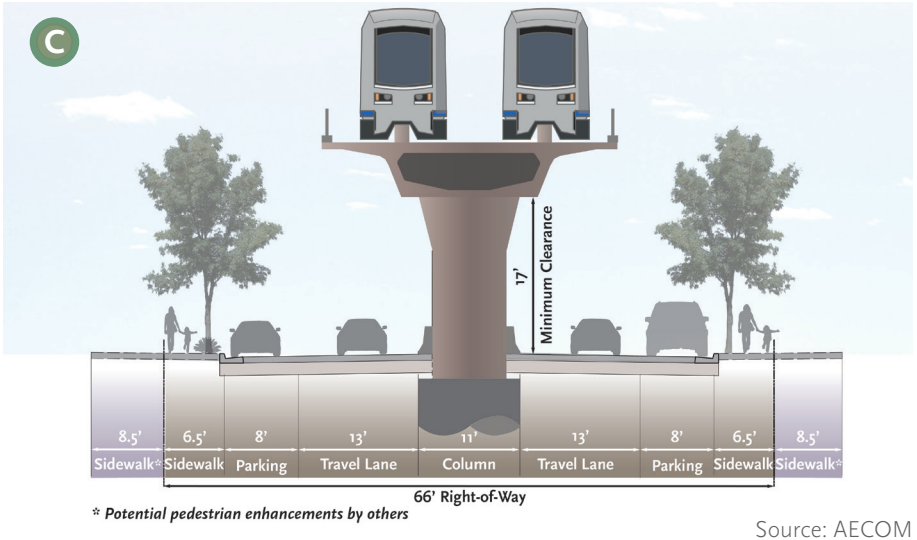
Source: AECOM

Figure 2.1-11 Arbor Vitae West of La Brea Looking West



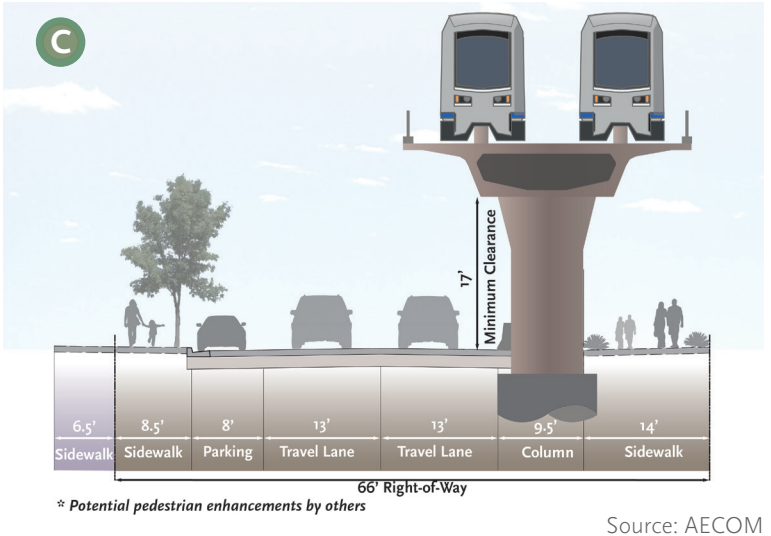
Source: AECOM

Figure 2.1-12 Arbor Vitae West of La Cienega Looking West (Future LAMP Section)



Source: AECOM

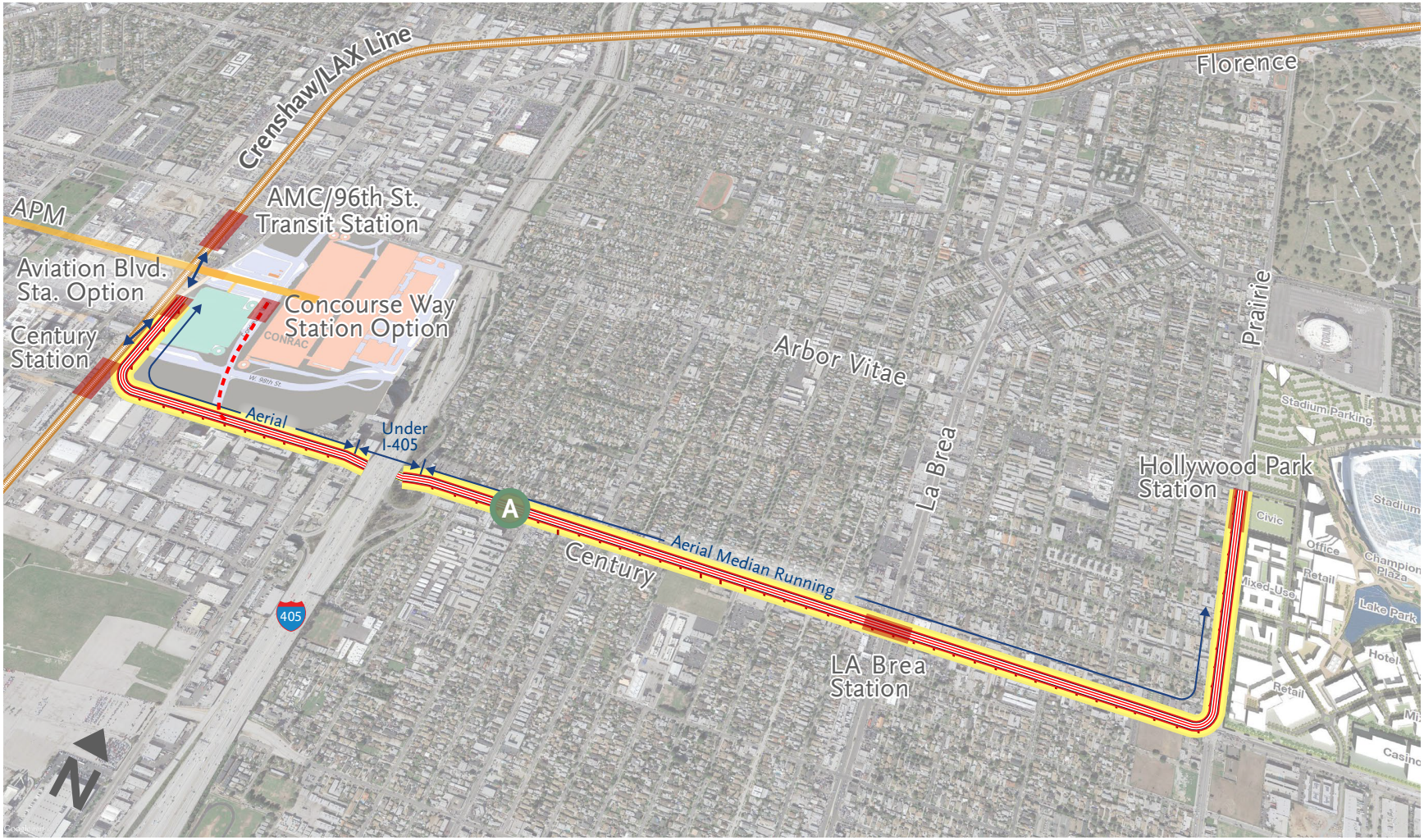
Figure 2.1-13 Arbor Vitae East of La Brea Looking West - Center Running Option



Source: AECOM

Figure 2.1-14 Arbor Vitae East of La Brea Looking West - Side Running Option

Aerial guideways minimize operational impacts to the transit service but can cause impacts at guideway column locations to existing medians and/or turning lanes. West of La Brea Avenue, Arbor Vitae Street includes a center two-way left-turning lane that is adequate for placement of guideway columns. East of La Brea Avenue, the roadway section only includes one through lane in each direction and parallel parking lanes. This section of Arbor Vitae street would require significant modification to accommodate the guideway columns.



Source: AECOM
Figure 2.1-15 Option 3: Century Boulevard

Independent Scenario

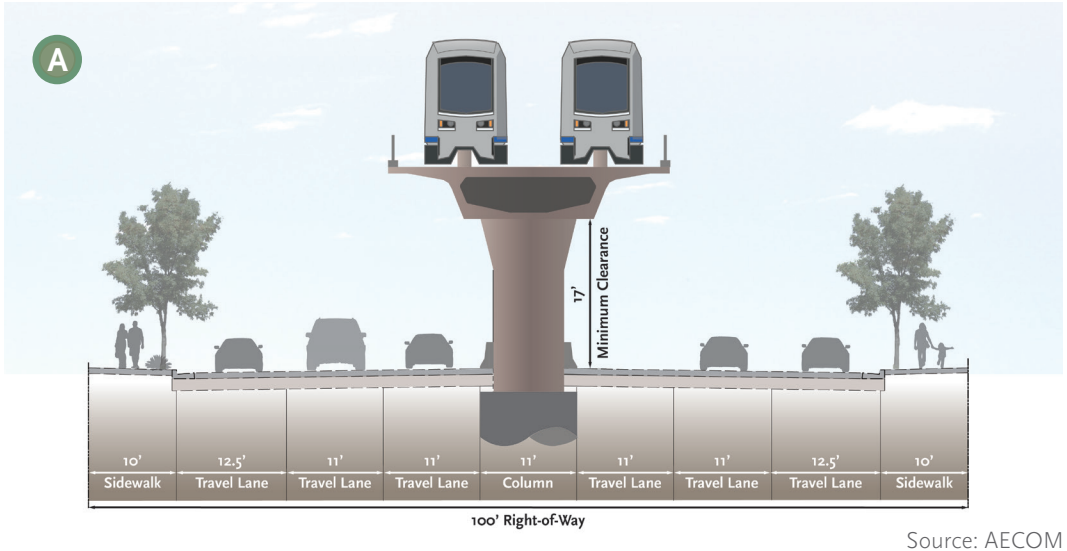
Option 3: Century

The Century Independent Option was developed as an alternative to Arbor Vitae Street. Century Boulevard has a wider ROW, continuous center median and a center two-way left-turn lane, and is lined by larger-scale commercial uses. It is also assumed to feature a completely exclusive, elevated aerial guideway (**Figure 2.1-15**, **Figure 2.1-16**, **Figure 2.1-17**). The Interstate 405 freeway crosses Century Boulevard with a single 100-foot span bridge. The elevated transit guideway could drop into the median of Century Boulevard to pass under the I-405 without affecting the bridge structure and with minor impacts to the existing lane configuration. Vertical clearance requirements, traffic impacts, and utility impacts for this crossing need to be studied further.



Source: http://www.monorailsaustralia.com.au/highpoint.html

Figure 2.1-16 Example Aerial Monorail Guideway



Source: AECOM

Figure 2.1-17 Century Boulevard Looking East

2.1.2 Technology / Mode

For the purpose of this transit connection project, fixed-guideway technologies with high capacity and urban compatibility are being explored. For the Interlined Scenario, LRT was considered. Urban Rail, Automated People Mover (APM), and Monorail were considered for the Independent Scenario Options (**Table 2.1-1**).

Interlined Scenario

LRT is a high capacity transit system operating in two to three car trains with power provided by overhead wires. The Fairview Heights Interlined Option would utilize the same type of LRT vehicles as the Crenshaw/LAX Line, adding additional LRT cars to the Metro fleet.

Independent Scenario

Urban Rail is a high capacity transit system similar to low-floor light rail, European tram or modern streetcar technologies that can operate as single cars or multiple car trains, depending on demand. It is also powered by overhead wires, and usually intended for shorter trips with frequent stops. For Option 1, this technology is being considered for flexibility of station and guideway configuration and ability to fit within surrounding urban context, especially in Downtown Inglewood.

An APM system is a high capacity transit system that usually operates over a limited distance. Vehicles are automated (i.e. driverless). APM vehicles have a similar minimum turning radius to LRT and urban rail vehicles. Monorail can also be automated, and operates on a single elevated rail or beam guideway. While monorail has the smallest guideway footprint (3-4 feet) among the four modes, and can accommodate a roadway grade of up to 10%, it also requires the largest minimum turning radius (120 feet).

APM and monorail technologies are considered for Options 2 and 3. Both systems could provide the necessary passenger capacity for game days to/from the Development. To minimize visual impacts to the communities nearby the two alignments will be fully aerial.

Modes	Train Length	Weight /Car	Capacity /Train	Speed	Examples
Light Rail	289 Feet (3-Car)	122,250 lb	450	25 - 65 mph	 LA Metro LRT
Urban Rail	198 Feet (3-Car)	80,570 lb	450	5 - 55 mph	 Rome Tram
APM	252 Feet (6-Car)	52,100 lb	600	5 - 35 mph	 DFW Skylink
Monorail	240 Feet (6-Car)	48,000 lb	600	30 - 55 mph	 Las Vegas Monorail

Source: AECOM

Table 2.1-1 Technology Specifications of Modes Considered

2.1.3 Travel Times

Travel times were calculated for each option considered based on the assumed guideway characteristics, alignment geometry, station locations and associated dwelling time, the particular technology's acceleration and deceleration rates and maximum speeds, as well as any anticipated delay in the operating environment.

Interlined Scenario

For the Interlined Scenario, the travel time for the new segment from the Fairview Heights Station to the Development Station was calculated based on the methodology above (**Table 2.1-2**); and from Fairview Heights Station to Expo/Crenshaw Station, the travel time of the Crenshaw/LAX Line in Metro's regional travel demand model was deployed. For the entire segment between the Development and Expo/Crenshaw Station, the calculated travel time is 15:03 minutes, with an average speed of 21.2 miles per hour.

Independent Scenario

For the three independent options, one-way run-times range from about 3.8 minutes to 6.8 minutes. Variations largely reflect the number of stations, project mileage, and alignment geometry. For instance, Option 1 has the lowest average speed at around 15 mph; whereas the average speed of Option 2 is around 32 mph for an assumed straight alignment with no turns.

The majority of the alignment in Option 1 is grade-separated; the only potential delay is on Market street. For this study's purpose, it is assumed that transit service has priority over crossing vehicular traffic at Queen and Regent Streets.

Subsequent refinement of Option 2 runtime can incorporate alternative alignments at the AMC 96th Street Transit Station or LAWA's APM, which may lengthen the runtime and decrease the average speed.

Detailed station-to-station travel times are included in Appendix B.

Option	Stations	Mode	Distance (Mi)	One-Way Time (Min)	Average Speed (Mph)
Interlined Scenario					
Fairview Heights	Fairview Heights, Development	LRT	1.78	3.0	35.60
Independent Scenarios					
Option 1: Market-Manchester	Market North, Market South, Manchester, Forum, Development	Urban Rail	1.23	4.8	14.90
Option 2: Arbor Vitae	AMC/96th St., La Brea, Development	APM/Monorail	2.06	3.8	32.70
Century	AMC, La Cienega, La Brea, Century/Prairie, Development	APM/Monorail	2.77	6.8	24.60

Source: Connetics Transportation Group

Table 2.1-2 One-Way Travel Times for Project Options (in Minutes)

2.2 Station Design & Connectivity

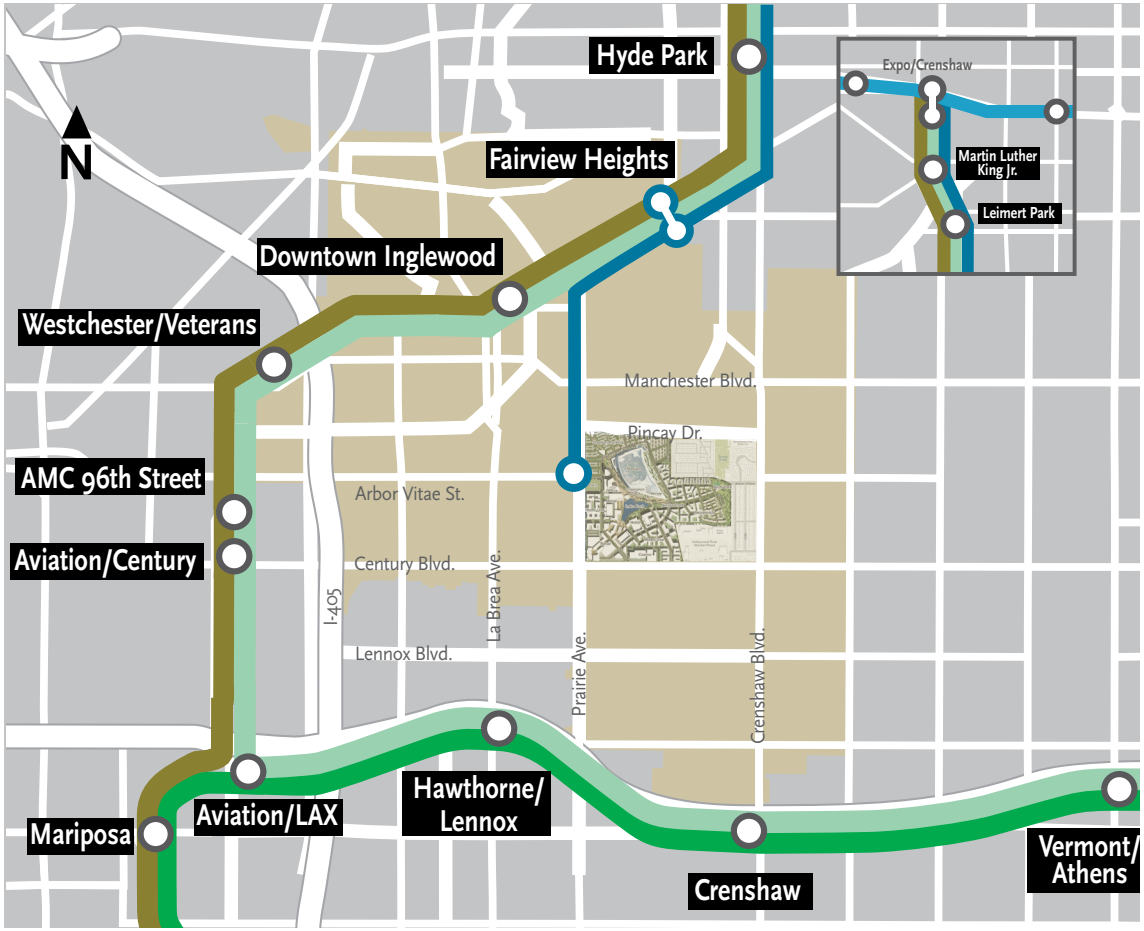
One of the goals of the Project is to provide a direct connection from the Development to the regional rail network by providing transfer service to a Metro rail station. The discussion below describes station design elements and associated station capacity that will successfully connect the Development to the Metro rail system and/or other multi-modal services to provide convenient transit access.

2.2.1 Station Design

Interlined Scenario

As an extension of the Crenshaw/LAX line (**Figure 2.2-1**), the station at Development is intended to be an underground terminal. As part of this transit line, the design of this station would include components from Metro's "kit-of-parts". An entry plaza would be provided which would also include elements from the kit such as a glass canopy at the portal (**Figure 2.2-2**).

In this interlined scenario, consideration would be given to the increased number of patrons aggregated from other connecting transit lines during event days. Those station plazas and sheltered waiting areas would be reviewed and modified to accommodate patrons transferring from other transit service lines to the Crenshaw/Expo line to reach the Development. Additional signage at those connecting stations would be provided to guide event patrons to the platforms for the Crenshaw/LAX line that would streamline their travel to the Development.



Source: AECOM

Figure 2.2-1 Interlined scenario



Source: Metro

Figure 2.2-2 Example Entry Plaza with Metro's Kit-of-Parts

Independent Scenario

Option 1: Market-Manchester

In this option (**Figure 2.2-3**), Market Street is closed to vehicular traffic during events (**Figure 2.2-4**). Stations on Market Street may be designed as sidewalk extensions. Design considerations include:

- Safety barriers at the boarding platforms and sidewalks to encourage patrons to cross at dedicated crossings where urban rail and pedestrian movements can be coordinated
- Sightlines of the transit operator
- Further safety measures such as crossing guards may be required on an event day
- Ramps may be required to transition from existing grades to the boarding height depending on the height of the vehicle

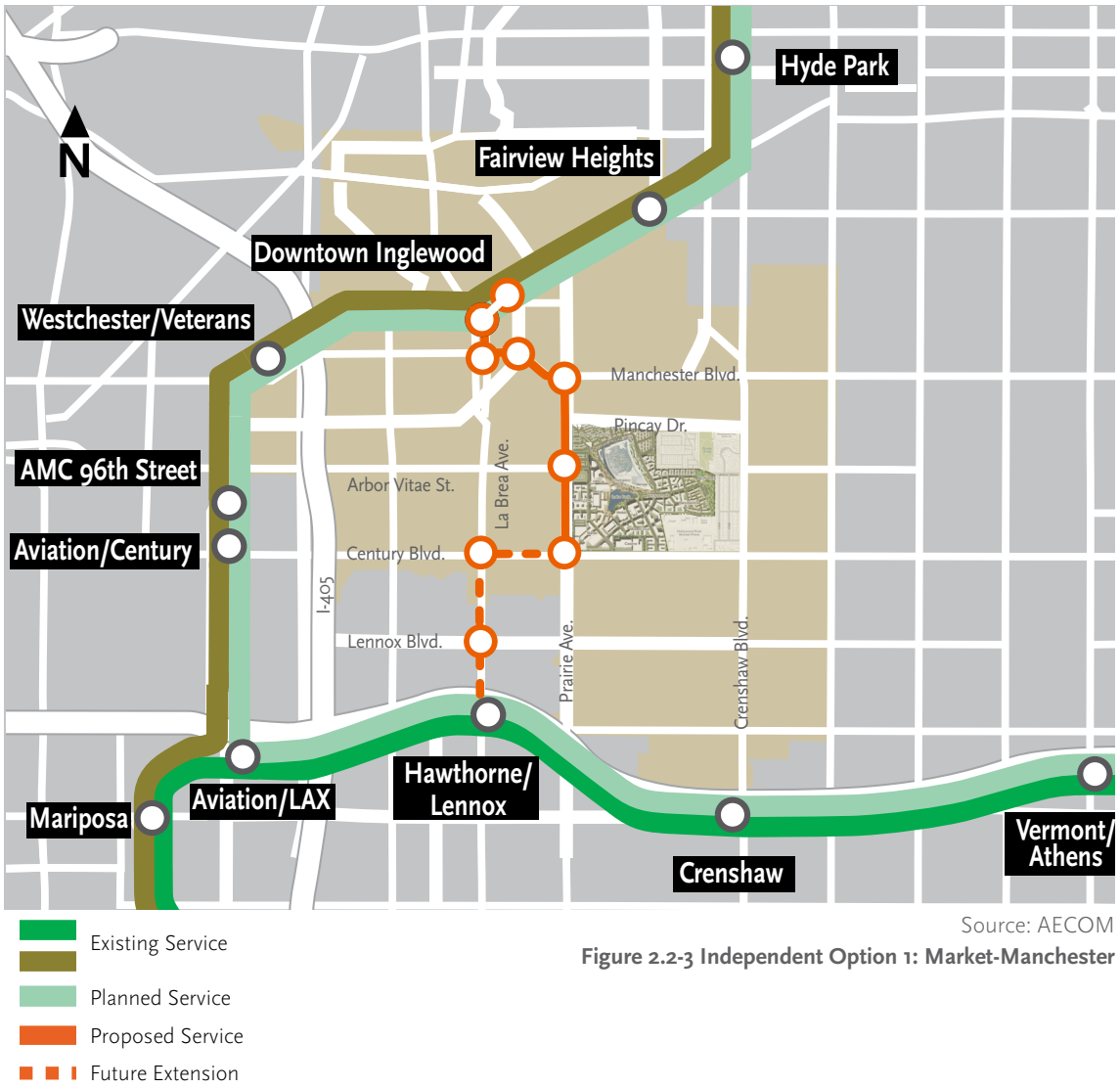
The Market Street North Station places the at-grade station is in close proximity to the Downtown Inglewood Station of the Crenshaw/LAX Line. This adjacency would allow the patrons to transfer to and from the Development and Crenshaw/LAX line. The primary design focus is the safe access across Florence Avenue to both stations.

One option to completely segregate pedestrians from vehicular traffic is aerial pedestrian bridges that would span over Florence Avenue to connect the Development station to the plaza at the Crenshaw/LAX station. Stairs and elevators will be provided on both sides of the street.



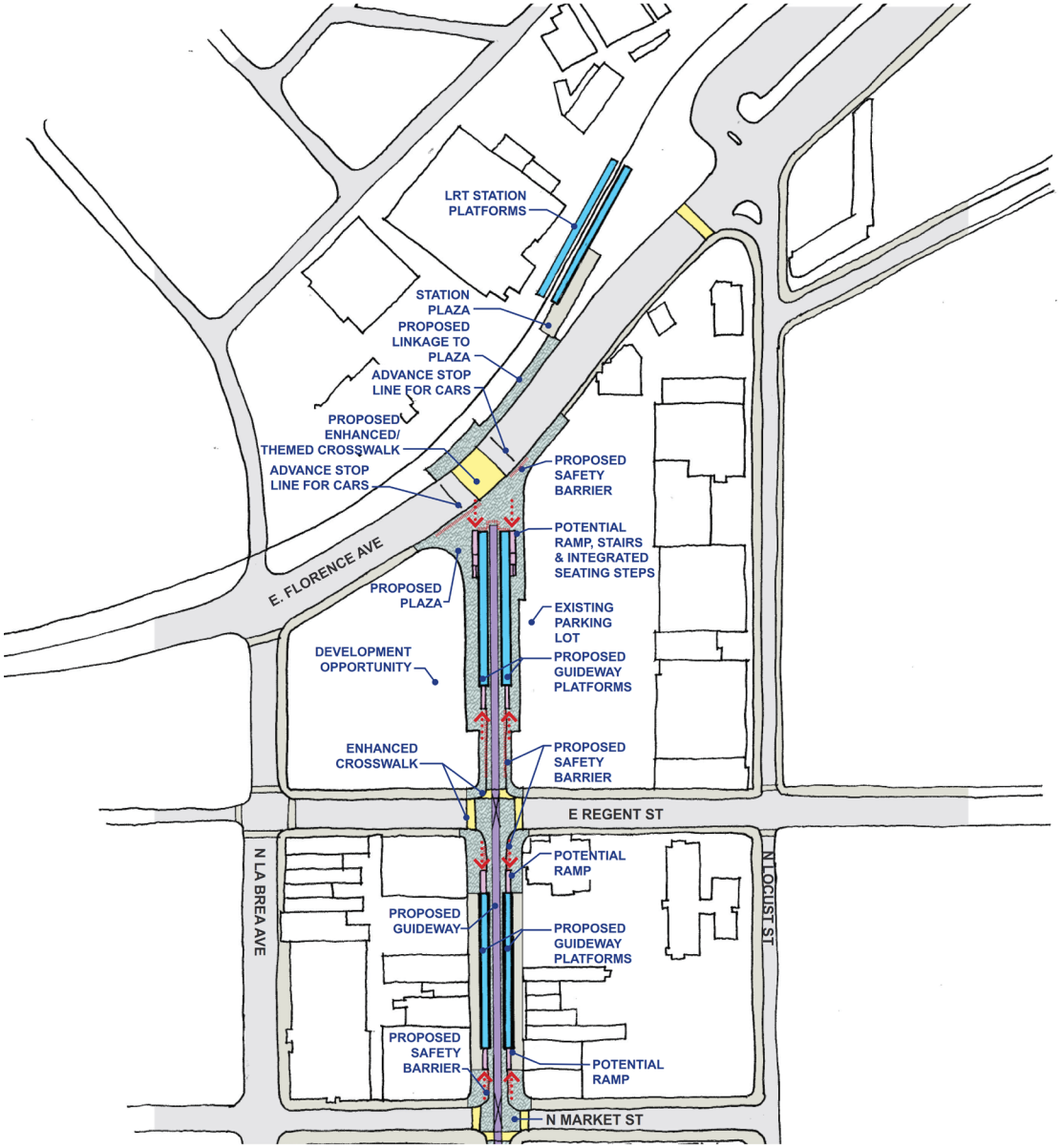
Source: https://www.denver.org/things-to-do/fall-winter/free-fall/

Figure 2.2-4 Example Transit Mall



Source: AECOM

Figure 2.2-3 Independent Option 1: Market-Manchester



Source: RAW International

Figure 2.2-5 Option 1: Market-Manchester Northern Terminus Area Sketch

Alternatively, a signature intersection may be designed at Market Street and Florence Avenue to provide at-grade pedestrian access (with a well governed crossing). Additional traffic studies are needed to identify the size of the queuing areas, ensure safe and efficient pedestrian crossings, and to minimize adverse impacts to vehicular traffic on Florence Avenue. In addition, sidewalk bulb-outs, bike boxes, two-stage queue boxes for bicyclists, median refuge islands, and advance stop lines could all serve as traffic-calming measures.

Another option to segregate vehicular and pedestrian traffic but still provide safe and ease of access from the Market Street North Station to the Downtown Inglewood Station of Crenshaw/LAX Line is to realign Florence Avenue. The roadway would descend below grade near Market Street and a pedestrian overpass with a maximum slope of 1:12 spanning over the depressed roadway will allow pedestrians to cross without stairs. In this configuration, neither vehicular nor pedestrian movements will be interrupted.

In addition to stations at the Development and Century Boulevard, stations could be located to provide local access along Manchester Boulevard and at The Forum. These stations would be similar to elevated light-rail stations with access to the platforms provided by bridges, escalators, elevators and stairs to adjacent access plazas (**Figure 2.2-6**).



Source: http://prr4ever.blogspot.com/2016/06/16-06-14-photos-san-diego-trolley.html

Figure 2.2-6 Example Aerial Guideway

Option 2: Arbor Vitae

An aerial station on Arbor Vitae would be median running with pedestrian bridges and vertical circulation devices to the sidewalks below. This station is in close proximity to the Metro AMC 96th Street Transit Station, including the regional bus transfer center, LAWA's APM and CONRAC. As such, clear way-finding would be provided to direct patrons to transit modes for regional connectivity.

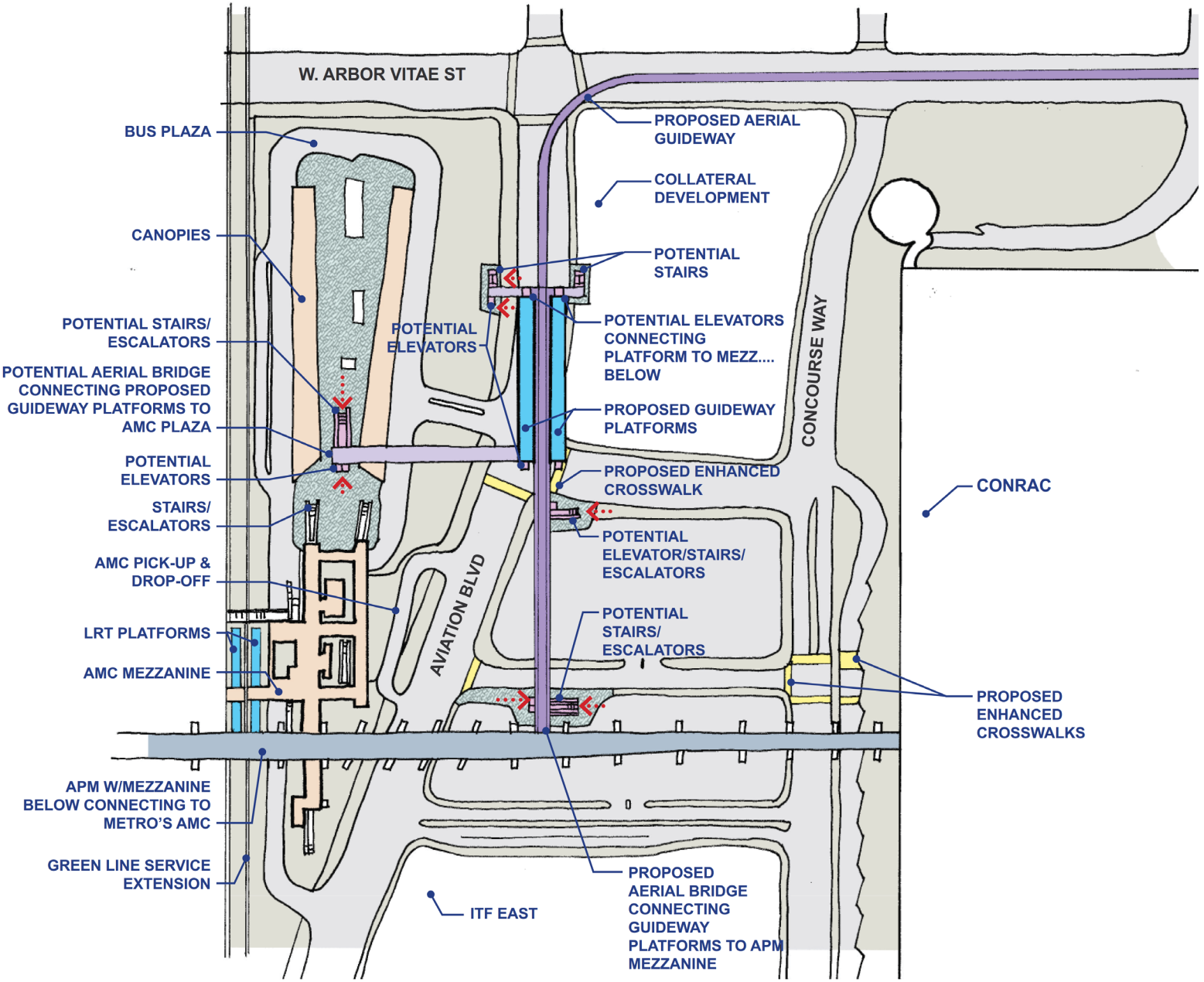
An alternative is to route the guideway from Arbor Vitae Street south along Concourse Way to provide a station that connects to LAWA's APM concourse (**Figure 2.2-8**). This aerial station would require its own vertical devices for access and egress. The capacity, ingress and egress strategy from the concourse would need to be reconsidered to accommodate the combined ridership from the APM and Development line.

At the Development station, there would be multiple platforms with redundant vertical circulation to provide ease of access and egress from the station on event day (**Figure 2.2-9**). Part of the station would be located over Prairie Avenue and align east/west with Arbor Vitae Street. Vertical access by means of stairs, escalators and elevators would be provided either on Arbor Vitae Street or Prairie Avenue. An optional station at La Brea Avenue would provide additional local access along a major existing travel corridor within Inglewood.



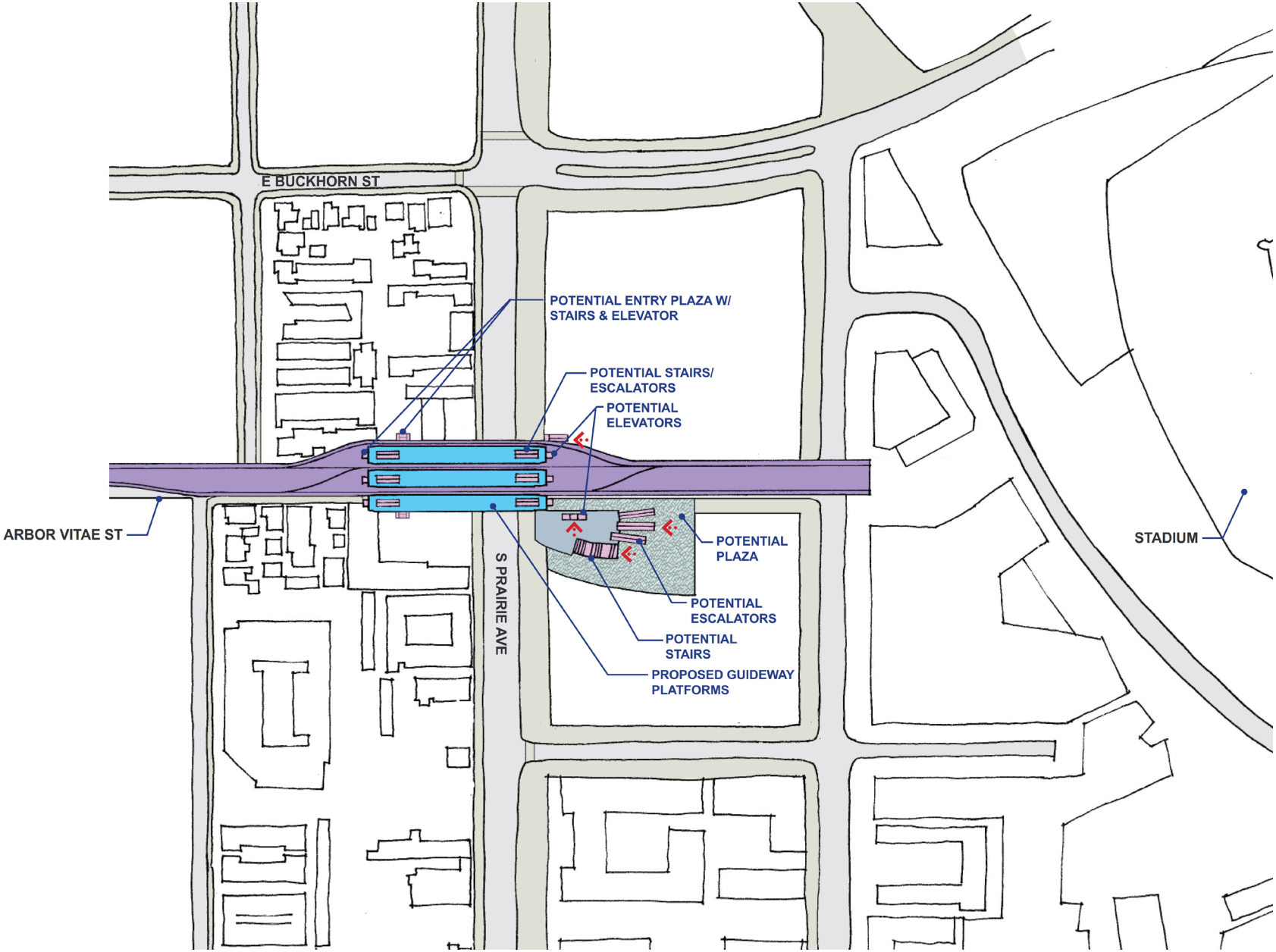
Source: AECOM

Figure 2.2-7 Independent APM/Monorail on Arbor Vitae



Source: RAW International

Figure 2.2-8 Option 2 Arbor Vitae AMC Terminus Area Sketch



Source: RAW International

Figure 2.2-9 Option 2 Arbor Vitae Development Terminus Area Sketch

Independent Scenario

Option 3: Century

An aerial station on Aviation Way routed from Century Blvd (**Figure 2.2-10**) would have similar design considerations as the Arbor Vitae independent scenario.

A proposed aerial station would also be located at the intersection of Century Boulevard and South La Brea Avenue. This station would require pedestrian bridges connecting the platform to vertical circulation on the north and/or south sides of Century Boulevard.

.



Source: AECOM

Figure 2.2-10 Independent APM/Monorail on Century

2.2.2. Station Capacity

Station design capacity is established by passenger demand volumes under typical peak conditions in addition to demands that increase during special events, service disruptions and emergency evacuation situations. These additional factors would be considered in evaluating station capacity:

- Occupant load
- Design of the platform
- Configuration and number of tracks
- Capacity of trains, service headways, ridership
- Level of service
- Access to station and platform(s)
- Egress capacity, emergency evacuation strategy

Interlined Scenario

A new underground station at the Development will provide adequate queuing and waiting spaces without impediments to station access and egress. Overflow areas at the concourse and plaza levels may be required to relieve congestion on the platforms on event days. Additional considerations for emergency lighting and HVAC at underground egress paths would also be provided.

The Fairview Heights and Expo/Crenshaw stations need to be evaluated to accommodate normal daily ridership as well as the surge of event day ridership. However, the maximum train load would not exceed maximum passenger capacity for the largest capacity train operating on that track during the peak period, despite game day surge.

Egress at an underground station at Development would be provided by stairs, elevators and escalators that are in alignment with the platforms.

Independent Scenario

Option 1: Market-Manchester

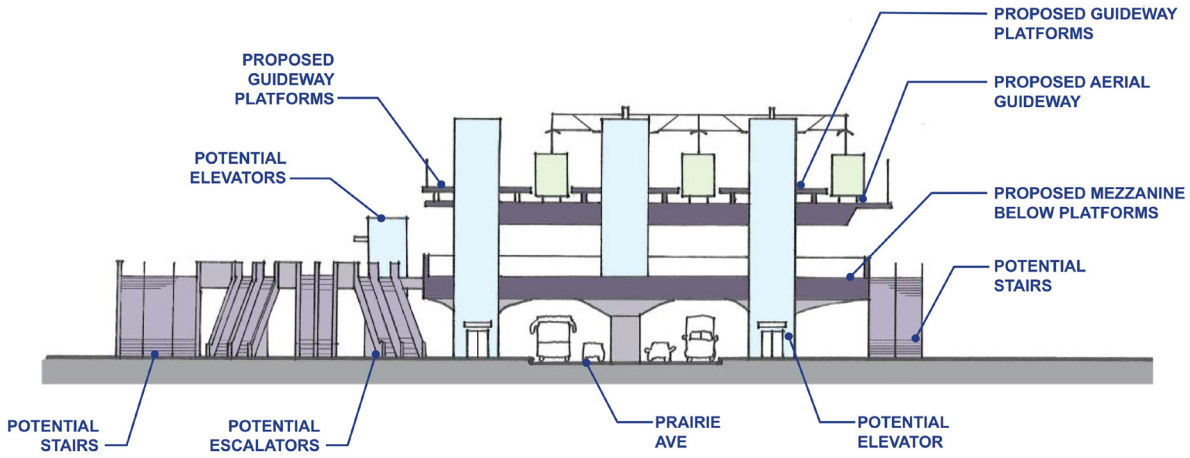
Option 1 includes at-grade stations. Design considerations for capacity would be similar to the aforementioned scenarios for each type of station. The North Market Street station places the at-grade station in close proximity to the Metro Crenshaw/LAX Line station north of Florence Ave. This adjacency would allow the patrons to transfer to and from the Development and Crenshaw/LAX line. The platform and queuing areas may need to be oversized to accommodate an influx of patrons transferring between the two transit lines. Egress at an aerial station at the Development would be provided by stairs, elevators and escalators that are located adjacent or in alignment with the platforms. Paths of egress which involve track crossing would be avoided. A concourse/mezzanine level would be required to egress passengers off the center platform onto pedestrian bridges that would descend to the north and south sidewalks below on Arbor Vitae. Egress from the two side platforms would be directly to grade via stairs, elevators and escalators.

Option 2: Arbor Vitae

The terminus station at Arbor Vitae (**Figure 2.2-11**) could either be standalone or connected to the AMC/96th Street station via the concourse level. In the scenario where the Development station is directly connected to the LAWA APM and concourse (**Figure 2.2-12**), the peak-period calculations contributing to occupant load may differ greatly from an emergency situation and thus impact station capacity and egress. Passengers who typically pass through to the airport or CONRAC via LAWA's APM may be required to exit at the Development station. The same is true in reverse. Egress at an aerial station at the Development would be provided by stairs, elevators and escalators that are located adjacent or in alignment with the platforms. Paths of egress which involve track crossing would be avoided. A concourse/mezzanine level would be required to egress passengers off the center platform onto pedestrian bridges that would descend to the north and south sidewalks below on Arbor Vitae. Egress from the two side platforms would be directly to grade via stairs, elevators and escalators.

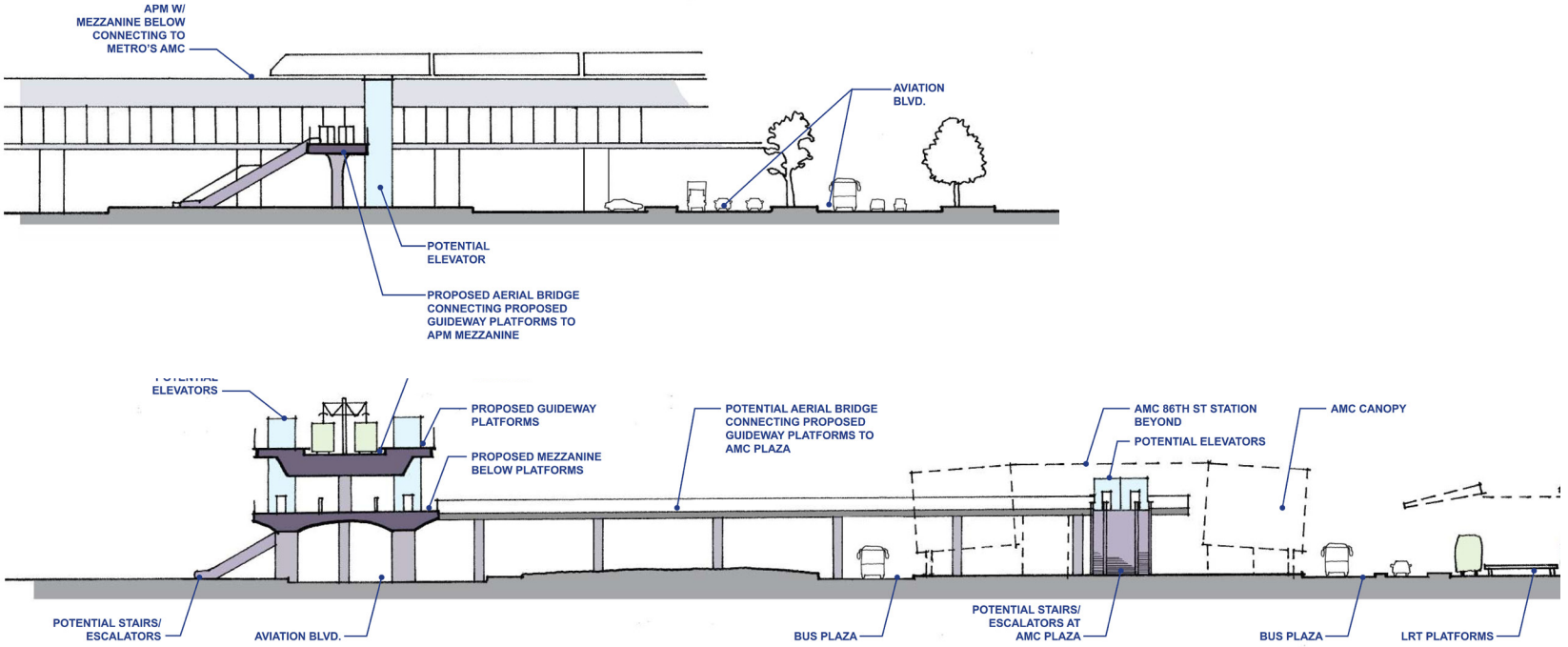
Option 3: Century

Station capacity considerations for Option 3 stations via Century are similar to the Arbor Vitae Independent Option.



Source: RAW International

Figure 2.2-11 Option 2 Arbor Vitae AMC Terminus Area Sketch



Source: RAW International

Figure 2.2-12 AMC 96th Street Transit Center Access

2.3 Operating Plan

One of the Project's primary goals is to accommodate the capacity of those traveling to and from the Development via public transportation. The Project must have the ability to serve peak travel demand during major events. This section presents an operating plan for both the Interlined and Independent Scenarios considered in this Study.

A high-capacity transit connection should be justified by anticipated travel demand, which in turn must be satisfied by the proposed operating plan. This is an iterative process with the following steps:

1. Set a peak-capacity goal to define conceptual service requirement
2. Develop conceptual operating plan to meet conceptual service requirement
3. Evaluate travel demand (ridership) and adjust operating plan as necessary

Station capacity is also crucial because of the special considerations associated with serving peak event loading, crowds, queuing, and fire-life safety (emergency evacuation).

With the knowledge that Metro served between 14% and 26% of Rams' games attendees at the Coliseum, and policy goals set at other locations for emptying the stadium after an event within one hour, it was calculated that the service should be able to serve 25% of the stadium capacity per hour. Therefore, for the study the target capacity was set at 25% of the 80,000 stadium capacity, or 20,000 passengers per hour.

Interlined Scenario

The Fairview Heights Interlined Option provides a new LRT branch from Metro's Crenshaw/Green Line to serve the Development via the station at Prairie/Arbor Vitae. The branch junction occurs south of the Fairview Heights station near Florence Avenue.

Routine Service

For routine service, the Project is envisioned to operate between the Expo/Crenshaw station and the Development at 5-minute peak period headways and 10-minute midday and evening headways, tapering to 20-minute headways at night (**Figure 2.3-1**). The service levels on this branch match the No-Build headways for the combined Crenshaw/LAX and Green Line service. This means that for the segment from Fairview Heights Station to the Expo/Crenshaw Line, the combined service frequencies between the Crenshaw/LAX, Green and Inglewood NFL lines would be 2.5 minutes in the peak and 5 minutes in the off peak. Capital improvements are required in this segment to accommodate the increased frequencies from the Crenshaw/LAX Line as currently designed.

With peak period headways at 5 minutes, the resulting twelve trains per hour serving this branch provide more than enough capacity given the interlined scenario serves one new market at the Development. Passenger loads are likely to be accommodated by single-car trains with this level of service. A refinement to the operating plan can be considered for 10-minute, all-day service tapering to 20-minute night service.

Special Event Service

For event days including NFL football games, additional service shall be scheduled and trains lengthened to their maximum (3-car) to accommodate peak demand over a certain period. Service is most needed after events as passengers tend to leave the event during a short time frame, whereas arrivals (particularly on weekends) are usually more dispersed. This study assumes a 9-hour period of event service:

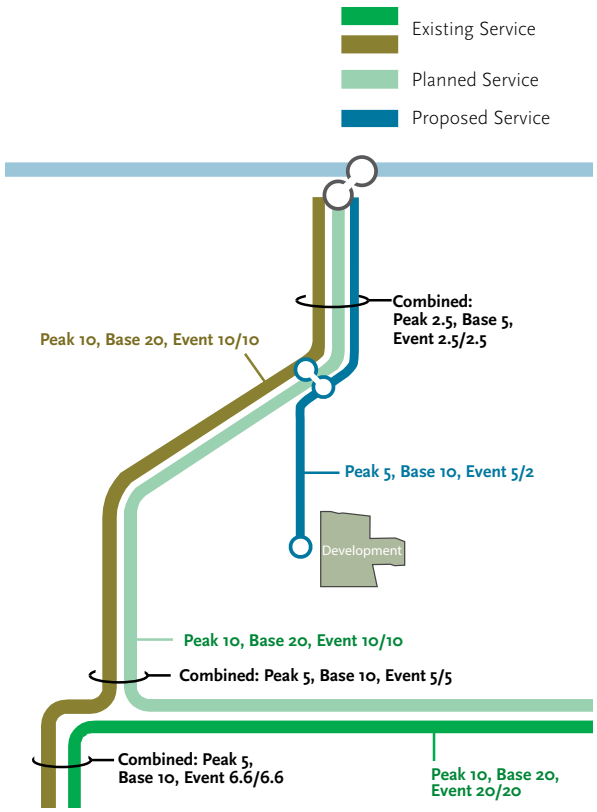
- a 6-hour period covering several hours before to mid-way through the event, and
- a 3-hour period mid-way through the event extending up to a couple hours past the event.

This event service span is consistent with that associated with the Rams games at the Coliseum during the 2016 NFL season.

NFL games are expected to occur on Sunday, Saturday or Monday & Thursday nights. For the 9-hour event service period, the following level of service is proposed (**Figure 2.3-1**):

- Development branch: 5 minute headways
- Crenshaw/LAX Line (Expo/Crenshaw to South Bay): 10 minute headways
- Green Line North (Expo/Crenshaw to Norwalk): 10 minute headways
- Expo Line (east west): 10-minute headways (5 minutes during weekday afternoon peak)
- Green Line South (Norwalk to South Bay): 20 minute headways (10 minutes during weekday afternoon peak)

Specifics of the service plans for this and all other scenarios are provided in Appendix D.



Source: Connetics Transportation Group, AECOM

Figure 2.3-1 Interlined Option Operating Concept

Independent Scenarios (Options 1 through 3)

The independent options assume a stand-alone line connecting the Development with Metro's rail network.

Routine Service

For routine service, the Project is envisioned to operate at 5-minute peak headways, 10-minute midday and evening headways, tapering to 20-minute night service. These service levels are set to be compatible with planned headways for the combined Crenshaw/LAX and Green Line service.

With peak period headways at 5 minutes, the resulting twelve trains per hour provide more than enough capacity for the forecasted travel demand. Passenger loads are likely to be accommodated by single-car trains with this level of service. A refinement to the operating plan can be considered for 10-minute, all-day service tapering to 20-minute night service.

Special Event Service

For event days including NFL football games, additional service shall be scheduled and trains lengthened to their maximum per station platform design (6-car trains for APM or monorail, and 3-car trains for urban rail). The analysis for Independent Scenario Options also assumes a 9-hour period of event service similar to the Interlined Scenario, and the service span is also consistent with the event service associated with the Rams games at the LA Coliseum during the 2016 NFL season.

Post-event service provides the "worst case" where the most service is needed, since passengers are more likely to leave the event during a short time frame, whereas arrivals (particularly on weekends) tend to be more dispersed. Since the independent options are not constrained by sharing track with other services, the post-event period can be designed at very tight headways to provide the most capacity. The frequency of operations is limited by:

- Operational considerations of how long it takes to turn trains around at each end and safely load and unload crush loads, and
- Considerations of whether passenger loads can be distributed effectively at the terminus of the line.

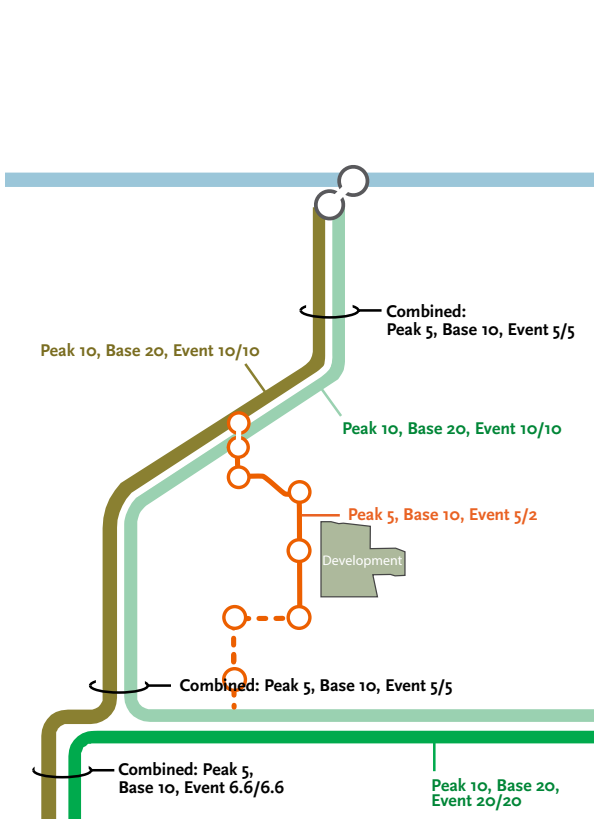
NFL games are expected to occur on Sunday, Saturday or Monday & Thursday nights. For the 9-hour event service period, the following level of service is proposed to provide the greatest capacity possible and allowing times for efficient loading and unloading passengers at each end of the line:

- Options 1 through 3: 5-minute headways pre- and during event; 2 minute headways mid- to post-event
- Crenshaw/LAX Line (Expo/Crenshaw to South Bay): 10-minute headways
- Green Line North (Expo/Crenshaw to Norwalk): 10-minute headways
- Expo (east west) Line: 10-minute headways (5 minutes during weekday afternoon peak)
- Green Line South (Norwalk to South Bay): 20 minute headways (10 minutes during weekday afternoon peak)

For Option 1 (**Figure 2.3-2**), passenger loads in Downtown Inglewood can be distributed toward the South Bay (via the Crenshaw/LAX Line southbound to El Segundo and eventually

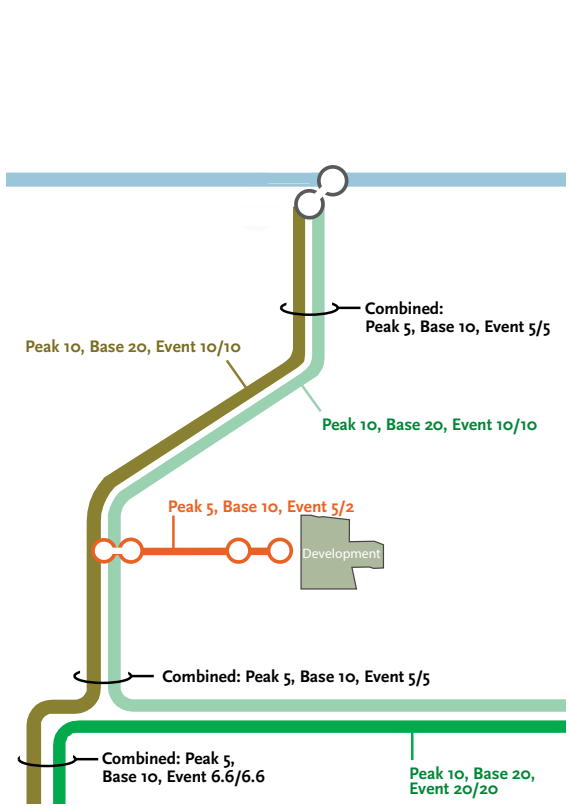
Torrance), communities to the south and east (via Green Line to Norwalk), and the Westside, downtown and East Los Angeles (via Crenshaw/LAX Line northbound to Expo/Crenshaw), with opportunities to further transfer onto other major transit lines serving the county and greater region. Connection to bus routes are limited since the Inglewood Transit Center is served by only a limited number of Metro and municipal lines compared to the AMC 96th Street Transit Station.

For Options 2 & 3 (**Figure 2.3-3 and Figure 2.3-4**) passenger loads at AMC 96th Street Transit Station can be distributed toward the South Bay (via Crenshaw/LAX Line southbound to El Segundo and eventually Torrance), communities to the south and east (via Green Line to Norwalk), and the Westside, downtown and East Los Angeles (via Crenshaw/LAX and Green Line northbound to Expo/Crenshaw), with opportunities to further transfer onto other major transit lines serving the county and greater region. Passengers will also be able to take advantage of a wide array of bus transit routes serving the AMC 96th Street Transit Station, as well as the airport via LAWA's APM.



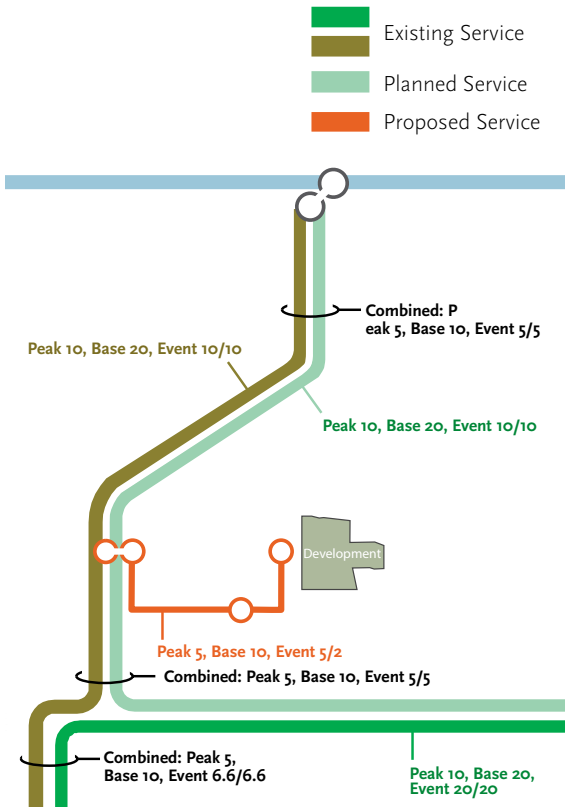
Source: Connetics Transportation Group, AECOM

Figure 2.3-2 Option 1: Market-Manchester Operating Concept



Source: Connetics Transportation Group, AECOM

Figure 2.3-3 Option 2: Arbor Vitae Operating Concept



Source: Connetics Transportation Group, AECOM

Figure 2.3-4 Option 3: Century Operating Concept

2.4 Ridership Analysis

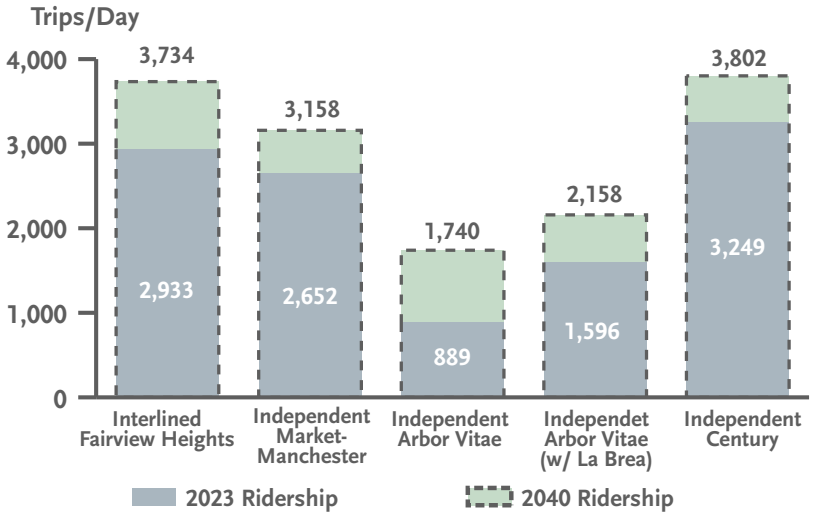
Based on the operating plan described above, an analysis of travel demand to estimate future ridership of both the Interlined and Independent Scenarios was evaluated. The Metro model was used to perform this analysis, which does not include special event forecasts. A separate model was developed for special events ridership forecasts.

2.4.1 Ridership Forecasts

This section documents the results of the travel demand forecasting process for both scenarios and related options. Included in this section is a description of the types of data used to assess and compare the scenarios, followed by additional model results for each option. The subsequent section presents a comparison of the performance of the scenarios and related options across a set of key performance indicators. Transit ridership is evaluated by a range of statistics that depict the ability of a project to attract riders and the ability of the bus and rail system to serve the traveling public. Key statistics for this project include:

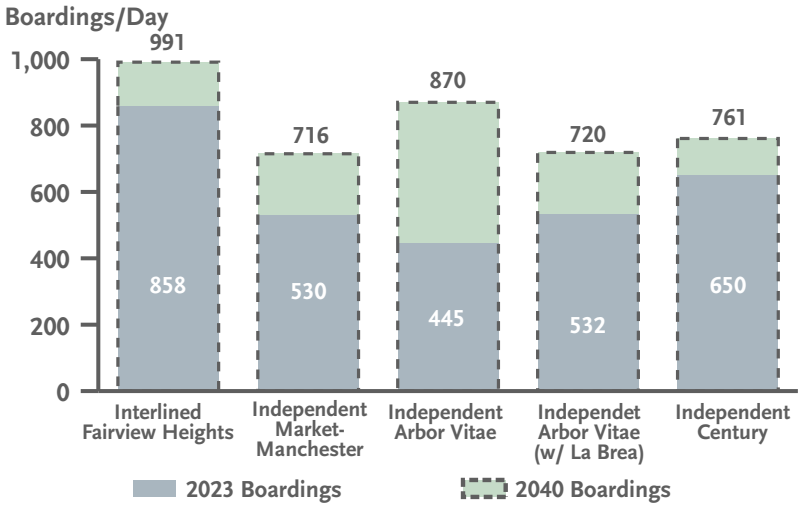
- **Boardings**: Boardings represent the number of times a traveler boards a new transit vehicle. With this statistic, a commuter driving to a train station and taking the train downtown counts as one boarding. A traveler walking from home to a bus and then transfers to another bus or train counts as two boardings. It can be measured at the route or station level and provides the most intuitive understanding of whether a project is able to attract ridership.
- **Trips on the Project**: Trips on the Project are a subset of the boarding statistic and represent those boardings making use of a new transit project. Trips on the Project are equal to the Administration (FTA) uses this measure to quantify ridership for New Starts project evaluations.
- **Station Boardings**: Station boardings are the number of boardings occurring at each station and can also show the modes of access and egress (e.g., walk, bus, park-and-ride or kiss-and-ride) to and from a station. This statistic provides information on the locations where the project is forecasted to attract demand. It is also useful in understanding the impacts that each station may have on the surrounding community.

The projected transit ridership of each of the Development transit options for the rail system and other Metro lines are shown in the tables below (**Figure 2.4-1**). Ridership projections by line are included in Appendix E.



Source: AECOM

Figure 2.4-1 Year 2023 and 2040 Typical Weekday Trips on Project



Source: AECOM

Figure 2.4-2 Year 2023 and 2040 Typical Weekday Average Station Boardings

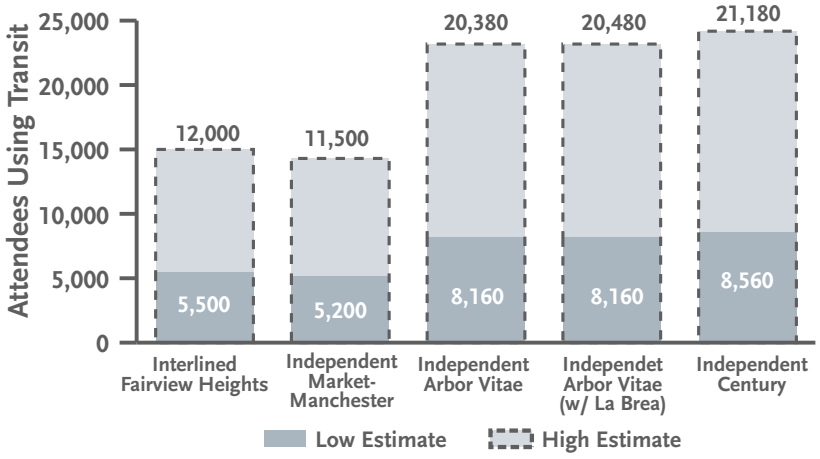
The interlined option essentially acts as a one station branch off of the Crenshaw/LAX Line, so trips on the project only include trips the new station is responsible for which is inbound ons and outbound offs at the station. As boardings are calculated as total ons added to total offs divided by two, and there are only inbound ons and outbound offs at the Development station, the interlined option's trips on the project are equal to the stations boardings multiplied by two. For Year 2023 and Year 2040 average weekday trips on the project, Option 3 has the highest weekday trips on the project with multiple stops through a higher density area along Century Boulevard. Option 2 has the lowest ridership with only two to three stops on the project. The 2040 forecasts increase trips on the project by 500 to 900 with the largest increase occurring on Option 2.

For station boardings, the interlined option has the highest station boardings at the Development of all the options with 1,500 in 2023 and 1,900 in 2040. The rest of the options have between 400 and 550 in 2023 and 700 to 900 in 2040 (**Figure 2.4-2**). Option 3 has the highest trips on the project due to the higher number of stations and alignment along Century Boulevard. Option 2 the lowest trips on the project as they are not interlined with the existing transit network and would include only a single new station at the Development. The difference in ridership between the APM and monorail technology are negligible as their difference in the model reflects a minor change in run-times.

2.4.2 Events-Based Forecasts

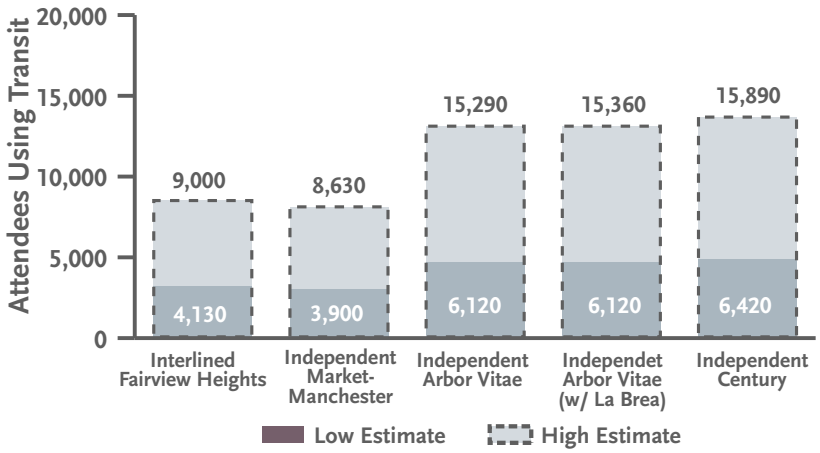
For the events based forecasts, a low-range and a high-range estimates were used for each of the scenarios which assumed a high and low average Rams and Chargers game attendance, transit mode shares, and of LAMP parking availability (**Figure 2.4-3, Figure 2.4-4**). These projections are based on one NFL team playing their home games at the stadium at the Development. Option 1 has the lowest estimate as it does not have the access to LAMP parking. Option 3 has the highest estimate due to access to the LAMP remote parking lots and high transit accessibility. Note that "attendees using transit" does not reflect boardings over a specific time period although it may be inferred that each attendee using transit will make a round-trip thus accounting for two boardings during an event day.

The options with LAMP parking have the highest game day usage with access to 3,200 to 9,500 remote parking spaces.



Source: AECOM

Figure 2.4-3 Year 2040 Rams Game Transit Usage Projection



Source: AECOM

Figure 2.4-4 Year 2040 Chargers Game Transit Usage Projection

2.5 Construction Methods and Impacts

This section presents an overview of the construction methods that would be used for the various guideway configurations of the Operability Scenarios as conceptually designed for this study.

A high level overview of the procedures is presented for each construction method, potential temporary and permanent traffic impacts, and temporary and permanent ROW acquisitions.

At-grade, aerial and underground guideway construction will have impacts to different extents in different scenarios (**Table 2.5-1**). Detailed descriptions of construction potential impacts are provided in Appendix F.

Construction Method	Interlined Scenario	Independent Scenario
At-Grade Guideway Construction Impacts	Along Florence Avenue where the alignment merges with the existing Crenshaw/LAX Line, consisting of two single-track at-grade guideway alignments on either side of the main line and two single track junctions into the main line.	Option 1: Market-Manchester: On Market Street in Downtown Inglewood between Florence Avenue and Manchester Boulevard,two at-grade stations would be constructed at the Development, the Forum, and two on Market Street.
Aerial Guideway Construction Impacts	N/A	Option 1: Market-Manchester: Along Manchester Boulevard between Locust Street and Prairie Avenue and on Prairie Avenue, an aerial structure would be constructed on Manchester Boulevard near Hillcrest Boulevard. Option 2: Arbor Vitae: On Arbor Vitae along the entire alignment between Prairie Avenue and the Crenshaw/LAX line. Two aerial stations would be constructed with one at each end of the alignment. Option 3: Century: Along the entire alignment on Prairie Avenue, Century Boulevard and parallel to the existing Crenshaw/LAX line. Two aerial stations would be constructed with one at each end of the alignment.
Cut & Cover Construction Impacts	Underground at the Development.	Option 1: Market-Manchester: A short underground segment on Manchester Boulevard between Market and Locust Streets. Guideway transitions from an underground to at-grade configuration would be constructed either end of the underground segment, on Manchester Boulevard and Market Street, creating two permanent open trenches with retaining walls.
Bored Tunnel Construction Impacts	Along Prairie Avenue from the Development station to Florence Avenue. Requires 4 to 6 acres for TBM launch, which could potentially occur at the Development station construction site. Guideway transitions on the north side of Florence Avenue adjacent to Edward Vincent Jr Park, creating two permanent open trenches with retaining walls on either side of the Crenshaw/ LAX line.	N/A

Source: AECOM

Table 2.5-1 Construction Impacts Summary

2.6 Traffic Impacts

Interlined Scenario

The Interlined Option will be fully underground along Prairie, and will transition back to at-grade on Florence and connect to the Crenshaw/LAX Line south of the Fairview Heights Station. Even though the alignment will not directly interfere with at-grade traffic flow, the proposed service increase on this spur and on the Crenshaw/LAX Line (2.5-minute headways) during events might result in significant traffic impacts at at-grade crossings along the Crenshaw/LAX upstream alignment. According to the Park Mesa Heights Grade Separation Study, Crenshaw/Slauson is the most problematic intersection (with high sensitivity to induced traffic) along the Park Mesa Heights at-grade alignment section, and queues and delays caused by the Crenshaw/Slauson have significant spill-over impacts on intersections nearby. Therefore, with the proposed service increase, additional study is required to define the feasibility of at-grade operation, but it is assumed that grade separation is required at Slauson Avenue. A summary of potential needs for grade separation of and traffic impacts due to service increase on Crenshaw/LAX Line is included in Appendix I.

Independent Scenario

All of the options evaluated are grade-separated except for Market Street in Downtown Inglewood. Market Street, Regent Street and Queen Street require further analysis to determine any impacts to traffic operations downtown.

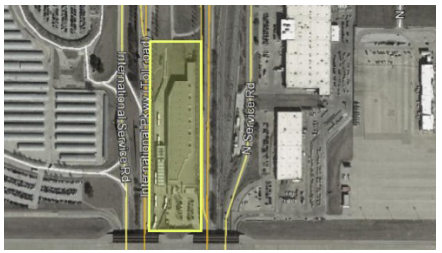
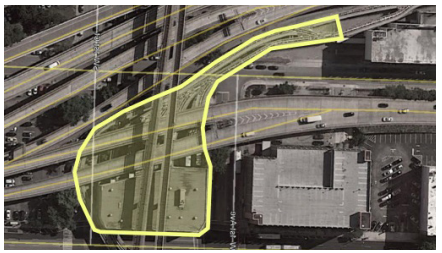
2.7 Maintenance and Storage Facilities

Each of the Operability Scenarios would require a maintenance and storage facility (MSF) to accommodate the new transit connection. Different fixed-guideway technologies have different space requirements for maintenance and storage facilities. As such, a discussion of the possible MSF facilities needs for each of the Operability Scenarios is discussed in the section below.

Many airport connectors deploy APM technology, and as **Table 2.7-1** presents, MSFs are usually located at some low-density urban area along the line (like those of AirTrain JFK, Sky Train, and BART) or at one terminus of the line (like Skylink's MSF). Miami Metromover's system has a downtown-based MSF, which is at the point where the-two loops split to run in adjacent parallel streets.

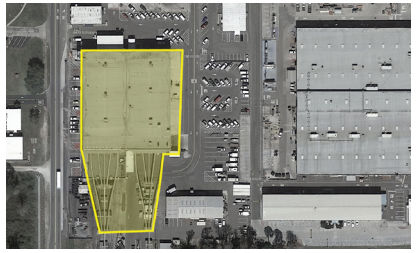
Some international practices were explored for Monorail system MSFs as the U.S. has limited experience in operating Monorail systems. As can be seen from site aerials included in **Table 2.7-2**, while generally still depending on the feet size and line length, the monorail systems usually require less maintenance bays, and therefore can be more compact in yard size and layout. Monorail MSFs are usually located at a terminus of the system.

While APM and Monorail are often deployed as shuttle systems for point-to-point or shorter trips, Urban Rail systems usually serve as local circulating systems. As shown in **Table 2.7-3**, Urban Rail MSFs can be either at the end of a line, next to a station on the line, or along the line.

System	No.	Name	City	# of Vehicles	MSF Size (acre)	Line Length (Mile)	Site Aerial
APM	1	AirTrain JFK	New York, New York	32	14	8.1	
	2	SkyTrain	Vancouver, Canada	298	22	49.5	
	3	Skylink	Dallas, Texas	64	10	4.8	
	4	BART Airport Line	Oakland, California	12	2.2	3.2	
	5	Miami Metromover	Miami, Florida	29	1.6	4.4	

Source: AECOM

Table 2.7-1 APM MSF Examples

System	No.	Name	City	# of Vehicles	MSF Size (acre)	Line Length (Mile)	Site Aerial
Monorail	1	Las Vegas Monorail	Las Vegas, Nevada	9	0.9	3.9	
	2	Disney World Monorail	Orlando, Florida	12	1.9	14.7	
	3	Sao Paulo Line 15	Sao Paulo, Brazil	378	14	17	
	4	Palm Jumeirah Monorail	Palm Jumeirah, Dubai	27	3.6	3	
	5	Kuala Lumpur Monorail	Kuala Lumpur Malaysia	24	3.7	5.3	

Source: AECOM

Table 2.7-2 Monorail MSF Examples

System	No.	Name	City	# of Vehicles	MSF Size (acre)	Line Length (Mile)	Site Aerial
Urban Rail	1	El Paso Streetcar	El Paso, Texas	6	0.8	5.0	
	2	Sun Link	Tucson, Arizona	8	1.1	3.9	
	3	Oklahoma City Streetcar	Oklahoma City, Oklahoma	7	2.5	6.9	
	4	Cincinnati Bell Connector	Cincinnati, Ohio	5	1.9	3.6	

Source: AECOM

Table 2.7-3 Urban Rail MSF Examples

System	No.	Name	City	# of Vehicles	MSF Size (acre)	Line Length (Mile)	Site Aerial
Urban Rail	5	QLINE	Detroit, Michigan	6	1.5	3.3	
	6	METRORail	Houston, Texas	76	45 *30 - Maintenance* *11- Storage 1* *4- Storage 2*	23.8	
	7	Nantes Tramway	Nantes, France	91	7	27.5	

Source: AECOM

Table 2.7-3 Urban Rail MSF Examples (Continued)

Interlined Scenario

LRT vehicles typically require more storage and maintenance space than smaller, APM vehicles. When taking the averages of the collected data, one acre of a maintenance site facility can accommodate about 3 LRT vehicles, 8 automated people mover (APM) vehicles, 6 monorail vehicles, or 5 urban rail (tram/urban rail) vehicles (**Table 2.7-5**).

Minimum site size requirements for average MSF sites can be calculated by dividing the fleet size from the operating plan by the average vehicle per acre requirements given above (**Table 2.7-6**). The Interlined Scenario would need at least 13 acres, the Independent Scenarios on Arbor Vitae or Century would need at least 5 to 7 acres, and the Independent Urban Rail Scenario would need at least 5 acres.

It should be noted that the actual space requirements can vary widely, depending on the shape of the site, the type of site (heavy maintenance, light maintenance, storage only, etc.), engineering layout, undeveloped space, price and availability of real-estate, proximity to main line, and other factors. Additionally, the acquisition of land is typically based on property tract lines instead of exact square footage, which results in purchasing more land than needed due to the full parcel takes.

2.7.1 Maintenance Facility Strategies

As part of this feasibility study, a preliminary MSF siting exercise was performed to identify site options that could potentially accommodate MSFs for the Project Options. Multiple solutions were presented for the scenarios, including the following strategies:

- **New MSF-only Parcel**
  Under this strategy, an all-new MSF would be built on land acquired for that purpose. Underutilized commercial properties or industrial lots within the vicinity of the line are potential candidate sites for a MSF to serve this Project.
- **Joint Development Site**
  Under this strategy, a new MSF would be built as part of a larger mixed-use development as part of a Public Private Partnership (PPP). This delivery strategy typically involves a rail operating agency and a property developer joining into agreement to develop a plot of land. The operating agency may purchase the parcels and construct the MSF and then lease land to property developers who could then build a development on top of adjacent to the MSF. Alternatively, the property can be sold to the property developer and then the operating agency could lease the land from the developer for the MSF site. Metro has several examples of PPP developments within the existing system. Underutilized commercial properties or industrial lots within the vicinity of the line are potential candidate sites for a MSF to serve this Project.

Mode	Average MSF Size # of Vehicles/acre
LRT	3*
APM	8**
Monorail	6**
Urban Rail	5**

* Average based on Metro Design Standards
** Averages based on collection of data for similar projects around US

Source: AECOM

Table 2.7-5 MSF Needs of Different Modes

Scenario	Fleet Size	Minimum Acreage Requirement*
Interlined: LRT	36	13
Independent: Option 1	23	5
Independent: Option 2	38	5 to 7
Independent: Option 3	38	5 to 7

* Actual MSF acreage can be greater due to site shape, type, layout, real-estate availability, proximity to main line, and parcel sizes.

Source: AECOM

Table 2.7-6 MSF Needs for Project

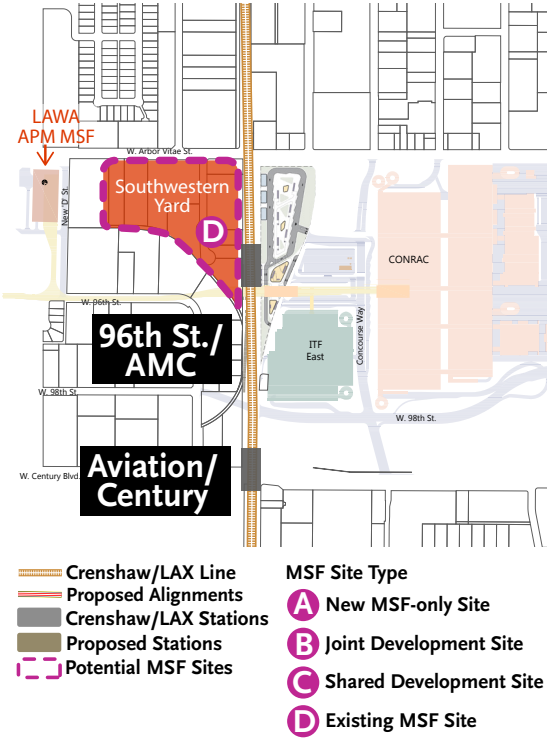
- **Shared Site with nearby Developments**
  The project study area contains several additional sites within larger, undeveloped properties that could be suitable for a MSF, such as the Forum, the Development, or LAWA APM development sites. This strategy would involve entering into agreement with an existing owner to either purchase a partial ROW easement or lease a portion of the site from the property owner.
- **Existing MSF Facility**
  Under this strategy, an existing MSF would be utilized with a non-revenue connection from this project. The existing MSF would need to be either expanded or reconfigured to accommodate the additional fleet size.

2.7.2 Potential MSF Locations

Interlined Scenario

The Interlined Scenario's rail vehicles would be an addition to Metro's Crenshaw/LAX Line LRT fleet. It is assumed for the purpose of this analysis that the Southwestern Yard would be utilized by the additional fleet for maintenance and storage purposes. The Southwestern Yard (**Figure 2.7-1**) would likely require an expansion in order to accommodate the storage and maintenance of additional LRT vehicles needed for the Development connector.

This yard would likely require an expansion to accommodate the increased fleet size of up to 13 acres. Adjacent properties include commercial businesses, airline cargo shipment companies, and temporary vehicle storage for rental car companies. Car rental storage parcels may be ideal candidates as these areas may become obsolete following the completion of the Consolidated Rental Car Facility (CONRAC) in development by LAX. If it is determined that this yard cannot accommodate a yard expansion, additional options would be explored such as expanding the Green Line maintenance yard or constructing a new maintenance yard for the additional fleet.



Source: AECOM

Figure 2.7-1 MSF Site for the Interlined Option









Independent Scenario

Option 1: Market-Manchester

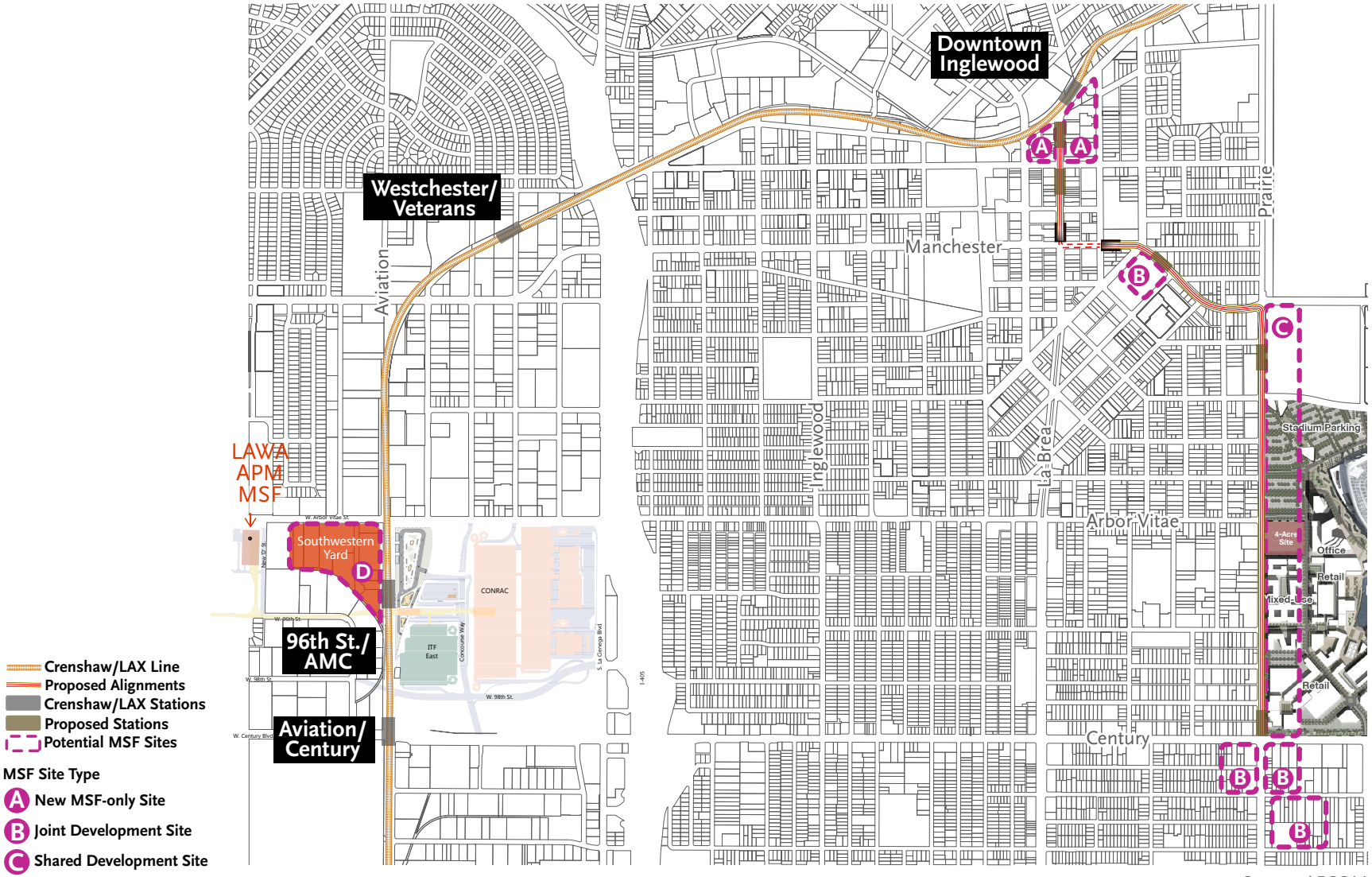
Option 1 would utilize use "urban rail" technology, assumed to be similar to tram, urban rail, or low-floor LRT. The MSF area required for urban rail systems can be less than that of typical Metro LRT. Eight potential MSF site options have been identified for the Independent Market-Manchester Option (**Figure 2.7-2**). Urban rail and LRT technologies generally have similar maintenance and storage requirements and can be compatible operationally, meaning that an existing Metro facility, such as the new Southwestern Yard, could accommodate vehicles from the Market-Manchester Option. This would require a "non-revenue" track connection to the Crenshaw/LAX line and also assumes that capacity is available at the Southwestern Yard. Another option would be for a Metro facility to assume specific, occasional "heavy maintenance" duties without storing or maintaining the entire fleet.

One site has been identified as being a potential for a joint development opportunity on East Manchester Boulevard between East Hillcrest Boulevard and Spruce Avenue. This MSF option assumes the opportunity for PPP for a mixed-use development in which the MSF would be designed and operated within the same property as a development.

One potential site has been identified as a location for a MSF site within a shared development. The site location is along South Prairie Avenue between West Manchester Boulevard, within the Development. This option would require re-programing a portion of the Hollywood Development and Development site.

The following five sites have been identified that could be used as a MSF site that exclusively serves the fleet independent of other transit systems.

- Southwest corner of intersection between South Prairie Avenue and West Century Boulevard
- Southeast corner of intersection between South Prairie Avenue and West Century Boulevard
- Along South Prairie Avenue between West 102nd Street and West 104th Street
- Southwest corner of East Florence Avenue and North Market Street
- Southeast corner of East Florence Avenue and North Market Street



Source: AECOM

Figure 2.7-2 Potential MSF Sites of Independent Option 1: Market-Manchester

Option 2: Arbor Vitae & Option 3: Century Boulevard

Option 2 uses an APM or Monorail technology along an aerial alignment. Four possible MSF site options have been identified for the Independent Arbor Vitae Option (**Figure 2.7-3**).

The following two sites have been identified near Arbor Vitae and the Crenshaw/LAX alignment could be used as a MSF site that exclusively serves the fleet independent of the LAWA APM system.

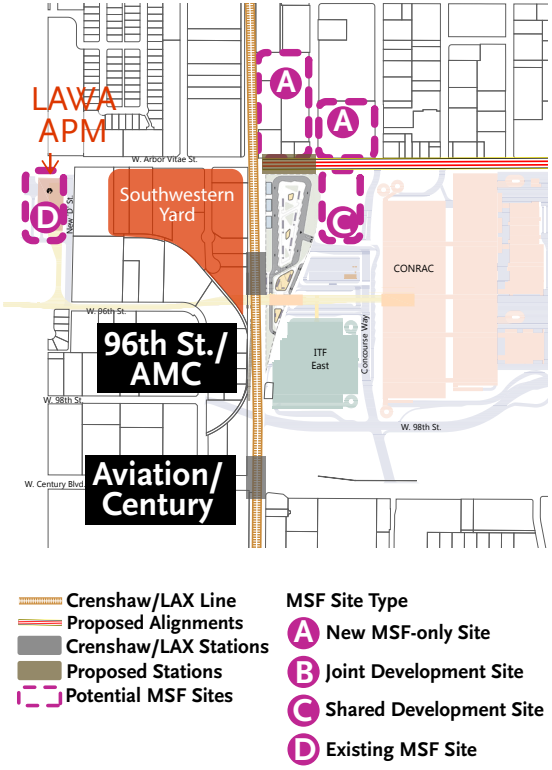
- Northeast corner of intersection between West Arbor Vitae Street and Aviation Boulevard
- Along westbound Arbor Vitae Street between Isis Avenue and Hindry Avenue

These parcels are currently occupied by car rental facilities which could be ideal candidates following the completion of the CONRAC facility.

A potential location for a MSF site within a shared development has been identified along eastbound Arbor Vitae Street between Isis Avenue and Hindry Place north of LAWA CONRAC. This site would be located with the LAX CONRAC area developments and would require agreements with LAX to lease and program the use of this space.

If the Independent Arbor Vitae Scenario uses an APM technology, it has the potential to be designed to be compatible with the LAWA APM maintenance facility. This would provide for the opportunity to utilize the same facility as the APM located at 93rd Street and Bedford Avenue. This facility may need to be expanded or reconfigured to accommodate the increased fleet size. This option would require complete system integration between the Development and LAX.

This option could add the requirement that LAX would need to operate the entire system for security and continuity purposes.



Source: AECOM

Figure 2.7-3 Potential MSF Sites of Independent Option 2: Arbor Vitae

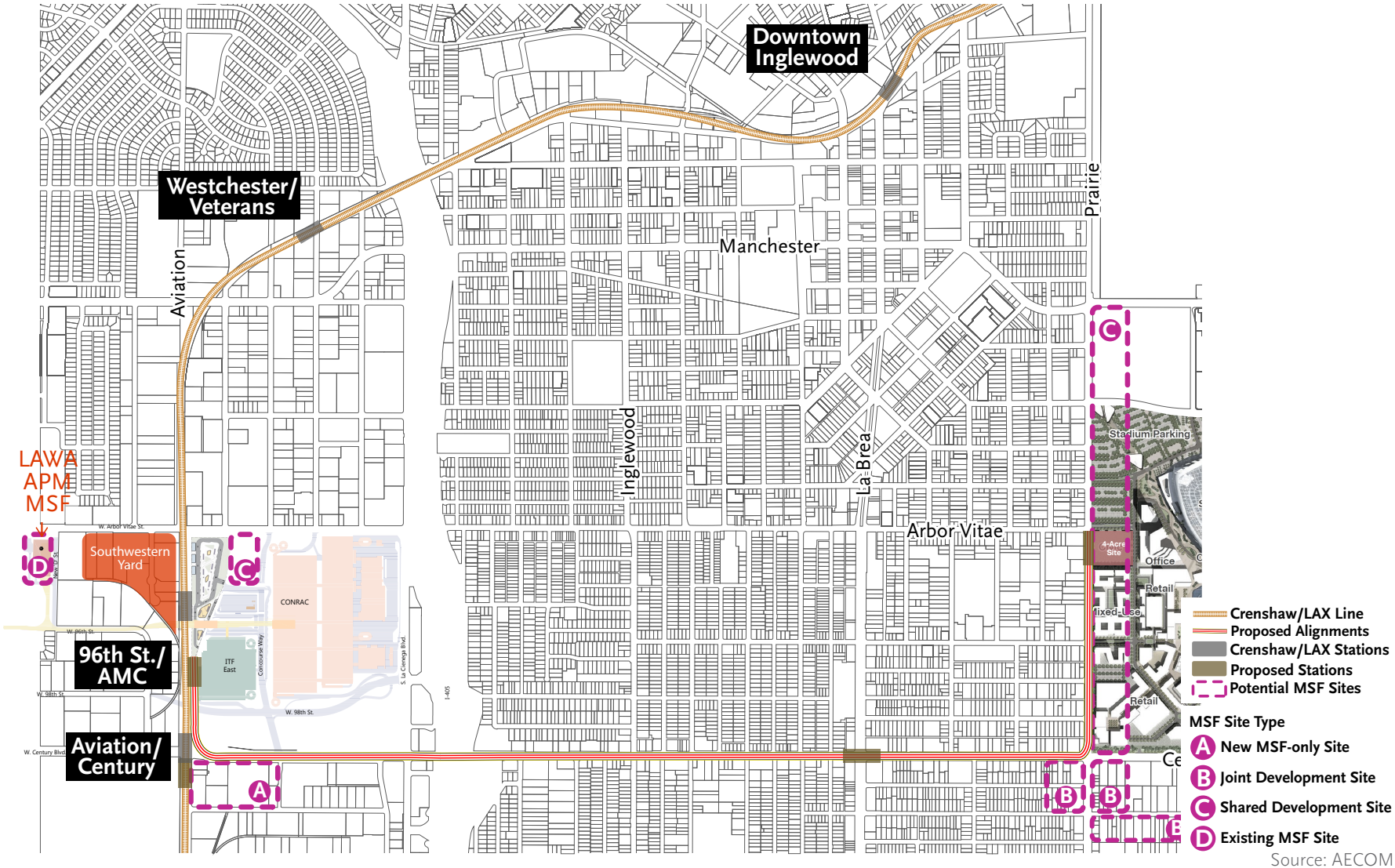






Option 3: Century

Option 3 would also use APM or Monorail technology. Seven potential MSF site options have been identified for the Independent Century Option (**Figure 2.7-4**).



