APPENDIX 3.0

PROJECT DESCRIPTION

Appendix 3.0.1

Inglewood Transit Connector EIR Operating Systems Conceptual Planning EIR Project Definition, December 2020

INGLEWOOD TRANSIT CONNECTOR

OPERATING SYSTEM CONCEPTUAL PLANNING

EIR PROJECT DEFINITION

DECEMBER 2020

LEA ELLIOTT

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1. Introduction

1.1. Project Background

The City of Inglewood is currently developing an Environmental Impact Report to evaluate the environmental effects of the proposed Inglewood Transit Connector (ITC) Project.

The ITC Project was developed to address the anticipated increase in mobility needs due to the City's projected population and employment growth and the new sports and entertainment venues. The City recognized that in order to provide quality and high level of service for residents, commuters, and event attendees, a transit system providing the "last mile" connection between the future Metro Crenshaw/LAX Station and the event venues is needed. The transit system would also improve economic activity along the alignment, providing opportunities for integration with transit-oriented development and other initiatives in the area.

In June 2018, the City of Inglewood released their Envision Inglewood report which established the City's locally preferred alternative for providing automated transit service to the City's growth centers. Named the Inglewood Transit Connector (ITC), this system would provide high-frequency service between the future Downtown Inglewood Metro Crenshaw/LAX Station and the Forum; the Los Angeles Stadium and Entertainment District at Hollywood Park (LASED), which is the home of the LA Rams and LA Chargers NFL teams; and the Inglewood Basketball and Entertainment Center (IBEC), which is the future home of the LA Clippers NBA team. The ITC system will provide service to residents and commuters on non-event days, and special event service on event days.

1.2. Report Purpose

The scope of this report is to present the results of the conceptual planning performed in support of the development of the EIR project definition.

The analysis includes:

- Description of the Automated People Mover (APM) configuration, including guideway geometry
- Overview of the APM demand
- Basis for the APM project
- Description of APM system operations and operating modes
- Normal and event-based operations
- Round trip times, fleet, and system capacity
- Maintenance and Storage Facility conceptual requirements
- Power Distribution Substation conceptual requirements
- Conceptual cost estimates for the APM operating system

These Conceptual Plans identify the proposed Alignment for the APM, which will be in the public right of way, with supporting facilities on property located adjacent to the public right of way as described further below. These Conceptual Plans will be refined as design of the facility progresses. However, in order to evaluate potential impacts of the project, the size of the APM guideway, columns and other components of the Project as identified in the Conceptual Plans illustrate the likely maximum potential size of these elements. The location, layout, and size of the proposed stations, traction power substations, and maintenance and storage facility as illustrated in the Conceptual Plans also represent the likely maximum potential size of these facilities for the purpose of analyzing the potential impacts of the Project. The description of the proposed changes to streets identified in the alignment plans are also illustrative and identify the likely maximum potential extent of changes to existing streets proposed as part of the Project. Engineering and design-level details of the Project will be refined as the Project moves through the environmental review, approval, procurement, and design processes

1.3. Basic Assumptions

Initial planning for the ITC project was conducted under the Envision Inglewood effort, which included an alignment alternatives review, ridership development, operational analysis, and identification of the preferred alignment.

For this project, assumptions and parameters established under the Envision Inglewood effort were reviewed to determine their continued applicability for the ITC project. The following assumptions for the operations of the ITC system were identified as being relevant and are continued to be used as basic assumptions for the ITC Project.

- The ITC alignment would further refine Alignment A of Envision Inglewood: Market-Manchester Alignment, which was selected as the preferred alignment for further study. This alignment is also included in the City of Inglewood Notice of Preparation and Notice of Public Scoping Meeting for an Environmental Impact Report, July 16, 2018.
- The five-station alignment developed for the Envision Inglewood project was further refined for cost and operational efficiencies. The proposed dual lane system serves three (3) stations:
    - Market Street / Florence Avenue Station (Market St. Station), located at Market St. and Florence Ave., which provides connection to the future Downtown Inglewood Metro Crenshaw/LAX Station;
    - Prairie Avenue / Pincay Drive Station (Forum Station), located at Prairie Ave. and Pincay Dr., which provides connection to The Forum and LASED; and
    - Prairie Avenue / Hardy Street Station (Hollywood Park Station), located at Prairie Ave. and Hardy St. which provides connections to LASED and the IBEC Project.
- The ridership developed for the Envision Inglewood Appendix B: Ridership Memo was refined based on the assumptions used in the IBEC EIR effort to ensure the basis for both projects are consistent.
- Capacity per car is based on a passenger space allocation of 2.7 square feet per passenger identified in Envision Inglewood, Section 4.5 Operations Analysis, which this evaluation confirms is consistent with the FTA Transit Cooperative Report Program 57's definition of AW2 design load (seated plus 4 standing passengers per square meter).
- Technology will be automated people mover (APM) systems, which include the three potential self-propelled technologies identified in the Envision Inglewood report: rubber-tire, large monorail, and steel wheel/steel rail were identified to be maintained for consideration. These three technologies were further assessed as part of the ITC Project. See Section 3. The

assessment found that while the application of steel wheel/steel rail technology is considered challenging due to the physical constraints, they are not precluded from proposing on the project to provide industry an opportunity to evaluate and determine its applicability to the project.

- The system operates daily from 6am to 11:59pm and shuts down from 12am to 5:59am. Extended hours may be operated for special event days.

2. System Layout

The ITC systems is a fully elevated, APM system, spanning a total length of approximately 8,500 ft. (dual lane) and connecting a total of three, center platform stations, as shown in Figure 2-1.

On the north end of the alignment, the system begins with the Market St. Station located on Market St. just south of Florence Ave., serving the future Metro/LAX Crenshaw LRT Station located on Florence Ave and the historic Market St. district. The ITC Project will operate as an extension of existing transit facilities by providing a station and passenger walkway connecting the ITC Project to the Downtown Inglewood Station on the Metro Crenshaw/LAX Line. The ITC Project is necessary to close the last-mile gap between the Crenshaw/LAX line and the City's new activity centers, allowing passengers to transfer to or from the Crenshaw/LAX Line to the City's activity centers. The alignment runs southwest for approximately 0.35 miles, turning east at Manchester for another 0.5 miles until turning south on Prairie Ave.

The alignment continues south on Prairie Ave. for approximately .75 miles, ending north of Hardy St. The two event-serving stations, Forum Station and Hollywood Park Station, are located along Prairie Ave. Further information on stations is provided in Section 6.

The stations are located over the roadways to minimize impacts to existing developments and to remain within the public right of way to the extent possible; this approach minimized impacts on private properties and the potential acquisition requirements. Where possible, the dual tracks are narrowed and designed to allow for a single column to support the structure, thus minimizing the infrastructure needs.

Trains will be maintained and stored at an off-line Maintenance and Storage Facility (MSF), which is planned to be located at 500 E Manchester Blvd, Inglewood, CA 90301 at Manchester Blvd. and S Hillcrest Blvd. Further information on the MSF is provided in Section 8.

The system is planned to be powered by two power distribution substations. The final locations of the substations are yet to be confirmed with the local utility and City as of the time of the writing of this report. However, tentative locations have been identified and are discussed in Section 9.

The alignment profile was developed assuming a minimum clearance of 16 ft. – 6 in. is required above all roadways. The alignment elevation is dictated by the elevation at the stations. The alignment elevation between stations is then adjusted to ensure the minimum roadway clearance is maintained.

The full alignment plan and profile is provided in Appendix A.

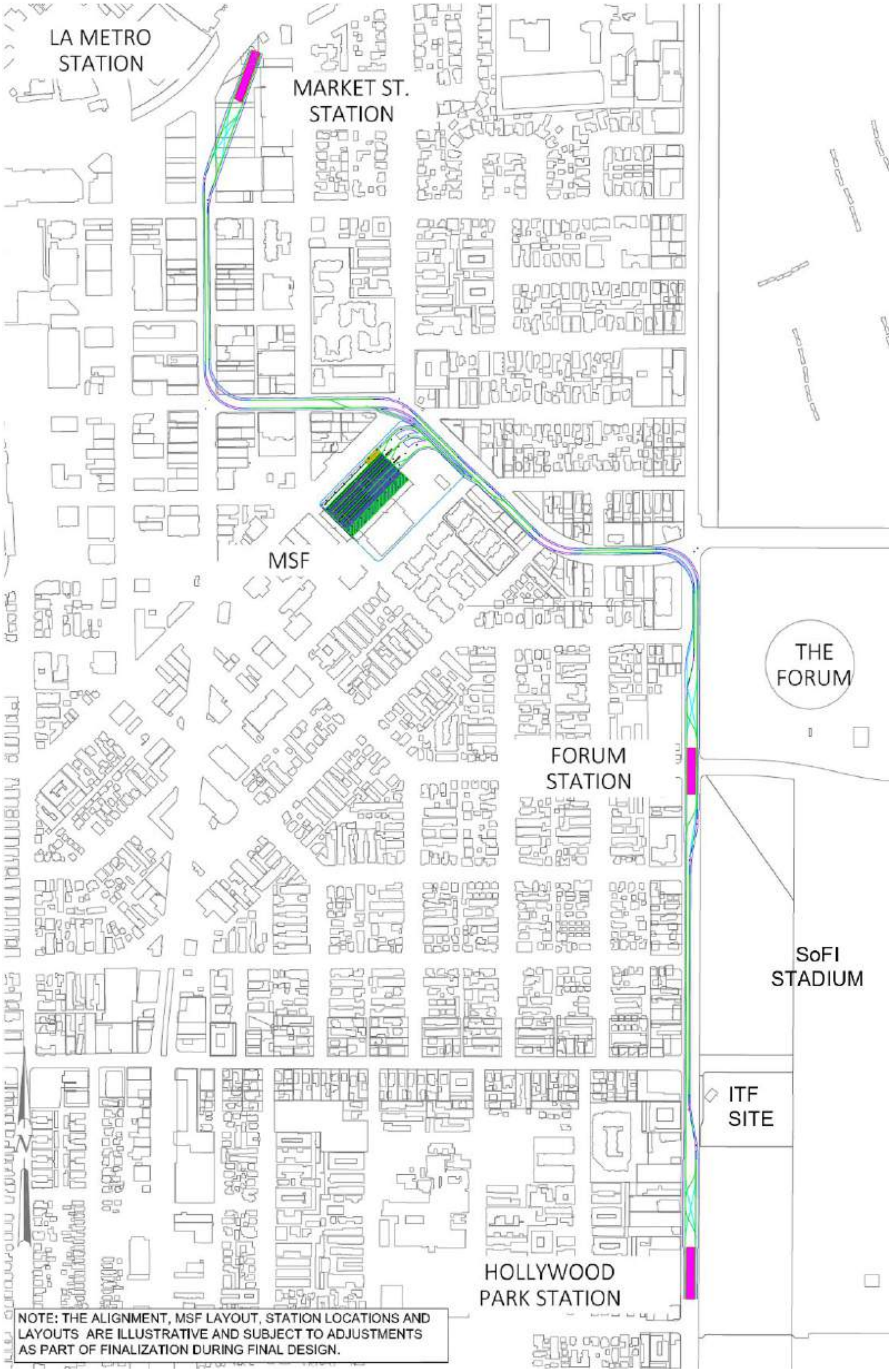


Figure 2-1: Map of Proposed System Alignment
(Preliminary conceptual draft: subject to change)

2.1. Utilities Review

During the development of the ITC alignment, the City of Inglewood advised that the large water and sewer pipes along Prairie Ave. are to be avoided. Relocation of these utilities would be a major effort.

Based on the review of the City-provided utility information, the large water and sewer pipes are concentrated either in the center or eastern edge of Prairie Ave. The location of these pipes is provided in Appendix B.

The location of these utilities guided the development of the alignment along Prairie Ave. Where the alignment is pinched together to be as narrow as possible, the alignment is located on the western edge of Prairie Ave., thus allowing for future columns to avoid the large water and sewer utilities.

2.2. Alternatives

The five-station alignment developed for the Envision Inglewood project was further refined as part of the ITC Project. This effort included the refinement of the alignment and station locations, including review of a station south of Century Blvd. As part of an optimization effort, station locations and their connectivity to the City's growth centers were assessed against various parameters, including passenger demand, operations, and cost. Through this effort, the alignment was refined to three stations, optimizing the level of service for its passengers while providing cost benefits. The Market St. Station was refined to allow for a more seamless connection to the Metro station, minimizes infrastructure over Market St., and provides residential and commercial development opportunities to further enhance the Market Street commercial district. Manchester Station was removed as a non-event serving station. The Forum Station and Hollywood Park Station locations were refined to optimize service to the future growth centers, The Forum, the LASED development, and the IBEC development.

3. Technology

The ITC Project's transit technology is a form of light rail technology that can be steel-wheel/steel rail, rubber tired, or magnetically levitated. The technology can also be supported on dual rails (that may be steel rail or concrete plinths), straddling or suspended from a single beam/rail such as in a monorail type technology, and operate within a dedicated trainway. Power distribution will be through a third rail instead of overhead catenary to avoid additional visual impacts due to the overhead catenary system wires and support structures. It will be fully automated (i.e. driverless) which is necessary to operate at the tight headways to meet the projected ridership needs. The vehicles are smaller than traditional heavy rail technology so as to successfully maneuver the tight curves driven by the site-specific conditions. This type of technology is often times also referred to as automated guideway transit, automated people movers or simply monorails; regardless of the terminology used it is a form of a light rail technology.

3.1. Technology Assessment

As part of this ITC project, the Envision Inglewood technology conclusions were further assessed against the ITC project's alignment and station refinement efforts. These refinement efforts focused on ensuring that the physical requirements for the project (i.e. alignment including turn radii, guideway widths, station sizes, traction power substations and Maintenance and Storage Facility) were developed based on maximizing the number and types of automated transit system technologies that may be viable for the project – this encourages a robust competitive procurement environment. A key driver of potential technology viability was the ridership capacity, ability to fit within the physical project requirements, operational flexibility, and noise during operations.

The Envision Inglewood technology evaluation identified Large Monorail and Rubber-tire APMs as the technology to be maintained for consideration for the ITC project, and identified large automated steel-wheel/steel rail technology as a "maybe" for further consideration.

As part of this ITC project, the technical requirements for large automated monorail, rubber-tire, and automated steel-wheel/steel-rail, also known as automated light rail transit (ALRT), were reviewed against the public right of way and property availability to determine the technologies best applicable for the project. The results of the review, also summarized in Table 3-1, are as follows:

- It was confirmed that large, automated monorail and rubber-tire APM technologies are still applicable and appropriate for the project. The requirements for rubber-tire and large monorail APM technologies were used in the project design.
- The review concluded that the typical automated steel-wheel/steel-rail requirements of technologies currently available should not continue to be used in alignment planning due to the resulting need for additional property acquisitions requirements and potential higher noise levels.
- **Although steel-wheel/steel rail design requirements were not applied to the design of the project, they are not precluded to propose on the project if they can fit within the identified right of way and meet all other specified requirements.** This provides industry the opportunity

to offer the best possible solution for application of steel-wheel/steel rail technology to the project, within the constraints that are defined.

While rubber tired APM systems, including monorail systems, can be readily applied to the project requirements as defined, steel wheel/steel rail technologies may also be applied to the project provided they sufficiently demonstrate the ability to comply with the established project requirements including maximum limits on noise and fitting within the defined physical space of the project. Certain suppliers offer or are in the process of updating their steel wheel/steel rail technologies to meet these requirements, and it is therefore prudent to allow the market to determine the best solution in terms of the proposed technology as part of the procurement process.

TECHNOLOGY	MEETS CAPACITY	STAYS WITHIN ALIGNMENT SPECIFIC CONSTRAINTS/ GEOMETRY	AVOID MSF PROPERTY IMPACTS	LOW NOISE POLLUTION	SUMMARY OF VIABILITY
Rubber-tire APM	Yes	Yes	Yes (Fits within proposed site)	Yes	Yes
Monorail	Yes	Yes	Yes (Fits within proposed site-requires two trains to be stored at stations)	Yes	Yes
ALRT*	Yes	No	No	No	Not recommended

*Steel wheel/steel rail are not precluded from proposing.

Table 3-1: Summary of comparison between possible rail technologies

The following sections provide further information on the rubber-tire, large monorail, and automated steel-wheel/steel-rail technologies and suppliers.

3.2. Self-Propelled Rubber-Tire APMs

Large rubber-tire APM systems are in widespread use at airports around the world, as well as in urban areas. These systems feature one-car to six-car trains operating in a shuttle or pinched loop configuration. Typical characteristics include:

- Train speeds of up to 50 mph;
- Urban system car capacity of approximately 90 to 100 passengers per car;
- Minimum turning radius of 180 ft.;
- Vehicle dimensions of approximately 40 to 42 ft. long by approximately 9 ft. wide;
- Maximum recommended grade of 6%.

Currently available self-propelled rubber-tire APM technologies are:

- Bombardier INNOVIA APM 300
- Mitsubishi Heavy Industries (MHI) Crystal Mover
- Siemens CityVAL and AirVAL: Currently implementing first AirVAL system at Bangkok Suvarnabhumi International Airport and CityVAL is anticipated to begin service in Rennes, France in December 2020.
- IHI/Niigata I-Max: IHI / Niigata has developed a new, larger vehicle, the “I-Max”, and tested it extensively on a test track in Korea. This vehicle has yet to be implemented on a project.
- Woojin Industrial Systems Rubber-tire APM

These are generally proprietary technologies that preclude interoperability as they each have different physical dimensions, power/signaling requirements, guidance mechanisms, and other features. MHI and IHI are potential exceptions to this rule, though interoperability requirements significantly limit the range of vehicle design, performance and other factors.

While rubber-tire APMs are most common at airports, they are also operated as urban transit systems. Urban Systems where this technology is operating, and the suppliers of the systems include:

- Europe
  - France Rennes Metro: Siemens CityVAL
- United States
  - Miami, Florida Metromover: Bombardier
- Asia
  - Shanghai Metro Line 8: Bombardier INNOVIA APM 300
  - Guangzhou Zhujiang New Town: INNOVIA APM 100
  - Singapore Bukit Panjang LRT: Bombardier INNOVIA APM APM 100
  - Singapore Sengkang and Punggol LRT: MHI Crystal Mover
  - Macau Taipa LRT: MHI Crystal Mover (opening 2019)

Bombardier INNOVIA APM 300

Bombardier has provided by far the most airport and urban APM systems. In addition to 20 worldwide airport projects, they have also implemented six urban systems in China, Singapore, and the United States. Their current vehicle is the INNOVIA APM 300, operated at Dubai International Airport and being implemented at Frankfurt International Airport. The INNOVIA APM 300 is a center-guided vehicle, with all guidance, power rails, and equipment located between the vehicle tires.

Figure 3-1: Bombardier INNOVIA APM 300, Shanghai (Source: chinanews.com)

MHI Crystal Mover

MHI (Mitsubishi Heavy Industries) has several urban APMs in Japan and Singapore and is nearing the completion of the Macau Taipa line, which will operate 11 stations and 55 vehicles. It is also a strong player for airport APM systems, with 12 total urban and airport projects worldwide. The Crystal Mover is a side-guided vehicle, with all guidance and power rails and equipment located on the sides of the vehicle.

Figure 3-2: MHI Crystal Mover, MIA Mover, Miami International Airport (Source: Lea+Elliott)

Siemens AirVAL

Siemens Transportation's latest generation of their VAL system are the AirVAL and CityVAL transportation systems. The AirVAL and CityVAL systems differ in vehicle width only; all other systems (train control, guidance, etc.) are the same. In 2018, Siemens began operation of their first CityVAL system on the Rennes Metro in France and they are implementing their AirVAL system at Bankok's Suvarnabhumi International Airport. The AirVAL and CityVAL are center-guided vehicles, with all guidance and power rails and equipment located between the vehicle tires.

Figure 3-3: Siemens CityVAL, Rennes, France (Source: Siemens)

IHI/Niigata I-MAX

IHI/Nigata has developed a new Japanese standard vehicle, the "I-Max", and tested it extensively on a test track in Korea as shown in the figure. However, this vehicle has yet to be implemented on a project, the I-Max is larger than the vehicles that IHI provided to Hong Kong International Airport. The I-MAX is a side-guided vehicle, with all guidance and power rails and equipment located on the sides of the vehicle.

Figure 3-4: IHI I-Max

Woojin Industrial Systems

Woojin is a newer APM supplier with only two airport APM systems in operation. The Seoul Incheon airsideTerminal 2 shuttle APM system began operations in January 2018, and the Jakarta Soekarno-Hatta Airport landside systems began operations in 2018. In addition, Woojin implemented the Busan metro line No. 4 (South Korea) which operates their automated guideway transit (AGT) technology, a similar automated, rubber-tire technology. The Busan system started revenue service in 2011.