Source: AECOM

Figure 2.7-4 Potential MSF Sites of Independent Option 3: Century Boulevard

Four potential sites have been identified that could be the location of new MSF sites that would serve as an exclusive independent MSF.

- Southwest corner of intersection between South Prairie Avenue and West Century Boulevard
- Southeast corner of intersection between South Prairie Avenue and West Century Boulevard
- Along West 102nd Street between South Prairie Avenue and South Doty Avenue
- Opposite Aviation/Century Station between West Century Boulevard and West 102nd Street

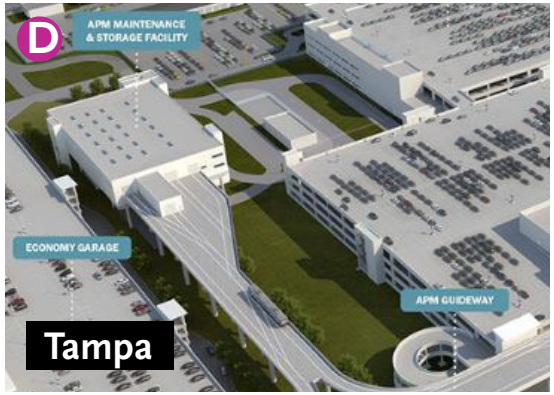
These parcels are currently occupied by car rental facilities which could be ideal candidates following the completion of the CONRAC facility.

Two potential locations for a MSF site within a shared development have been identified. One site is located along eastbound Arbor Vitae Street between Isis Avenue and Hindry Place north of LAWA CONRAC. This site would be located with the LAX CONRAC area developments and would require agreements with LAWA to lease and program the use of this space. The second site is along South Prairie Avenue between West Manchester Boulevard, within the Development. This option would require re-programing a portion of the Hollywood Development and Development site to be a MSF.

As discussed above for Option 2, for the APM technology for Option 3, there is an opportunity to utilize the same facility as the APM is located at 93rd Street and Bedford Avenue.







2.8 Right-Of-Way Acquisition

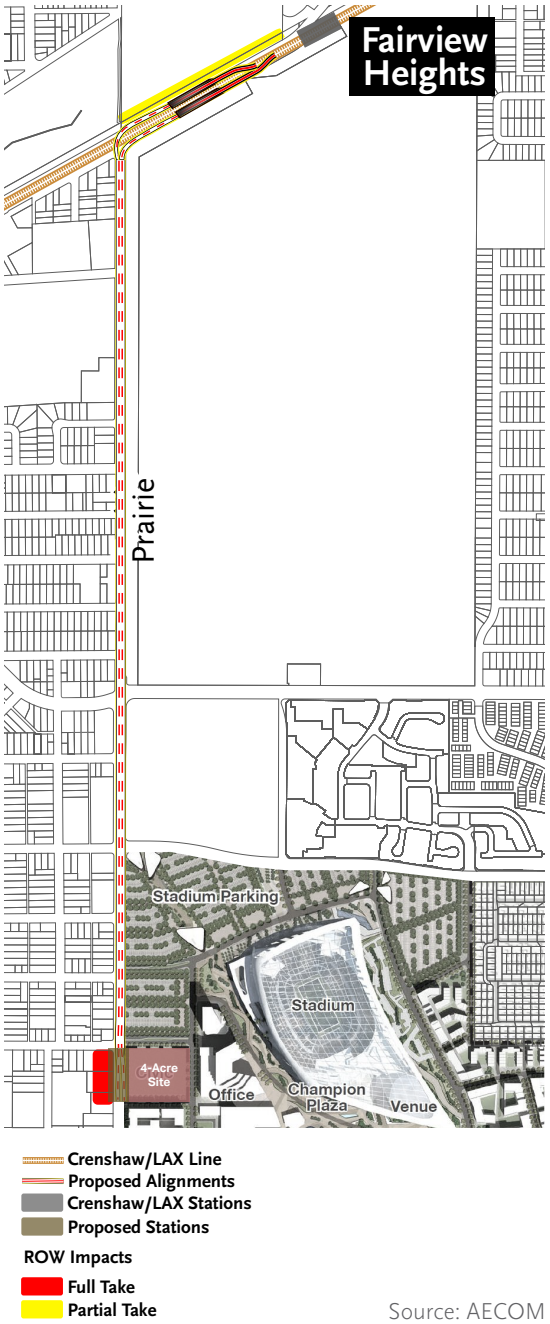
2.8.1 Right-of-Way Requirements and Constraints

This section summarizes the right-of-way (ROW) acquisitions that may be required for the Project Operability Scenarios (**Table 2.8-1**).

ROW acquisition will be required for delivering several components of the options. As mentioned previously, temporary construction staging areas will be required for tunneling, material lay-down, equipment storage, and project field offices. In the section above, multiple potential maintenance and storage facility (MSF) locations are presented that would require ROW acquisition for new MSF sites or expansion of existing MSF sites. Additionally, ROW acquisition may be required at station locations and station developments along the alignments.

Interlined Scenario

The underground guideway along Prairie Avenue requires additional right-of-way for construction, the junction with the Crenshaw/LAX Line, and potentially at the Development station. Temporary sites for tunnel boring machine launch and retrieval will be required during construction near the Crenshaw/LAX Line junction. The 4-acre Development station site can be used for this purpose at the south end, for example. The junction with the Crenshaw/LAX Line requires additional ROW along Florence Avenue and the Edward St. Vincent Jr. Park(**Figure 2.8-1**). If a station access plaza is provided on the west side of Prairie Avenue from the underground station additional parcels will be required.



Source: AECOM

Figure 2.8-1 Interlined Option ROW Needs

Independent Scenario

Option 1(**Figure 2.8-3**), Option 2 (**Figure 2.8-4**) and Option 3 (**Figure 2.8-5**) have stations along their respective alignment which may involve re-development of the areas adjacent to the stations.

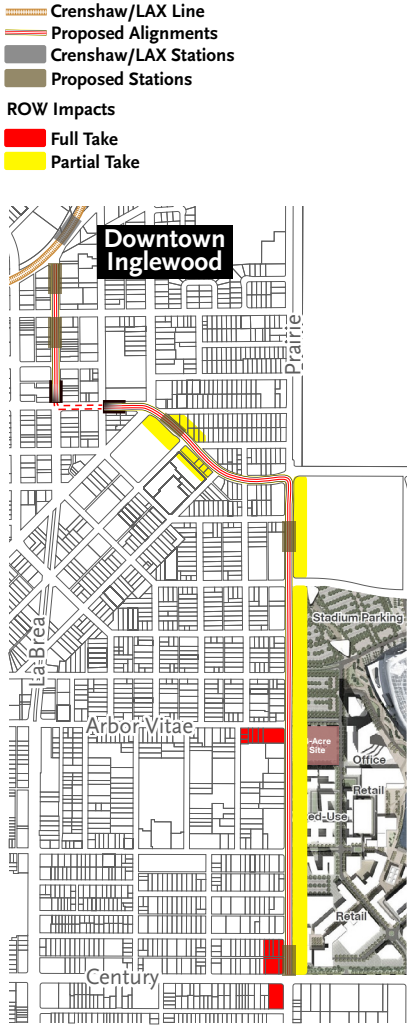
Traction Power

In addition to station area and MSF ROW acquisitions, additional ROW acquisition may be required for traction power substations. While all of the options operate on DC electric current supplied from traction power supply substations (TPSS), LRT and urban rail operate with an overhead contact system (OCS), and APM and monorail use electrified channels attached to or enclosed within the guideway (**Figure 2.8-2**). Typical loading requirements require substations spaced at approximately half-mile intervals along the alignment. The substations can be located in locations along the alignment, including parking structures, in adjacent parcels, in the MSFs, or in underground vaults. The final size and spacing of the substations will require a detailed analysis based on vehicle, frequency of service and headways, alignment profile, passenger stations, and the speed and load cycle over specific time intervals, which determine the actual utility power demands.



Source: AECOM

Figure 2.8-2 Example Traction Power Substation



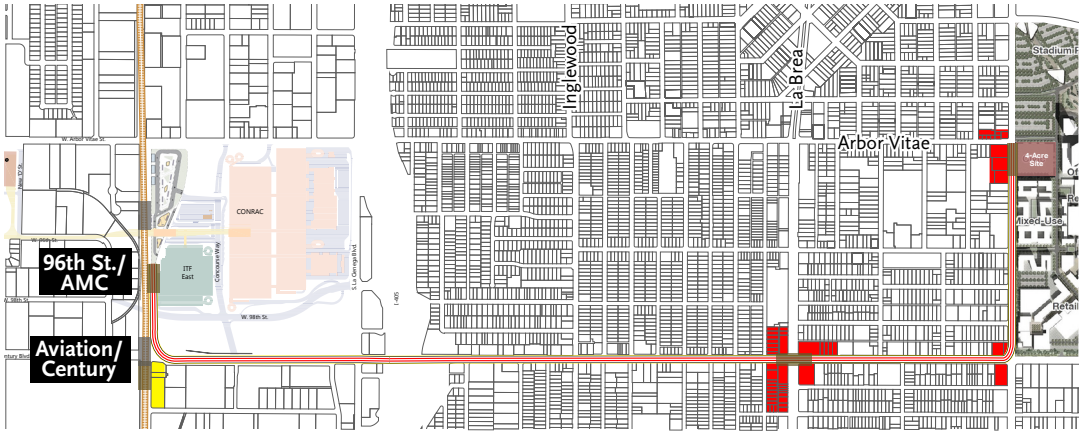
Source: AECOM

Figure 2.8-3 Independent Option 1: Market-Manchester ROW Needs



Source: AECOM

Figure 2.8-4 Independent Option 2: Arbor Vitae ROW Needs



Source: AECOM

Figure 2.8-5 Independent Option 3: Century Boulevard ROW Needs

ROW Needs	Interlined	Independent		
	Fairview Heights	Option 1: Market-Manchester	Option 2: Arbor Vitae	Option 3: Century
Construction Staging and TBM Assembly	6 to 8 Acres at TBM launch site and TBM extraction site.	2 Acres along alignment	No acquisition: Assumes using temporary construction staging area near LAX/APM Construction site.	No acquisition: Assumes using temporary construction staging area near LAX/APM Construction site.
Maintenance & Storage Facility	Minimum 13 Acres expansion on existing MSF Yard	Minimum 5 Acres New Yard, Joint Development, Shared Development, or existing yard expansion	Minimum 7 Acres New Yard or Joint Development	Minimum 7 Acres New Yard or Joint Development
Stations / Station Area Development / Traction Power Substations	Up to 4 Acres at Near Hollywood Park Station	Up to 8 Acres at Prairie/Century, Prairie/ Arbor Vitae, and Manchester/Hillcrest	Up to 26 Acres at Arbor Vitae/Prairie, Arbor Vitae/La Brea, and Arbor Vitae/Aviation	Up to 12 Acres at Century/Prairie, Century/La Brea, and Century/Aviation
Total Estimated ROW Acquisitions	22 Acres	15 Acres	33 Acres	19 Acres

Source: AECOM

Table 2.8-1 ROW Needs for all Options

2.9 Utility Conflicts and Relocation

Existing infrastructure along the alignments of the Options would need to be reconfigured to accommodate the new rail guideway structures. In addition to surface improvement, utility infrastructure under the surface will likely be in conflict with guideway structures and will need to be reconfigured to accommodate the guideway slabs, footings, and other components. This section summarizes a preliminary investigation of subsurface utility infrastructure along the Operability Scenario routes.

2.9.1 General Utility Relocation Impacts of Typical Construction Methods

Completion of any proposed interlined or independent alignment would involve general utility relocation. The extent of removal and re-installation depends on the construction methods used to build the scenarios and related options. Typical construction methods include underground, at-grade, aerial, cut-and-cover, tunnel portals, and bored-tunnel construction. Each method presents a unique set of utility impacts that require specific mitigation measures and further investigation during the environmental phase.

At-Grade Construction

Civil roadway and transit infrastructure typically requires minor modification, adjustment, and relocation of any utilities within the envelope of the proposed improvements, including utility mains, service laterals, and any other appurtenances such as valves, meters, etc. Exclusive at-grade transit guideways are typically cleared of parallel utilities. Crossing utilities may be protected (such as sleeved or encased), lowered, or left in place depending on the depth of the utility and loading due to the transit vehicle.

Aerial Construction

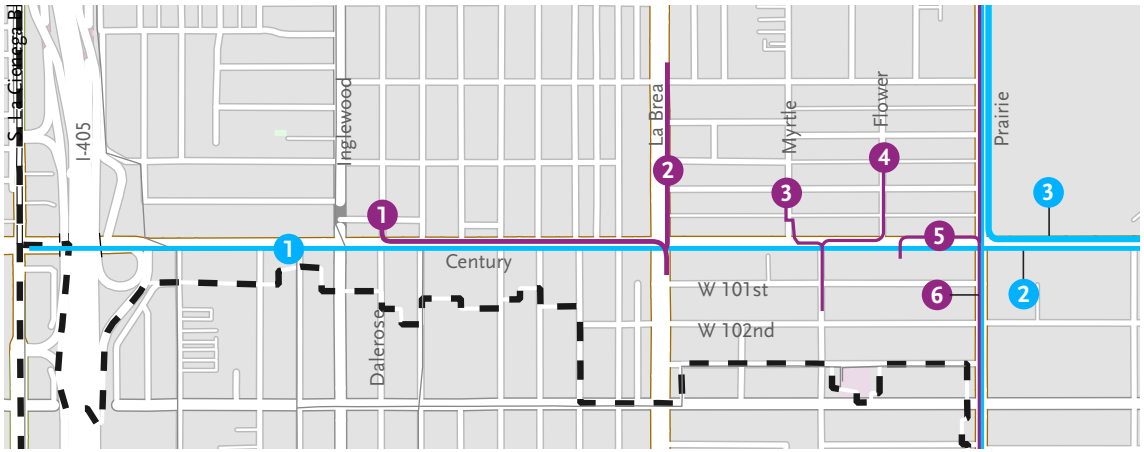
Exclusive aerial transit guideways require the clearance of utilities for deep column foundations. Aerial structures could result in the replacement of utilities only at the location of column foundations or relocation of utilities along the entire length of the alignment, depending on relation of the utilities to the footings. Overhead electrical and telecommunications utilities affected by an aerial guideway may be relocated elsewhere or underground.

Cut-and-cover Construction & Tunnel Portals

Cut-and-cover and tunnel portal sections typically require the full utility relocation from curb-to-curb for the length of the alignment. In some circumstances, utilities can be maintained and protected by being suspended over cut-and-cover boxes.

Bored-tunnel Construction

Bored tunnels typically avoid utility impacts except for major relocations at tunnel/launch station and other cut and cover excavations (see previous). Utility relocations are typically limited to TBM launching and extraction pits and underground stations.



Water Lines
1. 36" Water Line (LADWP)
2. 60" Water Line (LADWP)
3. 36" REC. Water Line in 54" Casing (West Basin Municipal Water Dist.)

Sewer Lines
1. 102" RCP Sewer Line
2. 60" RCP Sewer Line
3. 21" RCP Sewer Line
4. 4'(W) X 4'(D) R.C. ARCH Sewer Line
5. 42" RCP Sewer Line
6. 39" RCP Sewer Line

Source: AECOM

Figure 2.9-1 Non-City-owned Water and Sewer Lines on Century Boulevard

2.9.2 Utility Impact Feasibility Analysis of Options

Interlined Scenario

The interlined scenario will create the following utility impacts:

- At-grade construction impacts (as described above) for the junction with the Crenshaw/LAX Line near Fairview Heights
- Cut-and-cover and bored-tunnel construction impacts (as described above) for the launch and retrieval sites for the tunnel under Prairie Avenue, the extension of the Crenshaw/LAX Line northern terminus at Expo/Crenshaw for the additional tail tracks and crossover, and tunnel ventilation upgrades to the Crenshaw/LAX Line.

Independent Scenario

Options 1, 2, and 3 will have general utility impacts as described above along the length of the alignments. The cut-and-cover transition from Market Street to Manchester Boulevard will require complete relocation of utilities in the area of the excavation. In other areas, impacts are typically limited to relocating parallel utility lines running underneath the transit guideway and/or relocating access manholes, valves, and other infrastructure that falls within the guideway.

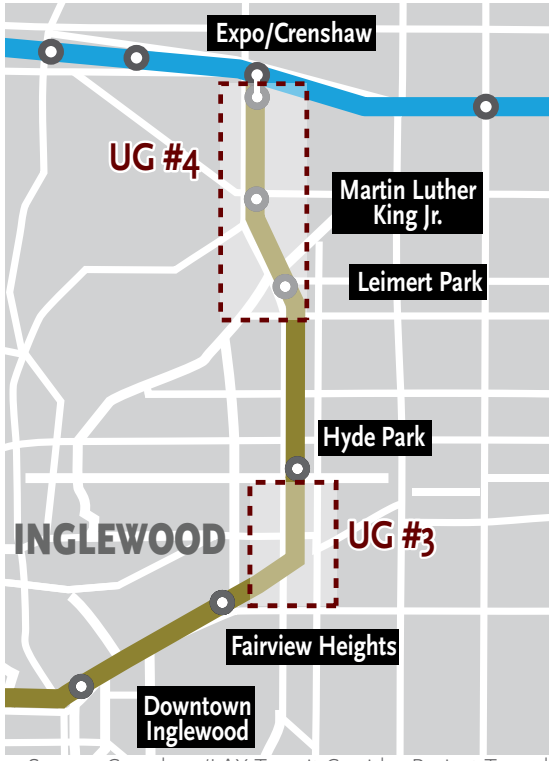
Option 3 will impact major utilities that exist on or are adjacent to the proposed alignment along Century Boulevard. For example, there are major water and sewer lines running down Century Boulevard (Figure 2.9-1). A full description of water, sewage, storm drain, electrical, natural gas, and hazardous liquid utilities impacts found on major alignment corridors in the Appendix G.

2.10 Rail Systems

The operability scenarios present unique transit systems requirements that will need to be satisfied to provide the level of service indicated in the operating plan. Tunnel ventilation and rail signaling in particular are critical systems for maintaining reliable, high-frequency service. Requirements for rail systems are typically not defined at this stage of conceptual study – the purpose of this section is primarily to analyze any impacts to the Metro Crenshaw/LAX Line, which is currently under construction.

2.10.1 Interlined

The under-construction Crenshaw/LAX Line guideway and facilities have been designed to maintain operational headways for the Crenshaw/LAX Line only. The interlined scenario would have additional trains connecting to and operating on the Crenshaw/LAX Line between Fairview Heights station and Expo/Crenshaw Station. The addition of more trains onto the Crenshaw/LAX Line would require upgrades to the existing infrastructure to accommodate the additional trains. Among the most crucial systems that would require upgrading would be the ventilation systems for the underground segments of the Crenshaw/LAX line and the train control and signaling for the length of the shared alignment. The number and length of ventilation zones, traction power blocks, the type of signaling system, and other factors are all affected by the operational headway.



Source: Crenshaw/LAX Transit Corridor Project Tunnel Ventilation Modeling Report

Figure 2.10-1 Schematic of Alignments and Underground Segments

Ventilation

This section summarizes the ventilation systems that would need to be upgraded from what is currently being built to support additional service to the Development. The interlined Scenario adds additional service to two underground guideway sections of the Crenshaw/LAX Line currently under construction, designated by that project as "UG#3" and "UG#4" (**Figure 2.10-1**). An analysis was performed to determine necessary changes to the existing ventilation zones to allow for a reduced headway on the Crenshaw/LAX Line and meet

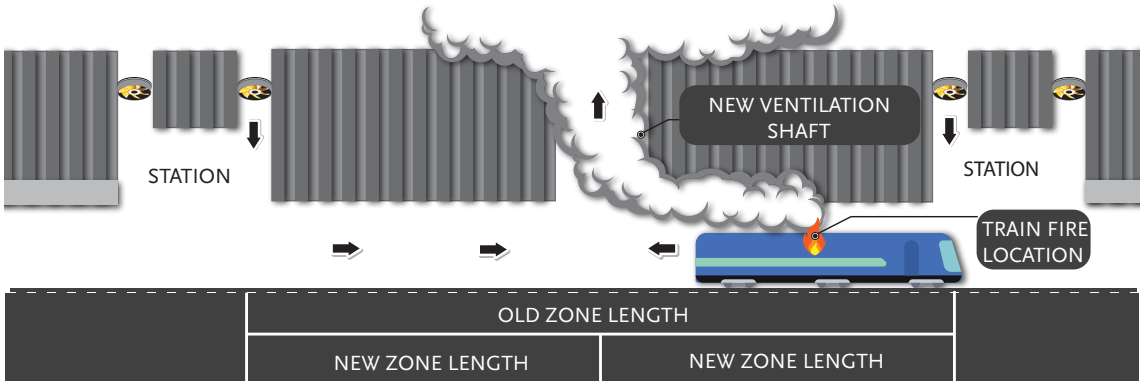
the Metro Rail Design Criteria (MRDC) for tunnel sections UG#3 and UG#4. Adding ventilation zones could allow trains to run at shorter headways.

The location of ventilation elements for UG#3 and UG#4 were determined from track plan and profile files, and the 2015 ventilation reports.

According to the MRDC Fire/Life Safety Criteria Rev. 1, 2.3.9.2, only one train is allowed per ventilation zone and a ventilation zone is defined as a section of tunnel between two ventilation shafts and/or portals. This requirement is one of the constraints on train throughput. Each ventilation zone becomes essentially a fixed signal block. Only one train can pass through each zone at a time. Creating shorter zone lengths increases the throughput of a particular tunnel section by allowing more trains to be in the tunnel simultaneously.

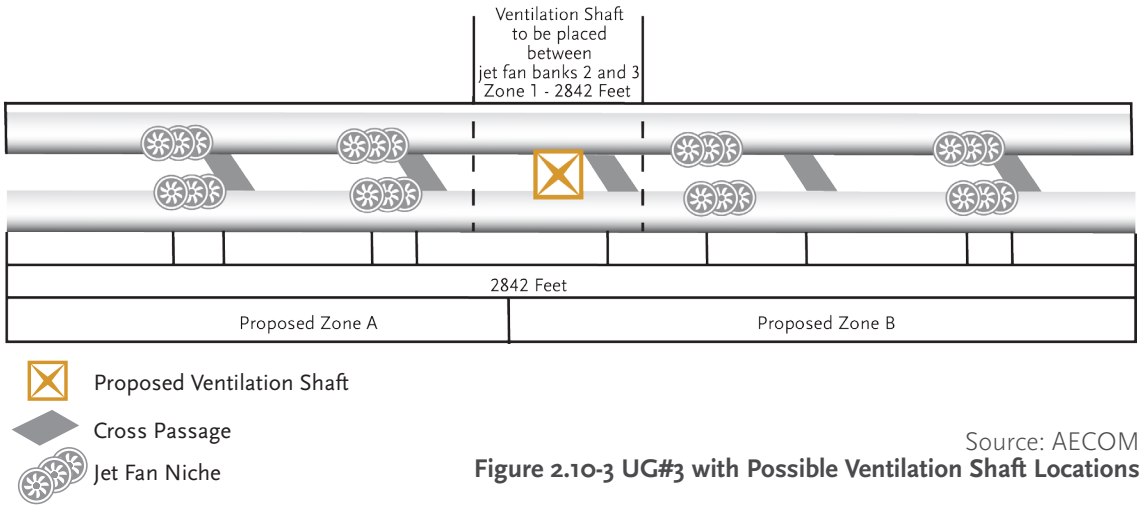
The only option available for reducing headway from a fire life safety and ventilation perspective is to divide existing ventilation zones into multiple shorter zones. This can only be accomplished by introducing portals or ventilation shaft inlets to the tunnels. For tunnels UG#3 and UG#4, adding additional shafts or portals between stations would increase the number of ventilation zones, allowing more trains to be in the tunnel concurrently. The additional tunnel ventilation zones will also impact the signaling system and traction power blocks, which should correspond to the limits of the ventilation zones.

According to a longitudinal section with a new ventilation shaft showing the reduction in ventilation zone length and possible emergency fan operation in a fire emergency, the new shorter ventilation zones would reduce the headway of that section (**Figure 2.10-2**).



Source: AECOM

Figure 2.10-2 Addition of Ventilation Shaft



Source: AECOM

Figure 2.10-3 UG#3 with Possible Ventilation Shaft Locations

UG#3 has a total distance of 2,970 feet and has no ventilation shafts. Therefore, according to MRDC, UG#3 is a single ventilation zone and only one train may be located within the tunnel at any time. An average speed throughout the tunnel that exceeds 13.5 mph must achieve headways of 2.5 minutes or less. If the average speed exceeds 13.5 mph, an additional ventilation shaft will not be required to UG#3 currently consists of one ventilation zone (**Figure 2.10-3**). With the current design, there can only be one train in the tunnel at any time. Therefore, a new ventilation shaft will be required between jet fan banks 2 and 3 if the minimum headway is determined to be insufficient.

UG#4 is a tunnel with three underground stations; Crenshaw/Expo (the terminus); Crenshaw/Vernon; and Crenshaw/MLK. Currently, the tunnel sections between the stations and the stations are individual ventilation zones with an additional zone near the Expo/Crenshaw station at the crossover. Based on the running times between stations and the dwell times (**Table 2.10-1**), the operational headway for UG#4 could possibly be decreased to 2.5 minutes by the addition of new ventilation shafts between the Development and the Crenshaw/LAX line (**Figure 2.10-4**).

Ventilation Zone	Run Time	Dwell Time	Total Time
Expo to MLK	2:40	0:20	3:00
MLK to Vernon	2:40	0:20	3:00

Source: AECOM

Table 2.10-1 Run and dwell times for tunnel segments in UG#4

Signals/Operations

The interlined scenario adds additional service for the approximately 3.5 mile segment from Fairview Heights to Expo/Crenshaw. The combined maximum service frequencies between the Crenshaw, Green and Inglewood NFL lines would be 2.5 minutes.

The constraints that the signal system has on the headway include the train separation requirements due to the tunnel ventilation zones, (discussed in the previous section) the track circuit block boundaries, and the turn-back capabilities at the terminal stations.

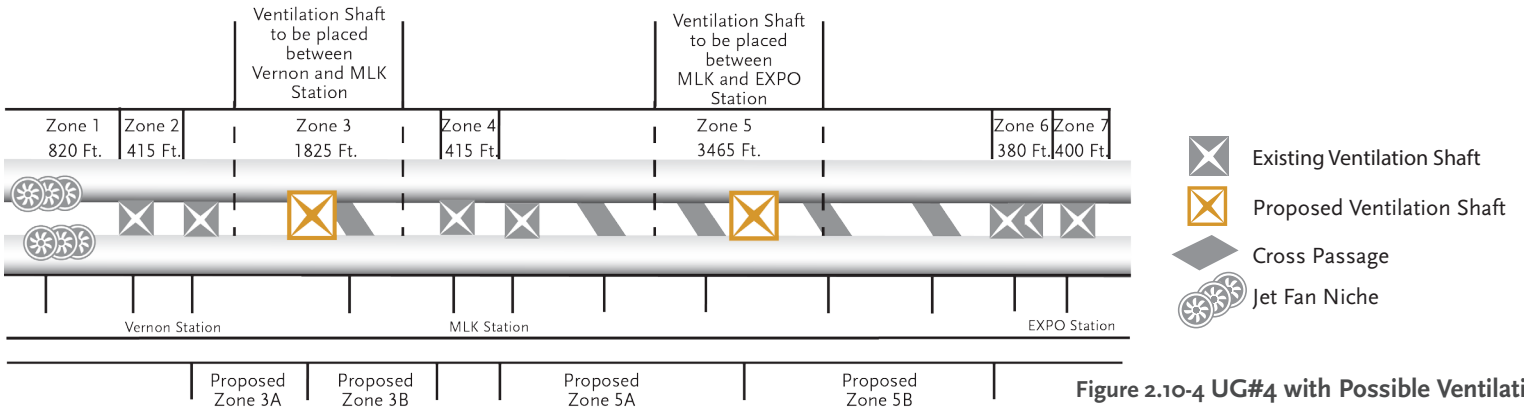
The Crenshaw/LAX Line utilizes a cab/no wayside (except at interlockings) signal system. The track circuits consist of AF-900/AF-904 Style digital FSK circuits, with digital cab signaling providing Automatic Train Control (ATC) functionality. These track circuit blocks are typically limited to an average length of 750'-1000', therefore making them conducive to close operating headways.

The Crenshaw/Exposition Station currently includes a diamond crossover on the south side of the station platforms for turn-back moves. Due to the increased headway requirements, a new tail track and/or crossover on the north end of the station platforms is assumed to be required to allow Crenshaw and/or Green Line trains to turn-back on north end crossovers, while the new Inglewood Development branch trains could turn-back on the south side of the station (during event service). The new Development branch line would occur just south of the Fairview Heights station. The Crenshaw line currently includes an interlocking at this location that could be extended/modified to include the additional crossovers/turnouts required for the new branch.

2.10.2 Independent Scenario

Independent Scenario

Requirements for rail systems are typically not defined at this stage of conceptual study. These systems will be designed as a project advances towards implementation. Costs are now included for these items at a rough-order-of-magnitude conceptual level.



Source: AECOM

Figure 2.10-4 UG#4 with Possible Ventilation Shaft Locations

2.11 Environmental Scan and Potential Mitigation Requirements

An environmental scan was conducted for the Scenarios. This section provides a preliminary analysis of the potential environmental impacts. The analysis also includes a comparison of the socio-economic factors, land use characteristics and potential visual effects .

The following conceptual-level assessment identifies likely environmental impacts related to Project Scenarios and related option implementation. The intent is to analyze the Project Options based on potential environmental impacts and/or identify areas that need further study. The document also provides streamlining for the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) documents.

The analysis employs a 150-foot wide study area on either side of the study scenarios (Study Area). This assessment includes identification of existing conditions, and a discussion of potential environmental effects based on relevant applicable standards and thresholds. The analysis addresses key issues included in the CEQA Guidelines supplemented by NEPA requirements.

2.11.1 Environmental Scan Summary

The Scenarios and related Options share similarities for a majority of the environmental impacts. All operating scenarios are anticipated to have no impact on the following environmental topics: Agriculture and Forestry Resources, Mineral Resources, Population and Housing, and Air Quality during Operations.

The Scenarios and related Options are anticipated to result in less than significant impacts with mitigation incorporated to the following environmental topics: Biological Resources, Greenhouse Gas (GHG) Emissions, Public Services, Utilities, Hazards/Hazardous Materials, Geology and Soils, and Tribal Cultural Resources. At least one scenario has moderate to high potential for significant impacts for all the remainder of the environmental categories. Further study is required for both air quality impacts and geology and soils in the next phase of study. The full environmental scan table with all findings is given in Appendix H.

Below includes a brief description the environmental issues with **high potential for significant impacts** for each of the Operability Scenarios.

Interlined Scenario

- Cultural Resources – due to close proximity to a cemetery

Independent Scenario

Option 1: Market-Manchester

- No environmental issue has high potential for significant impacts

Option 2: Arbor Vitae

- Visual Character – due to aerial structures along Arbor Vitae
- Light and Glare – due to the illumination of trains due to the proximity of light sensitive residential uses along the alignment.
- Land Use Compatibility – The introduction of a transit line on Arbor Vitae Street could limit circulation pathways along local north-south streets and may limit direct access to the existing driveways. Option 2 along Arbor Vitae would likely create a barrier that would divide an existing community
- Noise / Vibration Impacts – The highest potential for noise impacts is along Arbor Vitae Street because it has the highest number of Category 2 receptors and a narrow street width
- Circulation System - reduction in lane widths and potential turn limits may impact major intersections like La Cienega/Arbor Vitae and Inglewood/Arbor Vitae, that are currently operating at Level of Service (LOS) E or worse during peak hours. In addition, structural columns supporting the elevated guideway along turn-lanes may introduce intersection sight-distance challenges to drivers of vehicular traffic

Option 3: Century

- No environmental issue has high potential for significant impacts

2.12 Safety & Security

A planning-level Preliminary Hazard Analysis (PHA), based on the FTA Hazard Analysis Guidelines for Transit Projects (HAGTP), Final Report, January 2000, has been performed to assess the level of risk associated with each of the scenarios under study, and to determine if any one of the scenarios tends toward a higher safety risk than any of the others.

The analysis found that the Interlined Scenario and Independent Scenario Option 1 are believed to have the greatest potential for risk. Further, resolution of issues related to NFPA 130 compliance for the Interlined Scenario is expected to involve more costly design solutions (including potential HVAC and egress modifications), and/or implementation of special operational procedures than the other independent Options 2 and 3. All of the options have risks associated with the movement of large numbers of people nearby to special events of significance.

The focus of the Preliminary Hazard Analysis for this project was to identify hazards inherent to the design of the scenarios and identify suitable measures to control or mitigate for the hazard. While this analysis has considered security elements related to each of the various scenarios, a specific Threat & Vulnerability Analysis is not part of the scope of this assessment. However, it is important to note that there may be additional safety and security issues associated with Options 2 and 3, as these options will connect to the future Airport Metro Connector 96th Street Transit Station with direct access to LAX infrastructure via LAWA LAMP improvements such as the APM.

Based on risk, high-level safety concerns that might differentiate one alternative from another have been identified (**Table 2.12-1**).

#	Issue	Interlined Fairview Heights LRT	Independent Market-Manchester Street Urban Rail	Independent Arbor Vitae APM/ Monorail	Independent Arbor Vitae APM/ Monorail	Independent Century APM/ Monorail	Potential Mitigation Measures	Significant Cost Impacts
1	Increased potential for pedestrian/vehicle incidents at new, at-grade crossings, particular at transfer points		X				Perform diagnostic review of crossings, close coordination with CPUC on implementation of pedestrian safety treatments – warning gates, warning flashers, channelization, driveway closures, medians, signage, etc.; Consider street closures during major events.	
2	Emergency egress from aerial guideways.		X	X	X	X	Provide maintenance/emergency egress walkway, point of safety, associated area(s) of refuge, and access to grade; Coordinate with local Fire/EMS on best locations for elevated guideway access/ body removal points beyond NFPA requirements	
3	Point of safety and emergency egress off trackway in tunnel.	X	X				Provide maintenance/emergency egress walkway and associated area of refuge.	
4	Increased vehicular queuing at new at-grade crossings		X				Perform traffic safety analysis, Implement signal interconnection, traffic loops, signal pre-emption, roadway reconfiguration; Consider street closures during major events.	
5	Potential for increased risk to pedestrian and vehicular safety during construction	X	X	X	X	X	Prepare detailed construction sequencing plans; Provide changeable message signs with adequate advance notice to start of project; Provide advance warning to construction information – time/location/alternate routes.	

Source: AECOM

Table 2.12-1 PHA Risks Summary Matrix

#	Issue	Interlined Fairview Heights LRT	Independent Market-Manchester Street Urban Rail	Independent Arbor Vitae APM/ Monorail	Independent Arbor Vitae APM/ Monorail	Independent Century APM/ Monorail	Potential Mitigation Measures	Significant Cost Impacts
6	Potential for increased incidents due to introduction of new transit system (e.g. traffic control, signage, channeling devices, etc.).	X	X	X	X	X	Perform local public outreach in advance of construction, including educational programs in nearby schools for grade-crossing safety, how to ride transit safely, safety at stations Link to Metro's transit safety programs for kids and teens.	
7	Potential for crush loads of passengers during post-event service.	X	X	X	X	X	Provide adequate platform area; Perform egress analysis; Encourage methods/activities for crowd dispersal; Provide adequate personnel at Stations (SOPs); Review platform furnishing locations; Consider street closures during events; Consider sharing CCTV feeds with local police at key stations feeding the Development and analytics to respond to atypical crowd movement patterns	
8	Potential conflicts with pedestrians crossing the track mid-block for at-grade portion of urban rail alternative (particularly an issue during post-event service as people exit urban rail)		X				Consider use of pedestrian channelization devices; Provide adequate marked crossings; Develop SOPs for operations through areas of heavy pedestrian activity; Provide staffing to ensure track is clear to allow for continuous, uninterrupted service;	

Source: AECOM

Table 2.12-1 PHA Risks Summary Matrix (Continued)

#	Issue	Interlined Fairview Heights LRT	Independent Market-Manchester Street Urban Rail	Independent Arbor Vitae APM/ Monorail	Independent Arbor Vitae APM/ Monorail	Independent Century APM/ Monorail	Potential Mitigation Measures	Significant Cost Impacts
9	Potential increased risks on monorail/ APM, due to driverless vehicles: - Cyber Attacks - Difficulty determining responsibility for accidents - Difficulty addressing incidents onboard vehicle			X	X	X	Provide emergency call system on vehicle; Provide "Conductor" onboard train; Consider platform and vehicle security issues especially for the off-peak/night time hours – duress communications, lighting, eliminate areas for a person to obscure oneself, etc.	
10	Increased safety considerations around the secured perimeter of venues, including the increased security required to screen personal vehicles	X	X	X	X	X	1. Preserve enough distance between the station and the secured perimeter to ensure sufficient space for queuing, monitoring and screening; 2. Identify opportunities for pre-screening before spectators board the train: Create/enable a screening checkpoint at the main transfer point to create a "bubble to bubble" service, with witch spectators could be guided directly into the venue, potentially without the need for additional screenings, although random screenings would still be advised. Security screening on the Interlined Scenario may be more problematic than for other scenarios. 3. Recommend venues in the area consider the Department of Homeland Security safety certification, which could provide further consideration on the connection between transit and the venue; 4. Encourage increased mode share on transit through public outreach.	X
11	Ticketing Issues: Crowd management Device reliability & maintenance	X	X	X	X	X	Carefully consider the location of ticketing machines to avoid disruption to the pedestrian flow, particularly post-event. Consider on-line ticketing methods.	

Source: AECOM

Table 2.12-1 PHA Risks Summary Matrix (Continued)

#	Issue	Interlined Fairview Heights LRT	Independent Market-Manchester Street Urban Rail	Independent Arbor Vitae APM/ Monorail	Independent Arbor Vitae APM/ Monorail	Independent Century APM/ Monorail	Potential Mitigation Measures	Significant Cost Impacts
12	New line may impact NFPA 130 egress calculations	X					Review analyses previously performed for existing stations; Provide additional means of egress, if required.	X
13	Potential increase to time of tenability, which may increase required ventilation capacity.	X					Review capacities of existing system: Provide system modifications and/ or additional egress routes to achieve adequate time of tenability.	X
14	Shortened ventilation zones in the tunnel may be required, with a higher risk of affecting a non-fire train, and of misidentifying fire zone.	X					Provide a design for a more complex/ modified ventilation system, including additional shafts, fans, ventilation equipment, etc.	X
15	Pedestrian access to non-public areas of tunnel	X	X				Provide Intrusion Detection System (IDS) & signage; Integrate tunnel IDS into CCTV system to provide alerts to OCC.	
16	Potential for human contact with 3rd Rail/Hot Rail			X	X	X	Consider installation of Platform Screen Gates (PSGs); Provide warning signage.	
17	Pedestrian access to non-public areas of guideway		X	X	X	X	IDS & signage; Integrate guideway IDS into CCTV system to provide alerts to OCC	
18	Pedestrian access to areas beneath guideway, particularly at transitions, susceptible to vandalism and vagrancy.		X	X	X	X	Consider the installation of security lighting, fencing, or other means to discourage vandalism and vagrancy beneath the guideway.	
19	Public access to Maintenance Facility in joint-use development scenario		X				Consider the use of security fencing, Intrusion Detection System (IDS), regulatory signage; Carefully consider optimal locations for site egress/access	
	Unweighted Score:	**10**	**14**	**10**	**10**	**10**		

Source: AECOM

Table 2.12-1 PHA Risks Summary Matrix (Continued)

2.13 Capital and Operating Costs

The following section describes the Capital and Operating Costs of each of the Operability Scenarios.

2.13.1 Capital Cost Estimates

Rough-order-of-magnitude (ROM) capital costs were prepared for four operability scenarios, including the following interlined scenario and three independent scenarios (**Table 2.13-1**):

- Interlined Option
  - Fairview Heights – Underground LRT
- Independent Options
  - Option 1: Market-Manchester - Urban Rail
  - Option 2: Arbor Vitae – Aerial APM/Monorail
  - Option 3: Century – Aerial APM/Monorail

The rough-order-of-magnitude cost estimates presented in this memo are based on conceptual alignment drawings considered to be within a 0-5% level of design. Due to the preliminary nature of the design, the costs are presented in a range of costs that could be expected given the known project requirements and constraints. Rough-order-of-magnitude estimates could vary by as much as +/- 30% from the final project cost, and should be used for conceptual planning purposes only. It is the intention of the estimate to capture the fair market value under stable economic and bidding conditions for an average project with similar attributes within the Los Angeles area.

The low range represents the low end of an expected cost range based on the lower middle range of similar projects and standard contingencies. The high range represents the upper middle range of average costs for similar projects. Several factors could cause the actual project to increase in cost, such as designing the system to a level of design greater than standard, right-of-way acquisition issues, contractor bidding market, and material fluctuations. All costs listed are in current year (2017) dollar value and do not cost escalation between the current year and year of expenditure (YOE). Cost escalation should be added to these totals at a rate of 2 to 4% of the total project value per year to the mid-point of the construction schedule. If the mid-point of construction is 2024, the total project cost would increase by 15% to 30%.

Scenario and Option	Length (Route Miles)	Unit Cost/Mile (Millions in 2017$)		$ Capital Cost (Millions in 2017$)	
		Low	High	Low	High
Interlined Scenario	1.7	$ 800	$ 1,176	$ 1,358	$ 1,997
Option 1: Market-Manchester	1.8	$ 280	$ 419	$ 497	$ 746
Option 2: Arbor Vitae	2.1	$ 349	$ 468	$ 561	$ 982
Option 3: Century	2.8	$ 286	$ 375	$ 563	$ 1,049

Source: AECOM

Table 2.13-1 Project Operability Scenarios - Capital Cost Estimate Totals

The Independent Option 1 is the lowest cost compared to the other scenarios, followed by the Independent Option 2 and 3. The Interlined LRT Underground Scenario is by far the highest due to the fact that this scenario is underground, while the other scenarios are aerial. In general, capital cost and capital cost per mile are driven by alignment distance and the percentage of underground alignment. The cost of constructing bored tunnel guideway can be up to 2 to 3 times the cost of constructing aerial guideway.

Longer alignments typically have slightly lower cost per mile due to efficiencies involved with static, lump sum costs, spread out along the alignment. When comparing the unit cost per mile, it can be seen that the Interlined option clearly has the highest cost per mile due to the fact that it is mostly underground. Among the aerial Independent APM/Monorail options, it can be seen that the Independent Century Option has a lower cost per mile than the Independent Arbor Vitae Option, due to the project length. The Independent Urban Rail

cost has the lowest cost per mile due to the fact that the costs for urban rail components are less than APM/Monorail systems (**Figure 2.13-1**).

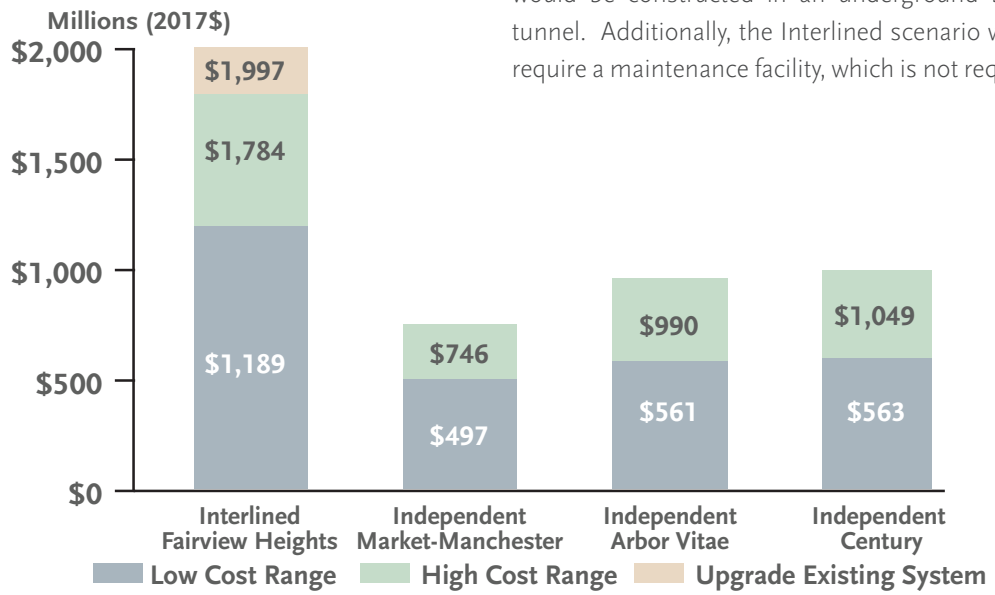
The Independent Urban Rail option is the least expensive and the Interlined scenario is the most expensive. The Urban rail option is within a $497 to $746 Million range, the Independent Arbor Vitae Option is within a $561-$990 Million range, the Independent Century Option is within a $563 Million to $1 Billion range, and the Interlined Option is within a $1.2 to $1.8 Billion range plus upgrades to existing Metro system that would raise the total to up to nearly $2 Billion.

2.13.2 Capital Cost Comparison to Referenced Projects

As part of this analysis, the total estimated capital costs were compared to referenced projects in order to validate the estimates and to provide a frame of reference for the expected level of design. The cost per mile of the Interlined LRT scenario and the independent Urban Rail scenario are compared against existing Metro LRT systems in place (**Figure 2.13-2**). The referenced Metro costs have been escalated to current year (2017) for accurate comparison.

The unit cost per mile for the Interlined LRT underground scenario is comparable to the Regional Connector project (**Figure 2.13-2**). Similar to the Regional Connector, the Interlined LRT underground scenario is approximately 2 miles and would be constructed in an underground bored tunnel. Additionally, the Interlined scenario would require a maintenance facility, which is not required for the Regional Connector. which the regional connector the cost per mile of the Interlined LRT scenario and the independent Urban Rail scenario compared to existing Metro LRT systems in place. The referenced Metro costs have been escalated to current year (2017) for accurate comparison. The Interlined LRT Underground scenario can be assumed to have a similar level of design to this project.

The unit cost per mile for the Independent Urban Rail scenario is comparable to the Crenshaw/LAX LRT project. Similar to the Crenshaw/LAX line, the Independent Urban Rail scenario would be constructed with multiple guideway types, including aerial, at-grade, and underground guideway. The Independent Urban Rail scenarios can be assumed to have a similar level of design, with a slightly lighter vehicle and systems components.

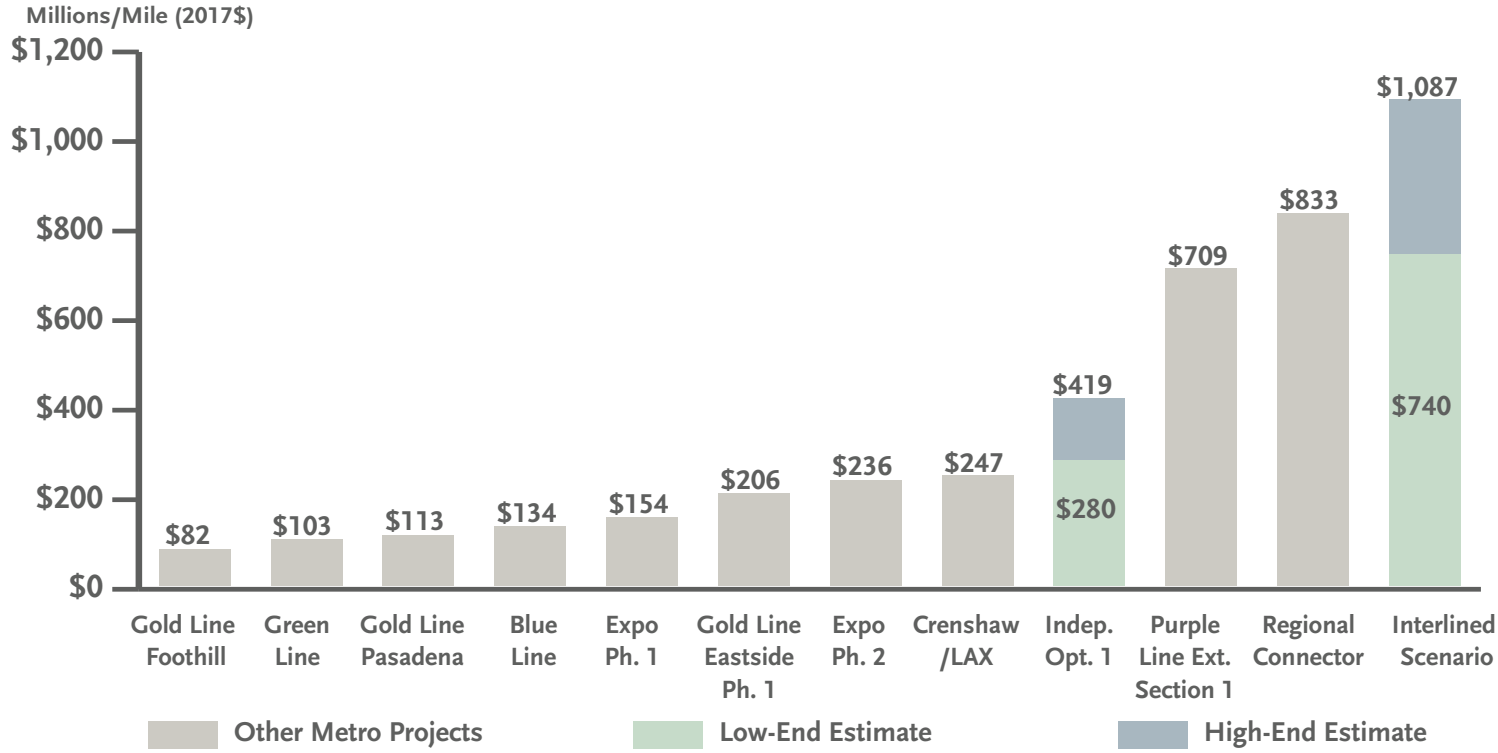


Source: AECOM

Figure 2.13-1 Capital Cost Range

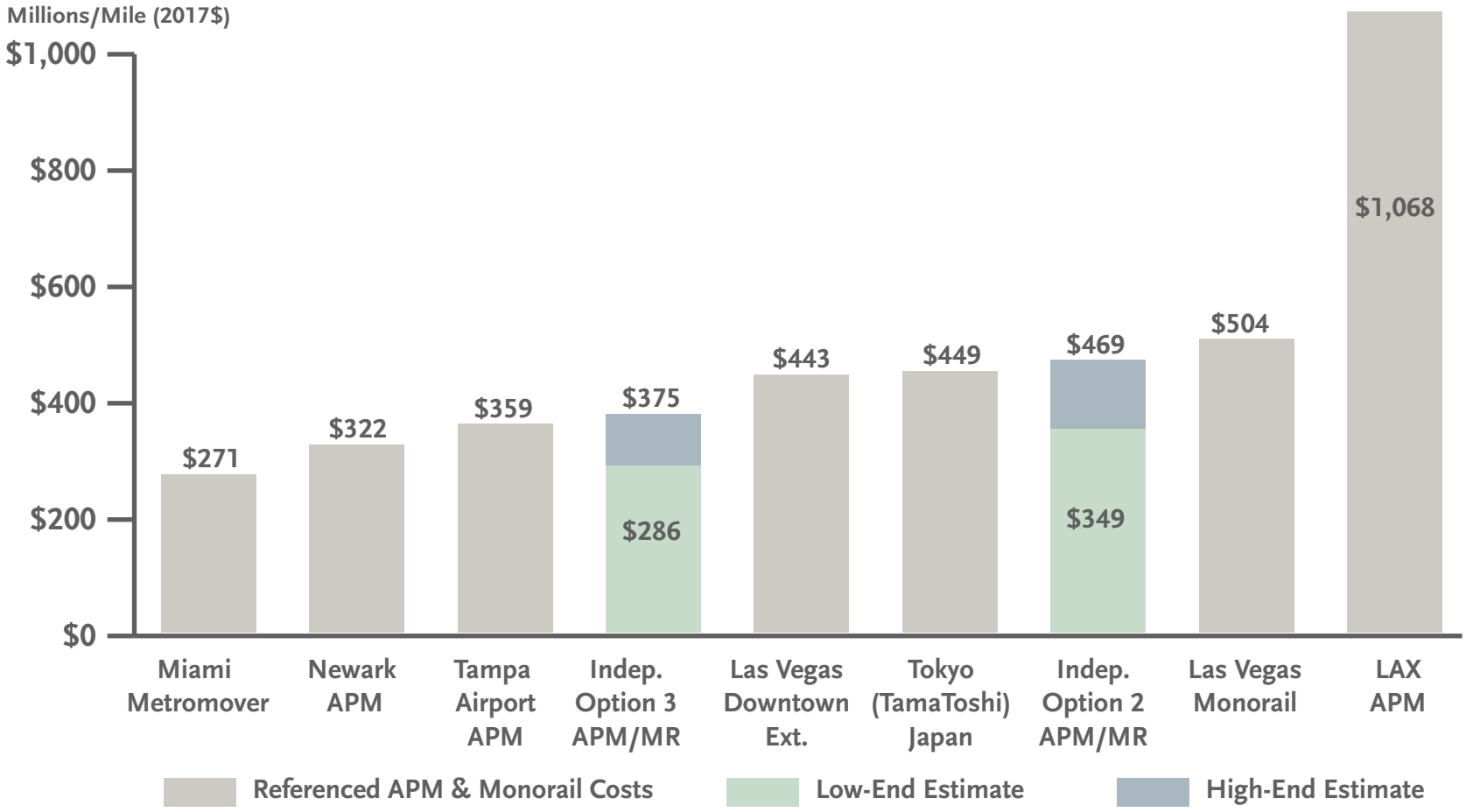
The cost per mile of the Independent APM/ Monorail scenarios compared to existing APM and Monorail projects are present on the next page, which the exception of the LAX APM cost, which is a conceptual engineering estimate. The referenced costs have been escalated to current year (2017) and adjusted to Los Angeles market for accurate comparison.

The unit costs per mile for the Independent APM/ Monorail scenarios have a range in cost that can be comparable to simple people movers (**Figure 2.13-3**), such as the Tampa APM at the low end and the Las Vegas Monorail at the high end. Despite the difference in unit cost, both Independent APM/ Monorail scenarios could be within this range of design. For the purpose of this study, both the APM/Monorail scenarios are assumed to have the same level of design and assumptions for guideway type, station design, and vehicle type. The reason for the variance between the two APM/Monorail scenarios is due to the difference in project length and right-of-way acquisition. As the project length increases, the cost per mile decreases slightly. Additionally, the greater right-of-way acquisition on the Arbor Vitae option increases the unit cost for that scenario.



Source: AECOM

Figure 2.13-2 LRT/Urban Rail Cost per Mile Comparison (2017$ Millions)



Source: AECOM

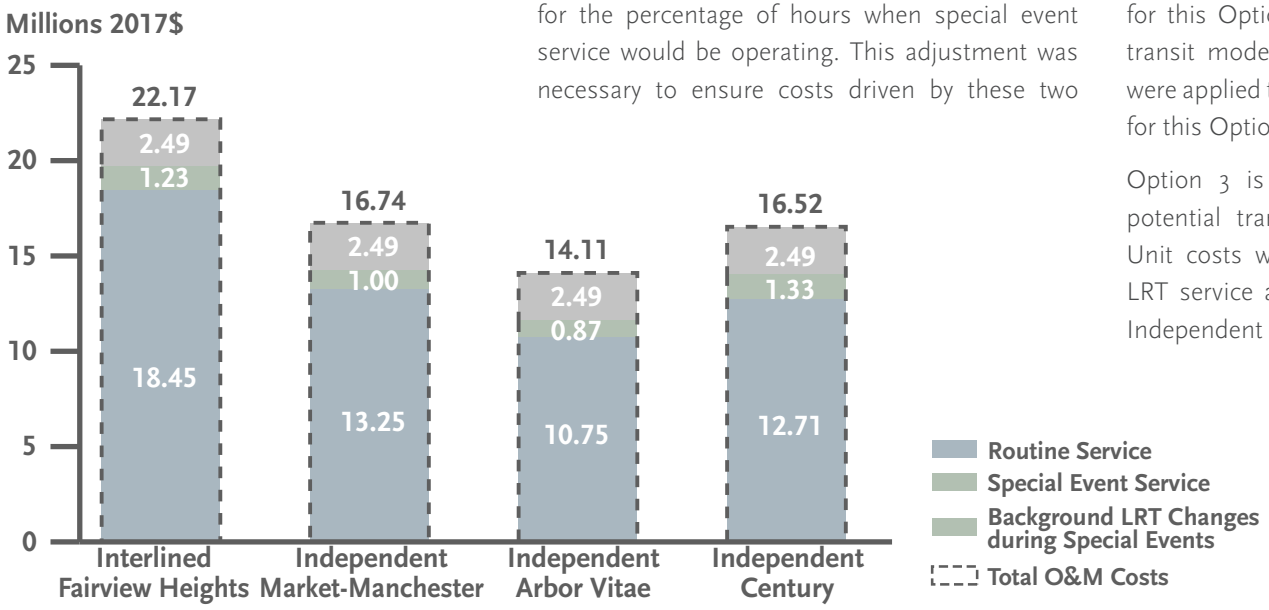
Figure 2.13-3 APM/Monorail Cost per Mile Comparison (2017$ Millions)

2.13.3 Operating and Maintenance Cost Estimates

Annual operating and maintenance (O&M) costs have been estimated with spreadsheet models that tie costs to the level of service that is to be operated and facilities that are to be maintained. Specifically, the cost allocation models assume that each operating expense incurred is driven by a key supply variable such as revenue-hours, revenue-miles or number of vehicles operated during peak periods. Unit costs are developed and applied to future service statistics. The result is an estimated annual O&M cost that is specific for the test scenario (**Figure 2.13-4**).

The interlined scenario reflects LRT service that operates as a branch of the Crenshaw/LAX Line and Green Line north pattern, proceeding from the Expo/Crenshaw LRT station, then branching at Fairview Heights to continue on Prairie Avenue until terminating at Arbor Vitae Street. Service and facility statistics were calculated for routine service based on 5-minute peak headways and 10-minute midday headways, with evenings tapering from 10 to 20 minutes. Besides routine service, special event service statistics are added representing 50 special events a year, with 9 hours of increased service for each special event. Special event service also assumes supplementation of background LRT service on the Crenshaw/LAX Line and Green Line north pattern.

Unit costs were applied to LRT service and facility statistics for the interlined scenario. Consideration was also given to costs related to potential yard expansion to accommodate additional LRT vehicles. For special events, costs driven by peak cars and stations were adjusted to account for the percentage of hours when special event service would be operating. This adjustment was necessary to ensure costs driven by these two variables are not over estimated, for these unit costs are based on annual cost characteristics. Detailed cost estimates for 2023 and 2040 are presented in Appendix K.



Source: AECOM

Figure 2.13-4 O&M Costs for Scenarios and Options

Independent Scenarios

For the Independent Options, service and facility statistics were calculated for routine service and for special event service. Additional event service is also assumed for background LRT service on the Crenshaw/LAX Line and Green Line north pattern. For special events, costs driven by peak cars and stations were adjusted to account for the percentage of hours when special event service would be operating. Detailed cost estimates for 2023 and 2040 are presented in Appendix K.

Option 1 reflects use of Urban Rail. Unit costs were applied to urban rail service and facility statistics for this Option. Option 2 includes two potential transit modes – APM and monorail. Unit costs were applied to APM and monorail facility statistics for this Option.

Option 3 is also under consideration for two potential transit modes – APM and monorail. Unit costs were applied to APM, monorail and LRT service and facility statistics for the Century Independent Option.

2.14 Summary / Findings

This section presents a summary of findings from the analysis performed on each of the Operability Scenarios as part of this feasibility study related to the following topics within the report:

2.1 Guideway Configuration and Mode
2.2 Station Design & Connectivity
2.3 Operating Capacity
2.4 Ridership Analysis
2.5 Construction Methods and Impacts
2.6 Traffic Impacts
2.7 Maintenance and Storage Facility
2.8 Right-Of-Way Acquisition
2.9 Utility Conflicts and Relocation
2.10 Rail Systems
2.11 Environmental Scan and Potential Mitigation Requirements
2.12 Safety & Security
2.13 Capital and Operating Costs

Recall that the goal of the service is to provide:

- **Reliability**: Convenient service with minimum delay, wait, and travel times
- **Connectivity**: Ease of transferring to and from the regional high-capacity transit network
- **Capacity**: The ability to serve peak travel demand to and from the Development

Both the interlined and independent scenarios are capable of reliable, convenient service with connectivity to the Metro Rail system from the Development. However, the scenarios yield differing capacity, ridership, and cost characteristics.

In general, the interlined scenario has the highest cost and the least capacity of the scenarios considered. Alternatively, the three independent scenario options meet the capacity goal for lower cost (**Table 2.14-1**).

The complete findings or results pertaining to each operability scenario and option for each topic are summarized below (**Table 2.14-2**).

Cost & Capacity Summary	Interlined Scenario	Independent Scenario		
		Option 1	Option 2	Option 3
	Via Fairview Heights - Prairie	Downtown Inglewood via Market-Manchester	AMC 96th St. Transit Station via Arbor Vitae	AMC 96th St. Transit Station via Century
Capacity Target	25% of 80,000 stadium capacity per hour = 20,000 passengers/hour			
Maximum Operating Capacity	5 minute peak headway = 5,400 passengers/hour	2 minute peak headway = 13,500 passengers/hour	2 minute peak headway = 18,000 passengers/hour	
Event Forecast (2040)- Attendees Using Transit per Event	4,130 - 15,000 attendees	3,900 - 14,300 attendees	6,120 - 23,180 attendees	6,420 - 24,180 attendees
Capital Cost Estimates (2017 $)	$1.333 - 1.960 billion	$416 - 624 million	$561 - 990 million	$563 million - 1.049 billion
Operating & Maintenance Cost (2017 $)	$22.2 million/year	$16.7 million/year	$14.0 - 14.1 million/year	$16.4 - 16.5 million/year

Source: AECOM

Table 2.14-1 Cost and Capacity Summary for Scenarios

		Interlined Scenario	Independent Scenario		
			Option 1	Option 2	Option 3
	Description	Via Fairview Heights - Prairie	Downtown Inglewood via Market-Manchester	AMC 96th St. Transit Station via Arbor Vitae	AMC 96th St. Transit Station via Century
	Alignment	Junction branching from Crenshaw/LAX south of Fairview Heights Station; underground along Prairie Avenue	Market Street - Manchester Boulevard - Prairie Avenue	Prairie Avenue to Aviation Boulevard via Arbor Vitae Street	Prairie Avenue to Aviation Boulevard via Century Boulevard
2.1	Guideway Configuration and Mode				
	Guideway Configuration	Fully Exclusive	Fully Exclusive Pedestrian/vehicle crossing on Market Street at Queen Street and Regent Street	Fully Exclusive	
	Technology / Mode	Metro Light Rail	Urban Rail (similar to european tram, streetcar, low-floor light rail)	Automated People Mover (APM) (including monorail)	
	Distance (route-miles)	1.5 miles (branch) - 5.3 miles (to Expo Line)	1.2 miles	2.1 miles	2.8 miles
	Travel Time (minutes)	3 minutes	5 minutes	4 minutes	7 minutes
	Average Speed (mi/hr)	21 mi/hr	15 mi/hr	33 mi/hr	25 mi/hr

Source: AECOM

Table 2.14-2 Findings or Results of Operability Scenarios and Options by Topic

		Interlined Scenario	Independent Scenario		
			Option 1	Option 2	Option 3
2.2	Station Design & Connectivity				
	Termini	• Upgraded Crenshaw/ LAX Terminus at Expo Line • New Terminus at Development	• New terminus on Market Street • New terminus at Development	• New terminus at AMC 96th St. Transit Station • New terminus at Development	• New terminus at AMC 96th St. Transit Station • New terminus at Development
	Station Design	• Assumed 270-feet platforms • Metro's "kit of parts" station design • Accommodation on plazas and waiting areas for patrons transferring from other transit service lines • Additional signage at connecting stations to guide event patrons to platforms to streamline travel	• Assumed 270' platforms • At-grade stations would be designed as an extension of existing sidewalks; safety barriers and other safety measures to encourage pedestrians to cross at dedicated crossings	• Assumed 270' platforms • Capacity, ingress and egress strategy from the LAWA concourse need to accommodate combined ridership from APM, AMC/96th St. Station and the Project; Station could be interlined with the developments on the site, currently slated for collateral development; vertical access needs to be provided on Arbor Vitae/Prairie Ave	• Assumed 270' platforms • Capacity, ingress and egress strategy from the LAWA concourse would need to accommodate combined ridership from APM, AMC 96th Street Transit Station and the Project; vertical access needs to be provided to the aerial station
2.3	Operating Capacity				
	Capacity Target	25% of 80,000 stadium capacity per hour = 20,000 passengers/hour	25% of 80,000 stadium capacity per hour = 20,000 passengers/hour		
	Train Consist	3 - Metro light rail vehicles	3 - low-floor urban rail vehicles	6 - 40-50' APM cars/segments	
	Train Capacity	150 passenger/vehicle = 450 passengers/train	150 passenger/vehicle = 450 passengers/train	100 passenger/car = 600 passengers/train	
	Maximum Operating Capacity	5 minute peak headway = 5,400 passengers/hour	2 minute peak headway = 13,500 passengers/hour	2 minute peak headway = 18,000 passengers/hour	

Source: AECOM

Table 2.14-2 Findings or Results of Operability Scenarios and Options by Topic (Continued)

		Interlined Scenario	Independent Scenario		
			Option 1	Option 2	Option 3
2.4	Ridership Analysis				
	Weekday Ridership Forecast (2040)	3,734 riders/day	3,158 riders/day	2,158 riders/day	3,802 riders/day
	Event Forecast (2040)- Attendees Using Transit per Event	4,130 - 15,000 attendees	3,900 - 14,300 attendees	6,120 - 23,180 attendees (assumes use of up to 25-75% LAX "ITF" parking)	6,420 - 24,180 attendees (assumes use of up to 25-75% LAX "ITF" parking)
2.5	Construction Methods and Impacts				
	Construction Methods and Impacts	Bored tunnel, cut & cover, and at-grade guideway and station construction	Cut & cover, at-grade, and aerial guideway and station construction	Aerial guideway and station construction	
2.6	Traffic Impacts				
	Permanent Traffic Impacts	Impact to at-grade crossings on Crenshaw/ LAX line. Slauson Avenue assumed to require grade separation	Full closure of Market Street to traffic with at-grade crossings at Regent Street and Queen Street. Some intersection turning movements may be impacted by aerial guideway/station columns	Some intersection turning movements may be impacted by guideway/station columns	
2.7	Maintenance and Storage Facilities				
	Vehicle Fleet Size (during maximum operations)	36 light rail vehicles	23 urban rail vehicles	38 APM cars/segments	
	Maintenance and Storage Facility (MSF) Size	13 acres	5 acres	5 - 7 acres	
	Maintenance Facility Strategies	Shared with existing/ expanded Metro facility	New joint-development/mixed-use redevelopment site or shared with existing/expanded Metro facility (requires non-revenue connection)	All-new redevelopment site (e.g. formal rental car lot), new joint development/mixed-use redevelopment site, or shared with LAWA APM	
	Potential MSF Locations	Metro Crenshaw/LAX Southwestern Yard or other	· Downtown Inglewood redevelopment site(s) · Other Inglewood infill site(s) · Forum or Hollywood Park sites · Metro Crenshaw/LAX Southwestern Yard or other	· Former LAX rental car lots · Hollywood Park sites · LAWA APM facility	

Source: AECOM

Table 2.14-2 Findings or Results of Operability Scenarios and Options by Topic (Continued)

		Interlined Scenario	Independent Scenario		
			Option 1	Option 2	Option 3
2.8	Right-Of-Way Acquisition				
	Right-Of-Way Acquisition - Construction/Staging	6 - 8 acres	2 acres	minimal	
	Right-Of-Way Acquisition - MSF	13 acres	5 acres	7 acres	
	Right-Of-Way Acquisition - Stations, Systems	up to 4 acres	up to 8 acres	up to 26 acres	up to 12 acres
	Right-Of-Way Acquisition - Total	22 acres	15 acres	33 acres	19 acres
2.9	Utility Conflicts and Relocation				
	Utility Conflicts and Relocation	Miscellaneous impacts due to cut & cover and at-grade construction	Miscellaneous impacts due to cut & cover and at-grade construction	Miscellaneous impacts due to support column construction for aerial guideway and stations	
2.10	Rail Systems				
	Ventilation	Assumed that increased ventilation capacity (additional vent shafts) are required for Crenshaw/LAX Line tunnel segments “UG3” and “UG4”	n/a		
	Signals/Operations	Assumed minor upgrades to Crenshaw/LAX systems to accommodate interlined service	n/a		

Source: AECOM

Table 2.14-2 Findings or Results of Operability Scenarios and Options by Topic (Continued)

		Interlined Scenario	Independent Scenario		
			Option 1	Option 2	Option 3
2.11	Environmental Scan and Potential Mitigation Requirements				
	Environmental Scan - High Potential for Significant Impacts	Cultural Resources – due to close proximity to a cemetery.	No environmental issue has high potential for significant impacts	• Visual Character – due to aerial structures along Arbor Vitae • Light and Glare – due to the illumination of trains due to the proximity of light sensitive residential uses along the alignment. • Land Use Compatibility – The introduction of a transit line on Arbor Vitae Street could limit circulation pathways along local north-south streets and may limit direct access to the existing driveways. • Noise / Vibration Impacts – The highest potential for noise impacts is along Arbor Vitae Street because it has the highest number of Category 2 receptors and a narrow street width • Circulation System - reduction in lane widths and potential turn limits may impact major intersections that are currently operating at Level of Service (LOS) E or worse during peak hours. In addition, structural columns supporting the elevated guideway along turn-lanes may introduce intersection sight-distance challenges to drivers of vehicular traffic.	No environmental issue has high potential for significant impacts

Source: AECOM

Table 2.14-2 Findings or Results of Operability Scenarios and Options by Topic (Continued)

		Interlined Scenario	Independent Scenario			
			Option 1	Option 2	Option 3	
2.12	Safety & Security					
	Safety & Security	Impacts to safety & security systems (fire life safety) on Crenshaw/LAX line as-designed (currently under construction). Fire-life safety systems require evaluation. Also, risks associated with movement of large passenger loads to special events.	Interface with pedestrians and vehicles along Market Street. Also, risks associated with movement of large passenger loads to special events.	Interface with Metro AMC 96th Street Transit Station and LAWA APM. Also, risks associated with movement of large passenger loads to special events.		Interface with Metro AMC 96th Street Transit Station and LAWA APM. Also, risks associated with movement of large passenger loads to special events.
2.13	Capital and Operating Costs					
	Capital Cost Estimates (2017 $)	$1.333 - 1.960 billion	$416 - 624 million	$561 - 990 million		$563 million - 1.049 billion
	Operating and Maintenance Cost - Routine	$18.5 million/year	$13.3 million/year	$10.2 - 10.7 million/year		$12.0 - 12.7 million/year
	Operating and Maintenance Cost - Special Event	$1.2 million/year	$1.0 million/year	$0.9 - 1.3 million/year		$1.3 - 1.9 million/year
	Operating and Maintenance Cost - Background Metro	$2.5 million/year	$2.5 million/year			
	Operating and Maintenance Cost - Total	$22.2 million/year	$16.7 million/year		$14.0 - 14.1 million/year	$16.4 - 16.5 million/year

Source: AECOM

Table 2.14-2 Findings or Results of Operability Scenarios and Options by Topic (Continued)

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PART III

FUNDING, FINANCING & DELIVERY

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Public Private Partnership (P3) benefits arise from optimizing risk allocation, aligning incentives for performance, and taking a project life-cycle perspective. This section presents a summary of potential funding and P3 delivery options that could support and accelerate the delivery of the transit connection. The analysis presented in this section includes a high-level summary of the formation process and financial assessment of Enhanced Infrastructure Finance Districts (EIFD), as well as an early identification of a range of governance and delivery options.

3.1 EIFD Formation and Financial Analysis

In June of 2011, Governor Brown signed into law two bills that effectively dissolved all California Redevelopment Agencies (RDAs). Among the many responsibilities of the RDA's was to improve or build new infrastructure to address the needs of the cities and communities. Since the dissolution of RDA's, California cities have struggled to improve and build the new infrastructure necessary for its growing population. However, in September 2014 a new bill, SB 68, was signed by the Governor, authorizing local agencies to create Enhanced Infrastructure Finance Districts (EIFD's). While also allowing the use of Tax Increment Financing (TIF), the newly authorized EIFD's differ significantly from the former RDA financing structures both in flexibility and scope. As with previous forms of "TIF", the principle taxing authority (here the County of Los Angeles) must consent to any use of its portion of tax increment. Therefore, Inglewood's formation of a new EIFD, would only allow it to direct the funds derived from its own share of tax increment to the EIFD and the County's voluntary agreement to participate will be necessary in order to secure any portion of the County's tax increment share for the proposed EIFD. As a result, local governments are clearly encouraged to partner on infrastructure development in order to maximize EIFD's financial capacity.

An additional and highly significant positive aspect of the newly created EIFD's is the extraordinary flexibility and reach of its powers and the ability to combine multiple sources of revenue in addition to tax increment and integrate them into a locally-developed financial business plan. This capacity to bundle multiple revenue streams including development and user fees, bond funds federal and state grants and myriad other sources serves to enhance the revenue available to the EIFD to fund proposed projects.

The following assessment and analysis provides an application of this new tool to the specific proposed project and determines if there is sufficient financial capacity available to support its operation and maintenance. This will also inform the decision as to whether, when utilized in connection with a project governance vehicle such as a P3 or similar project delivery strategy, whether this strategy can attract the scale of private investment needed to operate as a stand-alone enterprise.

3.1.1 EIFD Formation Process

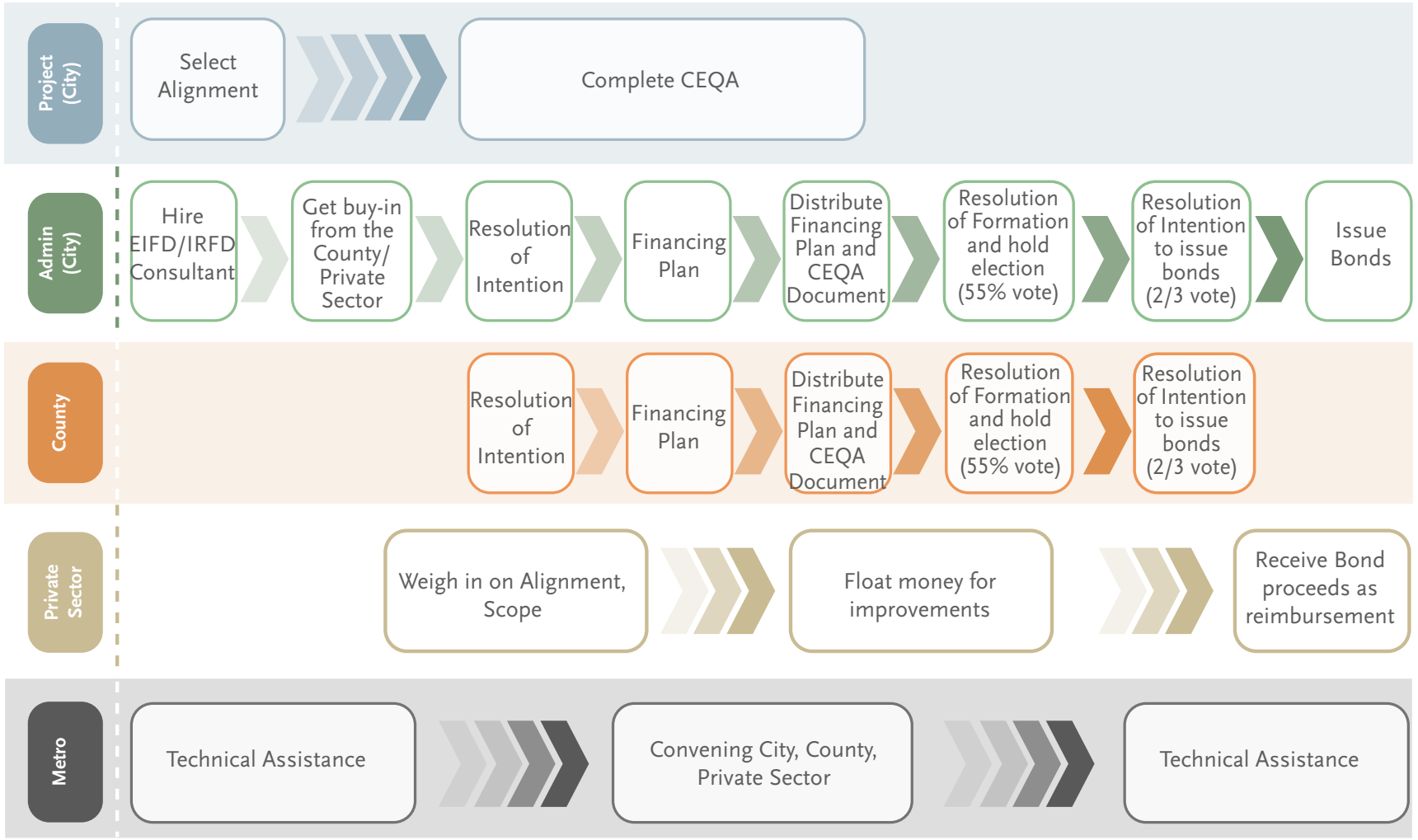
In order to form an EIFD, the Initiating Public Agency (IPA), in this case the City of Inglewood, must first adopt a resolution to establish the District and appoint the Public Financing Authority ("PFA"). The same process also must be followed by any other participating legislative bodies. The resolution identifies the proposed project and project area, along with district members, and appoints the individual PFA members. The PFA, which is the governing board of the EIFD, is a separate stand-alone governmental entity with relatively extensive powers. Its basic tasks include:

- Preparation of the Infrastructure Financing Plan ("IFP") that details the investment program and funding streams for the project
- Scheduling of a public hearing to review the IFP
- Proposal of a resolution to adopt the IFP and form the EIFD
- Approval of the IFP and officially establishment of the EIFD

In addition, an environmental review of the project is concurrently conducted and is presented as part of the public hearing process. A graphic presentation of the EIFD formation process and sequencing is presented as shown below (**Figure 3.1-1**).

Both the environmental review and the formation of the EIFD will need to take place before the completion of the first phase of the Development to take advantage of any tax increment generated.

Initial contacts with the County have occurred and await County Board of Supervisors approval of proposed County guidelines for tax increment utilization and EIFD governance participation, which will affect the identity of EIFD district members The project area is currently defined by City of Inglewood Ordinance No. 15-10 - City of Champions Revitalization Initiative, subject to potential consideration of areas encompassed by the proposed Clippers NBA stadium, also.



Source: Metro

Figure 3.1-1 EIFD Formation Process

3.1.2 Financial Assessment

In order to assess the potential availability of revenue to the EIFD to fund the project, the following was prepared:

- Tax increment projections
- City of Inglewood additional revenue projections to be derived from the Development
- Listing of potential additional EIFD revenue sources
- Table illustrating potential bonding capacity

In viewing the revenue and bond projections in this section, it is important to keep in mind the following:

A. Both the amount of potential tax increment and the revenue to the City of Inglewood are projections based on full build-out of all project improvements within the EIFD and within the projected time-frames established by the Developer and City.

Delays in construction of the improvements could result in major effects on the timing and amount of projected tax increment and project-generated revenue to the City and thus its availability to the EIFD. The current schedule for development phasing, adjusted for the recently announced one-year delay due to unusually inclement weather, is shown in **Figure 3.1-2**.

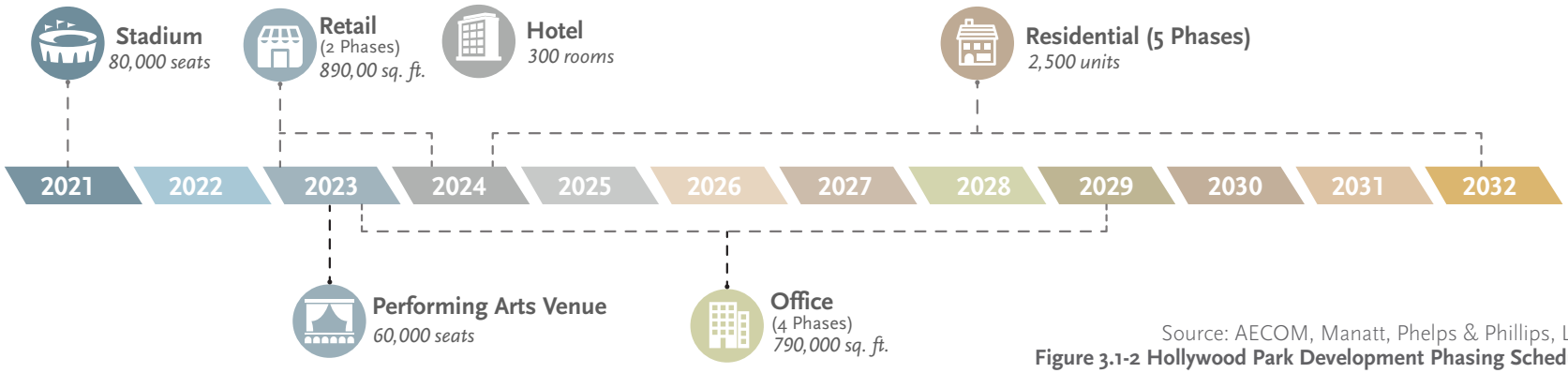
In order to assess the potential for both property tax increment and additional revenue streams generated by the project, the following project formation documents were reviewed:

- City of Inglewood ordinance adopting the initiative measure creating the City of Champions Revitalization Initiative
- Amended and Restated Development Agreement between the City and the project developers
- Owner Participation Agreement between the City and the developer defining the developers installation and rights to repayment for certain infrastructure improvements
- City of Inglewood Initiative Report relating to the proposed financial arrangements between the City and the developer
- City of Inglewood Budget for 2016-2017
- Other relevant documents

In addition, numerous meetings were conducted with City of Inglewood and County of Los Angeles officials to further clarify and assess the potential revenue generation available to the proposed EIFD.

B. Receipt by the EIFD of any portion of the County's share of tax increment is dependent upon the agreement by the County. The County, in its sole discretion, may choose whether and to what extent (in terms of percentage of tax increment funds) if any, it chooses to participate. The County is in the process of formulating guidelines for its EIFD participation.

The guidelines have not yet been published but are likely to require that in each instance the case be made as to the County-wide benefit that an EIFD-sponsored project would entail in order to allow the County to assess the magnitude of its participation by way of contribution of tax increment. In addition, the County guidelines may contain requirements for County membership on the EIFD PFA and/or other requirements relating to affordable housing that may further complicate the County's agreement to provide tax increment.



Source: AECOM, Manatt, Phelps & Phillips, LLP

Figure 3.1-2 Hollywood Park Development Phasing Schedule

C. The state Recognized Obligations Payment Schedule ("ROPS") indicated the obligation to pay former RDA debt is a senior obligation on both the City and County share of current tax as well as future tax increment. The City has recently re-issued bonds for two former redevelopment areas of the City totaling around $60 million and the remaining RDA obligation for former debt within the proposed EIFD area is about $14 million. Even though two of the former RDA areas are outside the proposed EIFD boundaries, the law requires that the total amounts of all former RDA debt be aggregated and thus the full amounts of all three are senior obligations to any proposed EIFD use.
The current City 14% share of property tax as well as the full 47.9% County retained share are both committed to repayment of the approximately $74 million former RDA debt. In addition, any increment to the current property tax amounts the County and City receive are likewise fully committed to repayment of the RDA debt and no tax increment will be available to the EIFD (or the transportation project) until the former RDA debt is fully retired. The current debt is being repaid at the rate of approximately $11 million per year. The proposed redevelopment as well as the general overall rise in property values throughout the City will substantially and quickly inflate the amount of repayment and thus retirement of the senior obligations. It is, therefore, difficult to assess the date at which these senior obligations will be repaid since they are dependent on both the projected rise in EIFD area property taxes as well as the overall rise in City-wide property tax share.

Tax Increment

Having established the issues, above, the following projected tax increment and project revenue are theoretically available to the EIFD under various tax increment contribution scenarios, again assuming full build out as scheduled and phased.

While more refined calculations will need to be made to adjust dates and amounts to reflect the date of RDA senior debt repayment the tables may be instructive as an indication of the amounts available to pay down the senior RDA debt, and as a guide to potential tax increment once that debt is retired.

A preliminary approximation of the total amount of net bondable tax increment available under four different circumstances was developed, which is dependent upon the extent of County participation in making tax increment available to the EIFD (**Table 3.1-1**).They are based upon relatively conservative projections as to the date and phasing of project build-out and do not represent the currently available tax increment. As noted, delay in phasing or non-build scenarios would have a negative effect on availability.

As noted above, the "ROP" repayment obligation is likely to somewhat diminish the available net bond proceeds in early years but is not subject to calculation due to the uncertainty of both City-wide tax collection amounts and County willingness to continue contribution of all or a portion of its tax share.

In addition, tax increment revenue representing additional required coverage ratio, to the extent not utilized for bond repayment, may also be available as additional revenue at later project stages.

	Max. 47.9% County and 14% City to EIFD	County 20% and City 14% to EIFD	County 10% and City 14% to EIFD	No County Share and City 14% to EIFD
Projected Year 5 & cum. through year. 4	$158,000,000	$82,000,000	$62,600,000	$33,800,000
Projected Year 10 & cum. through year. 9	$277,600,000	$159,5000,000	$108,400,000	$64,100,000
Projected Year 15 & cum. through year. 14	$428,200,000	$231,700,000	$163,000,000	$100,700,000
Projected Year 20 & cum. through year 19	$574,900,000	$314,400,000	$224,800,000	$128,100,000

Note: Assumes 30 year term and build-out as projected – Assume 1.35 coverage, 6% rate and 12% cost of issuance.
Source: Manatt, Phelps & Phillips, LLP
Table 3.1-1 City of Inglewood Projected Net Bond Proceeds

Revenue Projections

In addition to potential tax increment revenue, the project's additional streams of income will also inure to the City's benefit. These include ticket tax revenue from both the NFL teams as well as from the proposed entertainment venue, revenue generated by hotel taxes, sales tax revenue from both retail and entertainment venues and other sources emanating from the project. Some portion of this revenue may be available to the EIFD at the City's discretion, but is dependent on the City's prior commitments and plans.

The amount of project-generated revenue to the City of Inglewood is subject to an annual (guaranteed) "cap" of $25 million (adjusted for inflation). The amount actually available to the EIFD however, is somewhat less as certain project-related City expenses (fire, police, and traffic expenses, etc.) must be deducted.

The remainder of revenue, if any, above the $25 million, goes to the project developer until reimbursement for certain public improvement costs, park operations and maintenance and event public safety are satisfied. The potential for additional annual revenue to the City is attained as illustrated in the following scenarios.

A. One-Team Scenario

Projected City of Inglewood net revenue rises irregularly from initial Development completion through year 3, averaging at approximately $13.5 million per year and then gradually rises to $28 million per year through year 16 when developer infrastructure reimbursement is projected to be satisfied. The amounts to the City are then projected to increase to a year 17 total of $35 million and gradually rise to $43 million annually by year 20. Total net general fund impact approximately is approximately $670 million (**Table 3.1-2**)

B. Two-Team Scenario

The addition of revenue from a second NFL team provides additional project revenue to the City and could allow the re-imbursement to Developer to occur by as many as ten years sooner and thus additional revenue from years 11-25 could increase the total available revenue. However, amounts in this category are sensitive to both the ticket sales tax cap ($15 million annually), which under the current agreement does not increase under the two-team scenario, the potential for additional ancillary team product, food and retail sales, other terms and conditions which are expected to be further clarified with City officials and the developer.

C. Additional Los Angeles Clippers Development

The City has recently executed an Exclusive Negotiating Agreement (ENA) with the Los Angeles Clippers for the construction and operation of a professional basketball facility on a site near the projected EIFD. The City has indicated considering adding the projected site to the EIFD. If the ENA results in a final agreement of constructionand operation, additional revenue from ticket sales, retail taxes, as well as tax increment could become available. Depending on timing, there may be considerations of modifying the EIFD area to include the new NBA Clippers arena development.

While beyond the scope of the current study, additional funding vehicles such as the formation of an Infrastructure Revitalization Finance District ("IRFD") to allow cooperative funding and phased annexation in connection with the EIFD were explored. However the use of an IRFD is an unlikely prospect due to the restrictions contained in the IRFD legislation which requires that the "project" lie in redevelopment and former redevelopment project areas, a restriction not present in the EIFD legislation. As the likely "project" traverses many areas of the City not part of redevelopment areas this vehicle is likely unavailable.

City of Inglewood Project Revenue			City Re-imbursements		Pre-Expense Net	Additional City Expenses		Total Net General Fund Impact
Total City Project Revenues	One-time construction impact fees	Total Net to City Before Re-imbursements	Operating cost reimbursement to Developer	Capital Cost re-imbursement to Developer	Net to City after re-imbursements	Sales tax diversion	City annual expenses	
$1,282,969,963	$55,483,245	$1,338,455,208	($260,873,770)	($133,142,123)	$944,473,315	($14,008,394)	($260,373,518)	$670,055,855

Source: Manatt, Phelps & Phillips, LLP

Table 3.1-2 City of Inglewood General Fund - Total 25-Year Projected Project Revenue

Additional Potential Sources of EIFD Funding

As noted, an EIFD can utilize multiple funding sources along with tax increment. Those sources include, but are not limited to, the ones listed below. The City of Inglewood 2016-2017 Budget Plan was also reviewed to determine potential sources. As with the additional project revenue detailed in the previous section, they are subject to both the City's willingness to devote the City–controlled revenue to the EIFD revenue stream, prior commitments of those funds to other projects and, in the case of federal, state or other grants, on the availability and success in procurement of such potential sources. Potential funding sources include:

- Vehicle License Fee property tax backfill
- Development agreement/impact fees
- User fees
- City/County/Special District Loans
- Benefit assessments
- Proposition 1 bond funds
- GHG reduction funds (state)
- DOT/EPA/DOE funds (fed)
- Prop A local return
- Prop C Transportation Returns
- Measure R local return
- Off-site parking revenue
- AQMD funds
- Gas Tax Bill
- USDOT "FAST" Act
- Measure M Local Return
- Fare Revenue

While some of these sources may be substantial (e.g. $10.7 million from Motor Vehicle backfill annually, $2 million from Prop. A local return and Prop. C revenues annually), they are dependent upon the extent of prior City budget commitments and the City's willingness to devote to the EIFD.

Bonding Capacity

As the preceding discussions illustrate, any definitive projection of bonding capacity or a definitive timeline for formation of an EIFD are somewhat premature.

As one of the early steps in formation is the preparation of a "financing plan" for the project, several major pre-cursers to the plan are yet needed. They include, among other matters:

- The definition of and costs of both construction and operation of the transportation project
- Commitment from the County relating to its willingness to contribute tax increment and the amount thereof
- Commitment from the City as to the availability of and extent to which they are willing and able to contribute revenue from the project and from other uncommitted City-controlled sources

In addition, substantial work toward obtaining commitments from other sources (e.g., grants, state and federal programs, etc.,) as well as potential commitments from the Hollywood Park Development project developer and other stakeholder parties should also be undertaken.

As a further matter, the relationship between the transportation project governance and the EIFD governance needs to be carefully defined and coordinated – matters which await a final determination as to the options for project delivery and related matters.

3.1.3 Funding Summary

The EIFD is envisioned to be structured as one created by the City of Inglewood with the participation of the County of Los Angles in order to maximize the capture of tax increment and also to allow the capture of as many available additional revenue streams as may be available.

The bulk of potential EIFD funding emanates from two principal sources; a)tax increment, and; b) additional City of Inglewood general fund revenue generated by the proposed stadium and surrounding area development projects. A "very best scenario" aggregates $574 million in available bond proceeds and $670 million in additional City revenue derived from the project. Additional revenue from other qualified sources could further augment potential EIFD revenue.

However, as noted in the principle discussion of each of the tax increment and City revenue projection sections, significant uncertainties need to be resolved and the need for County and City commitments need to be established in order to craft a credible "Infrastructure Financing Plan" as required in the formation of an EIFD.

In the case of tax increment, the most critical factors are the percentage, if any, of potential tax increment the County is willing to contribute to the EIFD, the timing and completion of the phased construction of the stadium and surrounding development and the retirement timing of former Redevelopment Area debt.

In the case of City project-generated additional revenue (as well as additional eligible EIFD revenue sources), the total amount available will be

dependent on the extent of the City's contribution of these funds and potential prior budgetary commitments

It should be further noted that while the potential bond and development revenue may be substantial, this revenue is somewhat small during initial years and early funding sources need to be explored in order to support bond debt and initial formation expenses. These may, for example, include Bond Anticipation Notes, seed loans from City/County or other public agencies and institutions, and developer contributions/loans.

It should be further noted that among other important matters, the amassing of funding sources needs to be carefully coordinated with the analysis of project delivery method. As one primary example, the EIFD statute prohibits use of EIFD funds for normal maintenance and operation hence the contract with a presumed private operator would have to be carefully constructed to separate EIFD funds – usable only for construction – and a separate funding stream usable for operation and maintenance. One such option is, of course, fare revenue.

3.2 Preliminary P3 Project Delivery Options Analysis

In planning to procure, develop, finance, operate and maintain a fixed guideway transit system, two of the key issues that should be addressed as early in the planning process as possible are the optimal approaches to Project Governance and Project Delivery.

Addressing these questions at the outset will help drive answers to other important questions, including:

- How much preliminary engineering to do (and not to do) before further procurement
- How much should (and should not) be spent on project development before the owner achieves a high level of confidence of what the project will actually cost to build and operate;
- How much time it will take to complete the project (and opportunities to accelerate)
- What sources of funds will be available for the project (and when and how they will be routed)
- How to allocate risks between the owner and the contractors (including plan for early risk mitigation)

This section of the report will address a range of governance and delivery options that might be considered for the Project and a decision-making process that might be useful for the latter. Recommendations are outside the scope of this analysis and decisions will be reliant in part on legal issues that have not been researched.

3.2.1 Project Governance

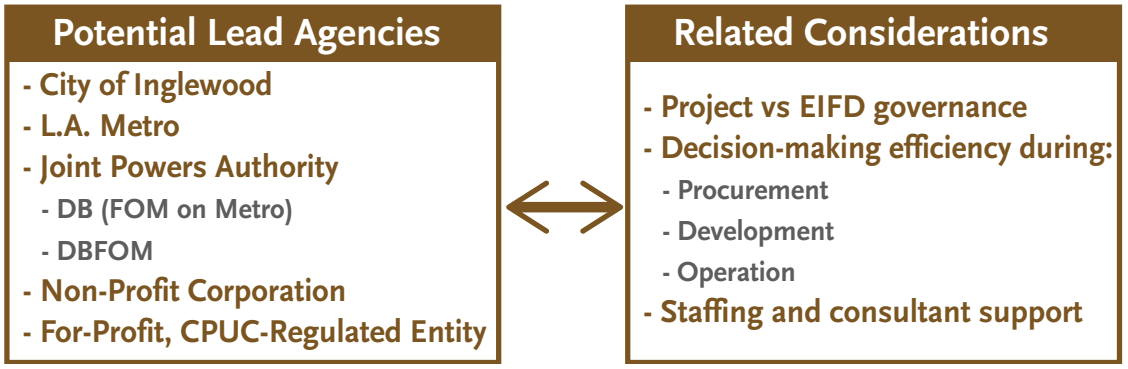
Among the important early decisions for a planned transit project are what entity or entities will be the:

- Owner
- Lead agency for environmental clearance and permitting
- Acquirer of real estate
- Contributor of funds; the issuer of debt
- Procurer and overseer of any services and supplies outsourced to contractors, consultants and vendors
- Provider of any other owner-retained functions.
- While often the above roles are aggregated within a single public entity, sometimes they are allocated by intergovernmental agreements among more than one public entity. Sometimes too, key responsibilities are carried out by non-public entities, subject to governmental regulation and/or outsourced private entities, subject to contractual oversight.

The aim should be to select the right entity or combination of entities that will achieve project goals, taking into consideration, among other factors, applicable law, potential sources of funding and financing and the extent of capabilities to carry out the functions efficiently and effectively.

Among the options to consider for one or more lead project roles area are (Figure 3.2-1):

- **City of Inglewood**: The City is a charter law city within the County of Los Angeles and has broad powers to carry out public works within its boundaries, either by itself or in combination with other public and private entities. Other cities within LA County and the State of California own and operate transit projects. One example is an APM system at LAX, currently being developed by the City of Los Angeles.
- **Los Angeles County Metropolitan Transportation Authority**: LA Metro is the primary public transit agency within the County of Los Angeles and as such carries out all governing entity functions for many fixed guideway transit projects.



Source: Nossaman LLP, AECOM

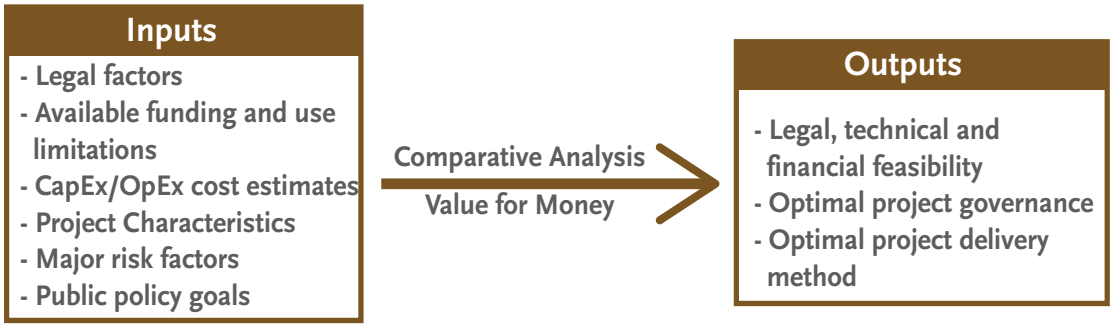
Figure 3.2-1 P3 Project Governance

- **Joint Powers Authority**: The term is applied to an entity formed, and participated in, by more than one public body, each of which has the powers to carry out the responsibilities of the joint entity. There are actually two different kinds of entities to which this label is commonly applied: one formed by agreement pursuant to the Joint Exercise of Powers Act; and one formed by special statutory enactment. Sometimes JPAs are used only for design and construction of a transit project, with another entity assuming responsibility for operations and maintenance.
- **Non-Profit Corporation**: To carry out key functions, sometimes transit projects and other public works are structured to rely for their governance on a non-profit corporation formed under state law and operating within the constraints of the federal and state taxing authorities. Such entities can be specially created by a public body, with approval of the articles of incorporation and the bylaws, or enabled by a lease, franchise or other agreement between the public body and the non-profit. The choice usually depends upon the degree of control over, or independence from, the project the involved public agencies wish to establish.
- **For-Profit Company**: There are circumstances under which a transit system is susceptible to being owned and operated by a for-profit company, which would be regulated by the California Public Utilities Commission.

Among the factors to take into account in selecting among governance options are (Figure 3.2-2):

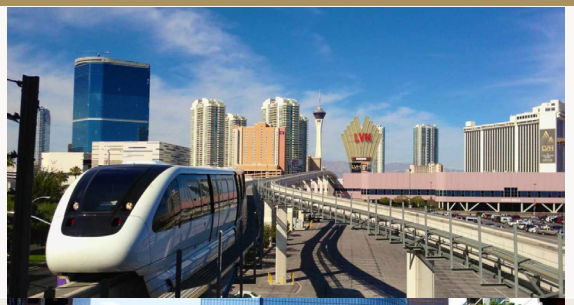
- **For-Profit Company**: There are circumstances under which a transit system is susceptible to being owned and operated by a for-profit company, which would be regulated by the California Public Utilities Commission.
- **Legal considerations**: There are a number of legal issues that typically need to be sorted out in arriving out the list of available governance options and then selecting from that list the optimal entity or combination of entities. We have provided to LA Metro and the City a preliminary list of such issues to consider.
- **Sources of funding**: How funding is to be sourced and routed into a project should be taken into account in determining project governance. For the Expo and Gold Lines developed by JPAs, LA Metro and the relevant JPA entered into funding and finance agreements. Similarly for the Inglewood project, an EIFD is under consideration and governance for the project's delivery will need an interface with EIFD governance.
- **Decision-making efficiency**: Capital-intensive and large rail transit projects require careful and efficient management and decision-making. This need starts in the development and carries through the environmental, project definition, procurement, construction and operation phases.
- **Organizational capability**: Undertaking the development of a rail transit system effectively is time and resource intensive, requiring significant expertise and capability. Deciding on optimal project governance should include a careful analysis of organizational capability to carry out retained governing entity functions and oversight of outsourced functions.

Established rail transit agencies exist to provide such resources, but there have been successful governing entities that: (a) had not previously delivered rail transit but effectively expanded their functions to do so; or (b) were newly created for the mission-specific job of delivering rail transit. Each option carries with it varying degrees of internal staff and consultant team capabilities, all with necessary qualifications.



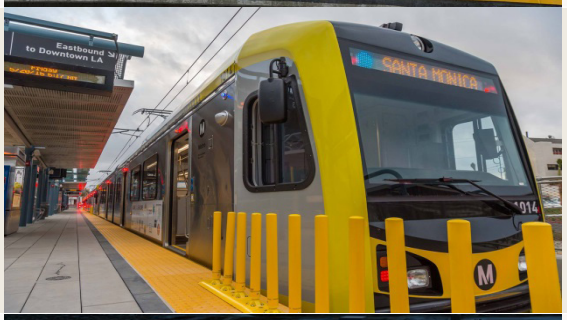
Source: Nossaman LLP, AECOM

Figure 3.2-2 Decision-Making Process for Project

Project Name	Location	Project Governance	Delivery Method	Picture
Las Vegas Monorail[1]	Las Vegas, NV	Non-Profit	P3 Revenue Risk	
Angels Flight[2]	Los Angeles, CA	Non-Profit	P3 Revenue Risk	
Napa Valley Wine Train[3]	Napa, CA	For Profit	P3 Revenue Risk	
Heathrow Express (UK)[4]	London, UK	For Profit	P3 Revenue Risk	

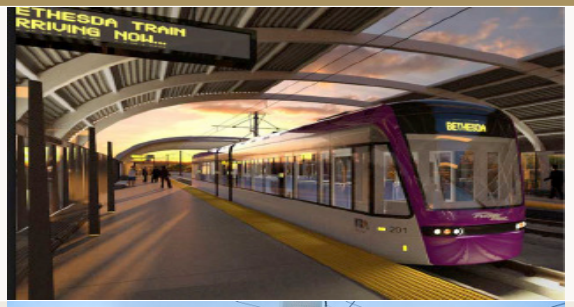
Source: Nossaman LLP, AECOM

Table 3.2-1 Example P3 Projects

Project Name	Location	Project Governance	Delivery Method	Picture
Gold Line[5]	Los Angeles, CA	JPA	Design-Build (Lump Sum)	
Expo Line[6]	Los Angeles, CA	JPA	Design-Build (Lump Sum)	
LAWA APM[7]	Los Angeles, CA	Municipal	P3 Performance Contract	
Purple Line[8]	Los Angeles, CA	Transportation Agency	Design-Bid-Build	

Source: Nossaman LLP, AECOM

Table 3.2-1 Example P3 Projects (Continued)

Project Name	Location	Project Governance	Delivery Method	Picture
Maryland Purple Line[9]	MD	Transportation Agency	P3 Performance Contract	
Houston Metro Solutions 2[10]	Houston, TX	Transportation Agency	PDA	
DFW Airport APM[11]	Dallas, TX	Transportation Agency	Design-Build-Operate-Maintain	

Picture Sources:
1, 5, 7, 9: Nossaman LLP
2: https://cdn.vox-cdn.com/thumbor/vLSrXijYPmS6ajaMtrxShlhkOeM=/0x0:1280x853/1200x800/filters:focal(538x325:742x529)/cdn.vox-cdn.com/uploads/chorus_image/image/55452705/61681400009_7afbf9ba80_o.0.jpg
3: http://winetrain.com/wp-content/uploads/2014/03/Napa-Valley-Wine-Train-Napa-Valley-Sign.jpg
4: https://static.standard.co.uk/s3fs-public/thumbnails/image/2014/06/18/08/heathrow-express.jpg
6: http://assets.inhabitat.com/wp-content/blogs.dir/1/files/2016/05/Los-Angeles-Metro-Santa-Monica.jpg
8: https://i.ytimg.com/vi/rKe8NKeJwBk/maxresdefault.jpg
10: https://upload.wikimedia.org/wikipedia/commons/5/54/METRO_Light_Rail3.jpg
11: http://www.bombardier.com/content/dam/Websites/bombardiercom/Projects/Innovia-APM-Dallas-2527_L.jpg/_jcr_content/renditions/original

Source: Nossaman LLP, AECOM

Table 3.2-1 Example P3 Projects (Continued)

3.2.2 Decision-Making Process for Project Delivery

One of the most important decisions made about a rail transit project is the plan to be used in contracting for its delivery and operation (Figure 3.2-2). There are a wide range of delivery options available. No one option is suitable for every project. Once the list of suitable options is delineated, a decision can then be made as to which is optimal.

3.2.3 Project Delivery

Rail transit projects in the United States historically have been awarded through conventional contracting, whereby the governing entity and its engineers design the project to 100% plans and specifications, divide the work up into multiple biddable construction packages, make awards to lowest responsible bidders, manage the contracts and their interfaces, pay contractors on progress, accept completed work and operate and maintain the completed system.

Over the last 10-15 years, the industry has opened to other forms of contracting. While many projects continue to be delivered conventionally, governing entities in a range of circumstances have sought to shift more risk and responsibility to the private sector, bundling together into single contracts project elements (i.e. civil, systems, vehicles) and/or project functions (i.e. design, construction, finance, operations, maintenance).

This has resulted in an array of now commercially accepted delivery methods, each of which has its own suitability criteria. Among the project delivery options to consider as alternatives to conventional delivery are:

- Progressive Design-Build / Construction Manager / General Contractor / Construction Management-at-Risk with public finance, operations and maintenance
- Design-Build (lump sum) with public finance, operations and maintenance
- Design-Build-Operate-Maintain
- P3 Performance Payment Contract
- P3 Revenue Risk Contract
- Pre-Development Agreement, which can lead to DB, DBOM or P3 option

P3 Performance Payment Contract

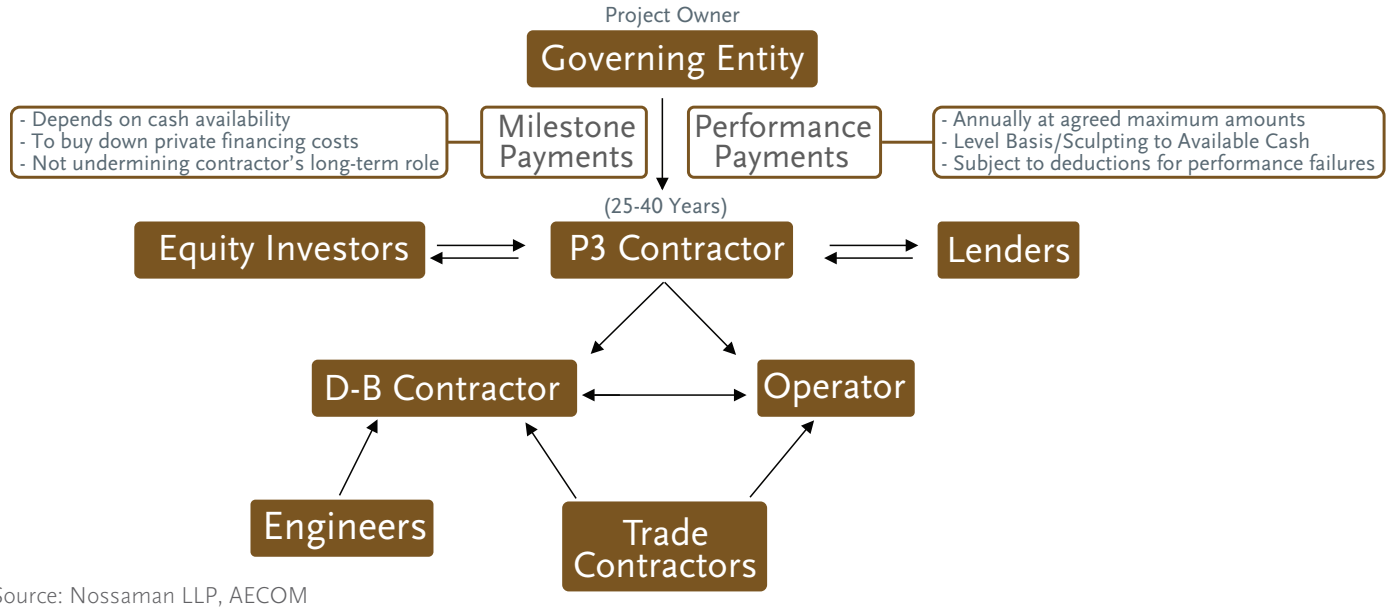
The key attributes of a P3 Performance Payment Contract are:

- Employing technical requirements well short of final design, focused more on performance/outcome based specifications, less on means and methods regulation, on maximizing private sector innovation opportunities and on capturing lifecycle cost efficiencies.
- Selecting the contractor on a best value basis, using lowest life-cycle cost as the price factor, along with technical factors.
- Procurements that can incentivize inclusionary practices for hiring, training and subcontracting at levels exceeding conventional procurements, favoring selection of contractors with favorable track records.
- Upon award, obligating the contractor to complete the project and to carry out operations and maintenance over the project's useful life (typically 25-35 years).
- Upon project completion, the governing entity making payments to the contractor over the duration of the contract at agreed maximum annual amounts, typically on a level basis, although amenable to sculpturing to match available cash.
- Providing, importantly, that the annual payment amounts are subject to deductions to the extent of any under-performance (e.g. safety, availability, maintenance, and other performance indices).
- Permitting the governing entity to make milestone payments, if cash is available, to buy down private financing costs, but typically not to the extent of undermining the contractor's long term "skin in the game".
- Governing entity, at all times, keeping project ownership, with the contractor handling the project back at the end of the term in a condition meeting contractually established specifications.
- Generally shifting more risks to contractors than conventional contracts, creating more cost and schedule certainty, as long as the governing entity timely carries out its retained responsibilities (e.g., ROW delivery).
- Particularly for $200 million to $2.5 billion capital projects, there is significant market interest in P3 Performance Payment Contracts, at commercially reasonable pricing, from internationally experienced companies.

The suitability criteria for Performance Payment Contracts generally include one or more of the following:

- The project's capital costs are sufficiently large enough to offer material economies of scale.
- The project is sufficiently complex to offer the governing entity significant benefits from shifting integration risk (i.e. between design and implementation, among civil construction, systems and vehicles).
- Governing entity will benefit from, and therefore want to incentivize:
  - Life-cycle cost efficiencies
  - Capital Expenditure (CapEx) and Operating Expenditure (OpEx) cost certainty
  - Cost savings and quality gains from private sector innovation
  - On-time or accelerated completion
- Operations, routine maintenance and/or capital maintenance can be efficiently separated from any existing systems.
- Outsourcing the operations and maintenance component doesn't create unmanageable collective bargaining agreement or related labor issues.
- A modest increase in cost of private capital (typically 90% debt/10% equity) over public sector borrowing is outweighed by:
- Shifting risks to a contractor, which can best manage and price
- Paying only to the extent the project performs as promised
- Contractor having financial "skin in the game," creating protection akin to a long-term "super-warranty".
- The project may have significant fare-box and advertising revenue potential, but the governing entity wishes to retain revenue risk and opportunity.
- The specified system and vehicle specifications can be set to attract sufficient competition (or, if not, consideration can be given acquiring that scope through a separate procurement and "stapling" that contract to the P3 Performance Payment Contract).

The major components and steps of the P3 Performance Payment Contract strategy is illustrated below (**Figure 3.2-3**).



Source: Nossaman LLP, AECOM

Figure 3.2-3 Performance Payment Contract Strategy

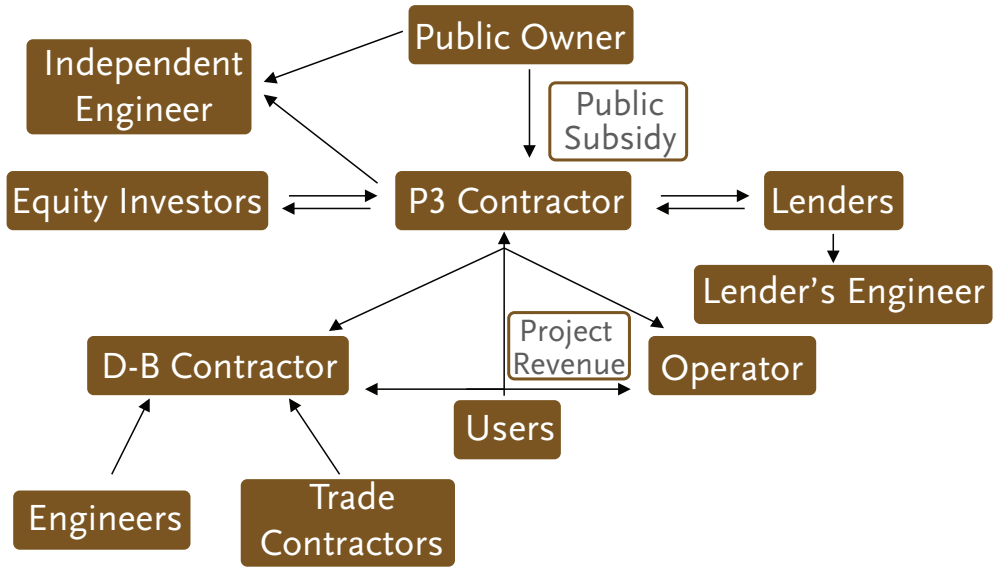
P3 Revenue Risk Contract

The key attributes of a P3 Revenue Risk Contract are similar to a P3 Performance Payment Contract, with certain refinements, including:

- Selecting the contractor on a best value basis, with lowest net present value public subsidy as the price factor, along with other technical factors.
- Instead of receiving performance payments, compensates the contractor through application of project revenues to CapEx, OpEx and finance costs, as supplemented by government funding only as agreed in advance.
- Maximizes the advancement of capital for construction from future project revenues (more than investment grade project revenue bonds would secure) and minimizes the need for other funding.
- Protects the governing entity (but not the contractor) from risk of revenue under-performance.
- Shares any actual revenue over-performance between the governing entity and the contractor.
- Employs a contract duration typically longer (40-50 years) than the 25-35 year duration of a Performance Payment Contract.
- Generally shifts more project-related risks to the contractor than a P3 Performance Payment Contract.
- Market interest is not as deep as for P3 performance payment contracts, but generally is still sufficient for real competition.

The suitability criteria for a P3 Revenue Risk Contract are similar to a P3 Performance Payment Contract, with refinements, generally including:

- - When fare-box and other project revenues are projected to exceed projected operations and maintenance costs (e.g. fare plan with premium pricing opportunities; cost of developing/operating infrastructure low relative to potential revenues; significant advertising and/or other project-generated ancillary revenues)
- - The governing entity is willing to allow private operator flexibility to set rates within contractual parameters
- - Higher cost of capital (typically 65-75% debt, 25-35% equity), compared to P3 performance contract, is outweighed by shifting risk of project revenue under-performance and securing more up-front capital for construction from future project revenues
- - Bidders able to attract equity/debt sufficient to meet P3 contract obligations
- The major components and steps of the P3 Performance Payment Contract strategy is illustrated below (**Figure 3.2-4**).



Source: Nossaman LLP, AECOM

Figure 3.2-4 Revenue Risk Contract Strategy

Pre-Development Agreement

In hard-bid procurements, whether conventional or alternative, governing entities engage with firms capable of delivering and financing their project only when preliminary engineering, environmental clearance and feasibility analyses have progressed sufficiently to the point that the project is well-defined and funded. Governing entities sometimes feel such delivery methods produce less than optimal outcomes, reflecting inadequate innovation or unaffordability.

In such instances, governing entities seek to bring a developer into the project definition process and feasibility analysis at a much earlier stage, in an effort to capture expertise and innovation directly from companies that has actually delivered such projects before.

This form of project delivery, via early contractor involvement, is frequently called a Pre-Development Agreement. Among the key attributes of a PDA are:

- Deploying a competitive procurement to select a developer, completed well before the environmental process and preliminary engineering are complete
- Selecting a developer based on qualifications, conceptual development/ finance plans and an offer to cost-share during the pre-feasibility phase
- Upon award, the governing entity and selected developer collaborating on a joint work plan seeking to achieve and accelerate project legal, technical and financial feasibility
- An agreement including "off ramps" at key points if either party wishes to terminate
- The governing entity retaining complete control over the environmental process and all other decision-making, using developer expertise for technical and financial innovation
- The governing entity owning all work-product
- If the joint work plan results in a project that the governing entity deems feasible, the parties entering into good faith negotiations for a contractually limited period on the terms of an implementation agreement
- The government sponsor sometimes securing a confidential "shadow bid" to use as a reference in the negotiations
- If an implementation agreement is not reached satisfactory to the governing entity, it may terminate and pursue other means of project delivery
- If an agreement is reached, it may take the form of any delivery option, including Design-Build, Design-Build-Operate-Maintain, P3 Performance Payment Contract or P3 Revenue Risk Contract
- If project is deemed infeasible or negotiations unsuccessful, the governing entity may or may not be obligated to compensate the developer, depending upon initial PDA commitments

Among the suitability criteria favoring use of a PDA are:

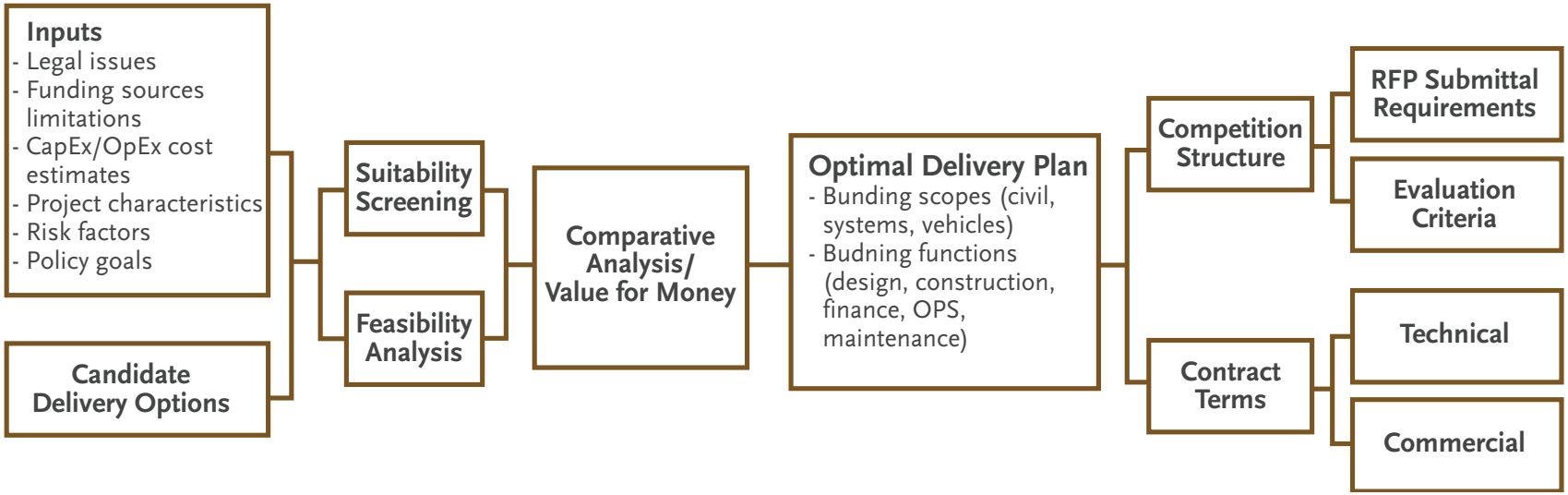
- Governing entity sees value in securing developer innovation and sweat equity during the project definition/feasibility/concept phase, much earlier than other forms of project delivery
- The benefit of early contractor involvement justifies reliance on a qualifications-based competition process, with subsequent negotiations in lieu of hard-bid price competition

3.2.4 Delivery Strategy Summary

There are multiple approaches to implementing a project. However, the right approach to provide the highest likelihood of success will be based on City of Inglewood's objectives.

Ascertaining this optimal approach for a given project depends upon careful establishment of the public policy goals the project is to serve, an assessment of the project's own unique characteristics and an understanding of its legal and financial constraints. Like other endeavors, these inputs are then properly subject to metrics, both qualitative and quantities, in the form of what is called a Value for Money Analysis . This leads to choosing, from among available options, the optimal governance and project delivery method.

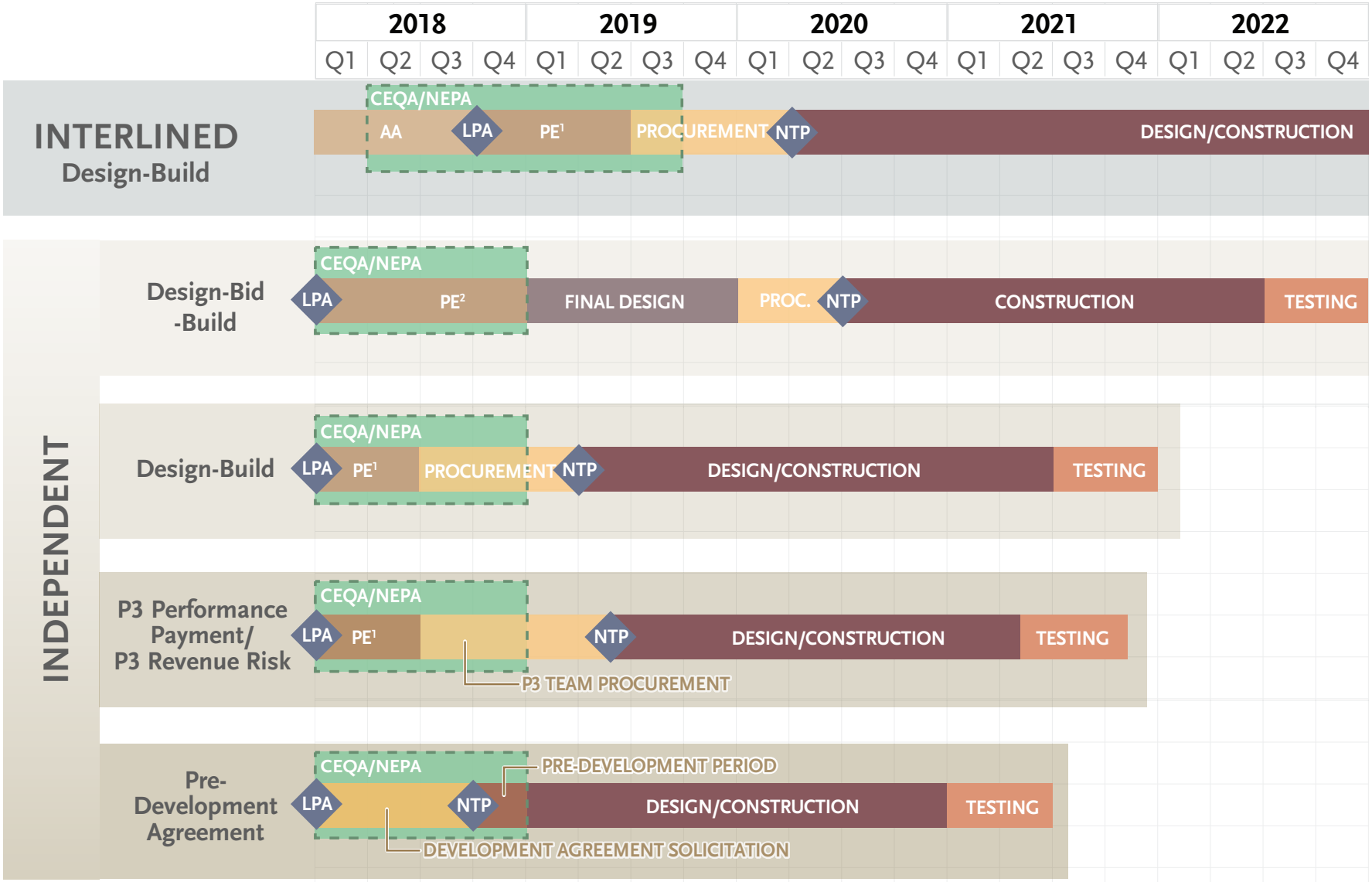
When chosen, the outputs are the procurement documents themselves, as depicted below (**Figure 3.2-5**).



Source: Nossaman LLP

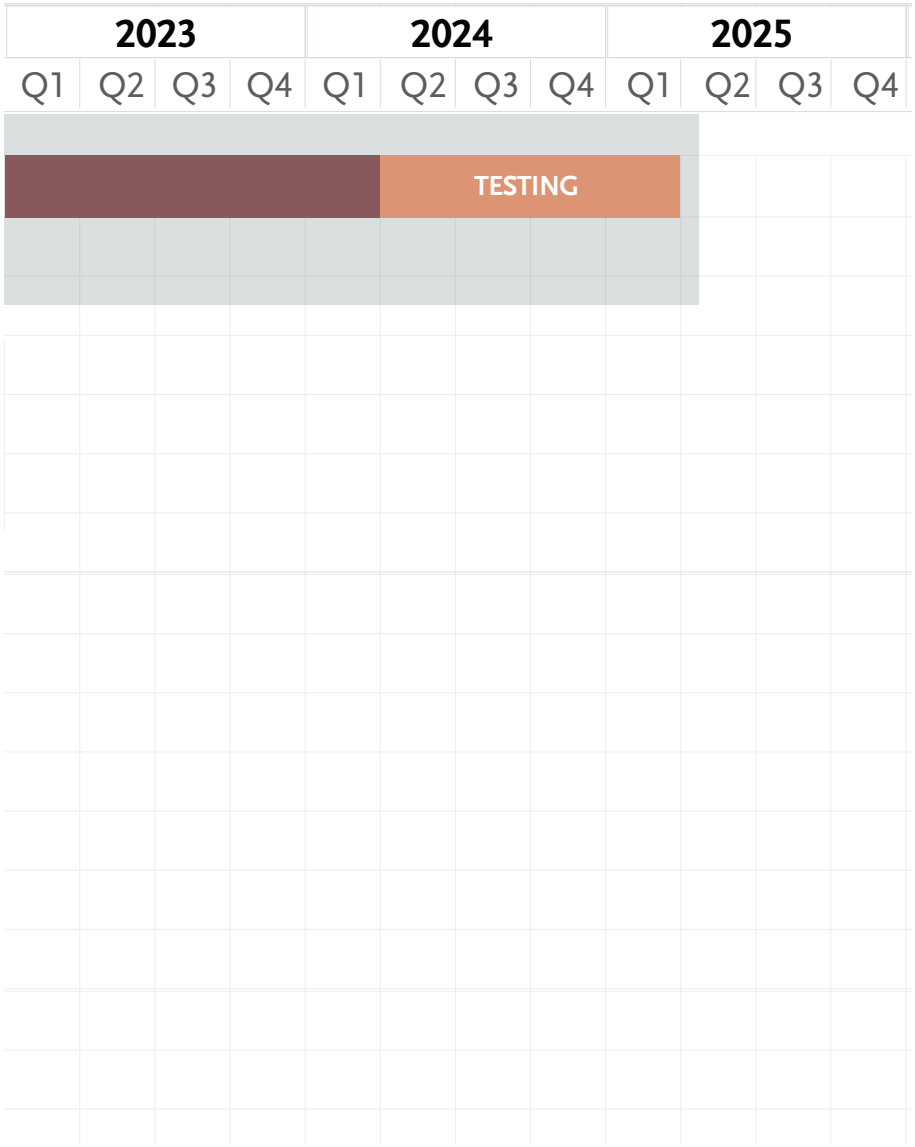
Figure 3.2-5 P3 Delivery Strategy Summary

3.3 Preliminary Project Delivery Schedule



Source: AECOM

Figure 3.3-1 Project Delivery Schedule under Different Methods



Abbreviations:

AA: Alternative Analysis

PE: Preliminary Engineering

LPA: Locally Preferred Alternative

NTP: Notice to Proceed

P3: Public Private Partnership

Notes:

1. PE in support of CEQA/NEPA and DB bridging documents.
2. PE to advance design and in support of CEQA/NEPA.

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PART IV

NEXT STEPS

In order to advance implementation of an independent operability scenario, the City of Inglewood should seek environmental and financial consulting to resolve the following:

A. Environmental Clearance

Potential project(s) will need to be cleared through the California Environmental Quality Act (CEQA) and possibly the National Environmental Protection Act (NEPA) should federal funds be sought.

B. Implementation of Financing District

County of Los Angeles Participation: It will be critical to enter into early discussions with the County of Los Angeles to determine the extent of its willingness to participate in tax increment funding, the retirement of former Redevelopment Agency obligations and to determine how any restrictions (e.g., affordable housing requirements in the EIFD area) may affect the financing plan. All of these recommended steps will be needed to remove the current funding level uncertainties and to move toward formation of a viable and credible Infrastructure Financing Plan, formation of an EIFD and eventual project delivery.

City Budget Analysis: The City will need to analyze its budget requirements to determine the extent to which it can contribute additional stadium project revenue and other City- controlled revenue (e.g., Proposition and Vehicle Tax License tax backfill etc.) to the EIFD. It must also aggressively pursue and establish any federal and state grants, loans and other funding sources at the earliest possible date.

C. Engage Developer

The City will need to consult with the developers of the stadium and surrounding venues and housing need to be initiated to assure coordination of effort and compliance with any potential development requirements. This should also include further in-depth discussion with the potential NBA stadium developer and exploration of the timing and feasibility of EIFD inclusion or some form of adjunct project or EIFD start-up funding.

D. Public & Stakeholder Outreach

Outreach/ workshops with public and private stakeholders should be conducted to build project support and transparency that will carry through to project delivery.

Both the environmental review and the formation of the EIFD will need to take place before the completion of the first phase of the Development to take advantage of any tax increment generated. Therefore, schedule needs to be maintained to assure completion of environmental and the initial steps to EIFD formation are adequately accounted for. This potential connection is not included in Metro's Long Range Transportation Plan and as such, no Metro funding is identified for it, including any entitlement and pre-construction activities.

CITY OF CHAMPIONS/INGLEWOOD (NFL) PROJECT FOCUSED ANALYSIS OF TRANSIT CONNECTION

City of Inglewood, July 2017

APPENDICES

Metro

AECOM

Appendix A: Opportunities and Challenges Memorandum

Appendix B: Station-to-Station Travel Time Worksheets

Appendix C: Station Design and Capacity Methodology

Appendix D: Operating Plan Assumptions & Base Network

Appendix E: Travel Demand Modeling Methodology and Results

Appendix F: Construction Impacts Summary

Appendix G: Existing Utilities in City of Inglewood

Appendix H: Environmental Scan Summary

Appendix I: Traffic Information and Potential Impacts

Appendix J: Cost Estimating Memo

Appendix K: Operating Statistic Worksheets and Assumptions

Appendix L: Engineering Drawings

APPENDIX A

Opportunities and Challenges Memorandum

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1. Introduction

In November 2016, the Los Angeles County Metropolitan Transportation Authority (Metro) in coordination with City of Inglewood (the Project Team) initiated a study of a rail transit connection (Project) from the Crenshaw/LAX line (under construction) to the City of Champions/Inglewood (NFL) Stadium, scheduled to open in 2020, and Hollywood Park (Development). This study is being conducted by Metro for the City of Inglewood. See **Figure 1-1** for the Project Area map.

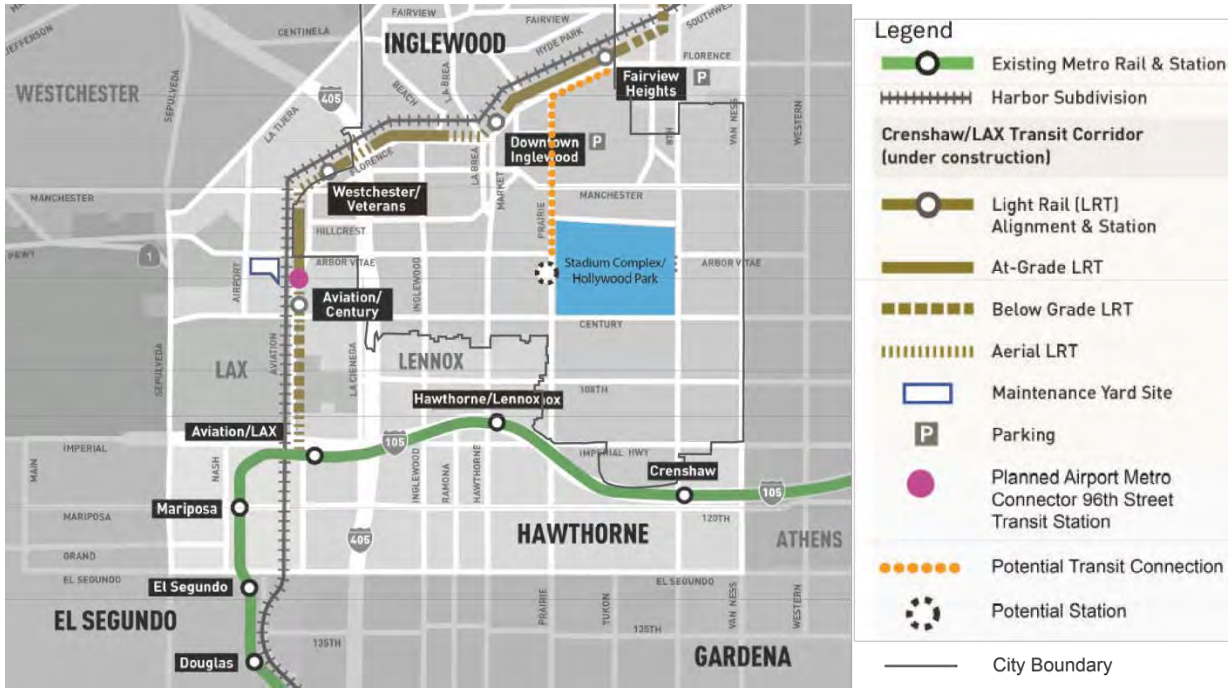


Figure 1-1: Project Area Map

The purpose of this memorandum is to explore the particular opportunities and challenges associated with two operability scenarios:

- Scenario 1: Interlined Operability – an interlined service as part of the Metro light-rail transit (LRT) system
- Scenario 2: Stand-alone/Independent Operability – a service independent of but providing connection to Metro's LRT system.

This study is intended to develop fixed-guideway scenarios connecting to the Metro rail system. Bus, shuttle and vehicular connections to the Development are being studied under a separate traffic management plan being prepared by the City of Inglewood.

1.1 Background

This section describes the study area and Development site, describes the purpose and goals of the Project, summarizes Metro's current transportation service and ridership in the City of Inglewood, and provides a summary of other examples of rail service to NFL stadiums in the United States.

1.2 Study Area and Hollywood Park Development Site

The City of Inglewood is located in the South Bay area of Los Angeles County, east of the Los Angeles International Airport (LAX). The City's population has grown steadily since 2000, and currently has a population of 112,000 within 9.1 square miles. While the median age (33 years) is slightly younger than that of the county (35.1 years), since 2000, the percentage of seniors has grown and the share of adolescents decreased. Based on the 2015 U.S. Census and American Community Survey, Latinos and African-Americans make up nearly 95% of the City's population, a much higher proportion than overall Los Angeles County. Although the number of residents with a high school diploma follows a similar trend to Los Angeles County, the number of residents with a college degree or higher is lower than the overall county average. The median household income is also lower than the county average at $42,044. [1] These characteristics often signify a population that is transit dependent who rely on public transit services for their daily travel needs.

1.2.1 Hollywood Park Development

The 238-acre Hollywood Park Development site is located near the center of the City on the site of a former Hollywood Park Racetrack, Casino and training facility. The Forum entertainment arena and the Inglewood Park Cemetery are located north of the Development, commercial and hospital-medical/residential land uses are located to the west, industrial and commercial spaces to the south, and residential neighborhoods to the east (**Figure 1.2.1-**). The Development is proposed to be mixed-use including an 80,000-seat NFL stadium, a 6,000-seat performance venue, 2,500 residential units, retail, office and hotel, as well as parks and recreational amenities. See **Table 1.2.1-1**, **Figure 1.2.1-**and **Figure 1.2.1-** for more detailed land use information and a preliminary site plan for the Hollywood Park Development.

[1] U.S. Census. City of Inglewood. http://www.census.gov/quickfacts/table/PST045215/0636546

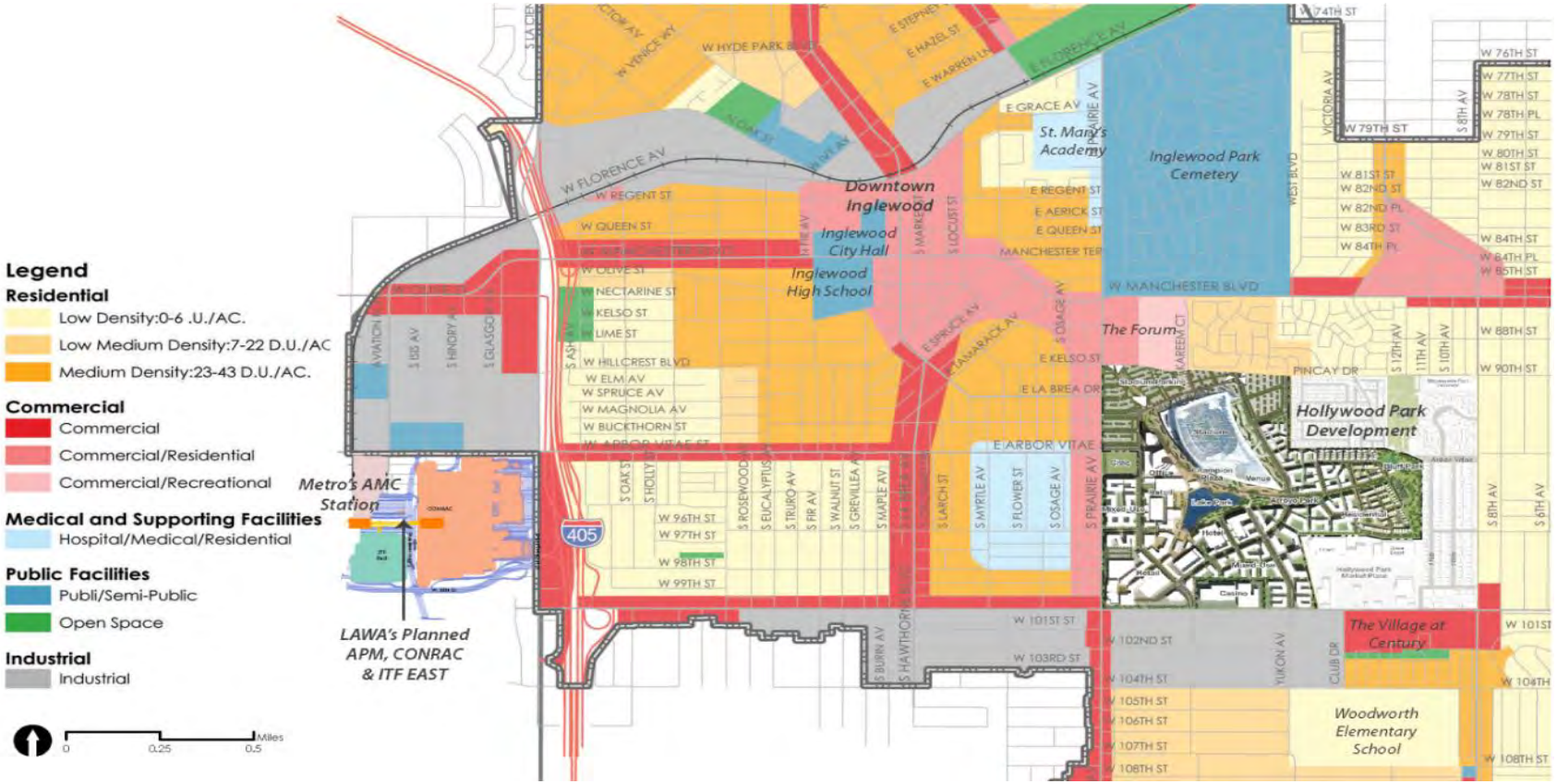


Figure 1.2.1-1: City of Inglewood Land Use Map

Table 1.2.1-1: Hollywood Park Development Land Uses

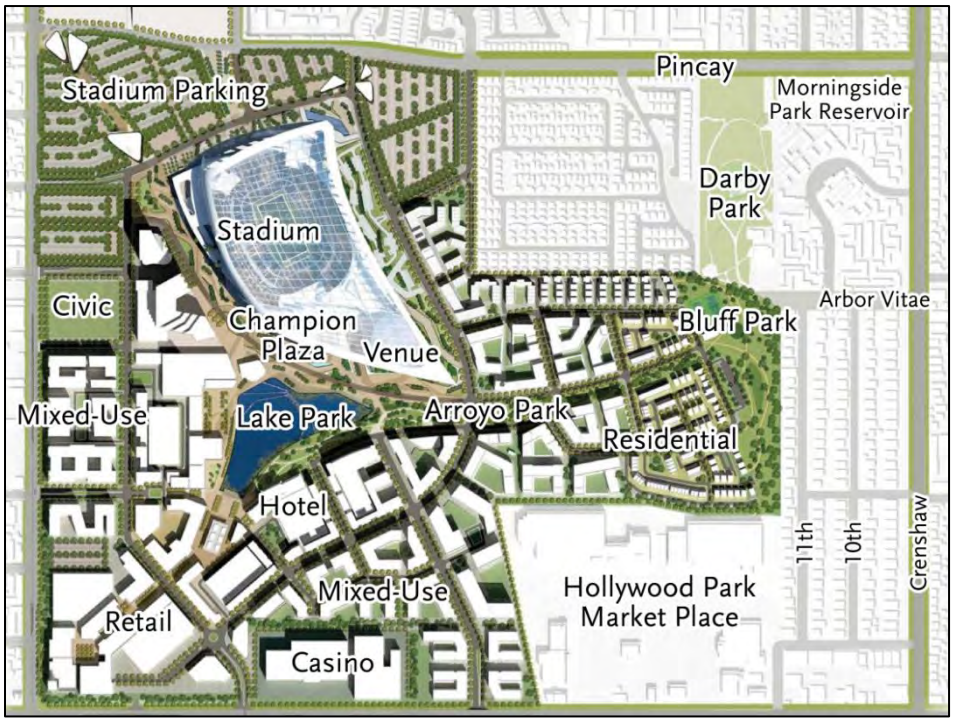
Type of Use	Capacity / Sq. Footage
Stadium	Up to 80,000 seats
Performance Venue	6,000 seats
Residential	2,500 units
Retail	890,000 SF
Office Space	780,000 SF
Hotel	300 rooms
Neighborhood Parks & Recreational Amenities	25 acres

Source: City of Inglewood General Plan Update, 2006



Source: City of Inglewood

Figure 1.2.1-2: Development Site Program



Source: City of Inglewood

Figure 1.2.1-3: Hollywood Park Development Site Plan

1.3 Project Purpose and Goals

1.3.1 Project Purpose

The Stadium and portions of the associated Development is anticipated to open in 2020. The City of Inglewood recognizes that direct transportation access to this new mixed-use and special events complex of this magnitude located within a mile of the Metro rail network is critical and requires special consideration, especially given local and regional goals to increase transportation choice, reduce greenhouse gas emissions, and encourage compact development patterns. The Development, especially during special events, is expected to attract trips from throughout the region, and the City of Inglewood aims to effectively and conveniently serve this demand. Thus, the primary purpose of this project is to serve the Development with a transit service that provides the following:

- **Reliability**: Convenient service with minimum delay, wait, and travel times
- **Connectivity**: Ease of transferring to and from the Metro Rail system
- **Capacity**: The ability to serve 20,000 passengers/hour event travel demand

Secondarily, the Project should be compatible with local and regional plans, and facilitate economic development in surrounding areas of Inglewood.

1.3.2 Project Goals

The goals of the project include:

- Providing a high-capacity, convenient 1-2 mile service to the Development.
    - The service should be high-frequency and relatively high-speed (speed is less critical because the distance is short)
    - The service should have relatively few or a minimal number of station stops
    - The service should be highly reliable (not impacted by externalities like traffic)
    - The guideway should be fully exclusive (no crossings with other modes). This usually requires extensive or full grade-separation
    - The route should connect directly from the development to desired transfer point(s) (such as Downtown Inglewood or the 96th St./ACM stations) with no or minimal intermediate stations
- Encouraging economic development along the transit corridor and supporting economic development in Downtown Inglewood and/or providing an easier connection to the airport (LAX).

1.3.3 Transit Network within the Study Area

Metro Crenshaw/LAX Line

The Crenshaw/LAX transit line, currently under construction, has two stations located in the City of Inglewood – the Downtown Inglewood Station at the intersection of Florence Avenue and La Brea Avenue and the Fairview Heights Station at Florence Avenue and West Boulevard.

Metro Green Line

The Metro Green Line currently terminates at the Redondo Beach Station to the south and Norwalk Station to the east. It provides transfer service to the Blue Line, Silver Line and several Metro bus lines traveling north-south. Metro's Expenditure Plan identifies the extension of the Green Line to Torrance at Crenshaw Boulevard. The project is anticipated to be completed in 2030.

An extension of the Green Line is proposed east to connect to the Norwalk/Santa Fe Springs Metrolink station by the year 2051. There is currently a 2.9-mile gap between the Norwalk Metro Green Line station and the Norwalk/Santa Fe Springs Metrolink Station. This extension would provide access to the Development from the southern portion of the Los Angeles-San Diego rail corridor (LOSSAN) served by both Metrolink and Amtrak.

Local Bus

Buses serving the City of Inglewood include Metro local and Rapid bus services (**Figure 1.3.3-1**). Bus service mainly exists on the major east-west and north-south arterials. Bus routes are located within the study area via Manchester Boulevard, Century Boulevard, La Brea Avenue, and Crenshaw Boulevard and currently provide the most direct service to the Development. (**Table 1.3.3-1**, **Figure 1.3.3-1**, and **Figure 1.3.3-2**).

Table 1.3.3-1: Metro Bus Service in the City of Inglewood

Route #	From / To	To / From	Via	Number of Stops	Daily Route Ridership
40	Downtown Los Angeles	South Bay Galleria	King Blvd. Hawthorne Blvd.	24	17770
102	LAX City Bus Center	South Gate	La Tijera Blvd. Exposition Blvd.	3	2605
110	Playa Vista	Bell Gardens	Jefferson Blvd. Gage Ave.	24	9638
111	LAX	Norwalk Station	Florence Ave.	32	16900
115	Playa Del Rey	Norwalk Station	Manchester Blvd. Firestone Ave.	44	15666
117	City Bus Center	Downey	Century Blvd. Imperial Hwy.	26	8550
120	LAX	Whittwood Town Center	Imperial Hwy.	11	4153
126	Manhattan Beach & Valley Dr.	Hawthorne Station	Manhattan Beach Blvd.	1	208
209	Wilshire Center	Athens	Van Ness Ave.	11	1064
210	Hollywood/Vine Station	South Bay Galleria	Crenshaw Blvd.	24	13210
211	Redondo Beach	Inglewood	Prairie Ave. Inglewood Ave.	45	757
212	Hawthorne/Lennox Station	Hollywood/Vine Red Line Station	La Brea Ave.	42	13531
442	Hawthorne/Lennox Station	Downtown Los Angeles	Manchester Blvd.	20	237
607	Inglewood Transit Center	Inglewood Transit Center	N/A	19	82
710	Wilshire Center	South Bay Galleria	Crenshaw Blvd.	6	7458
740	Jefferson Park	South Bay Galleria	Crenshaw Blvd. Hawthorne Blvd.	9	2790

Source: Metro Service Routes and Metro stop-level and route-level Ridership data in May, 2016

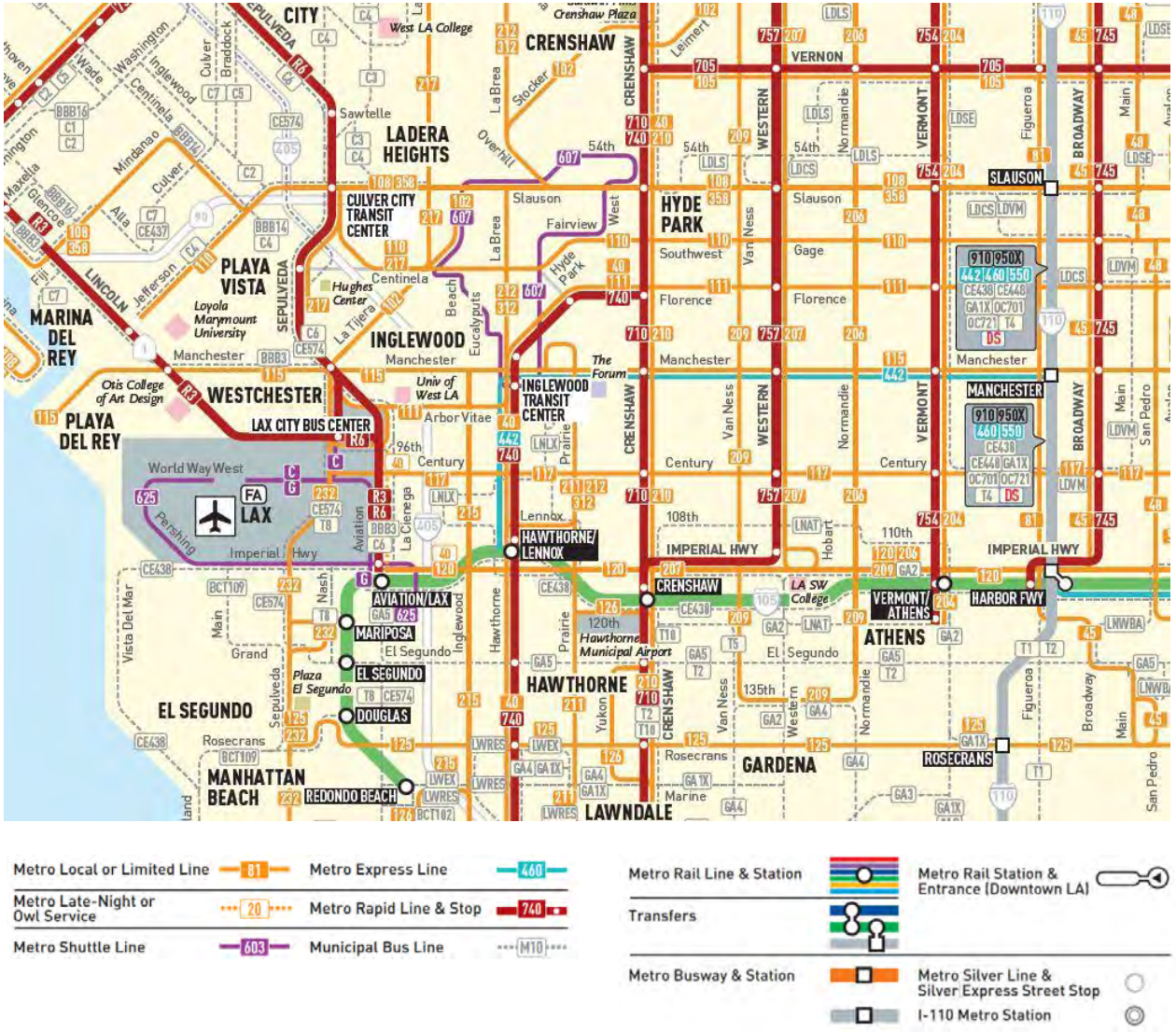
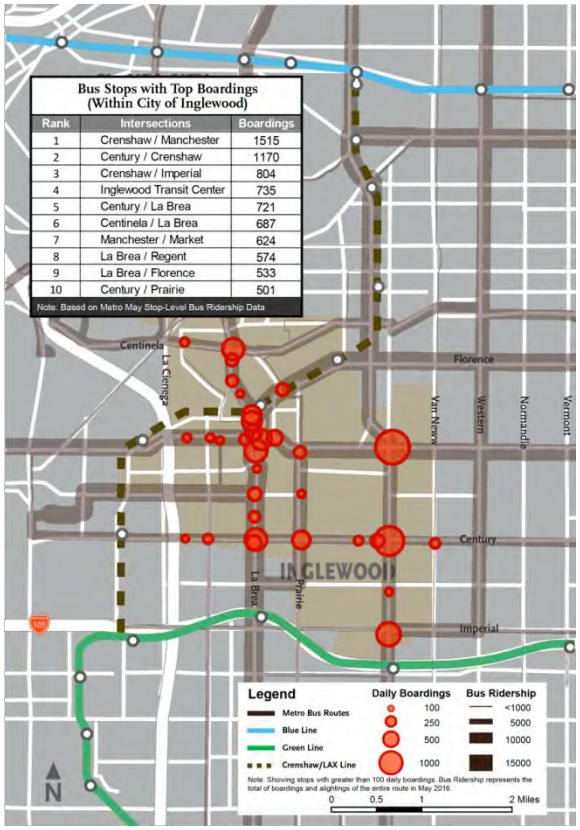


Figure 1.3.3-1: Metro Transportation Network in the City of Inglewood



Source: Metro Service Routes and Metro stop-level and route-level Ridership data in May, 2016

Figure 1.3.3-2: Daily Metro Bus Ridership in the City of Inglewood

1.3.4 2024 Olympics and 2021 Super Bowl

Los Angeles is the United States candidate city for the 2024 or 2028 Olympic Games. As part of the LA Olympic Games proposal concept, the NFL stadium in the City of Inglewood will stage formal events for the Olympic Games including the opening ceremonies and also serve as a venue for competition. The nearby Forum will also serve as a venue. Assuming existing conditions, there is currently no fixed-route system providing direct connections to both the Development and the Forum.

The 2022 NFL championship game or "Super Bowl" is also planned to be held at the stadium located on the Development site. Similar to the concept proposed for the 2024 Olympics Opening Ceremony event as part of the Los Angeles Olympic bid, the Super Bowl will have the maximum number of attendees. These types of maximum attendance events necessitate additional safety and security considerations. The 2016 Super Bowl at Levi's Stadium in the City of Santa Clara prompted closures of key segments of Santa Clara Valley Transportation Authority (VTA) light-rail service due to safety and security requirements (a 500-foot safety perimeter). This study will take into consideration these large events and the necessary safety and security requirements when analyzing possible route options, alternatives and operations to supplement the existing and future transportation network near the Development.

1.3.5 NFL Stadiums

Stadiums that host NFL games and other special events are unique venues. There are 31 other locations nationwide. Each stadium is located in an American city with different weather patterns, population, cultural and socio-demographics and transportation connections.

Information about existing connections to NFL stadiums around the U.S. was collected and summarized in **Table 1.3.5-1**. As shown below, 22 out of the 31 stadiums have rail stations located within a 1-mile radius, with various rail modes ranging from streetcar to commuter rail. In general, transit services that are accessible to major venues experience heavy usage before and after major events.

Note that the proposed stadium is about 8000 feet (approx. 1.5 miles) from the Downtown Inglewood Crenshaw/LAX line, just outside of what is considered "transit accessible", suggesting that the Metro Crenshaw/LAX service by itself will not drive transit mode-share to the site.

Although best practices from other NFL stadiums can be applied to assess the best transportation connection, the analysis performed in this study is specific to this distinct site and sensitive to the surrounding environment.

Table 1.3.5-1: Transit Connections to NFL Stadiums

Stadium	Location	Rail Type	Distance to Station (Feet)	City	Year Stadium Built
M&T Bank Stadium	Urban	Light Rail	150	Baltimore, Maryland	1998
U.S. Bank Stadium	CBD	Light Rail	200	Minneapolis, Minnesota	2016
MetLife Stadium	Suburban	Commuter Rail	200	East Rutherford, New Jersey	2010
Heinz Field	CBD	Light Rail	250	Pittsburgh, Pennsylvania	2001
Qualcomm Stadium	Suburban	Light Rail	250	San Diego, California	1967
Georgia Dome	CBD	Heavy Rail Transit	500	Atlanta, Georgia	1992
FirstEnergy Stadium	CBD	Amtrak	500	Cleveland, Ohio	1999
O.co Coliseum	Urban	Heavy Rail Transit	500	Oakland, California	1966
Levi's Stadium	Urban	Light Rail	600	Santa Clara, California	2014
Lucas Oil Stadium	CBD	Amtrak	1000	Indianapolis, Indiana	2008
Soldier Field	Urban	Heavy Rail Transit	1000	Chicago, Illinois	1924
Mercedes-Benz Superdome	CBD	Streetcar	1200	New Orleans, Louisiana	1975
CenturyLink Field	Urban	Light Rail Transit	1300	Seattle, Washington	2002
Mile High Stadium	Urban	Light Rail Transit	1500	Denver, Colorado	2001
Los Angeles Memorial Coliseum	Urban	Light Rail Transit	1500	Los Angeles, California	1923
Gillette Stadium	Suburban	Commuter Rail	1800	Foxborough, Massachusetts	2002
Bank of America Stadium	CBD	Light Rail	2000	Charlotte, North Carolina	1996
Ford Field	CBD	People Mover	2000	Detroit, Michigan	2002
Reliant Stadium	Suburban	Light Rail	2200	Houston, Texas	2002
LP Field	CBD	Commuter Rail	2500	Nashville, Tennessee	1999
Paul Brown Stadium	CBD	Streetcar	2500	Cincinnati, Ohio	2000
Lincoln Financial Field	Urban	Heavy Rail Transit	2500	Philadelphia, Pennsylvania	2003
Stadiums Not Within Walking Distance To Transit (> 0.5 mile)					
EverBank Field	Urban	People Mover	7000	Jacksonville, Florida	1995
FedExField	Suburban	Heavy Rail Transit	8000	Landover, Maryland	1997
Arrowhead Stadium	Suburban	Amtrak	27500	Kansas City, Missouri	1972
Raymond James Stadium	Suburban	Amtrak	28000	Tampa, Florida	1998
AT&T Stadium	Suburban	Commuter Rail	36400	Arlington, Texas	2009

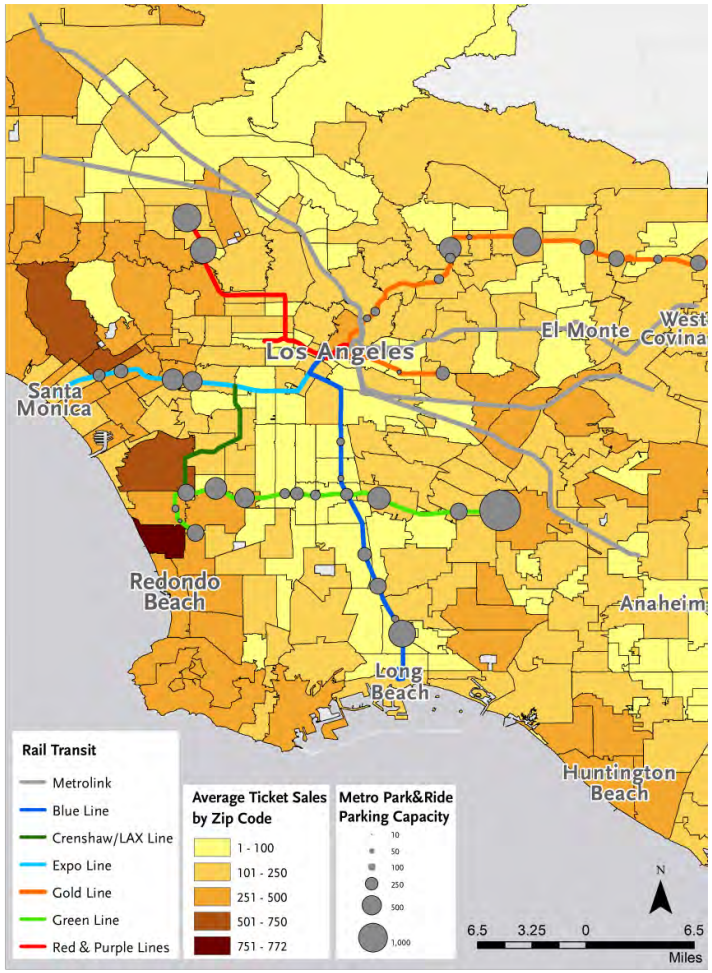
Stadium	Location	Rail Type	Distance to Station (Feet)	City	Year Stadium Built
Sun Life Stadium	Suburban	Commuter Rail	45000	Miami Gardens, Florida	1987
University of Phoenix Stadium	Suburban	Light Rail	52000	Glendale, Arizona	2006
Ralph Wilson Stadium	Suburban	Amtrak	55000	Orchard Park, New York	1973
Lambeau Field	Suburban	N/A	N/A	Green Bay, Wisconsin	1957

2. Travel Demand

2.1 2016 Los Angeles Rams Home Games at the Coliseum

The ticket sales data by zip code for the Rams 2016 NFL season shows high concentrations of ticket sales in western, eastern and southeastern portions of Los Angeles County (**Figure 2.1-1**). This data accounts for season tickets and other Rams box-office sales, but not the re-sale of tickets. These findings do not necessarily indicate the origin trips to the Coliseum or future trips to the Development. Nevertheless, this data is assumed to be a general measure of the geographic distribution of travel demand for Rams home games.

Typically, transit ridership is augmented by supportive land uses such as high density population, job, and other activity centers. The ticket sales data suggests widespread trip "productions" throughout the region. These may be in areas that don't typically produce high levels of transit ridership, but convenient access to parking and services near transit lines may attract ridership to a major regional destination such as the Development, especially on special event days. Availability of parking could be an influential factor in people's willingness to take transit. It is notable that there is significant parking capacity in the Metro-owned Park-and-Ride lots along the Green Line, which suggests that connectivity to the Green Line in particular could drive transit travel demand to the Development from the southeast.



Source: AECOM

Figure 2.1-1: Average Rams Ticket Sales by Zip Code

2.2 Metro TAP Data on Rams Game Days

A comparative analysis of Metro's Transit Access Pass (TAP) card data on game days and non-game (regular) days is discussed below. Considering TAP cards are only utilized when entering or transferring within the Metro system, no data is available for where riders leave the system.

Data was provided by Metro on five game day Sundays (September 18th, October 9th, November 6th, November 20th, and December 11th, 2016), and seven regular Sundays when there were no major events at the Coliseum (September 25th, October 2nd, 16th, 23rd, and 30th, November 13th, and December 4th, 2016). Parallel analysis was done for a pre-game time frame (defined as 11:00 am – 2:00 pm in this analysis) and a post-game period (3:00 pm – 6:00 pm). The mean game day ridership was compared to the mean regular day ridership in the two time frames. Notable increases of greater than 100 passenger boardings and/or transfers are expressed as the "Game Day to Regular Day Ratio". The Game Day Ratio is defined in this study as the mean game day ridership divided by regular day ridership. Significant utilization increases were observed on Metro's rail system at different stations during the pre-game and post-game periods. (**Table 2.2-1, Table 2.2-2, Figure 2.2-2, Figure 2,2-3**). Pre-game "spikes" in ridership again may indicate broad geographic distribution of travel demand to regionally transit-accessible special events. Note that post-game spikes indicate primarily where transfers are being made for return trips, also indicating widespread travel demand across and use of the Metro Rail system.

Table 2.2-1: Pre-Game (11AM – 2PM) Boarding and Transferring Patterns

High Number of Boardings	
Line	**Stations**
Expo Line	7th/Metro, Culver City, Downtown Santa Monica, La Cienega/Jefferson, Pico
Gold Line	Union Station
Red Line	North Hollywood, Union Station, and Universal City
High Number of Transfers	
Expo Line	7th/Metro, Pico
Red Line	Union Station
Green Line	Willowbrook
Low Number of Transfers	
Orange Line	Balboa, Pierce College

Table 2.2-2: Post-Game (11AM – 2PM) Boarding and Transferring Patterns

High Number of Boardings	
Line	**Stations**
Expo Line	7th/Metro, Expo Park/USC, Expo/Vermont, Jefferson/USC
Gold Line	Union Station
Green Line	Harbor Freeway, Willowbrook
High Number of Transfers	
Expo Line	7th/Metro
Gold Line	Union Station
Green Line	Willowbrook
Orange Line	North Hollywood
Low Number of Transfers	
Orange Line	Balboa, Pierce College

Source: Metro

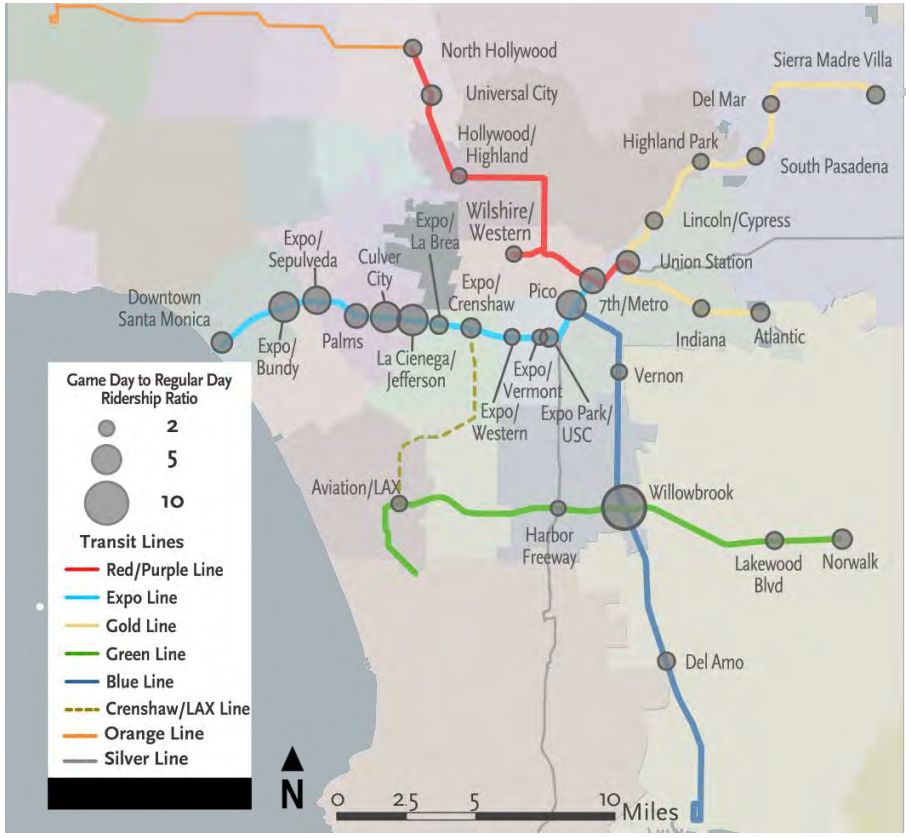


Figure 2.2-2: Pre-Game Metro Rail Utilization Increases (Entry and Transfer)

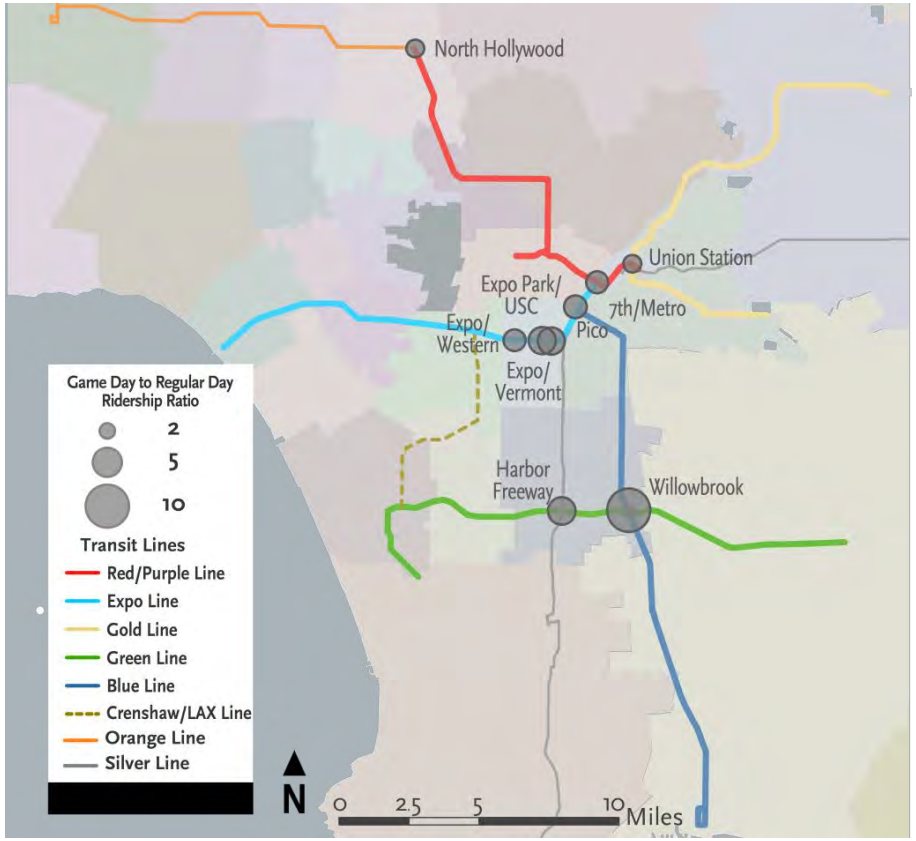


Figure 2-3 Post-Game Metro Rail Utilization Increases (Entry and Transfer)

2.3 Sustainability & Transit Mode-Share

The Coliseum as the Rams' interim home attracted significant transit mode-share on game days, in part due to the Coliseum's location near the existing Metro transit facilities and proximity to downtown Los Angeles. The Metro Expo Line, Silver Line and other connections to downtown provide robust transit accessibility to the Coliseum. Rams games have a high transit ridership mode share of 26%, while other stadiums experience much less. For example, Levi's Stadium in the City of Santa Clara and the home stadium to the 49ers NFL team experiences a 10% transit mode share on game days. By December 2016, Metro operations were able to clear the stations of attendees near the Coliseum in less than 2.5 hours after Rams' games. Metro has since developed a goal to reduce wait times to within 60 minutes following the end of a Rams game to clear all Metro transit stations.[2] (**Table 2.3-1**)

Table 2.3-1: Rams Home Game Day Ridership

Game Date	Rams Vs.	Ridership**	Attendance	%
8/13/2016	Cowboys	10,600	80,000	13.25%
8/20/2016	Chiefs	12, 200	61,000	20.00%
9/18/16	Seahawks	21,000	80,000	26.25%
10/9/2016	Bills	18,000	70,400	25.57%
11/9/2016	Panthers	17,500	76,000	23.03%

** Ridership number includes the Expo and Silver Line stations; does not include local bus service.

The goal of this project is also to encourage a high transit mode-share equal to or higher than the pattern demonstrated at Rams games held at the Coliseum during the 2016 NFL season for NFL games held at the Development site.

[2] 12/09/2016 Meeting minutes.

3. Base Network and Scenario Building

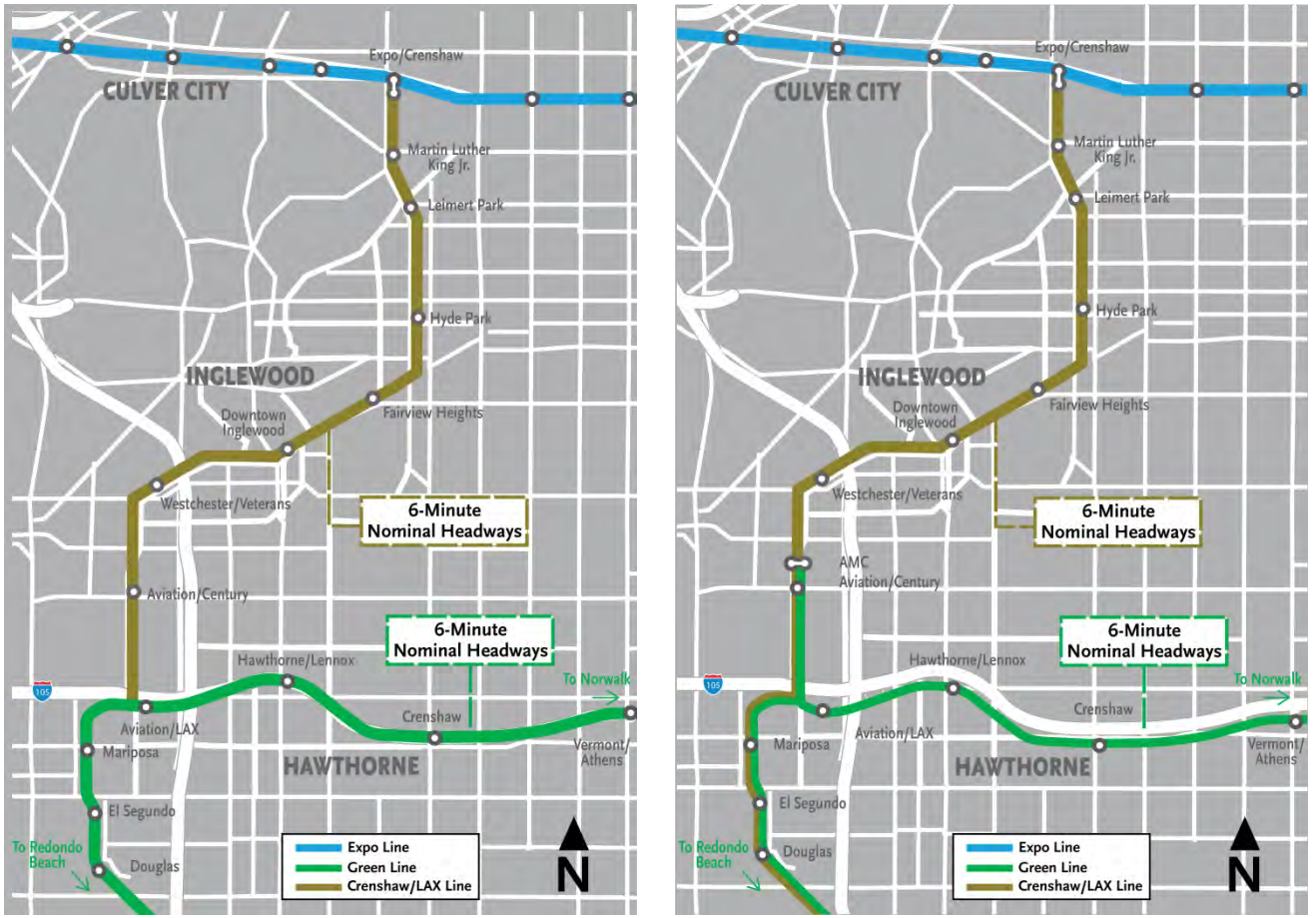


Figure 3-1: Short-Term Metro Base Network

The purpose of this section is to discuss constraints to modification or expansion of service on the Crenshaw/LAX project (currently under construction from the existing Green Line to the Expo Line) in order to serve the Development. This discussion is based on input received from Metro Operations staff at a meeting on December 9th, 2016. The Crenshaw/LAX line is designed to support up to 5-minute minimum headways and upon opening, will operate on 6-minute minimum headways. The existing Green Line is also designed to operate at minimum 5-minute headways (**Figure 3-1**).

For purpose of this study, a "future base", or hypothetical "no-build" network was assumed, with the combined Crenshaw/LAX and existing Green Line considered an independently operating system with three branches terminating at Expo/Crenshaw, Redondo Beach, and Norwalk (**Figure 3-2**). As designed, this system could be operated as three separate services at 10-12 minute headways, for effective branch line headway of 5-6 minutes. This maximizes the service potential for these lines.



Figure 3-2: Future Metro Network

3.1 Universe of Operability Scenarios

Building off of the base network described above, the project team developed a series "operability scenarios" **interlined** with, and **independent** of, the Metro light rail system. Four considerations informed the selection of scenarios for further study:

1. The Development will be a 24-hour regional trip generator and mixed-use activity center. The proposed service must accommodate peak travel demand to and from the Development.
2. The Metro Expo and Silver Lines carried approximately 25% of attendance to Rams games at the Los Angeles Memorial Coliseum. The proposed service must similarly accommodate "crush" event travel demand.
3. Travel demand for special events will from the east and south in addition to the north and west (via the Green Line in addition to the Expo Line). The number of transfers from the region should be minimized.
4. The connection to the Development will occur adjacent to or within a 4-acre site identified by the City of Inglewood on the southeast corner of Arbor Vitae Street and Prairie Avenue.

Based on these considerations, the following scenarios were screened for further study.

3.1.1 Interlined Operability Scenarios

A series of interlined operability scenarios were identified and screened. In order to complete a full set of possible scenarios, options were developed and organized into two sets of categories:

1) Implementation timeline:
   a. **Short term** – minimum investment required to serve Development but often impacts level of service along existing lines
   b. **Upgrades to Crenshaw/LAX** – adds capacity to the Crenshaw/LAX line to serve the Development
   c. **Long Term** – extends the project to connect both north and south
2) Directionality:
   a. **"A" - east-oriented** – interlined via Fairview Heights Station
   b. **"B" - west-oriented** – interlined via Downtown Inglewood Station
   c. "C" - **both east- and west-oriented**

Figure 3.1.1-1 below represents the universe of interlined scenarios considered.

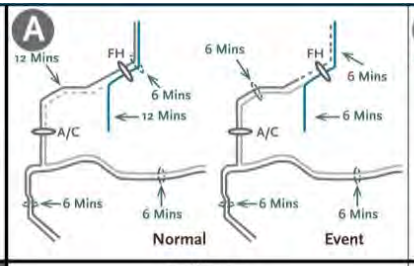
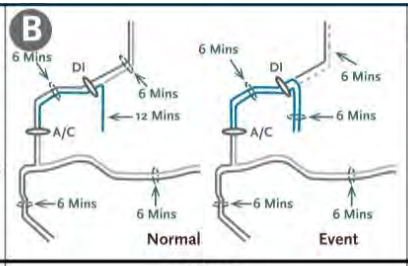
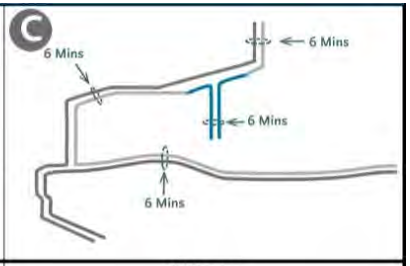
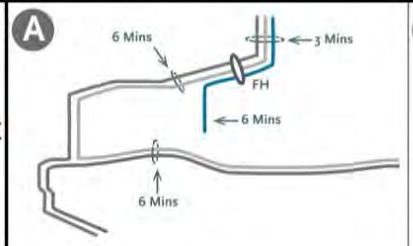
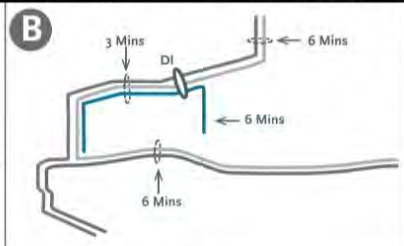
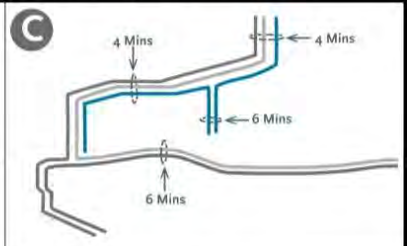
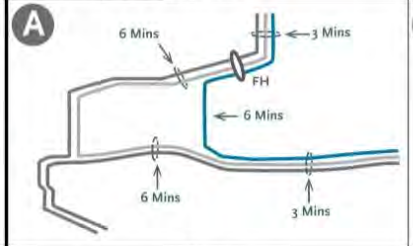
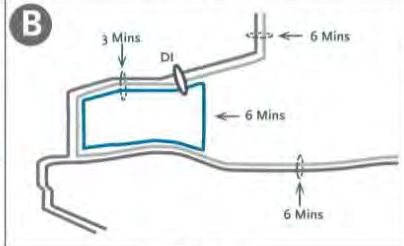
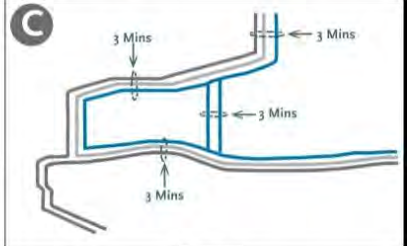
	A	B	C
Short-term			
Normal Headways	12 Minutes	12 Minutes	6 Minutes
Event Headways	6 Minutes	6 Minutes	6 Minutes
Max Train Length	2 - 3 Cars	2 - 3 Cars	2 - 3 Cars
Opportunities & Challenges	- Major cost to upgrade FH Station for turning and terminating - Accommodation for major transfers at FH Station on Game Day	- Major cost to upgrade DI Station for turning and terminating - Accommodation for major transfers at DI Station on Game Day - Integration opportunities with businesses in Inglewood	- Major cost for the 3-way junction at Prairie/Florence - Does not require upgrades to DI or FH Stations
Upgrades to Crenshaw/LAX			
Normal Headways	12 Minutes	12 Minutes	6 Minutes
Event Headways	3 - 6 Minutes	3 - 6 Minutes	3 Minutes
Max Train Length	3 - 5 Cars	3 - 5 Cars	3 - 5 Cars
Opportunities & Challenges	- Upgrades to tunnel & signaling systems and/or platform length on Crenshaw/LAX line north of Fairview Heights Station - Tail tracks required at Expo/Crenshaw	- Upgrades to tunnel & signaling systems and/or platform length on Crenshaw/LAX and Green Line south of DI Station	- Upgrades to tunnel & signaling systems and/or platform length on all lines in this area
Long-term			
Normal Headways	12 Minutes	12 Minutes	6 Minutes
Event Headways	3 - 6 Minutes	3 - 6 Minutes	3 Minutes
Max Train Length	3 - 5 Cars	3 - 5 Cars	3 - 5 Cars
Opportunities & Challenges	- Upgrades to tunnel & signaling systems and/or platform length on both Crenshaw/LAX and Green Line - Tail tracks required at Expo/Crenshaw and Green Line Stations	- Upgrades to tunnel & signaling systems and/or platform length on both Crenshaw/LAX and Green Line	- Upgrades to tunnel & signaling systems and/or platform length on both Crenshaw/LAX and Green Line

Figure 3.1.1-1: Interlined Operability Scenarios

These scenarios were screened, and a service connecting the Development interlined through the Crenshaw/LAX Line via the Fairview Heights Station to the Expo Line ("Upgrades to Crenshaw/LAX 'A'", shown in **Figure 3.1.1-2**) was **recommended for further study** because:

- The scenario represents the City of Inglewood's original request to Metro
- The scenario supports what will likely be significant travel demand from the north and west
- This scenario minimizes impacts to the Crenshaw/LAX line access to LAX.



Figure 3.1.1-2: Interlined Scenario for Further Study: Fairview Heights

3.1.2 Independent Operability Scenarios

A series of independent operability scenarios was also identified (**Figure 3.1.2-1**). Each of these scenarios is assumed to operate a point-to-point "shuttle" type service from the Development to a transfer point on the Crenshaw/LAX Line. Future ("Long Term") connections to the Green Line and Hawthorne were identified but not recommended for further study and are not included in this analysis. These connections can be explored at a later date.