Figure 3-5: Woojin APM, Soekarno-Hatta Airport, Indonesia (Source: Gunawan Kartapranata)

3.2.1. Applicability to ITC Project

Rubber-tire APMs are feasible and applicable for the ITC project.

- Capacity: With a vehicle capacity of approximately 97 passengers per car, this technology can meet the demand requirements for the ITC project.
- Alignment Specific Constraints / Geometry: The minimum turning radii for operating and maintenance tracks are well suited for the urban environment and geometric constraints of the Manchester MSF location. This technology has the least impacts to existing properties.
- MSF: The site slated for the ITC MSF can fit an MSF facility capable of performing all required maintenance and can store the full 8-train fleet.
- Noise: Rubber-tire systems have much lower noise impacts compared to rail system.

3.3. Monorails

Monorails are in widespread use in urban environments around the world, as well as some systems at airports. The unique feature of monorails is that they are either supported by or suspended by a single beam, which generally provides a minimized visual impact. Monorails feature connected vehicles operating in a shuttle or pinched loop configuration. Typical characteristics include:

- Train speeds of up to 50 mph;
- Urban system car capacity of approximately 90 to 110 passengers per car;
- Minimum turning radius of 200 ft.;
- Vehicle dimensions large monorails of approximately 55 to 65 ft. long by approximately 9.5 ft. to 10.3 ft wide; and
- Maximum recommended grade of 6%.

Example large monorail systems are:

- Bombardier INNOVIA Monorail 300;
- Hitachi; and
- Scomi Rail.

These are generally proprietary technologies that preclude interoperability as they each have different physical dimensions, power/signaling requirements, guidance mechanisms, and other features.

Urban monorail systems and the suppliers of the systems include:

- South America
    - Sao Paulo Monorail, Brazil: Bombardier
- United States
    - Las Vegas Monorail: Bombardier
- Asia
    - Daegu, South Korea: Hitachi
    - Chongqing, China: Hitachi
    - Riyadh, Saudi Arabia: Bombardier
    - KL Line, Kuala Lumpur Malaysia: Scomi

Bombardier Innovia 300

Bombardier has implemented their Innovia monorail technology in multiple locations worldwide, including in China, Korea, Japan, and the United States. Their current vehicle is the Innovia 300, implemented most recently in Brazil. The technology is a straddle-beam technology.

Figure 3-6: Las Vegas Monorail Four-Car Vehicle

Hitachi

Hitachi has a range of monorail vehicle sizes, ranging from small systems, such as the monorail on Sentosa island in Singapore, to large technologies implemented in Daegu, South Korea. The technology is a straddle-beam technology.

Figure 3-7 Hitachi Monorail, Daegu Metro Line 3 (Image source: IMKSv)

Scomi Rail

Scomi Rail is a rolling stock supplier in Malaysia, implementing multiple projects in Asia including in Kuala Lumpur and Munbai. The technology is a straddle-beam technology.

Figure 3-8: Scomi Rail Monorail, Kuala Lumpur (Image Source: Howard Pulling)

BYD Skyrail

Build Your Dreams (BYD) is currently actively marketing their Skyrail monorail technology worldwide. Skyrail currently has projects in implementation; however, no projects are currently in operation. The technology is a straddle-beam technology.

Figure 3-9 BYD Skyrail Monorail, Shenzhen (Image source: BYD)

3.3.1. Applicability to the ITC Project

Large monorails are feasible and applicable for the ITC project.

- Capacity: With a vehicle capacity of approximately 100 passengers per car, this technology can meet the demand requirements for the ITC project.
- Alignment Specific Constraints / Geometry: The minimum turning radii for operating and maintenance tracks are well suited for the urban environment and geometric constraints of the Manchester MSF location. However, it does have larger property impacts at tight turns at Market St./Manchester and Manchester/Prairie where tight turns are needed.
- MSF: The site slated for the ITC MSF can fit an MSF facility capable of performing all required maintenance and can store the six-train fleet.
- Noise: Rubber-tire systems have the much lower noise impacts compared to rail system.

3.4. Automated Light Rail Transit (ALRT)

Large steel-wheel APM systems operate in numerous urban settings and two landside airport applications: New York Kennedy (JFK) and the Beijing Capital (PEK) International Airports. Urban applications of this technology include Vancouver, Toronto, Detroit, Dubai, Riyadh, Copenhagen, Breccia, Kuala Lumpur, and Honolulu (under construction). Train length ranges from two to six vehicles. Train speeds range between 50 and 60 mph. Suppliers of this type of technology include Alstom, Ansaldo-Breda, Bombardier, MHI, and Rotan.

Three examples of automated light rail transit (ALRT) technologies and associated systems are:

- The Mark II system manufactured by the Bombardier and installed at New York JFK (Air Train), Beijing Capital International Airport (Airport Express of the Beijing Subway), and Vancouver (SkyTrain)
- Breda Metro driverless light rail system for Copenhagen, Denmark
- The Kinki Sharyo/Mitsubishi system for the Dubai Metro.

The greater capacity and speed of this technology makes it more suitable for systems with relatively straight alignment on dedicated transportation right of way for the system.

Figure 3-10: Bombardier MKII Sky Train Vancouver, British Columbia

Figure 3-11: KinkiSharyo/Mitsubishi, Dubai Metro, UAE

3.4.1. Applicability to the ITC Project

ALRT technology is not recommended for the ITC project. However, the technology is not precluded from proposing on the project if they can fit within the identified right of way and meet all other specified requirements.

- Capacity: With a vehicle capacity of approximately 140 passengers per car, this technology can meet the demand requirements for the ITC project.
- Alignment Specific Constraints / Geometry: The minimum turning radius (300 ft. operating) is larger than what can be easily accommodated in Inglewood's urban environment and geometric constraints of the Manchester MSF location. It results in much larger property impacts at tight turns at Market St./Manchester and Manchester/Prairie where tight turns are needed.
- MSF: It was found that the site slated for the ITC MSF resulted in space constraints for an ALRT MSF; further property acquisitions are likely to be required if an ALRT MSF is located at the ITC MSF site. However, an ALRT supplier is not precluded from proposing on the project if they can fit the ALRT technology into the identified MSF site without requiring additional property acquisitions.
- Noise: Generally, steel wheel/steel rail systems have higher noise levels than rubber-tire systems, and the tighter the turning radius, the higher the noise levels. As minimum turning radii will be required at Market St./Manchester and Manchester/Prairie, higher noise levels may

occur. However, there are certain suppliers and technologies that, if applied, can mitigate and limit the noise.

4. Projected Ridership

The basis for the normal weekday/weekend and event service projected ridership for the ITC project was first established in the Envision Inglewood report, detailed in the report's Appendix B: Ridership Memo. In the Envision Inglewood report, weekday and weekend demand was estimated on an hourly basis. For event ridership, pre-and post-event demand for small, medium, and large events at each The Forum, IBEC, LASED were estimated. Ridership was projected for all alignment alternatives.

As part of this project, the basis and methodology for the development of the Envision Inglewood ridership was reviewed. It was determined that the ridership projected for the Envision Inglewood Alignment A is applicable for the project definition effort of the ITC project.

The ridership projections were also re-calibrated against the IBEC EIR to ensure that the assumptions for the development of the projected ridership were consistent between the ITC and IBEC projects.

In addition, further assumptions were established that were necessary to solidify the projected ridership. Those assumptions are:

- While it cannot be confirmed that there will be no conflicting events at The Forum, LASED, and the IBEC, it is confirmed by the City of Inglewood that it can be assumed that if there are overlapping events, they will not be NFL and NBA games.
- No surge factor is applied to the ridership presented in Envision Inglewood. As the riders travel from events to the ITC station, they are metered and distributed at various points, including funneling through designated exists, walking the distance to the station, buying tickets at the ITC station, and passing through the fare gates. The riders can therefore be assumed to arrive in a fairly consistent rate throughout the hour.

Based on these assumptions, the following are the final projected ridership numbers for the ITC project:

PEAK PERIOD	PROJECTED RIDERSHIP	PROJECTED FREQUENCY
Normal Weekday/Weekend	441 peak hour passengers	Daily
Single Large Event: NFL Game	8,910 passengers departing the Los Angeles Stadium within the one hour after the end of event	20 events per year
Three-Event Scenario: NFL Midsized Game + IBEC Concert + Forum Concert	9,600 passengers departing Market St. Station post events	Rare

Table 4-1: Projected ridership numbers during peak periods

5. System Operations

5.1. Typical Operations

The ITC will be a "pinched loop" system, whereby trains operate back and forth from the Market St. Station to the Hollywood Park Station, stopping at each station along the way and reversing at "turnbacks" at each end of the system. Trains will crossover to the adjacent guideway prior to entering the Market St. Station and reverse direction when leaving the station. At the Hollywood Park Station end of the line, trains will also crossover prior to entering the station and reverse direction when leaving the station.

The system is planned to operate from 6am to 12am for normal weekday/weekend service, with the possibility to add trains and extend hours, as needed, to serve special events. Generally, additional service will be provided before the start of an event to bring passengers to the venue, and again at the end of the event to bring passengers back to the LA Metro system.

At the start of service, the Central Control Operator (CCO) will issue a command to initiate the required operations. The Automated Train Control (ATC) system will then automatically dispatch the necessary number of trains to the mainline from the MSF. The ATC system should be designed so that the station dwell times are adjusted until the trains are equally spaced at the required headway. To adjust the operating fleet for special event service, the CCO will issue commands to inject trains onto the mainline guideway. For removal of trains from the system, maintenance personnel will be staged at one or more stations to ensure that all passengers have deboarded the trains prior to the trains going out of service.

5.2. Simulation and Performance

The Lea+Elliott Train Performance Simulation Model (TPSim©) was run for the ITC alignment and the results were used to calculate the optimal number of trains and cars per train to provide the capacity required to meet the normal weekday/weekend and event ridership projections. An analysis of the minimum operating headway and other operating constraints were included in this analysis.

The simulation results are subject to change based upon refinements to the ridership demand forecasts and changes to the alignment, crossovers locations, station configuration, and other aspects of the system.

The following are the operational parameters assumed for the TPSim© simulation:

- Conventional self-propelled large APM technology
- Pinched loop operations, serving all three stations
- Maximum potential vehicle speed of up to 50 mph but operating at a maximum of 45 mph for passenger comfort
- Station dwell of 40 seconds to accommodate larger numbers of passengers needing to board or deboard at once, as would occur for events. The dwell times for normal weekday/weekend service is anticipated to be shorter due to low demand. The longer dwell time for event service is therefore assumed for the operational analysis.
- Simulation inputs included:

- Lateral acceleration: 0.075 g
- Jerk rate: 0.06 g/s
- Brake rate: 0.08 g/s
- Super elevation through curves: 3%
- Speed limits were applied in specific sections of the route to prevent speed surges (spikes) that would impact passenger ride comfort.

Based on the simulation, the estimated round trip time for the pinched loop is 12.5 minutes (750 seconds). Trip times, dwell times and round trip times for the pinched loop are shown in Table 5-1. Graphs of train velocity and trip distance versus time are provided in Figure 5-1.

TO / FROM	MARKET STREET	THE FORUM	HOLLYWOOD PARK
Market Street	N/A	4.7	6.8
Forum	3.7	N/A	2.1
Hollywood Park	5.7	2.0	N/A

Table 5-1: Forecasted Northbound Station-to-Station In-Vehicle APM Travel Times (minutes)

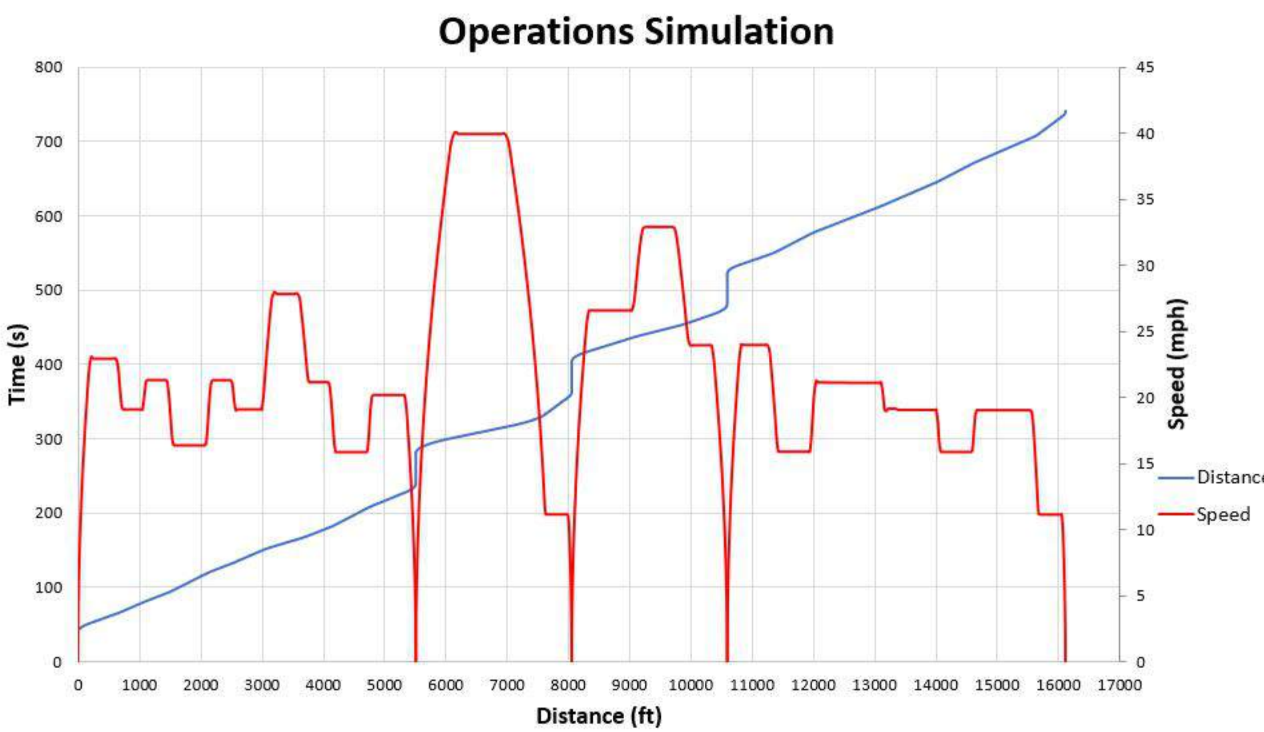


Figure 5-1: Train Velocity (mph) and Trip Distance (ft.) versus Time (minutes)

5.3. Minimum Operating Headway

To minimize the overall footprint of the ITC system, and therefore its impact on the neighborhoods, the crossovers at the end stations, Market St. and Hollywood Park Stations, are location in front of the stations. However, locating the crossovers in front of the stations limits trains from entering the end stations before the train ahead has departed. Thus, this time between trains being able to occupy the stations is the minimum operating headway.

In a pinched loop operation, the minimum operating headway is the time separation between two consecutive trains at the same end-of-line platform. It also defines the frequency of the operation of the System. In practical terms, this is the time for a given train to approach and enter a switch, traverse the switch, enter the station, dwell, depart the station and clear the switch zone before another train can be permitted to enter the switch zone to enter the station vacated by the prior train.

The headway is affected by:

- Station geometry as related to guideway separation (station width), switch location (optimally switch must be located just outside the station), and the station length relative to the train berthing position.
- Station dwell time.

To minimize the operating headway, the crossovers in front of each of the end stations, Market St. and Hollywood Park Stations, are located as close to the platform as possible. In addition, the station dwell was analyzed as being the minimum dwell required to deboard a full train; as event ridership is directional, the additional time to board a train would be negligible. With this configuration and a minimize dwell to deboard passengers, the minimum operating headway was calculated at approximately 95 sec.

5.4. Fleet Size and Line Capacity Analysis

Line capacity is defined as the number of passengers per hour per direction (pphpd) that the System can carry past any particular point. The estimated fleet size considers the operating fleet, which is the number of vehicles required to provide the necessary line capacity to meet the projected demand, as well as the spare fleet, comprised of the hot standby and maintenance trains to ensure that the number of trains required for operations is always available. The TPSim-developed round trip time is the foundation of the fleet size and APM system capacity.

- Operating Fleet: The ITC system must serve the most frequent, largest event, which is an NFL game at LASED. The fleet size and line capacity analysis therefore sized the operating fleet so that the system can fully serve the 8,910 pphpd demand for NFL events. To serve the 8,910 pphpd ridership demand, a fleet of 5 trains, operating at a 2.5 min. headway is required. For rubber-tire, self-propelled technology, a 4-car train is required. For large monorails, a 4-car train provides the necessary capacity and is of an equivalent length to a 4-car self-propelled APM train.

- Spare Fleet: For the ITC system only one train is assumed to be used for hot standby or maintenance for the ITC system. For typical automated systems that operate the full fleet for normal daily operations, the spare vehicle fleet calculation considers a hot standby train in addition to a minimum of 10 to 15 percent of the operational fleet. This larger spare fleet is needed to ensure that at all times, including during maintenance rotations, the required number of operating trains is always available for normal service.

However, the ITC system is not a typical automated system. As normal weekday/weekend projected demand is so much lower than event demand, there is added flexibility to perform maintenance during normal weekday/weekend service; maintenance is not limited to only non-operating or off-peak hours. In addition, the full five-train operating fleet is only projected for approximately 20 NFL events, concentrated into 18 weeks of the year, and the occurrence of the three-event scenario is projected to be rare.

For normal weekday and weekend service, the 4-car self-propelled APM trains may be de-coupled into smaller 1- or 2-car trains to provide service that is more optimized to the time -specific, low projected demands. Splitting one 4-car train into two 2-car trains and operating a headway of 6.3 min provides a reasonably good level of service for commuter and daily service and optimizes the utilization of the fleet with respect to the lower demand. Large monorails are more difficult to de-couple so would likely operate the full 4-car train length for normal weekday/weekend operations. The headways of the operating fleet to serve the projected number of passengers are shown in the following table. The APM system also offers the flexibility to provide additional higher capacity if needed in the future to accommodate changes in demand levels, event sizes, event schedules, etc. Operating the full six-train fleet by activating the hot standby train into operation can cover some unique and infrequent situations where the additional capacity is required. This increases the system capacity to approximately 11,100 to 11,500 at a headway of approximately 2.1 min.

PEAK PERIOD	PROJECTED RIDERSHIP (pphpd)	HEADWAY	FLEET	CAPACITY
Normal Weekday	441	6.3 min.	2 x 2-car trains or 1 x 4-car trains	1,850 to 1,950
NFL Event	8,910	2.5 min	5 x 4-car trains	9,300 to 9,700
Three-Event	9,600	2.1 min	6 x 4-car trains	11,100 to 11,500

Table 5-2: Analysis of Project Ridership Numbers Against System Fleet and Capacity

In addition, the stations and system are also capable of adding capacity through the addition of more trains. The ultimate capacity of the system is driven by the tightest headway achievable, considering the safe separation and operational requirements of the turnback. It is estimated that the system capacity can reach about 15,000 pphpd through the addition of up to three additional trains. However, further detailed analysis is required to determine the exact final expandable capacity and associated system and infrastructure design considerations to allow for this level of expandability.

6. Stations

The primary function of the passenger station is to accommodate the boarding and alighting of passengers to and from the APM vehicles. This section discusses the conceptual planning performed for the APM stations, including vertical circulation, platform configurations, and overall station area requirements.

6.1. Basic Functions

Passenger station locations and designs must provide for the efficient and convenient movement of passengers. The functional spaces within APM stations typically include boarding/ deboarding platforms, access or vertical cores for circulation, and system equipment rooms. Features of each functional spaces are as follow:

- Station platforms provide for passenger deboarding/boarding, circulation and queuing at platform doors and are typically sized per the following criteria:
    - Projected peak passenger demands.
    - Space per passenger.
    - Accessibility and associated life safety requirements.
    - Dimensional requirements of candidate APM technologies.
    - Projected maximum trains length.
- Automatic station platform doors, integrated into a platform edge barrier wall separate passenger on the platform from the guideway. The barrier wall and station platform doors can be half- or full-height.
- A refuge area under and along the entire station platform length is required for a person who is on the guideway to escape the path of an oncoming train. This refuge area is required for all platform edges that are along the guideway. A minimum clear cross-sectional area of 2 ft. by 2 ft. is recommended.
- Access and vertical circulation elements include stairs, escalators, elevators, and/or ramps. Requirements are typically determined based on:
    - Capacity to facilitate life-safety platform passenger clearing and exiting requirements.
    - Level of service provided to deboarding passengers in terms of wait time for escalators and elevators.
    - Areas that do not conflict with passenger horizontal circulation and queuing areas on the platforms.
- Station communication and surveillance equipment, including public announcement (PA) speakers, closed circuit television (CCTV) cameras, and static and dynamic signage.
- Equipment rooms are required in each station to house ATC equipment, interface equipment for station doors, dynamic graphics, station CCTV, and public address systems and Uninterruptible Power Supply (UPS) equipment. Station equipment rooms are approximately 1,000 sq. ft. and are to be located within 200 ft. of the station.
- In order to provide access to the Equipment Rooms for equipment delivery, replacement, and maintenance, a freight elevator with the following minimum requirement is recommended, if the room is not located on the ground level:

- Min door clear width: 6 ft. – 4 in.
- Min door clear height: 8 ft.
- Interior dimensions: No smaller than 4,000 lb. interior dimensions

- A janitor's closet of approximately 110 sq. ft. is recommended.