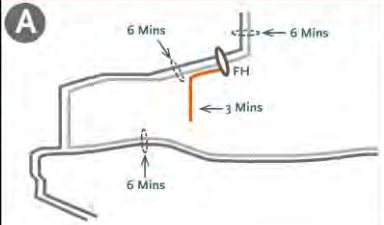
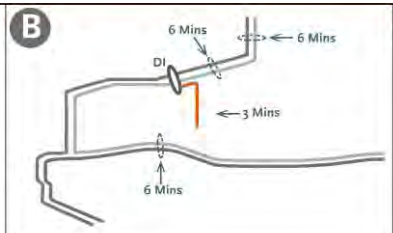
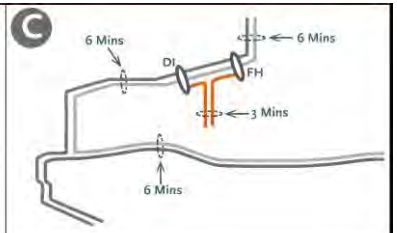
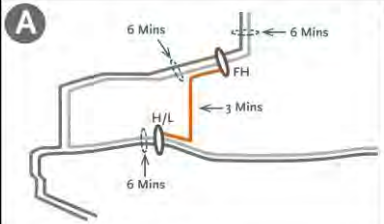
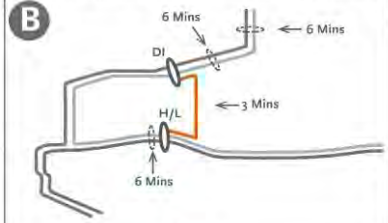
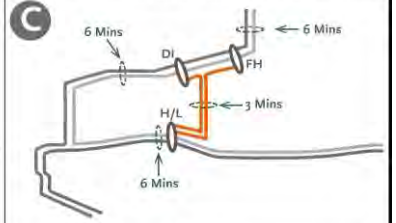
	A	B	C
Short-term			
Normal Headways	6 Minutes	6 Minutes	6 Minutes
Event Headways	3 Minutes	3 Minutes	3 Minutes
Max Train Length	3 - 5 Cars	3 - 5 Cars	3 - 5 Cars
Opportunities & Challenges	- Major cost to upgrade FH Station for turning and terminating - Accommodation for major transfers at FH Station	- Major cost to upgrade DI Station for turning and terminating - Accommodation for major transfers at DI Station - Integration opportunities with businesses in Inglewood	- Major cost for the 3-way junction at Prairie/Florence - Accommodation for transfers at both Stations - Low cost effectiveness due reduced headways at split
Long-term			
Normal Headways	6 Minutes	6 Minutes	6 Minutes
Event Headways	3 Minutes	3 Minutes	3 Minutes
Max Train Length	3 - 5 Cars	3 - 5 Cars	3 - 5 Cars
Opportunities & Challenges	- Major cost to upgrade FH Station for turning and terminating - Accommodation for major transfers at FH Station - Major junction at Green Line and/or stations' expansions	- Major cost to upgrade DI Station for turning and terminating - Accommodation for major transfers at DI Station - Major junction at Green Line and/or stations' expansions	- Major cost for the 3-way junction at Prairie/Florence - Accommodation for major transfers at both Stations - Low cost effectiveness due reduced headways at split

Figure 3.1.2-1: Independent Operability Scenarios

These scenarios were screened and refined, with the following findings:

1) An independent connection to the Fairview Heights station, as originally conceived for this study, is not an ideal location for crush- or peak-load transfers as it does not provide direct access to any activity centers. **Therefore, this scenario will not be recommended for further study.**

2) An independent connection to the Downtown Inglewood station presents an opportunity for integration with local economic activity, transit-oriented development, and other initiatives in the area, and **is recommended for further study.**
3) An independent connection to **the Airport Metro Connector (AMC) 96th Street Transit Station** was added because it presents an opportunity to connect to a significant regional multimodal hub, currently under design, and **is recommended for further study.**

To connect to the Downtown Inglewood Station, a transit service will be evaluated along Prairie and Florence Avenue as well as along Prairie Avenue to Market Street via Manchester Boulevard (**Figure 3.1.2-2** and **Figure 3.1.2-3**).

The proposed transit connection to the AMC 96th Street Transit station will include studying transit service along both Arbor Vitae Street and Century Boulevard (**Figure 3.1.2-4** and **Figure 3.1.2-5**). These concepts will require coordination with Los Angeles World Airports to ensure compatibility with the Los Angeles International Airport's Landside Access Management Plan (LAMP), including a proposed automated people-mover and consolidated rental car facility.



Figure 3.1.2-2: Downtown Inglewood Connection via Prairie/Florence



Figure 3.1.2-3: Downtown Inglewood Connection via Prairie/Manchester/Market



Figure 3.1.2-4: 96th St. / AMC Connection via Arbor Vitae



Figure 3.1.2-5: 96th St. / AMC Connection via Century

The next section describes the opportunities and challenges associated with each of scenarios recommended for further study.

4. Interlined Scenario – Opportunities & Challenges

Table 4-1 below describes the opportunities and challenges associated with the operations, design and implementation for a transit service connecting to the Development interlined through the Crenshaw/LAX Line via the Fairview Heights Station to the Expo Line.

Table 4-1: Interlined Scenario: Opportunities and Challenges

Characteristics	Interlined Scenario	
	Opportunities	Challenges
OPERATIONS		
Station Locations	• Opportunity to activate and revitalize neighborhoods adjacent to Fairview Heights Station where the connector service interlines with the Crenshaw/LAX line • May require less additional first/last mile infrastructure and/or programs relying on the existing first/last mile solutions in place along the Crenshaw/LAX line and Metro system	• Improvements to the Crenshaw/LAX station could require additional resources and have impacts to current under construction design • The Crenshaw/LAX line would require additional major upgrades. • Additional station locations may introduce service disruptions. • Accommodation of additional transfers at Fairview Heights Station
Operational Efficiencies	• Could operate at the minimum 5-6 minute headways on special event days • Increases service along the Crenshaw/LAX line north of Fairview Heights • A direct and seamless connection to Metro Rail system as the connector line is part of the Metro system • An enhanced user experience due to the fact that a forced transfer is not required at the station where the connector merges with the Crenshaw/LAX line • Connecting to the Metro bus system at each station along the Crenshaw/LAX line, rather than connecting to the bus systems at only one transfer location • Transfer opportunities to be spread along the transit line rather than concentrated at one specific location	• Additional operational burdens on the Crenshaw/LAX line including additional vehicles and potentially slower headways to accommodate the additional service especially for special events. • Any service owing to the success of or increased travel demand due to the Development will be at the expense of peak service on the Crenshaw/LAX line • Rail operations at the Expo/Crenshaw Station and the Fairview Heights Station could be impacted by large numbers of transit patrons connecting to Expo and Green Lines • Metro Bus connections would be impacted at the terminus stations of the Crenshaw/LAX line as well as the station where the connector line merges with the Crenshaw/LAX line
Maintenance Facilities	• New maintenance and storage facilities are not required	• Additional burden on the maintenance facilities for the Crenshaw/LAX line including turn-back/terminal operations • The southwest maintenance yard has limited excess capacity to accommodate additional transit projects undergoing planning or design.
DESIGN		

Design & Engineering	• Track, tunnel and signaling improvements for decreased headways • Easier transfers	• Extended underground tail/terminal tracks at Crenshaw/Expo Station • Tunnel ventilation and rail signal impacts • Grade separated junction, transitions, and right-of-way impacts at Prairie/Florence
Station Design for High Capacity	• Quicker and easier transfers within the Metro system. One fare for the entire trip. • Significant increase in transfers due to the through service to and from the Development	• Impacts may occur to the Fairview Heights Station design as it is currently being constructed in order to accommodate the high number of transfers. • Station track layout and other systems must be evaluated if trains are terminating at the Downtown Inglewood or Fairview Heights Stations which currently cannot accommodate the termination or turning/reversing of trains as designed
ROW Identification	• Impacts only at junction along Florence. ROW impacts limited along Prairie since guideway is underground	• Junction requires reconfiguration of Florence Avenue and ROW impact to Edward Vincent Jr. Park
Grade Separation Analysis	• Most of the alignment would be grade separated, underground, not impacting traffic on Prairie Avenue near the development	• Increased train service on the Crenshaw/LAX line will likely require additional grade separation of the line in the Park Mesa Heights area; specifically at Slauson Avenue
Environmental Issues	• Similar environmental impacts to the Crenshaw/LAX line • Fewer environmental impacts due to fewer station locations	• Requires a new environmental document. Would potentially affect sensitive land uses
IMPLEMENTATION		
Financial Feasibility	• Underground: $1.5B - $2B + Upgrades to Crenshaw/LAX • Aerial: $750M - $1B + Upgrades to Crenshaw/LAX • Can utilize both traditional and alternative project delivery mechanisms	• May be more difficult to utilize an EIFD and CBC as the spur would be included in the Metro system and have limited “capture” with fewer stations
Fare Structure	• Fare structure would follow Metro standards and policies	• Fare structure would follow Metro standards and policies
Labor Relations/Labor/Admin	• Required to be under Metro policies and standards already established	
High Level Project Delivery Schedule	• Project delivery could be faster than most Metro LRT projects	• Project delivery could range from 6-9 years • Delivery schedule may be difficult to execute given Metro’s standard policies for construction and project delivery. Shorter delivery time could include minimal environmental documentation and accelerated construction methods

5. Independent Scenarios – Opportunities & Challenges

Table 5-1 below describes the opportunities and challenges associated with the operations, design and implementation for an independent transit service recommended for further study connecting to the Downtown Inglewood Station and the 96th Street/Airport Metro Connector station to the Development.

Table 5-1: Independent Scenario: Opportunities and Challenges

Characteristics	Independent Scenarios	
	Opportunities	Challenges
OPERATIONS		
Station Locations	• Requires two new stations; one at the Development site and an additional station at the interface location with the Metro system • Station locations can serve other areas within the City • Provide opportunities for transit-oriented communities and to generate economic activity	• Station locations can serve other areas within the City • Would require an intermodal transfer and connection from Metro facility to the connector
Operational Efficiencies	• Requires an intermodal transfer facility at the Metro station where the connector meets the Crenshaw/LAX line • Fare could be TAP card enabled to allow easy transfer • Requires easy pedestrian access • Would require significant Metro bus transfer facilities at the station where the connector meets the Crenshaw/LAX line as this would be a concentrated transfer facility • Headways, train size, the line capacity would be flexible to the demands of the development	• May require two different fares for one trip • Would require more frequent trains during events to facilitate smooth transfer and reduce queuing times • All patrons continuing on Metro rail would be forced to transfer and queue at the Crenshaw/LAX station • Significantly impact the Metro station and bus connections where the connector merges with the Crenshaw/LAX line (Fairview Heights or Downtown Inglewood) • Would require concentrated first/last mile solutions at the connector station
Maintenance Facilities	• A streetcar/tram technology may be able to utilize existing Metro maintenance and storage facility	• New vehicle maintenance and storage facility probably required. Locations for maintenance facilities must be identified.
DESIGN		
Design & Engineering	• A transfer station could be located adjacent to the Downtown Inglewood station which generate significant economic development benefit to the City and downtown has the	• Would require new stations that must address high-capacity for queuing, high capacity for transfers, change in fare system and multimodal access to other services

	capacity of accommodating large crowds (transfers and queues)	
Station Design for High Capacity	• Several stations can help to disperse the crush load	• ADA compliance and pedestrian safety a consideration for transfers between modes during crush loads
ROW Identification	• Better compatibility with land uses for the independent scenarios. All routes travel through a dense urban area and are generally grade separated to avoid impacts to ROW	• Potential ROW impacts for aerial structures and at-grade facilities for all independent scenarios • Aerial configurations may have ROW impacts to accommodate the structures
Grade Separation Analysis	• Independent options in general are fully grade-separated/elevated	• May have some impacts as the independent alignments require a transition from at-grade to aerial
Environmental Issues	• May have some environmental impacts, but more economic benefits • May avoid revisions to the footprint of the Crenshaw/LAX project by not impacting any of that project's improvements • Could implement this project following the opening of the Crenshaw/LAX line	• Requires a new environmental document. Would potentially affect sensitive land uses • Potentially more environmental impacts due to more station locations • Implementing this project following the opening of the Crenshaw/LAX line would require a new environmental document
IMPLEMENTATION		
Financial Feasibility	• Cost variability will greatly depend on whether the guideway configuration is below grade or an aerial structure	• Cost variability will greatly depend on whether the guideway configuration is below grade or an aerial structure
Fare Structure	• Opportunity for a private operator that would have a separate fare structure that could result in a revenue stream.	• Private operator and revenue stream would require inter-agency coordination between the Cities of Los Angeles, Inglewood and Metro. • Change in fare system transitioning from Metro paid-fare zone into Project paid-fare zone
Labor Relations/Labor/Admin	• Unique opportunities to establish labor relations	• Delivery schedule may be difficult to execute given Metro's standard policies for construction and project delivery.
High Level Project Delivery Schedule	• APM or Streetcar technology could be delivered faster than LRT (3-6 years) • LRT would have a similar project duration of the interlined (6-9 years)	• Shorter delivery time could include minimal environmental documentation and accelerated construction methods • Potential for an extended environmental review period or unforeseen delays due to litigation or funding appropriation.

APPENDIX B

Station-to-Station Travel Time Worksheets

LOS ANGELES COUNTY METROPOLITAN TRANSIT AUTHORITY

Inglewood Stadium Connector

SUMMARY TABLE - ROUTINE OPERATIONS

(total vehicle requirement based on peak vehicle requirement plus 20% spare ratio)

Independent Scenarios	Via	Mode	Max Spd	Distance	One-Way Time	Two-Way Time	Min. Cycle	Peak Headway	Trainsets	Consists	Peak Cars	Total Cars	Notes
Arbor Vitae (no La Brea station)	Arbor Vitae	APM	60	2.06	2.92	5.84	10	5	2	6	12	15	Standard 20% spare ratio
Arbor Vitae (no La Brea station)	Arbor Vitae	Monorail	50	2.06	3.22	6.44	11	5	3	6	18	22	Standard 20% spare ratio
Arbor Vitae (with La Brea station)	Arbor Vitae	APM	60	2.06	3.78	7.56	12	5	3	6	18	22	Standard 20% spare ratio
Arbor Vitae (with La Brea station)	Arbor Vitae	Monorail	50	2.06	3.97	7.94	12	5	3	6	18	22	Standard 20% spare ratio
Market-Manchester	Market-Manchester	Streetcar	55	1.23	4.97	9.94	14	5	3	3	9	11	Standard 20% spare ratio
Century	Century	APM	60	2.77	6.75	13.5	18	5	4	6	24	29	Standard 20% spare ratio
Century	Century	Monorail	50	2.77	6.83	13.66	18	5	4	6	24	29	Standard 20% spare ratio

Interlined Scenario	Via	Mode	Max Spd	Distance	One-Way Time	Two-Way Time	Min. Cycle	Peak Headway	Trainsets	Consists	Peak Cars	Total Cars	Notes
Fairview Heights Interlined Option	Prairie	LRT	65	5.30	15.03	30.06	39	5	8	3	24	29	Standard 20% spare ratio

LOS ANGELES COUNTY METROPOLITAN TRANSIT AUTHORITY

Inglewood Stadium Connector

SUMMARY TABLE - SPECIAL EVENT OPERATIONS

(total vehicle requirement based on peak vehicle requirement plus 2 additional cars)

Independent Scenarios

Option	Via	Mode	Max Spd	Distance	One-Way Time	Two-Way Time	Min. Cycle	Peak Headway	Trainsets	Consists	Peak Cars	Total Cars	Notes
Special event at 2 minute headways:													
Arbor Vitae (no La Brea station)	Arbor Vitae	APM	60	2.06	2.92	5.84	10	2	5	6	30	32	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (no La Brea station)	Arbor Vitae	Monorail	50	2.06	3.22	6.44	11	2	6	6	36	38	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (with La Brea station)	Arbor Vitae	APM	60	2.06	3.78	7.56	12	2	6	6	36	38	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (with La Brea station)	Arbor Vitae	Monorail	50	2.06	3.97	7.94	12	2	6	6	36	38	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Market-Manchester	Market-Manchester	Streetcar	55	1.23	4.97	9.94	14	2	7	3	21	23	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Century	Century	APM	60	2.77	6.75	13.5	18	2	9	6	54	56	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Century	Century	Monorail	50	2.77	6.83	13.66	18	2	9	6	54	56	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Special event at 2.5 minute headways:													
Arbor Vitae (no La Brea station)	Arbor Vitae	APM	60	2.06	2.92	5.84	10	2.5	4	6	24	26	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (no La Brea station)	Arbor Vitae	Monorail	50	2.06	3.22	6.44	11	2.5	5	6	30	32	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (with La Brea station)	Arbor Vitae	APM	60	2.06	3.78	7.56	12	2.5	5	6	30	32	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (with La Brea station)	Arbor Vitae	Monorail	50	2.06	3.97	7.94	12	2.5	5	6	30	32	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Market-Manchester	Market-Manchester	Streetcar	55	1.23	4.97	9.94	14	2.5	6	3	18	20	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Century	Century	APM	60	2.77	6.75	13.5	18	2.5	8	6	48	50	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Century	Century	Monorail	50	2.77	6.83	13.66	18	2.5	8	6	48	50	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Special event at 3 minute headways:													
Arbor Vitae (no La Brea station)	Arbor Vitae	APM	60	2.06	2.92	5.84	10	3	4	6	24	26	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (no La Brea station)	Arbor Vitae	Monorail	50	2.06	3.22	6.44	11	3	4	6	24	26	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (with La Brea station)	Arbor Vitae	APM	60	2.06	3.78	7.56	12	3	4	6	24	26	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (with La Brea station)	Arbor Vitae	Monorail	50	2.06	3.97	7.94	12	3	4	6	24	26	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Market-Manchester	Market-Manchester	Streetcar	55	1.23	4.97	9.94	14	3	5	3	15	17	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Century	Century	APM	60	2.77	6.75	13.5	18	3	6	6	36	38	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Century	Century	Monorail	50	2.77	6.83	13.66	18	3	6	6	36	38	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Special event at 5 minute headways (same as routine peak):													
Arbor Vitae (no La Brea station)	Arbor Vitae	APM	60	2.06	2.92	5.84	10	5	2	6	12	14	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (no La Brea station)	Arbor Vitae	Monorail	50	2.06	3.22	6.44	11	5	3	6	18	20	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (with La Brea station)	Arbor Vitae	APM	60	2.06	3.78	7.56	12	5	3	6	18	20	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Arbor Vitae (with La Brea station)	Arbor Vitae	Monorail	50	2.06	3.97	7.94	12	5	3	6	18	20	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Market-Manchester	Market-Manchester	Streetcar	55	1.23	4.97	9.94	14	5	3	3	9	11	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Century	Century	APM	60	2.77	6.75	13.5	18	5	4	6	24	26	Total cars = Peak Cars + 2 extra (event service uses all available fleet)
Century	Century	Monorail	50	2.77	6.83	13.66	18	5	4	6	24	26	Total cars = Peak Cars + 2 extra (event service uses all available fleet)

Interlined Scenario

Option	Via	Mode	Max Spd	Distance	One-Way Time	Two-Way Time	Min. Cycle	Peak Headway	Trainsets	Consists	Peak Cars	Total Cars	Notes
Special event at 3.33 minute headways (to maximize extra capacity available from weekend/evening service plan):													
Fairview Heights Interlined Option	Prairie	LRT	65	5.30	15.03	30.06	39	3.33	12	3	36	NA	No additional vehicles needed beyond routine operations since able to use cars from system fleet (assumes event service does not coincide with peak period)
Special event at 5 minute headways (same as routine peak):													
Fairview Heights Interlined Option	Prairie	LRT	65	5.30	15.03	30.06	39	5	8	3	24	29	Standard 20% spare ratio

LOS ANGELES COUNTY METROPOLITAN TRANSIT AUTHORITY
Inglewood Stadium Connector
ALIGNMENT DIAGRAMS

INDEPENDENT SCENARIOS
Arbor Vitae Independent Option (without La Brea station)
Modes: APM, Monorail



Century Independent Option
Modes: APM, Monorail

Arbor Vitae Independent Option (with La Brea Station)
Modes: APM, Monorail



AMC station area plan



The proposed project conceptual site plan showing the APM alignment above the southern portion of the site.



Fairview Heights Interlined Option (based on concept transmitted 4-26-17)
Modes: Streetcar only



INTEGRATED SCENARIO
Fairview Heights Interlined Option (based on concept transmitted 4-26-17)
Modes: LRT only

LOS ANGELES COUNTY METROPOLITAN TRANSIT AUTHORITY

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INDEPENDENT SCENARIO: Arbor Vitae Independent Option (APM, Monorail)

AMC TO STADIUM VIA ARBOR VITAE, NO LA BREA STATION

APM - Maximum speed 60 mph

Sta No.	Station/Intersection	Speed [mph]	ROW Type	Distance Miles	Distance Total	Delay	Time [hh:mm:ss] Run	Time [hh:mm:ss] Dwell	Time [hh:mm:ss] Total
1	AMC				0.00			0:00:00	0:00:00
		60	Aerial	2.06		0:00:00	0:02:35		
2	ARBOR VITAE/STADIUM				2.06			0:00:20	0:02:55
TOTALS				2.06	2.06	0:00:00	0:02:35	0:00:20	0:02:55
						0%	89%	11%	
								Avg. Speed =	42.5

Monorail - Maximum speed 50 mph

Sta No.	Station/Intersection	Speed [mph]	ROW Type	Distance Miles	Distance Total	Delay	Time [hh:mm:ss] Run	Time [hh:mm:ss] Dwell	Time [hh:mm:ss] Total
1	AMC				0.00			0:00:00	0:00:00
		50	Aerial	2.06		0:00:00	0:02:53		
2	ARBOR VITAE/STADIUM				2.06			0:00:20	0:03:13
TOTALS				2.06	2.06	0:00:00	0:02:53	0:00:20	0:03:13
						0%	90%	10%	
								Avg. Speed =	38.5

LOS ANGELES COUNTY METROPOLITAN TRANSIT AUTHORITY

Inglewood Stadium Connector

INDEPENDENT SCENARIO: Arbor Vitae Independent Option (APM, Monorail)

AMC-LA BREA-STADIUM VIA ARBOR VITAE

APM - Maximum speed 60 mph

Sta No.	Station/Intersection	Speed [mph]	ROW Type	Distance Miles	Distance Total	Delay	Time [hh:mm:ss] Run	Time [hh:mm:ss] Dwell	Time [hh:mm:ss] Total
1	AMC				0.00			0:00:00	0:00:00
		60	Aerial	1.48		0:00:00	0:02:00		
2	LA BREA STATION				1.48			0:00:20	0:02:20
		50	Aerial	0.59		0:00:00	0:01:07		
3	ARBOR VITAE/STADIUM				2.06			0:00:20	0:03:47
TOTALS				2.06	2.06	0:00:00	0:03:07	0:00:40	0:03:47
						0%	82%	18%	
								Avg. Speed =	32.7

Monorail - Maximum speed 50 mph

Sta No.	Station/Intersection	Speed [mph]	ROW Type	Distance Miles	Distance Total	Delay	Time [hh:mm:ss] Run	Time [hh:mm:ss] Dwell	Time [hh:mm:ss] Total
1	AMC				0.00			0:00:00	0:00:00
		50	Aerial	1.48		0:00:00	0:02:11		
2	LA BREA STATION				1.48			0:00:20	0:02:31
		50	Aerial	0.59		0:00:00	0:01:07		
3	ARBOR VITAE/STADIUM				2.06			0:00:20	0:03:58
TOTALS				2.06	2.06	0:00:00	0:03:18	0:00:40	0:03:58
						0%	83%	17%	
								Avg. Speed =	31.2

LOS ANGELES COUNTY METROPOLITAN TRANSIT AUTHORITY

Inglewood Stadium Connector

INDEPENDENT SCENARIO: Market-Manchester Independent Option (Streetcar)

MARKET/FLORENCE TO STADIUM VIA DOWNTOWN INGLEWOOD, MANCHESTER, PRAIRIE

Streetcar

Sta		Speed	ROW	Distance			Time [hh:mm:ss]		
No.	Station/Intersection	[mph]	Type	Miles	Total	Delay	Run	Dwell	Total
1	**MARKET ST - NORTH**				**0.00**			0:00:00	**0:00:00**
		20	Ded. at-grade	0.13		0:00:00	0:00:31		
2	**MARKET ST - SOUTH**				**0.13**			0:00:20	**0:00:51**
		20	Ded. at-grade/portal	0.10		0:00:00	0:00:23		
					0.23				0:01:14
	curve (plus descent/ascent)	15	Subway	0.07		0:00:00	0:00:17		
					0.3				0:01:31
	slight curve	40	Portal/aerial	0.23		0:00:00	0:00:34		
3	**MANCHESTER**				**0.53**			0:00:20	**0:02:25**
	slight curve	35	Aerial	0.20		0:00:00	0:00:31		
					0.73				0:02:56
		15	Aerial	0.05		0:00:00	0:00:13		
					0.78				0:03:09
		25	Aerial	0.10		0:00:00	0:00:21		
4	**FORUM**				**0.88**			0:00:20	**0:03:50**
		40	Grade sep	0.35		0:00:00	0:00:48		
5	**ARBOR VITAE/STADIUM**				**1.23**			0:00:20	**0:04:58**
						0%	73%	27%	
								Avg. Speed =	**14.9**

LOS ANGELES COUNTY METROPOLITAN TRANSIT AUTHORITY

Inglewood Stadium Connector

INDEPENDENT SCENARIO: Century Independent Option (APM, Monorail)

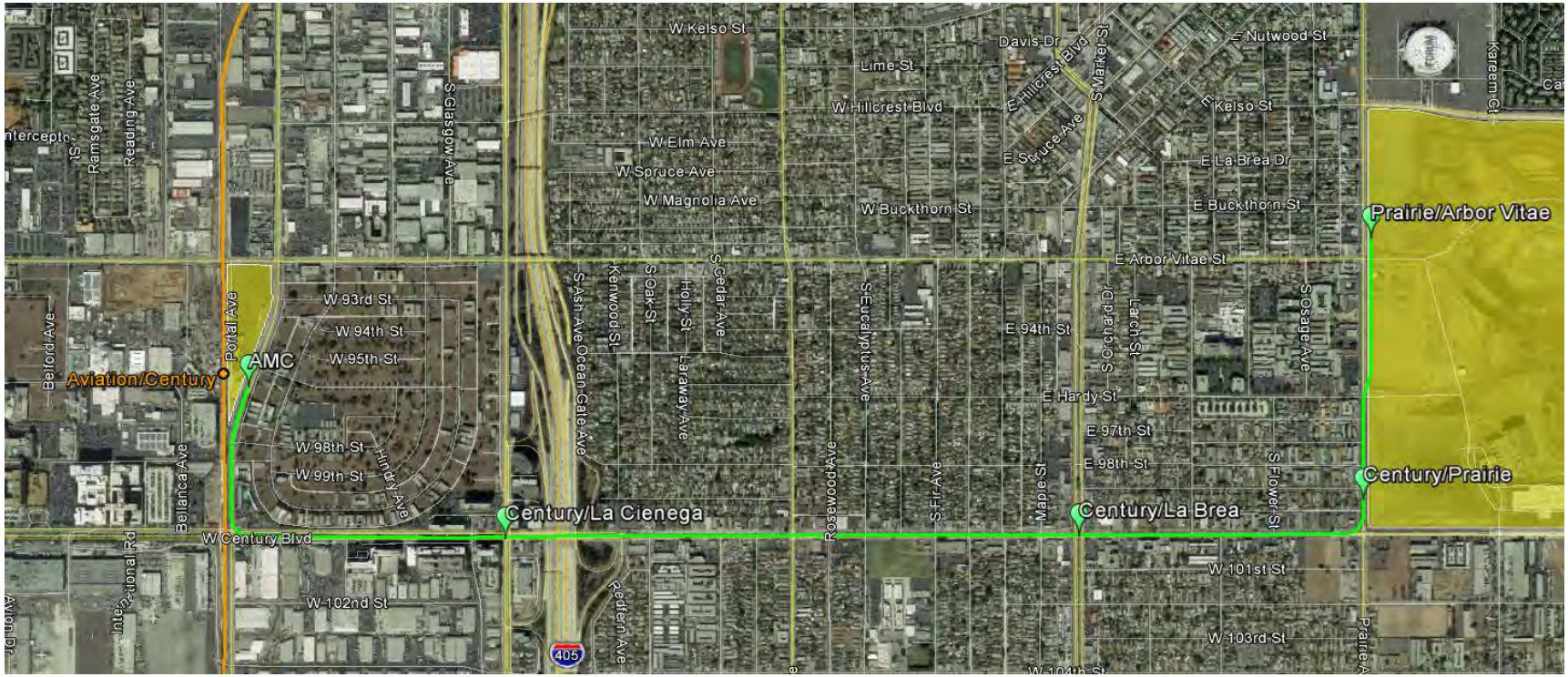
AMC-PRAIRIE/ARBOR VITAE VIA CENTURY AVE

APM - Maximum speed 60 mph

Sta		Speed	ROW	Distance			Time [hh:mm:ss]		
No.	Station/Intersection	[mph]	Type	Miles	Total	Delay	Run	Dwell	Total
1	**AMC**				**0.00**			**0:00:00**	**0:00:00**
		40	Aerial	0.25		0:00:00	0:00:35		
					0.25				0:00:35
	curve	15	Aerial	0.06		0:00:00	0:00:14		
					0.31				0:00:49
		45	Aerial	0.43		0:00:00	0:00:50		
2	**CENTURY/LA CIENEGA**				**0.74**			**0:00:20**	**0:01:59**
		60	Aerial	1.00		0:00:00	0:01:31		
3	**CENTURY/LA BREA**				**1.74**			**0:00:20**	**0:03:50**
		50	Aerial	0.47		0:00:00	0:00:53		
					2.21				0:04:43
	curve	15	Aerial	0.08		0:00:00	0:00:23		
4	**CENTURY/PRAIRIE**				**2.29**			**0:00:20**	**0:05:26**
		50	Aerial	0.48		0:00:00	0:00:59		
5	**PRAIRIE/ARBOR VITAE**				**2.77**			**0:00:20**	**0:06:45**
TOTALS				**2.77**	**2.77**	**0:00:00**	**0:05:25**	**0:01:20**	**0:06:45**
						0%	80%	20%	
								Avg. Speed =	**24.6**

Monorail - Maximum speed 50 mph

Sta		Speed	ROW	Distance			Time [hh:mm:ss]		
No.	Station/Intersection	[mph]	Type	Miles	Total	Delay	Run	Dwell	Total
1	**AMC**				**0.00**			**0:00:00**	**0:00:00**
		40	Aerial	0.25		0:00:00	0:00:35		
	curve				0.25				0:00:35
		15	Aerial	0.06		0:00:00	0:00:14		
					0.31				0:00:49
		45	Aerial	0.43		0:00:00	0:00:50		
2	**CENTURY/LA CIENEGA**				**0.74**			**0:00:20**	**0:01:59**
		50	Aerial	1.00		0:00:00	0:01:36		
3	**CENTURY/LA BREA**				**1.74**			**0:00:20**	**0:03:55**
		50	Aerial	0.47		0:00:00	0:00:53		
					2.21				0:04:48
	curve	15	Aerial	0.08		0:00:00	0:00:23		
4	**CENTURY/PRAIRIE**				**2.29**			**0:00:20**	**0:05:31**
		50	Aerial	0.48		0:00:00	0:00:59		
5	**PRAIRIE/ARBOR VITAE**				**2.77**			**0:00:20**	**0:06:50**
TOTALS				**2.77**	**2.77**	**0:00:00**	**0:05:30**	**0:01:20**	**0:06:50**
						0%	80%	20%	
								Avg. Speed =	**24.3**


W Kelso St
Davis Dr
Nutwood St
Lime St
W Hillcrest Blvd
E Hillcrest Blvd
S Market St
Kareem Ct
Ramsgate Ave
Reading Ave
S Glasgow Ave
W Elm Ave
W Spruce Ave
E Spruce Ave
E Kelso St
W Magnolia Ave
E La Brea Dr
W Buckthorn St
E Buckthorn St
Prairie/Arbor Vitae
E Arbor Vitae St
Belford Ave
Pontlatzin Ave
W 93rd St
W 94th St
W 95th St
AMC
Aviation/Century
S Ash Ave Ocean Gate Ave
Kenwood St
S Oak St
Holly St
S Cedar Ave
Laraway Ave
S Eucalyptus Ave
E 94th St
S Orchard Dr
Larch St
S Osage Ave
E Hardy St
E 97th St
E 98th St
W 98th St
W 99th St
Hindry Ave
Bellanca Ave
Century/La Cienega
Century/La Brea
Century/Prairie
Rosewood Ave
S Fir Ave
Maple St
S Flower St
W Century Blvd
International Rd
W 101st St
W 102nd St
W 103rd St
Redfern Ave
405

LOS ANGELES COUNTY METROPOLITAN TRANSIT AUTHORITY									
Inglewood Stadium Connector									
INTERLINED SCENARIO: Fairview Heights Interlined Option (LRT only)									
CRENSHAW LINE BRANCH AT FAIRVIEW HEIGHTS TO STADIUM VIA PRAIRIE AVE									
LRT - Maximum speed 65 mph									
Sta		**Speed**	**ROW**	**Distance**			**Time [hh:mm:ss]**		
No.	**Station/Intersection**	**[mph]**	**Type**	**Miles**	**Total**	**Delay**	**Run**	**Dwell**	**Total**
	EXPO/CRENSHAW				***0.00***			***0:00:00***	***0:00:00***
				0.8		*0:00:00*	*0:02:40*		
	MLK/CRENSHAW				***0.80***			***0:00:20***	***0:03:00***
				0.6		*0:00:00*	*0:02:40*		
	CRENSHAW/VERNON				***1.40***			***0:00:20***	***0:06:00***
				1.0		*0:00:00*	*0:02:40*		
	SLAUSON/CRENSHAW				***2.40***			***0:00:20***	***0:09:00***
				1.1		*0:00:00*	*0:02:40*		
1	**FAIRVIEW HEIGHTS (West/Florence)**				**3.50**			**0:00:20**	**0:12:00**
		45	Grade sep	0.40		0:00:00	0:00:45		
					3.90				0:12:45
	Track curve	20	Grade sep	0.10		0:00:00	0:00:18		
					4.00				0:13:03
		65	Grade sep	1.30		0:00:00	0:01:39		
2	**ARBOR VITAE/STADIUM**				**5.30**			**0:00:20**	**0:15:02**
TOTALS				**1.80**	**5.30**	**0:00:00**	**0:02:42**	**0:00:40**	**0:15:02**
						0%	18%	4%	
								Avg. Speed =	**21.2**
Note: Expo/Crenshaw to Fairview Heights (West/Florence) runtimes and distances taken from LACMTA Regional Model (as provided by AECOM, 4/24/17).									

APPENDIX C
Station Design Methodology

Design capacity based on occupant load would determine the physical square footage measurements for station areas such as platform, concourse, queuing landings, passageways and stairways.

NFPA 101 and the California Building Code (CBC) define occupant load factor as the number of square feet per person for the use of a space. This method of determining a station's size makes no allowance for actual operating conditions or demand/use fluctuations such as increase loading from event day at the stadium.

To better determine station capacity, the occupant load factor should be analyzed along with the level of service (LOS) or quality of service (QOS) planned for that station. The Transit Capacity and Quality of Service Manual provides a comprehensive definition and ranking of capacity and quality of service for different types of transit. In relation to station design, LOS describes the flow of passengers at stadium platforms and queuing areas. Station elements would be sized to accommodate the LOS desired to minimize disruptions to pedestrian movement onto and off the platform and station areas. As an additional tool, crowd simulation models can be generated to reveal the way people will move through the station as they encounter elements and barriers as well as possible scenarios on special event days where there may be a lack of queuing or waiting on the platform(s). Such dynamic simulations may be used during advanced design to configure platforms, internal spaces, station amenities and evacuation routes.

Additionally, per CBC-2016 section 433 Fixed Guideway Transit Systems, the occupant load for a transit station shall be based on the emergency condition requiring evacuation of that station to a point of safety. The station occupant load shall be the sum of the number of persons in the calculated train load of trains entering a station plus the entraining load of persons awaiting train(s), during a specified time period. Notwithstanding, the minimum occupant load shall not be less than the maximum capacity load of a train which would occupy the entire length of the station platform on a single track. Exiting shall be provided for occupant loads recalculated upon increase in service and/or every five years. This definition of occupant load is similar to that described in NFPA 130.

Based on NFPA 130 and CBC, the train load is the number of passengers on train(s) simultaneously entering the station on all tracks in normal traffic direction during the peak 15-minute period. The maximum train load at each track shall be the maximum passenger capacity for the largest capacity train operating on that track during the peak period.

The entraining load is the number of people waiting on the platform to board the train(s) in a time period equivalent to two headways during the peak 15-minute period, whichever time period is longer. Headway is the time between trains that people would be waiting for the next train. Special consideration shall be given to stations servicing areas such as sports venues where events establish occupant loads that are greater than normal passenger loads. The entraining load for each platform shall be the sum of train loads for each track serving that platform.

As part of the analysis for station capacity, egress capacities of exit devices would be evaluated. Provisions for evacuation of the station occupant load during an emergency shall be from the platform(s) to a point of safety. Exiting requirements for fixed guideway systems shall be per Section 443 of the California Building Code-2016 in conjunction with NFPA 130-2017.

In both codes, evaluation of egress from a transit station is a time-based analysis that simulates movement of passengers through the station. The

flow of egress would be consistent, minimize bottlenecks across the station to egress elements and out of the station area to a designated point of safety established by code and Authority Having Jurisdiction (AHJ). To reach a designated point of safety from underground stations and aerial stations, additional stairs may be required to direct passengers from the platform to guideway to grade. Where the designated point of safety is permitted to be at an acceptable horizontal distance away from the platform(s), accessible walkways on the guideway would be provided. Path of travel on the guideway would clearly demarcated and visible to the train conductor.

To anticipate and eliminate bottlenecks while evacuating station, the following would be considered:

- Occupant loads
- Travel distances (horizontal and vertical)
- Platform exit capacities (clear width of stairs and ramps)
- Egress element capacities (clear width of barriers such as fare gates, emergency exit gates and exit doors to a safe area)

Key provisions of both CBC and NFPA to assess station capacity include the following:

- Provide sufficient exit capacity to evacuate platform occupant load from the platform in 4 minutes or less.
- Provide sufficient exit capacity to permit evacuation from the most remote point on the point on the platform to a point of safety in 6 minutes or less.
- Provide a second means of egress with at least 44" clear width and remote from the major egress routes at each platform.
- The maximum distance to an exit from any point on a platform shall be not more than 300 feet.
- To calculate evacuation time, the walking travel time would be calculated using the longest exit route and travel speeds and cannot be less than zero.
- Exiting requirements shall be provided for occupant loads recalculated upon increase in service and/or every five years.

Further capacity considerations such as queuing dimensions at landings of stairs, elevators and escalators and distances between those devices shall be designed per Metro standards. Fare barriers and gates that will impede the flow of egress shall also be provided per Metro's guidelines. At least one passenger elevator shall be provided to accommodate the loading and transport an ambulance gurney.

At all scenarios where the transit line terminates or transfers at the Development, the immediate area at the point of safety would be sized to accommodate the evacuated occupant load in addition to event day patrons from the stadium who might overlap at that location.

APPENDIX D

Operating Plan Assumptions & Base Network

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1.1 Service Plans for 2023 and 2040 No Build Networks 2
1.2 Metro Major Capital Projects 2
1.3 Background Bus Network in Study Area 3
2. Calculation of Fleet Requirements and Operating Statistics for Operability Scenarios 4

1. Assumptions & Methodology

1.1 Service Plans for 2023 and 2040 No Build Networks

Two planning horizon years are being evaluated for the Project: Year 2023 and Year 2040. The assumed background (No Build) networks are defined as existing plus committed (funded) projects in the region. Committed projects are defined as those identified in the Measure M expenditure plan.

1.2 Metro Major Capital Projects

Table 1.2-1 and **Table 1.2-2** summarize the Year 2023 and Year 2040 No Build (background) transit network. Any bus modifications related to these major projects are also incorporated in the regional model as available from corridor studies. Notably, a number of bus routes are connected to the AMC/96th Street station.

Table 1.2-1: Year 2023 No Build – Major Projects

Line	From	To	Headways (Minutes)		Differences compared to existing network
			Peak	Off-Peak	
Purple	Union Station	Wilshire/La Cienega	6	10	extends to La Cienega, adjusts headways
Red	Union Station	North Hollywood	10	10	adjusts headways
Green - North Pattern	Norwalk	Expo/Crenshaw Sta	10	20	incorporates latest Metro operating concept with Crenshaw Line opening, includes AMC station
Green - South Pattern	Norwalk	El Segundo (Redondo Bch Sta)	10	20	incorporates latest Metro operating concept with Crenshaw Line opening
Crenshaw	Expo/Crenshaw Sta	El Segundo (Redondo Bch Sta)	10	20	incorporates latest Metro operating concept with Crenshaw Line opening, includes AMC station
East-West (currently Expo, Gold)	Santa Monica	East LA (Atlantic)	5	10	realigned per Regional Connector
North-South Long (currently Blue,	Long Beach	Azusa	10	20	realigned per Regional Connector
North-South Short (currently Blue, Gold)	Azusa	Willow St	10	20	realigned per Regional Connector
Orange Long	Chatsworth	North Hollywood	8	20	
Orange Warner-Chats	Warner Center	Chatsworth	15	0	
Orange Warner-NoHo	Warner Center	North Hollywood	8	20	
LAWA Automated People Mover	Airport Metro Connector	LAX terminals	2	2	new
NoHo to Pasadena BRT Connector	North Hollywood Sta	Pasadena	10	12	new

Table 1.2-2: Year 2040 No Build – Major Projects

Line	From	To	Headways (Minutes)		Differences compared to 2023 Network
			Peak	Off-Peak	
Purple	Union Station	VA Hospital	4	7.5	extends to VA Hospital, adjusts headways
Red	Union Station	North Hollywood	10	7.5	adjusts headways
Green - North Pattern	Norwalk	Expo/Crenshaw Sta	10	20	
Green - South Pattern	Norwalk	Torrance	10	20	extends to Torrance
Crenshaw	Expo/Crenshaw Sta	Torrance	10	20	extends to Torrance
East-West SR60 Branch	Santa Monica	SR-60/Peck	10	20	extends from ELA to S. El Monte
East-West Washington Branch	Santa Monica	Washington/Lambert	10	20	extends from ELA to Whittier
North-South Long	Long Beach	Claremont	10	20	extends from Azusa to Claremont
North-South Short	Claremont	Willow St	10	20	extends from Azusa to Claremont
West Santa Ana Branch	Union Station	Cerritos	5	10	assumes both phases can be completed by 2040 due to P3 delivery.
Orange Long	Chatsworth	North Hollywood	8	20	
Orange Warner-Chats	Warner Center	Chatsworth	15	0	
Orange Warner-NoHo	Warner Center	North Hollywood	8	20	
LAWA Automated People Mover	Airport Metro Connector	LAX terminals	2	2	
East SFV/Sepulveda Pass Transit Tunnel	Sylmar/San Fernando Metrolink	Purple Wilshire/Westwood Sta	5	10	combines East SFV/Sepulveda Pass LRT
NoHo to Pasadena BRT Connector	North Hollywood Sta	Pasadena	10	12	
Vermont BRT (replaces 754-Vermont Rapid)	120th Street	Hollywood Blvd	5	10	new (includes associated adjustment to Vermont Local 204 headways at 10 minute peak, 15 minute base)

1.3 Background Bus Network in Study Area

The background bus network in the study area is based on existing bus service, with modifications associated with the opening of the Crenshaw Line and redesign of bus routes to serve the new AMC/96th Street station.

Figure 1.3-1 illustrates existing routes in the study area, whereas **Figure 1.3-2** illustrates the assumed rerouting of selected bus routes once the AMC station is in place.

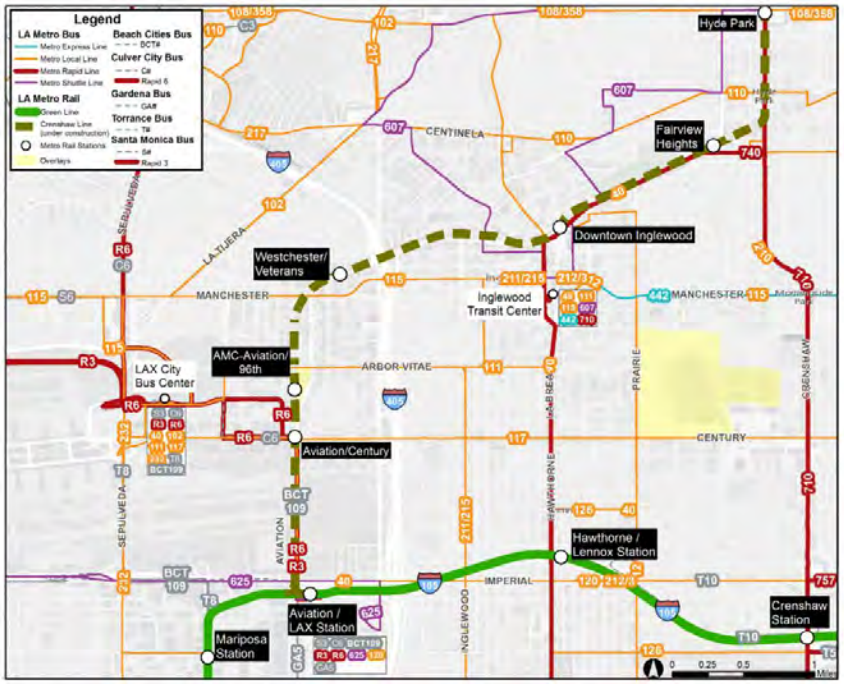


Figure 1.3-1: Existing Bus Routes in Study Area

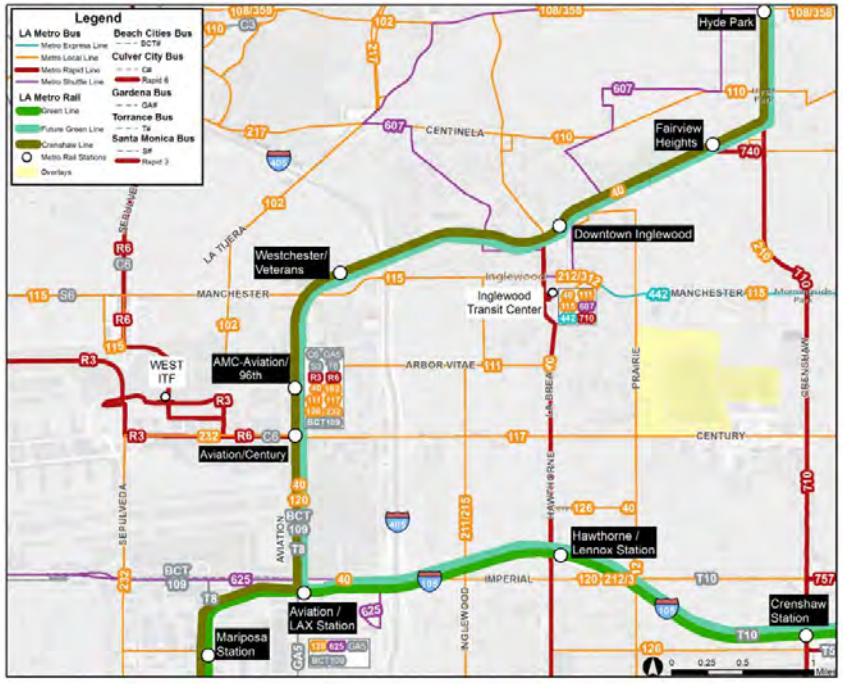


Figure 1.3-2: Future Bus Routing to AMC Station

2. Calculation of Fleet Requirements and Operating Statistics for Operability Scenarios

Once the one-way travel times are calculated, a round trip cycle time was established, which accounts for two-way travel and adequate layover on both ends of the route. Layover requirements were discussed with Metro operations staff. Since the Project operability scenarios are relatively short and may terminate with minimal tail track, leaner layovers (at least on one end) of three to five minutes are acceptable for routine service, and may be reduced even further during event service.

Once the round trip cycle time is established, peak vehicle requirements are calculated. Peak vehicle requirements represent the maximum amount of

vehicles during peak service. Typically a spare ratio of 20 percent is added to the peak fleet. This method is used for fleet calculations for routine service. For event service, it is assumed that all available cars will be put out in service since fleet maintenance can work around event days. Therefore, the total fleet calculation for event service is based on adding two cars to the peak event fleet requirement, to account for a couple of disabled cars. Table 2-1 and Table 2-2 provide calculations of the peak vehicle and total fleet requirements based on routine service and event service.

Table 2-1: Vehicle Requirements for Project Options – Routine Operations

Option	Mode	One-Way Time (min)	Two-Way Time (min)	Cycle Time (min)	Peak Headway	Trainsets	Cars per Train	Peak Cars	Total Fleet
Integrated Scenario									
Fairview Heights	LRT	15.03	30.06	40	5	8	1	8	10
Independent Scenarios									
Arbor Vitae	APM	3.78	7.56	15	5	3	1	3	4
Arbor Vitae	Monorail	3.97	7.94	15	5	3	1	3	4
Century	APM	6.75	13.5	20	5	4	1	4	5
Century	Monorail	6.83	13.66	20	5	4	1	4	5
Market-Manchester	Streetcar	4.97	9.94	20	5	4	1	4	5

Note: Total Fleet based on adding 20% spare ratio.

Table 2-2: Vehicle Requirements for Project Options – Special Event Operations

Option	Mode	One-Way Time (min)	Two-Way Time (min)	Cycle Time (min)	Peak Event Headway	Event Trainsets	Event Cars per Train	Peak Event Cars	Total Event Fleet
Integrated Scenario									
Fairview Heights	LRT	15.03	30.06	35-40	5	8	3	24	26
Independent Scenarios									
Arbor Vitae	APM	3.78	7.56	12-15	2	6	6	36	38
Arbor Vitae	Monorail	3.97	7.94	12-15	2	6	6	36	38
Century	APM	6.75	13.5	18-20	2	9	6	54	56
Century	Monorail	6.83	13.66	18-20	2	9	6	54	56
Market-Manchester	Streetcar	4.97	9.94	16-20	2	8	3	24	26

Note: Total Fleet based on adding two spare cars to event fleet (peak event service uses all available fleet).
Peak Event Cars include vehicles otherwise used for routine service (reports total rather than incremental cars needed).

Provision for effective event service leads to a disparate amount of vehicles required when comparing routine service with event service. The Fairview Heights Interlined Option varies from 10 total vehicles for routine service to 26 vehicles for event service. While in most cases the additional event vehicles could be borrowed from other LRT lines, the worst-case – when the event is a weekday evening and event service coincides with the afternoon

peak – means that there would be no light rail vehicles in other parts of Metro's system that can be freed up for event service.

The independent options have an even greater disparity between routine and event service: for example, the Century option requires a total fleet of five vehicles for routine service, whereas a total fleet of 56 vehicles is required to allow operation of 6-car trains at 2-minute headways for post-event service. **Table 2-3** summarizes key annual operating statistics for each of the project options, based on the service plan assumptions as previously described. Annual event statistics are based on 50 special event days per year.

Table 2-3: Annual Operating Statistics for Project Options

Alternative	Service Type	Revenue Train-Hours	Revenue Car-Miles	Revenue Car-Hours	Peak Cars
Integrated Scenario					
Fairview Heights	Routine	36,350	577,840	36,350	8
Interlined	Event	1,650	143,150	8,550	24
	Total	**38,000**	**720,990**	**44,900**	
Independent Scenarios					
Arbor Vitae	Routine	16,710	236,480	16,710	3
Independent	Event	900	189,150	9,900	36
	Total	**17,610**	**425,630**	**26,610**	
Century	Routine	19,130	317,990	19,130	4
Independent	Event	1,650	254,300	14,400	54
	Total	**20,780**	**572,290**	**33,530**	
Market-Manchester	Routine	19,130	141,210	19,130	4
Independent	Event	1,500	53,100	6,300	24
	Total	**20,630**	**194,310**	**25,430**	
Enhancements to Crenshaw and Green Line Service - Year 2023					
Crenshaw Line	Increment to Routine	1,350	123,100	5,850	13
Green Line North	Increment to Routine	2,250	263,500	9,450	21
	Total	**3,600**	**386,600**	**15,300**	34
Enhancements to Crenshaw and Green Line Service - Year 2040					
Crenshaw Line	Increment to Routine	1,800	171,700	7,650	17
Green Line North	Increment to Routine	2,250	263,500	9,450	21
	Total	**4,050**	**435,200**	**17,100**	38

Note: Event statistics based on additional service associated with 50 event days per year (incremental over routine service).

The resulting annual operating statistics are used as a basis for estimating annual operating and maintenance (O&M) costs, described separately.

APPENDIX E

Travel Demand Modeling Methodology and Results

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1. Travel Demand Methodology

This section provides a summary of the methods used to estimate travel demand for the different Project operability scenarios. Average weekday travel demand and ridership for each option were evaluated using a travel demand modeling process using the latest Los Angeles County Metropolitan Metro model. In addition, a special events model was created to estimate ridership for future NFL games hosted at the stadium in the Development. Service data from the Metro model, observed attendance to 2016 Los Angeles Rams home games held at the Los Angeles Memorial Coliseum, and mode shares from other markets around the country were used to estimate event ridership.

1.1 Metro Model Overview

The Metro Transportation Analysis Model, similar to most transit forecasting models, uses assumptions regarding regional socioeconomic and transportation network characteristics to develop estimates of the amount of travel (i.e., trips) occurring between different locations in the area, the market share of each transportation mode, and the routing of these trips over the highway and transit networks. The results of this process include trips by mode and by facility including usage of individual transit routes or stations (ridership). These procedures also develop estimates of travel time savings and other Transportation System User Benefits.

This process is repeated for every combination of origin and destination location in the metropolitan area. In order to maintain a tractable modeling process, locations in the model are aggregated into a series of Traffic Analysis Zones (TAZs) which are the fundamental geographic unit of analysis for the entire process.

The model, itself, is a conventional four-step model used for transportation analysis throughout the United States. Key steps of the model include:

- **Trip generation.** This step estimates the number of trips produced in and attracted to each TAZ based on zonal socioeconomic variables such as population, households, and employment. The trip generation step estimates the amount of travel beginning and ending in each production (home) and attraction (non-home) TAZ for Home-Based Work, Home- Based University, Home-Based Other, and Non-Home Based trips. Trip generation rates are based on procedures developed by the Southern California Association of Governments (SCAG).
- **Trip distribution**. A computerized network representation of the transportation system is used to estimate the time and cost associated with travel between each pair of zones and these estimates are combined with trip generation results to develop a matrix (known as a "trip table") of travel between each production and each attraction zone in the region. Both the zone-to-zone travel times (known as "skims") and the trip tables are organized as very large matrices that have one row for each production zone and one column for each attraction zone. Each cell in these matrices contains an estimate of the time or number of trips beginning at a given production zone and ending at a given attraction zone. Each skim table or trip table contains over 9 million values representing each combination of production and attraction zone.

- **Mode choice splits**. The total travel between origins and destinations by the type of mode they choose to travel, e.g., Drive Alone, Shared Ride, Walk to Transit, Drive to Transit etc. The share for each mode is determined by the travel characteristics of competing highway and transit services, socio-economic characteristics of the production and attraction locations, and parameters that define the relative importance of each factor.
- **Transit Assignment**. The transit trips resulting from the mode choice step are loaded onto the transit network using TRANPLAN "Load Transit Network" module. The assignment step chooses the transit service for each origin-destination pair based on available services and their service characteristics.

1.2 Hollywood Park Development

Current Southern California Association of Governments (SCAG) forecasts do not fully incorporate the Hollywood Park Development (Development) in the City of Inglewood into their model projections. Since the new development plan is not in current model projections, TAZ 936 was updated to reflect the development. The stadium is located within the Development. The Development includes several components including additional residential units, hotel rooms, additional neighborhood parks and amenities, office space, retail space, as well as the stadium and a performance venue. **Table 1.2-1** shows the new land use information for the Development based on the site plan provided by City of Inglewood (February 2017) and the Institute of Transportation Engineers (ITE) estimates for trip generation for each.

Table 1.2-1: Hollywood Park Development Land Use and ITE Trip Generation

Land Use information	ITE Trip Generation Category	Range of Trip Generation Rates	Average Trip Generation Rate	Average Trips Generated
2,500 residential units	High Rise Apt	3-6.45 trips/dwelling unit	4.2 Avg trips/dwelling unit	10,500
300 room hotel	Hotel	4.14-17.44 trips/occupied room	8.92 avg trips/occupied room	2,676
25 Acres neighborhood parks and amenities	City Park	1.04-8 trips/acre	1.59 avg trips/acre	40
780,000 Sq Ft Office Space	General Office Building	3.58-28.8 trips/1000 sq. feet gross floor area	11.01 avg trips/1000 sq. feet gross floor area	8,588
890,000 Sq Ft Retail Space	Shopping Center	12.5-270.89 trips/1000 sq. feet gross Leasable Area	42.94 avg trips/ 1000 sq. feet gross leasable area	38,217
New stadium – 80,000 seats	N/A			
Performance Venue – 6,000 seats	N/A			

Figure 1.2-1 displays the area covered by the Hollywood Park Development as well as the rest of the TAZ which contains it. As the development only covers 50% of TAZ 936, the SCAG forecasts for the rest of the zone were kept in addition to the ITE estimates. **Table 1.2-2** shows the updated 2040 production and attraction estimates for the zone using 2012 trips as a base, adds the ITE trip generation estimates for the Development, and takes 50% of the 2040 SCAG forecasted growth to account for the rest of the zone. This results in a 3% increase in productions and 116% increase in attractions relative to the initial SCAG 2040 forecasts.

Figure 1.2-1: Hollywood Park Development and TAZ 936



Table 1.2-2 – Updated Hollywood Park Development Zone Productions and Attractions

	2012	SCAG Forecasted 2040	SCAG Growth 2012 to 2040	ITE Trip Generation[1]	2040'= 2012 + ITE Trip Generation[2]
Productions	19,437	38,291	18,854	10,500	39,277
Attractions	30,280	39,025	8,745	49,520	84,132
Intrazonal	1,208	2,777	1,569	-	1,985
Total Trips	48,509	74,539	26,030	60,020	121,424

[1] Trips from Residential units counted as productions, Trips from Hotel, Parks, Retail, and Office Space Counted as Attractions
[2] 2040' trips calculated by adding to 2012 trips the ITE Trip Generation trips from the Hollywood Park Development and the growth in trips between 2012 and 2040 multiplied by the proportion of TAZ not containing the Hollywood Park Development

1.3 Events-Based Model

The Metro Transportation Model was used in order to evaluate the average weekday ridership on the project. Also, an additional spreadsheet model was developed in order to assess demand for large events such as NFL football games at the stadium. This model was developed using service data from the Metro Model to establish transit accessibility. Data containing ZIP code information of home game ticket sales for the 2016 Los Angeles Rams season were used to establish the locations and where the greatest numbers of attendees were traveling from. Assumptions for a baseline mode share for eligible attendees were developed based on other NFL stadiums observed data. Also, the LAX Landside Access Modernization Program (LAMP) remote parking was included as possible park-and-ride spaces for scenarios that accessed the AMC station.

In order to determine potential market (game attendees) for the proposed stadium connector, an evaluation of transit accessibility to the stadium was completed. Off-peak level of service data (skims) for the best transit path from the forecast year (2040) Metro Model were exported from each zone to the Development/Stadium zone. These skims include attributes such as total time in vehicle, wait time, access time, and number of transfers to get from each zone to the destination zone. For this analysis, it was assumed that attendees would walk to access transit to reach the stadium if it required two or fewer transfers, or drive to access transit if one or fewer transfers were required. Transfers were used as the main measure of accessibility due to the convenience and reliability fewer transfers to arrive at the stadium provides. With a large number of transfers, there is a greater probability that a connection will be missed. Increase in transfers also increases 'Out-of-vehicle' time which is treated more onerous than in-vehicle time in the model.

After the zone level transit accessibility was established, a zone to ZIP code equivalency was made in order to determine if the game attendance at the ZIP code level had transit access to the stadium. For this analysis, a ZIP code has transit access if at least one zone within it has transit access. Using this assumption, the numbers of attendees with transit walk access, transit drive access, and transit walk or drive access are determined for each scenario.

A baseline for transit mode share was established using other NFL stadium experiences from other cities, considering regional differences. **Table 1.3- 1** shows the transit mode shares for the Minneapolis Vikings 2016 season and San Diego Chargers NFL seasons from 1997-2014. The Minneapolis stadium is located in downtown Minneapolis with the cities two regional LRTs stopping at the stadium providing access from the Twin City of St. Paul and regional Minneapolis. The San Diego Qualcomm Stadium is located outside of Downtown San Diego, northwest of the Interstate 8 and Interstate 15 interchange in the Mission Valley neighborhood. Before 2005 the stadium was serviced by Mission Valley West LRT line providing access from Downtown San Diego to Qualcomm Stadium. The Green Line opened in 2005 providing access to the east with an additional 5.9 mile Mission Valley East extension, which increased the transit share. For this project a baseline of 15-25% mode share for attendees with transit access was assumed, as the Crenshaw Line does not provide direct access to downtown Los Angeles. The low end estimate reflects the lack of one seat rides to the stadium with a forced transfer required at either AMC or Downtown Inglewood for the independent options and the interline option requiring a transfer from most other regional transit if not boarding along the Crenshaw Line. The high end mode share reflects additional factors such as limited parking at the stadium and Hollywood Park development, multimodal and off-site parking options are greater around project stations away from the stadium, and total transit mode shares experienced in 2016 for Rams games played at the Coliseum were between 20% and 25%. The high end estimate also assumes attendees would find the new service as convenient as current Expo Line service to the Coliseum.

Table 1.3-1: Transit Mode Share to NFL Games

Other Cities Transit Mode Share to NFL Games	
Minneapolis[1]	37-44%
San Diego with Mission Valley West only (1997-2004)[2]	14-19%
San Diego with Mission Valley East (2005-2014)[2]	22-25%

[1]Based on 2016 Vikings Game Attendance from August - November
[2]Based on yearly average Chargers Game Attendance from 1997-2014

After the transit accessibility and mode shares are established, an estimated gameday ridership was forecasted. Ridership is projected for a high and low estimate of game attendance. The high estimate of 100,000 average attendance was used as well as a low estimate of 61,000. Using the percentage of game attendance with transit access, the low baseline mode share of 15% applied to the low estimate of game attendance, a low estimate of gameday ridership is forecast, similarly done with high baseline mode share of 25% applied to the high estimate of game attendance for a high estimate of gameday ridership.

For scenarios in which the project connects to the Los Angeles International Airport Automated People Mover (AMC), Landside Access Modernization Program (LAMP) remote parking that could be utilized for attendees was also taken into consideration. With the fully completed parking garages at Intermodal Transportation Facilities (ITF) East and ITF West there are projected to be 15,800 parking stalls near the AMC station with a portion of which may be utilized as remote parking for events. For the model a low estimate of 20% and high estimate of 60% could be used for gameday events which would be added to the rail attendance number calculated in the previous section of the model.

Finally, a rough estimate of Chargers game ridership was performed by estimating it as a percentage of the Rams game ridership. As there is limited data available as to what Chargers game attendance will be and where ticket holders will come from, a conservative estimate is that Chargers games will generate 75% of the ridership that the Rams games generate.

2. Travel Demand Results

Table 2-1: Year 2023 Line Level Ridership

Line	2023 Headway		2023 No Build			2023 Fairview Heights Interlined Option		
	Peak	Off-Peak	Peak	Off-Peak	Total	Peak	Off-Peak	Total
805-Purple Line	6	10.0	48,202	15,271	63,473	48,209	15,258	63,467
802-Red Line	10	10.0	41,207	26,195	67,402	41,256	26,212	67,468
803-Green LAX	10	20	26,845	11,208	38,053	25,304	10,597	35,901
803-Green Torrance	10	20	14,883	5,918	20,801	14,682	5,826	20,508
807-Crenshaw Torrance	10	20	6,404	2,897	9,301	5,164	2,457	7,621
809-East-West SR60 Br	5	10	95,692	48,634	144,326	96,325	49,034	145,359
809-East-West Wash Br	-	-	-	-	-	-	-	-
810-North-South NB	10	20	45,754	20,613	66,367	45,709	20,593	66,302
810-North-South SB	10	20	33,515	16,315	49,830	33,505	16,309	49,814
810-North-South SL	10	20	64,010	30,929	94,939	63,956	30,874	94,830
812-PEROW LA Cerritos (West Santa Ana Branch Phase 1)	-	-	-	-	-	-	-	-
Orange Line	8	20	72,702	44,504	117,206	72,718	44,518	117,236
LAWA Automated People Mover	2	2	2,573	1,386	3,959	2,556	1,367	3,923
East SFV/Sepulveda Pass Transit Tunnel	-	-	-	-	-	-	-	-
Vermont BRT (replaces 754-Vermont Rapid)	-	-	-	-	-	-	-	-
204-Vermont Local	-	-	-	-	-	-	-	-
Inglewood NFL Connection (Fairview Heights Interlined Option)	**5**	**10**	-	-	-	**4,453**	**2,033**	**6,486**
Inglewood NFL Connection (Market-Manchester Independent Option)	**5**	**10**	-	-	-	-	-	-
Inglewood NFL Connection (Arbor Vitae Independent Option)	**5**	**10**	-	-	-	-	-	-
Inglewood NFL Connection (Century Independent Option)	**5**	**10**	-	-	-	-	-	-
Total			451,787	223,870	675,657	453,837	225,078	678,915

Table 2-1 (Cont'd): Year 2023 Line Level Ridership

	2023 Market-Manchester Independent Option (Streetcar)			2023 Arbor Vitae Independent Option (APM)			2023 Arbor Vitae Independent Option (Monorail)		
Line	Peak	Off-Peak	Total	Peak	Off-Peak	Total	Peak	Off-Peak	Total
805-Purple Line	48,190	15,261	63,451	48,193	15,270	63,463	48,197	15,270	63,467
802-Red Line	41,199	26,181	67,380	41,203	26,185	67,388	41,204	26,182	67,386
803-Green LAX	27,018	11,320	38,338	27,004	11,233	38,237	27,000	11,229	38,229
803-Green Torrance	14,746	5,939	20,685	14,761	5,872	20,633	14,765	5,874	20,639
807-Crenshaw Torrance	6,318	2,879	9,197	6,464	2,942	9,406	6,464	2,945	9,409
809-East-West SR60 Br	95,772	48,675	144,447	95,677	48,650	144,327	95,686	48,649	144,335
809-East-West Wash Br	-	-	-	-	-	-	-	-	-
810-North-South NB	45,731	20,628	66,359	45,749	20,617	66,366	45,750	20,619	66,369
810-North-South SB	33,520	16,319	49,839	33,540	16,322	49,862	33,539	16,324	49,863
810-North-South SL	63,983	30,937	94,920	64,006	30,911	94,917	64,008	30,911	94,919
812-PEROW LA Cerritos (West Santa Ana Branch Phase 1)	-	-	-	-	-	-	-	-	-
Orange Line	72,696	44,505	117,201	72,702	44,504	117,206	72,701	44,505	117,206
LAWA Automated People Mover	2,503	1,327	3,830	2,604	1,381	3,985	2,597	1,383	3,980
East SFV/Sepulveda Pass Transit Tunnel	-	-	-	-	-	-	-	-	-
Vermont BRT (replaces 754-Vermont Rapid)	-	-	-	-	-	-	-	-	-
204-Vermont Local	-	-	-	-	-	-	-	-	-
Inglewood NFL Connection (Fairview Heights Interlined Option)	-	-	-	-	-	-	-	-	-
Inglewood NFL Connection (Market-Manchester Independent Option)	2,005	647	2,652	-	-	-	-	-	-
Inglewood NFL Connection (Arbor Vitae Independent Option)	-	-	-	643	246	889	635	242	877
Inglewood NFL Connection (Century Independent Option)	-	-	-	-	-	-	-	-	-
Total	453,681	224,618	678,299	452,546	224,133	676,679	452,546	224,133	676,679

Table 2-1 (Cont'd): Year 2023 Line Level Ridership

Line	2023 Arbor Vitae Independent Option (APM) (with La Brea)			2023 Arbor Vitae Independent Option (Monorail) (with La Brea)			2023 Century Independent Option (APM)		
	Peak	Off-Peak	Total	Peak	Off-Peak	Total	Peak	Off-Peak	Total
805-Purple Line	48,218	15,274	63,492	48,218	15,272	63,490	48,200	15,271	63,471
802-Red Line	41,218	26,185	67,403	41,219	26,187	67,406	41,201	26,176	67,377
803-Green LAX	27,144	11,221	38,365	27,151	11,223	38,374	26,863	11,114	37,977
803-Green Torrance	14,762	5,914	20,676	14,761	5,913	20,674	14,716	5,921	20,637
807-Crenshaw Torrance	6,439	2,884	9,323	6,438	2,882	9,320	6,199	2,777	8,976
809-East-West SR60 Br	95,856	48,689	144,545	95,856	48,688	144,544	95,743	48,614	144,357
809-East-West Wash Br	-	-	-	-	-	-	-	-	-
810-North-South NB	45,749	20,628	66,377	45,747	20,630	66,377	45,747	20,646	66,393
810-North-South SB	33,526	16,328	49,854	33,528	16,328	49,856	33,510	16,318	49,828
810-North-South SL	64,004	30,922	94,926	64,004	30,917	94,921	64,004	30,928	94,932
812-PEROW LA Cerritos (West Santa Ana Branch Phase 1)	-	-	-	-	-	-	-	-	-
Orange Line	72,699	44,508	117,207	72,700	44,506	117,206	72,692	44,501	117,193
LAWA Automated People Mover	2,596	1,345	3,941	2,591	1,349	3,940	2,642	1,368	4,010
East SFV/Sepulveda Pass Transit Tunnel	-	-	-	-	-	-	-	-	-
Vermont BRT (replaces 754-Vermont Rapid)	-	-	-	-	-	-	-	-	-
204-Vermont Local	-	-	-	-	-	-	-	-	-
Inglewood NFL Connection (Fairview Heights Interlined Option)	-	-	-	-	-	-	-	-	-
Inglewood NFL Connection (Market-Manchester Independent Option)	-	-	-	-	-	-	-	-	-
Inglewood NFL Connection (Arbor Vitae Independent Option)	1,077	519	1596	1,073	513	1,586	-	-	-
Inglewood NFL Connection (Century Independent Option)	-	-	-	-	-	-	2,245	1,004	3,249
Total	453,288	224,417	677,705	453,286	224,408	677,694	453,762	224,638	678,400

Table 2-2: Year 2040 Line Level Ridership

	2040 Headway		2040			2040 Fairview Heights Interlined Option		
Line	Peak	Off-Peak	Peak	Off-Peak	Total	Peak	Off-Peak	Total
805-Purple Line	4	7.5	115,287	48,920	164,207	115,370	48,928	164,298
802-Red Line	10	7.5	40,200	26,962	67,162	40,247	26,964	67,211
803-Green LAX	10	20	32,087	12,033	44,120	30,705	11,459	42,164
803-Green Torrance	10	20	29,947	11,388	41,335	29,679	11,275	40,954
807-Crenshaw Torrance	10	20	11,153	4,966	16,119	10,021	4,586	14,607
809-East-West SR60 Br	10	20	53,536	25,657	79,193	54,034	25,923	79,957
809-East-West Wash Br	10	20	59,774	28,570	88,344	60,259	28,840	89,099
810-North-South NB	10	20	54,966	24,974	79,940	54,935	24,934	79,869
810-North-South SB	10	20	47,861	20,479	68,340	47,900	20,494	68,394
810-North-South SL	10	20	84,042	38,692	122,734	84,021	38,674	122,695
812-PEROW LA Cerritos (West Santa Ana Branch Phase 1)	5	10	12,184	3,948	16,132	12,204	3,947	16,151
Orange Line	8	20	88,631	52,132	140,763	88,642	52,149	140,791
LAWA Automated People Mover	2	2	2,993	1,526	4,519	2,969	1,495	4,464
East SFV/Sepulveda Pass Transit Tunnel	5	10	49,936	24,064	74,000	49,954	24,062	74,016
Vermont BRT (replaces 754-Vermont Rapid)	5	10	33,429	20,406	53,835	33,333	20,363	53,696
204-Vermont Local	10	15	10,710	4,046	14,756	10,711	4,036	14,747
Inglewood NFL Connection (Fairview Heights Interlined Option)	5	10	-	-	-	5,171	2,286	7,457
Inglewood NFL Connection (Market-Manchester Independent Option)	5	10	-	-	-	-	-	-
Inglewood NFL Connection (Arbor Vitae Independent Option)	5	10	-	-	-	-	-	-
Inglewood NFL Connection (Century Independent Option)	5	10						
Total			726,736	348,763	1,075,499	730,155	350,415	1,080,570

Table 2-2 (Cont'd) - Year 2040 Line Level Ridership

	2040 Market-Manchester Independent Option (Streetcar)			2040 Arbor Vitae Independent Option (APM)			2040 Arbor Vitae Independent Option (Monorail)		
Line	Peak	Off-Peak	Total	Peak	Off-Peak	Total	Peak	Off-Peak	Total
805-Purple Line	115,276	48,907	164,183	115,313	48,927	164,240	115,312	48,930	164,242
802-Red Line	40,211	26,974	67,185	40,206	26,969	67,175	40,202	26,968	67,170
803-Green LAX	32,401	12,166	44,567	32,587	12,177	44,764	32,583	12,179	44,762
803-Green Torrance	29,836	11,454	41,290	29,777	11,318	41,095	29,781	11,319	41,100
807-Crenshaw Torrance	11,243	5,006	16,249	11,439	5,109	16,548	11,436	5,108	16,544
809-East-West SR60 Br	53,647	25,690	79,337	53,573	25,680	79,253	53,567	25,684	79,251
809-East-West Wash Br	59,856	28,605	88,461	59,807	28,582	88,389	59,805	28,581	88,386
810-North-South NB	54,963	24,991	79,954	54,961	24,959	79,920	54,962	24,958	79,920
810-North-South SB	47,893	20,492	68,385	47,909	20,479	68,388	47,909	20,477	68,386
810-North-South SL	84,066	38,709	122,775	84,079	38,710	122,789	84,085	38,715	122,800
812-PEROW LA Cerritos (West Santa Ana Branch Phase 1)	12,209	3,951	16,160	12,209	3,958	16,167	12,208	3,955	16,163
Orange Line	88,639	52,154	140,793	88,624	52,158	140,782	88,624	52,160	140,784
LAWA Automated People Mover	2,917	1,433	4,350	3,024	1,524	4,548	3,023	1,524	4,547
East SFV/Sepulveda Pass Transit Tunnel	49,932	24,048	73,980	49,943	24,050	73,993	49,945	24,051	73,996
Vermont BRT (replaces 754-Vermont Rapid)	33,404	20,427	53,831	33,462	20,417	53,879	33,466	20,418	53,884
204-Vermont Local	10,743	4,027	14,770	10,726	4,029	14,755	10,724	4,032	14,756
Inglewood NFL Connection (Fairview Heights Interlined Option)	-	-	-	-	-	-	-	-	-
Inglewood NFL Connection (Market-Manchester Independent Option)	2,392	766	3,158	-	-	-	-	-	-
Inglewood NFL Connection (Arbor Vitae Independent Option)	-	-	-	1,263	477	1,740	1,253	473	1,726
Inglewood NFL Connection (Century Independent Option)									
Total	729,628	349,800	1,079,428	728,902	349,523	1,078,425	728,885	349,532	1,078,417

Table 2-2 (Cont'd) - Year 2040 Line Level Ridership

Line	2040 Arbor Vitae Independent Option (APM) (with La Brea)			2040 Arbor Vitae Independent Option (Monorail) (with La Brea)			2040 Century Independent Option (APM)		
	Peak	Off-Peak	Total	Peak	Off-Peak	Total	Peak	Off-Peak	Total
805-Purple Line	115,330	48,936	164,266	115,332	48,936	164,268	115,383	48,938	164,321
802-Red Line	40,210	26,980	67,190	40,208	26,977	67,185	40,212	26,983	67,195
803-Green LAX	32,543	12,118	44,661	32,543	12,119	44,662	32,389	12,031	44,420
803-Green Torrance	29,865	11,399	41,264	29,869	11,399	41,268	29,882	11,467	41,349
807-Crenshaw Torrance	11,327	5,044	16,371	11,324	5,041	16,365	11,143	4,937	16,080
809-East-West SR60 Br	53,631	25,699	79,330	53,620	25,697	79,317	53,602	25,672	79,274
809-East-West Wash Br	59,856	28,619	88,475	59,862	28,618	88,480	59,860	28,577	88,437
810-North-South NB	54,968	24,985	79,953	54,970	24,991	79,961	54,998	25,004	80,002
810-North-South SB	47,897	20,493	68,390	47,899	20,492	68,391	47,897	20,480	68,377
810-North-South SL	84,081	38,706	122,787	84,081	38,703	122,784	84,106	38,720	122,826
812-PEROW LA Cerritos (West Santa Ana Branch Phase 1)	12,207	3,952	16,159	12,206	3,957	16,163	12,216	3,962	16,178
Orange Line	88,638	52,157	140,795	88,639	52,157	140,796	88,626	52,150	140,776
LAWA Automated People Mover	3,019	1,492	4,511	3,014	1,491	4,505	3,038	1,500	4,538
East SFV/Sepulveda Pass Transit Tunnel	49,931	24,057	73,988	49,935	24,057	73,992	49,926	24,045	73,971
Vermont BRT (replaces 754-Vermont Rapid)	33,447	20,431	53,878	33,447	20,430	53,877	33,451	20,448	53,899
204-Vermont Local	10,729	4,038	14,767	10,728	4,037	14,765	10,738	4,027	14,765
Inglewood NFL Connection (Fairview Heights Interlined Option)	-	-	-	-	-	-	-	-	-
Inglewood NFL Connection (Market-Manchester Independent Option)	-	-	-	-	-	-	-	-	-
Inglewood NFL Connection (Arbor Vitae Independent Option)	1,488	670	2,158	1,480	666	2,146	-	-	-
Inglewood NFL Connection (Century Independent Option)							2,668	1,134	3,802
Total	729,167	349,776	1,078,943	729,157	349,768	1,078,925	730,135	350,075	1,080,210

Table 2-3: Special Events Model Projected 2040 Gameday Ridership

	Fairview Heights Interlined Option		Market-Manchester Independent Option (Streetcar)		Arbor Vitae Independent Option				Arbor Vitae Independent Option (with La Brea)				Century Independent Option (APM)	
					APM		Monorail		APM		Monorail			
	Low est.	High est.	Low est.	High est.	Low est.	High est.	Low est.	High est.	Low est.	High est.	Low est.	High est.	Low est.	High est.
Average Rams Game Attendance	61,000	100,000	61,000	100,000	61,000	100,000	61,000	100,000	61,000	100,000	61,000	100,000	61,000	100,000
Walk Only Transit Access	24%	24%	25%	25%	30%	30%	30%	30%	29%	29%	29%	29%	23%	23%
Drive Only Transit Access	5%	5%	5%	5%	3%	3%	3%	3%	3%	3%	3%	3%	5%	5%
Walk and Drive Transit Access	31%	31%	30%	30%	25%	25%	25%	25%	25%	25%	25%	25%	32%	32%
% of Attendees with Transit Access	60%	60%	60%	60%	57%	57%	57%	57%	57%	57%	57%	57%	60%	60%
Transit Mode Share of Attendees with Transit Access	15%	25%	14%	24%	14%	24%	14%	24%	14%	24%	14%	24%	15%	24%
Attendees using Rail	5,500	15,000	5,200	14,300	5,000	13,700	5,000	13,600	5,000	13,700	5,000	13,700	5,400	14,700
LAX LAMP Parking Capacity	-	-	-	-	15,800	15,800	15,800	15,800	15,800	15,800	15,800	15,800	15,800	15,800
% of Parking Available for Gameday Riders	-	-	-	-	20%	60%	20%	60%	20%	60%	20%	60%	20%	60%
LAX LAMP Remote Parking for events	-	-	-	-	3,160	9,480	3,160	9,480	3,160	9,480	3,160	9,480	3,160	9,480
Attendees using Rail + remote parking for Rams Games	5,500	15,000	5,200	14,300	8,160	23,180	8,160	23,080	8,160	23,180	8,160	23,180	8,560	24,180
Proportion of Chargers Game Attendance relative to Rams Game Attendance	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Attendees using Rail + remote parking for Chargers games	4,130	11,250	3,900	10,730	6,120	17,390	6,120	17,310	6,120	17,390	6,120	17,390	6,420	18,140

In order to incorporate the change in transit patterns for travelers going to and coming from the stadium zone into the transit mode share, the transit share was scaled based on the change in average weekday transit trips to and from the stadium zone. Table 4-6 shows the scaling of mode share for each option relative to the interlined option based on the average weekday transit trips to and from the stadium zone from 2040 scenarios. The low and high estimates of transit mode shares for the interlined option were assumed to be 15% and 25% respectively. The Low and high estimates of transit mode shares for the Independent options based on scaling were 14% and 24% respectively. This resulted with the Independent options having approximately 95% of the transit trips to and from stadium zone as the interlined option.

Table 2-4 – Special Events Model Transit Mode Share Scaled by Average Weekday Transit Trips to/from Stadium Zone

Scenario	Mode	Average Weekday Transit Trips to/from Stadium Zone	Transit Mode Share	
			Low Estimate	High Estimate
Interlined – Fairview Heights	LRT	3,617	15.0%	25.0%
Independent – Market Street	Urban Rail	3,445	14.3%	23.8%
Independent – Arbor Vitae	APM/Monorail	3,442	14.3%	23.8%
Independent – Arbor Vitae (w/ La Brea Station)	APM/Monorail	3,456	14.3%	23.9%
Independent - Century	APM/Monorail	3,515	14.6%	24.3%

APPENDIX F

Construction Impacts Summary

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1. Construction Impacts of At-grade in Mixed-Traffic Guideway and Stations

1.1 Construction Methods:

The construction of an At-Grade in Mixed-Traffic Guideway would involve the use of an embedded track on a concrete track slab. Construction would involve excavation of the existing roadway paving and subgrade material, recompaction or replacement with imported soils, preparation of the rail subgrade, installing a track slab, track work, and an overhead contact system (OCS). Construction of at-grade stations would involve cast-in-place concrete or pre-cast panels to construct a raised platform with ramps and stairs, station canopies, and other station furnishings. Two tracks would be installed either side-by-side within the median or curb running on both sides of the street.

1.2 Traffic Impacts:

Construction vehicles and staging areas may temporarily impede traffic mobility in the areas of construction. The street may be sectioned with K-rail so as to facilitate partial traffic flow with lane reductions during construction. Traffic detour and truck routes would be required during construction to accommodate partial and full street closures during nights, weekends, and possibly during extended weekday periods during construction. A traffic management and traffic control plan would be implemented to minimize traffic disruptions.

Permanent traffic impacts may be minor for At-Grade Guideway in Mixed-Traffic Guideway since the guideway is mixed with the traffic flow. Lane widths and on-street parking may be adjusted to accommodate wider rail vehicles widths. If the guideway is a dedicated alignment in lieu of mixed-traffic, permanent traffic impacts could include lane reductions, elimination of on-street parking, and/or sidewalk width adjustment to accommodate the two tracks. At-grade guideway presents the opportunity for street re-design to re-program the amount of space allowed for autos and pedestrians. Overhead contact system (OCS) wirings and poles would be visible overhead and permanently limit overhead clearance for the length of the at-grade segment. At-Grade stations could require further street lane reductions and street re-design beyond typical at-grade guideway sections.

1.3 Right-of-Way Impacts:

Temporary right-of-way acquisitions may be needed for construction staging areas near station. However, the staging area needed for at-grade station construction would be far less than the area needed for aerial or underground construction. At-grade stations are typically designed within the street and sidewalk right-of-way and do not require permanent right-of-way acquisition. Train systems installation for At-Grade in Mixed-Traffic Guideway would include the installation of OCS pole foundations, which requires driving piles at each pole location and installing OCS poles along both sides of the street within the sidewalk right-of-way. Pole foundations could potentially impact underground vaults and underground basements of existing structures which could result in the need for special improvements to existing private properties.

2. Construction Impacts of Aerial Guideway and Stations

2.1 Construction Methods and Impacts:

Aerial structures are constructed in stages, starting with sectioning off the road with k-rail and then installing foundation piles up to 10' in diameter. Pile caps of up to 4 to 5' thick are constructed to tie the foundations together and then reinforced concrete columns of up to 7' in diameter are erected. Precast concrete girders are lifted into place by large cranes, connecting the columns together to form the horizontal support for the guideway. Once the girders have been placed, a concrete slab is placed and the trackwork is installed. Cast-in-place concrete spans would require the erection of falsework (framing) to support the forms into which concrete is poured. Aerial stations are constructed in a similar method as aerial guideway, with columns, girders, and cast-in-place concrete with falsework.

Aerial stations may be supported on straddling bent columns bridging the roadway, rather than columns placed in the median, in order to support the wider station structure. Ancillary facilities would then be added, including stairs, elevators, canopy, railings, lighting, seating, signage, and fare vending equipment. Bridges that span active roadways must be designed with sufficient clearance under the falsework to allow traffic to pass.

2.2 Traffic Impacts:

Construction vehicles may temporarily impede traffic mobility in the areas of construction. Traffic detour and truck routes would be required during construction. A traffic management and traffic control plan would be implemented to minimize traffic disruptions.

Permanent traffic impacts for an Aerial Guideway could include lane reductions, elimination of on-street parking, and/or sidewalk width to accommodate space needed for columns within the street right-of-way. Typically, aerial guideway construction requires less street right-of-way width reduction than At-Grade Guideway in a dedicated right-of-way, but can require more width reduction than At-Grade Guideway in Mixed Traffic. Aerial station could require additional reductions and street re-design beyond typical aerial guideway sections.

2.3 Right-of-Way Impacts:

Temporary right-of-way acquisitions may be needed for construction staging areas for crane assembly and girders storage. Aerial stations may require partial or full permanent right-of-way acquisition of nearby properties abutting the roadway in order to accommodate straddling bent columns and footings.

3. Cut and Cover Below-Grade Construction for Guideway and Stations

3.1 Construction Methods and Impacts:

Cut and cover below-grade construction method is used for underground stations and can be used for short sections of underground guideway construction. Cut and cover method entails a construction shoring system, excavating down from the ground surface (cut), placing a temporary deck over the excavated area (cover), constructing the underground facilities beneath the deck, and then backfilling and restoring the surface once the facilities are completed. Temporary concrete decking is placed over the cut following the first part of excavation to allow traffic to pass above. Once the deck is in place, excavation and internal bracing would continue beneath the deck to the required depth. Once the desired construction is completed inside the excavated area, the deck would be removed, the excavation would be backfilled, and the surface would be restored permanently.

Dewatering may be required at underground station locations and tunnel sites to temporarily lower the groundwater level below the excavation depth or to an impermeable layer. Uncontaminated groundwater may be treated and pumped back into the groundwater table, but any contaminated groundwater would be properly treated prior to being discharged.

Underground stations would be constructed using a similar cut and cover construction in the following steps: excavation of the station box, followed by the pouring of the foundation base slab, followed by the installation of exterior walls and any interior column elements. Vertical conveyance, station finishes, and exterior entrances would be constructed after the station structure has been completed.

3.2 Traffic Impacts:

Temporary lane closures would be needed during the first stage during excavation before the deck cover is placed on top. Traffic could resume during the remainder of the construction of the underground facilities after the deck is placed over the excavation with intermittent lane closures throughout the construction duration. Following construction of the underground facilities, temporary lane closures would be needed again during the final stage of backfilling over the underground structure. No permanent lane closures would be needed following construction of alignment as all rail activity would be located underground. The street reconstruction presents the opportunity for to re-program the space allowed for autos and pedestrians.

3.3 Right-of-Way Impacts:

Temporary right-of-way acquisitions may be needed for construction staging areas for shoring equipment, crane assembly, material storage, excavation spoils storage, and construction field offices and equipment. Alternatively, staging areas could be located within the street right-of-way on top of the cut and cover deck if the route can accommodate long term street lane closures. Typically, larger construction staging areas are needed for

Cut and Cover construction methods than for At-Grade or Aerial construction methods. Underground stations would require permanent right-of-way acquisition of properties for station boxes and structures of 1 to 2 acres. However, underground stations provide a unique opportunity for public private partnerships to develop a mixed-use, transit-oriented-development on top of the structure which could recover land acquisition costs.

4. Bored Tunnel Construction for Guideway

4.1 Construction Methods and Impacts:

Bored Tunnel Construction can be used for underground guideway lengths of greater than 1 mile. Bored tunnel construction is performed by Tunnel Boring Machines (TBMs) which are large-diameter horizontal drills that simultaneously excavate sections of the tunnel and construct the tunnel structure. The excavated materials are removed through the tunnel using hopper type rail cars or by a conveyor system. As the machine advances, both the ground in front of the machine and the hole it creates are continually supported by the machine shield and pre-cast concrete tunnel liners. This method creates a tunnel with little or no disruption at the surface, and is especially suitable for creating a circular opening at greater depths that would not be practical for cut and cover construction.

The TBM is advanced a small distance (typically 4 to 5 feet) by means of hydraulic jacks, which push against the previously installed tunnel lining ring. The jacks are retracted and another tunnel lining ring is erected. The pre-cast concrete liners are fabricated off-site and delivered by truck to the site. Tunneling operation is typically continuous, occurring seven days a week with two 10-hour shifts per day and advances at a rate of about 30 to 50 feet per day.

The bored tunnel method requires construction of portals that are used to launch and extract the TBMs. The portals are large pits constructed with the cut and cover method as presented above. The launch and extraction pits can be within underground station excavations since the stations require excavation to the depth of the guideway. However, separate launch and extraction pits may be required where guideway transitions occur along the alignment between stations. These pits are would employ construction methods similar to those used for underground stations, but the portal would remain permanently open and no decking would be required during construction.

4.2 Traffic Impacts:

Traffic would not be impacted along bored tunnel segments as all activity is conducted below the ground surface. Temporary traffic impacts would be limited to the TBM portals, which would have similar impacts as the Cut and Cover method presented above. No permanent lane closures would be needed following construction of alignment as all rail activity would be located underground.

4.3 Right-of-Way Impacts:

Bored Tunnel construction typically requires more temporary construction staging than all other methods.

Temporary right-of-way acquisitions are needed for construction staging areas to assemble the TBM, launching and extraction, crane assembly, material storage, excavation, spoils storage, construction field offices and other equipment. The launching pit requires a total construction staging area of 4 to 8 acres and the extraction pit requires less than 1 acre. Launch and extraction pits may require temporary land acquisition if they are not constructed as part of the underground station.

APPENDIX G

Existing Utilities in City of Inglewood

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1. Water

The potable water in the City of Inglewood is supplied by the City, Golden State Water Company, and Cal-America Water Company. Water lines are located in almost all the major street alignments of the proposed options. The majority of the (as well as the relatively older) water pipes are made of Asbestos Cement (AC), with some relatively new water lines (installed in the recent years) made of Cast Iron (CI) pipes and some PVC pipes, Ductile Iron Pipe (DIP) and Galvanized (GALV) pipes. The pipe diameter sizes range from 4" to 24". However, it is notable that there are also some big LADWP water lines traversing the City. **Figure 1-1** presented the City's Water Line System.

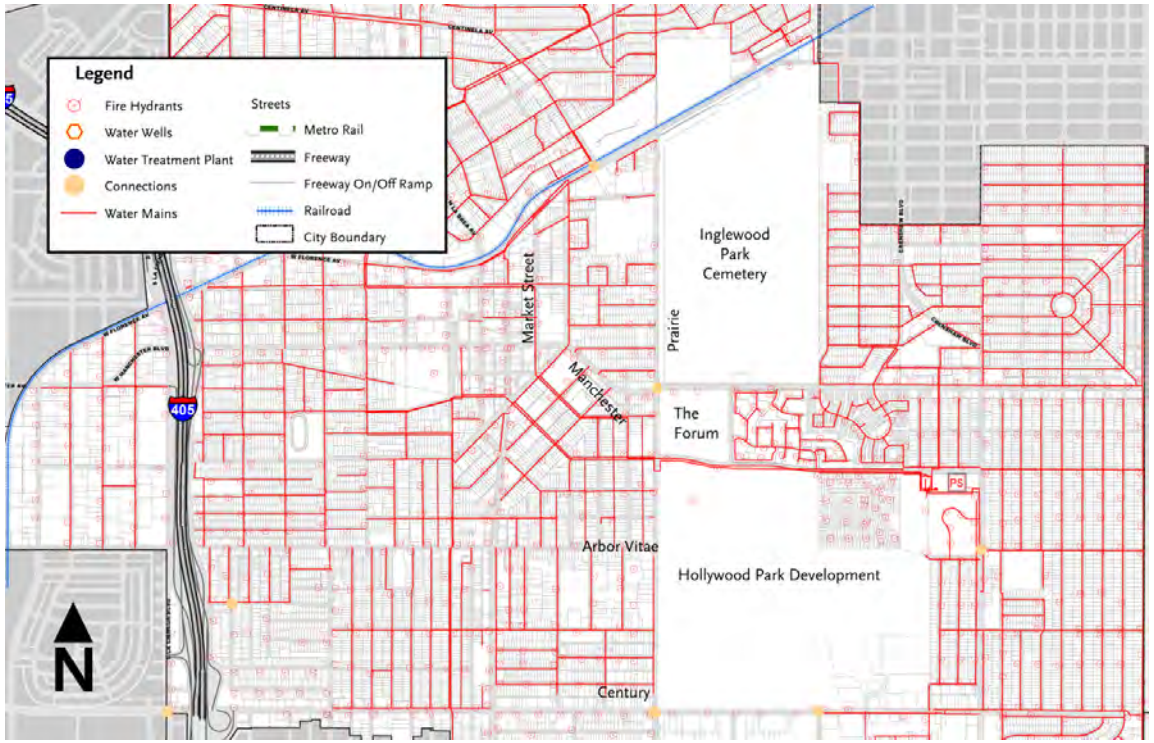


Figure 1-1: City of Inglewood Water System

Source: City of Inglewood Department of Public Works

Table 1-1 Water Utilities on Alignments

Alignment	Description
Prairie	There is a 12" PVC water main between Florence and Manchester, a 10" CI water main between Manchester and Arbor Vitae, and a 8" AC water main between Arbor Vitae and Century. In addition, there are also a 36" RFC water main (West Basin Municipal Water) and a 60" LADWP water main going next to the middle of Prairie.
Manchester	There is a 12" CI water main between Market and Prairie.
Market	There is a 12" PVC water main between Florence and Manchester.
Arbor Vitae	There are 12" AC water mains between Prairie and Inglewood, as well as La Cienega and Aviation; a 12" PVC water main exist between Inglewood and La Cienega.
Century	There is a short 16" AC water main near La Cienega and a 10" DIP water main between Burl and La Brea. In addition, there is a 36" LADWP water main running down the center of Century.

2. Sewer System

The existing sewer system in the City of Inglewood is owned by both the City and the County. The existing sewer mains in the project are mostly 8" Vitrified Clay Pipe (VCP) with a few Concrete Mortar (CMT) pipes, Asbestos Cement (AC) pipes and Reinforced Concrete Pipes (RCP **Figure 2-1** presented the City's Sewer System. Error! Reference source not found. presented the existing sewer line locations along the four Options' alignments.

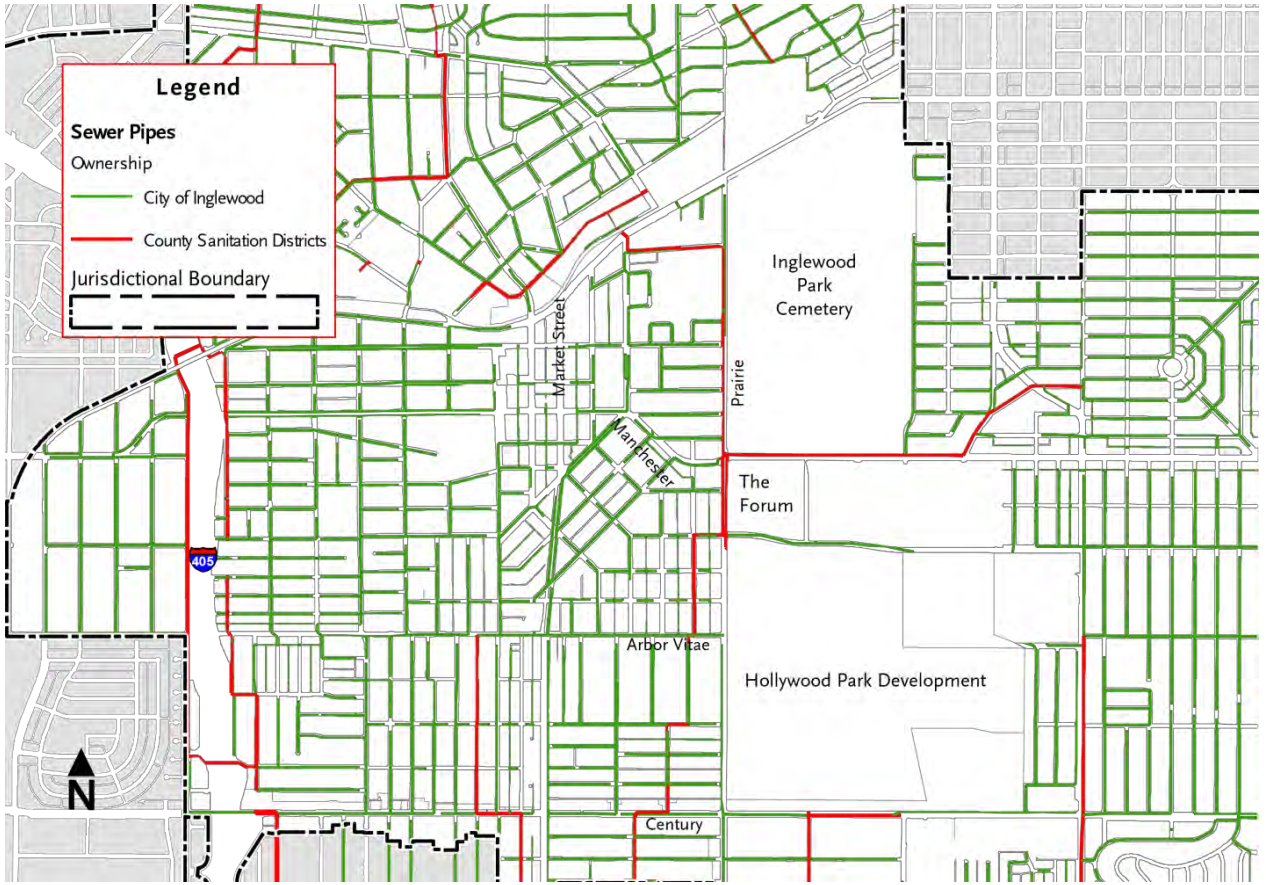


Figure 2-1: City of Inglewood Sewer System

Source: City of Inglewood Department of Public Work

Table 2-1: Sewer Utilities on Alignments

Alignment	Description
Prairie	There is an 8" AC sewer line between Florence and Grace, a 24" RCP sewer line between Grade and Manchester Terrace, a 24" VCP sewer line between Manchester Terrace and Kelso, and a 10" VCP sewer line between Kelso and Century. These sewer lines are all owned by the County.
Manchester	There are some short 8" sewer lines on Manchester between Market and Prairie, owned by the City.
Market	No major sewer system exists along Market Street alignment.
Arbor Vitae	There are some VCP sewer lines ranging from 8" to 15" on Arbor Vitae, which are all owned by the City.
Century	There is an 8" VCP sewer line along Century, which is owned by the City.

3. Storm Drain System

The main lines of the storm drain system in the City of Inglewood are jointly maintained by the Los Angeles County Flood Control District (LACFCD) and the City of Inglewood. The storm drain main lines within the project area consist of Reinforced Concrete Pipe (RCP) and Reinforced Concrete Box (RCB). RCP diameter sizes in the project area vary from 24" to 96". The general topography of the project area slopes from north to south and east to west; therefore, the storm drain pipes gravity flow generally from the northeast to southwest. This also explains why pipe sizes generally increase from north to south. In addition, some non-City-affiliated sewer lines also traverse the City's jurisdiction. **Figure 3-1** presented the City's Storm Drain System. **Table 3-1** presented the main existing storm drain main lines along the proposed alignments.

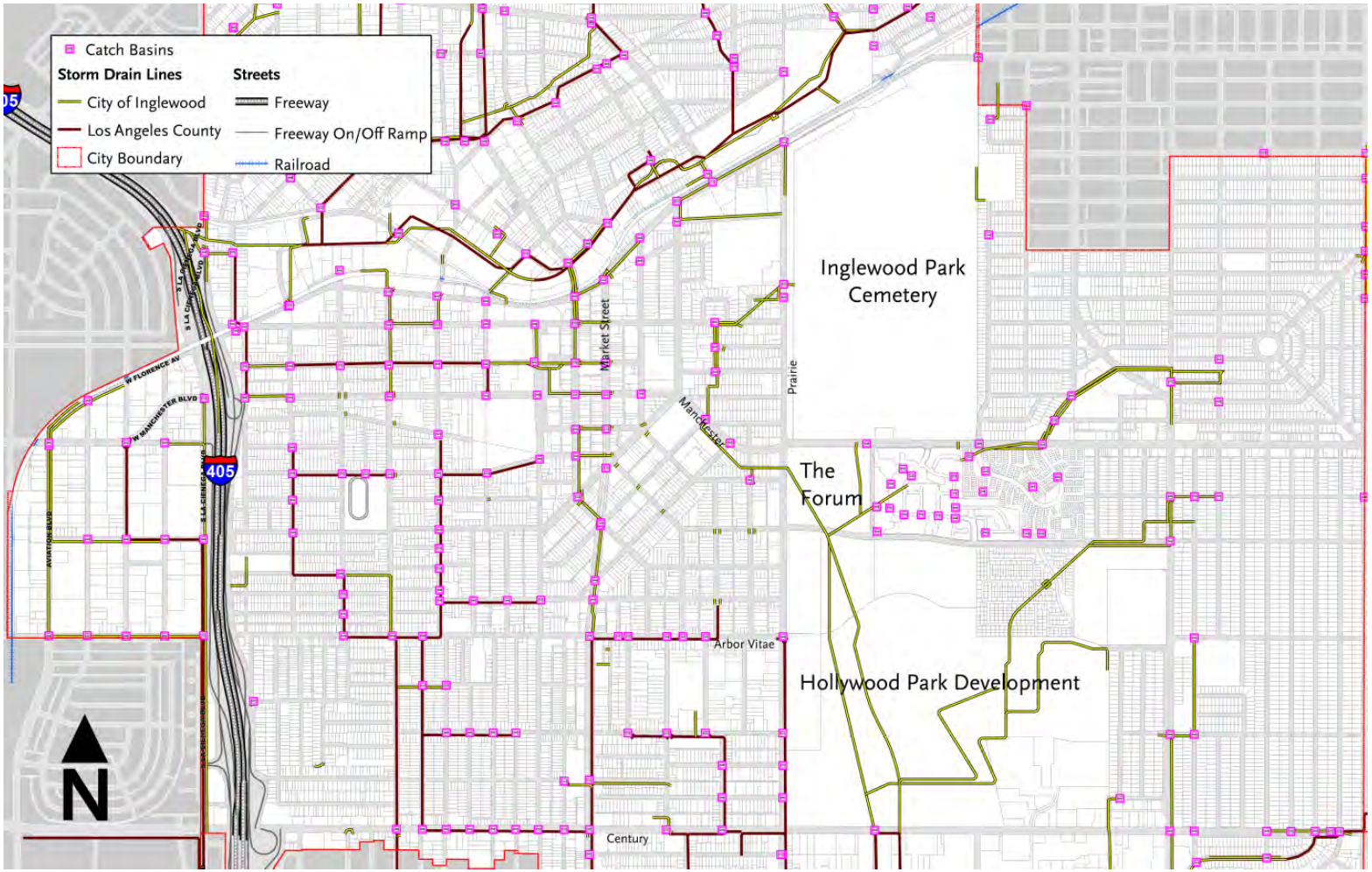


Figure 3-1: City of Inglewood Storm Drain System

Source: City of Inglewood Department of Public Works

Table 3-1: Storm Drain Utilities on Alignments

Alignment	Description
Prairie	There is a City-owned 36" RCP storm drain line on Prairie between Arbor Vitae and Century, and also 39" RCP storm drain line on the southern end of this Prairie alignment which is not City-affiliated.
Manchester	No major storm drain lines are documented along the Manchester alignment.
Market	No major storm drain lines are documented along the Market Street alignment.
Arbor Vitae	There is a City-owned 73" RCP storm drain line on Arbor Vitae.
Century	There is a 96" * 80" RCB VCP storm drain line along Century, and several other shorter storm drain lines (sizes unknown), which are all owned by the City. In addition, there is a non-City-owned 6'8" * 8' RCB storm drain line running down the center of Century between Rosewood and La Brea, as well as a non-City-owned 42" RCP storm line on the close to the northern edge of Century between Myrtle and Prairie.

4. Other Utilities

Electrical Power is supplied by the Southern California Edison Company for the City of Inglewood. The majority of the existing electrical facilities are overhead electrical system with poles carrying low voltage conduits along with telecommunication and cable TV facilities. Most of the overhead electrical lines are located at the back of single family residence, in between the streets and parcels, with power poles and overhead lines located at the rear of the residential buildings. Some high-voltage power lines also exist on Prairie. RAM Circuits are mapped in **Figure 4-1** as orange lines.

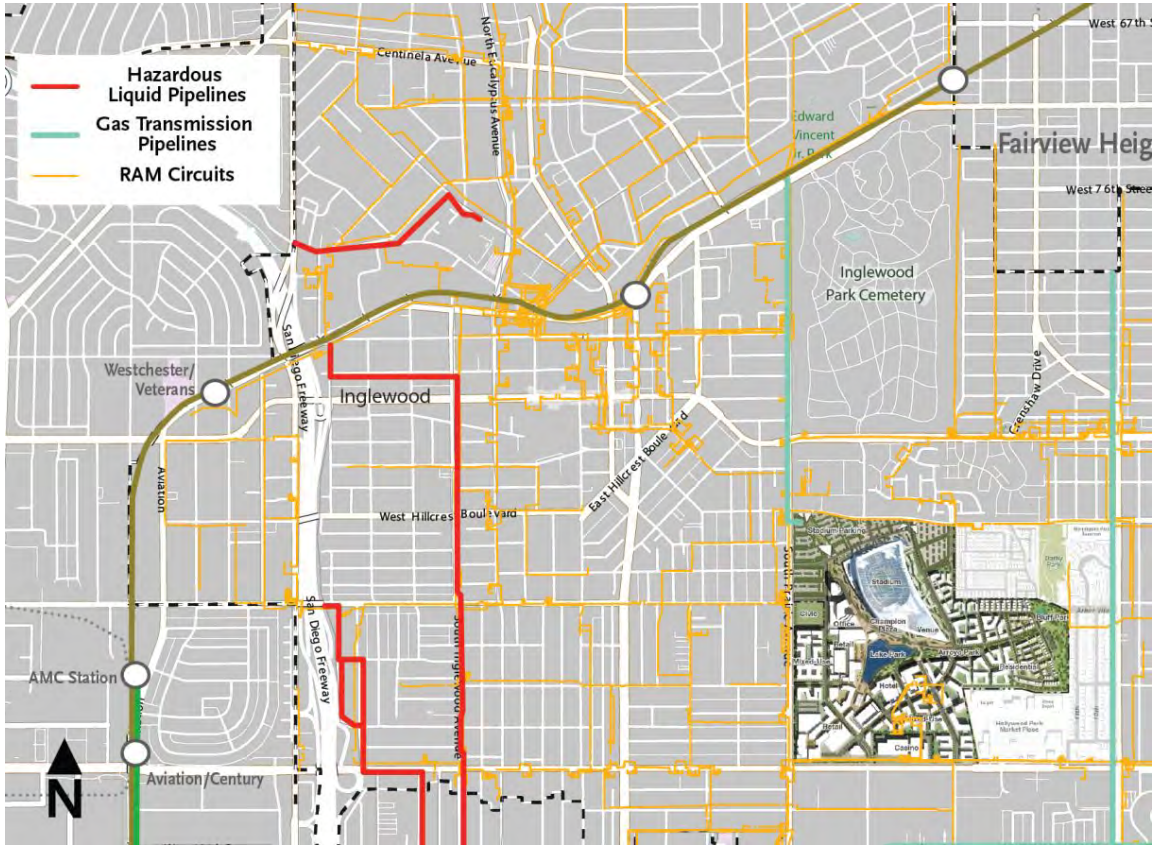


Figure 4-1 City of Inglewood Utilities

Source: Los Angeles County GIS Portal, AECOM

City of Inglewood's Natural Gas is provided by Southern California Gas Company. The City's jurisdiction is well covered with natural gas facility network, and the existing gas lines range in sizes from 1" to 8". The major gas lines are mapped in **Figure 4-1** as green lines. Some county-owned Hazardous Liquid Pipelines also traverse the City and even has a segment on Century, as presented in red line in **Figure 4-1.**

APPENDIX H

Environmental Scan Summary

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1. Environmental Scan

Terry A. Hayes Associates Inc. (TAHA) completed an environmental scan and preliminary environmental analysis for the Fairview Heights Interlined Scenario and the three Independent Scenarios (the Arbor Vitae Independent Option, the Century Independent Option and the Market-Manchester Independent Option). These four scenarios are collectively known as the Alternative Scenarios. As discussed above, the Florence-Prairie Independent Option has not been carried forward for further study by the Project team.

This section provides a preliminary analysis of the potential environmental impacts of the Alternative Scenarios. The analysis also includes a comparison of the socio-economic factors, land use characteristics and potential visual effects.

2. Methodology

The following conceptual-level assessment identifies likely environmental impacts related to Project implementation. The intent is to facilitate comparison of the Alternative Scenarios based on potential environmental impacts and/or identify areas that need further study. The document also provides streamlining for the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) documents.

The analysis employs a 150-foot wide study area on either side of the four Alternative Scenarios (Study Area). This assessment includes identification of existing conditions, and a discussion of potential environmental effects based on relevant applicable standards and thresholds. The analysis addresses key issues included in Appendix G of the CEQA Guidelines supplemented by NEPA requirements.

3. Environmental Issues

The preliminary environmental analysis is focused on the following topical areas:

- Aesthetics
- Air Quality
- Cultural Resources
- Greenhouse Gas Emissions
- Hydrology and Water Quality
- Mineral Resources
- Population, Housing, and Employment
- Agriculture/Forestry Resources
- Biological Resources
- Geology and Soils
- Hazards and Hazardous Materials
- Land Use and Planning
- Transportation and Traffic
- Utilities and Service Systems
- Noise
- Public Services
- Tribal Cultural Resources

4. Overview

As evident in the analysis below, the Alternative Scenarios share similarities for a majority of the environmental impacts. They are anticipated to have no impact on the following environmental topics: Agriculture and Forestry Resources, Biological Resources, Greenhouse Gas (GHG) Emissions, Mineral Resources, Population and Housing, Public Services (fire, police, parks, schools and other services), and Utilities (water, wastewater, solid waste). The Alternative Scenarios are anticipated to result in less than significant impacts with mitigation incorporated to: Air Quality (Operations), Hazards/Hazardous Materials, Geology and Soils, Hydrology and Water Quality, Transportation and Traffic, and Tribal Cultural Resources. Further study is needed to determine potentially significant impacts to: Air Quality (Construction), Geology and Soils, Noise and Vibration, and, Transportation and Traffic. However, potential impacts vary substantially between the Alternative Scenarios with regard to: Aesthetics, Cultural Resources, Land Use Compatibility, Noise and Vibration and Transportation and Traffic.

Impacts related to aesthetics and historic resources for the Market Street Independent Scenario and the Century Independent Scenario are primarily tied to the historic Forum. The Market Street Independent Scenario would result in significant impacts with regard to aesthetics and historic resources, in the event the scenario includes an elevated guideway along Prairie Avenue, which would adversely affect the visual setting and the historic integrity of the Forum. The Century Independent Scenario would not result in significant impacts with regard to aesthetics and historic resources, if the scenario does not include an MSF within the Forum property. However, in the event, the Century Independent Scenario includes an MSF within the Forum property, impacts related to aesthetics and historic resources are likely to be significant.

The Arbor Vitae Independent Scenario would result in significant impacts with regard to aesthetics, including visual quality, shade/shadow and glare impacts, primarily due to the proximity of residential land uses and the narrow street width of Arbor Vitae Street. Among the Alternative Scenarios, only the Arbor Vitae Independent Scenario is anticipated to result in significant impacts with regard to land use, as it has the potential to create a barrier within an existing residential community. For the same reasons, the Arbor Vitae Independent Scenario would likely result in significant impacts with regard to noise and vibration. No significant impacts are anticipated for the remaining three Alternative Scenarios with regard to land use and noise and vibration.

With regard to traffic, the Market Street Independent Scenario is not anticipated to result in significant traffic impacts, since the Market Street portion of the alignment is proposed as a pedestrian promenade and the Prairie Avenue portion would either include an underground or aerial guideway. However, traffic impacts as a result of the Fairview Heights Interlined Scenario would need further study, since there is potential for impacts due to the proposed service increase (2.5 minute headways) to the Crenshaw/LAX Line. Similarly, traffic impacts as a result of the Arbor Vitae and Century Independent Scenarios would also need further study, since there is potential for impacts due to reduction in lane widths, potential turn limits and intersection sight-distance issues.

4.1 Aesthetics

4.1.1 Setting/Existing Conditions

The Study Area is an urbanized area primarily located in the City of Inglewood. A portion of the Century Independent Scenario, west of La Cienega Boulevard, is located within the City of Los Angeles. Existing views surrounding the Alternative Scenarios and nearby areas are defined by commercial, institutional and residential buildings. No scenic vistas or scenic resources are located within the Study Area, and none of the Alternative Scenarios are located within or adjacent to a designated State scenic highway.

Land uses adjacent to the Alternative Scenarios are likely to experience shade and shadow impacts. The Fairview Heights Interlined Scenario includes public facilities, residential uses, and neighborhood-serving commercial uses. Prominent uses along this alignment include the Inglewood Park Cemetery to the southeast corner of Florence Avenue/Prairie Avenue intersection; Edward Vincent Jr. Park to the north of Florence Avenue; and the historic Forum to the east of Prairie Avenue. The west of Prairie Avenue mostly consists of residential and commercial uses and also includes two schools. The Arbor Vitae Independent Scenario consists of a mix of commercial and residential uses to the west of La Brea Avenue, with predominately residential uses to its east. The Century Independent Scenario predominately consists of commercial uses and is interspersed with a few residential uses. The Market Street Independent Scenario predominately includes commercial uses along Market Street and Manchester portion of the alignment. The Prairie Avenue portion of the alignment includes the Inglewood Park Cemetery and the historic Forum to the east, with mostly residential and commercial uses to the west. In addition to the Forum, historic resources in the Study Area include the Fox Theater, Centinela Springs, and a notable Industrial Building. These historic resources are described further in Section 4.5, Cultural Resources.

The Project would include Traction Power Substation (TPSS) units and an MSF. TPSS would be placed approximately every half mile, and would be located within station areas, where possible. Electrical power would be supplied to the transit system through an overhead contact system (OCS). All Alternative Scenarios would include night lighting for safety, which could result in light and glare impacts to the surrounding properties.

4.1.2 Environmental Effect

The potential for significant or adverse impacts would be related to affecting existing visual resources, shade/shadow effects and light and glare.

As described above, the Study Area is fully developed and existing views are urban and defined by commercial, residential and institutional buildings. No scenic vistas are located within the Study Area and there are no designated State scenic highways within or in proximity to any of the Alternative Scenarios. Implementation of the Alternative Scenarios would involve removal of trees, some of which may be protected. However, removed trees within the City of Los Angeles would be replaced on a 2: 1 scale and those within the City of Inglewood would be replaced in compliance with the City's Municipal Code (Article 32, Section 12-116), which requires removed trees be replaced by the number of trees as determined by its Parks, Recreation and Library Services Department. As described further below, although all the Alternative Scenarios would alter the visual landscape of the Study Area to some degree, impacts would likely be least along the Century Boulevard Independent Scenario.

The Fairview Heights Interlined Scenario would include an at-grade guideway along the Florence Avenue portion of its alignment, and would be underground along Prairie Avenue. The alignment would include an MSF at Southwest Corner of Arbor Vitae Street/Portal Avenue Intersection and no intermediate stations are proposed for this Scenario.

The at-grade portion along Florence Avenue would be screened by trees and the rest of the underground portion would not be visible at the street level. As such, visual impacts to the surrounding area are not likely to be significant for this alternative. The southbound alignment along Florence Avenue would result in a retaining wall along the south edge of Edward Vincent Jr. Park. The approximately 10-foot retaining wall would alter the existing visual quality of the park area. However, implementation of appropriate design features and selection of visually pleasing materials would minimize potential visual impacts. Therefore, visual impacts as the result of an underground guideway along Prairie Avenue are not likely to be significant.

The Fairview Heights Interlined Scenario would be primarily underground, except for a small at-grade portion along Florence Avenue. Therefore, no shade/shadow and light and glare impacts are anticipated as a result of the Fairview Heights Interlined Scenario.

The Arbor Vitae Independent Scenario includes an aerial guideway along Arbor Vitae Street, with three alternative guideway locations. One alternative would include a median running aerial guideway along the entire Arbor Vitae alignment. The second alternative would include a median running aerial guideway for the portion west of La Brea Avenue, with the guideway transitioning to the south of Arbor Vitae Street along east of La Brea Avenue. The third alternative would be similar to the second alternative, except the structural support would be further south along Arbor Vitae Street and the guideway would be cantilevered from the vertical structural system. The Arbor Vitae Independent Scenario would include an intermediate station at La Brea Avenue.

The Arbor Vitae Independent Scenario would travel along an aerial structure approximately 17 feet above street grade. All the proposed alternatives would result in the loss of parkways that are currently present on either side of Arbor Vitae Street. The parkways are green spaces consisting of plants, shrubs and trees, and are a characteristic feature in front of single-family homes along Arbor Vitae Street, and their loss would alter the existing visual character of the area around the alignment. Therefore, the Arbor Vitae Independent Scenario would degrade the existing visual quality of the surrounding area and impacts are likely to be significant. MSF locations for this scenario are proposed on sites that currently serve as rental car, parking or are vacant lots and are surrounded by similar uses. Therefore, no significant impact to visual quality is anticipated as a result of the proposed MSF locations.

The proposed aerial guideway along the south side of Arbor Vitae Street and east of La Brea Avenue would extend into the sidewalk, which would cast shadows along the alignment. Although, a vertical clearance of 17 feet above would allow for sufficient day light along the sidewalk, shadow impacts would occur at outdoor spaces associated with the residential uses located adjacent to the alignment. In addition, an aerial guideway would appear more intrusive because of the narrow street width of Arbor Vitae, which varies between 66 and 85 feet. Based on the above description, the Arbor Vitae Independent Scenario would have high potential for shade/shadow effects.

The Arbor Vitae Independent Scenario would include night lighting along the guideway, and light and glare impacts could occur due to the illumination of trains. Trains would be approximately 20 feet above adjacent grade and would not cause light and glare impacts to buildings that are less than 20 feet in height. The Project would incorporate design features that would minimize or mitigate light and glare by using non-reflective materials and directing light to the intended area. In addition, the trains would be designed and lighted in a manner that would minimize the potential for spill light effects. Nevertheless, there is potential for significant light and glare impacts to occur, due to the proximity of light sensitive residential uses along this alignment.

The Century Independent Scenario proposes a median running aerial guideway along Century Boulevard and Prairie Avenue. The street width along the Century Boulevard alignment varies between 82 and 145 feet and the width along the Prairie Avenue alignment varies between 90 and 94 feet. Compared to the other three alternative scenarios, the Century Independent Scenario has the highest average street width. Further, the aerial guideway would be located within the Century Boulevard median, and the visual impact of an elevated guideway for this scenario would be least perceptible. The potential MSF site at the southwest corner of Century Boulevard/Aviation Boulevard intersection would be surrounded by industrial uses and would not conflict with the existing visual quality of the community. Potential MSF sites at the southwest and southeast corner of Century Boulevard/Prairie Avenue intersection would be joint development sites with mixed uses and would not conflict with the existing environment. However, an MSF located within the Forum property would block views to the historic Forum and disrupt the integrity of its visual setting. Therefore, the Century Independent Scenario would have a low potential for significant impacts with regard to visual quality, but for the MSF location within the Forum property.

Adjacent uses along Century Boulevard mostly consist of commercial uses, which are not considered sensitive to shade/shadow effects. Furthermore, the alignment is proposed along the median of the street and would be approximately 30 feet away from adjacent uses. As such, there is low potential for significant shade/shadow impacts as a result of the Century Independent Scenario.

Similar commercial uses are not considered sensitive to night lighting. In addition, due to the commercial nature of this corridor, ambient illumination levels are considerable and the Century Independent Scenario would not substantially exceed existing ambient light levels. As noted above, the alignment is proposed along the median of the street and would be approximately 30 feet away from adjacent uses. The trains would be 20 feet above adjacent grade and would not impact buildings that are less than 20 feet in height. Furthermore, to the extent possible, the Project would incorporate design features that would minimize light and glare by using non-reflective materials and directing light to the intended area. In addition, trains would be designed and lighted in a manner that would minimize the potential for spill light effects. As such, light/glare impacts as a result of the Century Independent Scenario is likely to be less than significant.

The Market Street Independent Scenario proposes an at-grade median guideway between Florence Avenue and Queen Street, which would descend to below grade between Queen Street and Manchester Boulevard, ascend to an aerial guideway along Manchester Boulevard at Locust Street and continue as an aerial guideway further east along Manchester Boulevard and at-grade along Prairie Avenue. Alternately, the guideway along the Prairie Avenue portion would be aerial and located on the east side of the street. This alignment would also include a station platform and MSF within the

Forum property. Alternately, an MSF would be located southwest or southeast corner of Florence Avenue/Market Street intersection, or the southeast corner of Manchester Boulevard/Hillcrest Boulevard intersection.

Along Market Street, the transition of the alignment from at-grade to below grade would create a trench at the street median. A safety wall along the trench approximately 5 to 6 feet above street grade would alter the existing visual character of the streetscape. However, implementation of appropriate design features and use of visually appealing materials would minimize potential visual impacts.

An at-grade alignment along Prairie Avenue would be screened by trees, and therefore would not substantially alter existing visual conditions. However, an elevated guideway structure would impact the existing visual landscape, including the historic Forum. The Forum was designed by local architect Charles Luckman to evoke the architecture style of the Roman Forum. It is designed as a symmetrical structure with a circular floor plan. Vertical columns are placed along the entire exterior façade of the circular structure. The structure is clad in red and contrasts with the white vertical columns, which together create a striking visual effect. The Forum is situated in the center of the property, with approximately 250 to 300 feet setbacks from its property line on all four sides. As viewed from Prairie Avenue, the Forum structure stands out uninterrupted by any other building within this space, except for maintenance equipment on the south side of the structure. **Figure 4.1.2-1** below shows views of the Forum as seen from Prairie Avenue.



Figure 4.1.2-1 Views of the Forum as seen from Prairie Avenue

The 300-foot setback combined with the 250 to 350 feet of clear space on either side of the building forms the current visual setting to the historic property. The proposed aerial guideway at approximately 17 feet above street grade and the structural support system would stretch across the front of the Forum. These horizontal and vertical elements would break up the visual integrity of the historic Forum. Therefore, the elevated guideway along Prairie Avenue as part of the Market Street Independent Scenario would diminish the existing visual setting of the historic Forum and impacts are likely to be significant.

The elevated guideway would extend approximately 12 to 13 feet over the sidewalk on the east side of Prairie Avenue, south of Manchester Boulevard. Although shade effects would be perceptible, a vertical clearance of 17 feet would allow for sufficient day light along the side walk. In addition, shadow-sensitive uses, such as routinely useable outdoor spaces associated with residential, recreational, or institutional land uses are located on the west of Prairie Avenue. Therefore, the Market Street Independent Scenario is not likely to result in significant shade/shadow effects.

The proposed station platform and/or MSF location within the Forum property would likely result in visual impacts. Potential MSF locations as part of a mixed use development at the southwest or southeast corner of Florence Avenue/Market Street intersection would be consistent with the Inglewood TOD Plan, which identifies these parcels for mixed use development. The potential MSF location at the southeast corner of Manchester Boulevard/Hillcrest Boulevard intersection is identified as part of a historic core in the Inglewood TOD Plan, and therefore, would be required to comply with the plan's development guidelines and design standards. With compliance with the development guidelines and design standards, the MSF as part of a mixed-use development would not conflict with the vision established in the Inglewood TOD Plan.

Similar to the other scenarios described above, the Project would incorporate design features that would minimize light and glare by using non-reflective materials and directing light to the intended area. Therefore, the Market Street Independent Scenario is not likely to result in significant light and glare impacts.

For all the Alternative Scenarios, aerial components such as catenary poles and OCS wires would be minimally apparent and would not block informal views. TPSS units would be designed in a manner that is appropriate to the context in which they are proposed. Configurations of the OCS would be site-specific and be made based upon engineering design and aesthetic considerations. OCS would be supported by decorative poles chosen to be consistent with the streetscape for each of the proposed Alternative Scenarios. Station platforms would not be of sufficient scale or bulk to cast shadows of sufficient size to affect shade-sensitive uses.

4.2 Air Quality

4.2.1 Setting/Existing Conditions

The federal Clean Air Act (CAA) governs air quality in the United States. In addition to being subject to the requirements of CAA, air quality in California is also governed by more stringent regulations under the California Clean Air Act (CCAA). At the federal level, the CAA is administered by United States Environmental Protection Agency (USEPA). The CCAA is administered by California Air Resources Board (CARB) at the State level and by the South Coast Air Quality Management District (SCAQMD) in the South Coast Air Basin (Basin), in which the Study Area is located.

USEPA is responsible for establishing the National Ambient Air Quality Standards (NAAQS). NAAQS have been established for seven major air pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), Ozone (O_3), particulate matter 2.5 microns or less in diameter ($PM_{2.5}$), particulate matter ten microns or less in diameter (PM_{10}), sulfur dioxide (SO_2), and lead (Pb). These air pollutants are referred to as criteria pollutants. The CAA requires USEPA to designate areas as attainment, nonattainment, or maintenance (previously nonattainment and currently attainment) for each

criteria pollutant based on whether the NAAQS have been achieved. USEPA has classified the Los Angeles County portion of the Basin as a nonattainment area for O3, PM2.5, and Pb. Under the CCAA, the non-desert Los Angeles County portion of the Basin is designated as a nonattainment area for O3, PM10, and PM2.5.

Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. CARB has identified the following groups who are most likely to be affected by air pollution: children less than 14 years of age, the elderly over 65 years of age, athletes, and people with cardiovascular and chronic respiratory diseases. According to the SCAQMD, sensitive receptors include residences, schools, playgrounds, child care centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Sensitive land uses located in the Study Area include, but not limited to, schools (e.g., St. Mary's Academy), parks (e.g., Queen Park), and medical facilities (e.g., Centinela Hospital Medical Center).

4.2.2 Environmental Effect

The potential for significant or adverse impacts would be related to the generation of construction and operational emissions on regional and local scales. As discussed below, the Project would potentially result in a significant or adverse air quality effect. This conclusion should be verified with a detailed air quality study to address CEQA/NEPA compliance.

Regarding construction activity, the SCAQMD has established significance thresholds for assessing pollutant emissions. Emissions would result from equipment exhaust, on-road truck and worker vehicle exhaust, and fugitive dust. The Alternative Scenarios would require varying degrees of construction activity, although each Scenario would require substantial equipment and truck activity. Based on experience with similarly sized projects, it is possible that construction emissions would exceed SCAQMD regional emissions significance criteria. The assessment of localized emissions is heavily dependent on the distance from the project site to the nearest sensitive land use. Sensitive receptors within the Study Area are located adjacent to each alignment (e.g., residences and schools located along Prairie Avenue). The SCAQMD Localized Significance Threshold (LST) guidance provides thresholds starting at 82 feet and extending to 1,640 feet. It is not unusual for the LSTs to be exceeded at 82 feet or less, particularly related to fugitive dust associated with excavation and site preparation. Construction emissions should be modeled and compared to the SCAQMD significance thresholds. Based on the distance between sensitive land uses and construction activities, it is likely that mitigation would be required to reduce or eliminate significant or adverse emissions. Regarding operational emissions, the electrically-powered transit line would not directly generate emissions that would impact sensitive land uses. The Project would result in indirect emissions related to electricity generation and shift in regional ridership and associated vehicle miles traveled (VMT). Emissions should be quantified, although these indirect emissions would not likely exceed the SCAQMD significance criteria based on experience with similar projects.

4.3 Agricultural Resources

4.3.1 Setting/Existing Conditions

No farmland, agricultural uses, or related operations are present within the Study Area or the surrounding area. Due to its urban setting, the Study Area is not included in the Farmland Mapping and Monitoring Program of the California Resources Agency. The Study Area is not zoned for agricultural use or under a Williamson Act nor zoned for forest land or timberland.

4.3.2 Environmental Effect

The potential for significant or adverse impacts would be related to conversion of farmland, timberland and forest land to other uses.

As noted above, the Study Area does not contain farmland, forestland, or timberland. Accordingly, the Project would not result in the conversion of these uses to non-agricultural or forest uses under the Alternative Scenarios. As the Study Area and surrounding area do not contain farmland of any type, none of the Alternative Scenarios would conflict with a Williamson Act. Similarly, the Alternative Scenarios would also not conflict with forest land or timberland zoning or result in the loss of forest land or conversion of forest land to non-forest use. None of the Alternative Scenarios would result in conversion of any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use, and therefore, no related impacts would occur.

4.4 Biological Resources

4.4.1 Setting/Existing Conditions

All of the Alternative Scenarios would be located in a dense urban environment. Vegetation within the proposed alternative alignments is limited to common street trees, grasses, and shrubs. A search of the California Natural Diversity Database (CNDDB) was also conducted to assess the existence of sensitive species within the Study Area and the results are shown in table below. The CNDDB database identifies eight sensitive rare bird and plant species that occur in the vicinity of the Study Area, of which five are listed as endangered.[1] Among the five endangered species, San Diego Button-Celery (*Eryngium aristulatum var. parishii*) and California Orcutt Grass (*Orcuttia californica*) are considered to have been extirpated. The Least Bell's Vireo (*Vireo bellii pusillus*), Tricolored Blackbird (*Agelaius tricolor*) and the Coastal Dunes Milk-Vetch (*Astragalus tener var. titi*) are considered to be possibly extirpated. Only Southwestern Willow Flycatcher (*Empidonax traillii extimus*) endangered species is presumed to still exist in the Study Area.

1 California Department of Fish and Wildlife, California Natural Diversity Database (CNDDB) for the Inglewood Quad, https://map.dfg.ca.gov/bios/?tool=cnddbQuick, accessed May 30, 2017.

In addition, a review of local and regional plans determined that no riparian habitats or sensitive natural communities are located in the Study Area or in the adjacent surrounding area, nor have they been identified in City or regional plans, policies, or regulations of the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, or the County of Los Angeles.

Table 4.4.1-1: Sensitive Species in the Vicinity of the Alternative Scenarios

Common Name	Scientific Name	Quadrant	Presence	Sensitive	Federal Status	State Status
Coastal California Gnatcatcher	Polioptila californica californica	Venice	Presumed Extant	N	Threatened	None
Spreading Navarretia	Navarretia fossalis	Inglewood	Extirpated	N	Threatened	None
Southwestern Willow Flycatcher	Empidonax traillii extimus	Los Angeles	Presumed Extant	N	Endangered	Endangered
Least Bell's Vireo	Vireo bellii pusillus	South Gate	Possibly Extirpated	N	Endangered	Endangered
San Diego Button-Celery	Eryngium aristulatum var. parishii	Venice	Extirpated	N	Endangered	Endangered
California Orcutt Grass	Orcuttia californica	Inglewood	Extirpated	N	Endangered	Endangered
Tricolored Blackbird	Agelaius tricolor	Inglewood	Possibly Extirpated	N	None	Candidate Endangered
Coastal Dunes Milk-Vetch	Astragalus tener var. titi	Inglewood	Possibly Extirpated	N	Endangered	Endangered

SOURCE: California Department of Fish and Wildlife, California Natural Diversity Database (CNDDB) for the Inglewood Quad

4.4.2 Environmental Effect

The potential for significant or adverse impacts would be related to tree removal, sensitive habitat, and sensitive species.

As discussed above, of the eight endangered species, only the Southwestern Willow Flycatcher is presumed to exist in the Study Area. Although it is possible for the Southwestern Willow Flycatcher species to exist within the Study Area, it is highly unlikely due to its current development setting.

The Study Area contains trees that have the potential to be used for nesting by migratory birds. In the event, street trees are to be removed as part of the Project, it is standard practice for construction activities that involve tree removal to be timed as much as possible to occur outside the migratory bird nesting season to ensure compliance with the Migratory Bird Treaty Act (MBTA). A survey of potential nesting sites to be completed by a qualified biologist would be required, if construction commenced during nesting season (March through August). Identified nests would be protected in place to ensure compliance with all applicable laws and regulations, including the MBTA and California Department of Fish and Wildlife Code's Protection of birds' nests (Sections 3503 and 3503.5) and (Section 3513) Taking Migratory Bird Treaty Act birds. Therefore, it is unlikely that any of the Alternative Scenarios would result in significant impacts related to biological resources.

4.5 Cultural Resources

4.5.1 Setting/Existing Conditions

The geographic area within which a project may directly or indirectly affect historic and other cultural resources is generally designated as the likely Area of Potential Effects (APE). If necessary, an APE will be formally defined during the initiation of the environmental clearance process. For this analysis, the Study Area, which is the area within 150 feet of each of the Alternative Scenarios, is identified as the preliminary APE.

The National Register for Historic Places (NHRP), the California Register of Historic Resources (California Register), the Los Angeles Historic Cultural Monuments Database and Historic Places LA were used to survey buildings in the preliminary APE and the following were identified as historic resources:

- **The Forum,** 3900 Manchester Boulevard (NHRP)
- **Fox Theater,** 115 North Market Street (NHRP)
- **Centinela Springs,** 700 Warren Lane (California Register)
- **Industrial Building,** 5310 West Century Boulevard (Historic Places LA)

In addition, the Los Angeles Assessor Parcel Map was used to identify buildings that are 45-years or older as they potentially could be historical buildings. **Table 4.5.1-1** below shows the total number of buildings and those that are 45-years or older along each of the Alternative Scenarios.

Table 4.5.1-1: Properties 45-Years or Older

	Fairview Heights Interlined Scenario	Arbor Vitae Independent Scenario	Century Independent Scenario	Market Street Independent Scenario
Total Number of Properties	104	248	172	141
Properties 45-Years or Older	94	232	148	128

SOURCE: Los Angeles County Office of the Assessor, 2015; Terry A. Hayes Associates Inc., 2017.

The proposed alignment for the Fairview Heights Interlined Scenario would traverse south of the Centinela Springs Historical Landmark and west of the Forum historic property. However, the Prairie Avenue portion of the alignment, along which the Forum historic property is located, would be underground. Of the total 104 properties identified within this Study Area, 94 of the properties are 45 years or older.

Along the Arbor Vitae Independent Scenario, 232 of the 248 properties within its Study Area would be 45-years or older and no identified historic properties are located along this scenario.

Along the Century Independent Scenario, 148 of the 172 total properties within its Study Area would be 45-years or older. On the north of this alignment, an Industrial Building located at 5310 West Century Boulevard is identified as a historic property by Historic Places LA.

The proposed alignment for the Market Street Independent Scenario would traverse west of the Forum historic property located at 3900 Manchester Boulevard, and to the east of the Fox Theater historic property located at 115 North Market Street. Of the total 141 properties identified within this Study Area, 128 of the properties are 45-years or older.

4.5.2 Environmental Effect

The potential for significant or adverse impacts would be related to damaging effect on any of the historic, archeological, and paleontological resources.

Construction of the Alternative Scenarios would mostly occur within the existing right-of way and would only require minor modifications to lanes, curbs, medians and gutters, with the exception of proposed station platforms and MSF. The share of properties 45-years or older are nearly the same along each of the Alternative Scenarios. However, based on the proximity of identified historical resources to the proposed alignments, the Arbor Vitae Independent Scenario would have the least potential for impacts with regard to historical resources. Impacts are likely to be less than significant for the Fairview Heights Interlined Scenario. However, impacts to historical resources for the Century Independent Scenario would depend on the location of the MSF site, and that for the Market Street Independent Scenario would depend on the location of the guideway and the MSF site.

The Fairview Heights Interlined Scenario would traverse adjacent to the historic Forum located on the east side of Prairie Avenue and the Edward Vincent Jr. Park located on the north of Florence Avenue, within which the Centinela Springs Historical Landmark is identified. Since the Prairie Avenue portion of this scenario would be located underground, no impacts to the Forum's historic setting is anticipated as a result of the Fairview Heights Interlined Scenario.

Based on description in the Historic Places LA, the Centinela Springs Historical Landmark refers to bubbling springs that once flowed here from their source in a deep water basin that has existed continuously since the Pleistocene Era. The Fairview Heights Interlined Scenario would include an approximately 10 feet retaining wall along the south edge of Edward Vincent Jr. Park. However, the retaining wall would be at a substantial distance from the Centinela Springs, and therefore, no impacts to this historical landmark is anticipated.

The Arbor Vitae Independent Scenario would not traverse adjacent to any of the identified historic properties. Further, none of the potential MSF sites are proposed within or adjacent to any identified historical resource. As such, no impacts are likely with regard to historic resources as a result of the Arbor Vitae Independent Scenario.

Along the Century Independent Scenario, an industrial building at 5310 West Century Boulevard was identified as a historic building. Based on description in Historic Places LA, the property may be eligible as a contributor to a Historic Preservation Overlay Zone (HPOZ) through SurveyLA or other survey evaluation. However, the median running aerial guideway would be constructed within the existing right-of-way and would not impact the industrial building at 5310 West Century Boulevard. Moreover, the Century Independent Scenario does not propose any demolition, relocation or rehabilitation of this property nor are stations or MSF proposed within or in its proximity.

The Century Independent Scenario includes a potential MSF within the Forum historic property. As described above, the Forum building is a symmetrical structure of roman architectural style and includes vertical columns along its circular façade. There are no other buildings within 250 feet of this building, except for maintenance equipment on the south of the structure. The open space all around the structure forms the current setting of the historic property. Introduction of MSF at this property would interfere with the relationship of this property to its historic setting. Although the MSF at this location would incorporate design features to ensure that they are compatible with the historic character of the Forum, the introduction of new structures would alter the existing environment surrounding the historic property thereby diminishing its historic setting. As such, the Century Independent Scenario is likely to have significant impact on the historic Forum.

Six other potential MSF sites are under consideration for the Century Independent Scenario. None of the other proposed MSFs would be located on any of the above identified historic properties. Therefore, no significant impacts related to historic resources are anticipated as a result of the Century Independent Scenario unless the MSF is located within the Forum.

The Market Street Independent Scenario would traverse adjacent to the Fox Theater property. However, as described above, construction and operation of this scenario would occur within the existing right-of way and would only require minor modifications. The Los Angeles Railway Yellow Cars historically operated along Market Street in front of this property, and a system of poles and overhead wires existed for many decades. As such,

overhead cables were part of the historic setting and their reintroduction as part of the new streetcar system would not be incongruous. The integrity of the setting or the character of the Fox Theater would not be altered in such a manner as to diminish the relationship of this property to its historic setting. However, similar to the Century Independent Scenario, the Market Street Independent Scenario includes a potential MSF and station platform at the Forum property. Therefore, similar to the discussion above, the introduction of an MSF and/or station platform at this location would diminish the relationship of the Forum to its historic setting.



Figure 4.5.2-1: A View of the Yellow Car in Front of Fox Theater on Market Street in Inglewood

TPSS units would not be located on historic properties, and would not reduce the integrity or significance important to historic resources, for any of the Alternative Scenarios. TPSS units would be designed in a manner that is appropriate to the context in which they are proposed. However, their exact location is not known at this time. In addition, many properties within the Study Area are 45-years or older, some of which could be historical buildings. Therefore, further study would be needed to assess the potential for adverse impact and appropriate mitigation measures when the exact location, size and design of the MSF, TPSS and station platforms have been determined.

No known or unknown archaeological resource would be removed, altered, or destroyed as a result of the proposed Project. Although, the Study Area has been previously disturbed, the Project would require additional ground disturbance that would involve excavation into native soils that may contain archaeological or paleontological resources. Discoveries which may be encountered may include, but not be limited to, dwelling sites, stone

implements or other artifacts, animal bones, human bones, and fossils. If discovery is made of items of archaeological or paleontological interest, Metro and FTA best management practices require that construction activities are immediately stopped and the appropriate authorities are notified of the find (i.e., Metro Project Manager and FTA liaison). Work is typically not allowed to continue until ordered and overseen by the Engineer.

The Fairview Heights Interlined Scenario would travel adjacent to the Inglewood Park Cemetery, which is located at the southeast corner of Florence Avenue/Prairie Avenue intersection. Accordingly, there is high potential for human remains to be encountered during excavation along the Fairview Heights Interlined Scenario. No formal cemeteries, other places of human interment, or burial grounds or sites are known to occur within the rest of the Study Area. However, there is always a possibility that human remains may be unexpectedly encountered during construction. If human remains are encountered unexpectedly during construction, demolition and/or grading activities, State and federal laws require that construction activities cease until the County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code Section 5097.98.

4.6 Geology and Soils

4.6.1 Setting/Existing Conditions

According to the most recent Alquist-Priolo Earthquake Fault Zoning Map, the closest fault zone to the Study Area is the Newport Inglewood Fault Zone. **able 4.6.1-1** below shows the location of the Newport Inglewood Fault Zone relative to the Alternative Scenarios. The fault would intersect the Fairview Heights Interlined Scenario at Florence Avenue. The fault is located approximately 500 feet west of North Market Street between Florence Avenue and East Nutwood Street, and further away from the rest of the alignment for the Market Street Independent Scenario. The Century and Arbor Vitae Independent Scenarios are not located within an Alquist-Priolo Special Study Zone and Fault Rupture Study Area.[2]

The topography of the Study Area is relatively flat and does not include major hills or land forms. Further, the Earthquake Zones of Required Investigation Map for the Inglewood and Venice Quadrangles, provided by the California Department of Conservation, Division of Mines and Geology does not identify any landslide or liquefaction zones within the Study Area.

2 City of Los Angeles, GeoHub, http://geohub.lacity.org/datasets/7f6e322db1d24909a90a4ddc2bba8d28_0, accessed June 1, 2016.

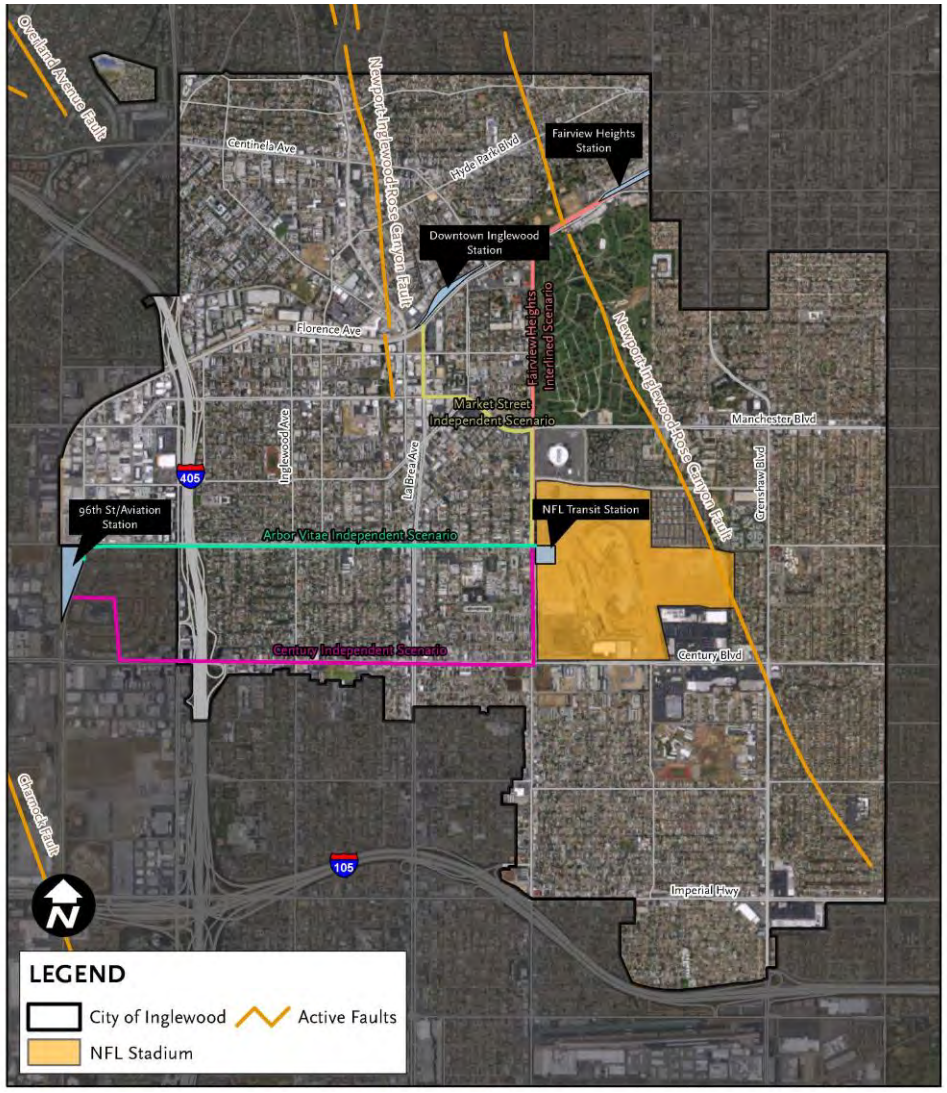


Figure 4.6.1-1: **Newport Inglewood Fault Zones Relative to the Study Area**

SOURCE: U.S. Geological Survey, 2006, Quaternary fault and fold database for the United States; Terry A. Hayes Associates Inc. 2017.

4.6.2 Environmental Effect

The potential for significant or adverse impacts would be related to personal and property damages resulting from fault rupture or any type of geological failure, including lateral spreading, off-site landslides, liquefaction, or collapse.

The Newport Inglewood Fault Zone would intersect with the Fairview Heights Interlined Scenario at Florence Avenue and is approximately 500 feet west of Market Street. The Newport-Inglewood fault has the potential to induce ground deformation by rupturing the ground surface in the Study Area.[3] Further study would be needed to determine potential adverse impacts as a result of the Fairview Heights Interlined Scenario, and to devise appropriate mitigation measures to reduce impacts to less than significant. Given the proximity of the Newport-Inglewood fault to the Market Street Independent Scenario, further study would be needed to determine potential adverse impacts and appropriate mitigation measures for this scenario.

No known faults traverse the other two Alternative Scenarios and no development is proposed on known faults. The Arbor Vitae and Century Independent Scenarios would not expose people to substantial risk of injury as a result of fault rupture. Therefore, no impacts related to the rupture of a known earthquake fault are likely for Arbor Vitae and Century Independent Scenarios.

As with seismic ground shaking impacts, the geographic context for analysis of impacts on development from unstable soil conditions, including landslides, liquefaction, subsidence, collapse, or expansive, unstable, or corrosive soils is generally site-specific. Development of the Project would be required to undergo analysis of geological and soil conditions applicable to the specific individual project, and restrictions on development would be applied in the event that geological or soil conditions pose a risk to safety as a result of site-specific geologic or soils instability, subsidence, collapse, and/or expansive soil.

Development of any of the Alternative Scenarios could occur in areas of expansive soils. Both the Cities of Inglewood and Los Angeles require, as a standard practice, the preparation, review, and approval of site-specific geotechnical reports for new developments. All earthwork and grading activities require grading permits and would include requirements and standards designed to limit potential expansive soil impacts to acceptable levels. All on-site grading and site preparation must comply with applicable provisions of Inglewood and Los Angeles Municipal Codes, which address grading, excavations, and fills, and the recommendations of the geotechnical report. Compliance with the recommendations of the geotechnical report, as well as the City's Building and Grading Codes, are reasonably expected to be sufficient to reduce impacts from expansive soil-related hazards. Because development facilitated by the Project would be required to implement such appropriate design and construction measures, impacts related to expansive soils are likely to be less than significant for all the Alternative Scenarios.

3 Draft Environmental Impact Report for the Crenshaw Transit Corridor Project, September 2009, http://media.metro.net/projects_studies/crenshaw/images/crenshaw-DEIS-DEIR-affected-environment-part-b.pdf, accessed June 1, 2017.

4.7 Greenhouse Gases (GHG)

GHGs refer to a group of chemical compounds that are generally believed to affect global climate conditions. The greenhouse effect is a concept in atmospheric science that describes the process by which certain atmospheric gases—GHGs—absorb energy from sunlight within the Earth's atmosphere and prevent it from being released back into space. This mechanism is responsible for maintaining a warm, habitable environment on the planet's surface based on the equilibrium concentrations of the gases. GHGs such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) keep the average surface temperature of the Earth close to 60 degrees Fahrenheit.

California is the 15th largest emitter of GHG on the planet, representing about two percent of the worldwide emissions. The transportation sector – largely the cars and trucks that move people and goods – is the largest contributor to GHG emissions followed by electrical power. Regionally, SCAG estimated regional transportation GHG emissions in the 2016-2040 RTP/SCS for a 2012 emissions scenario. The SCAG regional transportation total was estimated to be 243,152 tons per day of CO_2. Los Angeles County, the largest county in the SCAG region, represented 120,929 tons per day of transportation emissions, or 50 percent of the regional transportation total.

4.7.1 Environmental Effect

The potential for significant or adverse impacts would be related to the generation of construction and operational emissions on a regional scale. As discussed below, it is not anticipated that the Project would result in a significant or adverse GHG effect.

The Project would generate GHG emissions during both short-term construction and long-term operational activities. Sources of temporary GHG emissions associated with construction include off-road heavy duty equipment and on-road motor vehicle travel to and from the construction areas. In addition to short-term impacts, long-term operation of the Project would generate indirect GHG emissions associated with changes to regional passenger VMT and electricity generated to power the system. Regarding construction, GHG emissions are cumulative in nature and are not considered in the context of short-term environmental impacts. Furthermore, the complex nature of atmospheric chemistry responsible for climate change makes it impossible to determine the incremental impact of a single project with regards to GHG emissions, and consequently GHG emissions are considered from a long-term regional perspective.

Regarding long-term operational emissions, it is anticipated that the transit line would reduce regional passenger VMT. There would be an associated reduction in GHG emissions. State, regional, and local GHG reduction plans commonly site increased mass transit as a means to mobile source GHG emissions. The SCAG 2016-2040 RTP/SCS includes a strong commitment to reduce emissions from transportation sources. The plan charts a course for closely integrating land use and transportation planning including in areas labeled as High Quality Transit Areas. High Quality Transit Areas are located within one-half mile of a fixed guideway transit stop or a bus transit corridor where passengers are picked up at a frequency of every 15 minutes or less during peak commuting hours. Major themes in the 2016-2040 RTP/SCS that are relevant to the Project include integrating strategies for land use and transportation, striving for sustainability, protecting and preserving the existing transportation infrastructure, increasing capacity through improved system management, and giving people more transportation choices. The Project would provide increased regional transit

opportunities, would create new High Quality Transit Areas, and would not interfere with SCAG's ability to implement the regional strategies outlined in the 2016-2040 RTP/SCS. Therefore, the Project is unlikely to result in a significant or adverse GHG effect.

4.8 Hazards and Hazardous Materials

4.8.1 Setting/Existing Conditions

Environmental database records were reviewed to identify properties within the Study Area to identify sites that may have soil or groundwater contamination. The California Department of Toxic Substances Control's EnviroStor database is an online search tool for identifying sites that have known contamination or sites for which there may be reasons to investigate further. The EnviroStor database includes the following site types: federal Superfund sites (National Priority List); State response, including military facilities and State Superfund; voluntary cleanup; and school sites. Information included on the database consists of site name, site type, status, address, any restricted use (recorded deed restrictions), past use(s) that caused contamination, potential contaminants of concern, potential environmental media affected, site history, planned and completed activities. GeoTracker, which is the Water Boards' data management system for sites that impact groundwater or have the potential to impact groundwater, was also searched as part of this analysis. GeoTracker contains sites that require groundwater cleanup (Leaking Underground Storage Tanks (LUST), Department of Defense, and Site Cleanup Program) as well as permitted facilities that could impact groundwater (Irrigated Lands, Oil and Gas Production, Operating Underground Storage Tanks and Land Disposal sites).

The database search identified potential hazard sites as shown in the tables below. Cleanup has been completed for the majority of sites, with the exception of three sites along the Century Independent Scenario, one of which is eligible for closure. The Century Mobile Site at 1244 South Inglewood Avenue is identified as a LUST Cleanup Site and is currently under Site Assessment and the Northrop Corporation Aircraft Division identified as a Hazardous Waste Site is under Protective Filer.

Table 4.8.1-1: Hazardous Material Sites along the Fairview Heights Interlined Option

Site Name	Project Type	Cleanup Status	Address	On Study Area
Daniel Freeman Memorial Hospital	LUST Cleanup Site	Completed - Case Closed	333 Prairie Avenue Inglewood, CA 90301	No
The Forum	LUST Cleanup Site	Completed - Case Closed	3900 Manchester Blvd, West Inglewood, Ca 90305-2227	Yes

SOURCE: Envirostor.dtsc.ca.gov, geotracker.waterboards.ca.gov

Table 4.8.1-2: Hazardous Material Sites along the Arbor Vitae Independent Option

Site Name	Project Type	Status	Address	On Study Area
76 Products Station # 2156	LUST Cleanup Site	Completed - Case Closed	400 Arbor Vitae St W Inglewood, CA 90301	No
Circle K Stores # 5615	LUST Cleanup Site	Completed - Case Closed	400 Arbor Vitae St W Inglewood, CA 90301	No

SOURCE: Envirostor.dtsc.ca.gov, geotracker.waterboards.ca.gov

Table 4.8.1-3: Hazardous Material Sites along the Century Independent Option

Site Name	Project Type	Status	Address	On Study Area
Arco #0003	LUST Cleanup Site	Completed - Case Closed	5201 Century Blvd W Los Angeles, CA 90045	No
Chevron #9-7240	LUST Cleanup Site	Completed - Case Closed	5156 Century Blvd West Lennox, CA 90304	No
Inglewood Transmission, Inc	LUST Cleanup Site	Completed - Case Closed	4919 West Century Blvd Inglewood, CA 90301	No
Dombrowski's Flowers	LUST Cleanup Site	Completed - Case Closed	4940 Century Blvd W Inglewood, CA 90304	No
Rent A Car Cheap	LUST Cleanup Site	Completed - Case Closed	4858 Century Blvd W Inglewood, CA 90304	No
Century Mobile	LUST Cleanup Site	Open – Site Assessment	1244 S Inglewood Ave Inglewood, CA 90301	No
Unocal #6370	LUST Cleanup Site	Open – Eligible for Closure	4760 Century Blvd W Inglewood, CA 90304	No

Site Name	Project Type	Status	Address	On Study Area
Econo Lube N Tube	LUST Cleanup Site	Completed - Case Closed	4639 W Century Blvd Inglewood, CA 90304	No
United Oil #57	LUST Cleanup Site	Completed - Case Closed	4520 Century Blvd W Inglewood, CA 90304	No
Fritz Foreign Service	LUST Cleanup Site	Completed - Case Closed	4501 West Century Boulevard Inglewood, CA 90304	No
Unocal #5050	LUST Cleanup Site	Completed - Case Closed	4000 Century W Inglewood, CA 90304	Potential MSF Site
Mobile Oil Corp S/S #18-Apj	LUST Cleanup Site	Completed - Case Closed	3016 Century Blvd W Inglewood, CA 90303	No
Platinum Stereo	LUST Cleanup Site	Completed - Case Closed	4490 W Century Blvd. Inglewood, CA 90304	No
Century/Hawthorne Shopping Center	LUST Cleanup Site	Completed - Case Closed	10001-10025 Hawthorne Boulevard Inglewood, CA 90304	No
Ramar Industries	LUST Cleanup Site	Completed - Case Closed	426 East 99th Street Inglewood, CA 90301	No
Arco #9645/ Former Thrifty Oil #251	LUST Cleanup Site	Completed - Case Closed	4130 Century Blvd W Inglewood, CA 90304	No
Northrop Corporation Aircraft Division	Hazardous Waste	Protective Filer	9920 La Cienega Blvd Inglewood, CA 902500000	No

SOURCE: Envirostor.dtsc.ca.gov, geotracker.waterboards.ca.gov

Table 4.8.1-4: Hazardous Material Sites along the Market Street Independent Option

Site Name	Project Type	Status	Address	On Study Area
Simons Mini Market	LUST Cleanup Site	Completed - Case Closed	501 E Manchester Blvd Inglewood, CA 90301	No
Sears Auto Center (Former)	LUST Cleanup Site	Completed - Case Closed	500 Manchester Blvd E Inglewood, CA 90301	Potential MSF Site
The Forum	LUST Cleanup Site	Completed - Case Closed	3900 Manchester Blvd West Inglewood, Ca 90305-2227	No
Unocal #5050	LUST Cleanup Site	Completed - Case Closed	4000 Century W Inglewood, CA 90304	Potential MSF Site

SOURCE: Envirostor.dtsc.ca.gov, geotracker.waterboards.ca.gov

Schools within the Study Area were identified to determine the potential for impacts associated with hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste. The following schools are located near the Fairview Heights Interlined Scenario:

- **A Bright Beginning,** 503 South Prairie Avenue, Inglewood
- **Debbie's Child Development Center,** 521 South Osage Avenue, Inglewood
- **Kelso Elementary School,** 809 East Kelso Street, Inglewood
- **The Grace Hopper STEM Academy,** 601 Grace Avenue, Inglewood
- **St. Mary's Academy**, 701 Grace Avenue, Inglewood
- **St John Chrysostom School,** 530 East Florence Avenue, Inglewood

The following schools are located near the Arbor Vitae Independent Scenario:

- **Payne Elementary School,** 215 West 94th Street, Inglewood
- **Century Community Charter School,** 901 Maple Street, Inglewood
- **Wiz Child Development Center,** 121 West Arbor Vitae Street, Inglewood

The following schools are located near the Market Street Independent Scenario:

- **Kelso Elementary School,** 809 East Kelso Street, Inglewood
- **A Bright Beginning,** 712 East Manchester Boulevard, Inglewood

No schools were identified within the Century Independent Scenario.

4.8.2 Environmental Effect

The potential for significant or adverse impacts would be related to contamination sites within the Study Area.

The database search identified potential hazard sites as shown in the tables above. The Century Mobile site is currently under assessment, the Unocal #6370 site is identified as eligible for closure and the Northrop Corporation Aircraft Division is under protective filer. All the other sites were LUST cleanup sites and cleanup has been completed. However, it is likely that some of these hazards would be encountered during site disturbance activities. These materials, if existing, may be disturbed during construction of the new station. A Phase I Environmental Site Assessment would likely be required to identify and possibly remediate existing hazardous conditions, including the three sites identified above. Results of the Phase I Environmental Site Assessment would determine the need for a Phase II Environmental Site Assessment.

Six schools are located along the Fairview Heights Interlined Scenario alignment, three schools along the Arbor Vitae Independent Scenario alignment and two schools along the Market Street Independent Scenario alignment. No schools were noted along the Century Independent Scenario alignment. The Project would comply with all applicable local, State and federal regulations relating to transport, use, or disposal of hazardous materials. However, further analysis would be needed to evaluate potential impacts and to determine appropriate mitigation measures to ensure schools in the Study Area would not be adversely effected by hazardous emissions or by handling of hazardous or acutely hazardous materials.

Among the Alternative Scenarios, the Arbor Vitae Independent Scenario and the Century Independent Scenario would be within two miles of the Los Angeles International Airport (LAX). As shown in the figure below, both the scenarios are outside of the LAX Runway Protection Zones (RPZ). In addition, although the Hawthorne Municipal Airport is located approximately 1.5 miles south of Century Boulevard, the Century Independent Scenario is outside of the related RPZ. None of the Alternative Scenarios would result in an airport safety hazard.

The Los Angeles County Department of Water and Power has identified Interstate 405 and Hawthorne Boulevard as disaster routes.[4] These two disaster routes intersect Arbor Vitae Street and Century Boulevard within the Study Area. The Arbor Vitae Independent Scenario and Century Independent Scenarios would consist of an elevated guideway, and would be approximately 17 feet above street level. As such, neither of the two

4 Los Angeles County, Disaster Route Map for the City of Inglewood, http://dpw.lacounty.gov/dsg/disasterroutes/map/Inglewood.pdf, accessed June 6, 2017.

scenarios would interfere with vehicular traffic, including emergency vehicles. Therefore, none of the Alternative Scenarios are likely to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

To avoid disruption of emergency service during construction, emergency service providers would be consulted regarding the roadway modifications and the construction process. Proper communication with emergency facilities would inform them of exact construction area locations and schedules and would incorporate necessary mitigation measures. Therefore, construction related impacts on emergency services are not likely to be significant.

Wildland fires were not found to pose a significant risk to the communities in the City of Inglewood.[5]

5 City of Inglewood, All Hazards Mitigation Plan, March 23, 2010, http://hazardmitigation.calema.ca.gov/docs/approved_lhmps_under_2008_fema_guidance/City_of_Inglewood_All_Hazards_Mitigation_Plan_-_FINAL.pdf, accessed June 8, 2016.

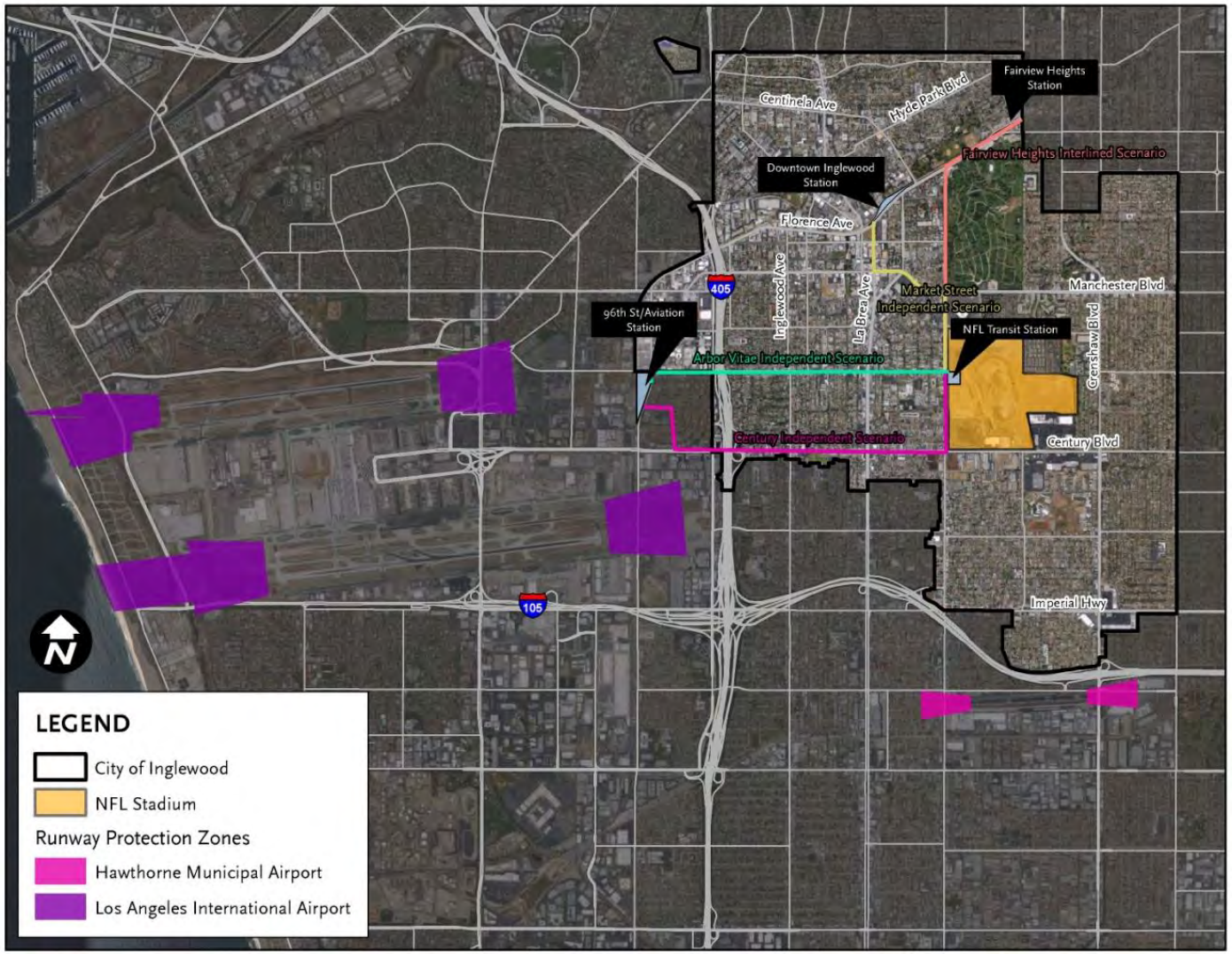


Figure 4.8.2-1: Runway Protection Zones for the Los Angeles International Airport and the Hawthorne Municipal Airport

SOURCE: Los Angeles County GIS Data Portal, Airport Land Use Commission Layers, 2016; Terry A. Hayes Associates Inc. 2017.

4.9 Hydrology and Water Quality

4.9.1 Setting/Existing Conditions

The Clean Water Act requires a biennial assessment of water quality and a list of impaired water bodies. The California 303(d) list of impaired water bodies in California provides the basis for identifying the Total Maximum Daily Loads (TMDLs) for pollutants of concern identified on the list of impaired water bodies. Ballona Creek, located approximately five miles northwest of the Study Area, is listed on the 303(d) List in response to cyanide pollutants, and TMDLs have been established for cyanide levels in the water. Ballona Creek is expected to be de-listed in 2019 once TMDL levels for cyanide are achieved. Centinela Creek Channel, a tributary of the Ballona Creek and located approximately 4.5 miles to the northwest, is not listed on the 303(d) List.

The Federal Emergency Management Agency (FEMA) tracks areas which are vulnerable to 100-year flood and 500-year flood. The FEMA Flood Map Service Center was used to identify 100- and 500-year flood hazard zones within Study Area. Each Alternative Scenario lies within Flood Insurance Rate Map (FIRM) panel 06037C1780F. No 100-year flood hazard zones occur within the Study Area. The Study Area is located within Zone X, which is an area determined to be outside the 0.2 percent annual chance floodplain.

4.9.2 Environmental Effect

The potential for significant or adverse impacts would be related to water pollution, drainage, and/or construction in a floodplain.

No impaired water bodies are located near the Study Area. The Project is expected to comply with all applicable codes, standards and regulations pertaining to water quality standards and waste discharge requirements. Any impact to water quality will be addressed through Best Management Practices (BMP) to comply with Los Angeles Regional Water Quality Control Board (LARWQCB) requirements. It is anticipated that the Project will need to address drainage at the elevated alignment segments. Any potential short-term construction impacts would be mitigated using requirements outlined by the California State Water Resources Control Board's National Pollutant Discharge Elimination System (NPDES).

The Project would not require the use of groundwater at the Study Area. Potable water would be supplied by the City of Inglewood, which draws its water supply from City-owned ground water wells and imported water from Metropolitan Water District, and conducts its own assessment and mitigation of potential environmental impacts. Operation of the Project would not require direct additions or withdrawals of groundwater.

The Fairview Heights Interlined Scenario and the Market Street Independent Scenario include alignments that are partially underground. A review of existing groundwater elevation and analysis of infiltration capacity of underlying soils would be necessary to determine potential impacts. In the event that temporary dewatering is required during construction, the Project would comply with NPDES permit requirements. Compliance of NPDES requirements would ensure that groundwater quality and groundwater recharge would not be impacted by the Fairview Heights Interlined Scenario and the Market Street Independent Scenario. The Arbor Vitae Independent Scenario and the Century Independent Scenario include aerial guideways. Neither of these Scenarios would directly result in a net deficit in aquifer volume or a lowering of the local groundwater table, and are therefore not

likely to adversely impact groundwater quality or groundwater recharge. Among the Alternative Scenarios, potential impacts would be greater for the Fairview Heights Interlined Scenario and the Market Street Independent Scenario, requiring appropriate mitigation measures.

The Project is expected to generally match the existing drainage pattern of the Study Area. However, unpaved areas replaced by impervious surfaces as part of the Project, could result in a minor increase in local stormwater runoff. Therefore, further study of Alternative Scenarios would be necessary to determine the level of impacts and selection of mitigation measures to reduce impacts. With the implementation of appropriate mitigation measures, impacts are likely to be less than significant.

No 100- and 500-year flood hazard zones are located within the Study Area, including station areas and MSF locations. Further, the City of Inglewood, within which the Study Area is located, is not susceptible to floods from levee or dam failure.[6] The Study Area is also outside of tsunami inundation zones as mapped by the California Emergency Management Agency.[7] Therefore, no potential impacts related floodplains and tsunami inundation zones are anticipated as a result of the Alternative Scenarios.

4.10 Land Use and Planning

4.10.1 Setting/Existing Conditions

The Figure below shows the types of land uses within the Study Area. Along the Fairview Heights Interlined Scenario, government owned utilities are located on the south and north of Florence Avenue. The area east of Prairie Avenue is occupied by the Inglewood Park Cemetery and the Forum, which are categorized as institutional and recreational uses, respectively. The area west of Prairie Avenue includes a mix of commercial and residential uses.

Along Arbor Vitae Independent Scenario, the eastern portion of the alignment between Prairie Avenue and La Brea Avenue primarily consists of residential uses. The portion of the alignment between La Brea Avenue and the Interstate 405 Freeway includes a mix of neighborhood-commercial and residential uses. A mix of industrial, commercial and residential uses occupy the western portion of the alignment between Interstate 405 and Aviation Boulevard.

The area around the Century Independent Scenario predominately consists of commercial uses interspersed with residential uses.

The Market Street Independent Scenario predominately consists of commercial uses along the Market Street and Manchester Boulevard portion of the alignment. The Prairie Avenue portion of the alignment includes the Forum on the east and residential and commercial uses on the west.

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6 City of Inglewood, All Hazards Mitigation Plan, March 23, 2010, http://hazardmitigation.calema.ca.gov/docs/approved_lhmps_under_2008_fema_guidance/City_of_Inglewood_All_Hazards_Mitigation_Plan_-_FINAL.pdf, accessed June 8, 2016.

7 *Lbid.*

4.10.2 Environmental Effect

The potential for significant or adverse impacts would be related to division of an existing community and/or land use consistency.

The Fairview Heights Interlined Scenario primarily consists of residential and commercial uses west of Prairie Avenue and institutional and recreational uses on the east of Prairie Avenue. The Florence Avenue portion of the alignment consists of government owned utilities. East-west local streets on the west of Prairie Avenue are not through streets, and do not provide connections to the east of Prairie avenue. No sidewalk currently exists along the east side of Prairie Avenue, north of Manchester Boulevard. These conditions do not provide for a cohesive community character around the Fairview Heights Interlined Scenario. The Fairview Heights Interlined Scenario would be located underground along the Prairie Avenue portion of this alignment. As such, the Fairview Heights Interlined Scenario would not create a new barrier that would divide an existing community. Moreover, by introducing a new transit line along Florence Avenue and Prairie Avenue, the proposed scenario would improve connectivity between the existing communities on the north and south of Florence Avenue.

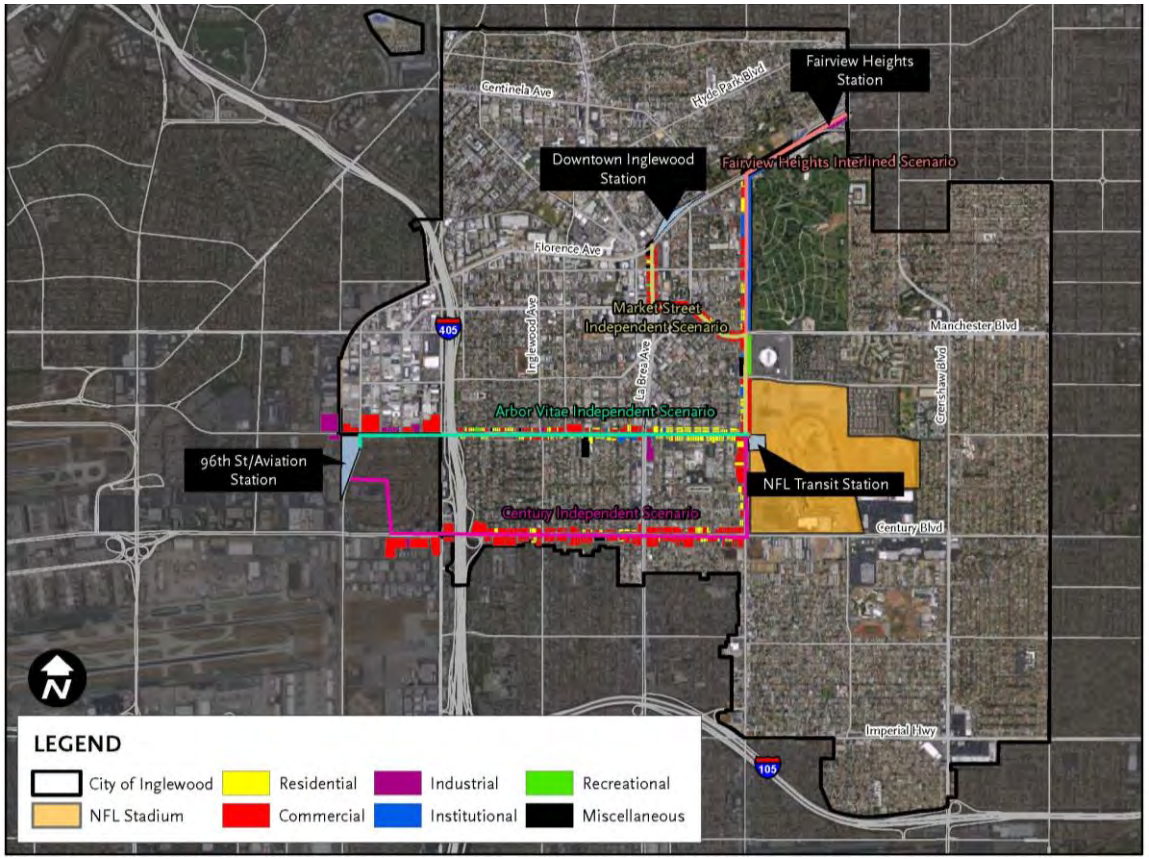


Figure 4.10.2-1: Existing Land Uses

SOURCE: Los Angeles County Office of the Assessor, Terry A. Hayes Associates Inc. 2017.

The Fairview Heights Interlined Scenario includes an alternative that extends the right-of-way along north Florence Avenue, adjacent to Edward Vincent Jr. Park. In addition, this alternative would include right-of-way extensions along east of Prairie Avenue, adjacent to the NFL Stadium. The proposed right-of-way extensions could require partial sliver takes of these properties for guideway transitions, which would change the existing land use. However, these changes are likely to be minor. Based on above, the Fairview Heights Interlined Scenario would not substantially conflict with the existing land use.

The Arbor Vitae Independent Scenario predominantly consists of residential uses interspersed with neighborhood serving commercial uses. Local streets running north-south intersect with Arbor Vitae street and connect existing residential communities on the north and south. Many of the residential and commercial properties along this alignment include driveway access from Arbor Vitae Street. The introduction of a transit line on Arbor Vitae Street could limit circulation pathways along local north-south streets and may limit direct access to the existing driveways. The Arbor Vitae Independent Scenario would mostly occur within the existing right-of-way, except for MSF and station platforms. However, as described in Section 4.1, Aesthetics, this Scenario would also result in the loss of existing parkways that currently provide a green buffer between the street and the adjacent residential uses. Based on the above, the Arbor Vitae Independent Scenario would likely create a barrier that would divide an existing community.

The Century Independent Scenario primarily consists of commercial uses along the alignment. Although, the properties along this alignment include driveway access from Century Boulevard, they are predominantly commercial and include hotel, motel and lodging facilities, which primarily attract non-resident customers. In addition, Century Boulevard is a major arterial connector with six traffic lanes and substantial amount of traffic. Based on existing conditions, the approximately 100 to 120 feet wide Century Boulevard is an existing barrier between the communities on its north and south. Therefore, potential circulation effects as a result of the Century Independent Scenario would not create a new barrier that would divide an existing community.

The Market Street Independent Scenario primarily consists of commercial uses, along Market Street and Manchester Boulevard. Prairie Avenue portion of its alignment consists of residential and commercial uses along the west, and includes the Inglewood Cemetery and the Forum on the east. Many of the local streets on the north and south of Manchester Boulevard are not interconnected. Moreover, Market Street and Manchester Boulevard portions of this scenario lie within the City of Inglewood TOD Plan area. The City of Inglewood adopted the TOD Plan in November of 2016. The Plan designates Market Street between Florence Avenue and Spruce Avenue as a Primary Pedestrian Promenade with priority on place-making and pedestrian movement. The TOD Plan also envisions a Green Boulevard with environmentally favorable features such as bioswales and protected bike lanes along Manchester Boulevard, between Inglewood Avenue and Prairie Avenue. A transit line along Market Street and Manchester Boulevard as part of the Market Street Independent Scenario would be consistent with the City of Inglewood's vision of updating infrastructure that result in environmental benefits and encourage active modes of transport. Local streets on west of Prairie Avenue are not through streets and do not provide connections to the east of Prairie Avenue. Therefore, although the Market Street Independent Scenario would reduce the accessibility between the north and south of Manchester Boulevard, it is not likely to be substantial enough to create a barrier that would divide an existing community.

The Market Street Independent Scenario also includes an alternative that extends the right-of-way along east of Prairie Avenue adjacent to the Forum and the NFL Stadium, and could require partial sliver takes of these properties for guideway transitions, which would change the existing land use on those areas. However, these land use changes are likely to be minor.

The Project would primarily occur within the existing public right-of-way. However, each Alternative Scenario would require full parcel takes for the development of MSF. This would require existing land uses to be converted to public facility land use. The majority of the MSF sites are proposed on parcels that serve as car rental, parking or are vacant. As such, no substantial land use changes are anticipated as a result of the Project.

The Study Area is not within a coastal zone and does not apply to a local coastal program. Further, the Study Area is located in an urban area and is not located in an area subject to any habitat conservation plan or natural community conservation plan.

4.11 Mineral Resources

4.11.1 Setting/Existing Conditions

The Project is located in an urbanized area with no known mineral resources or Mineral Resource Zones (MRZ). The California Department of Conservation's Regional Wildcat Map for District W1-5 indicates one oil field is located in the Study Area.

4.11.2 Environmental Effect

The existing oil filed in the Study Area is not active, and is designated as abandoned and dry by the California Department of Conservation.[8] No MRZs are located in the vicinity of the Study Area. Therefore, none of the Alternative Scenarios are likely to result in the loss of a locally important mineral resource recovery site delineated on a local general plan or other land use plan or result in the loss of availability of a known mineral resource that would be of value to the region.

4.12 Noise and Vibration

4.12.1 Setting/Existing Conditions

The Project would be located in a dense urban environment. Existing noise levels are dominated by aircraft and traffic noise; aircraft noise levels do not vary greatly during the day as air traffic is generally a constant activity. Portions of the Study Area along the northern end of Prairie Avenue, Manchester Boulevard, and the western portion of Century Boulevard are located within the LAX 65 decibel (dB) Community Noise Equivalent Level contour.[9] Although the dominant sources of noise are similar within the Study Area, the sensitive land uses surrounding the Alternative Scenarios are different. FTA has identified three categories of sensitive land uses. These land uses include 1) tracts of land where quiet is an essential element (e.g., recording studios), 2) residences and buildings where people normally sleep, and 3) institutional land uses with primarily daytime and evening use (e.g., schools and churches).

8 State of California, Department of Conservation, Division of Oil, Gas and Geothermal Resources, Regional Wild Cat Map, W1-5, ftp://ftp.consrv.ca.gov/pub/oil/maps/dist1/w1-5/MapW1-5.pdf, accessed June 14, 2017.

9 Los Angeles World Airports, Los Angeles International Airport Noise Contour Map, Quarter 1, 2017, May 30 2017.

Regarding the Fairview Heights Interlined Scenario, land uses on the western side of Prairie Avenue consist primarily of Category 2 land uses. Approximately 309 people reside along the Fairview Heights alignment. Category 3 land uses can be found on both the eastern and western side of the alignment such as Kelso Elementary School, Queen Park, Freeman Medical Tower, St. Mary's Academy, and Inglewood Park Cemetery. Along Florence Avenue, sensitive land uses are primarily limited to Category 3 land uses such as Inglewood Park Cemetery and Edward Vincent Jr. Park.

Regarding the Arbor Vitae Independent Scenario, land uses along either side of Arbor Vitae Street, east of Interstate 405 consist primarily of Category 2 land uses. Category 3 land uses along the alignment are Century Community Charter School, Islamic Center of Inglewood, and Payne Elementary School. Land uses west of Interstate 405 are primarily non-sensitive, with some sparsely populated areas of Category 2 land uses along the southern side of Arbor Vitae Street. Overall, approximately 1,400 people reside alongside the Arbor Vitae Street alignment and it has the largest population within its study area.

Regarding the Century Independent Scenario, Category 2 uses can be found on either side of the alignment. Approximately 530 people reside alongside the Century Boulevard alignment. Category 3 land uses along the alignment include Lenox Preschool, Jefferson Elementary School. Land uses west of the Interstate 405are primarily non-sensitive land uses.

Regarding the Market Street Independent Scenario, land uses on the western side of Prairie Avenue consist primarily of Category 2 land uses. Category 3 land uses along this alignment include Kelso Elementary School and Inglewood Park Cemetery. Land uses along Manchester Boulevard are primarily Category 2 between Prairie Avenue and South Locust Street. Land uses are primarily non-sensitive between Locust Street and Market Street. Land uses along Market Street are also primarily non-sensitive. There is one Category 3 land use along Market Street, Kaiser Permanente Inglewood Medical Offices. Approximately 276 people reside alongside the Market Street Independent Scenario.

The existing vibration environment in the Study Area is characterized by vehicles travelling along roadways, typically associated with heavy trucks and buses. However, vibration is rarely felt outside of the right-of-way. There are no other significant sources of vibration in the project vicinity. The primary concern regarding construction vibration relates to potential damage effects although annoyance is a concern for certain sensitive land uses (e.g. residences and schools).

Most buildings along each Alternative Scenario would fall into Category 2, residences and buildings where people sleep or Category 3, institutional land uses with primarily daytime use. There are highly vibration-sensitive buildings located along different alignments, including:

- The Forum along the Fairview Heights Interlined Scenario alignment;
- The Contenocity of Los Angeles LLC recording studio along the Arbor Vitae Independent Scenario alignment; and
- The Bembry Music recording studio along the Century Independent Scenario.

In addition, four historic vibration-sensitive resources are located in the Study Area. They include the Forum, Fox Theater, Centinela Springs, and an industrial building located at 5310 West Century Boulevard. The Forum is located approximately 300 feet outside of the right-of-way and would not be

susceptible to vibration damage. Centinela Springs is located within Edward Vincent Jr. Park, approximately 500 feet outside of the right of way and would not be susceptible to vibration damage.

4.12.2 Environmental Effect

The potential for significant or adverse noise and vibration effects would be related to construction and operations.

Construction activities typically require the use of numerous types of noise-generating equipment. FTA has established construction impact criteria in terms of A-weighted decibels (dBA) and hourly average noise levels (L_{eq}). The FTA daytime impact criteria are 90 dBA L_{eq} for residences (and other noise-sensitive land uses) and 100 dBA L_{eq} for commercial/industrial uses. Certain types of construction equipment (e.g., pavement breakers) often exceed 90 dBA at 50 feet, and residential land uses (and other sensitive land uses) are located along the proposed alignments in multiple locations. Construction noise levels would approach the FTA standards, and further study would be needed to identify and potentially mitigate construction noise.

Regarding operations, the Project would generate operational noise associated with light rail activity movements along the alignments and at station. At this time it is not clear what the operation noise level would be as it is dependent on trains per hour, number of grade crossings, and train speed. The proximity of sensitive land uses to construction activity and/or operational activity would determine the potential for significant\adverse impacts. Due to the presence of sensitive receptors along each scenario there is a potential for noise impacts to occur for each alternative. However, based on existing conditions the highest potential for noise impacts is along Arbor Vitae Street because it has the highest number of Category 2 receptors and a narrow street width. Further study would be needed to identify and potentially mitigate operational noise.

Construction activity can generate varying degrees of vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of a construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight structural damage at the highest levels. Pile driving and other impact devices can generate a vibration level of 0.644 inches per second at 25 feet. These levels of vibration can potentially damage sensitive structures and annoy institutional land uses, such as schools. Further study would be needed to identify and potentially mitigate construction vibration

Operational vibration would be generated by light rail activity along the alignment. FTA has published guidance for assessing related vibration, and significant and/or adverse impacts are not unusual when tracks are located adjacent to sensitive land uses. Further study would be needed to identify and potentially mitigate operational vibration.

4.13 Population, Housing and Employment

4.13.1 Setting/Existing Conditions

The table below shows the existing population, housing and employment associated with the Alternative Scenarios. Approximately 310 people reside along the Fairview Heights Interlined Scenario, approximately 1,400 people reside along the Arbor Vitae Independent Scenario, approximately 533 people reside along the Century Independent Scenario, and approximately 276 people reside along the Market Street Independent Scenario.

Table 4.13.1-1 Population, Housing and Employment

	Fairview Heights Interlined Scenario	Arbor Vitae Independent Scenario	Century Independent Scenario	Market Street Independent Scenario
Population	309 persons	1,403 persons	533 persons	276 persons
Housing	102 dwelling units	463 dwelling units	176 dwelling units	91 dwelling units
Employment	45 employees	36 employees	252 employees	160 employees

SOURCE: Los Angeles County Assessor Parcel Map, 2015; California Department Finance Demographic Research Unit, Table 2: E-5 City/County Population and Housing Estimates; U.S. Census Bureau, OnTheMap Longitudinal Employer-Household Dynamics; Terry A. Hayes Associates Inc. 2017.

There are approximately 102 dwelling units along the Fairview Heights Interlined Scenario, approximately 463 dwelling units along the Arbor Vitae Independent Scenario, approximately 176 dwelling units along the Century Independent Scenario, and approximately 91 along the Market Street Independent Scenario.

With regard to employment, there are approximately 45 employees along the Fairview Heights Interlined Scenario, approximately 36 employees along the Arbor Vitae Independent Scenario, approximately 176 employees along the Century Independent Scenario, and approximately 91 employees along the Market Street Independent Scenario.

4.13.2 Environmental Effect

There is potential for significant impacts if changes to the City's land use and planning designations result in substantial growth in the Study Area.

Potential changes to the City's land use and planning designations to a more intense use, if any, would be minimal for the proposed Alternative Scenarios. Therefore, the Project would not directly or indirectly induce substantial population growth.

Proposed MSF Sites could result in displacement of population, housing and employment. Current land uses of proposed MSF Sites provide the basis for evaluating potential displacement of population, housing and employment. The current land uses at potential MSF Sites are generally rental car, parking or vacant land, and a small proportion of commercial uses. The Project would not displace any housing and does not include a housing component. No residences are proposed to be demolished or displaced. Therefore, none of the Alternative Scenarios would displace substantial numbers of existing housing or people, necessitating the construction of replacement housing elsewhere.