Figure 6-1: Singapore Sengkang LRT Station with Half-height Barrier Wall/Platform Doors, MHI Crystal Mover APM (Image Credit: Peter Velthoen)

6.2. Station Configuration

Based on station size along with ridership and circulation parameters, the platform configuration can take three basic forms, visually presented in Figure 6-2.

- The first configuration is the center platform with cross flow movements, where there is a single center platform with boarding and alighting occurring through the same set of APM train doors. In this configuration, passengers are encouraged to allow the arriving passengers to alight before boarding begins, this option is the least costly and physical space demanding option.
- The second configuration is two side platforms with cross flow movements. By providing two side platforms, the level of service for the station can be greatly increased, and board/deboard times reduced. However, providing two side platforms is more costly, demands more physical space, and requires double the vertical circulation equipment than the center platform configuration. The additional physical requirements may outweigh the benefits of better passenger service.
- The third configuration is flow through, where the station has a center platform for boarding passengers located between the two APM guideway lanes that are in turn flanked by two exterior or side platforms for alighting passengers. This configuration removes cross flow movements by having the doors on the alighting (side) platform open first and then several seconds later having the doors on the boarding platform open. This separates conflicting passenger flows and allows the arriving passengers to begin to clear the vehicle before

departing passengers begin to board the vehicle. However it is the most costly and physical space demanding option.

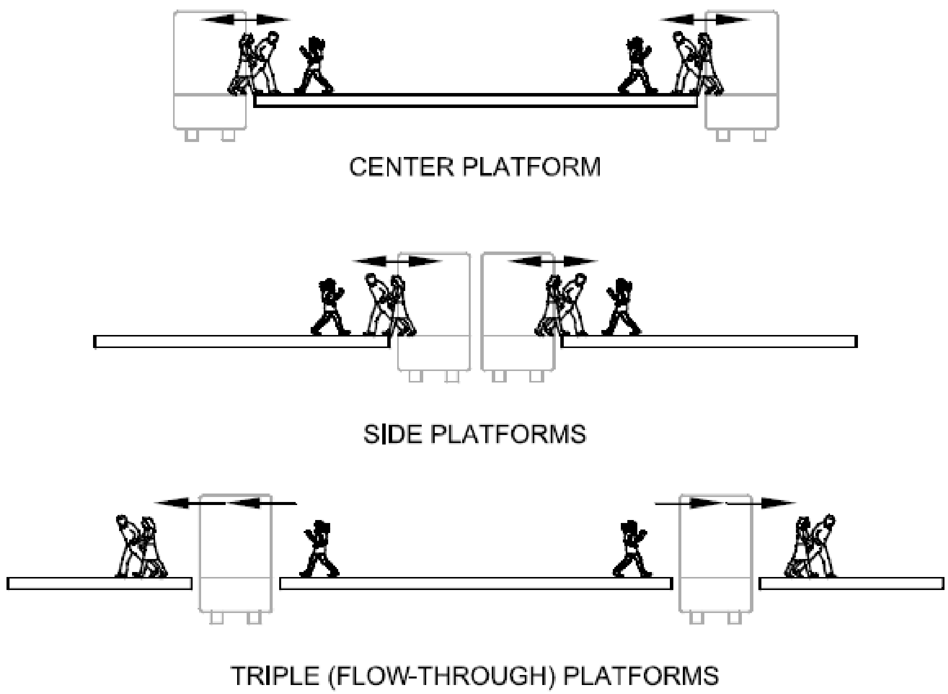


Figure 6-2: Profile views of Platform Configurations

6.2.1. Applicability to the ITC Project

The center platform configuration is the preferred option for the ITC System. The single center platform allows for optimized use of the station while minimizing the total width required for the station.

- Spatial constraints: The ITC right of way is limited in physical space due to the existing developments. The center platform configuration requires the least total width.
- Optimized platform utilization: Due to the event-driven service, the instances of high ridership are typically boarding or alighting, and not both occurring simultaneously. Therefore, the need to provide improved cross-traffic flow in both direction is not critical for the ITC system.
- Optimized vertical circulation: Center platforms allow for a single set of vertical circulation that can serve either platform edge, even if one is rendered out of service. To provide full redundancy in case one platform is rendered out of service, side platform configurations require that the two platforms be designed to accommodate all levels of service, and therefore require duplicated vertical circulation.

6.3. Station Dimensions

The purpose of the APM station sizing analysis is to ensure that the conceptual station design provides the platform queue area/width and length needed to accommodate the forecasted passenger ridership.

Train simulations and operational analyses determined the system requirements such as train lengths, headways, and other parameters. These requirements, along with the forecasted ridership, were used as input for queuing, vertical circulation, and emergency evacuation analyses which define circulation and other spatial, fire and life safety considerations required to determine minimum platform sizes. The resulting conceptual platform sizes will be further analyzed by the project architects as inputs into their fire and life safety/code compliance assessment for the station design as a whole.

6.3.1. Station Length

Minimum platform length estimates are based solely on maximum train length and do not account for vertical circulation elements added to either platform end. An additional 10 to 15 ft. beyond the end of the full length of a train is advised to be provided at the platform level for passenger circulation and vertical circulation queuing.

From the fleet size and line capacity analysis, it was determined that a four-car rubber-tire APM vehicle, approximately 170 ft. long, or four-car large monorail, approximately 200 ft. long is required to meet the projected demand. Because it is expensive and potentially disruptive to APM operations to expand APM station platforms after completion and initiation of passenger service, stations should be designed and constructed to accommodate either technology’s maximum length train. Thus, the four-car large monorail becomes the basis for determining the platform length. In addition, at this conceptual stage of the project, an additional 15 ft. is included at each end of the platform, resulting in a minimum platform length of 230 ft.

Pending the project’s infrastructure and systems design schedules, the station length may be refined and reduced should a self-propelled APM supplier and technology be selected early enough in the infrastructure design schedule.

6.3.2. Station Width

The purpose of the station sizing analysis is to ensure that the conceptual station designs provide the platform queue area/width needed to accommodate the forecasted passenger demands. The findings presented herein should be revisited accordingly should forecast data and/or APM operations be updated.

This analysis provides the methodology and results for passenger queuing analysis and the resulting minimum platform widths for passenger queuing and circulation. This analysis is not to replace the NFPA 130 platform evacuation analysis; this analysis is anticipated in a future phase of the project.

6.3.2.1. Assumptions

The following are the assumptions for the platform queuing analysis:

- Passenger space allocations: An average of 8.5 sq. ft. per passenger is assumed for this analysis. Based on the level of service descriptions for queuing in Pedestrian Planning and Design by John J. Fruin, Ph.D., 7 to 10 sq. ft. per passenger provides for a level of service C for passenger queuing.
- Circulation lane: To provide free flow of passengers, three feet per circulation lane is assumed. For all stations except Hollywood Park, one circulation lane in each direction is assumed. Due to the large number of passengers anticipated at Hollywood Park, three circulation lanes are assumed.
- Buffer: As passengers do not queue or walk directly against walls, an additional 18 in. of space for each side of the platform is assumed.
- Queue depth in off-peak direction: The passenger flows for the ITC system are inherently single-directional; for event service, passengers will be travelling toward the venue before an event and away from the venue towards the Market St. Station after the event. However, as there may be passengers traveling on the ITC system who are not attending events, a width of three feet is allocated for queuing for those off-peak passengers.
- Train length: The train length assumptions are based on the example operations characteristics provided in Section 5.4.
    - Market St. and Hollywood Park Stations: Four-car rubber-tire APM vehicle is used.
    - Forum Stations: Two-car rubber-tire APM train is used.
- Station width: A generic and common station platform width capable of supporting the maximum demand anticipated will be used as the basis for the station designs for all stations in the system for EIR purposes. The platform width is anticipated to be refined during a future phase of the project.
- Station demand:
    - Peak Direction: As the demand for each station differs due to their specific purposes, queuing analysis was performed for the highest boarding demand anticipated to be seen at any station.
    - Off-Peak Direction: The demand in the off-peak direction for event service is unknown. Off-peak demand is applicable for only the Forum Station. As Market St. and Hollywood Park Stations are end-of-line stations, there is no queuing in the off-peak direction.

Based on the assumptions above, and a review of the ridership demand per station for large NFL games and the Three-Event Scenario, the peak direction ridership demand value used for the queuing analysis is 8,910 passengers in an hour seen at Hollywood Park Station one hour after the end of a large NFL event.

6.3.2.2. Platform Queuing Analysis

A vehicle boarding queue model was used to determine the queue depth associated with each side of the APM station platform. The maximum demand scenario of two trains, travelling in opposite directions, stopping at the same station and simultaneously boarding on opposite sides of the platform was modelled for this analysis. If the station platforms are too narrow and do not have sufficient circulation space, passenger freedom of movement will be compromised, passengers will not be able to disperse evenly among all the train doors, and a poor level of service and reduced capacity will result.

The vehicle boarding queues represent the number of passengers consolidated at each vehicle door. The vehicle queue model assumes that the passengers form a wedge-shaped queue in front of each vehicle door. The sum of the two opposite boarding queue depths and a circulation space in between comprise the minimum platform width requirement without accounting for columns and other obstructions that might be located on the platform.

It is important to note that the resulting minimum platform width requirement corresponds to a generic rubber-tire APM technology. Different technologies may produce different boarding queues depths due to variation in maximum speeds, headways, vehicle capacities, and door configurations. The final design of the stations should consider the potential for greater minimum platform width requirements depending on the selected automated technology.

The following table summarizes the queuing analysis results, as well as the minimum width required. Due to the large number of passengers, an additional circulation lane is assumed.

PEAK DEMAND (pphpd)	QUEUE DEPTH (FT)		CIRCULATION LANES (3 FT / LANE)	BUFFER (FT)	TOTAL MINIMUM WIDTH (FT)
	PEAK DIRECTION	OFF-PEAK DIRECTION			
8,910	22.5	0	3	3	34.5

Table 6-1: Queuing Analysis Results Summary

Based on these queuing results, a generic 40 ft. width was assumed for all stations. At this conceptual stage of the project, all stations are designed with the same layout (width, length, vertical circulation, etc.). This conservative approach a) allows for further tailoring of the station widths during future design efforts by reducing the widths to better meet the station-specific needs; and b) allows for the largest possible physical envelope for the project to be cleared as part of the EIR process.

6.4. Vertical Circulation

Vertical circulation requirements are based primarily on the time required to clear station platforms of passengers that are deboarding trains. Deboarding passengers arrive in relatively large numbers over a relatively short time period and vertical circulation elements must clear this load from the platform before the next train arrives for passenger safety reasons. Level of service considerations, specifically the time required for deboarding passengers to access escalators and elevators, usually dictate that the platform be cleared well before the next train arrives at the station platform.

Where vertical circulation elements provide emergency egress from station platforms, escalators and stairs must satisfy code-prescribed emergency egress requirements. Among other requirements, codes will require adequate vertical circulation for passengers to clear the platform and reach a point of safety within specified time periods, and may require a secondary means of egress remote from the major egress route.

Lea+Elliott analyzed the vertical circulation requirements from an operational requirement perspective and established the minimum required vertical circulation to meet the normal boarding and deboarding needs for each station.

6.4.1. Operational Requirements Analysis

The purpose of the Operational Requirements analysis is to ensure that during normal operations, the station has the ability to:

- Bring the anticipated number of passengers onto the platform that are anticipated to be coming into the station based on post-event projected demand, and
- Clear the platform within one headway based on the projected pre-event demand estimates, i.e. the number of passengers that will be on the trains.

To assess the vertical circulation, the maximum anticipated number of people to be at a station for boarding and deboarding was determined. The maximum boarding demand reflect the maximum number of passengers anticipated to be at a station, while the maximum deboarding demand is reflected as a full, four-car train deboarding at a station.

DEMAND (pphpd)		NOTES
BOARDING	DEBOARDING	
8,910*	13,200**	*Boarding: Maximum station peak demand seen at Hollywood Park Station **Deboarding: Full train deboarding post event at Market St. Station

Table 6-2: Summary of Station Demand for Operational Requirements Analysis

Assumptions for the analyses were taken from industry-accepted planning resources and compared against the LA Metro Rail Design Criteria to determine the best fit for this unique special event-based system. Documents referenced for the station analysis are:

- Pedestrian Planning and Design, John J. Fruin, Ph.D
- TCRP Transit Capacity Quality of Service Manual
- LA Metro Rail Design Criteria, Section 6 Architectural
- Other APM application benchmarks

These reference documents resulted in the following key assumptions:

- Escalator width: 40 in.
- Escalator capacity: 55 people per minute (ppm) per 40 in. tread
- Stair capacity: 10 pedestrians per minute per foot of width (ppmpf)
- Minimum Stair Width: 5.5 ft.
- Elevator quantity: 2

- Elevator capacity: 3 sq. ft. / passenger
- Elevator Size: ~ 42 sq. ft.
- Elevator Speed: 150 feet per minute (fpm)
- Elevator travel distance: 25 ft.
- Elevator deboard/board speed: 1 sec. / passenger

In addition, the quantities of each type of vertical circulation must accommodate the number of people who likely want to or need to use each type of vertical circulation. Escalators are more popular than stairs, and there will always be a number of passengers who ride elevators. For this project, the goal for the distribution of passengers on vertical circulation is as follows:

- Escalators: 60%
- Stairs: 30%
- Elevators: 10%

The vertical circulation analysis also assumed that due to the event-based nature of the project, the demand would be single-direction. The boarding maximum occurs pre-event, while the deboarding occurs post-event. Therefore, the direction of the escalators would change to reflect the demand.

Based on all of the above assumptions, the vertical circulation required to meet the operational requirements and projected demand are summarized for each station in the following tables.

VERTICAL CIRCULATION ELEMENT	BOARDING	DEBOARDING
Escalator	2	3
Stairs (total width, ft)	6 ft.	6 ft.
Elevator	2	2

Table 6-3: Vertical Circulation Per Operational Requirements Analysis

The assumed 40 feet platform width identified in Section 6.3.2.2 is sufficient to accommodate all the vertical circulation elements.

7. Guideway

The term guideway structure refers to the structure providing support for running and guidance surfaces and other System equipment.

Guideway structures should be designed to provide a generally rectangular clearance envelope that accommodates:

- Clearance envelope for the vehicles, including additional width at curves for vehicle nosing and chording effects
- A continuous walkway along the entire guideway length to provide emergency egress for evacuating passengers and safe access to guideways and wayside equipment by operations and maintenance personnel
- Guidance and/or power equipment
- Cable trays, conduits, and/or wireway for power and communications needs

Guideway structures differ not only between rubber-tire APM and monorail technologies, but between the various suppliers for each technology type. Therefore, for this project and for the EIR, the guideway structure requirements are based on a combination of requirements for the candidate rubber-tire APM and monorail technologies.

7.1. Guideways and Guideway Equipment

7.1.1. Clearances

Guideway structures should be designed to provide the necessary clearances to accommodate vehicles, power and guideway equipment, and emergency walkways. The clearance requirements vary as a function of alignment geometry to account for nosing and chording effects through horizontal curves. Required clearances, taking into account nosing and chording effects, are included in the figures below. As all APM and monorail technologies have different vehicle designs, and therefore different dynamic envelope requirements, the dimensional data used for this project are based on worst-case dynamic parameters of the representative technologies of APMs and monorails.

Horizontal and vertical clearances between APM guideways and other existing and proposed infrastructure should be in accordance with the local, State, or Federal requirements specified by the governing authorities. For the EIR Project Definition, clearances between guideway structures and adjacent infrastructure was coordinated by the team architect.

Clearance requirements for dual track and at stations are provided for APM and monorail technology in Figure 7-1 to Figure 7-10.

Other station-guideway interface requirements are discussed in the Stations Section 6.1.

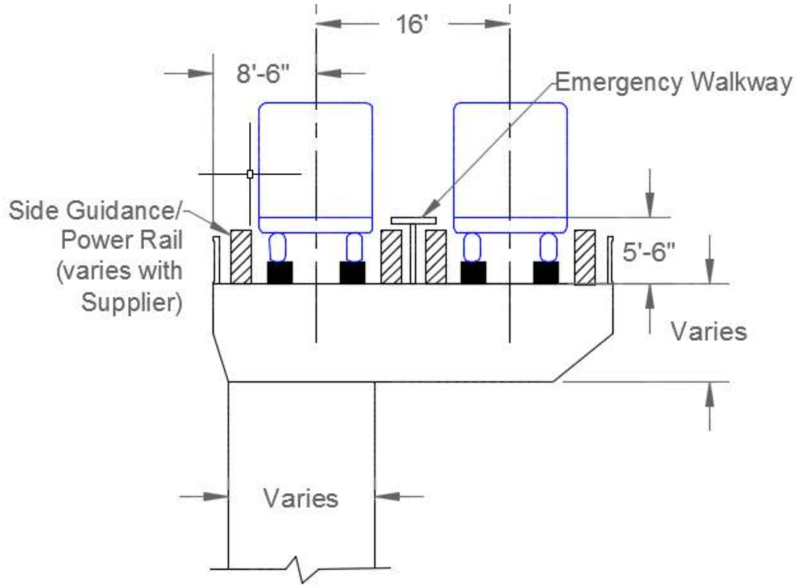


Figure 7-1: APM Guideway Clearances - Dual Track

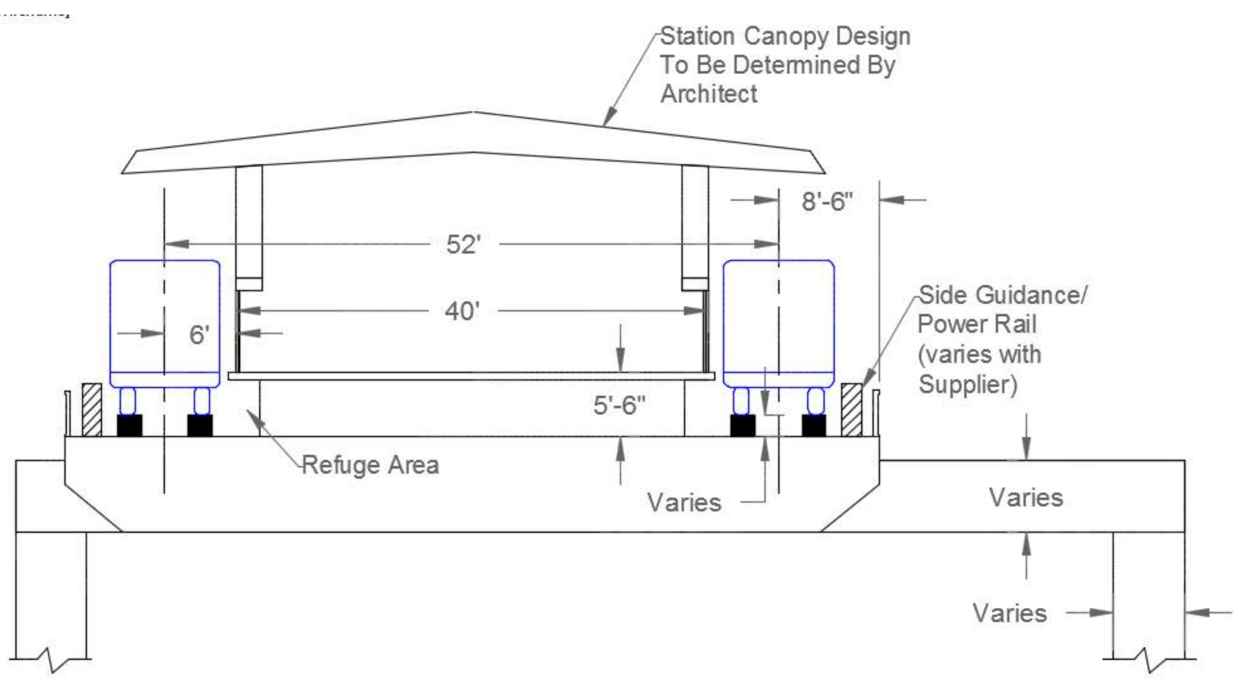


Figure 7-2: APM Guideway Clearances – In Stations

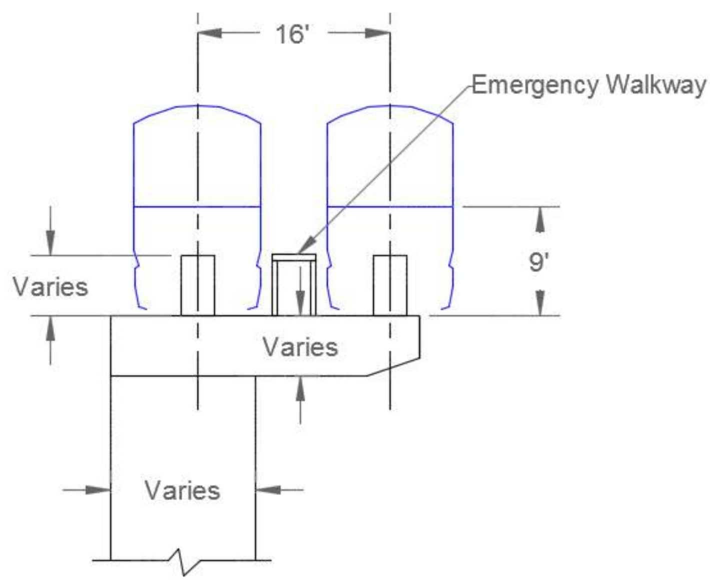


Figure 7-3: Monorail Guideway Clearances – Dual Track

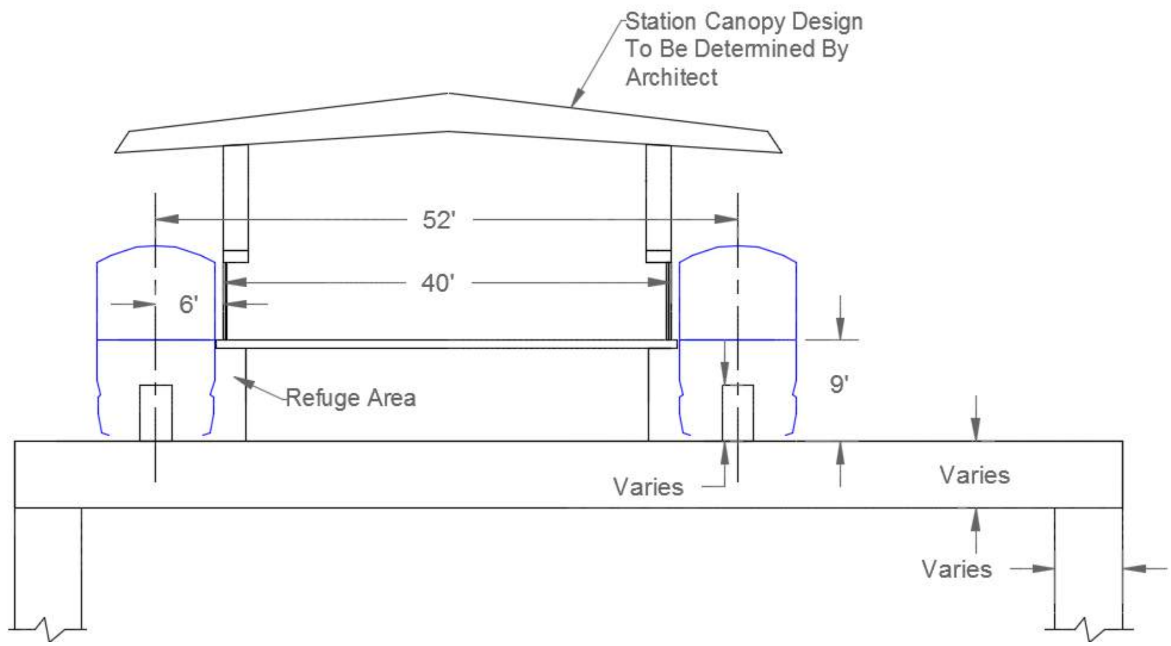


Figure 7-4: Monorail Guideway Clearances - At Stations

7.1.2. Maintenance/Emergency Walkway

A continuous walkway is required along the entire guideway length to provide emergency egress for evacuating passengers and safe access to guideways and wayside equipment by operations and maintenance personnel. For the ITC project, the walkway is assumed to be between the tracks, providing access into the center platform stations.

Maintenance/emergency walkway considerations and requirements include:

- The walkway must be continuous through crossovers/switches or other elements that may act as barriers.
- The walkway should be located at or below the vehicle floor level under both normal and worst-case vehicle suspension failure conditions. It is desirable to locate the emergency walkway not more than 12 inches below the vehicle floor level. The walkway must not be more than 40 inches below the vehicle floor level under any circumstances.
- Walkways without a railing should be at least 44-inches wide and walkways with a railing should be at least 30-inches wide.
- The walkway should provide a clear cross-sectional envelope at least 30 inches wide to a height of 6 feet-8 inches above the walkway surface.
- The APM System Supplier may desire to locate cable trays, wireways, and other System elements below the walkway.
- Emergency walkway lighting is required along the entire walkway and egress route and will normally be turned on only when passengers are required to evacuate a train or during maintenance activities.

Images of emergency walkway examples for APM and monorail systems are provided in Figure 7-5 and Figure 7-6, respectively.

Figure 7-5: APM Emergency Walkway Example, TPA SkyConnect APM (Image source: L+E)

Figure 7-6: Monorail Emergency Walkway Example, Las Vegas Monorail (Image source: LAmag)

7.1.3. Crossovers and Switches

Crossovers provide the means for trains to move between guideway lanes and are required for pinched-loop operations and failure management purposes. A crossover is generally composed of two switches (one on each guideway lane) connected by a short length of special trackwork. Crossovers and switches must be located in constant-grade, tangent guideway sections. Approximately 50 feet of tangent, constant-grade alignment should be provided before and after switches. Expansion joints are not allowed in crossover zones.

Crossover requirements vary significantly among APM System and monorail suppliers and each supplier's switch and crossover requirements are "discrete" in that their geometric and other requirements are largely inflexible. Unique requirements exist for:

- Switch curve radius
- Turn (or throw) angle
- Need for spiral and/or tangent lengths before and/or after a switch
- Widened and/or depressed slab sections required for switch machine support
- Widened slab sections to accommodate movement of guidance devices
- Spacing between consecutive switches on a single guideway
- Transverse spacing between parallel guideways

The guideway length required to accommodate a crossover is dependent on the required switch/crossover geometry, crossover configuration, and the spacing between parallel guideways. For the ITC system, crossovers are located adjacent to stations where the guideway widths are dictated by the station platform width of 40 ft., resulting in a separation of guideway centerlines of approximately 52 ft.

The crossover configurations for the ITC project are assumed to be a "double crossover" for APM systems and an X-crossover for monorail systems. The total length required for these two types of configurations for the two technologies is similar.

- For APM systems, "double crossovers" include two consecutive, but symmetrically oriented, crossovers. The orientation of double crossovers is dictated by operational considerations. Crossovers configured to create an "X" between guideways should not be planned, as this configuration is not possible for most APM system suppliers. See Figure 7-7 for an example double crossover.
- For monorail systems, X-crossovers are typical for all suppliers. Crossovers consist of a moveable guide beam that shifts positions depending on the required travel path. See Figure 7-8 for an example monorail X-crossover.

Figure 7-7: APM Double Crossover Example at IAH (Image Source: L+E)

Figure 7-8: Monorail X-Crossover Example, Las Vegas Monorail System (Image Source: LRN Library)

For the ITC project, the guideway structure must allow for both the APM and monorail crossover clearance requirements. As switches require additional space for switch equipment and/or switch movement, as well as emergency walkway access from both sides of the train, the guideway structure at crossovers is wider than in areas with track only. Cross sections through the guideway structure for APMs and monorail at the crossover areas are provided in Figure 7-9 and Figure 7-10.

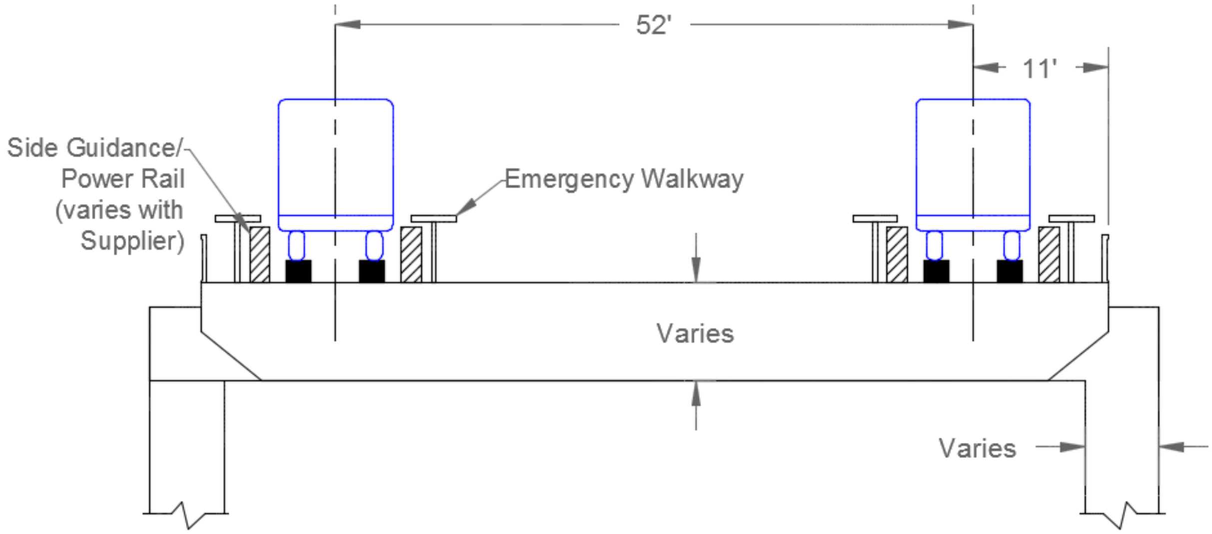


Figure 7-9: APM Guideway Clearances – At Crossovers

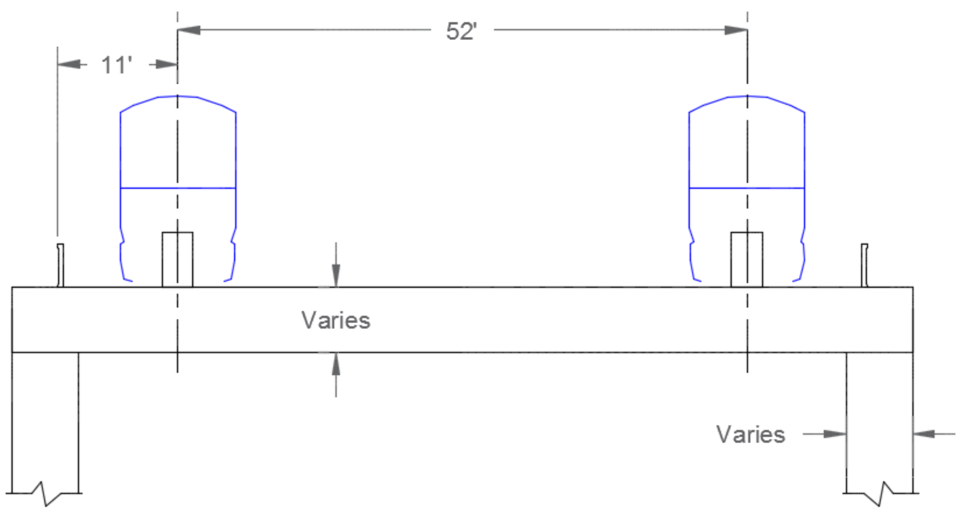


Figure 7-10: Monorail Guideway Clearances – At Crossovers

7.2. Alignment

The goal in defining the guideway alignment is to develop an alignment that allows APM and monorail systems suppliers to competitively bid on the project, and to optimize the alignment to their unique technology requirements. Optimizing the alignment also allows for optimized system performance and potentially reduced the facility and structure sizes.

The alignment options developed for the ITC project assumed generic and reasonably conservative parameters given the early planning stage of the project. The following sections provide a summary of the parameters used for the horizontal and vertical alignment development. The plan view of the alignment options, as well as the plan and profile for the final ITC alignment, are provided in Appendix A.

7.2.1. Plan

The horizontal alignment consists of tangents joined to circular curves by spiral transition curves. Tangent alignment is required through and about 50 ft. beyond the ends of station platforms.

Horizontal curves should use the largest practical radii. Large curve radii reduce required superelevation values and nosing and chording effects through horizontal curves; allow higher speeds to be maintained, which decreases trip times and potentially reduces the required fleet size and implementation costs; improve ride comfort. Minimum radii should only be considered in extreme cases when the cost or other adverse effects of using larger radii are prohibitive. The following minimum radii for APM and monorail technology were used for the ITC alignment (these do not apply to switches and crossovers):

- Minimum radius for operating track:
  - APM: 180 ft.
  - Monorail: 200 ft.
- Minimum radius for maintenance yard track:
  - APM: 100 ft.
  - Monorail: 180 ft.

7.2.2. Profile

The vertical alignment should consist of tangents joined by parabolic curves having a constant rate of change of grade. Guideway profile grades should be kept as level as possible and the number of grade changes minimized.

A constant grade, at least 50 feet in length between two adjoining parabolic vertical curves should be provided. Grade must be zero percent through stations. On the mainline, desired maximum grade is 6%. Although some technologies allow for a maximum grade of up to 10%, grades higher than 6% are not assumed for the ITC project due to the very early planning nature of this project. Steeper grades restrict the design and should only be used when absolutely necessary. Grades through switch and crossover locations are assumed to be 0% as not all technologies support switches on a grade.

7.3. Other Guideway Considerations

The following are further considerations for guideway and trackwork design as the project moves into more detailed design phases.

- Trackwork and the associated interface requirements vary significantly among APM system suppliers. Guideway structure designs must accommodate the variable trackwork load and connection and other interface requirements of the different APM system suppliers.
- Horizontal curves should be superelevated to limit sustained lateral accelerations parallel to the vehicle floor. Desirable maximum superelevation is 6%, but in some cases, the APM system supplier will be allowed to provide up to 10% superelevation.
- Access to the guideways is required at stations and desirable near abutments at ends of elevated guideway sections. Access and egress points must not permit unauthorized access to the guideway, and all guideway access and egress points must be alarmed at the CCF.

- Cable trays, conduits and/or wireways are required along the guideways to accommodate system cabling. These are typically located adjacent to longitudinal trackwork elements on the guideway structure, below emergency walkways, and are supported by elements such as walkways or parapet walls.
- Guideways must be designed and constructed to effectively drain water from their surfaces. Guideway drainage provisions should allow for reasonable and expected interaction with trackwork and other guideway equipment.
- Structure-borne, vehicle-induced vibrations and noise should be evaluated to mitigate passenger and facility occupant discomfort.
- Elevated and at-grade guideways should have parapet walls to screen guideway equipment and running surfaces so that trains have the appearance of gliding between stations.

8. Maintenance and Storage Facility

The MSF houses functional spaces required for the operation and maintenance of the APM Systems, including the Central Control Room (CCR), administrative offices, spare parts and consumable storage, and space for regular maintenance, inspection, service, testing, repair, and replacement of parts for vehicles and other system equipment.

Maintenance facility functions include vehicle maintenance, cleaning, and washing; shipping, receiving, and storage of parts, tools, and spare equipment; fabrication of parts; and repair of vehicle spares. Supervisory offices, rest rooms, locker rooms, and break/training rooms are also provided for staff use.

Maintenance performed on System equipment includes:

- Service - Replacement of consumables and expendables, adjustment of parts
- Cleaning - Interior and exterior
- Inspection - Periodic inspection of parts, appurtenances and subsystems subject to deterioration and failure.
- Repair - The repair or replacement of a part that has been damaged, has failed, or is nearing the end of its service life.
- Departure Test - The MSF and adjacent non-passenger carrying guideway will contain departure test equipment and a dedicated section of track for the departure test.
- Maintenance Information Management and Scheduling - The processing of maintenance information, work reports, failure reports, and System performance data needed to manage the System maintenance program effectively and efficiently.

8.1. Layout

The primary functions of the MSF include support of APM System operations, vehicle storage, and APM System maintenance.

Area is be provided for service and inspection shops, major repairs, vehicle storage, inspection and service (including under-vehicle bays), equipment and materials storage, offices, lunch/break rooms, restrooms, locker areas, personnel wash facilities, loading platforms, and other areas based on design information to be provided by the APM System Supplier. The design of the facility should also include roadway access, signage, and means of controlling access into and out of the MSF.

The MSF is currently sized for both, rubber-tire and monorail technology six-train fleet and also for larger fleet to allow for the addition of trains to support storage and maintenance for larger demands, if needed. This will still maintain flexibility to define the exact needs in the future phases of the project based on on-going coordination with the stakeholders. A reduction of the MSF size could occur in the next phases of the project as the design is refined and finalized.

8.1.1. Vehicle Storage

The MSF needs to be sized to accommodate the maximum number of vehicles to be in maintenance or stored during off-peak periods. Vehicles are planned to be accommodated in dedicated storage tracks and in maintenance bays.

Dedicated storage tracks at the MSF will have traction power guide rails with automated train control into and out of storage. This fully automated vehicles storage area allows trains to be stored during off-service, off-peak, and non-event time while remaining ready for immediate dispatch. The storage tracks are therefore protected from hazards, including moving vehicles and propulsion power. These automated areas are to be designed to control access in order to ensure the safety of maintenance personnel.

Locations of the vehicle storage tracks are identified in Figure 8-1.

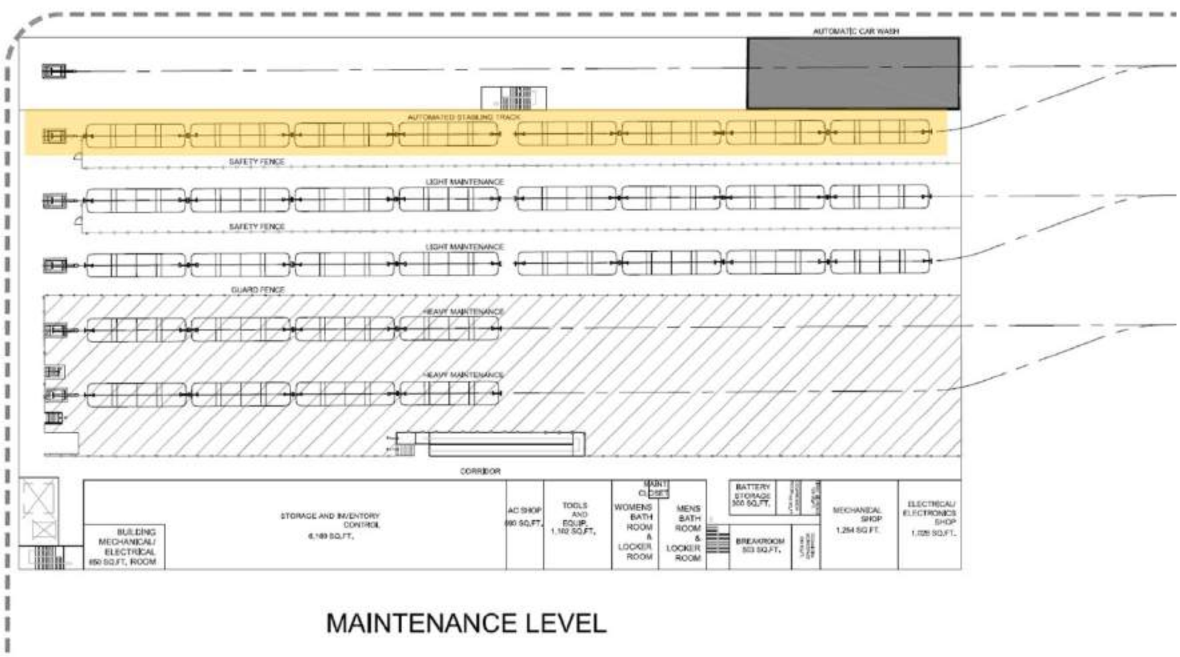


Figure 8-1: MSF Vehicle Storage

8.1.2. Maintenance Bays

Heavy and light maintenance bays are required to perform maintenance on trains at the MSF. The MSF design must include the space and related necessary infrastructure to inspect and maintain the APM vehicles. Shops, parts storage, and other maintenance-related functions should be situated at the same level as the maintenance floor. Trains are manually driven and moved to, from, and within the heavy and light maintenance bays. Power in the manual areas is provided to the vehicles via stingers, a festooning system with power plugs affixed to ceiling to allow for vehicle movements while connected to wayside power.

There are two types of maintenance bays, each with their own specific uses and requirements. The locations of the light and heavy maintenance bays are identified in Figure 8-2.