4.14 Public Services

4.14.1 Setting/Existing Conditions

The County of Los Angeles provides emergency, fire and rescue services to the City of Inglewood through three fire stations (i.e., Stations 170, 171 and 173 under Battalion 20). The City of Inglewood police department employs 186 sworn personnel and 92 civilian support personnel. The police department includes multiple resources, such as specially trained canine teams, directed enforcement units, scientific services investigators, bike teams, community affairs, fiscal services and recruitment to address the security needs of the community.

4.14.2 Environmental Effect

The potential for significant or adverse impacts on public services would be related to a project creating the need for new or physically altered government facilities, the construction of which could cause significant environmental impacts.

The Project is not expected to increase residential population growth resulting in additional demand for fire protection services in the Project vicinity. There is potential for significant impacts related to emergency response times to occur during construction. However, emergency service providers would be consulted during the construction process to avoid potential impacts. In addition, the Fire Department would be consulted for fire life safety designs. After construction is complete, the Project would not block or interrupt emergency access or evacuation routes during operations.

As noted above, the Project is not expected to increase residential population growth, and therefore would not create additional demand for police services in the Project vicinity. In addition, fare enforcement and crowd management services would be provided by the operator of the transit facility and would not impact Inglewood Police Department services.

Since the Project is not expected to increase residential population growth, the Project would not generate new demand for schools, parks or recreational facilities. Therefore, no impacts are anticipated to occur with regard to schools, parks and recreation facilities.

4.15 Transportation and Traffic

4.15.1 Setting/Existing Conditions

Regional network around the Study Area includes the Interstates 405 and 105. Interstate 405 generally runs north-south in the vicinity of the Study Area and is located perpendicular to the Century Boulevard and Arbor Vitae Street, along which the Project proposes two independent scenarios. Interstate 105 generally runs east-west in the vicinity of the Study Area and is located approximately 1.5 miles south of Century Boulevard.

With regard to transit, the Crenshaw/LAX Line, which is currently under construction is generally to the north and west of the Study Area and the Green Line that runs along Interstate 105 is located to the south of the Study Area. The Alternative Scenarios would link the NFL Stadium to the Crenshaw/LAX Line at different stations. The Fairview Heights Interlined Scenario proposes to connect the NFL stadium to the Crenshaw/LAX Fairview Heights Station and the Market Street Independent Option proposes to connect the NFL stadium to the Crenshaw/LAX Downtown Inglewood Station. Both the Arbor Vitae Independent Scenario and the Century Independent Scenario would connect the NFL stadium to the Crenshaw/LAX 96th Street/Aviation Station.

4.15.2 Environmental Effect

The potential for significant or adverse impacts would be related to significantly worsening delay at nearby intersections or pedestrian safety.

The Fairview Heights Interlined Scenario would be at-grade along the Florence Avenue portion of the alignment and would be underground along Prairie Avenue. The proposed alignments would not directly interfere with at-grade traffic flow. However, the proposed service increases on the Crenshaw/LAX Line (2.5-minute headways) during NFL Stadium events might result in significant traffic impacts at at-grade crossings along the Crenshaw/LAX Line. Therefore, further study would be needed to determine potential impacts and appropriate mitigation measures.

The Arbor Vitae and Century Independent Scenarios propose guideways that would be fully grade-separated, and therefore, would not interfere with street traffic. However, reduction in lane widths and potential turn limits may impact major intersections like La Cienega/Arbor Vitae, Inglewood/Arbor Vitae, Inglewood/Century, La Brea/Century, and Prairie/Century, that are currently operating at Level of Service (LOS) E or worse during peak hours.[10,11] In addition, structural columns supporting the elevated guideway along turn-lanes may introduce intersection sight-distance challenges to drivers of vehicular traffic. Therefore, further study would be needed to determine potential impacts and appropriate mitigation measures.

For the Market Street Independent Scenario, the alignment between Florence Avenue and Queen Street would be at-grade and would traverse underground between Queen Street and Locust Street and transition back to aerial at Locust Street. The Prairie Avenue portion of this alignment

10 Transit Oriented Development Plan for Downtown Inglewood and Fairview Heights EIR Traffic and Circulation Analysis, 2016.
11 Hollywood Park Redevelopment Project Environmental Impact report (EIR), Traffic Impact Analysis, 2006.

would be underground or aerial. However, Market Street is proposed as a pedestrian promenade with priority on place-making and pedestrian movement, and would be closed to vehicular traffic. Therefore, although the Market Street Independent Scenario has a significant portion of at-grade alignments, it is not likely to result in significant traffic impacts.

4.16 Tribal Cultural Resources

4.16.1 Setting/Existing Conditions

The Study Area Includes the Inglewood Park Cemetery on the east of Prairie Avenue. No other formal cemeteries, places of human interment, or burial grounds or sites are known to occur within the rest of the Study Area. As described in Section 4.5, Cultural Resources, based on a review of the NHRP, the California Register, the Los Angeles Historic Cultural Monuments Database and Historic Places LA, the Study Area includes four historic properties. However, none of these historic resources are identified as significant tribal cultural resource.

As per regulations of Assembly Bill (AB) 52 52, tribes are required to be notified of a proposed project, in order to provide interested Native American representatives an opportunity to consult on the project.

4.16.2 Environmental Effect

The potential for significant or adverse impacts would be related to the presence of tribal cultural resources in the Study Area that are listed or eligible for listing in the California Register, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k).

None of the historic resources identified in the Study Area are of significance to a Native American tribe. Given the urban nature of the Study Area and that most of the topsoil has already been disturbed from prior construction, it is unlikely that the Project would potentially uncover a resource of significance. However, in compliance with AB 52, tribes traditionally and culturally affiliated with the geographic area of the Study Area would be notified of the Project. The Project would conduct consultations with interested Native American representatives in the Study Area to identify any new discoveries and identify appropriate mitigation measures.

In addition, no known or unknown archaeological resource of significance to a Native American tribe would be removed, altered, or destroyed as a result of the Project. As described in Section 4.5, Cultural Resources. If discovery is made of items of archaeological or paleontological interest, Metro and FTA best management practices require that construction activities are immediately stopped and the appropriate authorities are notified of the find (i.e., Metro Project Manager and FTA liaison). Work is typically not allowed to continue until ordered and overseen by the Engineer. Therefore, impacts to tribal cultural resources as a result of the Project are likely to be less than significant.

4.17 Utilities and Service Systems

4.17.1 Setting/Existing Conditions

Water supply, wastewater and solid waste in the Study Area are managed by the City of Inglewood, Public Works Department. The City of Inglewood, Public Works released the 2015 Urban Water Management Plan (UWMP) in August 2016. The 2015 UWMP projects water demands for the City of Inglewood through the year 2040 based on anticipated growth, and concludes that the anticipated water demand would be met through 2040, under normal year, single dry year, and multiple dry year conditions.

The City of Inglewood also provides wastewater infrastructure in the Study Area and is responsible for the maintenance and repair of public sewer mains in the street areas. With regard to solid waste, the City of Inglewood promotes recycling efforts and currently diverts more than 50,000 tons of solid waste generated within the City from landfills.

Refuse collected by City of Inglewood and private haulers is disposed of at the regional landfills and waste-to-energy facilities in and around the County of Los Angeles. The City of Inglewood primarily uses the Azusa Land Reclamation Landfill. According to the County of Los Angeles Department of Public Works' Countywide Integrated Waste Management Plan 2015 Annual Report, the Azusa Land Reclamation Landfill has a total daily intake capacity of 6,500 tons per day and a remaining capacity of nearly 57 million tons. In the year 2016, the City of Inglewood landfilled approximately 4,300 tons of solid waste and transformed approximately 8,050 tons of solid waste.[12]

4.17.2 Environmental Effect

The potential for significant or adverse impacts would be related to exceeding available or planned infrastructure and utility supplies serving the Study Area.

None of the Alternative Scenarios would have restrooms and wastewater generated by the Project would be limited to routine maintenance and landscaping. Thus, the Project would not exceed wastewater treatment requirements of the applicable LARWQCB.

The Alternative Scenarios would generally be consistent with existing drainage plans, although system improvements or relocations would be required. As the existing right-of way is fully paved, offsite run-off would be limited, and the Project would likely need to address only onsite runoff. Given that the proposed imperviousness would remain generally the same, the overall wastewater discharge would not significantly exceed existing levels. Minimum drainage improvements would be required along elevated guideways of the Project. With the implementation of appropriate

12 County of Los Angeles, Solid Waste Information System, Detailed Solid Waste Activity Report by Jurisdiction of Origin, By Inglewood, https://dpw.lacounty.gov/epd/swims/reports/report/code/?USERID=863151357&CRID=11.2&TYPE=V&JURISDICTION_TYPE=C&JURISDICTION=135&START_PERIOD=201601&END_PERIOD=201612&FORMAT=PDF, accessed June 19, 2016.

mitigation measures, no significant impacts are likely for any of the Alternative Scenarios with regard to wastewater and storm water drainage facilities.

Similar to wastewater, water demands of the Project would be limited to routine maintenance and landscaping, and would not substantially exceed existing demands. Additionally, the UWMP for the City of Inglewood has determined that the projected water demands for normal year, single dry year, and multiple dry years would be met through the year 2040. Since the operation of the Project would likely to be within the 2015 UWMP planning period, the water demand is anticipated as part of the City's overall growth. Therefore, water demands of the Project would not require new water supply entitlements beyond those already considered in the 2015 UWMP.

It is anticipated that the amount of solid waste generated by the Project would not substantially exceed current generation levels, and would be sufficiently accommodated by the landfills serving the City. In compliance with AB 939, the Project would be required to implement a Solid Waste Diversion Program and divert at least 50 percent of the solid waste generated by the Project from landfills. The proposed Project would comply with all federal, State and local statues and regulations related to solid waste.

Based on the above, impacts with regard to water supply, wastewater and solid waste are likely to be less than significant for all the Alternative Scenarios.

5. Environmental Checklist

Summary of Potential Impacts for the Alternative Scenarios

Environmental Issue	INTERLINED	INDEPENDENT		
	Fairview Heights	Arbor Vitae	Century	Market-Manchester
AESTHETICS				
Views and Vistas	No Impacts	No Impacts		
Scenic Resources	No Impacts	No Impacts		
Visual Character	Impacts Likely to be Less than Significant	High Potential For Significant Impacts	High Potential For Significant Impacts if the MSF is located in the Forum Property.	High Potential For Significant Impacts if Prairie Avenue portion is an aerial guideway and/or the MSF is located within the

Environmental Issue	INTERLINED	INDEPENDENT		
	Fairview Heights	Arbor Vitae	Century	Market-Manchester
			Less Than Significant Impacts Otherwise	Forum. Property. Less Than Significant Impacts Otherwise
Light and Glare	Impacts Likely to be Less than Significant	High Potential For Significant Impacts	Low Potential For Significant Impacts with Mitigation Incorporated	
AGRICULTURAL RESOURCES				
Farmland	No Impacts	No Impacts		
Agricultural Land	No Impacts	No Impacts		
Timberland	No Impacts	No Impacts		
Forest Land	No Impacts	No Impacts		
AIR QUALITY				
Conflict with a Plan	No Impacts	No Impacts		
Violate Air Quality Standards	Further Study Needed Related to Construction Emissions. Impacts Likely to be Less than Significant during Operations	Further Study Needed Related to Construction Emissions. Impacts Likely to be Less than Significant during Operation		
Cumulative Increase in Non-Attainment Criteria Pollutant	Further Study Needed Related to Construction Emissions. Impacts Likely to be Less than Significant during Operations	Further Study Needed Related to Construction Emissions. Impacts Likely to be Less than Significant during Operations		
Expose Sensitive Receptors	Further Study Needed Related to Construction Emissions.	Further Study Needed Related to Construction Emissions. Impacts Likely to be Less than Significant during Operations.		

Environmental Issue	INTERLINED	INDEPENDENT		
	Fairview Heights	Arbor Vitae	Century	Market-Manchester
	Impacts Likely to be Less than Significant during Operations			
Odors	Impacts Likely to be Less than Significant	Impacts Likely to be Less than Significant		
BIOLOGICAL RESOURCES				
Special Status Species Habitat	Impacts Likely to be Less than Significant	Impacts Likely to be Less than Significant		
Riparian Habitat	No Impacts	No Impacts		
Wetlands	No Impacts	No Impacts		
Migratory Birds	Impacts Likely to be Less than Significant	Impacts Likely to be Less than Significant		
Tree Preservation	Impacts Likely to be Less than Significant with Mitigation Incorporated	Impacts Likely to be Less than Significant with Mitigation Incorporated		
Habitat Conservation Plans	No Impacts	No Impacts	No Impacts	No Impacts
CULTURAL RESOURCES				
Historical Resources	Impacts Likely to be Less than Significant	No significant Impacts are Likely.	High Potential For Significant Impacts if the MSF is located in the Forum Property. Less Than Significant Impacts Otherwise	
Archeological Resources	Impacts Likely to be Less than Significant	Impacts Likely to be Less than Significant		

Environmental Issue	INTERLINED	INDEPENDENT		
	Fairview Heights	Arbor Vitae	Century	Market-Manchester
Paleontological Resources	Impacts Likely to be Less than Significant	Impacts Likely to be Less than Significant		
Human Remains	Potential for Significant Impacts. Mitigation will likely be required to reduce or eliminate potential impacts.	Impacts Likely to be Less than Significant		
GEOLOGY AND SOILS				
Seismicity	Further Study Needed. Impacts Likely to be Less than Significant with Appropriate Mitigation Measures.	Impacts Likely to be Less than Significant		Further Study Needed. Impacts Likely to be Less than Significant with Appropriate Mitigation Measures.
Soil Erosion	Impacts Likely to be Less than Significant	Impacts Likely to be Less than Significant		
Unstable Soils	Impacts Likely to be Less than Significant with Mitigation Incorporated	Impacts Likely to be Less than Significant with Mitigation Incorporated		
Expansive Soils	Further Study Needed. Impacts Likely to be Less than Significant with Appropriate Mitigation Measures.	Further Study Needed. Impacts Likely to be Less than Significant with Appropriate Mitigation Measures.		
GREENHOUSE GAS EMISSIONS				
Greenhouse Gas Emissions	Impacts Likely to be Less than Significant	Impacts Likely to be Less than Significant		

Environmental Issue	INTERLINED	INDEPENDENT		
	Fairview Heights	Arbor Vitae	Century	Market-Manchester
Applicable Plans, Policies, or Regulations	Impacts Likely to be Less than Significant	Impacts Likely to be Less than Significant		
HAZARDS AND HAZARDOUS MATERIALS				
Transport and Disposal of Hazardous Materials	Further Study Needed. Impacts Likely to be Less than Significant with Appropriate Mitigation Measures.	Further Study Needed. Impacts Likely to be Less than Significant with Appropriate Mitigation Measures.		
Schools	Impacts Likely to be Less than Significant with Mitigation Incorporated	Impacts Likely to be Less than Significant with Mitigation Incorporated		
Airport Hazards	No Impacts Likely	No Impacts Likely		
Emergency Response Plans	Impacts Likely to be Less than Significant with Mitigation Incorporated	Impacts Likely to be Less than Significant with Mitigation Incorporated		
Wildland Fire	No Impacts Likely	No Impacts Likely	No Impacts Likely	No Impacts Likely
HYDROLOGY AND WATER QUALITY				
Surface Water Quality	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	Impacts are Likely to be Less Than Significant with Mitigation Incorporated		
Groundwater	Moderate Impacts are Likely and Further Study would be Needed to Identify Appropriate Mitigation Measures	No Impacts are Likely	No Impacts are Likely	Moderate Impacts are Likely and Further Study would be Needed to Indentify Appropriate

Environmental Issue	INTERLINED	INDEPENDENT		
	Fairview Heights	Arbor Vitae	Century	Market-Manchester
				Mitigation Measures
Stormwater Drianage	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	Impacts are Likely to be Less Than Significant with Mitigation Incorporated		
Flooding and Inundation	No Impacts are Likely	No Impacts are Likely		
LAND USE AND PLANNING				
Land Use Compatibility	No Impacts are Likely	High Potential for Significant impacts	No Impacts are Likely	Low Potential for Significant impacts
Land Use Consistency	No Impacts are Likely	No Impacts are Likely		
Habitat Conservation Plans	No Impacts are Likely	No Impacts are Likely		
MINERAL RESOURCES				
Statewide/Regional Mineral Resources	No Impacts are Likely	No Impacts are Likely		
Local Mineral Resources	No Impacts are Likely	No Impacts are Likely		
NOISE				
Noise	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	Significant Impacts Likely. Further Study Needed.	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	
Groundborne Vibration	Impacts are Likely to be Less	Significant Impacts Likely.	Impacts are Likely to be Less Than Significant with Mitigation	

Environmental Issue	INTERLINED	INDEPENDENT		
	Fairview Heights	Arbor Vitae	Century	Market-Manchester
	Than Significant with Mitigation Incorporated	Further Study Needed.	Incorporated	
POPULATION, HOUSING AND EMPLOYMENT				
Population	No Impacts are Likely	No Impacts are Likely		
Housing	No Impacts are Likely	No Impacts are Likely		
Employment	No Impacts are Likely	No Impacts are Likely		
PUBLIC SERVICES				
Fire Protection and Emergency Services	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	Impacts are Likely to be Less Than Significant with Mitigation Incorporated		
Police Protection Services	No Impacts are Likely	No Impacts are Likely		
Public Schools	No Impacts are Likely	No Impacts are Likely		
Parks and Other Public Services	No Impacts are Likely	No Impacts are Likely		
TRANSPORTATION AND TRAFFIC				
Circulation System	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	High Potential For Significant Impacts. Further Study Needed.	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	
Congestion Management Program	No Impacts are Likely	No Impacts are Likely		

Environmental Issue	INTERLINED	INDEPENDENT		
	Fairview Heights	Arbor Vitae	Century	Market-Manchester
Emergency Access	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	No Impacts are Likely	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	
Public Transit, Bicycle, or Pedestrian Facilities	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	No Impacts are Likely	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	
TRIBAL CULTURAL RESOURCES				
Tribal Resources	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	Impacts are Likely to be Less Than Significant with Mitigation Incorporated		
UTILITIES AND SERVICE SYSTEMS				
Water	No Impacts are Likely	No Impacts are Likely		
Stormwater	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	Impacts are Likely to be Less Than Significant with Mitigation Incorporated		
Wastewater	Impacts are Likely to be Less Than Significant with Mitigation Incorporated	Impacts are Likely to be Less Than Significant with Mitigation Incorporated		
Solid Waste	No Impacts are Likely	No Impacts are Likely		

APPENDIX I

Traffic Information and Potential Impacts

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2. Traffic Impacts due to Service Increase on Crenshaw/LAX Line 3

1. Existing Traffic Conditions

The Arbor Vitae Option and Century Option alignments will be fully grade-separated. While not directly interfering with traffic during operation, the guideway columns will be running down the median of each street, taking 1-2 traffic lanes, which might put challenges on some major intersections (like La Cienega/Arbor Vitae, Inglewood/Arbor Vitae, Inglewood/Century, La Brea/Century, Prairie/Century, etc.) that are currently operating at LOS E or worse during peak hours[1,2].

The Market-Manchester Independent Option will be at-grade on Prairie between Century and Manchester, with grade separation at Prairie/Pincay. While most intersections along this segment operate at LOS C or better during peak hour at present, Prairie/Century and Prairie/Manchester both experience LOS F during PM peak hour. A station at Prairie/Century might add additional traffic pressure to this intersection, therefore requiring mitigation measures. The alignment will be aerial on Manchester from Prairie until pass Hillcrest, and then transition to be underground between Locust and Market; the alignment will transition back to at-grade again on Market Street, which will be closed to vehicular traffic from Manchester to Florence. Therefore, even though the Market-Manchester Independent Option has a significant portion of at-grade alignments, the configuration will not very likely result in huge traffic impacts or intersection LOS deteriorations (**Table 1-1**).

Table 1-1: Existing/Historic City of Inglewood Intersection Performance

Intersection	AM V/C	AM LOS	PM V/C	PM LOS	Data Source*
Century/Prairie	0.885	D	1.017	F	2
Hardy/Prairie	0.538	A	0.644	B	2
Arbor Vitae/Prairie	0.603	B	0.74	C	2
Kelso/Prairie	0.659	B	0.736	C	2
Manchester/Prairie	1.032	F	1.012	F	1
Manchester/Market	0.5	A	0.557	A	1
Regent/Market	0.42	A	0.431	A	1
Florence/Market	0.433	A	0.381	A	1
Arbor Vitae/La Brea	0.686	B	0.855	D	2
Arbor Vitae/Inglewood	0.983	E	0.992	E	2
Arbor Vitae/La Cienega	0.837	D	1.014	F	2
Century/Inglewood	0.831	D	0.881	D	2
Century/Hawthorne (La Brea)	0.771	C	0.901	E	2

*1. Transit Oriented Development Plan for Downtown Inglewood and Fairview Heights EIR Traffic and Circulation Analysis, 2016
2. Hollywood Park Redevelopment Project EIR Traffic Impact Analysis, 2006

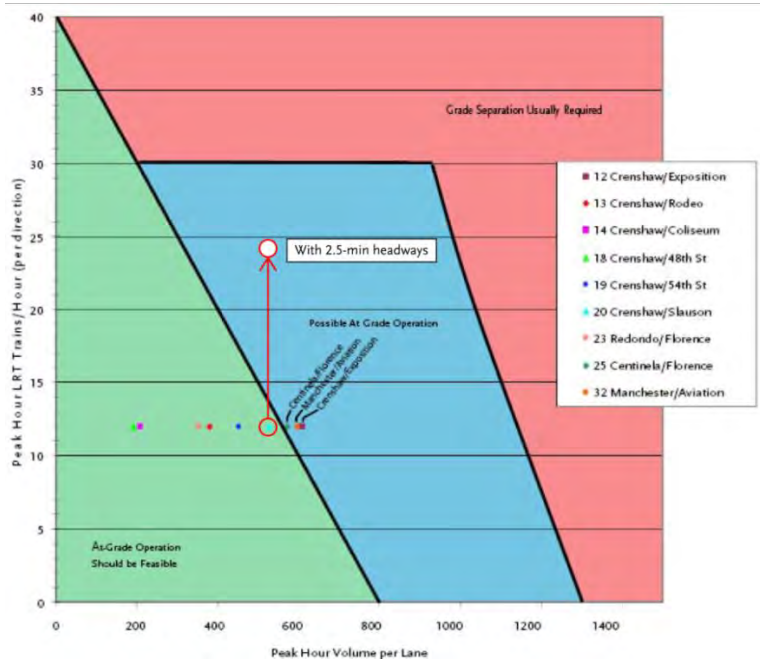
[1] Transit Oriented Development Plan for Downtown Inglewood and Fairview Heights EIR Traffic and Circulation Analysis, 2016
[2] Hollywood Park Redevelopment Project EIR Traffic Impact Analysis, 2006

2. Traffic Impacts due to Service Increase on Crenshaw/LAX Line

The DEIS/DEIR LPA on Crenshaw Blvd between 48th and 59th Streets is an at-grade alignment with an at-grade station will be also provided at Crenshaw/Slauson, the at-grade guideway will encompass up to seven roadway intersections (48th, 50th, 52nd, 54th, 57th, 59th Streets and Slauson Ave).

Both the original EIR analysis and the additional Park Mesa Heights Grade Separation Study found that per the application of the Metro's adopted Grade Crossing Policy, this at-grade Park Mesa Heights alignment did not warrant a grade separation, as the seven intersections on this segment all fell within the zone where "At Grade Operation Should be Feasible" (**Figure 2-1**). Also physical conditions of these intersections did not present conditions considered out of the ordinary for the safe operation of light rail trains[3].

Figure 2-1: Initial Screening of Rail Crossings along the Park Mesa Heights Section



Source: Crenshaw/LAX Transit Corridor Park Mesa Heights Grade Separation Analysis, June 2010

[3] Crenshaw/LAX Transit Corridor Park Mesa Heights Grade Separation Analysis, June 2010

However, it is also clearly seen from that Crenshaw/Slauson was the most problematic intersection (with high sensitivity to induced traffic) among the at-grade intersections along Park Mesa Heights alignment: The Peak Hour Volume per Lane on Slauson at this intersection is projected to be around 600 vehicles per lane in 2030, and with the planned 5-minute service frequency on Crenshaw/LAX, Crenshaw/Slauson was already almost at the edge to be grade separated under Metro's Grade Crossing Policy. With the increased service during events, the Crenshaw/Slauson intersection will fall under the "Possible At-Grade Operation" category, which usually requires additional analysis of traffic conditions, safety conditions, and rail operations to determine the appropriate operating configuration.

This intersection will be operating at LOS F during both AM and PM peak hours, with significant delays of around 110 seconds per cycle length under the light rail operating scenario[4]. The Crenshaw/LAX Line EIR has proposed mitigation measures (including adding double left-turns on eastbound and westbound approaches and dedicating right-turn lane on southbound approaches during the PM peak hour, see **Figure 2-2**) to keep this crossing at-grade, however, with the increased headway to 2.5 minutes, such mitigation measure will no longer work, and will cause enormous queues and delays, as well as significant spill-over impacts on intersections nearby (**Figure 2-3** and **Figure 2-4**Error! No bookmark name given.[5]).

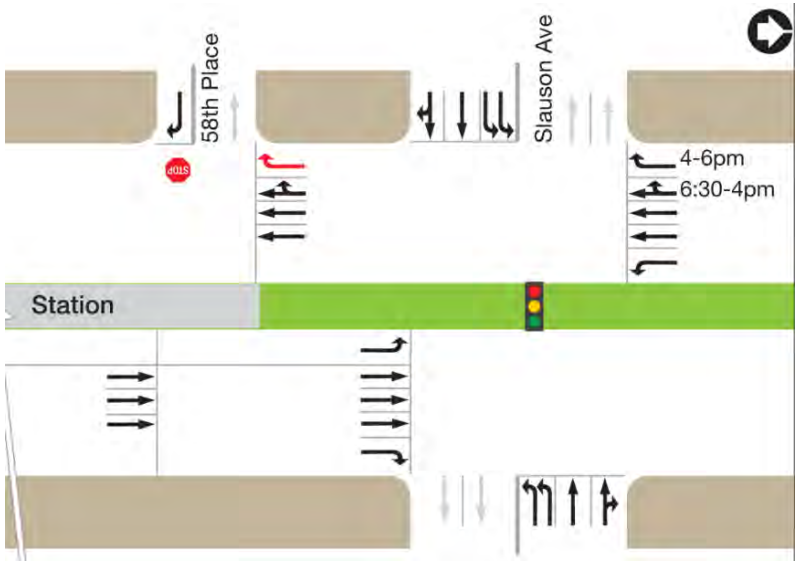


Figure 2-2: Proposed Mitigation Measures at Crenshaw/Slauson

Source: Crenshaw/LAX Transit Corridor Project Final EIR/EIS Appendix G Traffic Analysis, August 2011

[4] Crenshaw/LAX Transit Corridor Project Final EIR/EIS Appendix G Traffic Analysis, August 2011
[5] Crenshaw/LAX Transit Corridor Project Final EIR/EIS Appendix G Traffic Analysis, August 2011

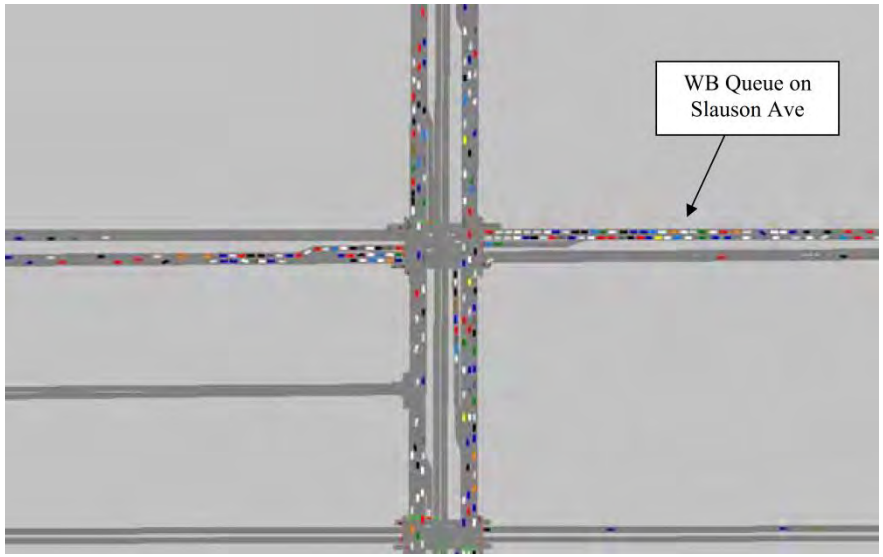


Figure 2-3: Spill-over Effects on Slauson Ave during AM Peak Hour

Source: Crenshaw/LAX Transit Corridor Project Final EIR/EIS Appendix G Traffic Analysis, August 2011

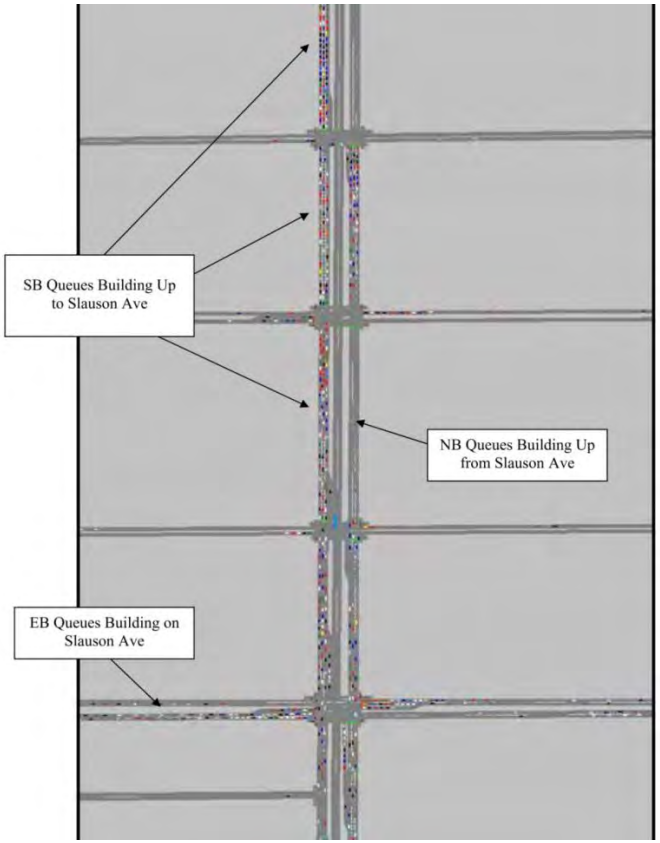


Figure 2-4: Spill-over Effects on Slauson Ave during PM Peak Hour

Source: Crenshaw/LAX Transit Corridor Project Final EIR/EIS Appendix G Traffic Analysis, August 2011

APPENDIX J

Cost Estimating Memorandum

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1. Introduction

This technical memo presents the rough-order-of-magnitude (ROM) capital, and operations & maintenance (O&M) cost estimates for the interlined and independent operability scenarios considered for the NFL Connector.

The cost estimates presented in this memo do not represent the total project cost at the time of construction. The costs presented in this memo are in 2017 dollars and do not include cost escalation to future years. The actual total project cost in the year of expenditure must include escalation, which is calculated by adding approximately 2-4% of the project cost per year, compounded, through to the mid-point of anticipated construction.

1.1 Project Background

In November 2016, the Los Angeles County Metropolitan Transportation Authority (Metro) initiated a study for a rail transit connection (Project) from the Crenshaw/LAX line (under construction) to the City of Champions/Inglewood (NFL) Stadium and Hollywood Park Development (Development), scheduled to open in 2020. This study is being conducted by Metro for the City of Inglewood.

The Project Area is located in the City of Inglewood and the City of Los Angeles. The Project Area Boundaries include the Development and extend to the east to Sepulveda Blvd in the City of Los Angeles, Fairview Ave to the north, Van Ness Ave to the west and El Segundo Ave to the South and includes the Los Angeles International Airport (LAX). See **Figure 1.1-1** for the Project Area map.



Figure 1.1-1: Project Study Area

1.2 Purpose of this Memo

This estimate was prepared to provide preliminary cost data in support of the operability scenario evaluation process. These costs are not intended to reflect the final design or construction cost and should be used for conceptual planning purposes only. It is the intention of the estimate to capture the fair market value under stable economic and bidding conditions for an average project with similar attributes within the Los Angeles area.

This report presents the ROM capital and O&M cost methodology and the cost estimate results. ROM cost estimates are typically prepared when the design is approximately 0-15% developed. The cost estimates presented in this memo are within a 0-5% level of design. Due to the preliminary nature of the design and the corresponding assumptions made by the estimating team, actual costs could vary by as much as +/- 30%.

1.3 Scenarios Evaluated

1.3.1 Interlined Scenario

A light rail transit (LRT) service connecting the Development interlined through the Crenshaw/LAX Line via the Fairview Heights Station to the Expo Line shown in Error! Reference source not found.). This report provides cost estimates for two options of the Interlined Scenario:

Option #1- Interlined LRT – Underground

- Light-Rail Transit with a Bored Tunnel Guideway and underground Station that interlines with the existing Crenshaw/LAX line at Fairview Heights. (1.7 Miles in Length)
- This Option represents the City of Inglewood's original request to Metro
- Option 1, the Underground option, is the option as defined for this feasibility study and is the version that will be presented for the interlined option in the final report of this feasibility study.
- The LRT Underground option has approximately 36 vehicles, a 10 acre MSF, and associated right-of-way acquisition.

Option #2- Interlined LRT – Aerial

- Light-Rail Transit with a Aerial Guideway and Station that interlines with the existing Crenshaw/LAX line at Fairview Heights. (1.7 Miles in Length)
- Option 2, the Aerial option, is for reference purposes only, which provides an interlined option of similar scope in order to compare to the Independent scenarios, which all have aerial configurations.
- The LRT Aerial option has approximately 36 vehicles, a 10 acre MSF, and associated right-of-way acquisition.

Both scenarios would require upgrades to the existing Crenshaw/LAX line due to increased train service. The costs for these upgrades are included within the total capital cost presented in this estimate.



Figure 1.3.1-1: Interlined Scenario: Fairview Heights

1.3.2 Independent Scenarios

Three independent scenarios were analyzed and estimated in this memo. In these scenarios, the transit alignment would not interline with the existing Crenshaw/LAX line. Passengers would be required to transfer from the connector line to the Crenshaw/LAX line.

Two independent options would use an Automated People Mover (APM) or Monorail system technology. If the system is an APM, it is assumed that this would be an extension on the LAX APM system, currently in development. If the system is a Monorail, it is assumed this would be an entirely different entity and operator from Metro and LAX.

Two versions of the APM/Monorail options are presented in this report: 1) full capacity and 2) low capacity. The full capacity systems represent the systems as they are envisioned in the operating plan comparable to the LRT and Urban Rail Options. The low capacity systems have fewer vehicles, a smaller MSF, and less right-of-way acquisition.

A third independent option would be a lighter version of a light rail, referred to as an Urban Rail in this study. This estimate assumes that the Urban Rail is a Streetcar system and is priced to represent streetcar guideways, vehicles, stations, and maintenance yards, which are significantly less than Light Rail or APMs.

Independent Option #1A: APM/ Monorail on Arbor Vitae

- APM or Monorail System on an Aerial Guideway with Aerial Stations. (2.1 Miles in Length)
- If the scenario is an APM system, this option would run along Arbor Vitae in a direct line, east-west, from the Hollywood Park station to the existing APM station at 196th Street.
- If the scenario is a Monorail System, it would run along Arbor Vitae and connect to a new station near the APM station at 196th Street.
- The APM/Monorail option has approximately 36 vehicles, a 10 acre MSF, and associated right-of-way acquisition.
- The APM/Monorail Low Capacity option has approximately 19 vehicles, a 5 acre MSF, and associated right-of-way acquisition.

Independent Option #1B: APM/ Monorail on Arbor Vitae (Low Capacity)



Figure 1.3.2-1: 96th St. / AMC Connection via Arbor Vitae

Independent Option #2: APM/ Monorail on Century

- APM or Monorail System on an Aerial Guideway with Aerial Stations. (2.8 Miles in Length)
- If the scenario is an APM system, this option would run along Prairie to Century and then turn north near the Crenshaw/LAX line to connect with the existing APM station at 196th Street.
- If the scenario is a Monorail System, it would run along Prairie, Century, and then north at the Crenshaw/LAX line to connect to a new station near the APM station at 196th Street.



Figure 1.3.2-2: 96th St. / AMC Connection via Century

Independent Option #3: Urban Rail (Streetcar) on Market and Manchester

- Streetcar system on aerial, at-grade, and underground guideway sections. (1.3 Miles in Length)

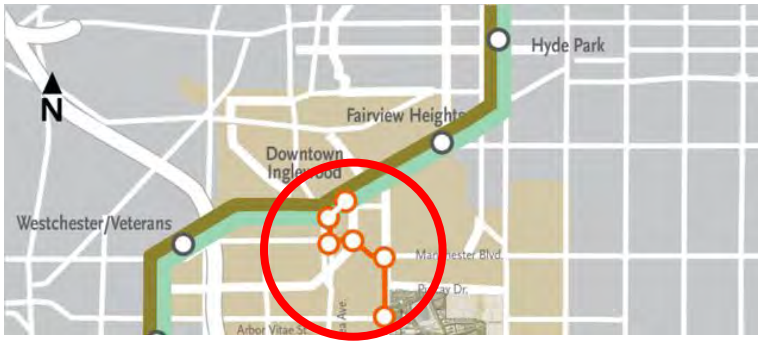


Figure 1.3.2-3: Downtown Inglewood Connection via Prairie/Manchester/Market

2. Capital Cost Estimate Criteria

This section presents the estimating criteria and methodology used in preparing the capital cost estimates for the interlined and independent scenarios.

2.1 Format and Level of Detail

This estimate is a "Rough-Order-of-Magnitude Estimate," based on a project that is at the preliminary planning stage at a design level considered to be 0-5% design. The estimates have been presented in simplified format generally following Federal Transit Authority (FTA) Standard Cost Categories (SCC). Cost estimates are presented with a list of 5 to 15 major project components representing the main elements of the project, including guideway type by track-foot or route-foot, counts of stations and special facilities, acreage of right-of-way acquisition, and other select components.

2.2 Sources of Pricing

Unit costs assigned to the Light Rail Transit (LRT) guideways, stations, MSF, and vehicles have been derived from recent planning level estimates, which were developed using actual capital cost estimates and bids from recent Metro LRT projects. The interlined scenario estimates prepared in this report were validated by comparing the normalized cost per mile to actual costs of Metro LRT projects, adjusted to be valid for 2017.

Unit costs assigned to the APM/ Monorail guideways, stations, MSF, and vehicles have been derived from an independent APM/Monorail cost research conducted for this study. Capital costs were collected for approximately 21 APM and Monorail systems from US cities and global cities. All costs were adjusted to be valid for Los Angeles in 2017. The APM/ Monorail scenario estimates prepared in this report were validated by comparing the normalized cost per mile to actual costs of APM and Monorail systems around the world, adjusted to Los Angeles and current year.

Unit costs assigned to the Urban Rail independent scenario guideways, stations, MSF, and vehicles included in this document were derived from streetcar systems from streetcar costs in US cities, adjusted to be valid for Los Angeles in 2017.

Unit costs assigned to Right-of-Way acquisition for all scenarios are based on an average square foot price for developed, commercial land in Inglewood. No specific real-estate analysis has been performed for any of the specific parcels identified for acquisition. Actual real-estate costs could vary depending on ownership type, parcel shape, size, existing business performance, and agreements.

The costs estimates presented in this memo are in 2017 dollars and do not include cost escalation to future years. The actual project cost in the year of expenditure includes additional cost escalation, calculated by adding approximately 2-4% of the project total per year, compounded, through to the mid-point of anticipated construction.

2.3 Guideway Component

The guideway costs components are based on similar projects representing construction cost per route foot, with different costs for aerial, at-grade, retained fill (transitions), and underground. The unit costs include guideway costs, trackwork, earthwork, aerial structures, bored tunnels, sitework, utilities, electrification systems, overhead catenary system, signaling, and all other linear costs involved in construction of guideway. The following **Table 2.3-1** lists the guideway quantities by type for each alternative.

Table 2.3-1 Scenario Guideway Quantities by Type

NAME OF SCENARIO	PROJECT LENGTH (ROUTE-MILES)	% AERIAL	% AT-GRADE	% RETAINED FILL	% UNDER-GROUND
Interlined - LRT Underground	1.70		2%	12%	86%
Independent - APM/Monorail: Aerial on Arbor Vitae	2.10	100%			
Independent - APM/Monorail: Aerial on Century	2.80	100%			
Independent - Urban Rail: Prairie to Market and Century	1.31	66%	16%	10%	8%
Independent - APM/Monorail: Aerial on Arbor Vitae (Low Capacity)	2.10	100%			
Independent - APM/Monorail: Aerial on Century (Low Capacity)	2.80	100%			
Interlined - LRT Aerial	1.70	86%	2%	12%	

2.4 Stations, Stops, Terminals, Intermodal (SCC 20)

Cost based on similar projects representing construction cost for complete station for at-grade, aerial, and underground configurations. The unit costs include demolition, subgrade preparation and earthwork, aerial structures, excavation for subterranean stations, slabs, structures, mechanical, electrical, plumbing, and finishes. **Table 2.4-1** identifies the number of stations by type for each alternative.

Table 2.4-1 Aerial, At-Grade, and Underground Stations by Scenario

NAME OF SCENARIO	# STATIONS AERIAL	# STATIONS AT-GRADE	# STATIONS UNDERGROUND
Interlined - LRT Underground		1	1
Independent - APM/Monorail: Aerial on Arbor Vitae	3		
Independent - APM/Monorail: Aerial on Century	5		
Independent - Urban Rail: Prairie to Market and Century	4	2	
Independent - APM/Monorail: Aerial on Arbor Vitae (Low Capacity)	3		
Independent - APM/Monorail: Aerial on Century (Low Capacity)	3		
Interlined - LRT Aerial	1	1	

2.5 Maintenance and Storage Facility (MSF)

This estimate includes an allowance for a generic 10-acre maintenance facility and yard for all scenarios except low capacity APM/Monorail options. The Arbor Vitae and Century low capacity options were allocated 5 acres for support facilities because service operations would require fewer trains. It is assumed that the maintenance facility for the Interlined Scenario is an expansion of an existing maintenance yard and the maintenance facility for each Independent Scenario is a new standalone facility.

2.6 Right-of-Way

- Station areas: Allowances for station area adjacent to aerial structures. Varies based on alignment.
- TBM Launch and Construction Staging sites: Allowance of 6 to 10 acres for a TBM launch site and extraction site.
- Maintenance Yard: Allowance of 10 acres of ROW acquisition for a maintenance yard. 5 acres for the low capacity APM/Monorail systems.
- ROW unit price is based on an average land area price within central Los Angeles of $100/SF plus 30% contingency.

2.7 Vehicles

- The number of vehicles required for each scenario was derived from the cycle time calculated as part of the operations analysis. The low capacity APM/Monorail systems have half of the vehicles required to maintain design headways.

2.8 Professional Services

- Professional services are added applied to the total construction. A total of 35% allowance is applied to the total construction cost, including the following elements.
    - 80.01 Preliminary Engineering
    - 80.02 Final Design
    - 80.03 Project Management for Design and Construction
    - 80.04 Construction Administration & Management
    - 80.05 Professional Liability and other Non-Construction Insurance
    - 80.06 Legal; Permits; Review Fees by other agencies, cities, etc.

- 80.07 Surveys, Testing, Investigation, Inspection
- 80.08 Start up

2.9 Contingency

- Allocated Contingency (or Pre-Construction Design Development): represents unknown or undeveloped scope that has not been developed in the design effort. The design at this stage is considered a rough-order-of-magnitude level of design within 0-5% and includes the highest suggested allocated contingency of 30% applied to all scope items. Allocated contingency is typically in the 30% range throughout the planning phases and then reduced during the design phase, falling to 0% when the engineering is complete and construction begins. [1]

- Unallocated Contingency (or Construction Contingency) (SCC 90) – Unallocated Contingency represents the potential changes in the project that are likely to occur during the construction phase, driven by unforeseen existing conditions. Unallocated contingency is included at 10% applied to the total project cost of SCC 10-80. Unallocated contingency remains constant throughout the design phase and through the duration of construction.

2.10 Finance Charges

Finance charges are excluded from the estimate as per typical approach for similar estimating purposes.

2.11 Cost Escalation

Cost escalation is excluded from this estimate. Costs are presented in current year (2017) only. Actual project is calculated by adding 2% to 4% if the project total per year (compounded) due to standard commodity and labor escalation between 2017 Base Year Dollar (BYD) and Year of Expenditure (YOE).

[1] Allocated contingency is meant to cover design development of a project with the same key components assumed in this estimate, such as lengths of guideways by configuration type, stations, and maintenance facilities. The estimated capital cost could vary significantly in future planning studies if key component quantities or types are modified such as an increase in underground guideway. Allocated contingency is not meant to cover increases in level of design beyond standard Metro design guidelines and existing metro facilities.

2.12 Exclusions

The following are excluded from the cost estimates prepared for this feasibility study:

1. Cost escalation to year of expenditure. (Costs are in Base Year Dollar only- 2017.)
2. LRT Guideway design features beyond existing typical Metro LRT systems such as increased guideway height and special finishes other than patterned concrete.
3. LRT Station components or design features beyond the Metro standard kit-of-parts.
4. Underground stations deeper than standard depths.
5. Maintenance Yard Lead Track.
6. Parking structures at stations.
7. Long span bridges, suspension bridges, or ornamental gateways.
8. Active transportation such as complete streets projects over and above the purpose of the project.
9. Financing Costs. (Not needed.)
10. Cost escalation due to schedule delays during planning, design, or construction.
11. Cost escalation due to schedule delays or excessive legal and professional services due to litigation.
12. Project advertising, marketing, or campaigning.
13. Excessive hazardous material abatement in existing structures or soil.
14. Unforeseen hazards or design changes due to varying soil types; gassy ground (methane, hydrogen sulfide, etc.) conditions, including specialized tunneling equipment and provisions.
15. Unforeseen schedule delays or additional costs related to archeological finds during excavation or tunnel boring.

2.13 Estimate Assumptions

1. This estimate assumes standard guideway types and station features similar to existing LRT projects such as the Crenshaw/LAX line, the Exposition Line, and the Gold Line.
2. This estimate assumes traditional delivery methods with standard contractual agreements.
3. This estimate assumes the project is not phased requiring multiple mobilizations and demobilizations of construction staging sites, field offices, and TBM launch and extraction sites.
4. This estimate assumes the Davis-Bacon Prevailing Wage Structure for all construction workers and professional services.
5. Additional assumptions listed throughout the estimate detail.

3. Capital Cost Estimate Summaries

3.1 Rough-Order-of-Magnitude Capital Cost Estimates for Scenarios

This section presents the preliminary rough-order-of-magnitude (ROM) capital cost estimates for the 7 scenario options. **Figure 3.1-1** and **Table 3.1-1** present the total estimated rough-order-of magnitude capital cost for each option.

Table 3.1-1: Executive Cost Estimates

NAME OF SCENARIO	LENGTH OF PROJECT (ROUTE-MILES)	$ CAPITAL COST (MILLIONS IN 2017$ VALUE)		UNIT COST $/MILE (MILLIONS IN 2017$ VALUE)	
		LOW	HIGH	LOW	HIGH
Interlined - LRT Underground	1.7	$ 785	$ 1,154	$ 1,333	$ 1,960
Independent - APM/Monorail: Aerial on Arbor Vitae	2.1	$ 351	$ 472	$ 736	$ 990
Independent - APM/Monorail: Aerial on Century	2.8	$ 286	$ 375	$ 800	$ 1,049
Independent - Urban Rail: Prairie to Market and Century	1.3	$ 317	$ 476	$ 416	$ 624
Independent - APM/Monorail: Aerial on Arbor Vitae (Low Capacity)	2.1	$ 267	$ 356	$ 561	$ 747
Independent - APM/Monorail: Aerial on Century (Low Capacity)	2.8	$ 201	$ 262	$ 563	$ 732
Interlined - LRT Aerial	1.7	$ 458	$ 663	$ 777	$ 1,126

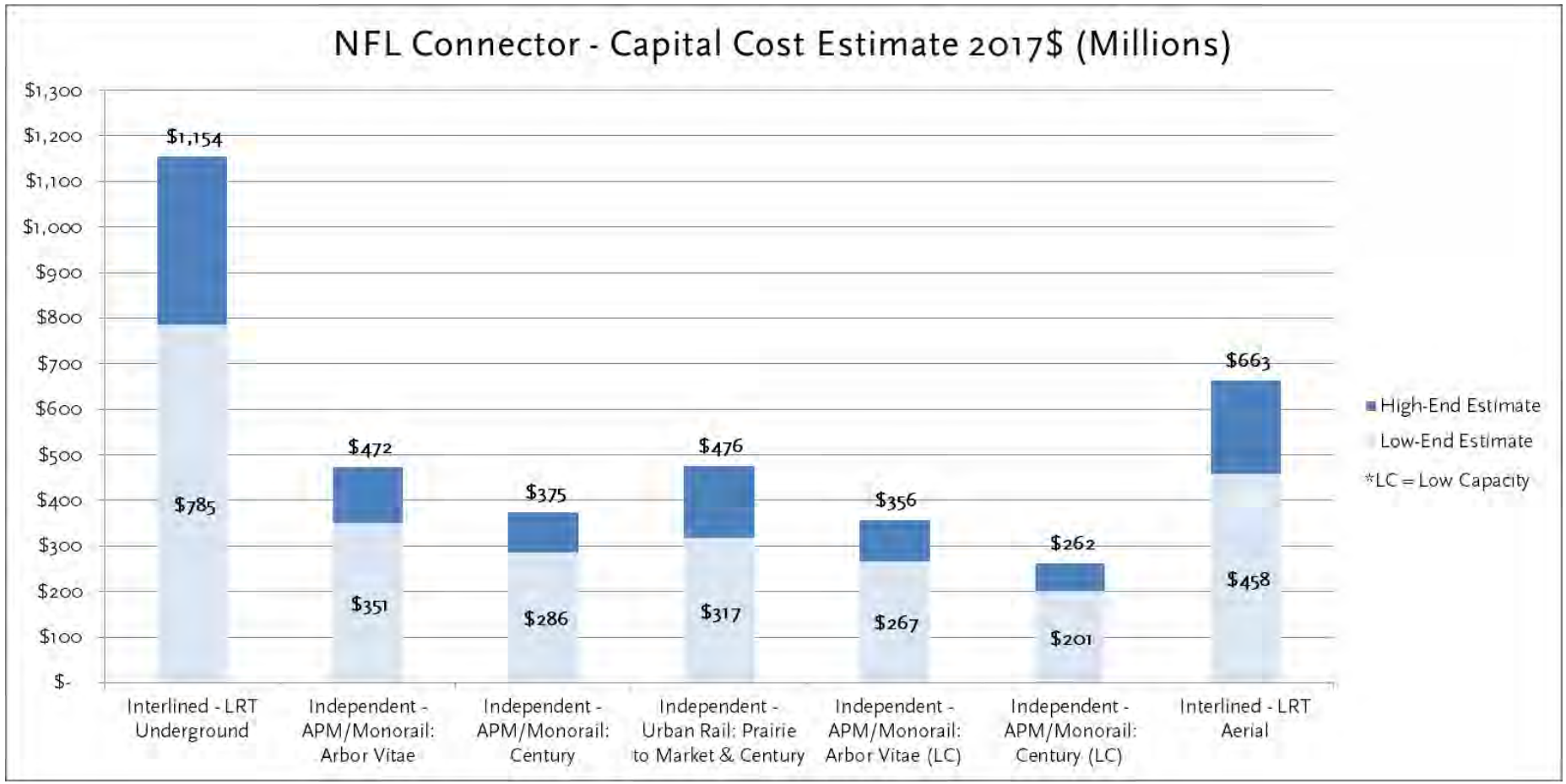


Figure 3.1-1: Capital Cost Totals for Scenarios

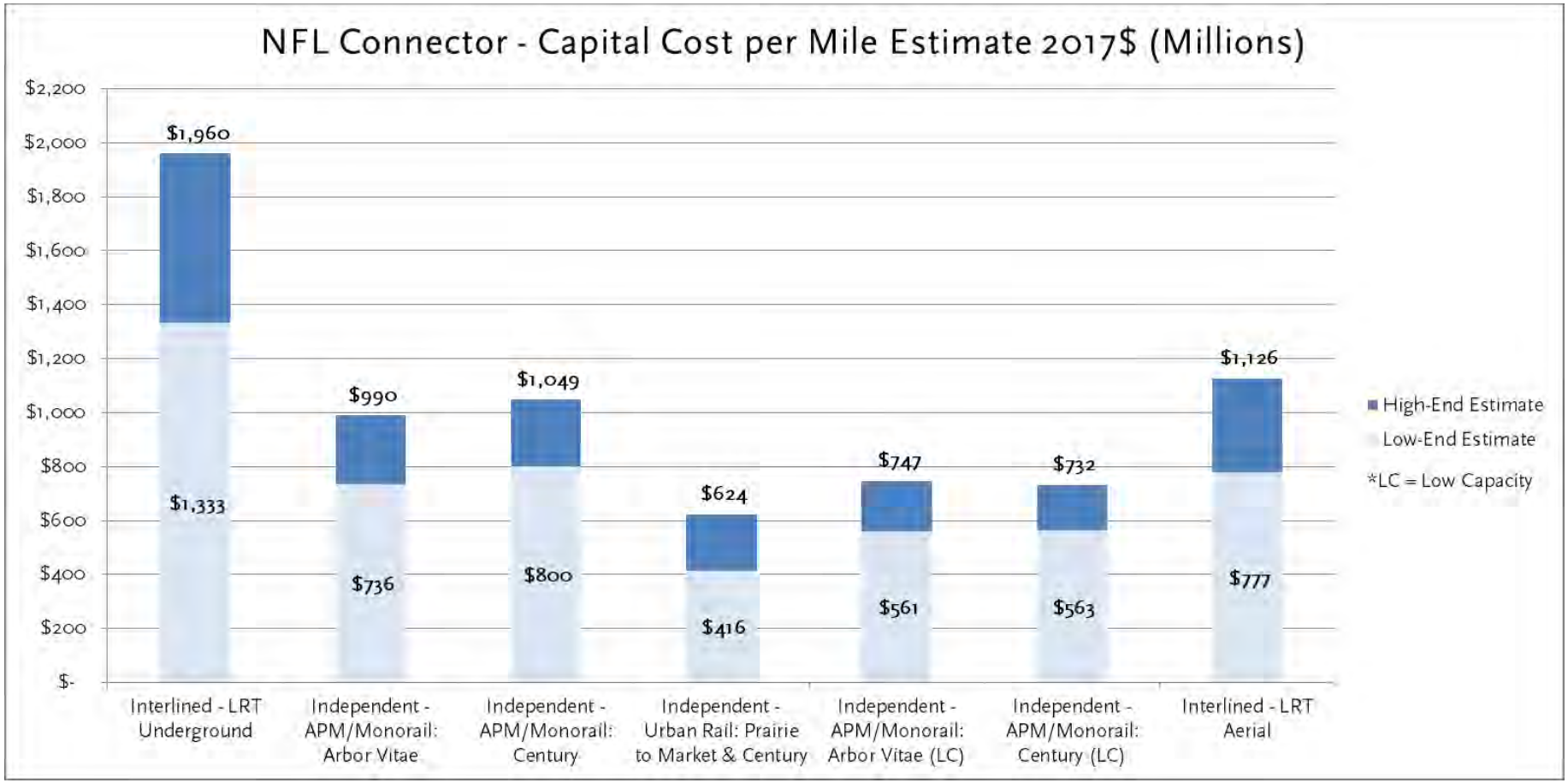


Figure 3.1-2: Cost Per Mile for Scenarios

- Option #1: LRT Underground: Interlined at Fairview Heights Station
  - Estimated capital cost of $1,258M-1,847M or $740M-1,087M per Mile (BYD)
  - Includes 0.04 route-miles of at-grade alignment, 0.20 route-miles of retained fill alignment, and 1.46 route-miles of underground alignment
  - Most expensive configuration based on total project cost and cost per mile.

- Option #2: LRT Aerial: Interlined at Fairview Heights Station:
  - Estimated capital cost of $742M-1,074M or $437M-632M per Mile (BYD)
  - Includes 1.46 route-miles of aerial alignment, 0.04 route-miles of at-grade alignment, and 0.20 route-miles of retained fill alignment
  - Significantly less than underground option, but second highest total project cost and cost per mile. The range of the aerial LRT costs are near the range of the APM/Monorail full capacity scenarios.

Independent Option #1: Arbor Vitae Independent Options

- APM/Monorail: Aerial on Arbor Vitae
  - Estimated capital cost of $731M-982M or $349M-469M per Mile (BYD)
  - Includes 2.10 route-miles of aerial alignment
  - Cost is lower than the LRT options and the Independent on Century full capacity option. Cost is more than the Urban Rail and low capacity APM/Monorail options.

- APM/Monorail: Aerial on Arbor Vitae (Low Capacity)
  - Estimated capital cost of $561M-747M or $267M-356M per Mile (BYD)
  - Includes 2.10 route-miles of aerial alignment
  - Scenario is the least expensive APM/Monorail option. Scenario is the second least expensive option, behind the urban rail scenario.

Independent Option #2: Century Independent Options

- APM/Monorail: Aerial on Century
  - Estimated capital cost of $800M-1,049M or $286M-375M per Mile (BYD)
  - Includes 2.80 route-miles of aerial alignment
  - Scenario is the more expensive than the Arbor Vitae option and the Urban Rail options, but less than LRT options.

- APM/Monorail: Aerial on Century (Low Capacity)

- Estimated capital cost of $563M-732M or $201M-262M per Mile (BYD)
- Includes 2.80 route-miles of aerial alignment
- Scenario is the more expensive than the Arbor Vitae low capacity option, but less than all other APM/Monorail options, the Urban Rail options, and the LRT options.

Independent Option #3: Streetcar: Prairie to Market and Century

- Estimated capital cost of $416M-634M or $317M-476M per Mile (BYD)
- Includes 0.87 route-miles of aerial alignment, 0.21 route-miles of at-grade alignment 0.13 route-miles of retained fill alignment, and 0.11 route-miles of underground alignment
- Scenario is the least expensive option than all other options.

3.2 Unit Cost Comparison to Other Systems

As part of this analysis the total estimated capital cost per route-mile for the NFL Connector Interlined and Independent scenarios was compared to other recent LA Metro projects (**Figures 3.2-1** and **3.2-2**). The NFL Connector scenarios are shown in Blue and the other Metro projects are shown in orange. Capital costs for other Metro projects have been escalated to 2017 from their respective sources in order to be comparable.

Figure 3.2-1 and **3.2-2** present the cost per mile of the systems compared to other similar comparative projects. The overall cost is primarily driven by the scenario mode and length of the system. Additional factors such as the construction or expansion of maintenance facilities, presence of at-grade and underground segments, upgrades to existing transit systems can also sway the unit cost either way. For example, alignments with shorter overall length will have higher unit costs when compared to longer alignments with the same type of guideway and station configurations.

Figure 3.2-1 compares the LRT ROM cost estimates to comparable Metro LRT projects. The range of cost per mile for the Interlined Aerial and Underground scenarios is $437M to $1.087B per mile. The low- and high-end Interlined Aerial LRT estimates fall into an expected range when compared to other Metro projects. In contrast, the high-end Interlined Underground LRT estimate is well-outside the comparison range. Its value is $347M more than the Regional Connector cost per mile. This difference can be attributed to a shorter distance despite a similar percentage of underground alignment. The low-end estimate falls between the Purple Line Extension – Section 1 and the Regional Connector. Both Aerial and Underground Scenarios require upgrades to existing infrastructure for interlined operability such as larger storage and maintenance facilities.

Figure 3.2-2 compares the APM/Monorail ROM cost estimates to comparable APM/Monorail projects. The range of cost per mile for the Independent Arbor Vitae and Century scenarios is $201M to $472M per mile. The low- and high-end estimates for the all four options fall into an expected range when compared to global applications of APM/Monorail.

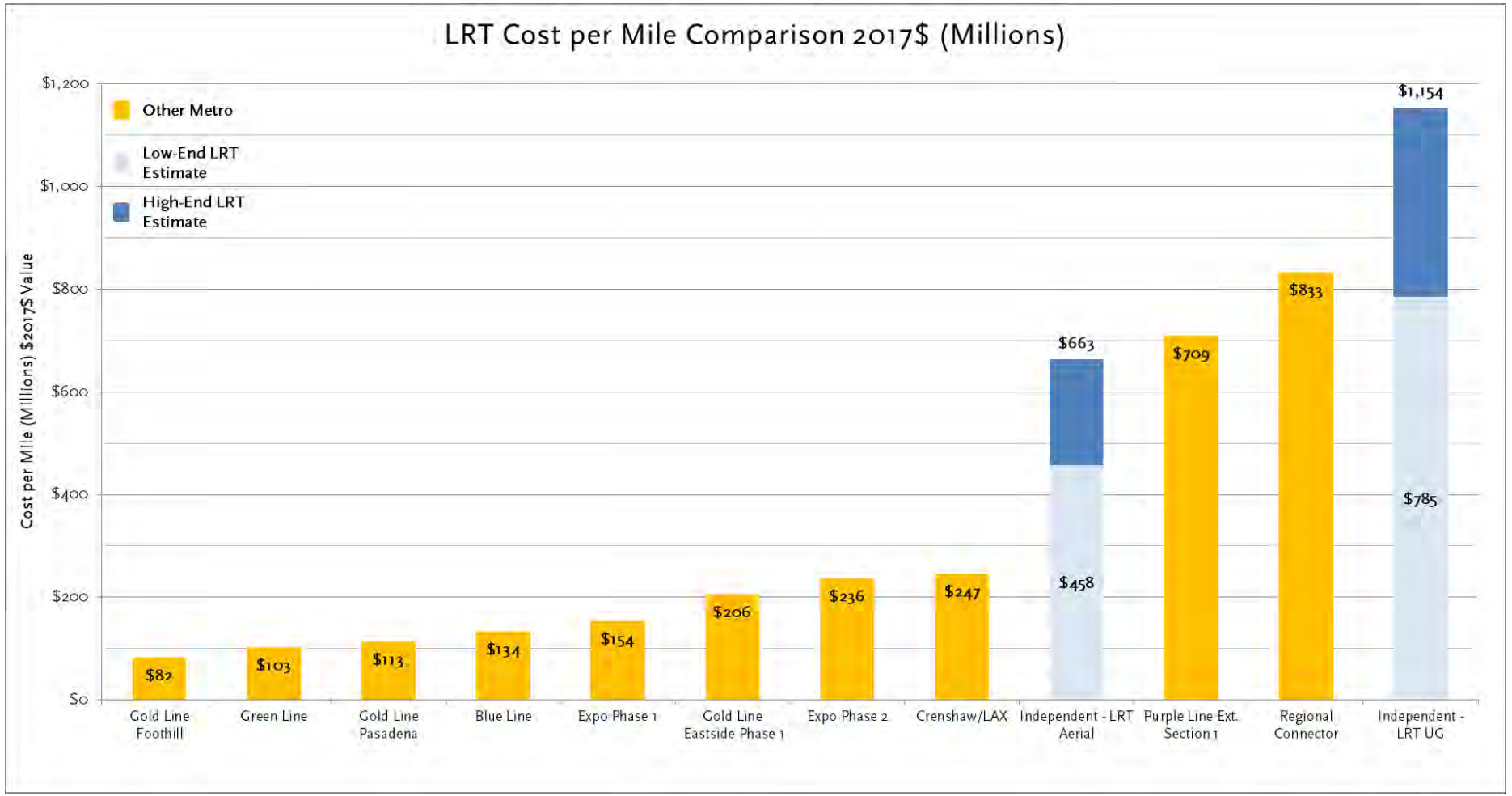


Figure 3.2-1: Cost per Mile Comparison of LRT Scenarios to Metro Systems

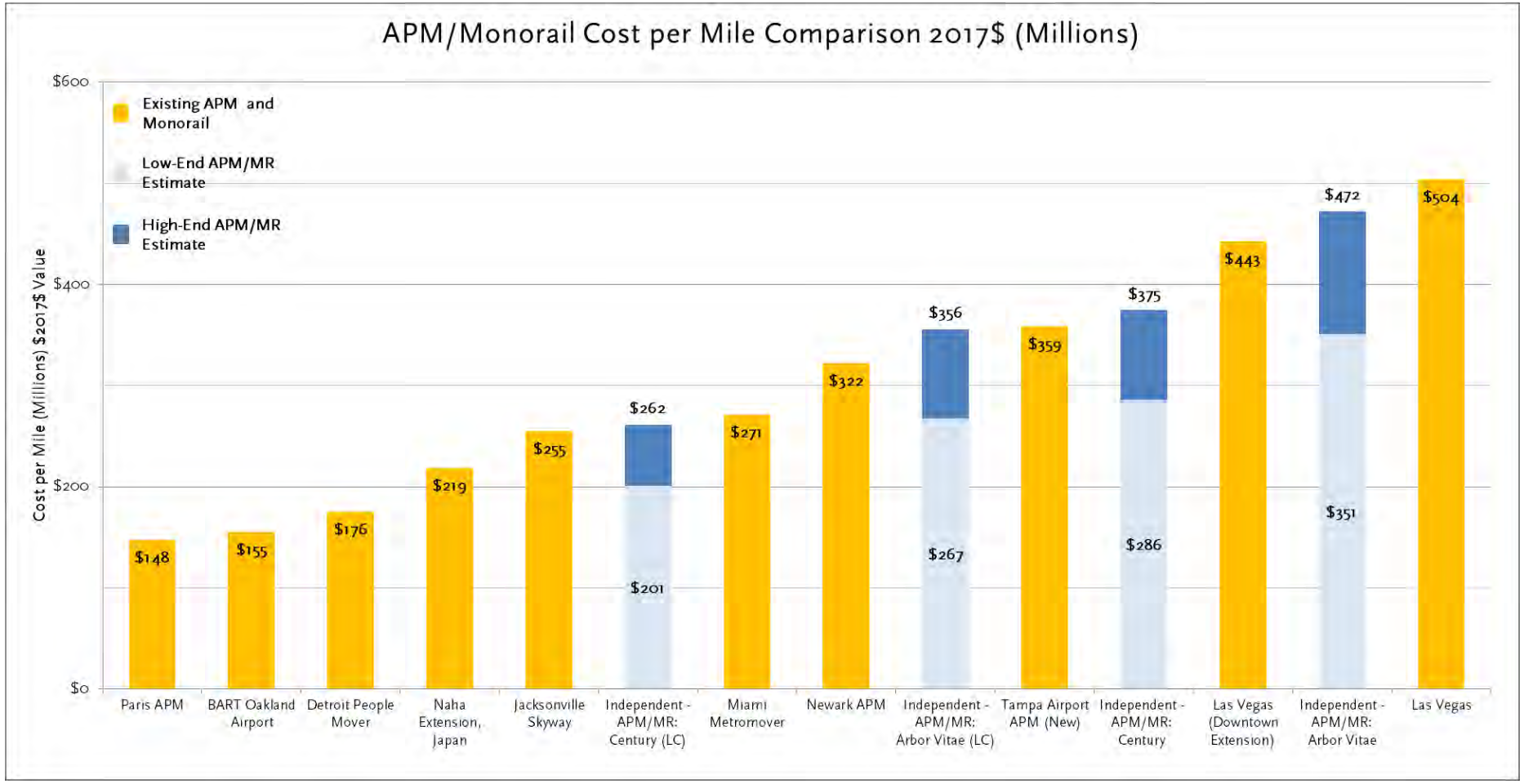


Figure 3.2-2: Cost per Mile Comparison of APM/Monorail Scenarios to other APM/Monorail Systems

4. Operating and Maintenance Cost Estimates

Annual Operating and maintenance (O&M) costs have been estimated with spreadsheet models that tie costs to the level of service that is to be operated and facilities that are to be maintained. Specifically, the cost allocation models assume that each operating expense incurred is driven by a key supply variable such as revenue-hours, revenue-miles or number of vehicles operated during peak periods. Unit costs are developed and applied to future service statistics. The result is an estimated annual O&M cost that is specific for the test scenario. Methodology for each mode that is under consideration is described below.

4.1 Methodologies

4.1.1 Light Rail and Streetcar O&M Cost Methodology

Actual cost data from the Los Angeles Metropolitan Transportation Authority (Metro) was used to develop unit cost data for light rail and streetcar alternatives (for purposes of this project, streetcar O&M cost characteristics are anticipated to be similar to LRT). Metro reports actual costs and service statistics to the Federal Transit Administration (FTA) in the National Transit Database (NTD). Service statistics used in the development of unit costs are as follows:

- *Annual Revenue Train-Hours* – The hours that trains (of any length) travel while in revenue service over the entire fiscal year. Revenue train-hours include layover and schedule recovery but exclude time for deadhead, operator training, and maintenance testing.
- *Annual Revenue Car-Hours* – The hours that passenger vehicles travel while in revenue service over the entire fiscal year. Revenue car-hours include layover and schedule recovery but exclude time for deadhead, operator training, and maintenance testing.
- *Annual Revenue Car-Miles* – The miles that passenger vehicles travel while in revenue service over the entire fiscal year. Revenue car-miles include layover and schedule recovery but exclude miles for deadhead, operator training, and maintenance testing.
- *Peak Cars* – The maximum number of passenger service vehicles operated simultaneously on an average weekday. In some cases, peak cars may be used as a supply variable when the model needs to base a line item expense on overall rail system size.
- *Stations* – Passenger boarding/alighting facilities with a platform and associated equipment and amenities such as stairs, escalators, elevators, canopies, wind shelters, lighting, ticket machines and signage.
- *Maintenance and Storage Yards* – The total number of yard facilities allocated.
- *Revenue Track-Miles* – Miles of directional revenue track reported in NTD.

Key supply variables and values used to represent LA Metro's FY 2015 calibration (base) year input are as follows:

- 290,617 annual revenue train-hours
- 680,077 annual revenue car-hours
- 13,702,192 annual revenue car-miles
- 144 peak rail cars
- 66 passenger stations
- 3 maintenance and storage yards
- 135.8 directional track miles

After selecting key supply variables, the next step for the LRT/Streetcar model was to record Metro's light rail operating expenses as a series of line items. The NTD report format categorizes operating expenses within the four functional areas of Vehicle Operations, Vehicle Maintenance, Non-Vehicle Maintenance, and General Administration. For each functional area, line item expenses are further classified as salaries/wages, fringe benefits, services, materials/supplies, utilities, casualty and liability, taxes/fees, and miscellaneous.

After the list of line items was established, each was assigned a key supply variable as its most relevant cost driver. Several line item expenses were deemed to be strongly influenced by more than one key supply variable, thus the spreadsheet model splits those specific expenses among two or more cost drivers.

Costs were inflated to 2017 dollars by 4.43 percent, using the Bureau of Labor Statistics consumer price index for all urban consumers(CPI-U) for Los Angeles. Resulting aggregate unit costs for the calibration system in 2017 dollars are as follows:

- $177.49 per annual revenue train-hour
- $20.72 per annual revenue car-hour
- $2.11 per annual revenue car-mile
- $746,383 per peak rail car
- $441,976 per rail station
- $11,438,351 per rail yard
- $87,662 per directional track miles

4.1.2 Automated People Mover (APM) O&M Cost Methodology

Actual cost data from Miami-Dade Transit was used to develop unit cost data for APM alternatives. Miami-Dade Transit operates APM service in downtown Miami (Metromover). Bombardier Innovia APM 100 vehicles are used on Metromover. Actual costs and service statistics are reported to

FTA in the NTD. Service statistics used in the development of unit costs are the same as those noted for light rail transit. Key supply variables and values used to represent the APM model's FY 2015 calibration (base) year input are as follows:

- 94,040 annual revenue train-hours
- 111,106 annual revenue car-hours
- 1,133,951 annual revenue car-miles
- 21 peak rail cars
- 21 passenger stations
- 1 maintenance and storage yard
- 9.4 directional track miles

After selecting key supply variables, the next step for the APM model was to record Miami-Dade Transit's APM operating expenses as a series of line items, using the same categories noted for light rail. After the list of line items was established, each was assigned a key supply variable as its most relevant cost driver. Several line item expenses were deemed to be strongly influenced by more than one key supply variable, thus the spreadsheet model splits those specific expenses among two or more cost drivers.

Miami-Dade Metromover costs were adjusted to reflect potential Los Angeles cost characteristics. Specifically, wages were factored up by a ratio of 1.228 to reflect higher wage rates in Los Angeles and utility propulsion costs were factored down by a ratio of 0.737 to reflect lower kwh costs. These adjustment factors were determined by calculating differences in the average cost per work hour and the average cost per kwh as reported in NTD. Fringe benefit rates were also adjusted to reflect Los Angeles Metro rates. Line item costs driven by revenue car-miles were also adjusted to account for significant differences in average speeds between Miami's Metromover and this project's APM alternatives.

Resulting aggregate unit costs for the calibration system in 2017 dollars are as follows:

- $41.17 per annual revenue train-hour
- $11.39 per annual revenue car-hour
- $2.24 per annual revenue car-mile
- $703,545 per peak rail car
- $305,071 per rail station
- $5,213,996 per rail yard
- $135,805 per directional route mile of track

4.1.3 Monorail O&M Cost Methodology

Actual cost data from the Las Vegas Monorail was used to develop unit cost data for monorail alternatives. The Las Vegas Monorail is a 3.9-mile system located adjacent to the Las Vegas strip. Bombardier MVI trains are used, with four cars per train. Actual costs and service statistics are reported to FTA in the NTD. Service statistics used in the development of unit costs are the same as those noted for light rail transit. Key supply variables and values used to represent the APM model's FY 2015 calibration (base) year input are as follows:

- 36,994 annual revenue train-hours
- 147,978 annual revenue car-hours
- 1,766,718 annual revenue car-miles
- 24 peak rail cars
- 7 passenger stations
- 1 maintenance and storage yard
- 7.7 directional track miles

After selecting key supply variables, the next step for the monorail model was to record the Las Vegas Monorail operating expenses as a series of line items, using the same categories noted for light rail. After the list of line items was established, each was assigned a key supply variable as its most relevant cost driver. Several line item expenses were deemed to be strongly influenced by more than one key supply variable, thus the spreadsheet model splits those specific expenses among two or more cost drivers.

Las Vegas Monorail costs were adjusted to reflect potential Los Angeles cost characteristics. Specifically, wages were factored up by a ratio of 1.173 to reflect higher wage rates in Los Angeles and utility propulsion costs were factored up by a ratio of 1.489 to reflect higher kwh costs. These adjustment factors were determined by calculating differences in the average cost per work hour and the average cost per kwh as reported in NTD. Fringe benefit rates were also adjusted to reflect Los Angeles Metro rates.

Resulting aggregate unit costs for the calibration system in 2017 dollars are as follows:

- $142.81 per annual revenue train-hour
- $6.51 per annual revenue car-hour
- $1.22 per annual revenue car-mile
- $363,797 per peak rail car
- $542,943 per rail station
- $5,119,679 per rail yard
- $30,879 per directional route mile of track

4.2 Scenario Analysis

4.2.1 Integrated Scenario

The integrated scenario reflects light rail transit service that operates as a branch of the Crenshaw Line and Green Line north pattern, proceeding from the Expo/Crenshaw LRT station, then branching at Fairview Heights to continue on Prairie until terminating at Prairie/Arbor Vitae. Service and facility statistics were calculated for routine service based on 5-minute peak headways and 10-minute midday headways, with evenings tapering from 10 to 20 minutes. Besides routine service, special event service statistics are added representing 50 special events a year, with 9 hours of increased service for each special event. Special event service also assumes supplementation of background LRT service on the Crenshaw Line and Green Line north pattern.

Unit costs presented above were applied to LRT service and facility statistics for the integrated scenario. For special events, costs driven by peak cars and stations were adjusted to account for the percentage of hours when special event service would be operating. This adjustment was necessary to ensure costs driven by these two variables are not over estimated, for these unit costs are based on annual cost characteristics. **Table 4.2.1-1** presents estimated costs for the integrated scenario, with costs broken out as routine service, special event service and background LRT changes during special events. Detailed cost estimates for 2023 and 2040 are presented in Appendix B.

Table 4.2.1-1 Integrated Scenario Annual O&M Cost Estimate (in millions, 2017 dollars)

	2023 Costs	2040 Costs
Routine Service	$15.899	$15.899
Special Event Service	$1.218	$1.218
Background LRT Changes during Special Events	$2.488	$2.792
Total O&M Costs	**$19.606**	**$19.910**

4.2.2 Independent Scenarios

Arbor Vitae Independent Option

The Arbor Vitae Independent Option is considered for two potential transit modes – APM and monorail. Service and facility statistics were calculated for routine service and for special event service. Additional event service is also assumed for background LRT service on the Crenshaw Line and Green Line north pattern.

Unit costs presented above were applied to APM, monorail and LRT service and facility statistics for the Arbor Vitae Independent Option. For special events, costs driven by peak cars and stations were adjusted to account for the percentage of hours when special event service would be operating. **Table 4.2.2-1** presents estimated costs for the Arbor Vitae Independent Option, with costs broken out as routine service, special event service and background LRT changes during special events.

Table 4.2.2-1 Arbor Vitae Independent Option Annual O&M Cost Estimate (in millions, 2017 dollars)

	2023		2040	
	APM	Monorail	APM	Monorail
Routine Service	$10.207	$10.751	$10.207	$10.751
Special Event Service	$1.300	$0.866	$1.300	$0.866
Background LRT Changes during Special Events	$2.488	$2.488	$2.792	$2.792
Total O&M Costs	**$13.995**	**$14.106**	**$14.299**	**$14.410**

Century Independent Option

The Century Independent Option also is under consideration for two potential transit modes – APM and monorail. Service and facility statistics were calculated for routine service and for special event service. Additional event service is also assumed for background LRT service on the Crenshaw Line and Green Line north pattern.

Unit costs presented above were applied to APM, monorail and LRT service and facility statistics for the Century Independent Option. For special events, costs driven by peak cars and stations were adjusted to account for the percentage of hours when special event service would be operating.

Table 4.2.2-2 presents estimated costs for the Century Independent Option, with costs broken out as routine service, special event service and background LRT changes during special events. Detailed cost estimates for 2023 and 2040 are presented in Appendix B.

Table 4.2.2-2 Century Independent Option Annual O&M Cost Estimate (in millions, 2017 dollars)

	2023		2040	
	APM	Monorail	APM	Monorail
Routine Service	$12.023	$12.707	$12.023	$12.707
Special Event Service	$1.920	$1.328	$1.920	$1.328
Background LRT Changes during Special Events	$2.488	$2.488	$2.792	$2.792
Total O&M Costs	**$16.431**	**$16.523**	**$16.735**	**$16.827**

Market-Manchester Independent Option

The Market-Manchester Independent Option reflects use of streetcar. As noted earlier, for purposes of this study, streetcar O&M cost characteristics are anticipated to be similar to LRT. Service and facility statistics were calculated for routine service and for special event service. Additional event service is also assumed for background LRT service on the Crenshaw Line and Green Line north pattern.

Unit costs presented above were applied to streetcar and LRT service and facility statistics for the Market-Manchester Independent Option. For special events, costs driven by peak cars and stations were adjusted to account for the percentage of hours when special event service would be operating. **Table 4.2.2-3** presents estimated costs for the Market-Manchester Independent Option, with costs broken out as routine service, special event service and background LRT changes during special events. Detailed cost estimates for 2023 and 2040 are presented in Appendix B.

Table 4.2.2-3 Market-Manchester Independent Option Annual O&M Cost Estimate (in millions, 2017 dollars)

	2023 Costs	2040 Costs
Routine Service	$9.501	$9.501
Special Event Service	$1.097	$1.097
Background LRT Changes during Special Events	$2.488	$2.792
Total O&M Costs	**$13.086**	**$13.390**

APPENDIX K

Operating Statistic Worksheets and Assumptions

Calibration Values

	LRT	APM	Monorail
Scenario	Calibration	Calibration	Calibration
Rev. Train Hrs.	290,617	94,040	36,994
Rev. Car-Mi's.	13,702,192	1,133,951	1,766,718
Rev. Car-Hrs.	680,077	111,106	147,978
Peak Cars	144	21	24
Stations	66	21	7
Yards	3.0	1.0	1.0
Track-Mi's.	135.8	9.4	7.7

		2023 Scenarios										2040 Scenarios												
		INPUT	Fairview Heights Integrated			Arbor Vitae			Century			Market Street			Fairview Heights Integrated			Arbor Vitae			Century			Market Street		
LRT	Scenario	Background	Routine Service	Special Events	Background	Routine Service	Special Events	Background	Routine Service	Special Events	Background	Routine Service	Special Events	Background	Routne Service	Special Events	Background	Routine Service	Special Events	Background	Routine Service	Special Events	Background	Routine Service	Special Events	Background
	Rev. Train Hrs.	3,600	36,350	1,650	3,600			3,600			3,600	19,130	1,500	3,600	36,350	1,650	4,050			4,050			4,050	19,130	1,500	4,050
	Rev. Car-Mi's.	386,600	577,840	143,150	386,600			386,600			386,600	141,210	53,100	386,600	577,840	143,150	435,200			435,200			435,200	141,210	53,100	435,200
	Rev. Car-Hrs.	15,300	36,350	8,550	15,300			15,300			15,300	19,130	6,300	15,300	36,350	8,550	17,100			17,100			17,100	19,130	6,300	17,100
	Peak Cars	1.92	9.00	1.13	1.92			1.92			1.92	4.00	1.24	1.92	9.00	1.13	2.14			2.14			2.14	4.00	1.24	2.14
	Stations	0.00	1.00	0.06	0.00			0.00			0.00	5.00	0.28	0.00	1.00	0.06	0.00			0.00			0.00	5.00	0.28	0.00
	Yards	0	0	0	0			0			0	0	0	0	0	0	0			0			0	0	0	0
	Track-Mi's.	0.00	3.60	0.00	0.00			0.00			0.00	2.46	0.00	0.00	3.60	0.00	0.00			0.00			0.00	2.46	0.00	0.00
APM & Monorail	Scenario	Routine Service				Routine Service	Special Events		Routine Service	Special Events								Routine Service	Special Events		Routine Service	Special Events				
	Rev. Train Hrs.	16,710				16,710	900		19,130	1,650								16,710	900		19,130	1,650				
	Rev. Car-Mi's.	236,480				236,480	189,150		317,990	254,300								236,480	189,150		317,990	254,300				
	Rev. Car-Hrs.	16,710				16,710	9,900		19,130	14,400								16,710	9,900		19,130	14,400				
	Peak Cars	3				3	1.92		4.00	2.93								3	1.92		4.00	2.93				
	Stations	3.00				3.00	0.17		5.00	0.28								3.00	0.17		5.00	0.28				
	Yards	1				1	0		1	0								1	0		1	0				
	Track-Mi's.	4.12				4.12	0.00		5.54	0.00								4.12	0.00		5.54	0.00				

City of Champions/Inglewood NFL Stadium
Project
Draft O&M Cost Estimates (June 3, 2017)

			Arbor Vitae Independent - APM					Arbor Vitae Independent - Monorail					Century Independent - APM					Century Independent - Monorail					Market-Manchester Independent (Streetcar)					Fairview Heights Integrated (LRT)				
			Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routine Service		Event Service		Total
Mode	Variable	Unit Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost
APM	Rev. Train-Hrs	$41.17	16,710	$687,953	900	$37,053							19,130	$787,585	1,650	$67,931																
	Rev. Car-Miles	$2.24	236,480	$529,481	189,150	$423,509							317,990	$711,983	254,300	$569,380																
	Rev. Car-Hrs.	$11.39	16,710	$190,261	9,900	$112,722							19,130	$217,816	14,400	$163,959																
	Peak Cars	$703,545	3	$2,110,636	34	$675,043							4	$2,814,181	52	$1,032,419																
	Stations	$305,071	3	$915,212	3	$51,655							5	$1,525,354	5	$86,092																
	Yards	$5,213,996	1	$5,213,996									1	$5,213,996																		
	Track Miles	$135,805	4.12	$559,519									5.54	$752,362																		
	Modal Cost			$10,207,058		$1,299,982	$11,507,040					$0		$12,023,276		$1,919,781	$13,943,057					$0					$0					$0
Monorail	Rev. Train-Hrs	$142.81						16,710	$2,386,324	900	$128,527							19,130	$2,731,920	1,650	$235,633											
	Rev. Car-Miles	$1.22						236,480	$289,572	189,150	$231,616							317,990	$389,382	254,300	$311,393											
	Rev. Car-Hrs.	$6.51						16,710	$108,842	9,900	$64,485							19,130	$124,605	14,400	$93,796											
	Peak Cars	$363,797						3	$1,091,390	34	$349,059							4	$1,455,187	52	$533,854											
	Stations	$542,943						3	$1,628,829	3	$91,932							5	$2,714,715	5	$153,220											
	Yards	$5,119,679						1	$5,119,679									1	$5,119,679													
	Track Miles	$30,879						4.12	$127,221									5.54	$171,069													
	Modal Cost						$0		$10,751,858		$865,619	$11,617,477					$0		$12,706,557		$1,327,897	$14,034,454					$0					$0
LRT/	Rev. Train-Hrs	$177.49																					19,130	$3,395,307	1,500	$266,229		36,350	$6,451,617	1,650	$292,852	
Streetcar	Rev. Car-Miles	$2.11																					141,210	$298,108	53,100	$112,099		577,840	$1,219,877	143,150	$302,204	
	Rev. Car-Hrs.	$20.72																					19,130	$396,350	6,300	$130,528		36,350	$753,127	8,550	$177,145	
	Peak Cars	$746,383																					4	$2,985,534	22	$463,389		9	$6,717,451	20	$421,262	
	Stations	$441,976																					5	$2,209,880	5	$124,727		1	$441,976	1	$24,945	
	Track Miles	$87,622																					2.46	$215,551				3.60	$315,441			
	Modal Cost						$0					$0					$0					$0		$9,500,731		$1,096,972	$10,597,703		$15,899,488		$1,218,409	$17,117,897
Background	Rev. Train-Hrs	$177.49			3,600	$638,950				3,600	$638,950				3,600	$638,950				3,600	$638,950			3,600	$638,950				3,600	$638,950	
LRT	Rev. Car-Miles	$2.11			386,600	$816,151				386,600	$816,151				386,600	$816,151				386,600	$816,151			386,600	$816,151				386,600	$816,151	
Changes	Rev. Car-Hrs.	$20.72			15,300	$316,997				15,300	$316,997				15,300	$316,997				15,300	$316,997			15,300	$316,997				15,300	$316,997	
	Peak Cars	$746,383			34	$716,146				34	$716,146				34	$716,146				34	$716,146			34	$716,146				34	$716,146	
	Modal Cost					$2,488,243	$2,488,243				$2,488,243	$2,488,243				$2,488,243	$2,488,243				$2,488,243	$2,488,243				$2,488,243	$2,488,243				$2,488,243	$2,488,243
TOTAL ALTERNATIVE COST				$10,207,058		$3,788,226	$13,995,283		$10,751,858		$3,353,862	$14,105,720		$12,023,276		$4,408,025	$16,431,301		$12,706,557		$3,816,140	$16,522,697		$9,500,731		$3,585,215	$13,085,946		$15,899,488		$3,706,652	$19,606,141

Notes:

1. Event service statistics assume 50 event days/year and 9 hours of event service on each of those days.
2. Event service statistics reflect "net" service, reflecting supplementation of regular service during those event hours.
3. Unit costs for peak cars and yards on event days pro-rated based on portion of annual hours of service.
4. Background LRT changes reflect proposed service changes to Green-North Branch and Crenshaw Lines during event service hours.

City of Champions/Inglewood NFL Stadium Project
Draft O&M Cost Estimates (June 3, 2017)

			Arbor Vitae Independent - APM					Arbor Vitae Independent - Monorail					Century Independent - APM				Century Independent - Monorail					Market-Manchester Independent (Streetcar)					Fairview Heights Integrated (LRT)				
			Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routine Service		Event Service		Total
Mode	Variable	Unit Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost
APM	Rev. Train-Hrs	$41.17	16,710	$687,953	900	$37,053							19,130	$787,585	1,650	$67,931																
	Rev. Car-Miles	$2.24	236,480	$529,481	189,150	$423,509							317,990	$711,983	254,300	$569,380																
	Rev. Car-Hrs.	$11.39	16,710	$190,261	9,900	$112,722							19,130	$217,816	14,400	$163,959																
	Peak Cars	$703,545	3	$2,110,636	34	$675,043							4	$2,814,181	52	$1,032,419																
	Stations	$305,071	3	$915,212	3	$51,655							5	$1,525,354	5	$86,092																
	Yards	$5,213,996	1	$5,213,996									1	$5,213,996																		
	Track Miles	$135,805	4.12	$559,519									5.54	$752,362																		
	Modal Cost			$10,207,058		$1,299,982	$11,507,040					$0		$12,023,276		$1,919,781	$13,943,057					$0					$0					$0
Monorail	Rev. Train-Hrs	$142.81						16,710	$2,386,324	900	$128,527							19,130	$2,731,920	1,650	$235,633											
	Rev. Car-Miles	$1.22						236,480	$289,572	189,150	$231,616							317,990	$389,382	254,300	$311,393											
	Rev. Car-Hrs.	$6.51						16,710	$108,842	9,900	$64,485							19,130	$124,605	14,400	$93,796											
	Peak Cars	$363,797						3	$1,091,390	34	$349,059							4	$1,455,187	52	$533,854											
	Stations	$542,943						3	$1,628,829	3	$91,932							5	$2,714,715	5	$153,220											
	Yards	$5,119,679						1	$5,119,679									1	$5,119,679													
	Track Miles	$30,879						4.12	$127,221									5.54	$171,069													
	Modal Cost						$0		$10,751,858		$865,619	$11,617,477					$0		$12,706,557		$1,327,897	$14,034,454					$0					$0
LRT/	Rev. Train-Hrs	$177.49																					19,130	$3,395,307	1,500	$266,229		36,350	$6,451,617	1,650	$292,852	
Streetcar	Rev. Car-Miles	$2.11																					141,210	$298,108	53,100	$112,099		577,840	$1,219,877	143,150	$302,204	
	Rev. Car-Hrs.	$20.72																					19,130	$396,350	6,300	$130,528		36,350	$753,127	8,550	$177,145	
	Peak Cars	$746,383																					4	$2,985,534	22	$463,389		9	$6,717,451	20	$421,262	
	Stations	$441,976																					5	$2,209,880	5	$124,727		1	$441,976	1	$24,945	
	Track Miles	$87,622																					2.46	$215,551				3.60	$315,441			
	Modal Cost						$0					$0					$0					$0		$9,500,731		$1,096,972	$10,597,703		$15,899,488		$1,218,409	$17,117,897
Background	Rev. Train-Hrs	$177.49			4,050	$718,818				4,050	$718,818				4,050	$718,818				4,050	$718,818				4,050	$718,818				4,050	$718,818	
LRT	Rev. Car-Miles	$2.11			435,200	$918,750				435,200	$918,750				435,200	$918,750				435,200	$918,750				435,200	$918,750				435,200	$918,750	
Changes	Rev. Car-Hrs.	$20.72			17,100	$354,291				17,100	$354,291				17,100	$354,291				17,100	$354,291				17,100	$354,291				17,100	$354,291	
	Peak Cars	$746,383			38	$800,399				38	$800,399				38	$800,399				38	$800,399				38	$800,399				38	$800,399	
	Modal Cost					$2,792,258	$2,792,258				$2,792,258	$2,792,258				$2,792,258	$2,792,258				$2,792,258	$2,792,258				$2,792,258	$2,792,258				$2,792,258	$2,792,258
TOTAL ALTERNATIVE COST				$10,207,058		$4,092,240	$14,299,298		$10,751,858		$3,657,877	$14,409,735		$12,023,276		$4,712,039	$16,735,315		$12,706,557		$4,120,155	$16,826,712		$9,500,731		$3,889,230	$13,389,961		$15,899,488		$4,010,667	$19,910,155

Notes:

1. Event service statistics assume 50 event days/year and 9 hours of event service on each of those days.
2. Event service statistics reflect "net" service, reflecting supplementation of regular service during those event hours.
3. Unit costs for peak cars and yards on event days pro-rated based on portion of annual hours of service.
4. Background LRT changes reflect proposed service changes to Green-North Branch and Crenshaw Lines during event service hours.