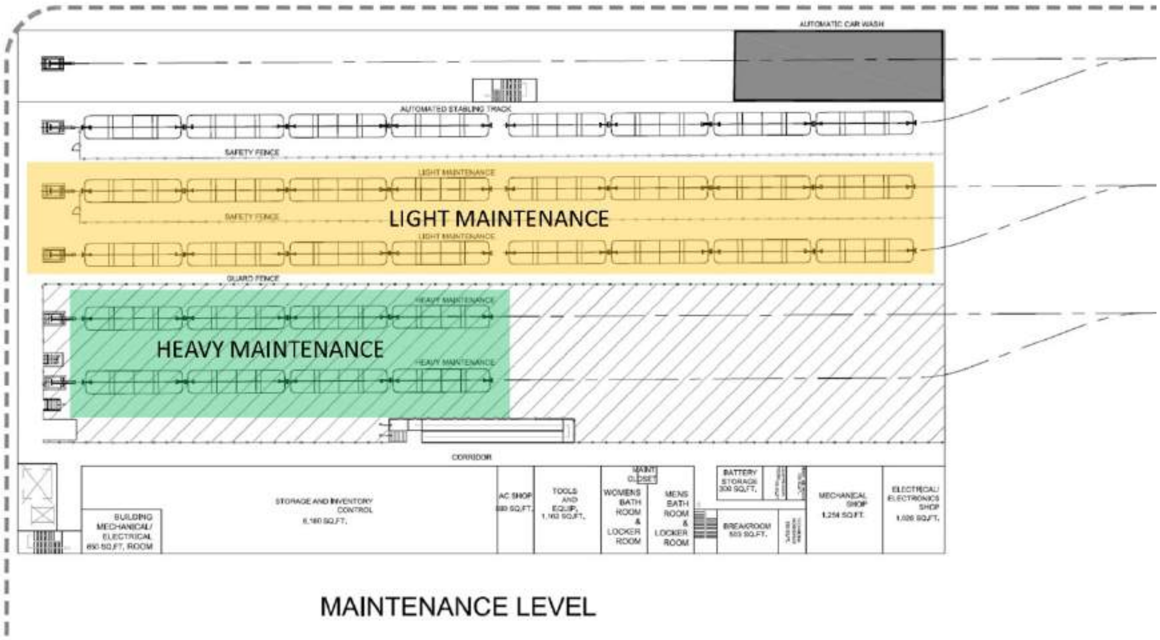


Figure 8-2: MSF Light and Heavy Maintenance

Light Maintenance Bays: Each train is required to undergo nightly light maintenance if it was in operation that day. Light maintenance is typically comprised of inspection and replacement of readily accessible parts and expendables and a general confirmation that the vehicle is available for the next day's service. Underbody access is required; light maintenance bays are over pits or on elevated structures such that staff can readily walk underneath them. Examples of access to the vehicle underbody are provided in Figure 8-3.

Typical light maintenance tasks include cleaning as needed, vehicle underbody inspection, checking and replacing brake pads, component inspection, dimensional verifications, contact/collector shoe replacements, inspection of running tires for wear/cuts, and other similar tasks that can be performed in relative short duration. Exact tasks and inspections performed are determined by the APM supplier per their maintenance practices.

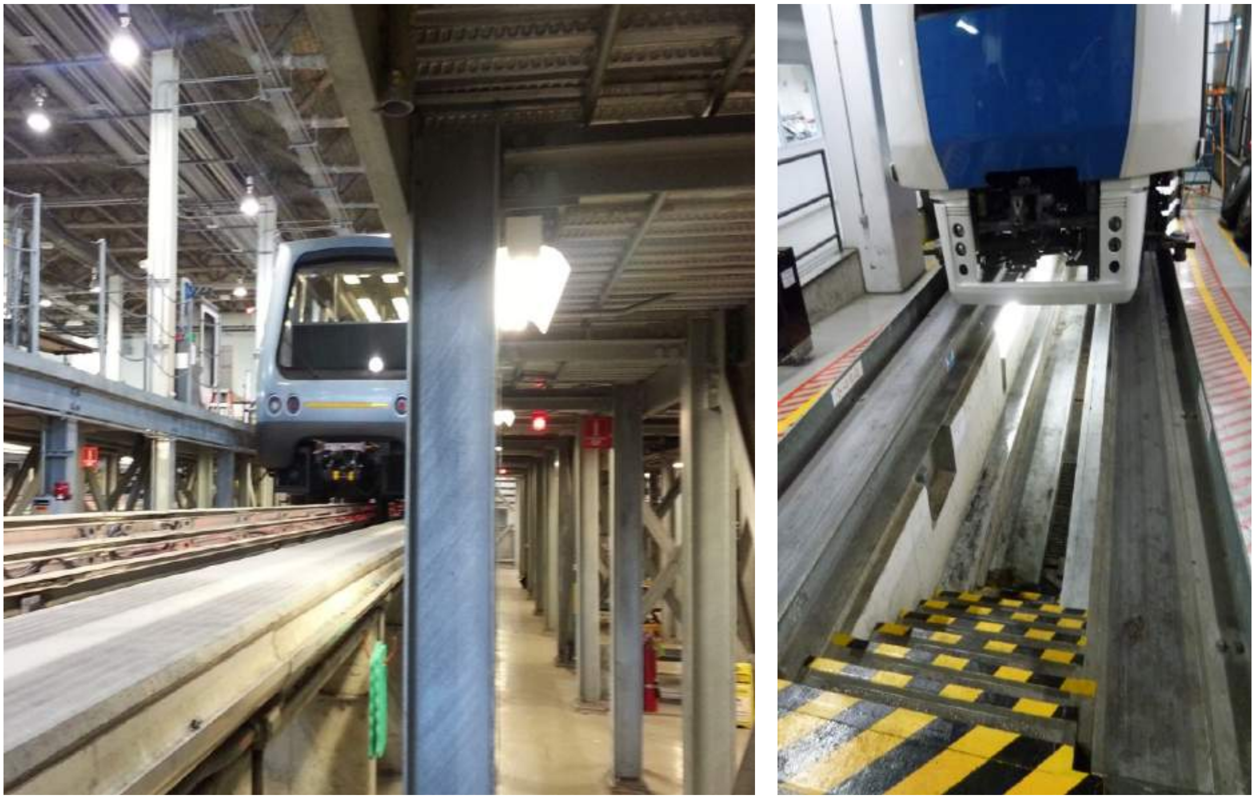


Figure 8-3: Example Light Maintenance Access

Heavy Maintenance Bays: Heavy maintenance, required on periodic and scheduled frequencies, includes a more thorough inspection of the vehicle and replacement of parts showing excessive wear and/or approaching their scheduled replacement time. Heavy maintenance tasks generally include major repairs/refurbishments of vehicle subsystems such as bogies and air conditioning units, replacement of brake calipers, replacement of brake discs, draining and refilling of axle oil, flushing of hydraulic systems, replacement of shocks, replacement of air bags, dropping the bogie, hydraulic fluid decontamination, and other similar tasks that take a number of hours to perform. Exact tasks and schedules of the heavy maintenance rotation are determined by the APM supplier per their maintenance practices.

Maintenance is performed on flat floors, with vehicles elevated on jacks, as needed. Four jacks per car are assumed, with the depot floor supporting loading up to 250 psf and a concentrated load of about 4 ton for the wheel load or load from lifting jacks. Guide rails in the heavy maintenance bays are removable to allow for unobstructed access below raised cars. An example of vehicles in heavy maintenance is provided in Figure 8-4.

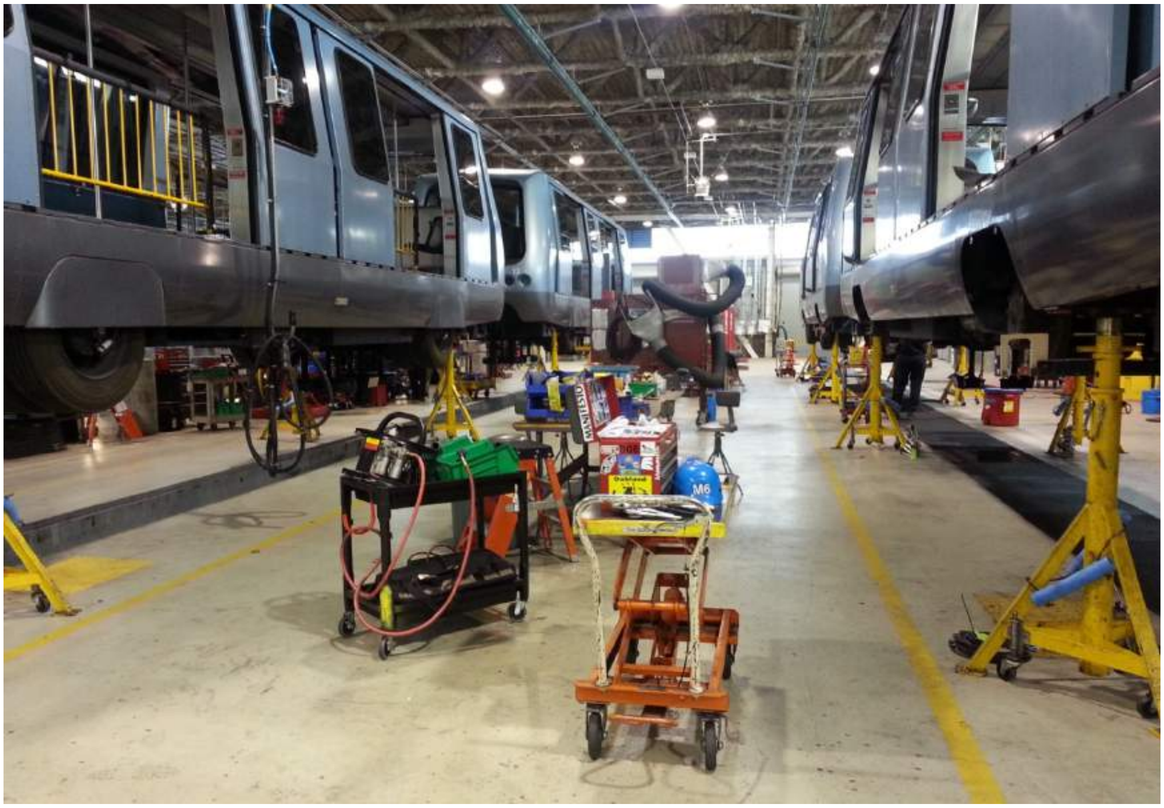


Figure 8-4: Example Heavy Maintenance

8.1.3. Vehicle Wash:

Automatic washing of the vehicle exteriors should be accomplished at a Vehicle Wash Facility. The vehicle wash is typically a stationary system located in/near/adjacent to the MSF building where trains can be either manually or automatically moved through the wash facility. Various required provisions, including sanitary sewer, power, and infrastructure provisions, will be needed. The location of the vehicle wash facility is identified in Figure 8-5.

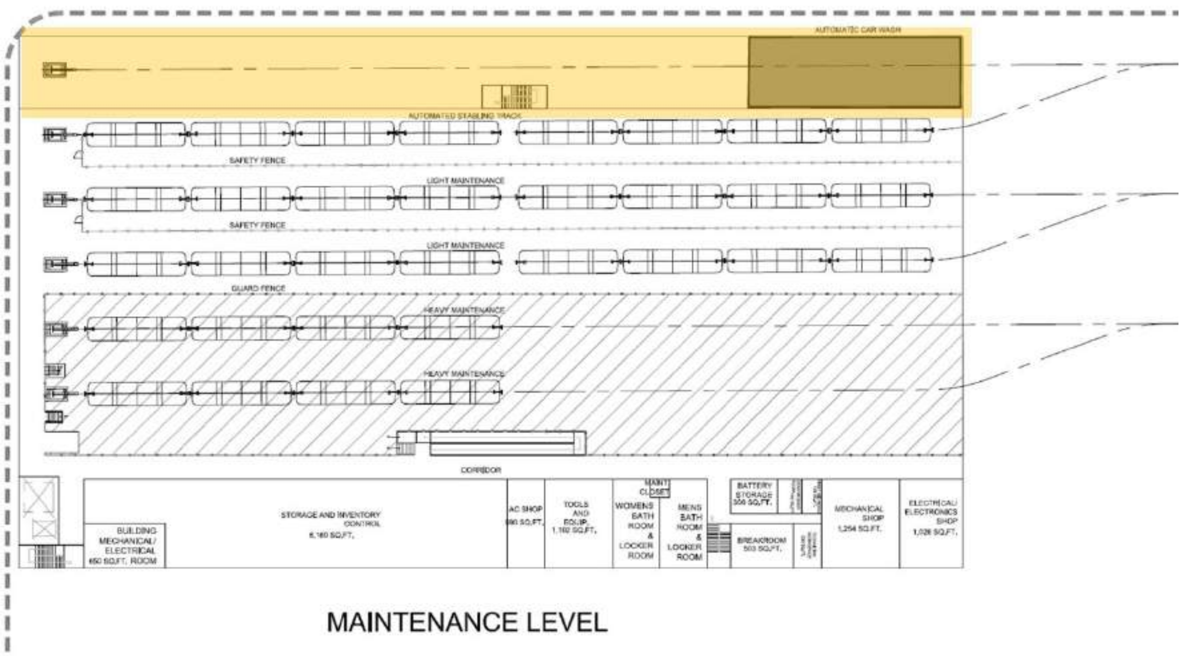


Figure 8-5: MSF Vehicle Wash

8.1.4. Maintenance Support Facilities

The following are the main support facilities needed for the APM MSF needs:

- Repair shops and inventory: For the maintenance of the APM equipment and storage of spare parts and inventory to support the maintenance needs, and located on the maintenance level
- Administrative: The APM operations and maintenance staff require space to support normal administrative functions. These are planned to be located on the mezzanine level.
- Command, Control, and Communications: The Command, Control, and Communications (CCC) facilities, which include the Central Control Room (CCR) and the CCC Equipment Room are planned to be located at the MSF on the mezzanine level.
- Roadway and Ground Floor Access: For personnel and visitor access, as well as deliveries and removal of inventory and equipment. These requirements are located on the ground floor.
- Power Distribution: The traction power substation is planned to be located at the MSF on the ground level. See Section 9 for further information on traction power substations.

These areas are identified in Figure 8-6, Figure 8-7, and Figure 8-8 and are further described in the following sections.

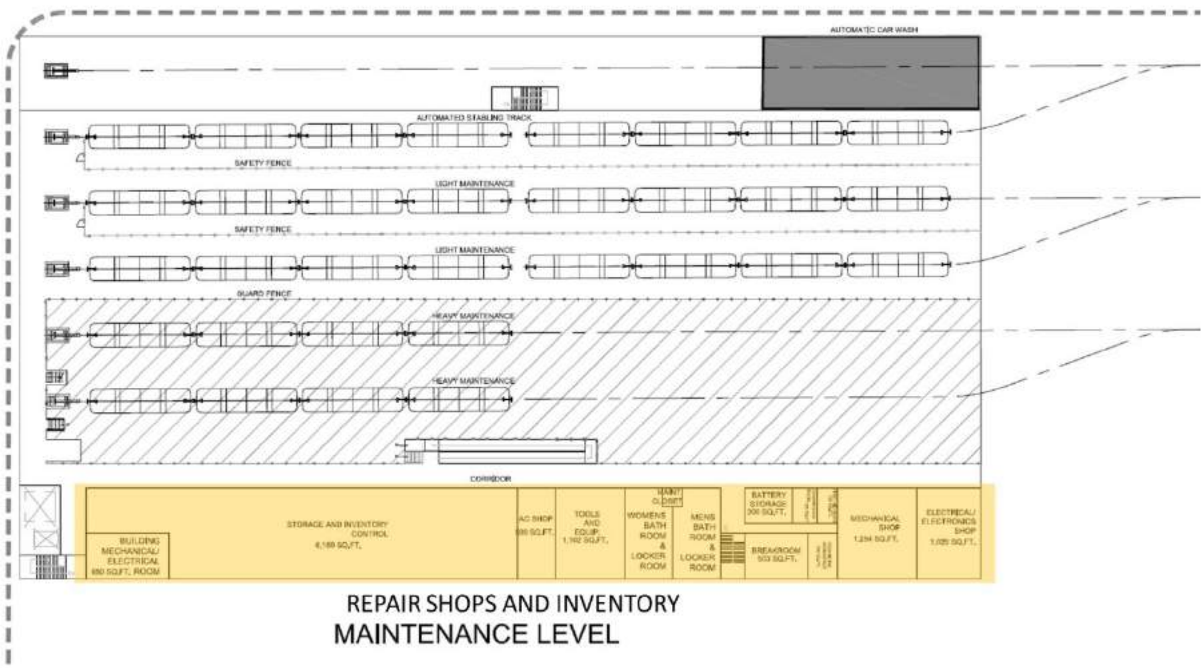


Figure 8-6: MSF Maintenance Level Support Facilities

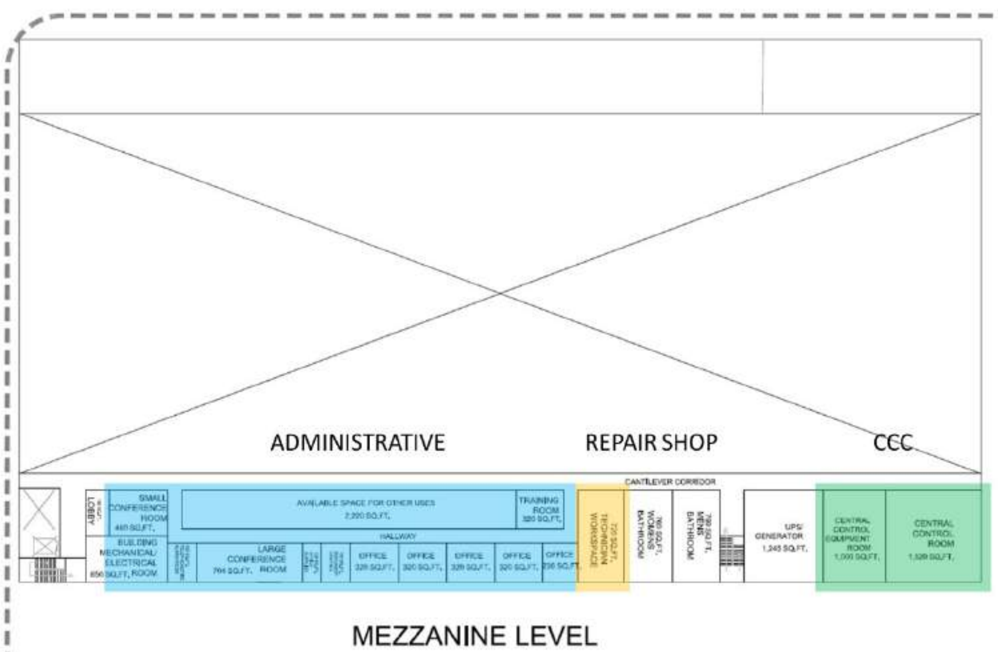


Figure 8-7: MSF Mezzanine Level Support Facilities

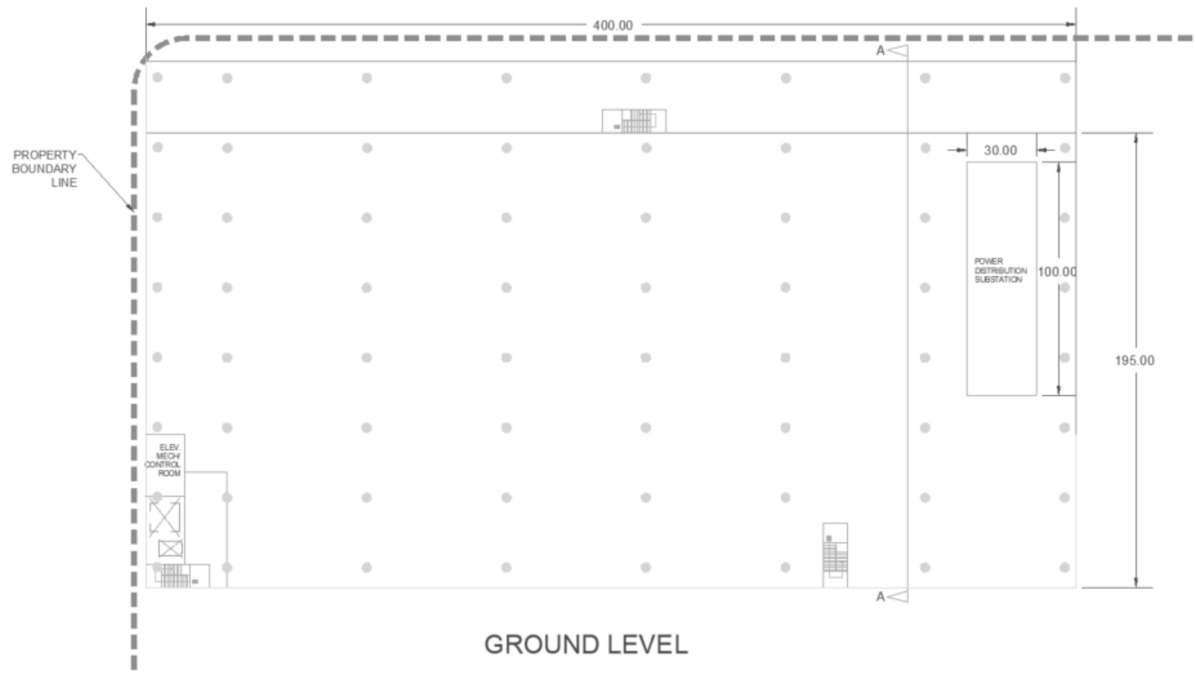


Figure 8-8: MSF Ground Level Support Facilities

In addition to the APM-specific functional areas, building HVAC, plumbing, electrical, and communications rooms will be required to serve the facility, and are anticipated to be located on the maintenance and mezzanine levels.

8.1.4.1. Repair Shops and Inventory

The maintenance support facilities provide for the maintenance of the APM system and vehicles. The shops and stores (i.e. inventory) allow for the maintenance of all but the most major repairs for all on-board and wayside systems. Major work includes the repair and replacement of bogies; traction motors; and heating, ventilation, and air conditioning (HVAC) units. All mechanical and electrical components are also repaired at the MSF. The shops include workbenches and storage areas, and specialty tools for each shop type. The electrical and electronics shops repair smaller components and units so access direction from the maintenance floor is less critical. Machine, HVAC, and mechanical shops are located with direct access to the maintenance areas.

The MSF must also house all inventory, including spares, tools, and consumables. All items must first be screened before being brought into the MSF facility. A sizable inventory area is therefore located in close proximity to the loading docks for easy access from the goods screening area. To maintain inventory control, this area is to be secured with protocol for parts/consumables removal and use.

A layout of the maintenance support facilities is provided in Figure 8-6 and Figure 8-7.

8.1.4.2. Administrative

The requirements for administrative offices are typical of any professional office environment. Besides office space for administrators and support staff, functional spaces for reception, records keeping, meeting, training, document receipt and transmission, copying, etc. are representative of those required in the APM administrative offices. The administrative offices should comply with the all relevant accessibility requirements.

Separation between administrative and maintenance staff uses is assumed, with the exception of shared conference and training rooms. Offices for maintenance managers are also assumed to be located with the administrative offices.

The location of the administrative offices is provided in Figure 8-7.

8.1.4.3. Command, Control, and Communications.

The command, control, and communications facilities, including the Central Control Room (CCR) and the CCC Equipment Room, are planned to be co-located at the MSF. Additional CCC equipment is located at stations and along the wayside. CCC equipment is required for train control and supervision, power control and supervision, station doors, dynamic graphics, closed-circuit television (CCTV), public address, radio, fire detection, and other System-related elements.

The CCR provides for the supervision of the overall APM operation. It houses all display, safety, and communications equipment required to monitor and control the APM system. Typical equipment includes large work consoles and monitor banks (for system overview, CCTV, etc.).

The CCC equipment room adjacent to the CCR houses all servers and equipment for the control of the APM system. The equipment room is also sized to house the uninterruptible power supplies (UPS) required for the operation of the System equipment. The UPS powers low voltage System equipment at the CCR and CCC equipment rooms.

The locations of the CCR and CCC Equipment Room are provided in Figure 8-7.

8.1.4.4. Roadway and Ground Floor Access

Road access to the MSF is required for employees, visitors, suppliers, and emergency vehicles. It is anticipated that all ground floor requirements can be accommodated below the building footprint.

- Employees and visitors require ample parking.
- Suppliers require a delivery entrance to load and unload equipment, materials and parts. A loading dock and adequate roadways and clearances must be provided for flat-bed trucks to deliver equipment and supplies into the MSF. The APM vehicles will be lifted onto the guideway, most likely at/near the MSF. Provisions must be made for these movements.
- Emergency Vehicles (fire trucks) require designated stopping positions for firefighting equipment adjacent to the MSF.

Appropriate space should be provided to allow adequate maneuvering by these ground vehicles. The number of employee parking spaces and assumed maneuvering for large delivery vehicles, as well as an area for APM vehicle delivery, have been identified in the conceptual MSF design. In addition to roadway access, vertical circulation (normal and emergency purposes) must also be provided, including a freight elevator for inventory/equipment delivery and removal.

An initial layout of the ground floor is provided in Figure 8-8.

8.1.5. Spatial Requirements

A summary of the estimated spatial requirements for all support facilities is provided in Table 8-1. These spatial requirements will be further refined during future phases of the project.

CONCEPTUAL MSF SPACE PLANNING REQUIREMENTS			
MAINTENANCE AND STORAGE FACILITY	**CITY OF INGLEWOOD APM**		
ROOM DESCRIPTION	**AREA (FT^2)**	**LEVEL**	**HVAC**
Central Control Room	1,500	mezzanine	Y
Central Control Equipment Room	1,000	mezzanine	Y
Telephone/Fire Alarm Room	200	mezzanine	Y
Management and Administrative Offices	1,350	mezzanine	Y
Lobby Reception	200	mezzanine	Y
Conference Room	500	mezzanine	Y
Restrooms (M/W)	350	mezzanine	Y
Training Room	350	mezzanine	Y
Technician Workspaces	950	maintenance	N
Break Room	500	maintenance	Y
Locker/Restrooms (M/W)	1,000	maintenance	Y
First Aid Room	100	maintenance	N
Storage/Inventory Control	6,150	maintenance	N
Electrical/Electronics Shop	1,250	maintenance	Y
Mechanical Shop	1,250	maintenance	N
AC Shop	600	maintenance	N
Welding Room	400	maintenance	N
Paint Shop	400	maintenance	N
UPS/Generator Room	1,000	maintenance	Y
Tools & Equipment	1,100	maintenance	N
Compressor	150	maintenance	N
Battery Storage and Charging	300	maintenance	Y
Vehicle Maintenance Area/Storage	60,800	maintenance	N
Car Wash & Equipment	13,800	maintenance	N
Elevators/Stairs/Hallways/Miscellaneous	2,200	mezzanine / maintenance	N
Loading Dock	400	ground	N
Power Substation	3,000	ground	Y
Total Maintenance Level (approx)	**91,950**	Approx 400 ft x 230 ft	
Total Mezzanine Level (approx)	**5,450**	Approx 400 ft x 43 ft	
Total Ground Level (approx)	**3,400**		
Total Area	**97,400**		

Table 8-1: Conceptual MSF Space Planning Requirements

8.2. Elevations

The guideway elevation in the MSF is dictated by the elevation of the mainline guideways outside of the MSF. The top of building measured from existing grade is approximately 75'. A cross section of the MSF is provided in Figure 8-9.

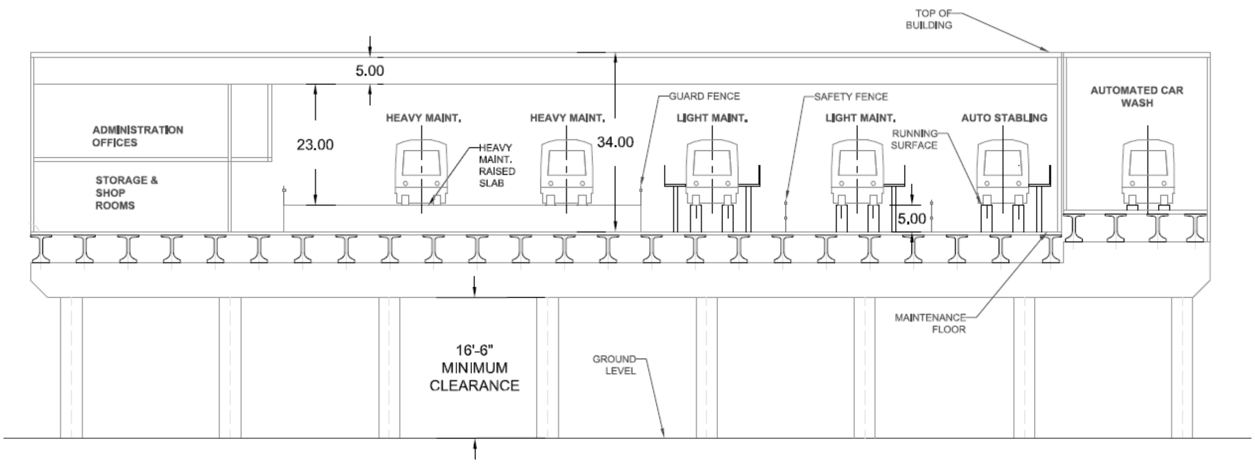


Figure 8-9: MSF Cross Section

9. Traction Power Substations

This section summarizes the preliminary power requirements analyses and results for the mainline operations and MSF operations for the ITC system. In order to obtain the power requirements for the ITC System, detailed load-flow analyses were performed for the rubber-tire APM technology for multiple traction power substation (TPSS) location combinations. These load-flow analyses results were then combined with estimated power requirements for the MSF to determine the transformer ratings for each of the TPSS locations.

This report identifies the key assumptions used as the basis for the analysis, provides some basic information about traction power systems and substations for informational purposes only, and summarizes the analysis results and considerations.

9.1. Introduction

The analysis for the propulsion power needs for the ITC system and therefore took into account the operations for normal and special event service.

Propulsion power (i.e. the power to run the train on a guideway) is provided via traction power substations (TPSS) located along the alignment. Each TPSS includes equipment to transform the medium- to high-voltage power feed provided from the power companies to the required 750-volt direct current (VDC) needed to power the vehicles and other ancillary equipment.

A key element in a TPSS is the transformer/rectifier unit, which needs to be sized to accommodate the power requirements for operating multiple trains simultaneously on the system. Load flow analyses were therefore performed to assess the potential locations for the TPSS to determine the required locations for the substations and required transformer sizes to provide the necessary service for the ITC system.

The load flow analyses were performed using two Lea+Elliott simulation and calculation models, the Legends© Train Performance Simulator (TPSim) and the Power Demand Analysis Model. The train performance simulator calculates individual train performance and power demand characteristics on a per second and guideway location basis throughout a single round-trip. The power demand analysis model accumulates the total simultaneous (also on a per second basis) power demand for all trains operating at a defined headway using the output of the train performance simulator. The power demand analysis model then calculates the power demand for each substation as a function of the positional and time Kilo-Volt Ampere (KVA) requirements of each train consist that is receiving power from that particular substation. The substation load calculation output provides both per second and root mean squared (RMS) KVA loads for each substation.

Predicted train performance from the Train Performance Simulator is obtained using a typical large capacity APM vehicle and train model, operating on the proposed ITC System alignment shown in Figure 2-1. To determine PDS substation requirements, simulations were conducted using 4-car trains loaded at the design load (AW1).

The operational train performance data was then applied to the Power Demand Analysis model to establish the peak and RMS capacity requirements for the minimum number of fully redundant substations. The configuration of substations was analyzed using the power analysis model and using this information, the Power Demand Analysis model generates the time and location distributed electrical load data.

9.2. Assumptions

The following are the key assumptions for the power load flow analyses:

1. The system must be able to operate at a minimum, 6 x 4-car trains at approximately 125-second headways.

2. The system operates for 18 hours per day and is closed with no trains operating for 6 hours per day.

3. The system alignment is approximately 8,500 feet of dual lane guideway and includes three stations and an MSF as shown in Figure 2-1 above.

4. Various potential locations for the PDS were identified along the alignment, including locations near all stations. Based on discussions to date with the City on the possible use of various properties along the alignment, those locations were refined to the following two locations, as shown in Figure 9-1. Further details on the parcels tentatively identified as possible locations for the PDS are provided in Appendix D.

    1. MSF site at 500 E Manchester Blvd, Inglewood, CA 90301 adjacent to E. Spruce Ave.; and

    2. City of Inglewood Intermodal Transit/Park and Ride Facility (ITF) site, or similarly located site, on the east side of Prairie Ave.

Figure 9-1: Potential Locations for ITC PDS Substations

5. The TPSS system will be fully redundant, meaning that there is not a single point of failure within the substations. Having a fully redundant substation requires the following:

   a. Primary power is expected to be provided by two separate primary power feeders such that the loss of a single feeder would not affect train operations. While future coordination with Southern California Edison will be required, the provision for, at a minimum, two separate feeders will continue as a base requirement for the system.

   b. Each TPSS will include two sets of equipment such that the loss of any single element within the TPSS (e.g. feeder, transformer, breaker, etc.) would not affect train operations.

6. Other non-vehicle propulsion loads included the APM equipment located in the APM equipment rooms in each station and the MSF.

7. 750 V DC distribution and rail resistance for a typical 750 V DC distribution APM system.

8. The MSF will be sized to store the full 6 train fleet and includes 4 maintenance berths and 4 automated storage berths.

9. The MSF must be able to perform maintenance on the maximum anticipated occupied berth based on the anticipated operations. This occurs during normal, non-event operations where 1 x 4-car train or 2 x 2-car trains are in operation.

9.3. Typical Substation Information

Prior experience indicates that when using DC power distribution, optimum performance of the PDS is obtained when the spacing between substations is kept under 5,000 feet due to power rail voltage drop and substations are located optimally between 100 feet and 500 feet from the guideway.

Actual substation locations may be changed as the result of a design process by the final selected supplier who will utilize more complex dynamic load flow comparative analysis techniques that are based on their specific system design criteria. Such a load flow examination is a design process beyond the scope of this programming level analysis effort since generic vehicle characteristics were assumed for the analysis. Nevertheless, the location selections made here may be considered appropriate to satisfy efficient system performance and for prediction of power consumption and substation capacity requirements.

9.3.1. Substation Single Line Diagram

A typical single line diagram for a DC distribution system is provided in Figure 9-2 below. As mentioned previously, each substation will typically be designed to utilize two sets (redundant) of transformer/rectifiers such that either transformer/rectifier set is capable of supplying the entire substation load indefinitely.

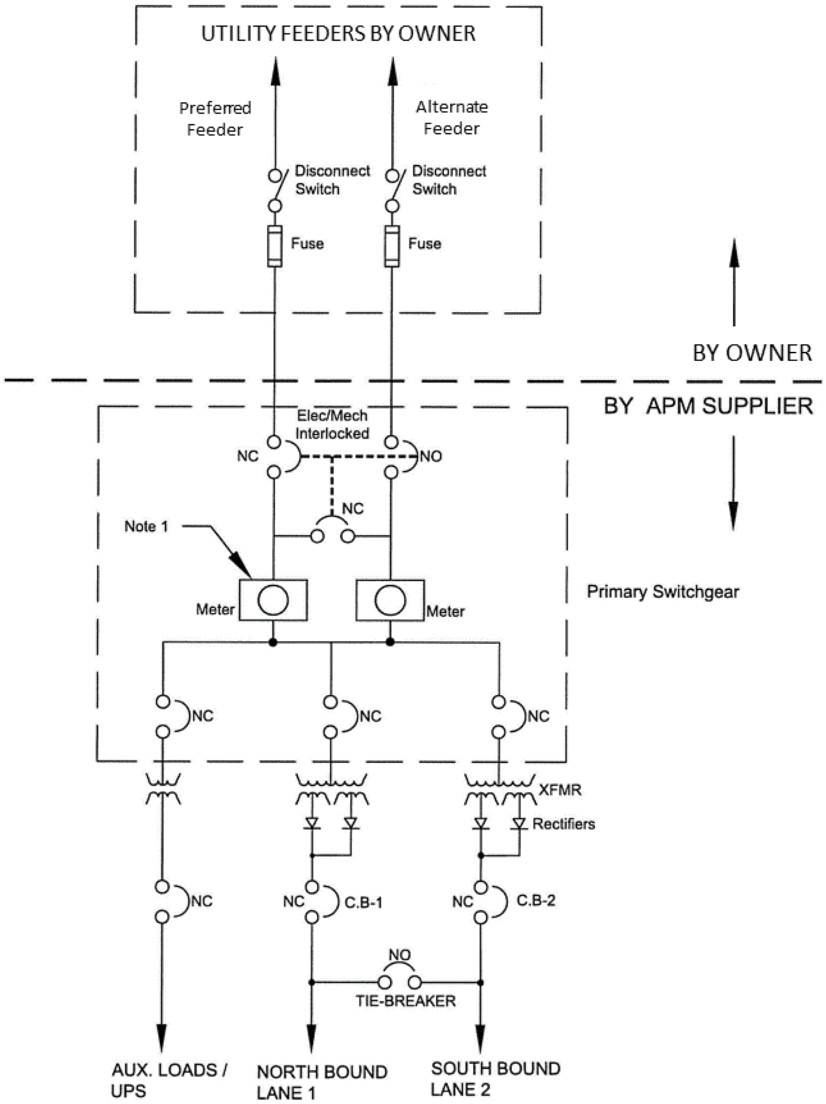


Figure 9-2: Typical Single Line Diagram

9.3.2. Estimated PDS Substation Space Allocations

The estimated minimum room space allocation for a fully redundant PDS substation is approximately 3,000 square feet and with 14 feet of clearance above the finished floor. Substations should be generally rectangular for power equipment placement. However, different aspect ratios can be considered provided that equipment spacing meets all applicable local codes and the National Electrical Code. The PDS substation houses transformers, DC rectifiers, primary and secondary switchgear, APM System auxiliary power and other propulsion related equipment required to provide power to the APM System for vehicle propulsion and other System equipment.

The PDS substation requires access for truck loading and adequate space for the passage for installation/replacement of PDS equipment. A typical DC propulsion power substation layout is illustrated in Figure 9-3 below.

Access to substations is also required for personnel to perform maintenance and testing activities. The PDS substation design should consider parking for approximately four APM ground maintenance vehicles and a loading/unloading zone to maneuver equipment, tools, and materials for maintenance activities. Ramps providing smooth transition over curbs, as applicable, should be provided to enable efficient movement of equipment.

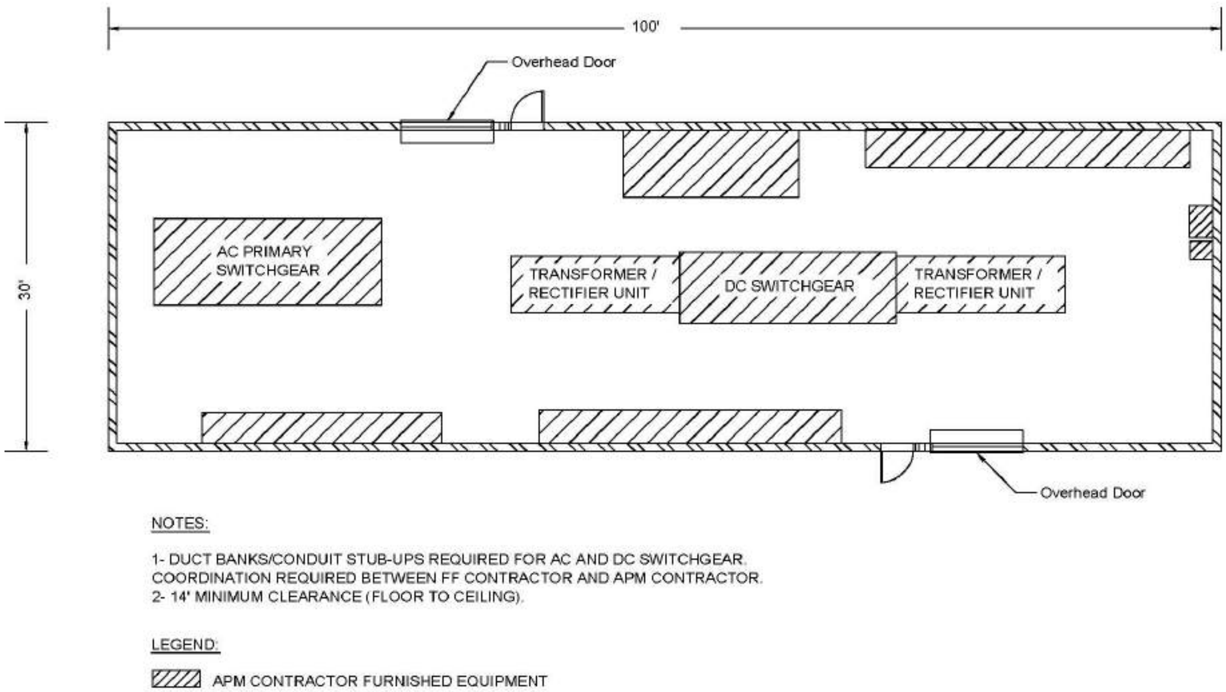


Figure 9-3: Typical Substation Layout

9.3.2.1. Underground PDS Substation

Typically, PDS substations are located at-grade due to local codes and regulations or at the direction of the local authorities having jurisdiction (AHJ). However, the possibility of an underground substation is also being preserved for as part of the ITC project. Further review of applicable codes and regulations and discussions with the AHJ are required for final determination on the acceptability of an underground substation.