CITY OF CHAMPIONS/INGLEWOOD (NFL) PROJECT
LIGHT RAIL O&M COST MODEL
(Reflects LA Metro Light Rail Cost Data)

Background

Inflate Factor 1.0443

Expense Line Item	2015 LA Metro LRT Expenses	Supply Variable Unit Cost ($2015)							Inflation Factor	Estimated Annual Cost (2017)
		Revenue Train-Hours	Revenue Car-Miles	Revenue Car-Hours	Peak Cars	Stations	Yards	Revenue Track-Miles		
VEHICLE OPERATIONS	*$134,616,338*									*$1,302,985*
Operators' Salaries and Wages	*$15,816,955*	$54.43							1.044	$204,603
Other Salaries and Wages	*$20,074,280*	$34.54				$76,039	$1,672,857		1.044	$129,837
Fringe Benefits	*$24,788,461*	$61.44				$52,517	$1,155,367		1.044	$230,983
Service Costs	*$55,354,411*				$192,202.82				1.044	$385,156
Fuel and Lubricants	*$38,955*				$135.26				1.044	$271
Tires and Tubes	*$0*								1.044	$0
Other Materials and Supplies	*$552,357*				$1,917.91				1.044	$3,843
Utilities	*$17,990,919*			$19.84	$15,617.12				1.044	$348,292
Casualty and Liability Costs	*$0*								1.044	$0
Taxes	*$0*								1.044	$0
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$0*								1.044	$0
VEHICLE MAINTENANCE	*$42,616,431*									*$868,021*
Operators' Salaries and Wages	*$0*								1.044	$0
Other Salaries and Wages	*$18,441,181*		$1.01		$16,007.97				1.044	$439,580
Fringe Benefits	*$15,147,180*		$0.83		$13,148.59				1.044	$361,061
Service Costs	*$270,345*		$0.01		$234.67				1.044	$6,444
Fuel and Lubricants	*$60,636*				$210.54				1.044	$422
Tires and Tubes	*$9,061*				$31.46				1.044	$63
Other Materials and Supplies	*$8,688,028*				$30,166.76				1.044	$60,451
Utilities	*$0*								1.044	$0
Casualty and Liability Costs	*$0*								1.044	$0
Taxes	*$0*								1.044	$0
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$0*								1.044	$0
NON-VEHICLE MAINTENANCE	*$37,982,769*									*$0*
Operators' Salaries and Wages	*$0*								1.044	$0
Other Salaries and Wages	*$14,719,880*					$89,211	$1,471,988	$32,518	1.044	$0
Fringe Benefits	*$11,122,398*					$67,408	$1,112,240	$24,571	1.044	$0
Service Costs	*$9,207,414*					$55,803	$920,741	$20,340	1.044	$0
Fuel and Lubricants	*$0*								1.044	$0
Tires and Tubes	*$0*								1.044	$0
Other Materials and Supplies	*$2,933,077*					$17,776	$293,308	$6,480	1.044	$0
Utilities	*$0*								1.044	$0
Casualty and Liability Costs	*$0*								1.044	$0
Taxes	*$0*								1.044	$0
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$0*								1.044	$0
GENERAL ADMINISTRATION	*$50,486,696*									*$317,237*
Operators' Salaries and Wages	*$0*								1.044	$0
Other Salaries and Wages	*$7,078,452*	$4.87			$12,288.98		$707,845		1.044	$42,939
Fringe Benefits	*$6,477,503*	$4.46			$11,245.66		$647,750		1.044	$39,293
Service Costs	*$12,298,277*	$8.46			$21,351.18		$1,229,828		1.044	$74,603
Fuel and Lubricants	*$0*								1.044	$0
Tires and Tubes	*$0*								1.044	$0
Other Materials and Supplies	*$2,566,124*	$1.77			$4,455.08		$256,612		1.044	$15,566
Utilities	*$4,613,411*		$0.17		$8,009.39				1.044	$84,013
Casualty and Liability Costs	*$8,512,750*				$7,389.54	$64,491	$709,396		1.044	$14,808
Taxes	*$122,545*						$40,848		1.044	$0
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$8,817,634*				$22,962.59		$734,803		1.044	$46,015
TOTALS IN 2015 DOLLARS	*$265,702,234*	$169.96	$2.02	$19.84	$357,376	$423,245	$10,953,583	$83,909		$2,488,243
TOTALS IN 2017 DOLLARS	*$277,461,295*	$177.49	$2.11	$20.72	$373,192	$441,976	$11,438,351	$87,622	Rev. Train Hrs.	3,600
2015 Resource Variable Values		290,617	13,702,192	680,077	144	66	3	135.8	Rev. Car-Mi's.	386,600
									Rev. Car-Hrs.	15,300
									Peak Cars	1.92
									Stations	0.00
									Yards	0.00
									Track-Mi's.	0.00

Expense Line Item	Supply Variable Percent Assignments						
	Revenue Train-Hours	Revenue Car-Miles	Revenue Car-Hours	Peak Cars	Stations	Yards	Revenue Track-Miles
VEHICLE OPERATIONS							
Operators' Salaries and Wages	100%						
Other Salaries and Wages	50%				25%	25%	
Fringe Benefits	72%				14%	14%	
Service Costs				100%			
Fuel and Lubricants				100%			
Tires and Tubes				100%			
Other Materials and Supplies				100%			
Utilities			75%	25%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report	100%						
Miscellaneous Expenses				75%		25%	
VEHICLE MAINTENANCE							
Operators' Salaries and Wages	100%						
Other Salaries and Wages		75%		25%			
Fringe Benefits		75%		25%			
Service Costs		75%		25%			
Fuel and Lubricants				100%			
Tires and Tubes				100%			
Other Materials and Supplies				100%			
Utilities		50%		50%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report		100%					
Miscellaneous Expenses				75%		25%	
NON-VEHICLE MAINTENANCE							
Operators' Salaries and Wages	100%						
Other Salaries and Wages					40%	30%	30%
Fringe Benefits					40%	30%	30%
Service Costs					40%	30%	30%
Fuel and Lubricants					50%		50%
Tires and Tubes					50%		50%
Other Materials and Supplies					40%	30%	30%
Utilities		50%		50%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report					50%		50%
Miscellaneous Expenses					50%		50%
GENERAL ADMINISTRATION							
Operators' Salaries and Wages	100%						
Other Salaries and Wages	20%			50%		30%	
Fringe Benefits	20%			50%		30%	
Service Costs	20%			50%		30%	
Fuel and Lubricants	20%			50%		30%	
Tires and Tubes	20%			50%		30%	
Other Materials and Supplies	20%			50%		30%	
Utilities		50%		50%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report				100%			
Miscellaneous Expenses				75%		25%	

CITY OF CHAMPIONS/INGLEWOOD (NFL) PROJECT

AUTOMATED PEOPLE MOVER O&M COST MODEL

(Reflects Miami-Dade Metrmover Cost Data, Adjusted for use in this Project)

Routine Service

Inflate Factor 1.0443

Expense Line Item	2015 Miami APM Expenses	Supply Variable Unit Cost ($2015) Revenue Train-Hours	Revenue Car-Miles	Revenue Car-Hours	Peak Cars	Stations	Yards	Revenue Track-Miles	Inflation Factor	Estimated Annual Cost (2017)
VEHICLE OPERATIONS	*$10,735,102*									*$2,892,247*
Operators' Salaries and Wages	*$0*								1.044	$0
Other Salaries and Wages	*$3,015,590*	$16.03				$35,900	$753,897		1.044	$1,179,506
Fringe Benefits	*$2,279,786*	$12.12				$27,140	$569,946		1.044	$891,707
Service Costs	*$2,791,007*				$132,905.10				1.044	$416,361
Fuel and Lubricants	*$0*								1.044	$0
Tires and Tubes	*$0*								1.044	$0
Other Materials and Supplies	*$1,033,458*				$49,212.29				1.044	$154,171
Utilities	*$1,615,262*			$10.90	$19,229.30				1.044	$250,502
Casualty and Liability Costs	*$0*								1.044	$0
Taxes	*$0*								1.044	$0
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$0*								1.044	$0
VEHICLE MAINTENANCE	*$9,405,873*									*$1,558,599*
Operators' Salaries and Wages	*$0*								1.044	$0
Other Salaries and Wages	*$3,198,512*		$0.99		$99,001.57				1.044	$553,943
Fringe Benefits	*$2,418,075*		$0.75		$74,845.19				1.044	$418,781
Service Costs	*$857,659*		$0.26		$26,546.58				1.044	$148,536
Fuel and Lubricants	*$794,733*				$37,844.43				1.044	$118,558
Tires and Tubes	*$147,332*				$7,015.81				1.044	$21,979
Other Materials and Supplies	*$1,989,562*				$94,741.05				1.044	$296,802
Utilities	*$0*								1.044	$0
Casualty and Liability Costs	*$0*								1.044	$0
Taxes	*$0*								1.044	$0
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$0*								1.044	$0
NON-VEHICLE MAINTENANCE	*$8,149,795*									*$3,781,342*
Operators' Salaries and Wages	*$0*								1.044	$0
Other Salaries and Wages	*$3,167,017*					$82,946	$950,105	$50,537	1.044	$1,469,432
Fringe Benefits	*$2,394,265*					$62,707	$718,279	$38,206	1.044	$1,110,891
Service Costs	*$1,081,581*					$28,327	$324,474	$17,259	1.044	$501,832
Fuel and Lubricants	*$0*								1.044	$0
Tires and Tubes	*$0*								1.044	$0
Other Materials and Supplies	*$1,506,933*					$39,467	$452,080	$24,047	1.044	$699,187
Utilities	*$0*								1.044	$0
Casualty and Liability Costs	*$0*								1.044	$0
Taxes	*$0*								1.044	$0
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$0*								1.044	$0
GENERAL ADMINISTRATION	*$5,558,316*									*$1,974,870*
Operators' Salaries and Wages	*$0*								1.044	$0
Other Salaries and Wages	*$1,671,074*	$4.44			$39,787.47		$417,768		1.044	$638,421
Fringe Benefits	*$1,263,332*	$3.36			$30,079.33		$315,833		1.044	$482,646
Service Costs	*$1,071,268*	$2.85			$25,506.38		$267,817		1.044	$409,270
Fuel and Lubricants	*$0*								1.044	$0
Tires and Tubes	*$0*								1.044	$0
Other Materials and Supplies	*$233,803*	$0.62			$5,566.74		$58,451		1.044	$89,323
Utilities	*$661,358*		$0.15		$23,619.91				1.044	$110,002
Casualty and Liability Costs	*$657,482*				$7,827.17	$15,654	$164,371		1.044	$245,207
Taxes	*$0*								1.044	$0
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$0*								1.044	$0
TOTALS IN 2015 DOLLARS	*$33,849,087*	$39.43	$2.14	$10.90	$673,728	$292,142	$4,993,022	$130,050		$10,207,058
TOTALS IN 2017 DOLLARS	*$35,347,130*	$41.17	$2.24	$11.39	$703,545	$305,071	$5,213,996	$135,805	Rev. Train Hrs.	16,710
2015 Resource Variable Values		94,040	1,133,951	111,106	21	21	1	9.4	Rev. Car-Mi's.	236,480
									Rev. Car-Hrs.	16,710
									Peak Cars	3.00
									Stations	3.00
									Yards	1
									Track-Mi's.	4.12

Expense Line Item	Supply Variable Percent Assignments						
	Revenue Train-Hours	Revenue Car-Miles	Revenue Car-Hours	Peak Cars	Stations	Yards	Revenue Track-Miles
VEHICLE OPERATIONS							
Operators' Salaries and Wages	100%						
Other Salaries and Wages	50%				25%	25%	
Fringe Benefits	50%				25%	25%	
Service Costs				100%			
Fuel and Lubricants				100%			
Tires and Tubes				100%			
Other Materials and Supplies				100%			
Utilities			75%	25%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report	100%						
Miscellaneous Expenses				75%		25%	
VEHICLE MAINTENANCE							
Operators' Salaries and Wages	100%						
Other Salaries and Wages		35%		65%			
Fringe Benefits		35%		65%			
Service Costs		35%		65%			
Fuel and Lubricants				100%			
Tires and Tubes				100%			
Other Materials and Supplies				100%			
Utilities		50%		50%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report		100%					
Miscellaneous Expenses				75%		25%	
NON-VEHICLE MAINTENANCE							
Operators' Salaries and Wages	100%						
Other Salaries and Wages					55%	30%	15%
Fringe Benefits					55%	30%	15%
Service Costs					55%	30%	15%
Fuel and Lubricants					50%		50%
Tires and Tubes					50%		50%
Other Materials and Supplies					55%	30%	15%
Utilities		50%		50%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report					50%		50%
Miscellaneous Expenses					50%		50%
GENERAL ADMINISTRATION							
Operators' Salaries and Wages	100%						
Other Salaries and Wages	25%			50%		25%	
Fringe Benefits	25%			50%		25%	
Service Costs	25%			50%		25%	
Fuel and Lubricants	25%			50%		25%	
Tires and Tubes	25%			50%		25%	
Other Materials and Supplies	25%			50%		25%	
Utilities		25%		75%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report				100%			
Miscellaneous Expenses				75%		25%	

CITY OF CHAMPIONS/INGLEWOOD (NFL) PROJECT

MONORAIL O&M COST MODEL

(Reflects Lass Vegas Monorail Cost Data, Adjusted for use in this Project)

Routine Service

Inflate Factor 1.0443

Expense Line Item	2015 LV Monorail Expenses	Supply Variable Unit Cost ($2015) Revenue Train-Hours	Revenue Car-Miles	Revenue Car-Hours	Peak Cars	Stations	Yards	Revenue Track-Miles	Inflation Factor	Estimated Annual Cost (2017)
VEHICLE OPERATIONS	*$10,488,373*									*$5,470,639*
Operators' Salaries and Wages	*$0*								1.044	$0
Other Salaries and Wages	*$4,415,249*	$59.68				$157,687	$1,103,812		1.044	$2,687,966
Fringe Benefits	*$3,337,928*	$45.11				$119,212	$834,482		1.044	$2,032,102
Service Costs	*$306,224*				$12,759.35				1.044	$39,972
Fuel and Lubricants	*$26,123*				$1,088.47				1.044	$3,410
Tires and Tubes	*$0*								1.044	$0
Other Materials and Supplies	*$87,658*				$3,652.40				1.044	$11,442
Utilities	*$1,230,694*			$6.24	$12,819.73				1.044	$149,004
Casualty and Liability Costs	*$0*								1.044	$0
Taxes	*$229,755*						$229,755		1.044	$239,923
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$854,741*				$26,710.66		$213,685		1.044	$306,821
VEHICLE MAINTENANCE	*$5,373,995*									*$726,623*
Operators' Salaries and Wages	*$0*								1.044	$0
Other Salaries and Wages	*$1,504,158*		$0.64		$15,668.31				1.044	$206,770
Fringe Benefits	*$1,137,143*		$0.48		$11,845.24				1.044	$156,318
Service Costs	*$50,416*		$0.02		$525.17				1.044	$6,930
Fuel and Lubricants	*$0*								1.044	$0
Tires and Tubes	*$198,707*				$8,279.45				1.044	$25,938
Other Materials and Supplies	*$2,455,197*				$102,299.89				1.044	$320,482
Utilities	*$0*								1.044	$0
Casualty and Liability Costs	*$0*								1.044	$0
Taxes	*$0*								1.044	$0
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$28,374*				$886.69		$7,093		1.044	$10,185
NON-VEHICLE MAINTENANCE	*$2,956,304*									*$1,714,982*
Operators' Salaries and Wages	*$0*								1.044	$0
Other Salaries and Wages	*$193,187*					$15,179	$57,956	$3,763	1.044	$124,265
Fringe Benefits	*$146,050*					$11,475	$43,815	$2,845	1.044	$93,944
Service Costs	*$1,134,764*					$89,160	$340,429	$22,106	1.044	$729,920
Fuel and Lubricants	*$0*								1.044	$0
Tires and Tubes	*$0*								1.044	$0
Other Materials and Supplies	*$0*								1.044	$0
Utilities	*$0*								1.044	$0
Casualty and Liability Costs	*$1,469,122*				$15,303.35	$104,937	$367,281		1.044	$760,221
Taxes	*$0*								1.044	$0
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$13,180*					$941		$856	1.044	$6,632
GENERAL ADMINISTRATION	*$6,366,183*									*$2,839,614*
Operators' Salaries and Wages	*$0*								1.044	$0
Other Salaries and Wages	*$2,166,860*	$14.64			$45,142.92		$541,715		1.044	$962,631
Fringe Benefits	*$1,638,146*	$11.07			$34,128.05		$409,537		1.044	$727,749
Service Costs	*$882,799*	$5.97			$18,391.64		$220,700		1.044	$392,185
Fuel and Lubricants	*$0*								1.044	$0
Tires and Tubes	*$0*								1.044	$0
Other Materials and Supplies	*$42,418*	$0.29			$883.71		$10,604		1.044	$18,844
Utilities	*$105,787*		$0.03		$2,203.90				1.044	$14,298
Casualty and Liability Costs	*$298,762*				$3,112.11	$21,340	$74,691		1.044	$154,599
Taxes	*$185,726*						$185,726		1.044	$193,946
PT Funds In Report	*$0*								1.044	$0
Miscellaneous Expenses	*$1,045,685*				$32,677.65		$261,421		1.044	$375,362
TOTALS IN 2015 DOLLARS	*$25,184,854*	$136.76	$1.17	$6.24	$348,379	$519,932	$4,902,702	$29,570		$10,751,858
TOTALS IN 2017 DOLLARS	*$26,299,449*	$142.81	$1.22	$6.51	$363,797	$542,943	$5,119,679	$30,879	Rev. Train Hrs.	16,710
2015 Resource Variable Values		36,994	1,766,718	147,978	24	7	1	7.7	Rev. Car-Mi's.	236,480
									Rev. Car-Hrs.	16,710
									Peak Cars	3.00
									Stations	3.00
									Yards	1
									Track-Mi's.	4.12

Expense Line Item	Supply Variable Percent Assignments						
	Revenue Train-Hours	Revenue Car-Miles	Revenue Car-Hours	Peak Cars	Stations	Yards	Revenue Track-Miles
VEHICLE OPERATIONS							
Operators' Salaries and Wages	100%						
Other Salaries and Wages	50%				25%	25%	
Fringe Benefits	50%				25%	25%	
Service Costs				100%			
Fuel and Lubricants				100%			
Tires and Tubes				100%			
Other Materials and Supplies				100%			
Utilities			75%	25%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report	100%						
Miscellaneous Expenses				75%		25%	
VEHICLE MAINTENANCE							
Operators' Salaries and Wages	100%						
Other Salaries and Wages		75%		25%			
Fringe Benefits		75%		25%			
Service Costs		75%		25%			
Fuel and Lubricants				100%			
Tires and Tubes				100%			
Other Materials and Supplies				100%			
Utilities		50%		50%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report		100%					
Miscellaneous Expenses				75%		25%	
NON-VEHICLE MAINTENANCE							
Operators' Salaries and Wages	100%						
Other Salaries and Wages					55%	30%	15%
Fringe Benefits					55%	30%	15%
Service Costs					55%	30%	15%
Fuel and Lubricants					50%		50%
Tires and Tubes					50%		50%
Other Materials and Supplies					55%	30%	15%
Utilities		50%		50%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report					50%		50%
Miscellaneous Expenses					50%		50%
GENERAL ADMINISTRATION							
Operators' Salaries and Wages	100%						
Other Salaries and Wages	25%			50%		25%	
Fringe Benefits	25%			50%		25%	
Service Costs	25%			50%		25%	
Fuel and Lubricants	25%			50%		25%	
Tires and Tubes	25%			50%		25%	
Other Materials and Supplies	25%			50%		25%	
Utilities		50%		50%			
Casualty and Liability Costs				25%	50%	25%	
Taxes						100%	
PT Funds In Report				100%			
Miscellaneous Expenses				75%		25%	

5 Digit NTD ID	Legacy NTD ID	Agency Name	Reporter Type	Form Module Type	Mode	TOS	Operating Expense Type	Operators' Salaries and Wages	Other Salaries and Wages	Fringe Benefits	Service Costs	Fuel and Lubricants	Tires and Tubes	Other Materials and Supplies	Utilities	Casualty and Liability Costs	Taxes	PT Funds In Report	PT Funds Reported Separately	Miscellaneous Expenses	Reduced Reporter Total OE	Total Operating Expenses	Total Operating Expenses (No Funds Reported Separately)	ADA Related Expenses
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	HR	DO	Vehicle Operations	$4,889,322	$9,350,520	$10,761,711	$25,881,197	$25,408		$304,888	$12,929,616							$64,142,662	$64,142,662	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	HR	DO	Vehicle Maintenance		$10,357,412	$7,827,578	$389,653	$96,138	$30,310	$4,611,116								$23,312,207	$23,312,207	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	HR	DO	Non-Vehicle Maintenance		$8,435,879	$6,375,385	$8,094,383			$2,588,871								$25,494,518	$25,494,518	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	HR	DO	General Administration		$1,455,464	$1,099,962	$4,661,569			$431,675	$1,460,554	$1,642,863	$301,499			$3,150,304		$14,203,890	$14,203,890	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	HR	DO	Total	$4,889,322	$29,599,275	$26,064,636	$39,026,802	$121,546	$30,310	$7,936,550	$14,390,170	$1,642,863	$301,499	$0	$0	$3,150,304	$0	$127,153,277	$127,153,277	$0
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	LR	DO	Vehicle Operations	$15,816,955	$20,074,280	$24,788,461	$55,354,411	$38,955		$552,357	$17,990,919							$134,616,338	$134,616,338	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	LR	DO	Vehicle Maintenance		$18,441,181	$15,147,180	$270,345	$60,636	$9,061	$8,688,028								$42,616,431	$42,616,431	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	LR	DO	Non-Vehicle Maintenance		$14,719,880	$11,122,398	$9,207,414			$2,933,077								$37,982,769	$37,982,769	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	LR	DO	General Administration		$7,078,452	$6,477,503	$12,298,277			$2,566,124	$4,613,411	$8,512,750	$122,545			$8,817,634		$50,486,696	$50,486,696	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	LR	DO	Total	$15,816,955	$60,313,793	$57,535,542	$77,130,447	$99,591	$9,061	$14,739,586	$22,604,330	$8,512,750	$122,545	$0	$0	$8,817,634	$0	$265,702,234	$265,702,234	$0
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	MB	DO	Vehicle Operations	$193,640,224	$42,048,797	$178,121,146	$35,693,282	$25,890,412	$7,590,448	$2,111,527			$743,940					$485,839,776	$485,839,776	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	MB	DO	Vehicle Maintenance		$88,770,443	$67,084,978	$2,508,256	$3,535,951	$245,799	$52,419,614			$101,449					$214,666,490	$214,666,490	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	MB	DO	Non-Vehicle Maintenance		$16,481,067	$12,455,508	$11,765,505			$5,561,062								$46,263,142	$46,263,142	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	MB	DO	General Administration		$16,752,185	$12,676,431	$52,518,326			$3,639,390	$17,409,290	$38,403,327	$1,259,390			$38,052,814		$180,711,153	$180,711,153	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	MB	DO	Total	$193,640,224	$164,052,492	$270,338,063	$102,485,369	$29,426,363	$7,836,247	$63,731,593	$17,409,290	$38,403,327	$2,104,779	$0	$0	$38,052,814	$0	$927,480,561	$927,480,561	$0
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	MB	PT	Vehicle Operations											$21,773,103				$21,773,103	$21,773,103	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	MB	PT	Vehicle Maintenance		$6,188	$7,647		$17,333	$1,506	$9,532				$6,928,568				$6,970,774	$6,970,774	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	MB	PT	Non-Vehicle Maintenance							$32				$2,038,257				$2,038,289	$2,038,289	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	MB	PT	General Administration		$361,396	$226,678	$17,145			$8,646	$3,346	$95		$9,464,975		$1,670		$10,083,951	$10,083,951	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	MB	PT	Total	$0	$367,584	$234,325	$17,145	$17,333	$1,506	$18,210	$3,346	$95	$0	$40,204,903	$0	$1,670	$0	$40,866,117	$40,866,117	$0
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	RB	DO	Vehicle Operations	$3,319,978	$1,336,714	$3,519,278	$9,893,698	$755,022	$219,057	$33,263								$19,077,010	$19,077,010	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	RB	DO	Vehicle Maintenance		$1,007,232	$761,212	$32,544	$0		$1,038,977								$2,839,965	$2,839,965	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	RB	DO	Non-Vehicle Maintenance		$490,012	$370,325	$1,557,240			$133,558								$2,551,135	$2,551,135	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	RB	DO	General Administration		$42,890	$32,414	$304,564			$33,572	$57,360	$292,733				$592,953		$1,356,486	$1,356,486	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	RB	DO	Total	$3,319,978	$2,876,848	$4,683,229	$11,788,046	$755,022	$219,057	$1,239,370	$57,360	$292,733	$0	$0	$0	$592,953	$0	$25,824,596	$25,824,596	$0
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	VP	PT	Vehicle Operations											$7,246,466				$7,246,466	$7,246,466	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	VP	PT	Vehicle Maintenance											$1,564,046				$1,564,046	$1,564,046	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	VP	PT	Non-Vehicle Maintenance							$1,659				$27,323				$28,982	$28,982	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	VP	PT	General Administration		$442,503	$213,716	$124,338			$12,556	$12,564	$357		$8,098,141				$8,904,175	$8,904,175	
90154	9154	Los Angeles County Metropo	Full Reporter	Full Reporter	VP	PT	Total	$0	$442,503	$213,716	$124,338	$0	$0	$14,215	$12,564	$357	$0	$16,935,976	$0	$0	$0	$17,743,669	$17,743,669	$0
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	DO	Vehicle Operations		$2,903,191	$566,665	$242,392	$21,323		$64,943	$619,947		$162,265			$558,002		$5,138,728	$5,138,728	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	DO	Vehicle Maintenance		$1,110,568	$381,464	$43,657		$172,067	$1,762,317						$24,570		$3,494,643	$3,494,643	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	DO	Non-Vehicle Maintenance		$157,317	$36,009	$1,083,541					$1,028,630				$11,987		$2,317,484	$2,317,484	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	DO	General Administration		$1,635,122	$234,030	$785,207			$22,863	$97,863	$256,472	$159,248			$901,880		$4,092,685	$4,092,685	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	DO	Total	$0	$5,806,198	$1,218,168	$2,154,797	$21,323	$172,067	$1,850,123	$717,810	$1,285,102	$321,513	$0	$0	$1,496,439	$0	$15,043,540	$15,043,540	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	PT	Vehicle Operations		$169,669	$9,669	$7,562			$6,607	$54,698		$25,271	$1,249,855		$139,676		$1,663,007	$1,663,007	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	PT	Vehicle Maintenance							$363,721				$597,363				$961,084	$961,084	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	PT	Non-Vehicle Maintenance				$225					$374,467		$126,713		$601		$502,006	$502,006	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	PT	General Administration		$140,830	$17,693	$63,377			$17,911	$3,824	$30,711	$19,280	$181,019		$103,277		$577,922	$577,922	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	PT	Total	$0	$310,499	$27,362	$71,164	$0	$0	$388,239	$58,522	$405,178	$44,551	$2,154,950	$0	$243,554	$0	$3,704,019	$3,704,019	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	PT	Vehicle Operations	$0	$3,764,631	$706,080	$306,224	$26,123	$0	$87,658	$826,523	$0	$229,755		$0	$854,741	$0	$6,801,735	$6,801,735	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	PT	Vehicle Maintenance		$1,282,509	$440,523	$50,416	$0	$198,707	$2,455,197	$0	$0	$0		$0	$28,374	$0	$4,455,727	$4,455,727	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	PT	Non-Vehicle Maintenance		$164,720	$37,703	$1,134,764	$0	$0	$0	$0	$1,469,122	$0		$0	$13,180	$0	$2,819,490	$2,819,490	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	PT	General Administration		$1,847,558	$261,872	$882,799	$0	$0	$42,418	$105,787	$298,762	$185,726		$0	$1,045,685	$0	$4,670,607	$4,670,607	
90242	9242	Las Vegas Monorail Compar	Full Reporter	Full Reporter	MG	PT	Total		$7,059,418	$1,446,179	$2,374,204	$26,123	$198,707	$2,585,273	$932,310	$1,767,884	$415,481		$0	$1,941,980	$0	$18,747,559	$18,747,559	
40034	4034	Miami-Dade Transit	Full Reporter	Full Reporter	MG	DO	Vehicle Operations		$2,456,078	$737,585	$2,791,007			$1,033,458	$2,191,944							$9,210,072	$9,210,072	
40034	4034	Miami-Dade Transit	Full Reporter	Full Reporter	MG	DO	Vehicle Maintenance		$3,206,229	$962,862	$1,055,580	$794,733	$147,332	$1,989,562								$8,156,298	$8,156,298	
40034	4034	Miami-Dade Transit	Full Reporter	Full Reporter	MG	DO	Non-Vehicle Maintenance		$2,579,409	$774,622	$1,081,581			$1,506,933								$5,942,545	$5,942,545	
40034	4034	Miami-Dade Transit	Full Reporter	Full Reporter	MG	DO	General Administration		$1,361,023	$408,729	$1,071,268			$233,803	$881,810	$657,482						$4,614,115	$4,614,115	
40034	4034	Miami-Dade Transit	Full Reporter	Full Reporter	MG	DO	Total	$0	$9,602,739	$2,883,798	$5,999,436	$794,733	$147,332	$4,763,756	$3,073,754	$657,482	$0	$0	$0	$0	$0	$27,923,030	$27,923,030	

Cost per Work Hour Calculations

City	Mode	Wages & Salaries	Work Hrs (FT&PT)	Cost/Work Hour			
Los Angeles	HR	$34,488,597	1,148,636	$30.03			
	LR	$76,130,748	2,436,259	$31.25			
	MB	$357,692,716	12,803,871	$27.94			
	RB	$6,196,826	237,813	$26.06			
Las Vegas	MG	$5,806,198	226,794	$25.60	1.173	Monorail Wage Adjustment Factor	
Miami	MG	$9,602,739	392,674	$24.45	1.228	APM Wage Adjustment Factor	

Cost/Kwh Calculations		Cost	kwh	Cost/kwh			
Los Angeles	HR	$12,929,616	87,651,000	$0.1475			
	LR	$17,990,919	133,910,199	$0.1344			
Las Vegas	MG	$826,523	8,342,980	$0.0991	1.489	Monorail kwh Cost Adjustment Factor	
Miami	MG	$2,191,944	10,950,000	$0.2002	0.737	APM kwh Cost Adjustment Factor	

LA METRO RAIL TRANSIT
RAIL OPERATING STATISTICS MODEL

Annual Operating Statistics for Project Options - Reduced Operating Plan *(for O&M cost model)*

Alternative	Service Type	Revenue Train-Hours	Revenue Car-Miles	Revenue Car-Hours	Peak Cars	Total Cars	*Incremental Peak Cars*
Integrated Scenario							
Fairview Heights	Routine	28,190	448,100	28,190	4	5	*4*
Interlined	Event	450	85,900	4,950	21	25	*17*
	Total	**28,640**	**534,000**	**33,140**			
Independent Scenarios							
Arbor Vitae	Routine	14,290	176,600	14,290	2	2	*2*
Independent	Event	150	77,900	5,400	18	22	*16*
	Total	**14,440**	**254,500**	**19,690**			
Century	Routine	14,290	237,470	14,290	2	2	*2*
Independent	Event	300	104,750	6,300	24	29	*22*
	Total	**14,590**	**342,220**	**20,590**			
Market-Manchester	Routine	14,290	105,450	14,290	2	2	*2*
Independent	Event	150	19,950	2,250	9	11	*7*
	Total	**14,440**	**125,400**	**16,540**			

Note: Event statistics based on additional service associated with 50 event days per year (incremental over routine service).

All routine service assumes single-car trains at 10-minute all-day (20-min eve) headways.

Event service assumes 3-car trains for LRT and streetcar options and 6-car trains for APM/monorail options at 10-minute pre-event and 5-minute post-event headways.

City of Champions/Inglewood NFL Stadium Project
Draft O&M Cost Estimates - Reduced Plan (June 30, 2017)

			Arbor Vitae Independent - APM					Arbor Vitae Independent - Monorail					
			Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routi
Mode	Variable	Unit Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units
APM	Rev. Train-Hrs	$41.17	14,290	$588,321	150	$6,176							14,290
Routine: 10 min	Rev. Car-Miles	$2.24	176,600	$395,409	77,900	$174,419							237,470
all-day, 20 min eve	Rev. Car-Hrs.	$11.39	14,290	$162,707	5,400	$61,485							14,290
	Peak Cars	$703,545	2	$1,407,090	16	$317,667							2
Event: 10 min pre-event,	Stations	$305,071	3	$915,212	3	$51,655							5
5 min post-event	Yards	$5,213,996	1	$5,213,996									1
	Track Miles	$135,805	4.12	$559,519									5.54
	Modal Cost			**$9,242,255**		**$611,402**	**$9,853,656**					**$0**	
Monorail	Rev. Train-Hrs	$142.81						14,290	$2,040,729	150	$21,421		
Routine: 10 min	Rev. Car-Miles	$1.22						176,600	$216,249	77,900	$95,389		
all-day, 20 min eve	Rev. Car-Hrs.	$6.51						14,290	$93,079	5,400	$35,173		
	Peak Cars	$363,797						2	$727,593	16	$164,263		
Event: 10 min pre-event,	Stations	$542,943						3	$1,628,829	3	$91,932		
5 min post-event	Yards	$5,119,679						1	$5,119,679				
	Track Miles	$30,879						4.12	$127,221				
	Modal Cost								**$9,953,379**		**$408,179**	**$10,361,558**	
Streetcar	Rev. Train-Hrs	$177.49											
Routine: 10 min	Rev. Car-Miles	$2.11											
all-day, 20 min eve	Rev. Car-Hrs.	$16.58											
	Peak Cars	$727,060											
Event: 10 min pre-event,	At-Grade Stations	$363,483											
5 min post-event	Aerial Stations	$525,375											
	Yards	$3,812,784											
	Track Miles	$87,622											
	Modal Cost												
LRT	Rev. Train-Hrs	$177.49											
Routine: 10 min	Rev. Car-Miles	$2.11											
all-day, 20 min eve	Rev. Car-Hrs.	$20.72											
	Peak Cars	$746,383											
Event: 10 min pre-event,	Subway Stations	$687,268											
5 min post-event	Yards	$6,919,766											
	Track Miles	$87,622											
	Modal Cost												
TOTAL ALTERNATIVE COST				**$9,242,255**		**$611,402**	**$9,853,656**		**$9,953,379**		**$408,179**	**$10,361,558**	

Notes:

1. Event service statistics assume 50 event days/year and 9 hours of event service on each of those days.
2. Event service statistics (including peak vehicles) reflect "net" service, reflecting supplementation of regular service during those event hours.
3. Unit costs for peak cars and yards on event days pro-rated based on portion of annual hours of service.
4. *Assumes no changes to background LRT Green-North Branch and Crenshaw Lines during event service hours.*
5. Costs calculated under station unit costs distinguished by profile (at-grade, aerial, subway).

Cost/Train-Hour	$646.76	$4,076.01	$696.53	$2,721.19
Cost/Car-Mile	$52.33	$7.85	$56.36	$5.24
Cost/Car-Hour	$646.76	$113.22	$696.53	$75.59

Century Independent - APM				Century Independent - Monorail					Market-Manchester Independent (Streetcar)					Fairview I	
e Service	Event Service		Total	Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routine Service	
Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost
$588,321	300	$12,351													
$531,698	104,750	$234,536													
$162,707	6,300	$71,732													
$1,407,090	22	$436,793													
$1,525,354	5	$86,092													
$5,213,996															
$752,362															
$10,181,528		**$841,504**	**$11,023,032**												
				14,290	$2,040,729	300	$42,842								
				237,470	$290,785	104,750	$128,268								
				14,290	$93,079	6,300	$41,036								
				2	$727,593	22	$225,861								
				5	$2,714,715	5	$153,220								
				1	$5,119,679										
				5.54	$171,069										
					$11,157,649		**$591,227**	**$11,748,876**							
									14,290	$2,536,275	150	$26,623			
									105,450	$222,615	19,950	$42,116			
									14,290	$236,857	2,250	$37,294			
									2	$1,454,121	7	$143,625			
									2	$726,965	2	$41,030			
									3	$1,576,126	3	$88,957			
									1	$3,812,784					
									2.46	$215,551					
										$10,781,294		**$379,645**	**$11,160,940**		
														28,190	$5,003,331
														448,100	$945,983
														28,190	$584,062
														4	$2,985,534
														1	$687,268
														0.33	$2,306,589
														3.60	$315,441
															$12,828,207
$10,181,528		**$841,504**	**$11,023,032**		**$11,157,649**		**$591,227**	**$11,748,876**		**$10,781,294**		**$379,645**	**$11,160,940**		**$12,828,207**

$712.49	$2,805.01		$780.80	$1,970.76	$754.46	$2,530.97		$455.06
$42.88	$8.03		$46.99	$5.64	$102.24	$19.03		$28.63
$712.49	$133.57		$780.80	$93.85	$754.46	$168.73		$455.06

Heights Interlined (LRT)		
Event Service		Total
Units	Cost	Cost
450	$79,869	
85,900	$181,343	
4,950	$102,558	
17	$358,073	
1	$38,790	
	$760,633	**$13,588,840**
	$760,633	**$13,588,840**

$1,690.29	
$8.85	
$153.66	

City of Champions/Inglewood NFL Stadium Project
Draft O&M Cost Estimates (June 7, 2017)

			Arbor Vitae Independent - APM					Arbor Vitae Independent - Monorail					Century Independent - APM					Century Independer		
			Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routine Service		Event Service		Total	Routine Service		Event
Mode	Variable	Unit Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units
APM	Rev. Train-Hrs	$41.17	16,710	$687,953	900	$37,053							19,130	$787,585	1,650	$67,931				
	Rev. Car-Miles	$2.24	236,480	$529,481	189,150	$423,509							317,990	$711,983	254,300	$569,380				
	Rev. Car-Hrs.	$11.39	16,710	$190,261	9,900	$112,722							19,130	$217,816	14,400	$163,959				
	Peak Cars	$703,545	3	$2,110,636	34	$675,043							4	$2,814,181	52	$1,032,419				
	Stations	$305,071	3	$915,212	3	$51,655							5	$1,525,354	5	$86,092				
	Yards	$5,213,996	1	$5,213,996									1	$5,213,996						
	Track Miles	$135,805	4.12	$559,519									5.54	$752,362						
	Modal Cost			**$10,207,058**		**$1,299,982**	**$11,507,040**					**$0**		**$12,023,276**		**$1,919,781**	**$13,943,057**			
Monorail	Rev. Train-Hrs	$142.81						16,710	$2,386,324	900	$128,527							19,130	$2,731,920	1,650
	Rev. Car-Miles	$1.22						236,480	$289,572	189,150	$231,616							317,990	$389,382	254,300
	Rev. Car-Hrs.	$6.51						16,710	$108,842	9,900	$64,485							19,130	$124,605	14,400
	Peak Cars	$363,797						3	$1,091,390	34	$349,059							4	$1,455,187	52
	Stations	$542,943						3	$1,628,829	3	$91,932							5	$2,714,715	5
	Yards	$5,119,679						1	$5,119,679									1	$5,119,679	
	Track Miles	$30,879						4.12	$127,221									5.54	$171,069	
	Modal Cost								**$10,751,858**		**$865,619**	**$11,617,477**							**$12,706,557**	
Streetcar	Rev. Train-Hrs	$177.49																		
	Rev. Car-Miles	$2.11																		
	Rev. Car-Hrs.	$16.58																		
	Peak Cars	$727,060																		
	At-Grade Stations	$363,483																		
	Aerial Stations	$525,375																		
	Yards	$3,812,784																		
	Track Miles	$87,622																		
	Modal Cost																			
LRT	Rev. Train-Hrs	$177.49																		
	Rev. Car-Miles	$2.11																		
	Rev. Car-Hrs.	$20.72																		
	Peak Cars	$746,383																		
	Subway Stations	$687,268																		
	Yards	$6,919,766																		
	Track Miles	$87,622																		
	Modal Cost																			
Background	Rev. Train-Hrs	$177.49			3,600	$638,950				3,600	$638,950				3,600	$638,950				3,600
LRT	Rev. Car-Miles	$2.11			386,600	$816,151				386,600	$816,151				386,600	$816,151				386,600
Changes	Rev. Car-Hrs.	$20.72			15,300	$316,997				15,300	$316,997				15,300	$316,997				15,300
(Year 2023)	Peak Cars	$746,383			34	$716,146				34	$716,146				34	$716,146				34
	Modal Cost					**$2,488,243**	**$2,488,243**				**$2,488,243**	**$2,488,243**				**$2,488,243**	**$2,488,243**			
Background	Rev. Train-Hrs	$177.49			4,050	$718,818				4,050	$718,818				4,050	$718,818				4,050
LRT	Rev. Car-Miles	$2.11			435,200	$918,750				435,200	$918,750				435,200	$918,750				435,200
Changes	Rev. Car-Hrs.	$20.72			17,100	$354,291				17,100	$354,291				17,100	$354,291				17,100
(Year 2040)	Peak Cars	$746,383			38	$800,399				38	$800,399				38	$800,399				38
	Modal Cost					**$2,792,258**	**$2,792,258**				**$2,792,258**	**$2,792,258**				**$2,792,258**	**$2,792,258**			
TOTAL ALTERNATIVE COST - YEAR 2023				**$10,207,058**		**$3,788,226**	**$13,995,283**		**$10,751,858**		**$3,353,862**	**$14,105,720**		**$12,023,276**		**$4,408,025**	**$16,431,301**		**$12,706,557**	
TOTAL ALTERNATIVE COST - YEAR 2040				**$10,207,058**		**$4,092,240**	**$14,299,298**		**$10,751,858**		**$3,657,877**	**$14,409,735**		**$12,023,276**		**$4,712,039**	**$16,735,315**		**$12,706,557**	

Notes:

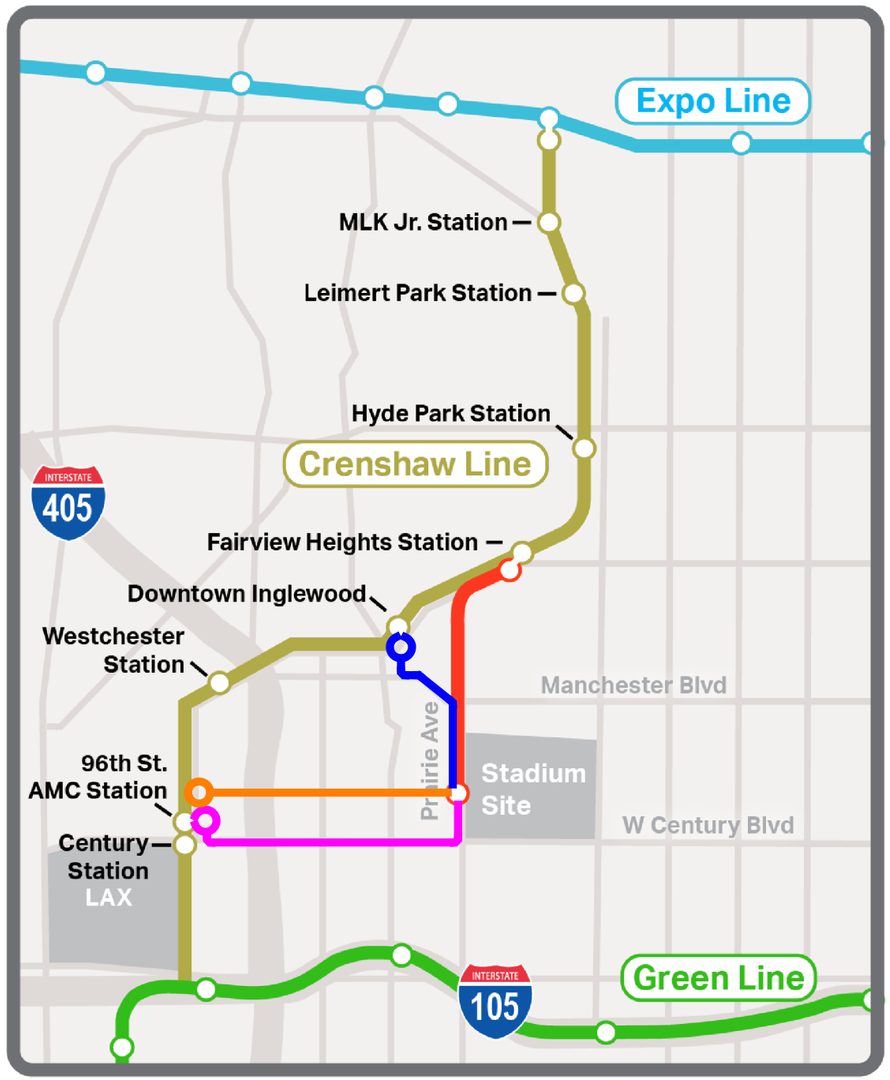
1. Event service statistics assume 50 event days/year and 9 hours of event service on each of those days.
2. Event service statistics reflect "net" service, reflecting supplementation of regular service during those event hours.
3. Unit costs for peak cars and yards on event days pro-rated based on portion of annual hours of service.
4. Background LRT changes reflect proposed service changes to Green-North Branch and Crenshaw Lines during event service hours.
5. Costs calculated under station unit costs distinguished by profile (at-grade, aerial, subway).

	Cost/Train-Hour	$610.84	$1,444.42		$643.44	$961.80		$628.50	$1,163.50		$664.22	
	Cost/Car-Mile	$43.16	$6.87		$45.47	$4.58		$37.81	$7.55		$39.96	
	Cost/Car-Hour	$610.84	$131.31		$643.44	$87.44		$628.50	$133.32		$664.22	

t - Monorail		Market-Manchester Independent (Streetcar)					Fairview Heights Interlined (LRT)				
t Service	Total	Routine Service		Event Service		Total	Routine Service		Event Service		Total
Cost	Cost	Units	Cost	Units	Cost	Cost	Units	Cost	Units	Cost	Cost
$235,633											
$311,393											
$93,796											
$533,854											
$153,220											
$1,327,897	**$14,034,454**										
		19,130	$3,395,307	1,500	$266,229						
		141,210	$298,108	53,100	$112,099						
		19,130	$317,080	6,300	$104,423						
		4	$2,908,241	22	$451,392						
		2	$726,965	2	$41,030						
		3	$1,576,126	3	$88,957						
		1	$3,812,784								
		2.46	$215,551								
			$13,250,163		**$1,064,130**	**$14,314,293**					
							36,350	$6,451,617	1,650	$292,852	
							577,840	$1,219,877	143,150	$302,204	
							36,350	$753,127	8,550	$177,145	
							9	$6,717,451	20	$421,262	
							1	$687,268	1	$38,790	
							0.33	$2,306,589			
							3.60	$315,441			
								$18,451,369		**$1,232,253**	**$19,683,623**
$638,950				3,600	$638,950				3,600	$638,950	
$816,151				386,600	$816,151				386,600	$816,151	
$316,997				15,300	$316,997				15,300	$316,997	
$716,146				34	$716,146				34	$716,146	
$2,488,243	**$2,488,243**				**$2,488,243**	**$2,488,243**				**$2,488,243**	**$2,488,243**
$718,818				4,050	$718,818				4,050	$718,818	
$918,750				435,200	$918,750				435,200	$918,750	
$354,291				17,100	$354,291				17,100	$354,291	
$800,399				38	$800,399				38	$800,399	
$2,792,258	**$2,792,258**				**$2,792,258**	**$2,792,258**				**$2,792,258**	**$2,792,258**
$3,816,140	**$16,522,697**		**$13,250,163**		**$3,552,374**	**$16,802,537**		**$18,451,369**		**$3,720,497**	**$22,171,866**
$4,120,155	**$16,826,712**		**$13,250,163**		**$3,856,388**	**$17,106,551**		**$18,451,369**		**$4,024,511**	**$22,475,880**

$804.79	$692.64	$709.42	$507.60	$746.82
$5.22	$93.83	$20.04	$31.93	$8.61
$92.22	$692.64	$168.91	$507.60	$144.12

APPENDIX L
Engineering Drawings



INGLEWOOD - NFL FOCUSED ANALYSIS DRAWINGS

- INTERLINED SCENARIO - FAIRVIEW HEIGHTS
- INDEPENDENT SCENARIO - MARKET ST / MANCHESTER AVE - OPTION 1
- INDEPENDENT SCENARIO - ARBOR VITAE STREET - OPTION 2
- INDEPENDENT SCENARIO - CENTURY BOULEVARD - OPTION 3

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LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

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SHT NO.	DWG NO.	DRAWING TITLE	XXX- 07/21/17					
		GENERAL						
		COVER	■					
		INDEX OF DRAWINGS	■					
		INTERLINED SCENARIO - FAIRVIEW HEIGHTS						
	001	LRT - INTERLINED CONNECTION - FAIRVIEW HEIGHTS - KEY MAP	■					
	010	LRT - INTERLINED CONNECTION - FAIRVIEW HEIGHTS - SECTION A-A (U-SECTION,SIDE)	■					
	011	LRT - INTERLINED CONNECTION - FAIRVIEW HEIGHTS - SECTION B-B (UNDERGROUND,CENTER)	■					
	012	LRT - INTERLINED CONNECTION - FAIRVIEW HEIGHTS - SECTION C-C (UNDERGROUND,CENTER)	■					
	020	LRT - INTERLINED CONNECTION - FAIRVIEW HEIGHTS - UNDERGROUND TERMINUS STATION - AT PRAIRIE AVENUE	■					
	021	LRT - INTERLINED CONNECTION - FAIRVIEW HEIGHTS - SECTION - UNDERGROUND STATION - AT PRAIRIE AVENUE	■					
	030	LRT - INTERLINED CONNECTION - FAIRVIEW HEIGHTS - PLAN AND PROFILE - SHEET 1 OF 2	■					
	031	LRT - INTERLINED CONNECTION - FAIRVIEW HEIGHTS - PLAN AND PROFILE - SHEET 2 OF 2	■					
		INDEPENDENT SCENARIO - MARKET ST / MANCHESTER AVE - OPTION 1						
	100	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - KEY MAP	■					
	110	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - SECTION A-A (U-SECTION,SIDE)	■					
	111	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - SECTION B-B (ALT1, AERIAL, CENTER)	■					
	112	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - SECTION B-B (ALT2, AERIAL, CENTER)	■					
	113	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - SECTION C-C (ALT1, AERIAL, SIDE)	■					
	114	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - SECTION C-C (ALT2, AERIAL, SIDE)	■					
	120	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - AERIAL TERMINUS STATION - AT PRAIRIE AVENUE	■					
	121	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - SECTION - AERIAL STATION - AT PRAIRIE AVENUE	■					
	130	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - PLAN AND PROFILE - SHEET 1 OF 3	■					
	131	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - PLAN AND PROFILE - SHEET 2 OF 3	■					
	132	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - PLAN AND PROFILE - SHEET 3 OF 3	■					
	133	URBAN RAIL - INDEPENDENT CONNECTION - MARKET STREET - MANCHESTER AVENUE - STATION TYPICAL SECTION	■					

SHT NO.	DWG NO.	DRAWING TITLE	XXX- 07/21/17					
		INDEPENDENT SCENARIO - ARBOR VITAE STREET - OPTION 2						
	200	APM - INDEPENDENT CONNECTION - ARBOR VITAE STREET - KEY MAP	■					
	210	APM - INDEPENDENT CONNECTION - ARBOR VITAE STREET SECTION A-A (AERIAL, CENTER)	■					
	211	APM - INDEPENDENT CONNECTION - ARBOR VITAE STREET SECTION B-B (AERIAL, CENTER)	■					
	212	APM - INDEPENDENT CONNECTION - ARBOR VITAE STREET SECTION C-C (ALT 1, AERIAL, CENTER)	■					
	213	APM - INDEPENDENT CONNECTION - ARBOR VITAE STREET SECTION C-C (ALT 2, AERIAL, SIDE)	■					
	214	APM - INDEPENDENT CONNECTION - ARBOR VITAE STREET SECTION C-C (ALT 3, AERIAL, SIDE)	■					
	220	APM - INDEPENDENT CONNECTION - ARBOR VITAE STREET AERIAL TERMINUS STATION	■					
	221	APM - INDEPENDENT CONNECTION - ARBOR VITAE STREET SECTION - AERIAL STATION	■					
	222	APM - INDEPENDENT CONNECTION - ARBOR VITAE STREET - AVIATION OLIVER - AERIAL TERMINUS STATION	■					
	223	APM - INDEPENDENT CONNECTION - ARBOR VITAE STREET - AVIATION OLIVER - SECTION - AERIAL STATION	■					
		INDEPENDENT SCENARIO - CENTURY BOULEVARD - OPTION 3						
	300	APM - INDEPENDENT CONNECTION - CENTURY BOULEVARD - KEY MAP	■					
	310	APM - INDEPENDENT CONNECTION - CENTURY BOULEVARD SECTION A-A (AERIAL, CENTER)	■					

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INGLEWOOD - NFL FOCUSED ANALYSIS

INDEX OF DRAWINGS

CONTRACT NO
DRAWING NO | REV
SCALE
SHEET NO

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NOTES:

1. ADD TAIL TRACK AT CRENSHAW/EXPO TERMINUS FOR INCREASED FREQUENCY
2. ADDITIONAL TUNNEL VENT SHAFT FOR INCREASED FREQUENCY
3. GRADE SEPARATION AT SLAUSON AVENUE FOR INCREASED FREQUENCY

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Los Angeles County
Metropolitan Transportation Authority

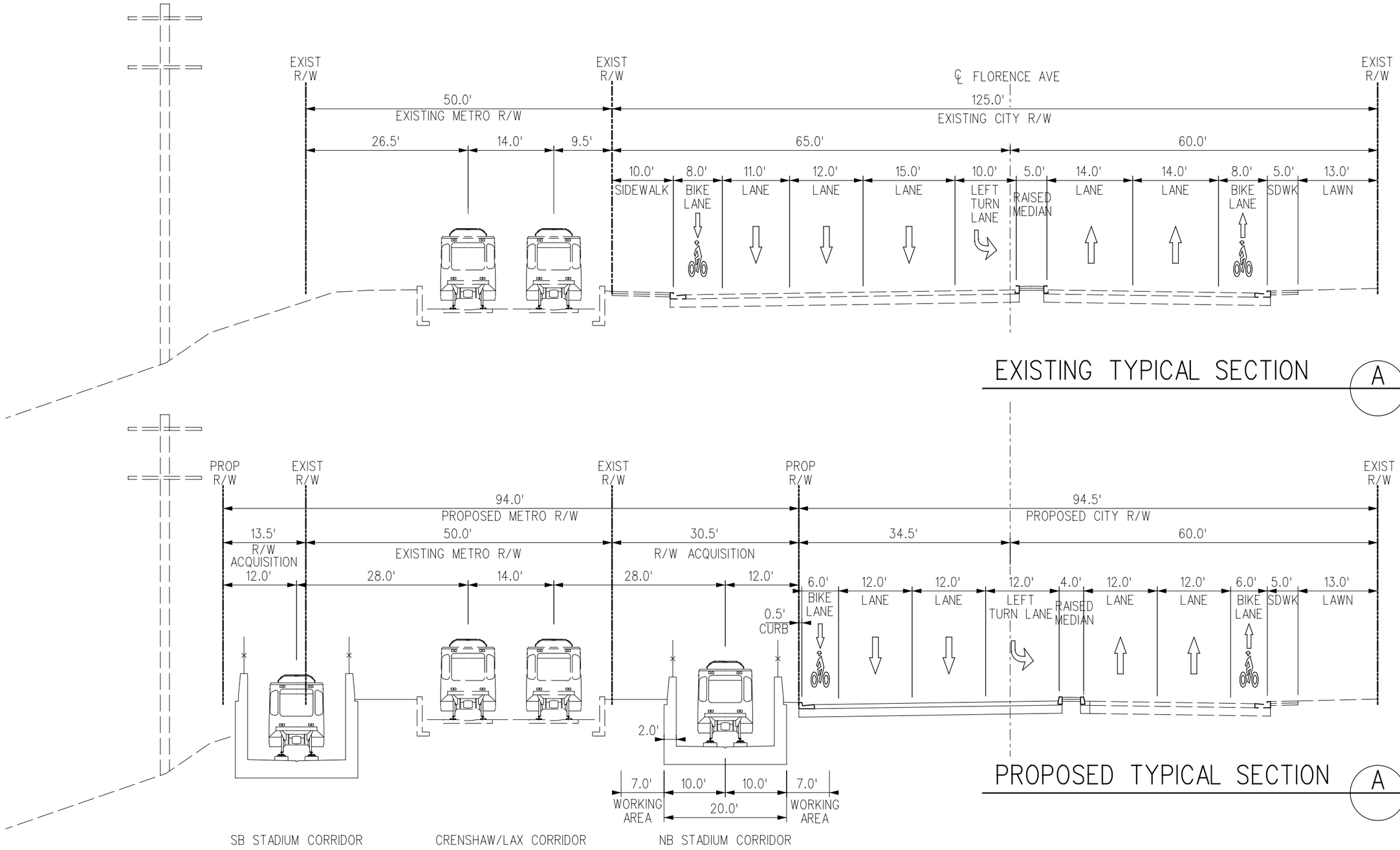
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INGLEWOOD - NFL FOCUSED ANALYSIS

LRT - INTERLINED CONNECTION
FAIRVIEW HEIGHTS
KEY MAP

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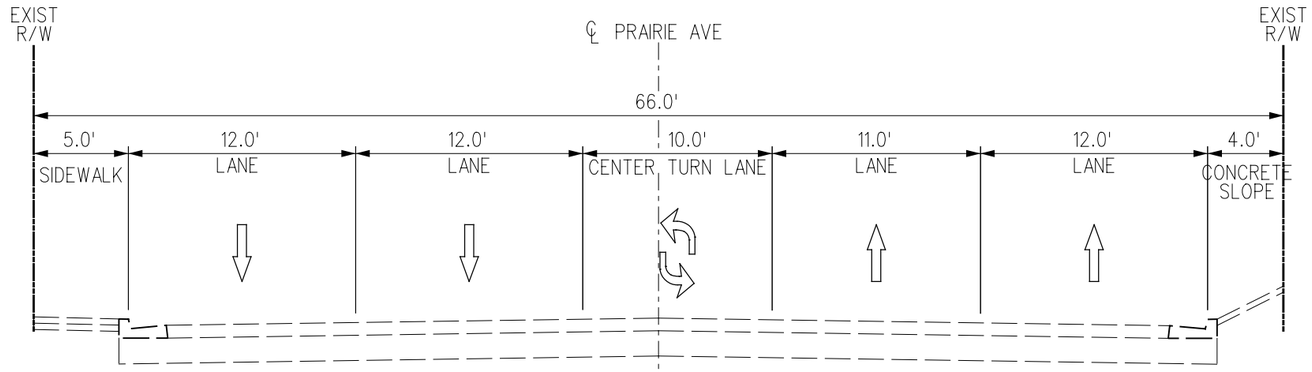
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INGLEWOOD - NFL FOCUSED ANALYSIS

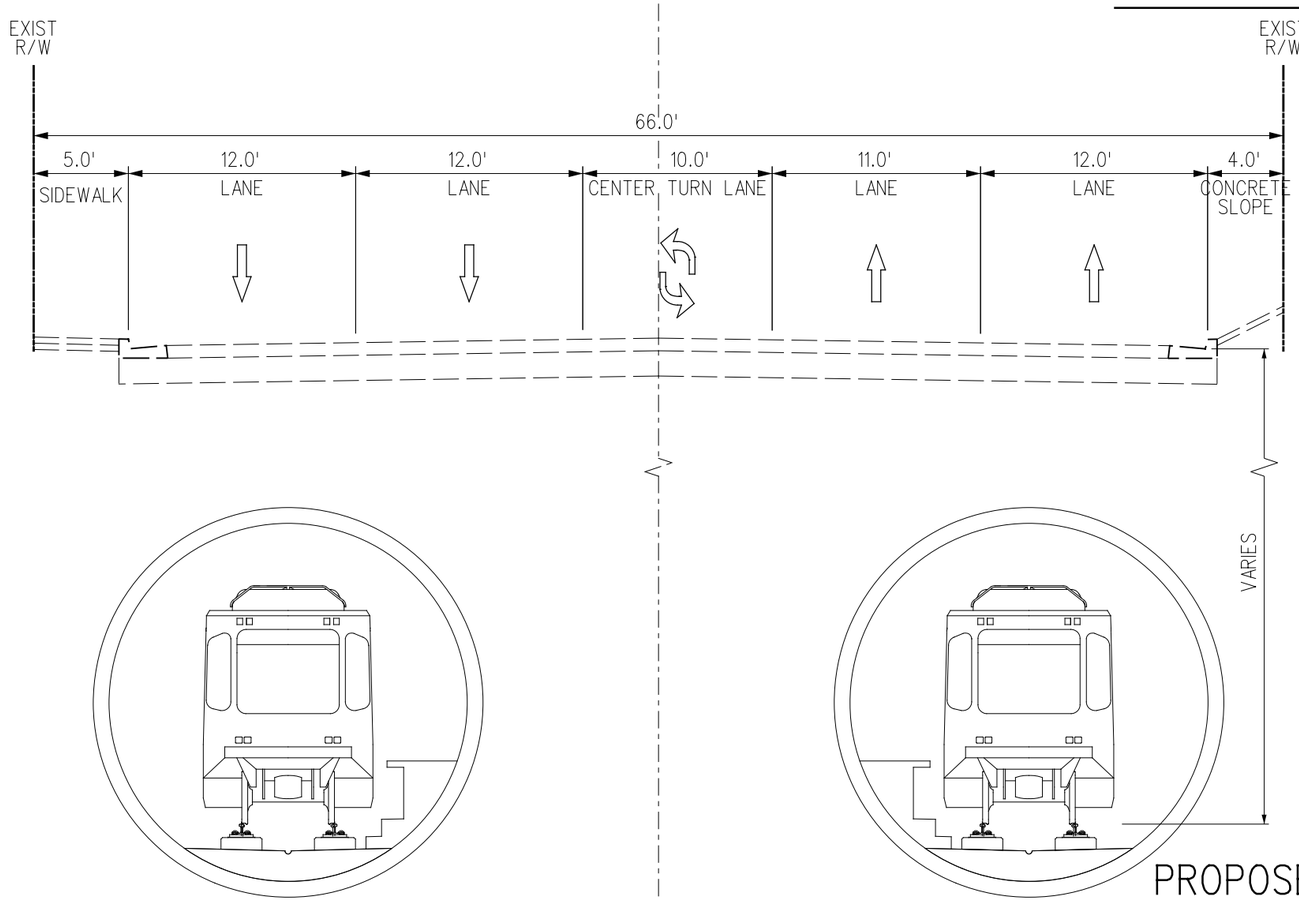
LRT - INTERLINED CONNECTION
FAIRVIEW HEIGHTS
SECTION A-A - (U-SECTION,SIDE)

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SCALE
SHEET NO

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EXISTING TYPICAL SECTION B



PROPOSED TYPICAL SECTION B

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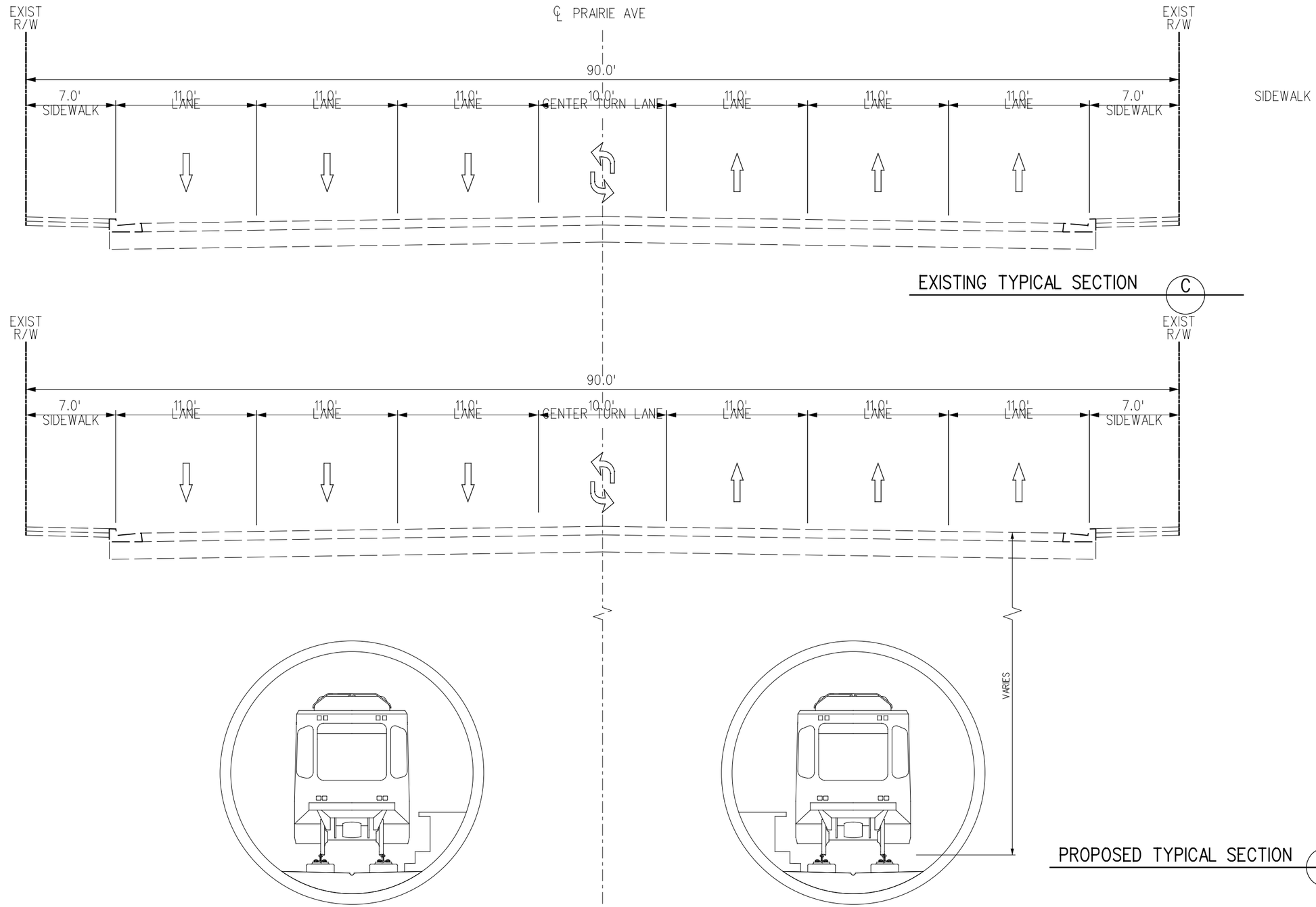
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INGLEWOOD - NFL FOCUSED ANALYSIS

LRT - INTERLINED CONNECTION
FAIRVIEW HEIGHTS
SECTION B-B - (UNDERGROUND,CENTER)

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SHEET NO

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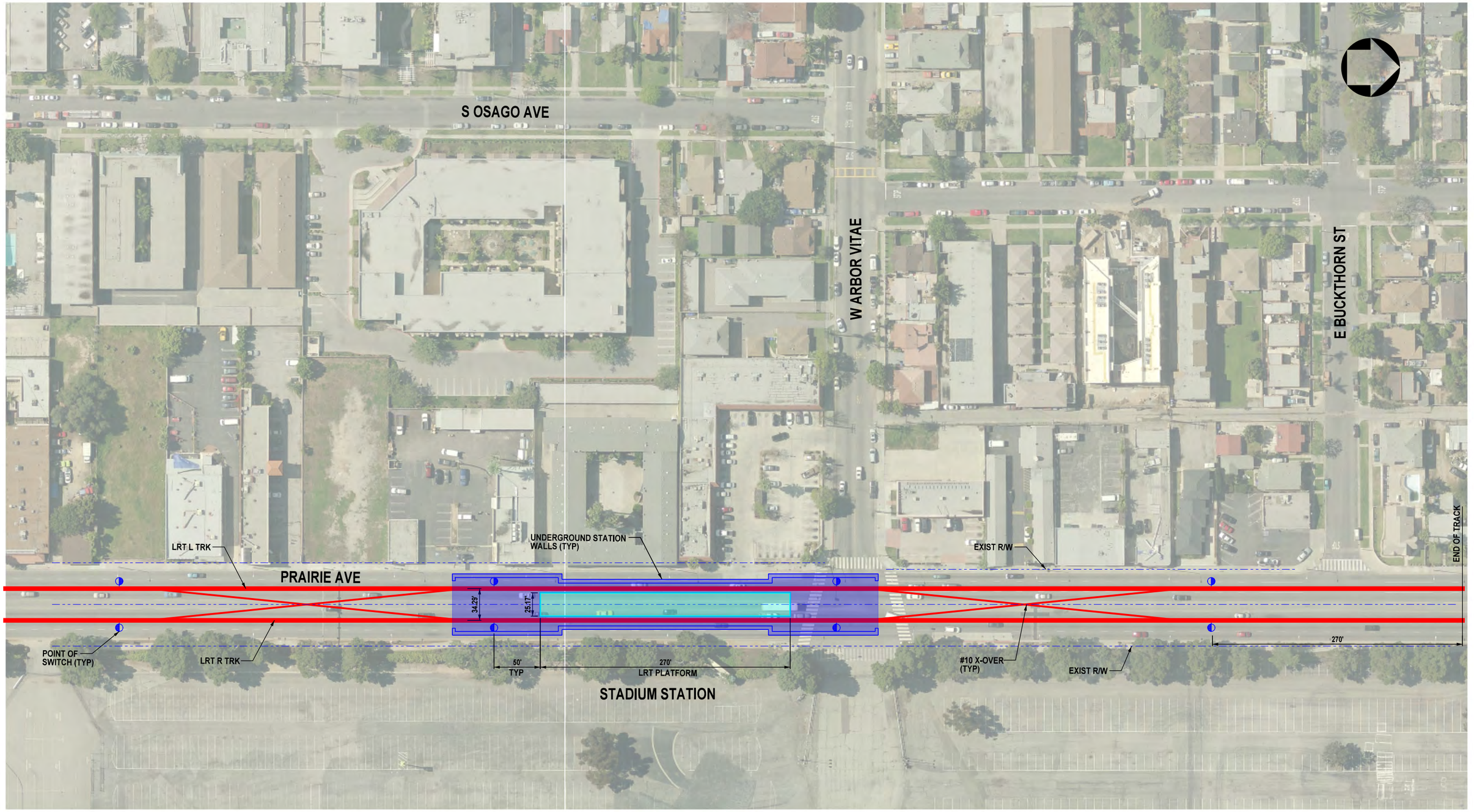
INGLEWOOD - NFL FOCUSED ANALYSIS

LRT - INTERLINED CONNECTION
FAIRVIEW HEIGHTS
SECTION C-C - (UNDERGROUND,CENTER)

CONTRACT NO
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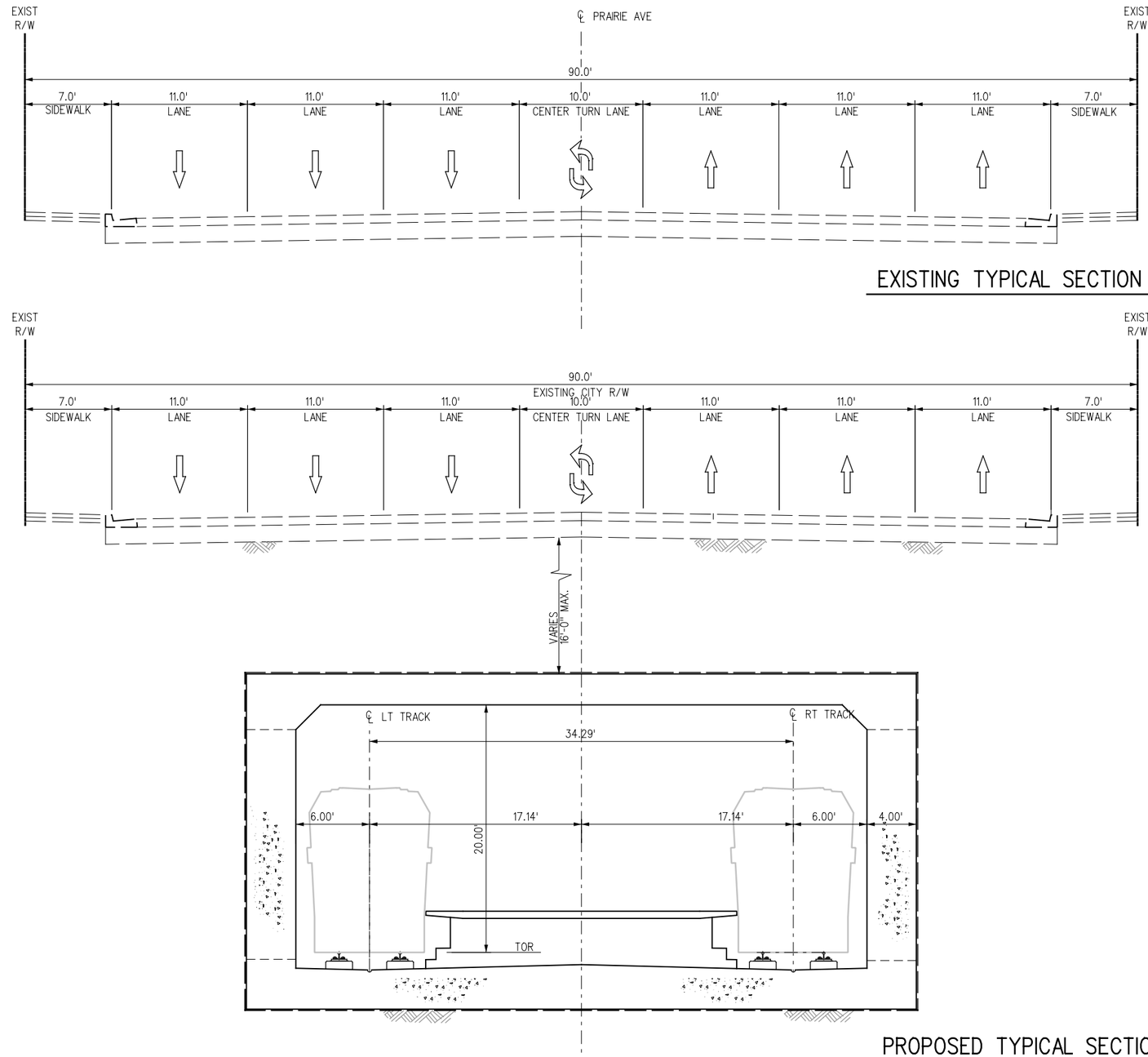
INGLEWOOD - NFL FOCUSED ANALYSIS

LRT - INTERLINED CONNECTION
FAIRVIEW HEIGHTS
UNDERGROUND TERMINUS STATION
AT PRAIRIE AVENUE

CONTRACT NO
DRAWING NO 020
REV
SCALE
SHEET NO

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EXISTING TYPICAL SECTION A

PROPOSED TYPICAL SECTION B

5' 0 5' 10'

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NOT FOR CONSTRUCTION

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IN CHARGE
DATE 7/28/2017

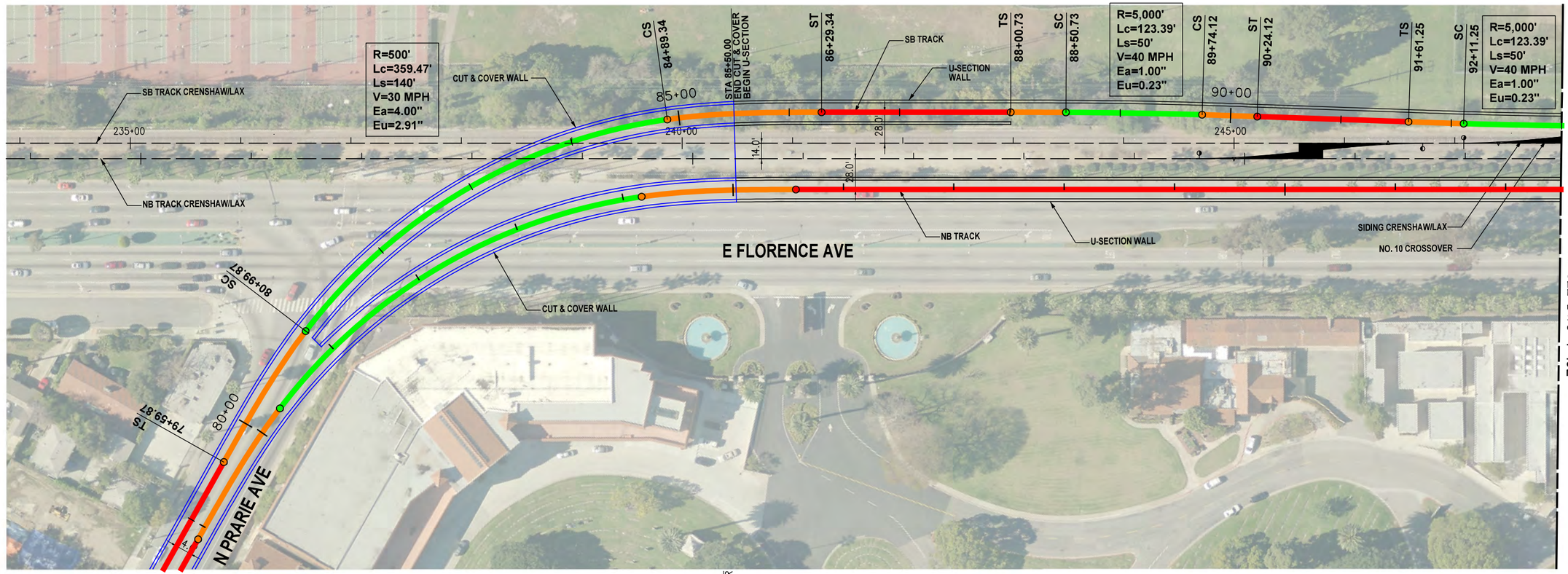
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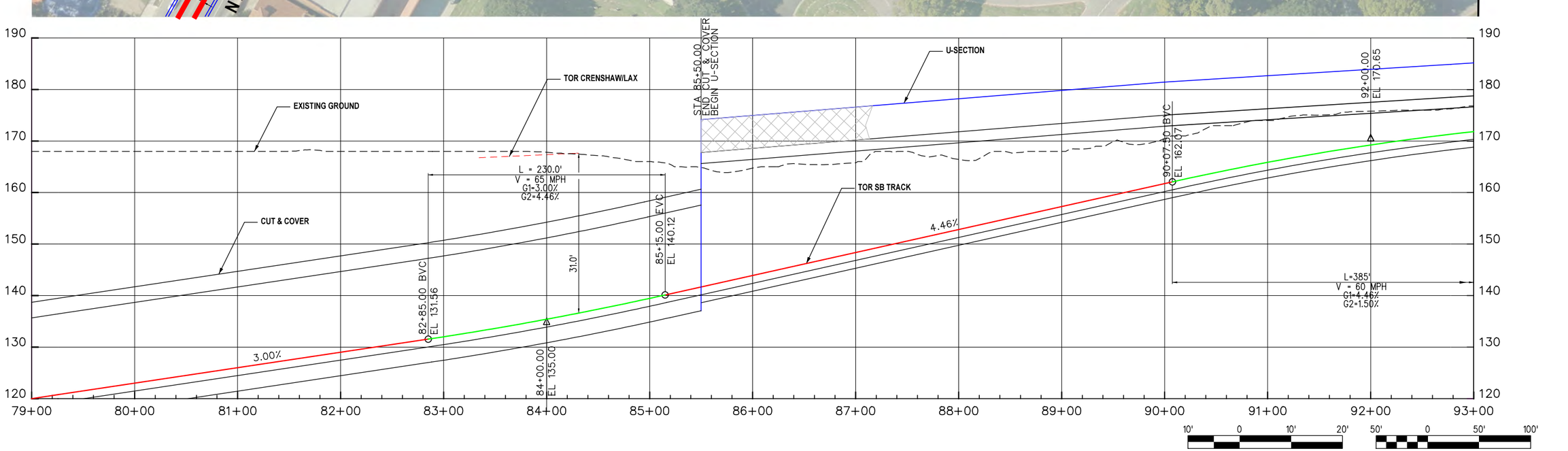
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INGLEWOOD - NFL FOCUSED ANALYSIS
LRT - INTERLINED CONNECTION
FAIRVIEW HEIGHTS
SECTION - UNDERGROUND STATION
AT PRAIRIE AVENUE

CONTRACT NO
DRAWING NO 021 REV
SCALE
SHEET NO

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NOT FOR CONSTRUCTION

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Los Angeles County
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INGLEWOOD - NFL FOCUSED ANALYSIS

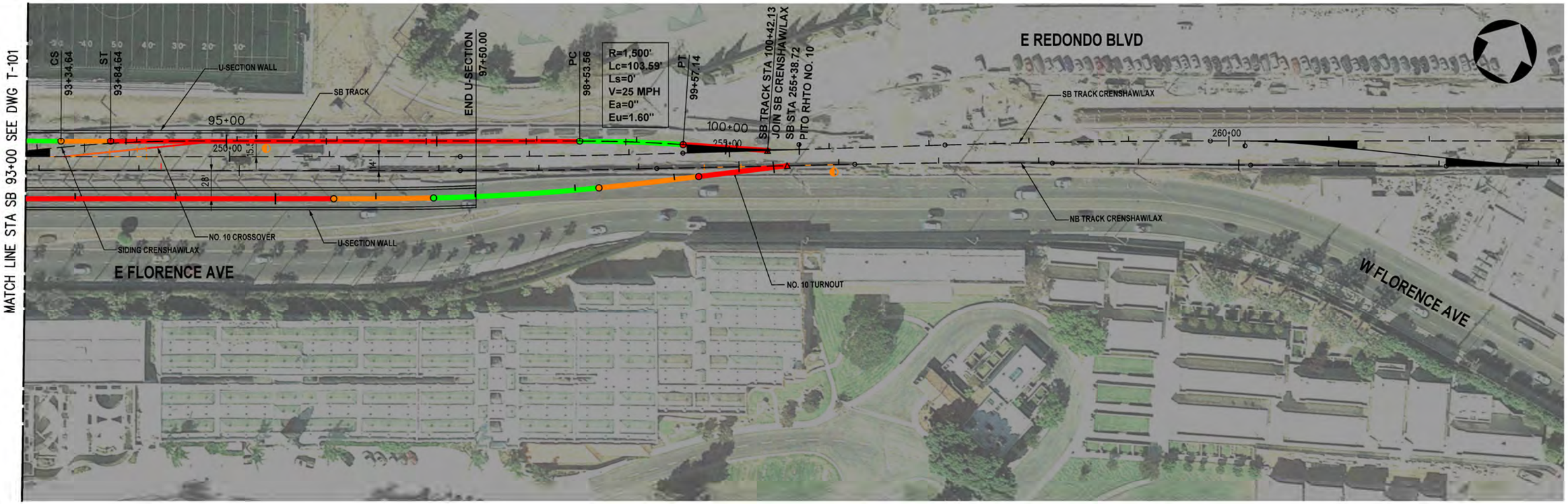
LRT - INTERLINED CONNECTION
FAIRVIEW HEIGHTS
PLAN AND PROFILE
SHEET 1 OF 2

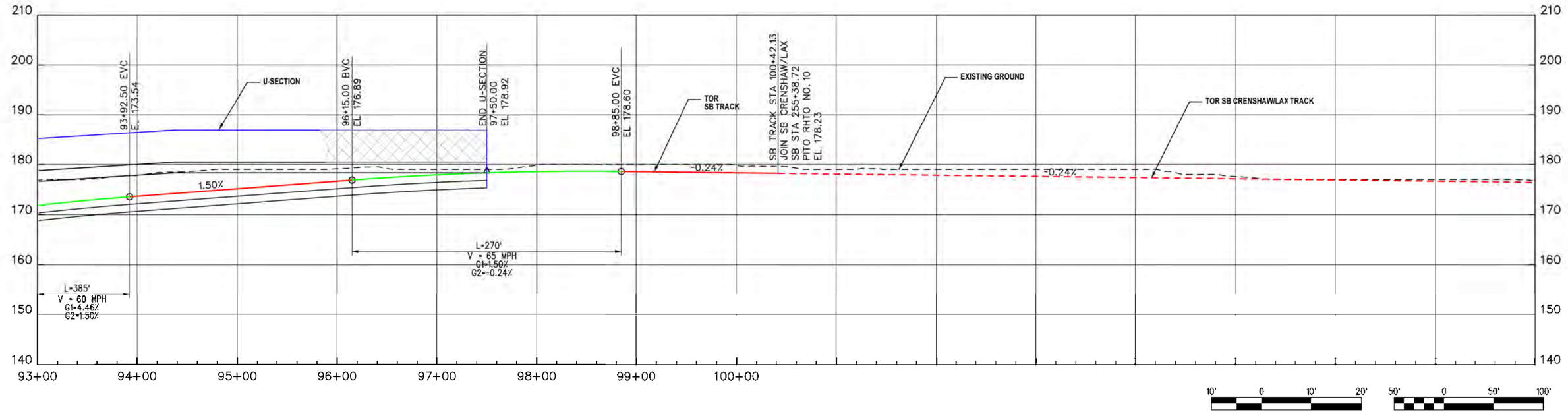
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SHEET NO

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MATCH LINE STA SB 93+00 SEE DWG T-101





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NOT FOR CONSTRUCTION

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

Metro
Los Angeles County
Metropolitan Transportation Authority

AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS
LRT - INTERLINED CONNECTION
FAIRVIEW HEIGHTS
PLAN AND PROFILE
SHEET 2 OF 2

CONTRACT NO
DRAWING NO 031
REV
SCALE HORIZ. 1" =50'
VERT. 1" =10'
SHEET NO

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THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

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DATE 7/28/2017

Metro
Los Angeles County
Metropolitan Transportation Authority

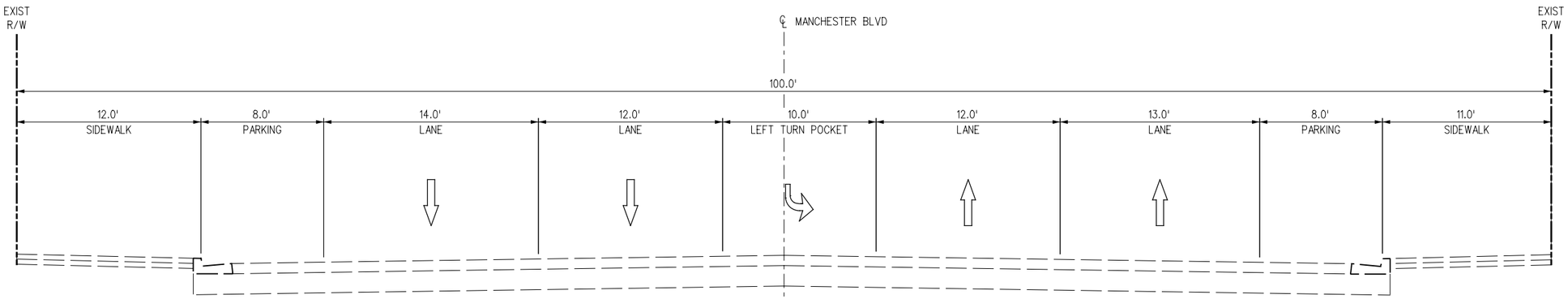
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INGLEWOOD - NFL FOCUSED ANALYSIS

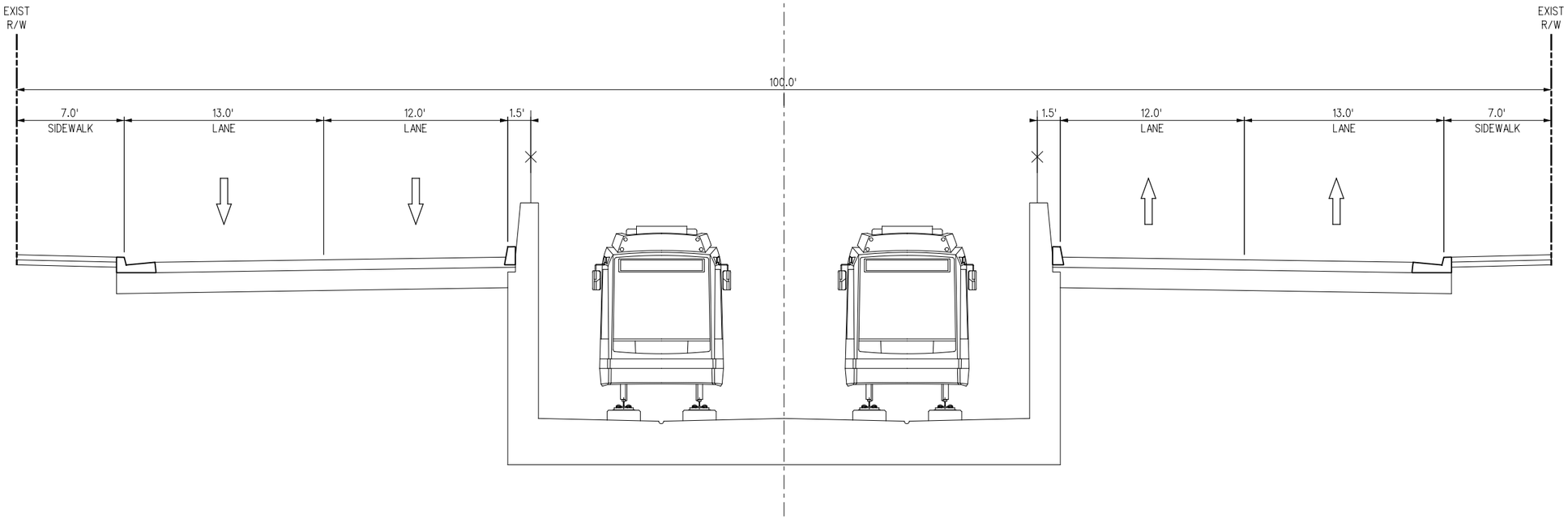
URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
KEY MAP

CONTRACT NO
DRAWING NO 100
REV
SCALE
SHEET NO

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EXISTING TYPICAL SECTION A



PROPOSED TYPICAL SECTION A

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

NOT FOR CONSTRUCTION

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

Metro
Los Angeles County
Metropolitan Transportation Authority

AECOM

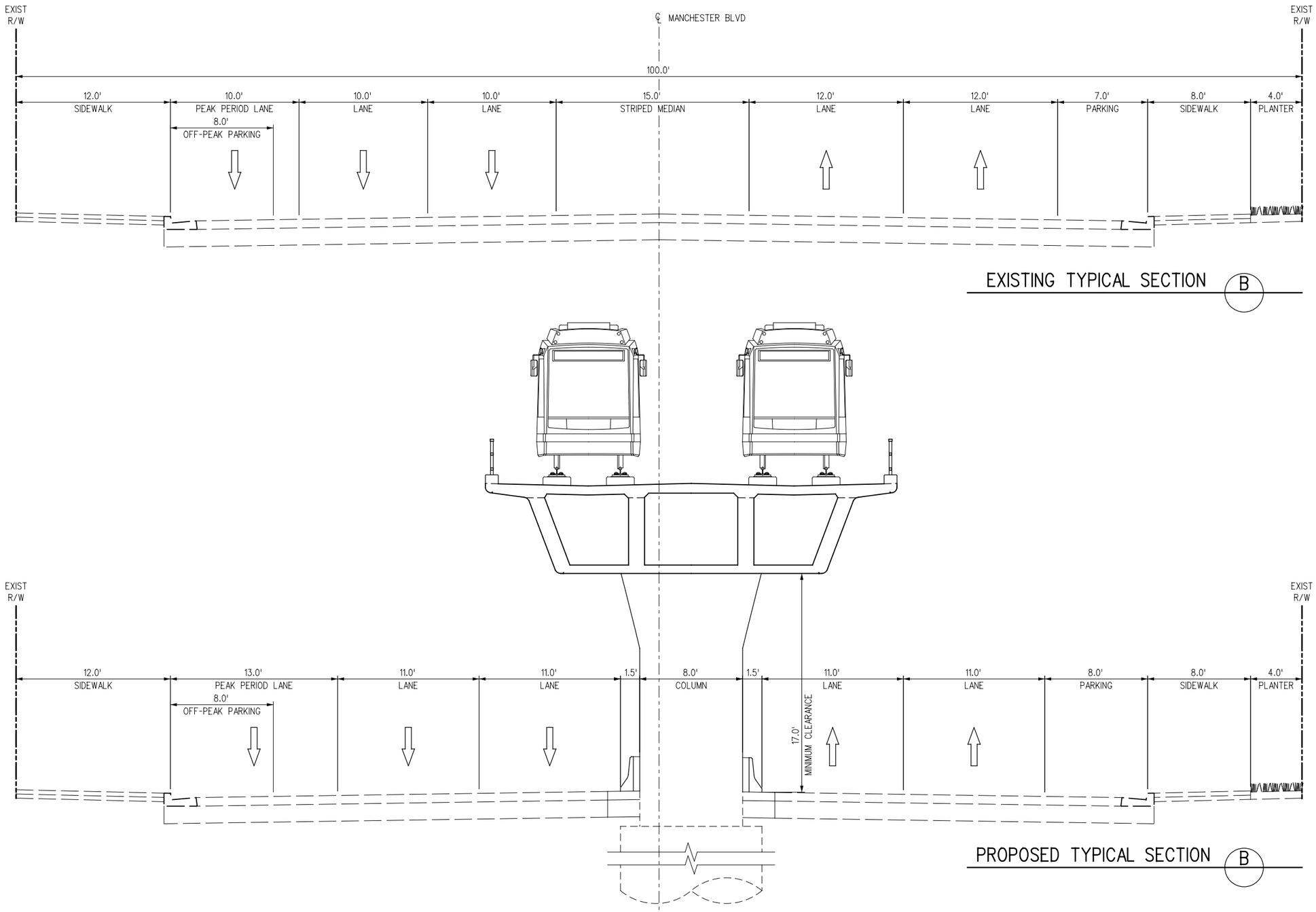
INGLEWOOD - NFL FOCUSED ANALYSIS

URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
SECTION A-A - (U-SECTION,CENTER)