For underground substations, the above requirements for an approximately 30 ft x 100 ft room is still applicable. Access for personnel and installation/replacement of smaller equipment can occur via freight elevators, and at a minimum, two staircases (one for normal access, and another for emergency egress). It is estimated that in addition to the 30 ft x 100 ft room, an additional space of approximately 30 ft x 30 ft should be adequate to fit the required vertical circulation. Access for large equipment installation/replacement, which is expected to occur infrequently, can occur via an access hatch located over the substation room in lieu of a ramp for truck access. The use of an access hatch minimizes the amount of underground excavation and construction. With the access hatch, equipment would be lowered down into or lifted u out of the substation via a temporary crane.

Note that, in addition to code/regulatory and local authority having jurisdiction requirements, the following may also be considerations for underground PDS substations:

- Water table and flooding;
- Water proofing design requirements;
- Air circulation equipment to ensure the necessary conditions are maintained within the substation; and
- Other safety and environmental mitigations.

9.4. Analysis Results

The following are the results of the load-flow analysis performed for mainline operations, as well as the estimated power load for the MSF.

9.4.1. Mainline Operations

The objective of the analysis was to determine the following:

A. Normal Operation: The service that could be operated with TPSSs located at the MSF and at the ITF site with both TPSS in operation;
B. Failure Operations: The service that could be operated with one full TPSS out of service and the other in service; and
C. The resulting transformer size for each TPSS location.

The results indicated that the two TPSS provide adequate redundancy with the ability to operate the 6 x 4-train fleet, even with either TPSS out of service.

9.4.2. Normal Operation

The following tables present the results of the load flow analysis based on Normal Operation with both TPSS in operation for the 6 x 4-car fleet. Normal Operations can be operated with the MSF and ITF site substation locations.

Normal	Peak Power (KW)	RMS Power (KW)	Average Power (KW)	RMS Current (A)
MSF Site TPSS 1	2008	834	755	1067
ITF Site TPSS 2	2119	777	639	996

Table 9-1: Normal Operations Load Flow Analysis

9.4.3. Failure Operations

The following presents the results of the load flow analysis used to determine the operations that are capable when one full TPSS is out of service. The analysis determined that with one TPSS out of service, the system can continue to operate the 6 x 4-car trains.

Based on the results provided in Table 9-2, the minimum transformer sizing is 2.0 MW.

Loss of TPSS 1	Peak Power (KW)	RMS Power (KW)	Average Power (KW)	RMS Current (A)
MSF Site TPSS 1	0	0	0	0
ITF Site TPSS 2	4152	1671	1447	2200
Loss of TPSS 2	**Peak Power (KW)**	**RMS Power (KW)**	**Average Power (KW)**	**RMS Current (A)**
MSF Site TPSS 1	4353	1668	1436	2197
ITF Site TPSS 2	0	0	0	0

Table 9-2: Failure Operations (6 x 4-car Train) Load Flow Analysis

9.4.4. MSF Operations

The power requirements for the MSF were developed assuming a worst-case scenario where during operating hours, 1 x 4-car or 2 x 2-car trains are operating on the mainline and maintenance is simultaneously being performed on the remaining trains at the MSF. During non-operating hours, all four maintenance berths are simultaneously performing maintenance. This worst-case scenario provides a conservative estimate for the power requirements for the MSF.

Based on the above assumptions and the operating hours noted in Section 9.2 Assumptions, it is estimated that the transformers at the MSF TPSS location will need 0.5 MVA of additional capacity.

The power usage for the automated stabling tracks can be accommodated by the power requirements for the mainline operations. There is no situation where trains are being moved into/out of the automated stabling area while the mainline is operating 6 x 4-car trains. Trains can only be moved into/out of automated stabling when the number of trains operating on the mainline is reduced. Therefore, it is not required to increase the size of the MSF or the mainline transformer sizes to power the automated stabling tracks.

9.5. Conclusions and Recommendations

The following table identifies the estimated transformer sizes for the analyzed MSF site and ITF site TPSS locations, along with Lea+Elliott's recommendations and comments.

These sizes and recommendations are based on an assumed high reliability robust level of service that is reasonable for this early level of planning. As the project progresses, the transformer sizes can be further optimized. In addition, if the peak hour demand assumptions are updated in a future phases due to updates to the number of trains in the system, additional load flow analysis will be required to determine the resulting estimated transformer sizes and TPSS facility size.

<table>
<tr><th>TPSS Locations</th><th>Transformer Size</th><th>Comments</th></tr>
<tr><td>MSF Site</td><td>2.5 MVA
(2.0 MVA + 0.5 MVA)</td><td rowspan="2">• Strongly recommend providing two TPSS.
• Provides Normal Operations and Failure Operations of 6 x 4-car trains with one full TPSS out of service.
• Further optimizing of transformer sizes can occur in a future phase of the project.</td></tr>
<tr><td>ITF Site</td><td>2.0 MVA</td></tr>
</table>

Table 9-3: Summary of Estimated Transformer Sizes

Two TPSS is strongly recommended. Although one TPSS appears sufficient to support the Normal Operation, no redundancy during failure operation can be provided with one TPSS. Although reduction from two to one TPSS would result in a capital cost savings of upwards of $3 Million, this savings does not outweigh the potential risks of failure scenarios and reduced future operational flexibility.

9.6. Coordination with Southern California Edison

In 2019, the EIR team reached out to Southern California Edison (SCE) to begin coordination related to the power demand requirements for the ITC system. The goal was to identify whether there were any major shortfalls or major issues at this time from a power capacity perspective.

The ITC Team provided the following requirements and assumptions to SCE regarding the ITC Project:

- The project would require approximately 10 MVA to power the System (trains, traction power, etc.) and infrastructure (Station lighting and vertical circulation, guideway lighting, etc.).
- Fully redundant power feeds are requested.
- Feeds to be provided at single location. The ITC Project would distribute power as needed.

Using these assumptions, SCE's Distribution Engineering department completed a high-level Distribution Study to determine the amount of load that SCE could accommodate and required infrastructure upgrades in order to meet the ITC Project's recommended full redundancy design. SCE's analysis assumed the use of the existing single (non-redundant) 16kVA circuit currently available along Market St. as it may be the most likely used circuit for the ITC Project.

The results of SCE's Distribution Study found that:

- The maximum load that can be accommodated at the present time is 10 MVA.
- To accommodate the 10MVA with full redundancy, the following upgrades would be required:
  - 1,500' of new civil work/duct banks
  - 1,860' of new 1000 JCN cable
  - 1,700' of upgrading/re-cabling existing SCE Primary cable to 1000 JCN
  - Two new Gas Switches

These values and upgrades are based on the current projected loads for 2026. SCE's also noted that their distribution system is dynamic and is subject to change as we approach the 2026 date. As the project details develop, SCE can effectively plan for this new load. The ITC project will need to be reevaluated by the SCE Distribution Engineering in a future phase of the project as the details are finalized.

Email correspondence from SCE are provided in Appendix E for reference.

10. Conceptual Cost Estimates

The total cost for an APM project is comprised of the cost for the infrastructure and the Operating System. The following sections provide a summary of the conceptual capital and Operations and Maintenance (O&M) cost estimates for the APM Operating System only. The APM infrastructure capital and O&M cost estimates were prepared separately by the EIR team's structural cost estimation consultant.

An APM project, including this ITC project, can be separated into the following two distinct elements:

- APM Operating System: The APM operating system includes the rolling stock (vehicles) and associated equipment (such as automatic train control and communications equipment, traction power distribution system, guidance and power rails, running surface/trackwork, public address and CCTV systems, maintenance equipment etc.) required for the integrated safe and reliable operations of the APM operating system. The APM operating system equipment is installed within APM Fixed Facilities; the requirements are driven by the APM operating system.
- APM Infrastructure (also called Fixed Facilities (FF)): APM Infrastructure is generally comprised of the passenger stations, guideway structures, maintenance and storage facility (MSF), central control facilities, power substations and equipment rooms, as well as establishing appropriate interfaces for life-safety systems such as lightning protection, grounding, NFPA 130, etc. The APM Infrastructure requirements are driven by the APM operating system.

APM Operating Systems are proprietary designs that must be procured as complete packages, whether in standalone contracts for Operating System or as part of a larger Design Build Operate Maintain contract with the design and construction of the infrastructure. In some cases, large infrastructure investments are also procured with the financing of the project integrated into the project delivery, such as Design Build Finance Operate Maintain (DBFOM). The procurement approach for the ITC project has not yet been determined.

10.1. Systems Capital Cost Estimate

10.1.1. Overview

APM Operating Systems are proprietary designs that must be procured as complete packages. The major subsystems (e.g., vehicles, tracks, switches, control systems, station equipment, etc.) from different suppliers cannot be mixed to form a system. Therefore, the APM Operating System must be procured under a turnkey design, supply and installation contract. The APM Operating System equipment designs are proprietary and are different for each of the suppliers. Due to the highly specialized nature of this work, there are a limited number of qualified, responsible suppliers for the APM Operating System. As a result, the costs within the APM industry vary on a project by project basis often driven by market conditions (i.e. how many APM procurements are ongoing, economic conditions, as well as a potential supplier's strategic considerations in gaining market share, among other things), degree and level of competitive interest in the procurement, and the project specific requirements. Some of the key project specific requirements for an APM System include the fleet size, capacity requirements, operational modes and more significantly, the general terms and conditions of the contract, including but not limited to caps on damages.

The ITC project has been programmed for a “generic” class of large APM technology, including large monorails, to facilitate a competitive procurement environment.

The generic APM Operating System includes characteristics common to the available proprietary technologies such that these technologies could be “easily adapted” to site specific requirements. The aim of this approach is to ensure that the project is compatible with the various APM technologies and thus increase the competitive environment.

For cost estimating purposes, Lea+Elliott has developed a proprietary cost model using cost data from historical projects that can be programmed to create a theoretical composite APM Operating System most like the APM Operating System planned for the subject project. The cost model considers prices from an extensive database, including costs of APM systems with similar characteristics to the system being estimated.

10.1.2. Capital Cost Estimate Breakdown

Table 10-1 provides a breakdown of the estimated capital cost for the APM Operating System by subsystem and/or major activity. The following items are taken into consideration in the estimate:

- This estimate is provided in 2018 dollars; additional escalation to mid-point of construction or bid dates is to be added should they be needed.
- Overhead and Bond costs are included in the contractor’s project management and administration, as they are typically assigned to this line item by the bidder/supplier.
- A 15% contingency is applied, which is applicable due to:
    - Level of unknowns at this early planning level of this project.
    - The proprietary nature of the technologies, as suppliers’ competitiveness, and therefore prices, vary depending on different economic factors.
- Fare collection costs are identified in a separate line item as further analysis and discussions are required to determine whether fare collection will be applied to this project.
- This estimate does not include the APM infrastructure cost, or the Owner’s costs for project management, technical assistance and administration of the contract, and any legal fees.

APM OPERATING SYSTEM CAPITAL COST ESTIMATE (DOES NOT INCLUDE INFRASTURCTURE)			
ITEM DESCRIPTIONS	**MAJOR QUANTITY AND UNIT**		**ESTIMATED COST**
GUIDEWAY EQUIPMENT	16,880	LINEAR FT. GUIDEWAY	$32,500,000
STATION EQUIPMENT	3	STATIONS	$3,500,000
MAINTENANCE AND STORAGE FACILITY EQUIPMENT	1	LUMP SUM	$12,800,000
POWER DISTRIBUTION SYSTEM EQUIPMENT	2	PDS	$8,800,000
AUTOMATIC TRAIN CONTROL EQUIPMENT	1	LUMP SUM	$14,400,000
COMMUNICATIONS EQUIPMENT	1	LUMP SUM	$3,500,000
CARS	24	EACH	$65,100,000
OTHER OPERATING SYSTEM EQUIPMENT OR FACILITIES	16,880	LINEAR FT. GUIDEWAY	$9,100,000
OPERATING SYSTEM VERIFICATION AND ACCEPTANCE	4%	% of subtotal	$6,600,000
OPERATING SYSTEM CONTRACTOR'S PROJECT MANAGEMENT AND ADMINISTRATION	32%	% of subtotal	$50,200,000
SYSTEM TOTAL			$206,500,000
CONTINGENCY FACTOR		15%	$31,000,000
TOTAL (ESTIMATE YEAR= 2018$)			**$237,500,000**

FARE COLLECTION	3	Sta	$2,500,000
CONTINGENCY FACTOR		15%	$400,000
TOTAL (ESTIMATE YEAR -2018$)			**$2,900,000**

Table 10-1: Conceptual APM Operating System Capital Cost Estimate

10.2. Operations & Maintenance Cost Estimate

10.2.1. Overview

The Systems O&M is typically performed by the Contractor as part of their delivery of the initial system. The annual O&M cost estimate addresses labor, power and material (i.e., parts and consumables) costs for the system operations and estimated fleet size. O&M costs include vehicle and guideway maintenance, system controls, fare collection, roving staff that can respond to mechanical problems and emergencies, and management and administration support. As an automated system, APM O&M labor costs can be relatively low compared to regular transit and allow more frequent service to be operated.

10.2.2. O&M Cost Estimate Breakdown

Table 10-2 provides a breakdown of the O&M estimate for the APM system equipment. The following items have also been taken into consideration in the estimate:

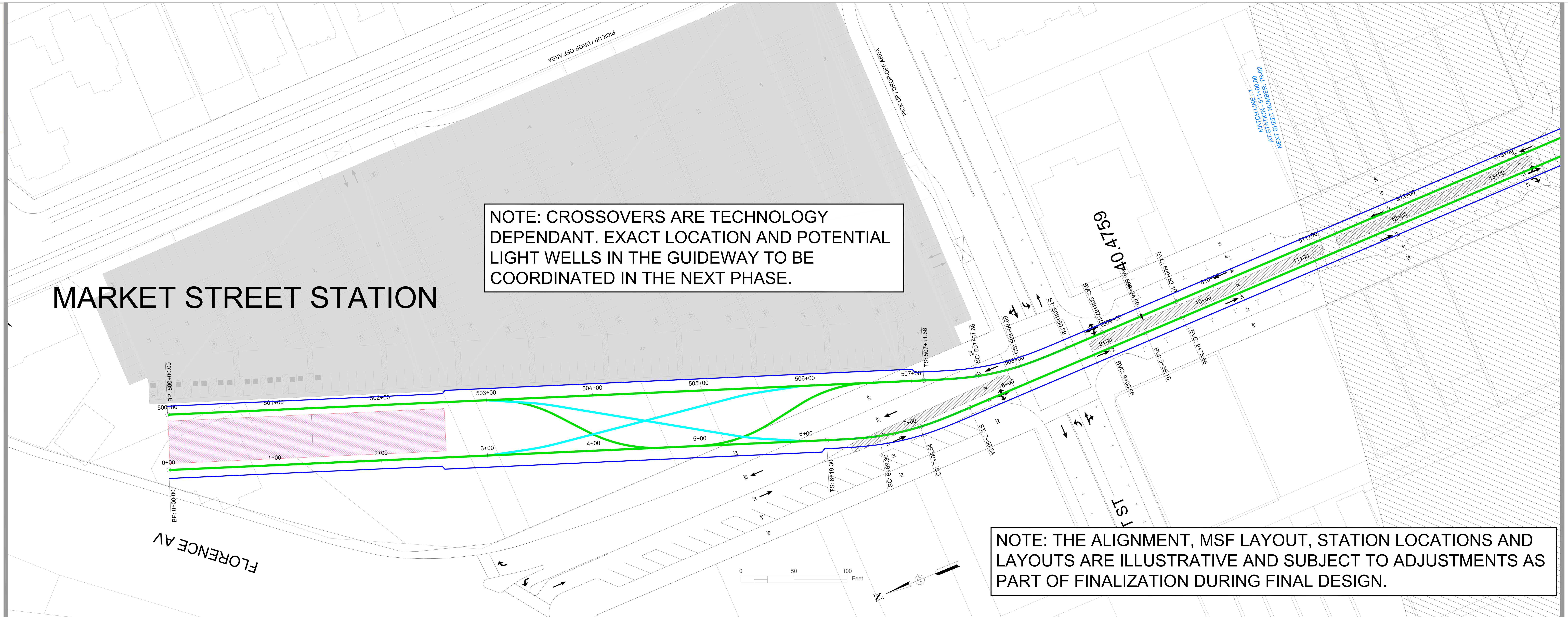
- Estimate is provided in 2018 dollars.
- A 20% contingency is applied, which is applicable due to:
  - Increased level of unknowns at this very early planning level of this project
  - The proprietary nature of the technologies, as suppliers' competitiveness, and therefore prices, vary depending on different economic factors.
- A 10% profit is assumed for the Contractor.
- Fare collection costs are identified in a separate line item as further analysis and discussions are required to determine whether fare collection will be applied to this project.
- This estimate does not include the infrastructure O&M costs or the Owner's costs for project management, technical assistance and administration of the contract, and any legal fees.

APM OPERATING SYSTEM O&M COST ESTIMATE (DOES NOT INCLUDE INFRASTRUCTURE)		
ITEM DESCRIPTION		**ESTIMATED COST**
LABOR		$5,240,000
MATERIALS		$1,810,000
	SUBTOTAL	**$7,050,000**
PROFIT AND G&A	10%	$710,000
	ANNUAL O&M CONTRACT	**$7,760,000**
UTILITIES		$1,320,000
TECHNICAL ASSISTANCE		$100,000
OTHER APM ADMINISTRATIVE REQUIREMENTS		$100,000
	SUBTOTAL	**$9,280,000**
CONTINGENCY	20%	$1,860,000
	TOTAL ANNUAL O&M COST	**$11,140,000**

Table 10-2: Conceptual APM Operating System O&M Cost Estimate

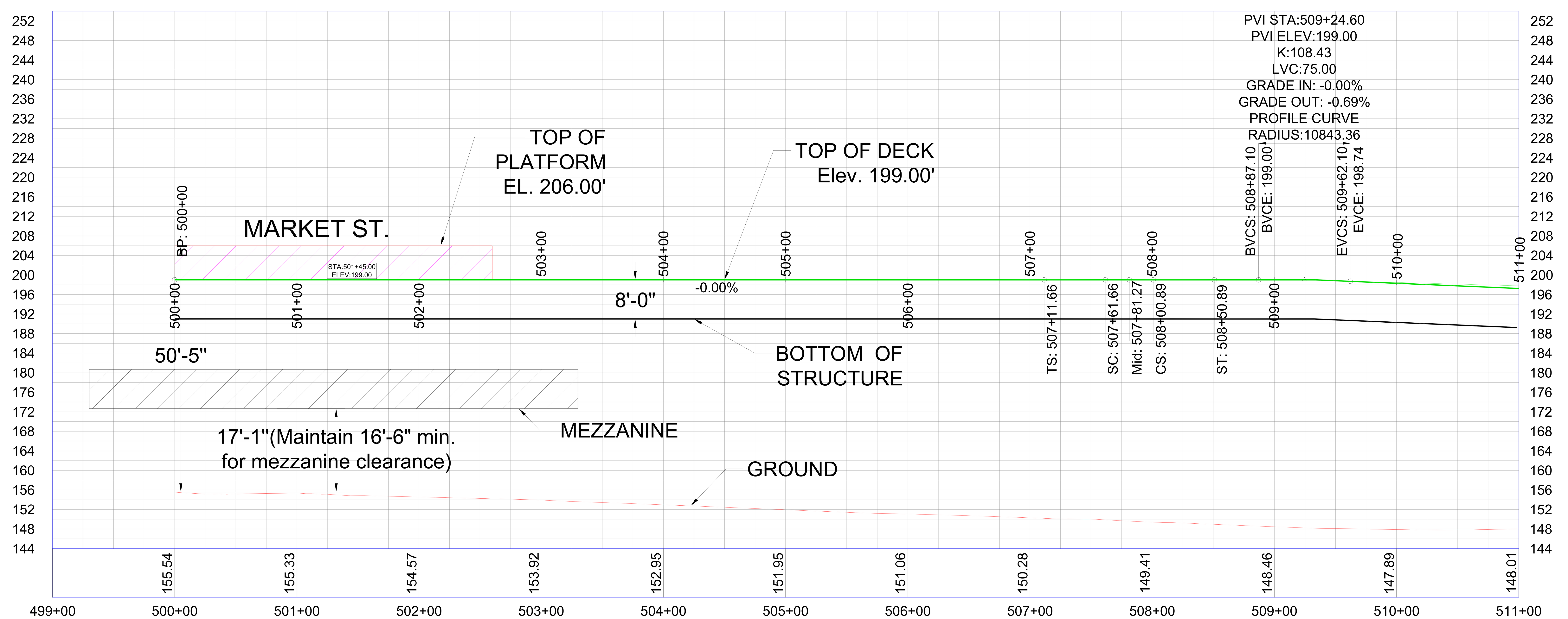
Appendix A: ITC Alignment Plan and Profile

Drawn By:
Checked By:
Approved By:



BASE PROJECT PLAN AND PROFILE; NOV 2020.