CONTRACT NO
DRAWING NO 110
REV
SCALE
SHEET NO

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Plot Driver=MTA_HALF_BW_PDF.pltcfg



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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

Metro
Los Angeles County
Metropolitan Transportation Authority

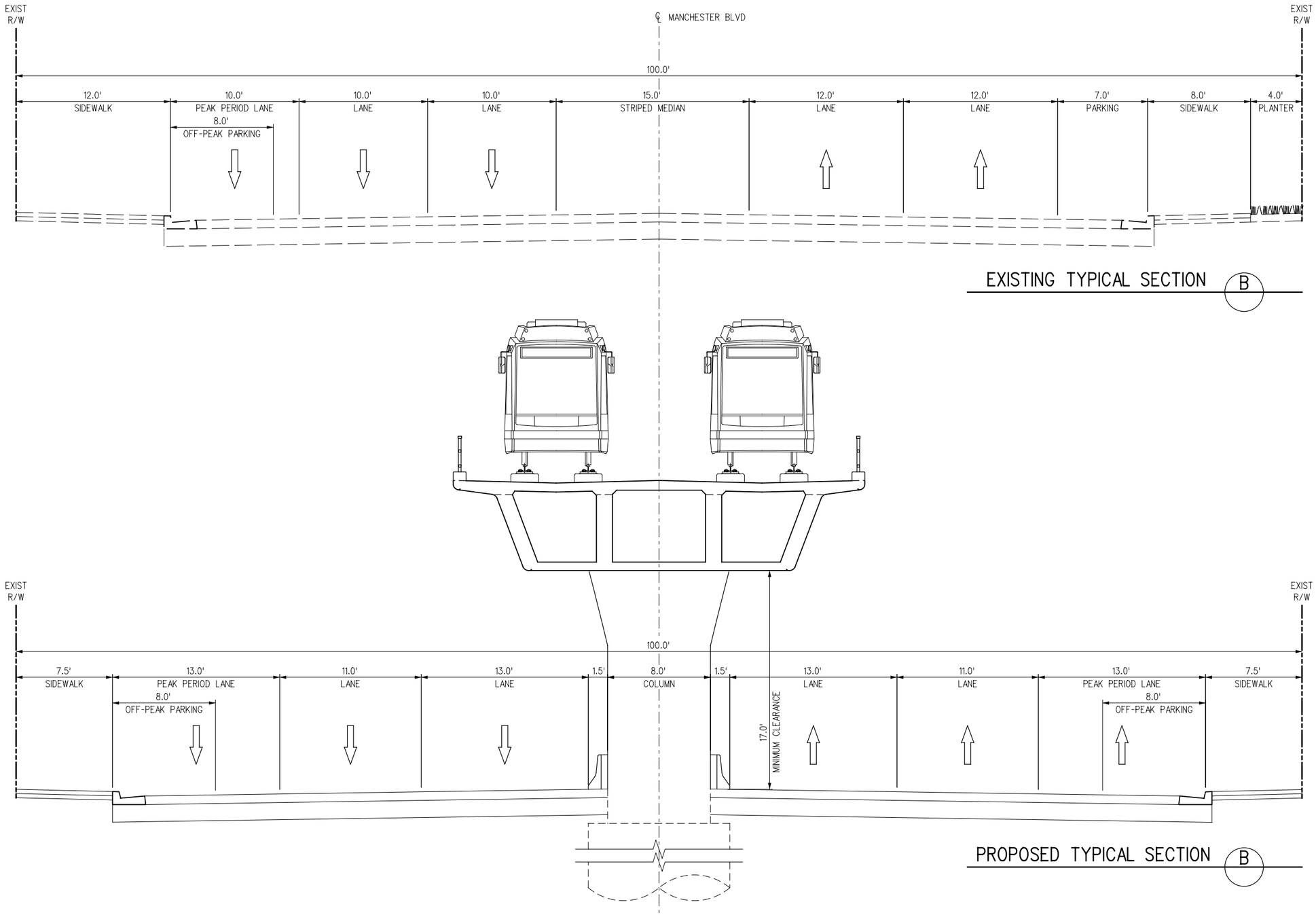
AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS

URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
SECTION B-B - (ALT1, AERIAL,CENTER)

CONTRACT NO
DRAWING NO 111
REV
SCALE
SHEET NO

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Plot Driver=MTA_HALF_BW_PDF.pltcfg



EXISTING TYPICAL SECTION B

PROPOSED TYPICAL SECTION B

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

NOT FOR CONSTRUCTION

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DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

Metro
Los Angeles County
Metropolitan Transportation Authority

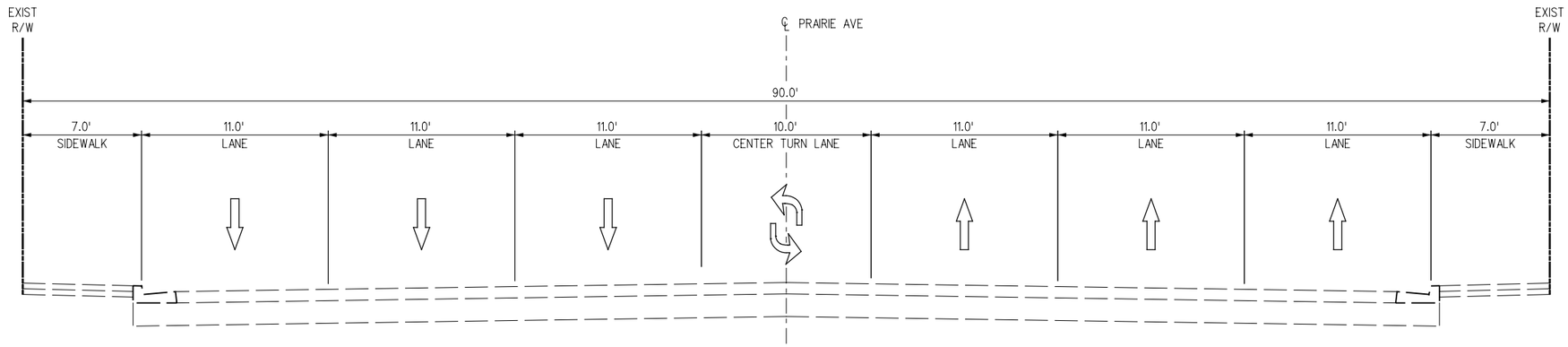
AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS

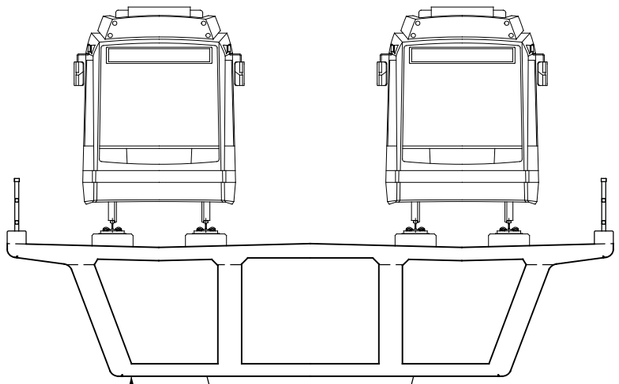
URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
SECTION B-B - (ALT 2,AERIAL,CENTER)

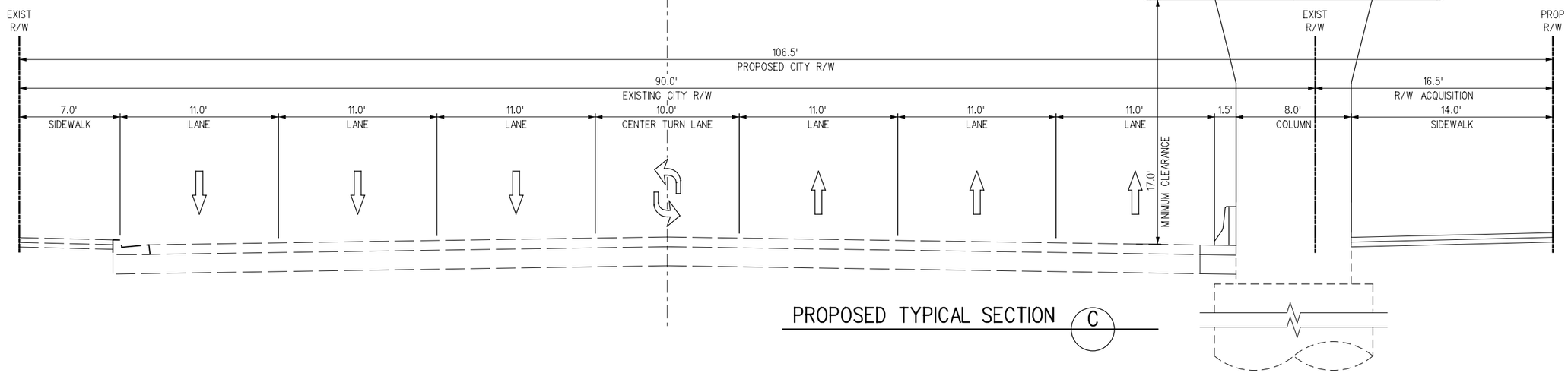
CONTRACT NO
DRAWING NO 112
REV
SCALE
SHEET NO

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Plot Driver=MTA_HALF_BW_PDF.pltcfg



EXISTING TYPICAL SECTION C





PROPOSED TYPICAL SECTION C

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

NOT FOR CONSTRUCTION

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

Metro
Los Angeles County
Metropolitan Transportation Authority

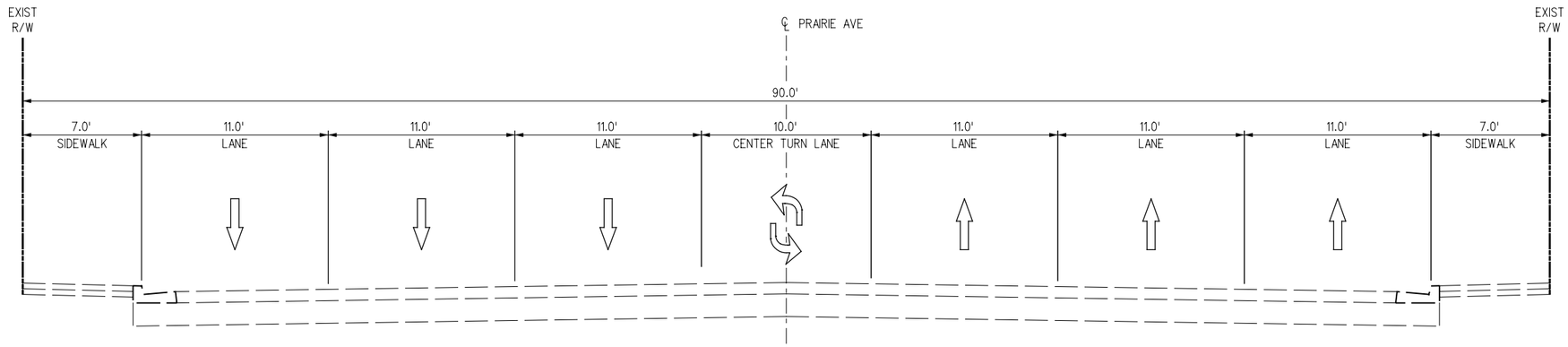
AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS

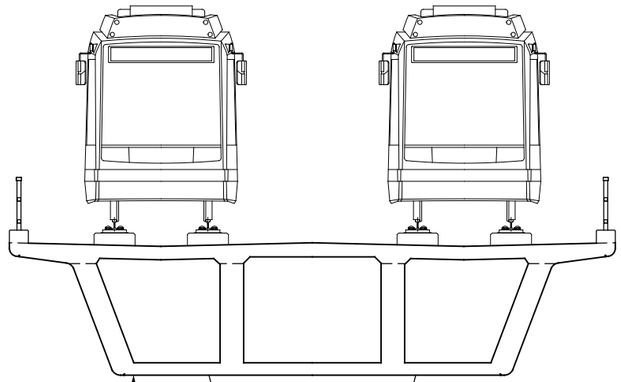
URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
SECTION C-C - (ALT 1,AERIAL,SIDE)

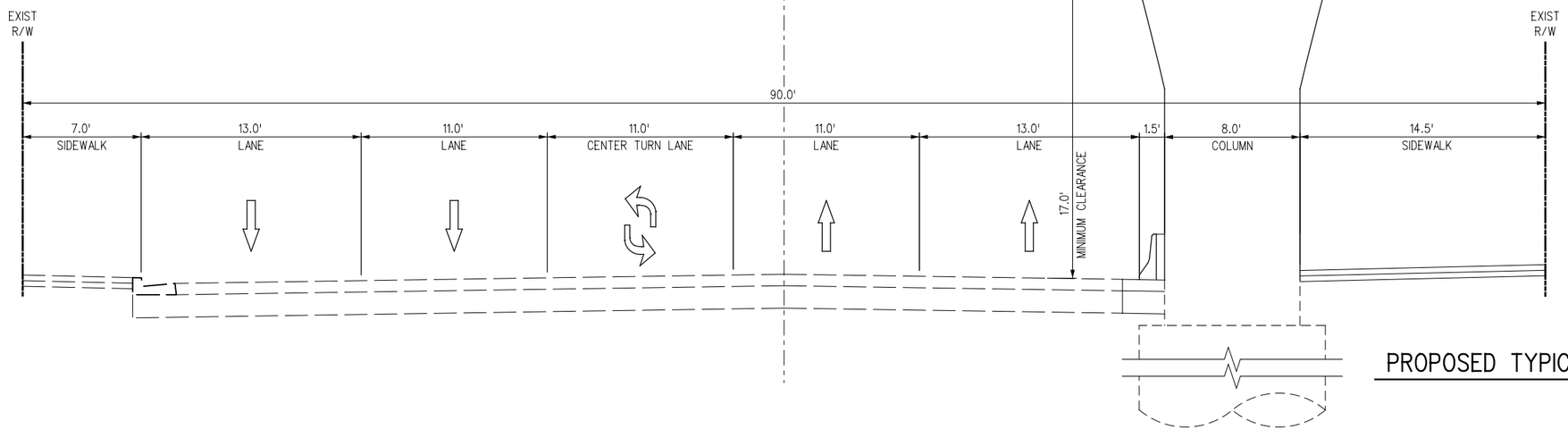
CONTRACT NO
DRAWING NO 113
REV
SCALE
SHEET NO

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Plot Driver=MTA_HALF_BW_PDF.pltcfg



EXISTING TYPICAL SECTION C





PROPOSED TYPICAL SECTION C

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

NOT FOR CONSTRUCTION

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

Metro
Los Angeles County
Metropolitan Transportation Authority

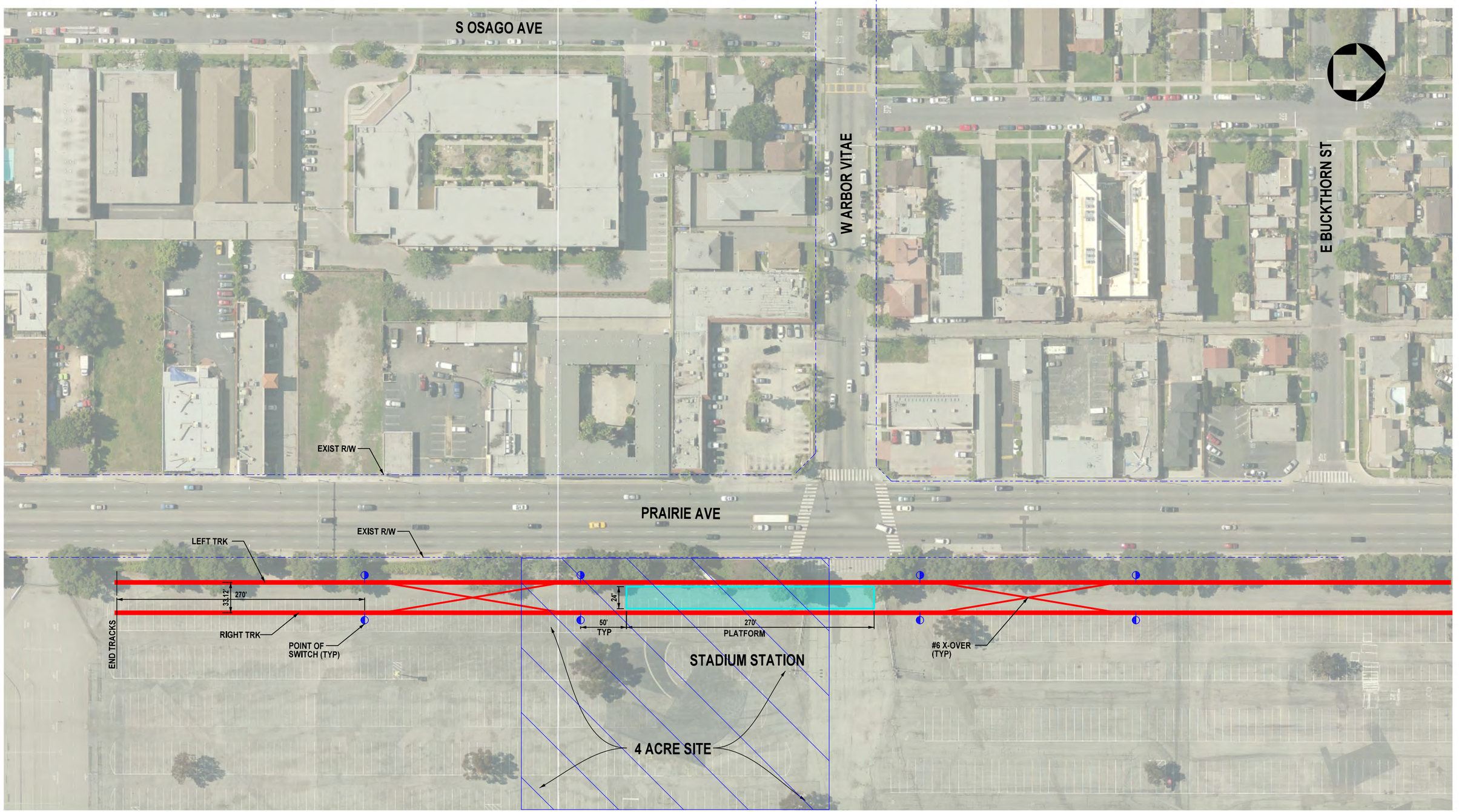
AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS

URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
SECTION C-C - (ALT 2,AERIAL,SIDE)

CONTRACT NO
DRAWING NO 114
REV
SCALE
SHEET NO

Pentable=MTA_H_BW.TBL USER=almashatm 10:14:37 AM 7/25/2017 \\losangeles\losangeles\Projects\TRN\60529090 NFL Connector\900 - Work\910 - CAD\000_CAD\020_Track\Sheets\114-S-C2.dgn
Plot Driver=MTA_HALF_BW_PDF.pltcfg



THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

NOT FOR CONSTRUCTION

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	7/28/2017

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Los Angeles County
Metropolitan Transportation Authority

AECOM

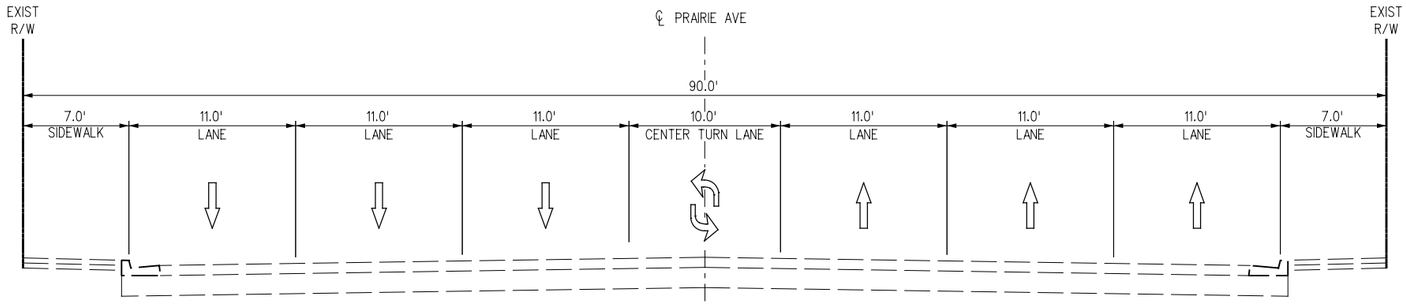
INGLEWOOD - NFL FOCUSED ANALYSIS

URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
AERIAL TERMINUS STATION
AT PRAIRIE AVE

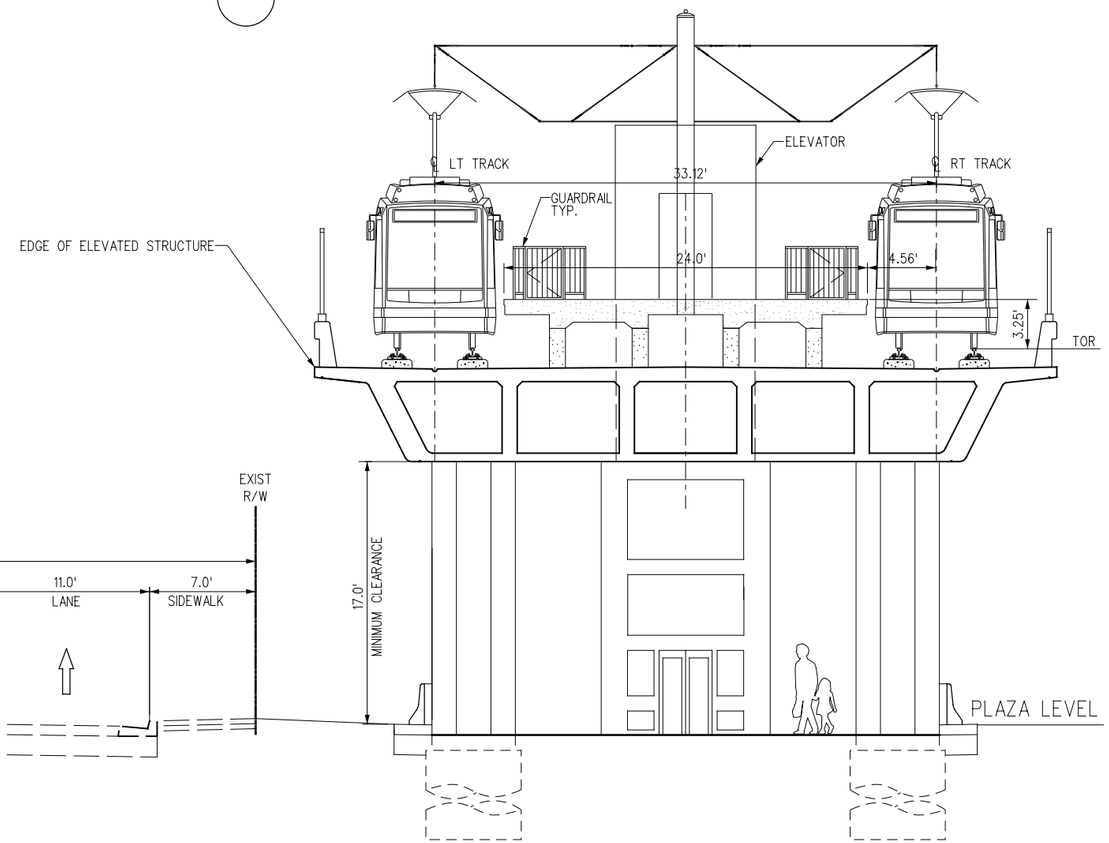
CONTRACT NO	
DRAWING NO	120
REV	
SCALE	
SHEET NO	

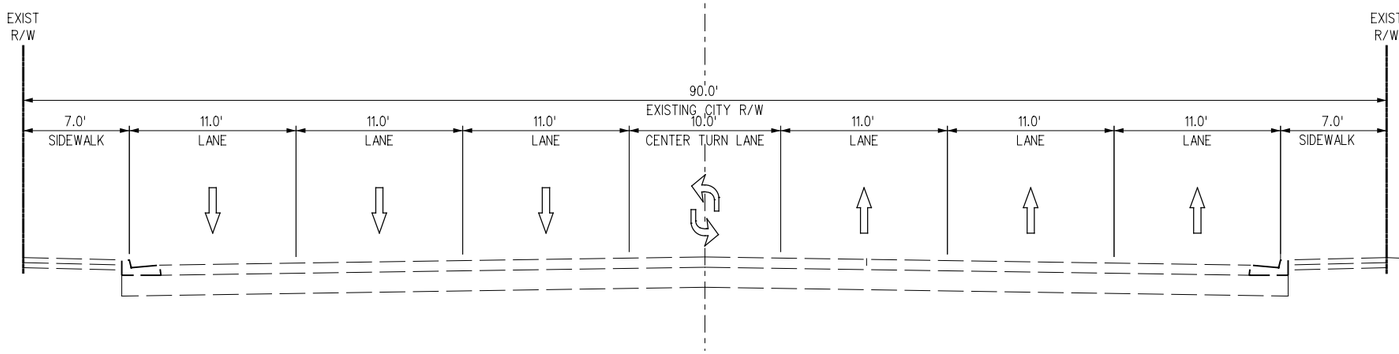
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Plot Driver=MTA_HALF_BW_PDF.pltcfg



EXISTING TYPICAL SECTION (A)





PROPOSED TYPICAL SECTION (B)

5' 0 5' 10'

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NOT FOR CONSTRUCTION

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

Metro — Los Angeles County Metropolitan Transportation Authority

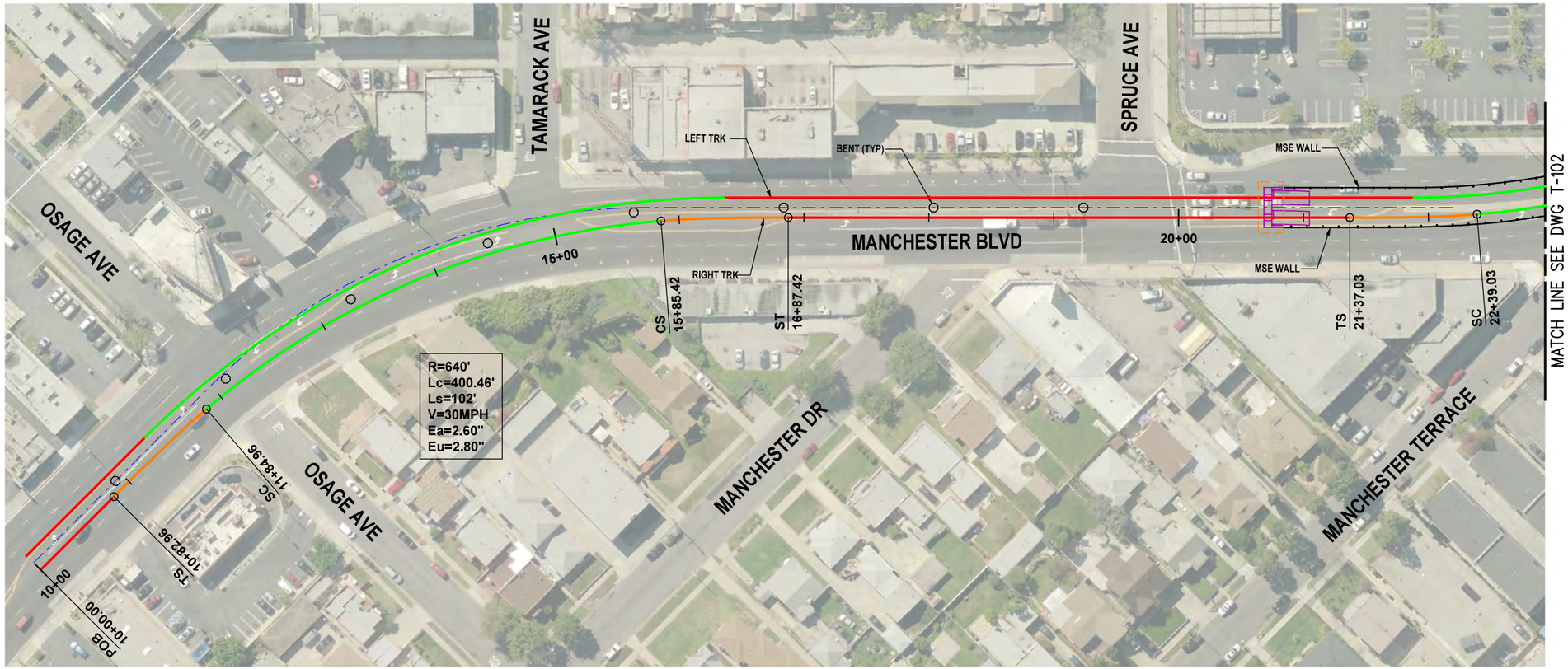
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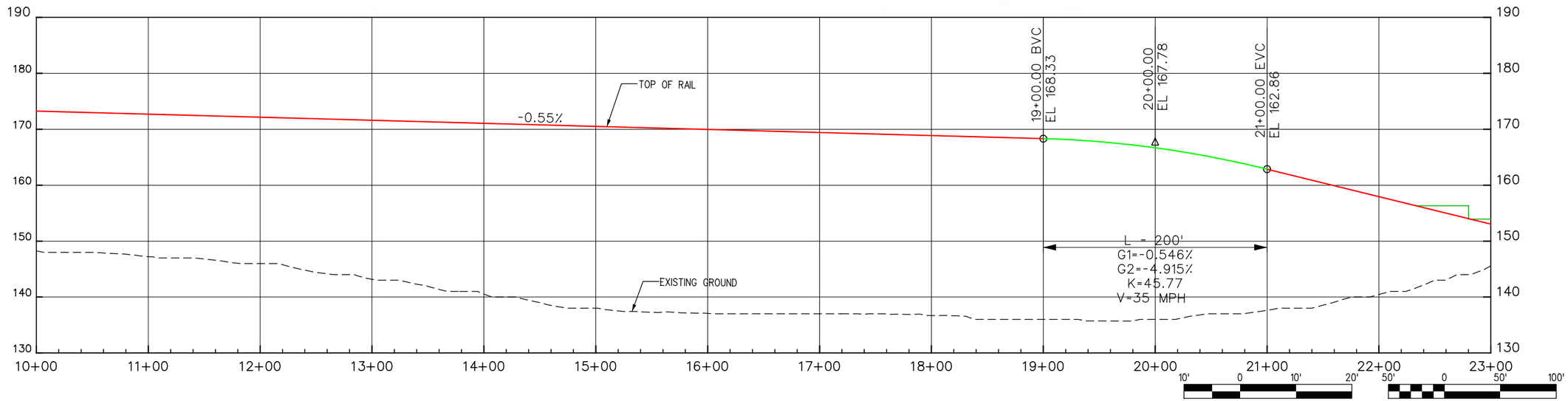
INGLEWOOD - NFL FOCUSED ANALYSIS
URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
SECTION - AERIAL STATION
AT PRAIRIE AVENUE

CONTRACT NO
DRAWING NO 121 REV
SCALE
SHEET NO

Plot Driver=MTA_HALF_BW_PDF.pltcfg

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

Metro — Los Angeles County Metropolitan Transportation Authority

AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS
URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
PLAN AND PROFILE
SHEET 1 OF 3

CONTRACT NO
DRAWING NO 130 REV
SCALE HORIZ. 1"=50'
VERT. 1"=10'
SHEET NO

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MATCH LINE SEE DWG T-101

R=640'
Lc=400.46'
Ls=102'
V=30MPH
Ea=2.60"
Eu=2.80"

HILLCREST BLVD

MSE WALL

END MSE WALL
BEGIN U-SECTION

25+00

MSE WALL

26+39.50 CS

27+41.50 ST

MANCHESTER BLVD

U-SECTION WALLS

END U-SECTION
BEGIN CUT & COVER

LOCUST ST

16' TRACK CENTERS
CUT AND COVER ALIGNMENT

30+00

CUT & COVER WALL

CUT & COVER WALL

LOCUST ST

R=65'
Lc=102.10'
Ls=0'
V=5MPH
Ea=0.00"
Eu=1.48"

33+67.00 PC

34+69.10 PT

35+00

END CUT & COVER
BEGIN U-SECTION

LEFT TRK

RIGHT TRK

14'

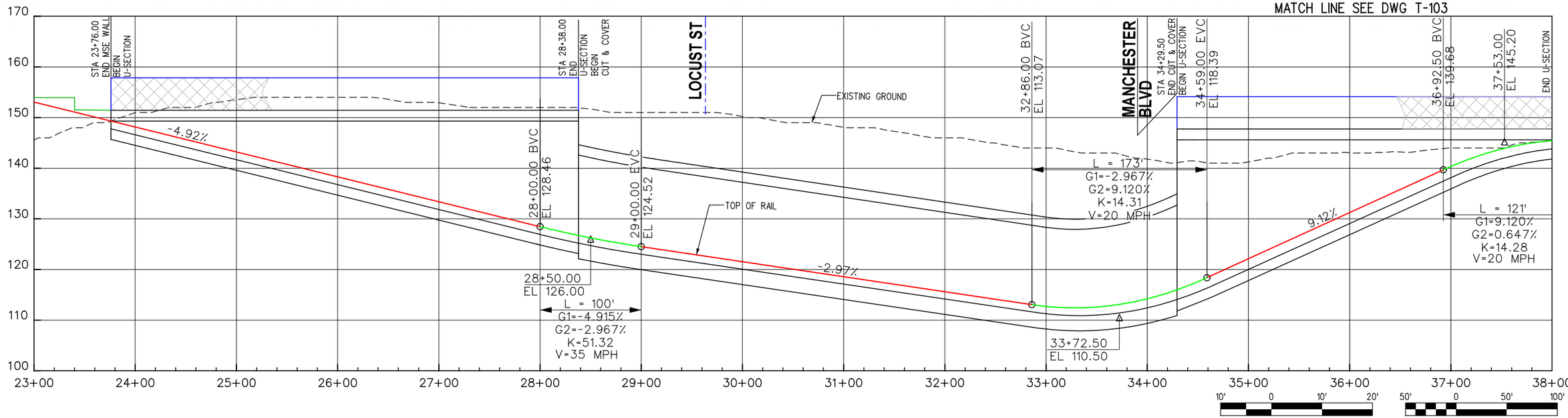
MARKET ST

QUEEN ST

END U-SECTION
BEGIN AT-GRADE
ALIGNMENT

QUEEN ST

MATCH LINE SEE DWG T-103



THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

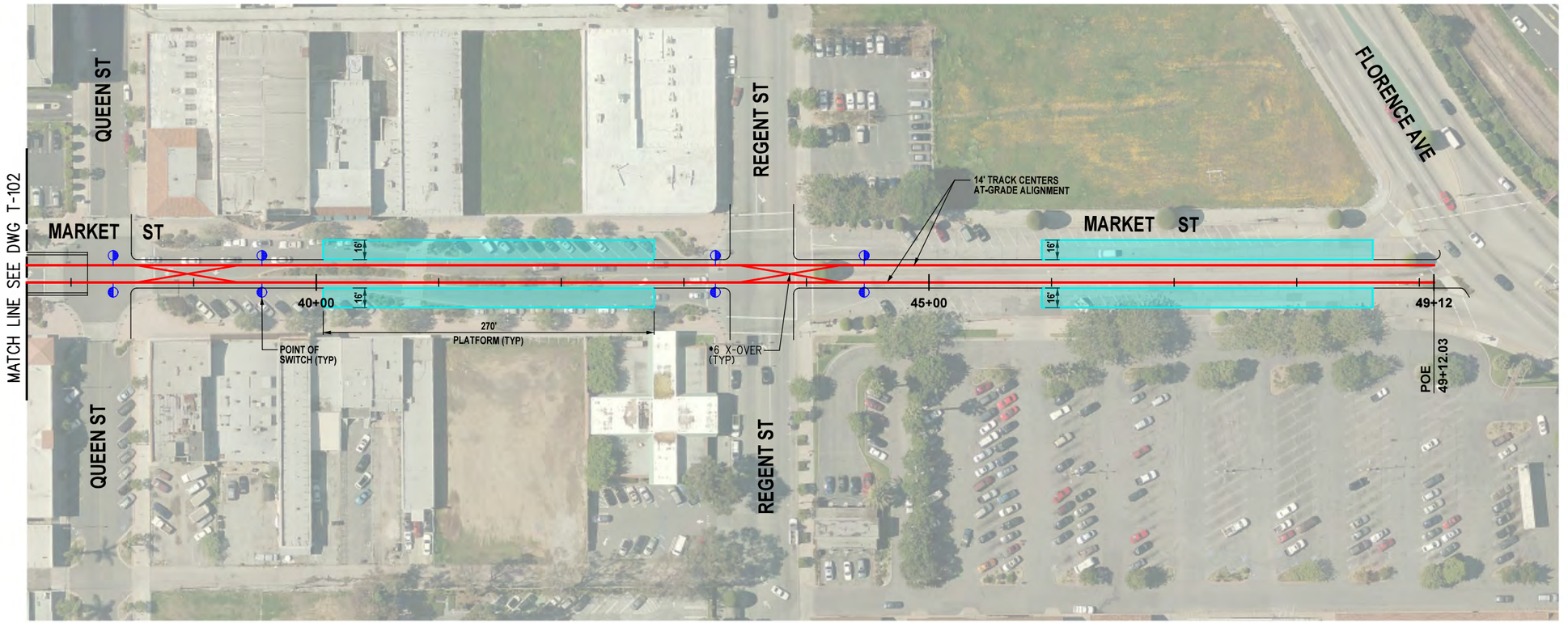
Metro
Los Angeles County
Metropolitan Transportation Authority

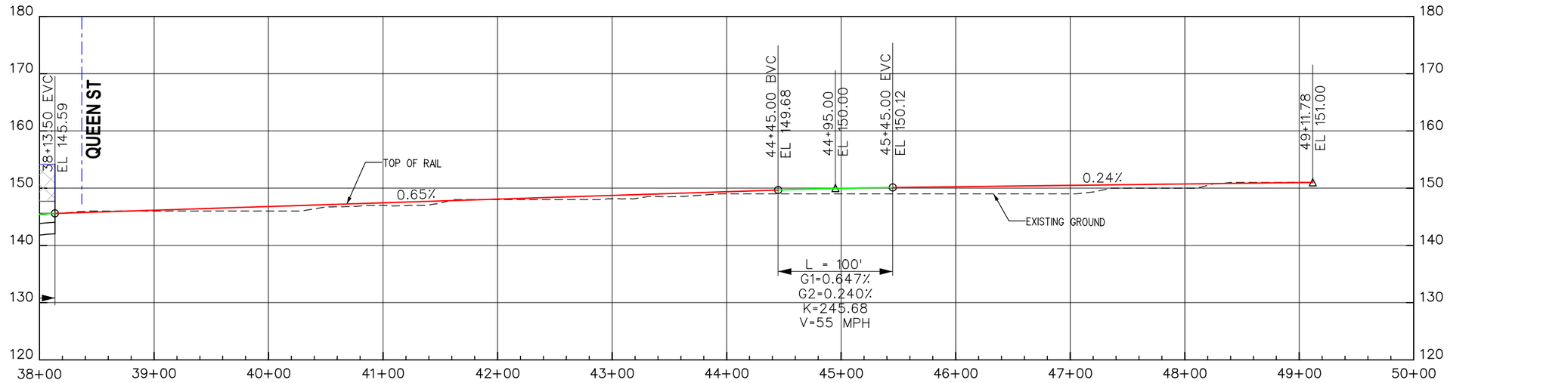
AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS
URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
PLAN AND PROFILE
SHEET 2 OF 3

CONTRACT NO
DRAWING NO 131
REV
SCALE HORIZ. 1"=50'
VERT. 1"=10'
SHEET NO

Plot Driver=MTA_HALF_BW_PDF.pltcfg
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10' 0 10' 20'

50' 0 50' 100'

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY

DRAWN BY

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DATE 7/28/2017

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INGLEWOOD - NFL FOCUSED ANALYSIS
URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
PLAN AND PROFILE
SHEET 3 OF 3

CONTRACT NO

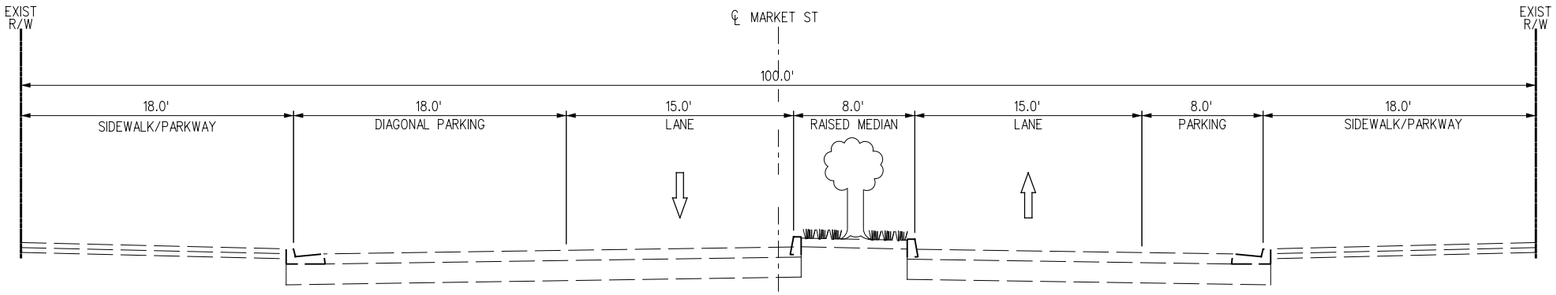
DRAWING NO 132 REV

SCALE HORIZ. 1"=50'
VERT. 1"=10'

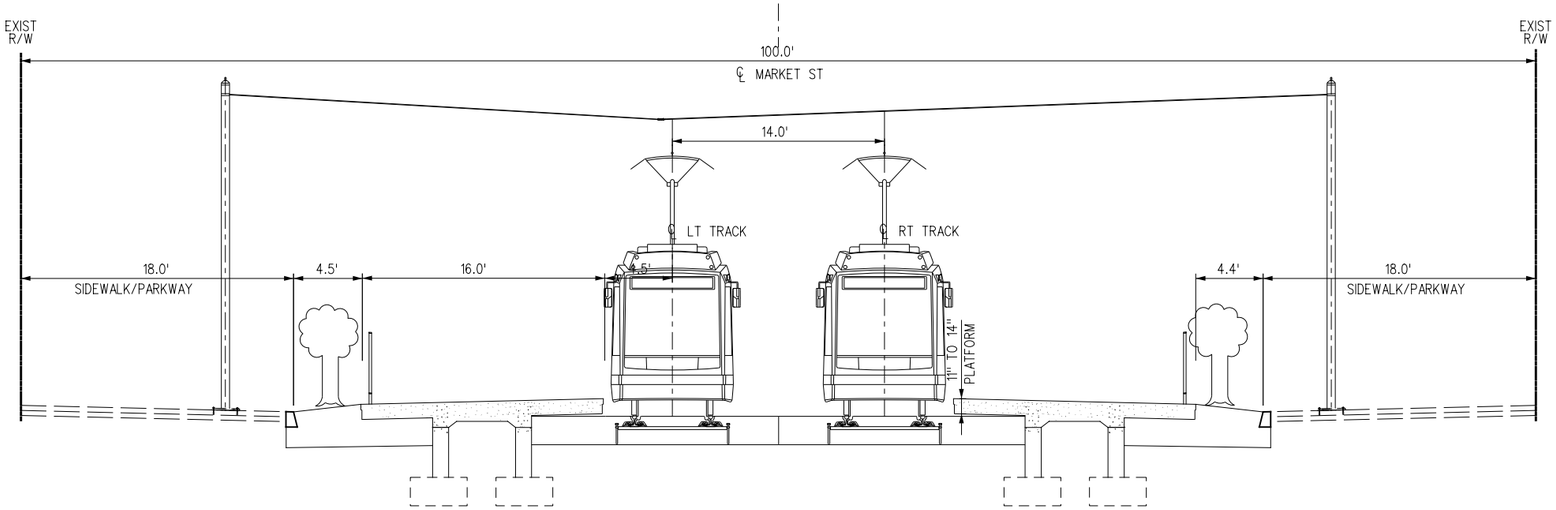
SHEET NO

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EXISTING TYPICAL SECTION A



PROPOSED TYPICAL SECTION B

5' 0 5' 10'

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

NOT FOR CONSTRUCTION

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

Metro
Los Angeles County
Metropolitan Transportation Authority

AECOM

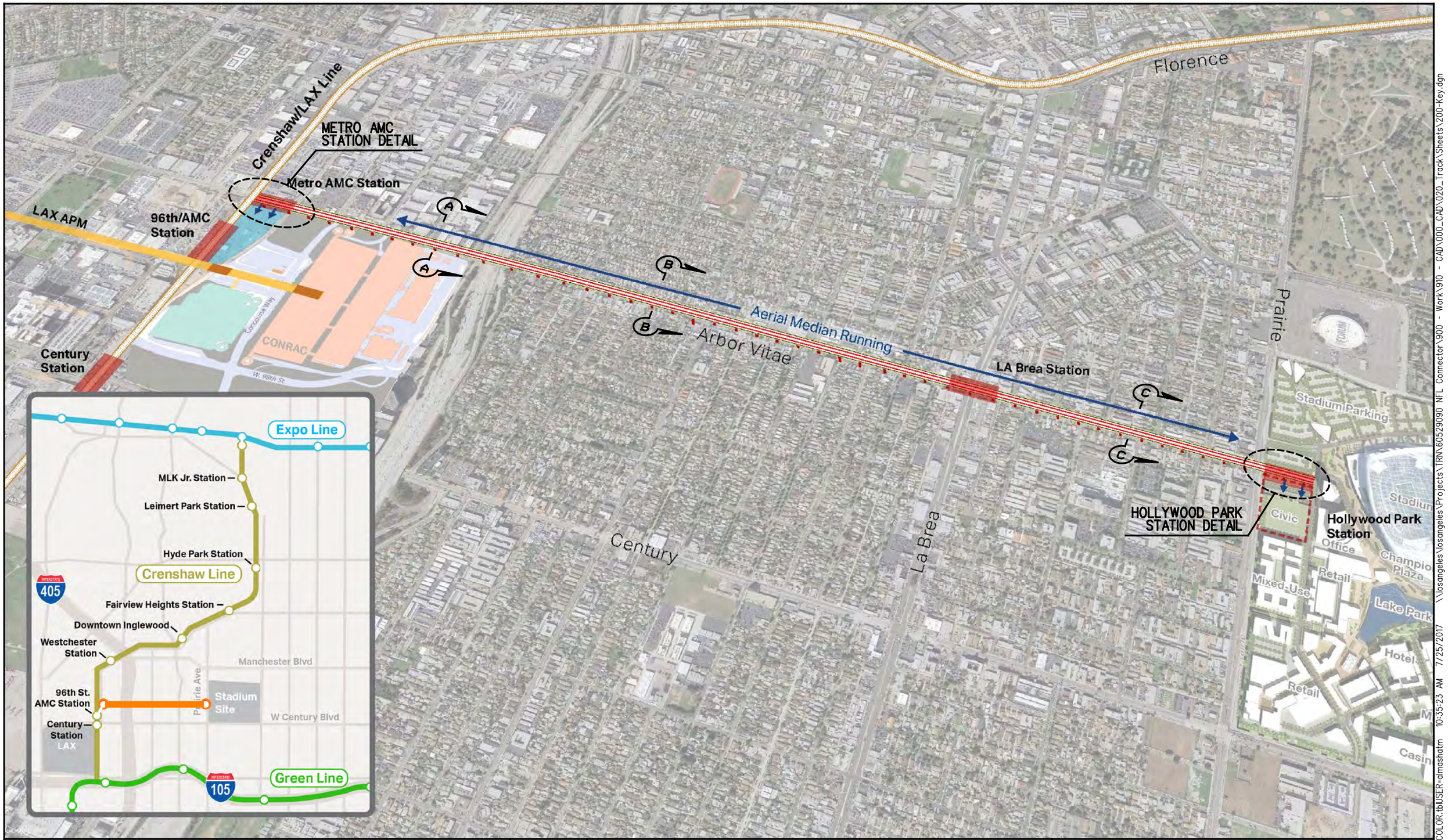
INGLEWOOD - NFL FOCUSED ANALYSIS

URBAN RAIL - INDEPENDENT CONNECTION
MARKET STREET - MANCHESTER AVENUE
STATION TYPICAL SECTION

CONTRACT NO
DRAWING NO 133
REV
SCALE
SHEET NO

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NOT FOR CONSTRUCTION

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

Metro
Los Angeles County
Metropolitan Transportation Authority

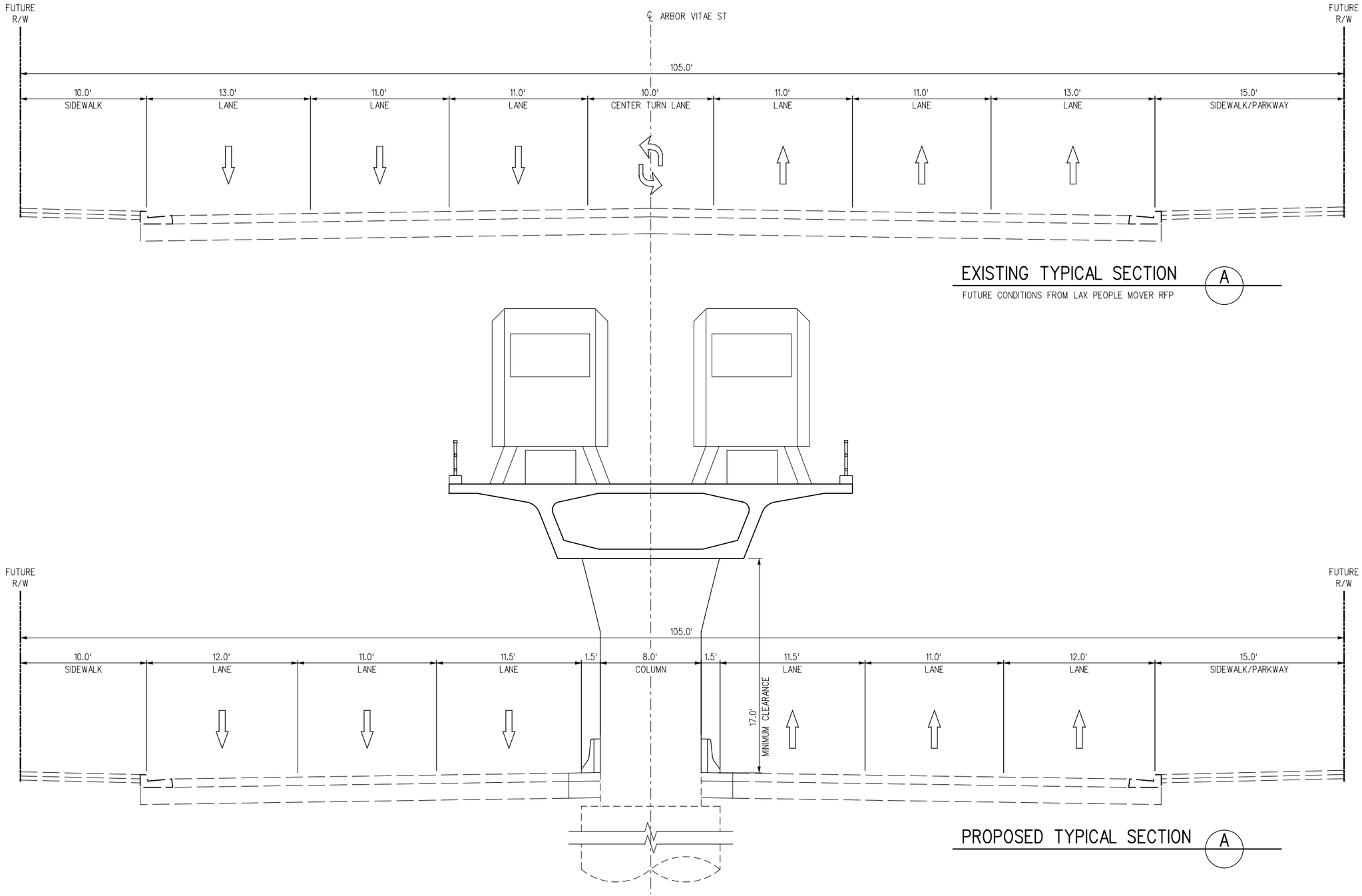
AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS

APM - INDEPENDENT CONNECTION
ARBOR VITAE STREET
KEY MAP

CONTRACT NO
DRAWING NO 200
REV
SCALE
SHEET NO

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Plot Driver=MTA_HALF_BW_PDF.pltcfg



EXISTING TYPICAL SECTION A

FUTURE CONDITIONS FROM LAX PEOPLE MOVER RFP

PROPOSED TYPICAL SECTION A

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

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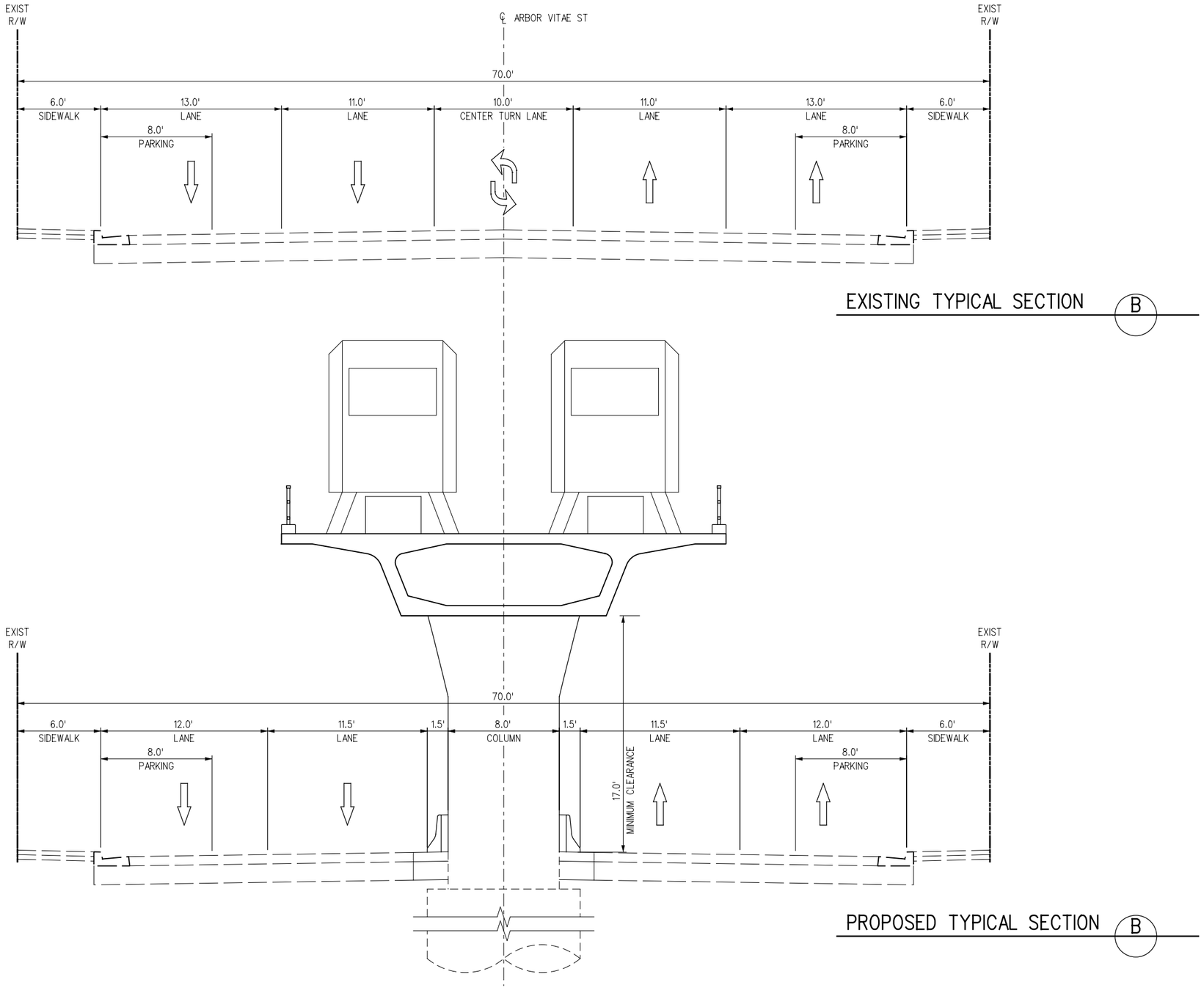
AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS

APM - INDEPENDENT CONNECTION
ARBOR VITAE STREET
SECTION A-A - (AERIAL,CENTER)

CONTRACT NO
DRAWING NO 210
REV
SCALE
SHEET NO

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Plot Driver=MTA_HALF_BW_PDF.pltcfg



EXISTING TYPICAL SECTION B

PROPOSED TYPICAL SECTION B

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

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DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

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Los Angeles County
Metropolitan Transportation Authority

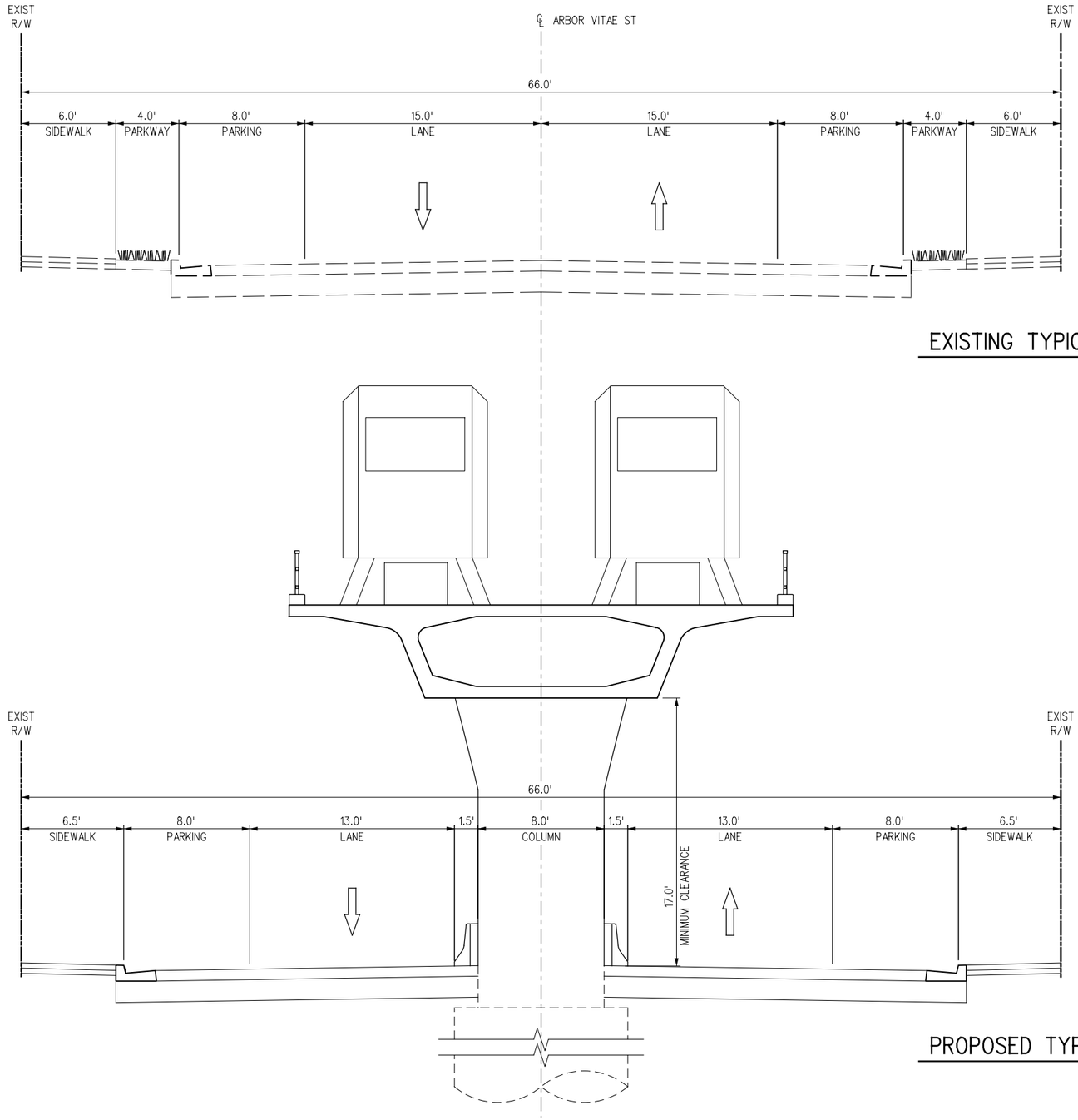
AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS

APM - INDEPENDENT CONNECTION
ARBOR VITAE STREET
SECTION B-B - (AERIAL,CENTER)

CONTRACT NO
DRAWING NO 211
REV
SCALE
SHEET NO

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Plot Driver=MTA_HALF_BW_PDF.pltcfg



EXISTING TYPICAL SECTION C

PROPOSED TYPICAL SECTION C

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

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DESIGNED BY
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IN CHARGE
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Metro
Los Angeles County
Metropolitan Transportation Authority

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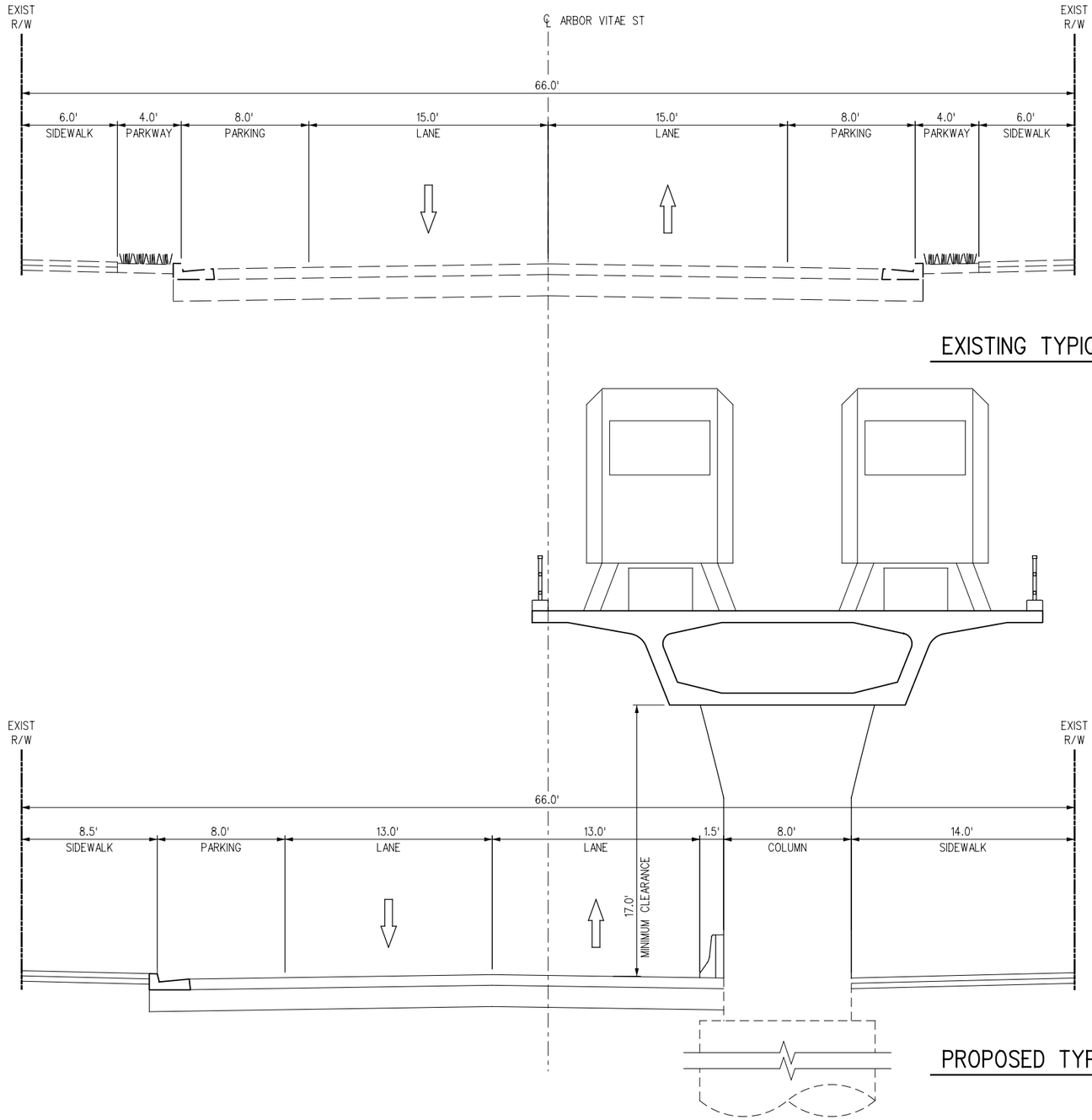
INGLEWOOD - NFL FOCUSED ANALYSIS

APM - INDEPENDENT CONNECTION
ARBOR VITAE STREET
SECTION C-C - (ALT 1,AERIAL,CENTER)

CONTRACT NO
DRAWING NO 212
REV
SCALE
SHEET NO

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Plot Driver=MTA_HALF_BW_PDF.pltcfg



EXISTING TYPICAL SECTION C

PROPOSED TYPICAL SECTION C

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

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DESIGNED BY
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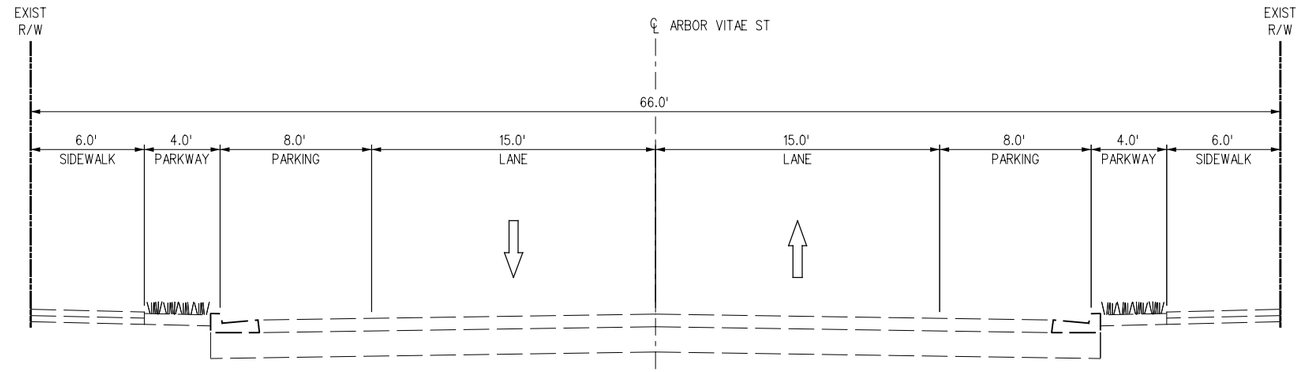
INGLEWOOD - NFL FOCUSED ANALYSIS

APM - INDEPENDENT CONNECTION
ARBOR VITAE STREET
SECTION C-C - (ALT 2,AERIAL,SIDE)

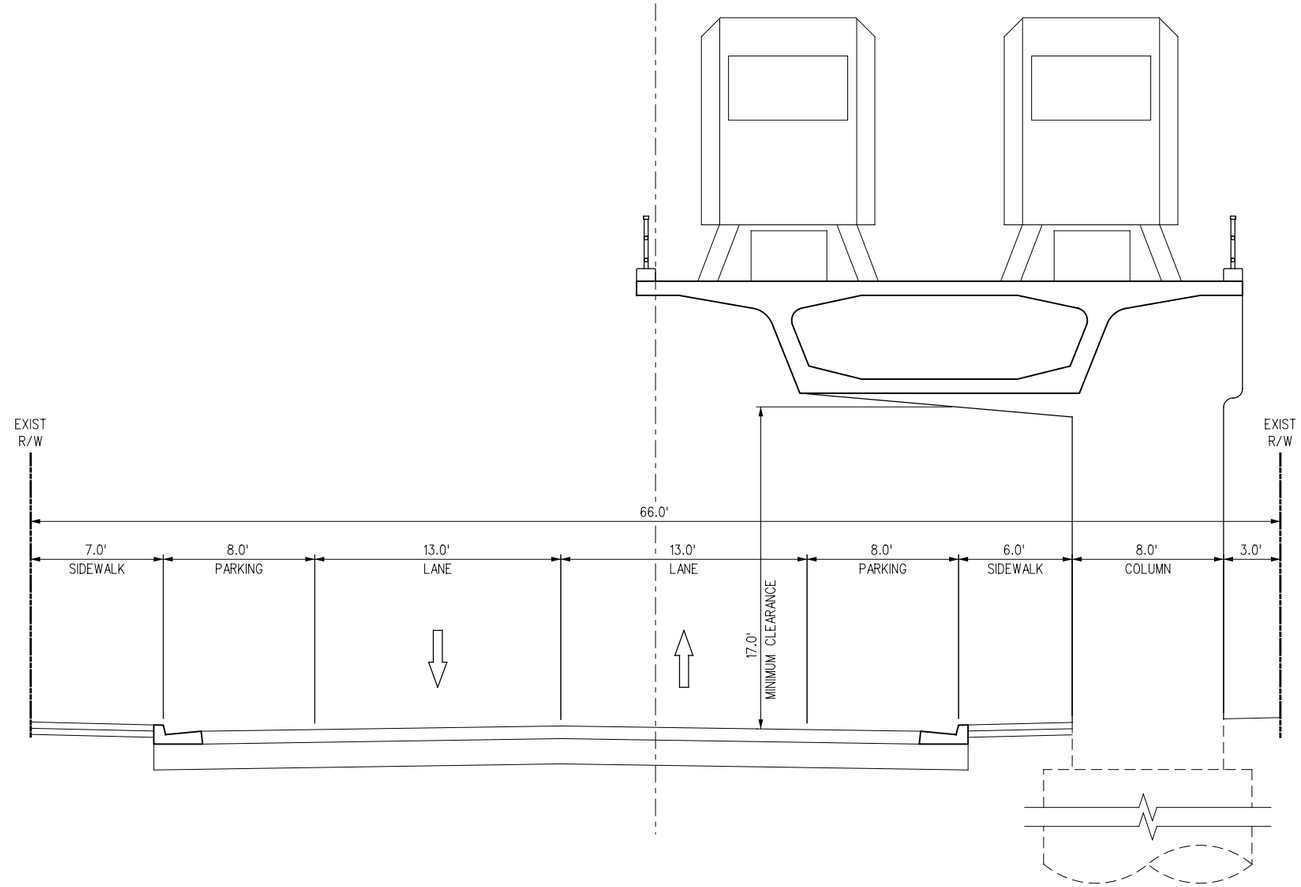
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SCALE
SHEET NO

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Plot Driver=MTA_HALF_BW_PDF.pltcfg



EXISTING TYPICAL SECTION C



PROPOSED TYPICAL SECTION C

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

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DESIGNED BY
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DATE 7/28/2017

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AECOM

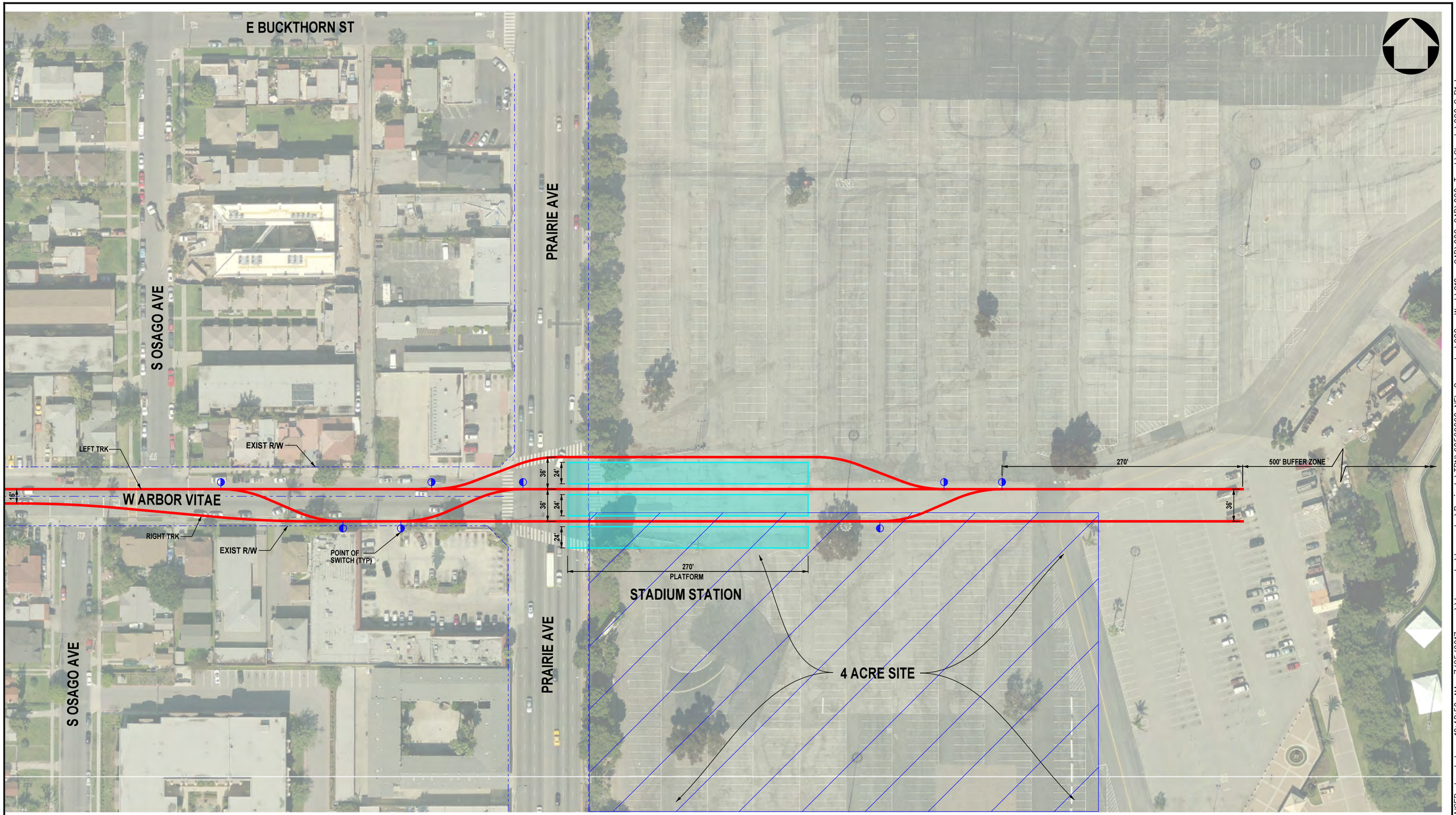
INGLEWOOD - NFL FOCUSED ANALYSIS

APM - INDEPENDENT CONNECTION
ARBOR VITAE STREET
SECTION C-C - (ALT 3,AERIAL,SIDE)

CONTRACT NO
DRAWING NO 214 REV
SCALE
SHEET NO

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DATE 7/28/2017

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Los Angeles County
Metropolitan Transportation Authority

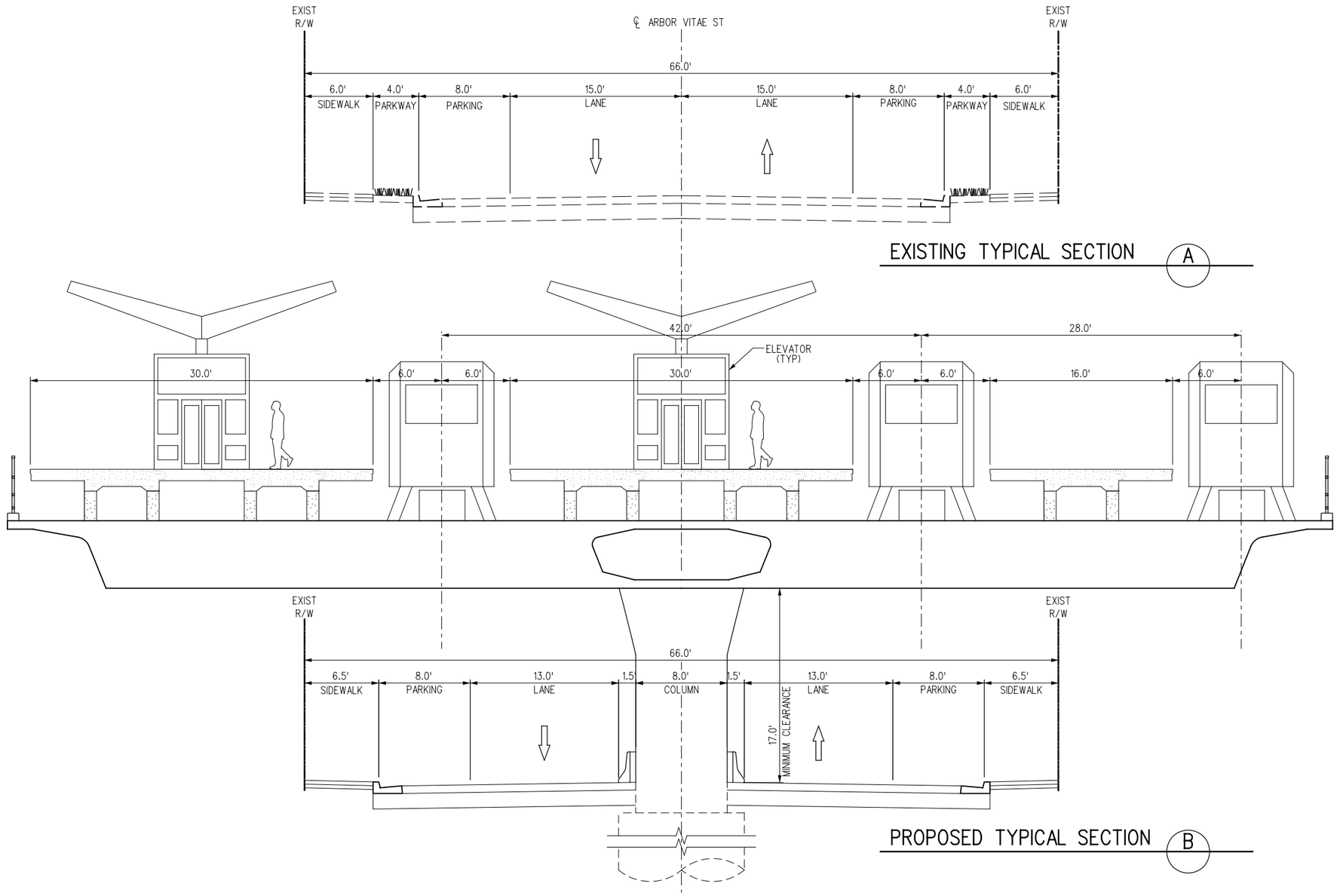
AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS
APM - INDEPENDENT CONNECTION
ARBOR VITAE STREET
AERIAL TERMINUS STATION

CONTRACT NO
DRAWING NO 220
REV
SCALE
SHEET NO

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DESIGNED BY
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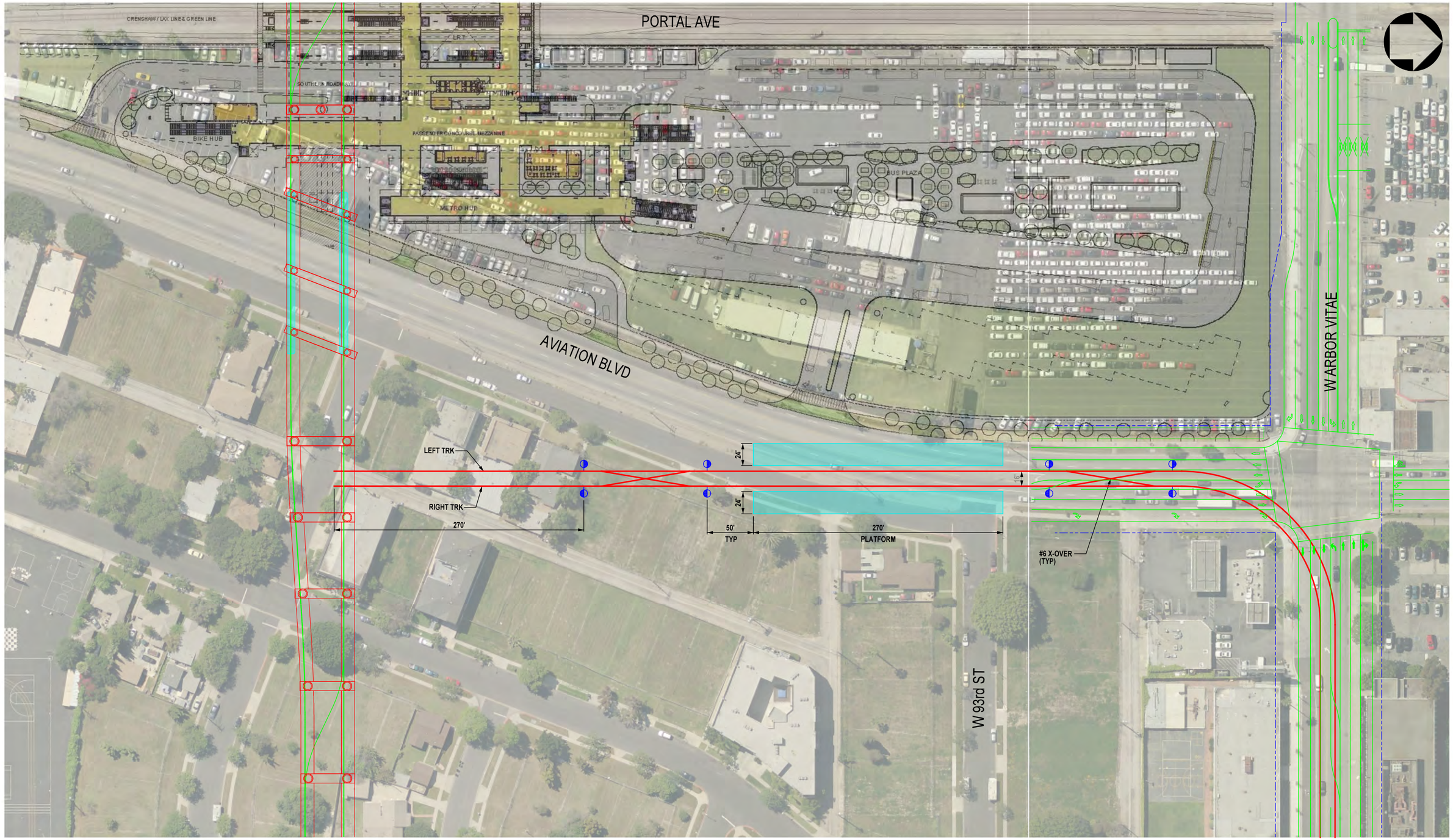
AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS

APM - INDEPENDENT CONNECTION
ARBOR VITAE STREET
SECTION - AERIAL STATION

CONTRACT NO
DRAWING NO 221
REV
SCALE
SHEET NO

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THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

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Los Angeles County
Metropolitan Transportation Authority

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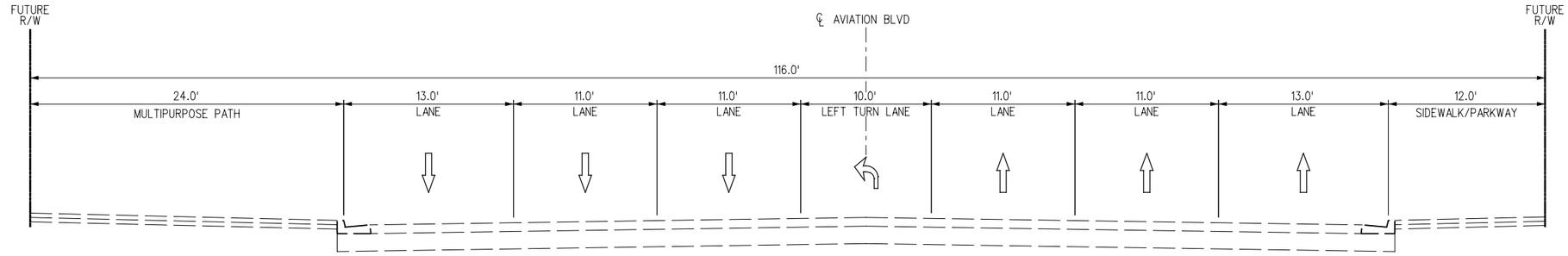
INGLEWOOD - NFL FOCUSED ANALYSIS

APM - INDEPENDENT CONNECTION
ARBOR VITAE STREET - AVIATION BOULEVARD
AERIAL TERMINUS STATION

CONTRACT NO
DRAWING NO 222
REV
SCALE
SHEET NO

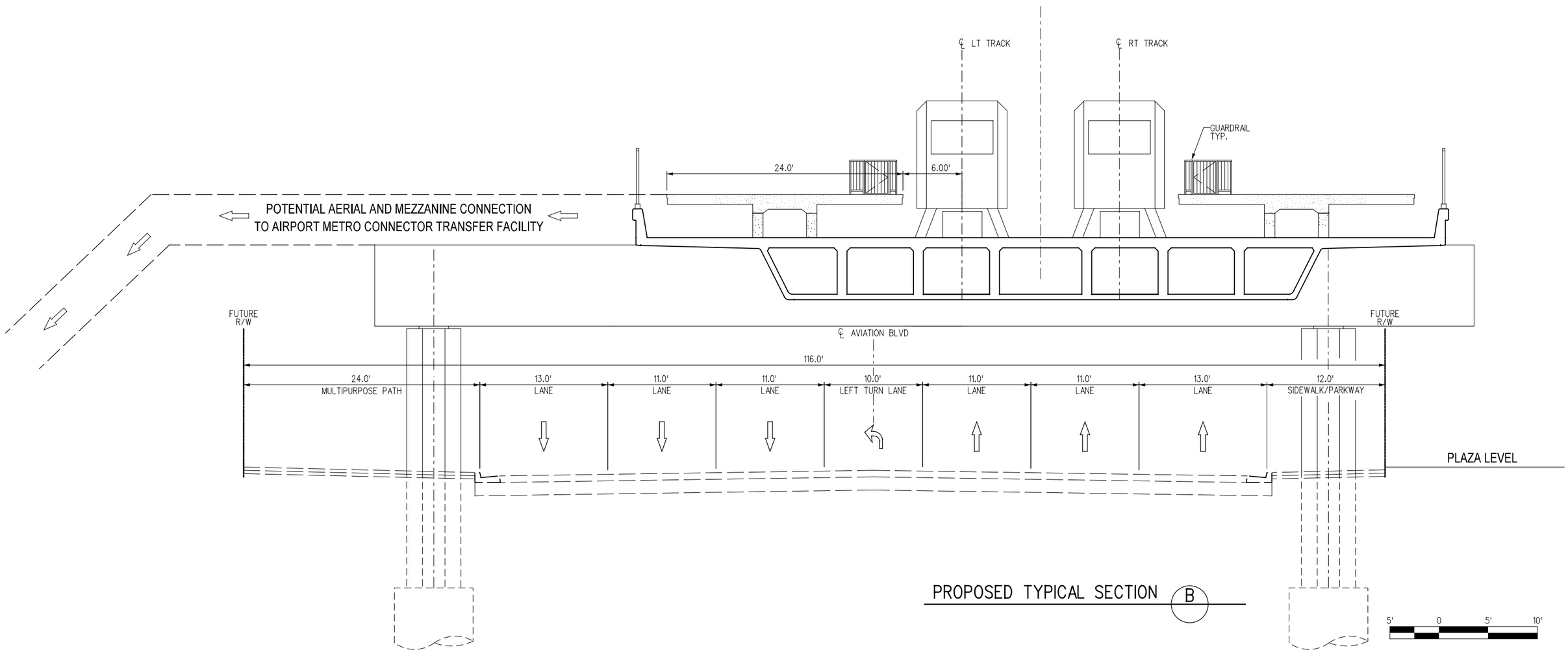
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EXISTING TYPICAL SECTION (A)

TO BE CONSTRUCTED WITH THE LAX PEOPLE MOVER



PROPOSED TYPICAL SECTION (B)

5' 0 5' 10'

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
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DATE 7/28/2017

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AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS

APM - INDEPENDENT CONNECTION
ARBOR VITAE STREET - AVIATION BOULEVARD
SECTION - AERIAL STATION

CONTRACT NO
DRAWING NO 223 REV
SCALE
SHEET NO

Plot Driver=MTA_HALF_BW_PDF.pltcfg
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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY

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DATE 7/28/2017

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Los Angeles County
Metropolitan Transportation Authority

AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS

APM - INDEPENDENT CONNECTION
CENTURY BOULEVARD
KEY MAP

CONTRACT NO

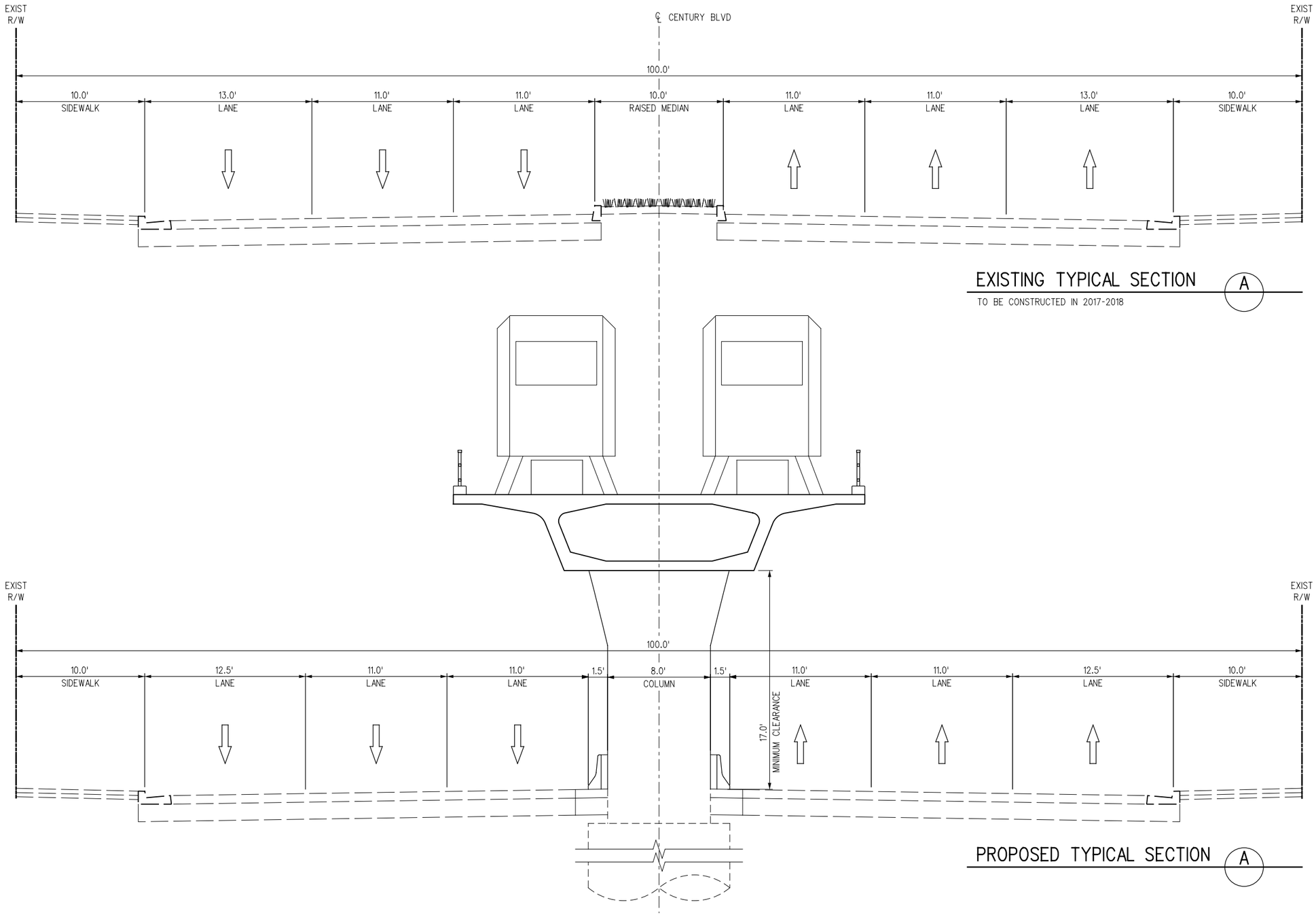
DRAWING NO 300 REV

SCALE

SHEET NO

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Plot Driver=MTA_HALF_BW_PDF.pltcfg



EXISTING TYPICAL SECTION A

TO BE CONSTRUCTED IN 2017-2018

PROPOSED TYPICAL SECTION A

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT ADMINISTRATION (FTA), UNDER THE FEDERAL TRANSIT ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 7/28/2017

Metro
Los Angeles County
Metropolitan Transportation Authority

AECOM

INGLEWOOD - NFL FOCUSED ANALYSIS

APM - INDEPENDENT CONNECTION
CENTURY BOULEVARD
SECTION A-A - (AERIAL,CENTER)

CONTRACT NO
DRAWING NO 310
REV
SCALE
SHEET NO

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