East Track PROFILE



Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

DRAFT - FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:

Revision		
No.	Date	Description

Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

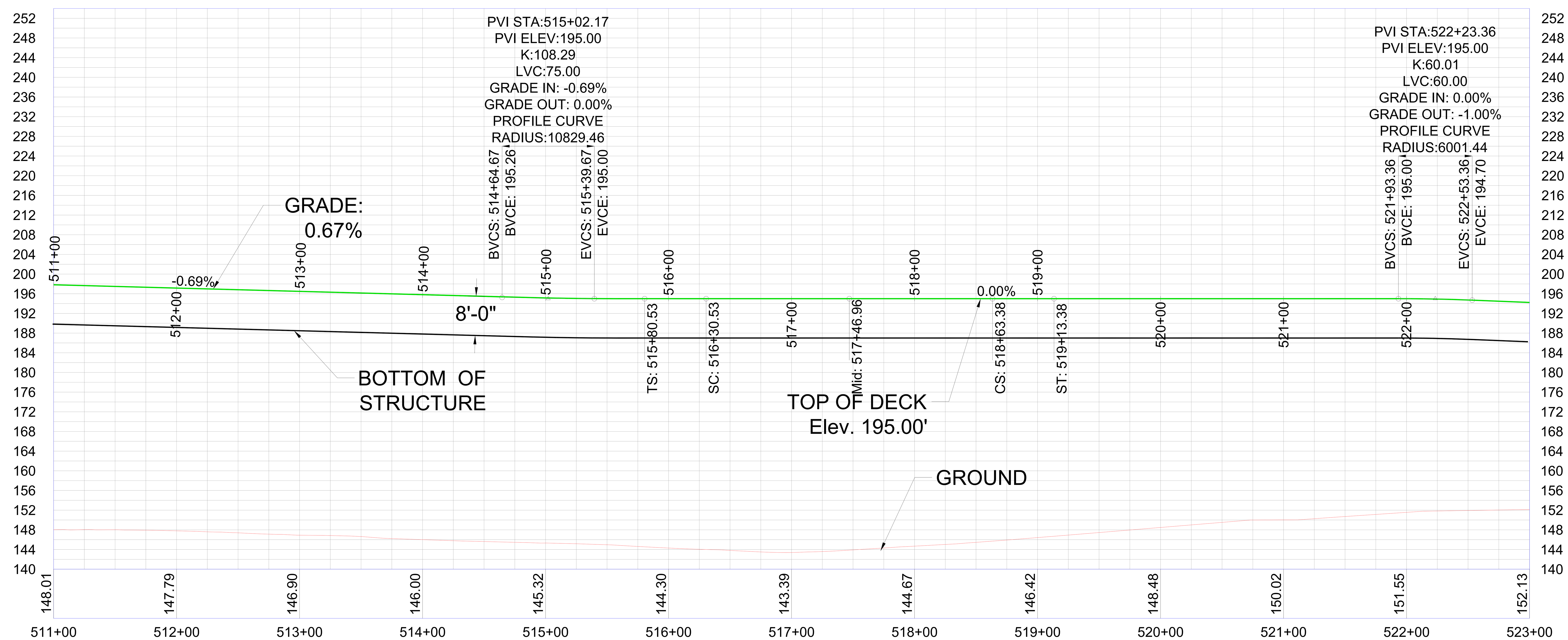
TR-01

PROJECT: 1341
DATE: 11-04-2020

Drawn By:
Checked By:
Approved By:

BASE PROJECT PLAN AND PROFILE; NOV 2020.

East Track PROFILE



Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

DRAFT - FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:

Revision		
No.	Date	Description

TR-02

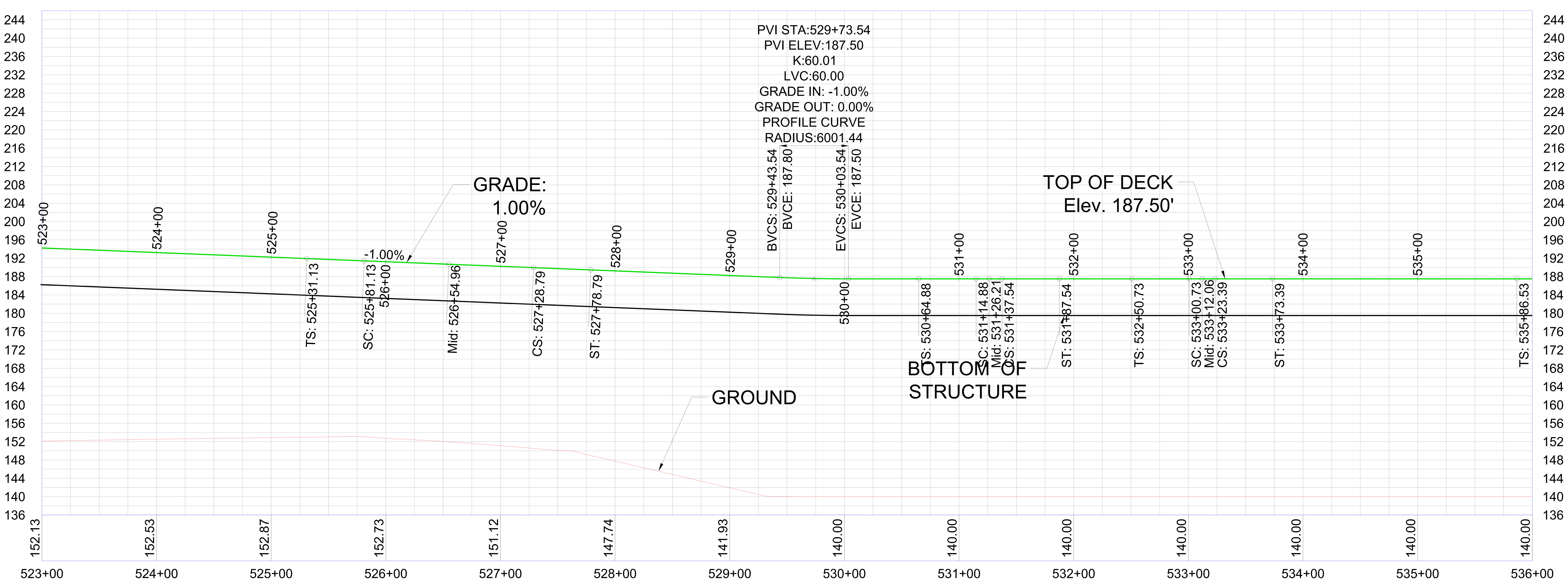
Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

PROJECT: 1341
DATE: 11-04-2020

NOTE: THE ALIGNMENT, MSF LAYOUT, STATION LOCATIONS AND LAYOUTS ARE ILLUSTRATIVE AND SUBJECT TO ADJUSTMENTS AS PART OF FINALIZATION DURING FINAL DESIGN.

BASE PROJECT PLAN AND PROFILE; NOV 2020.

East Track PROFILE



Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

Drawn By:
Checked By:
Approved By:

DRAFT - FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:

Revision		
No.	Date	Description

Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

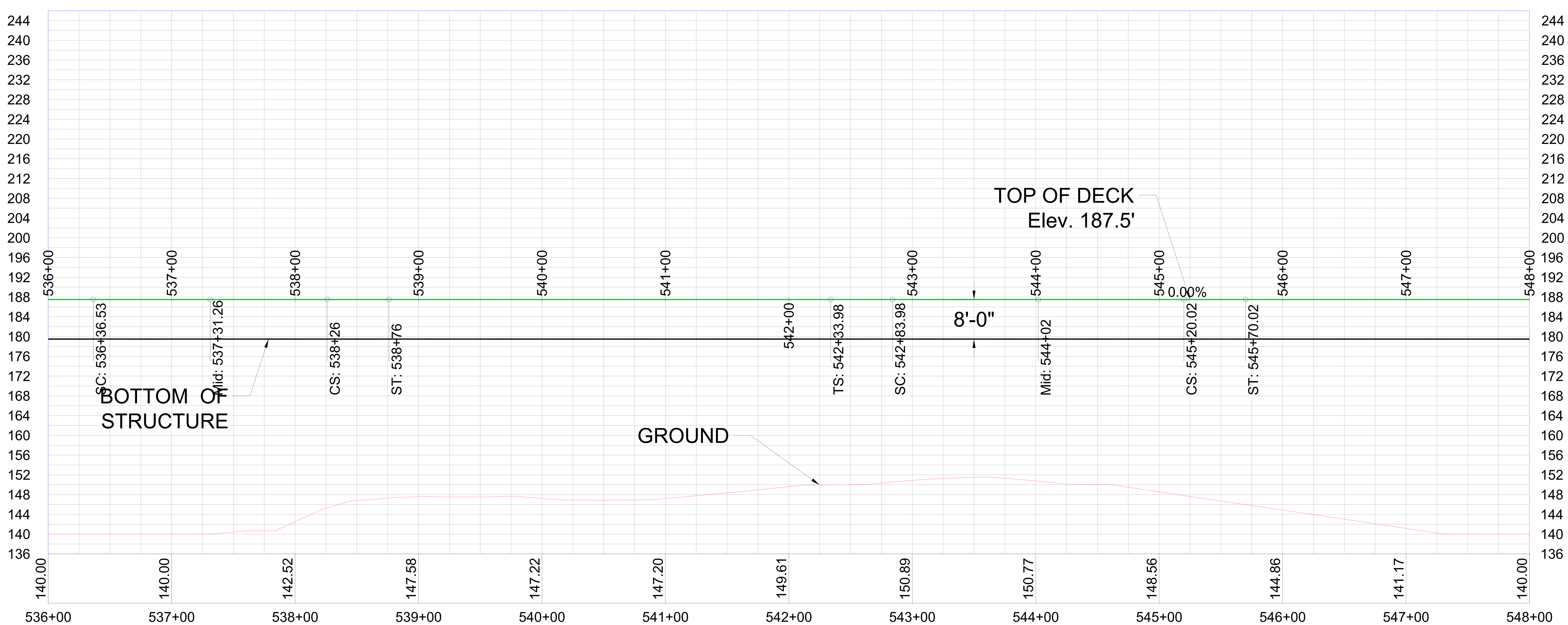
TR-03

PROJECT: 1341
DATE: 11-04-2020

Drawn By:
Checked By:
Approved By:

BASE PROJECT PLAN AND PROFILE; NOV 2020.

East Track PROFILE



Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

DRAFT - FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:

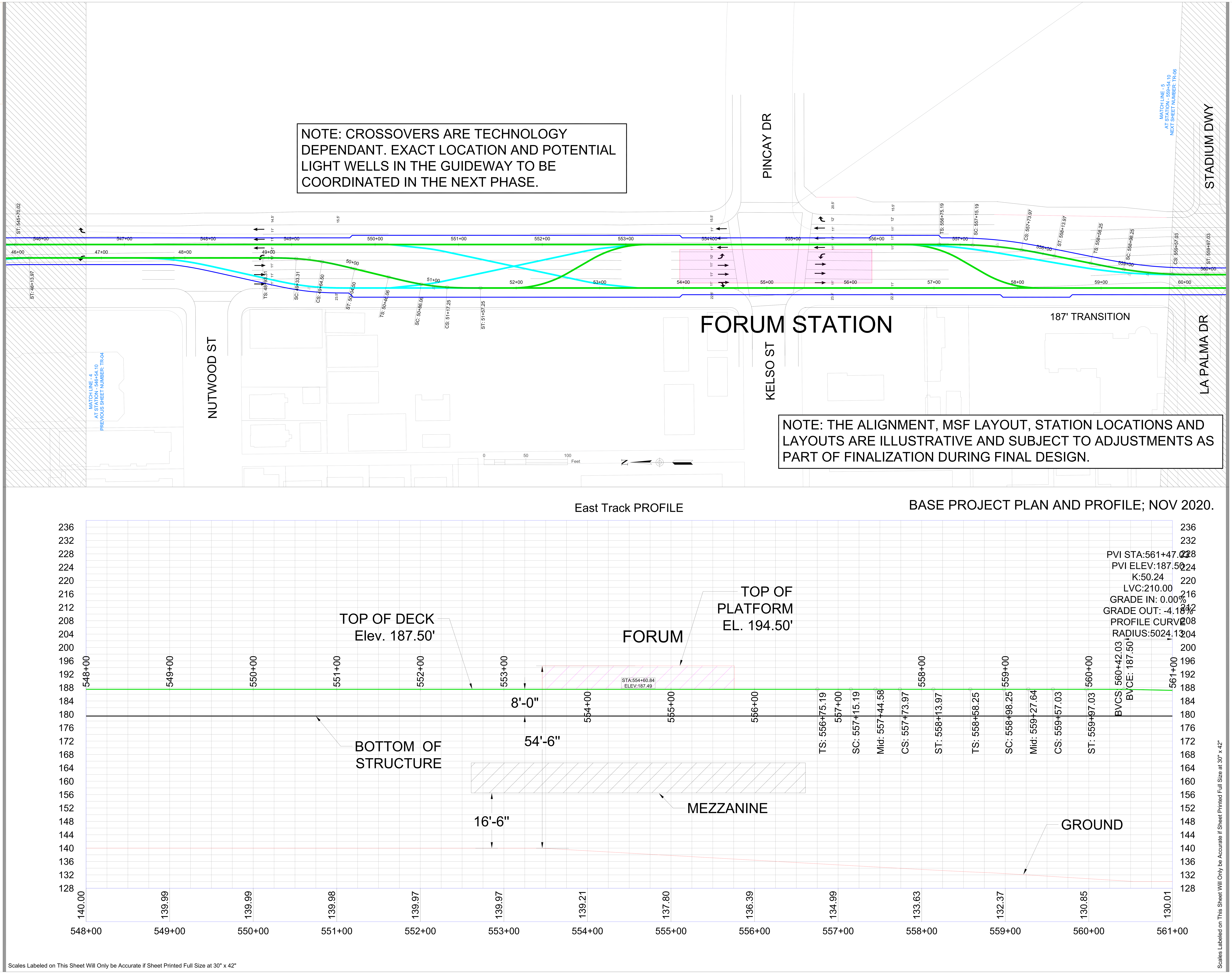
Revision		
No.	Date	Description

Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

TR-04

PROJECT: 1341
DATE: 11-04-2020

Drawn By:
Checked By:
Approved By:



DRAFT - FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:

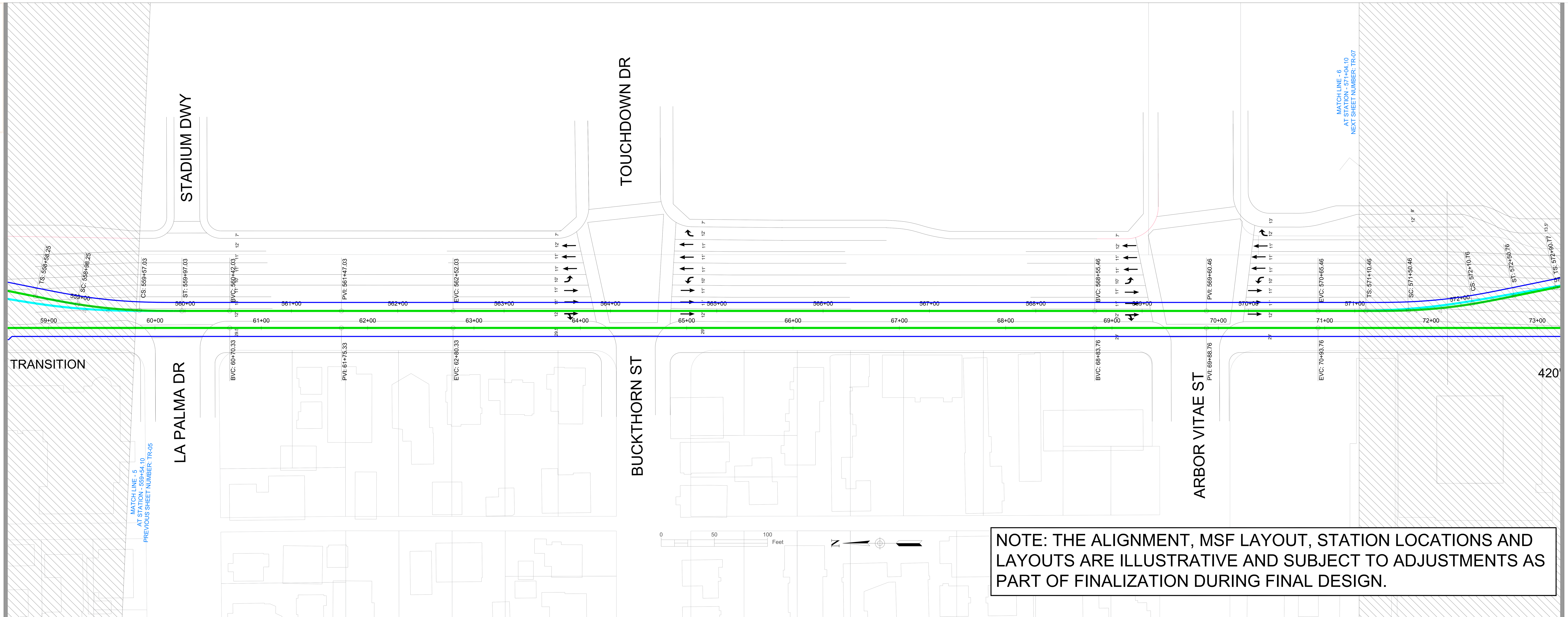
Revision		
No.	Date	Description

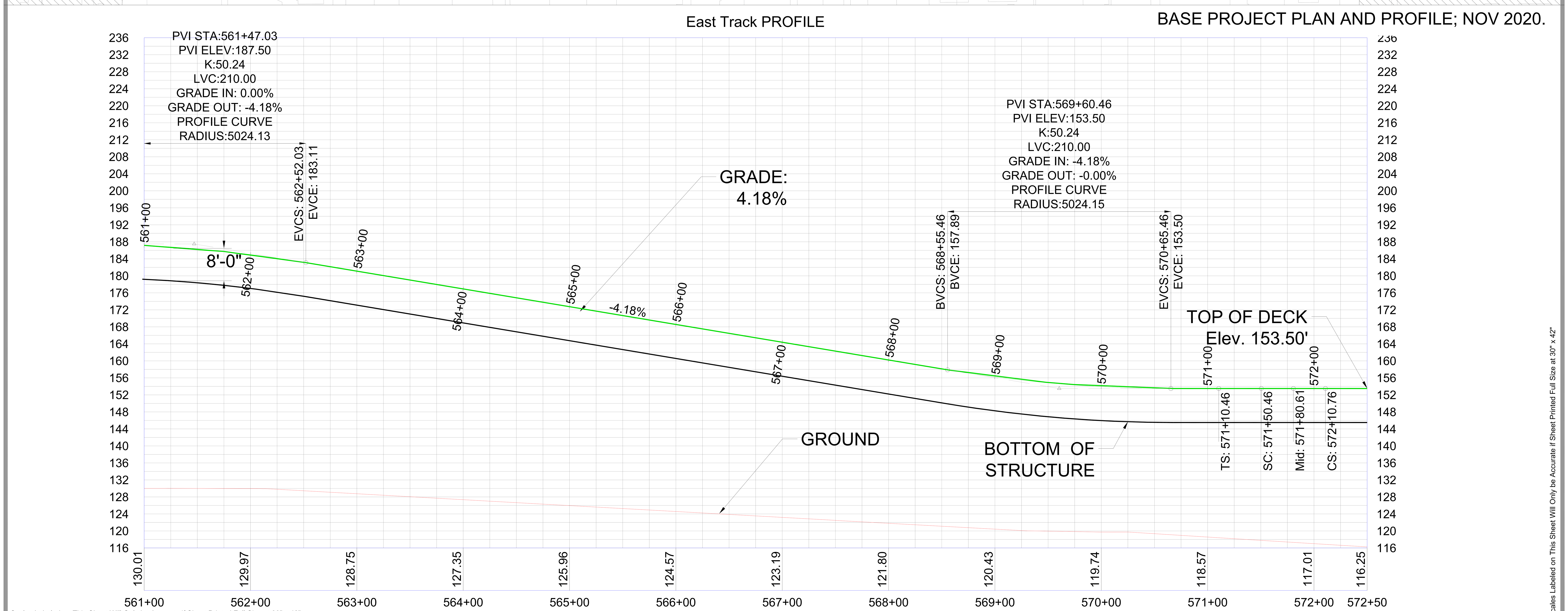
Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

TR-05

PROJECT: 1341
DATE: 11-04-2020

Drawn By:
Checked By:
Approved By:





DRAFT - FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

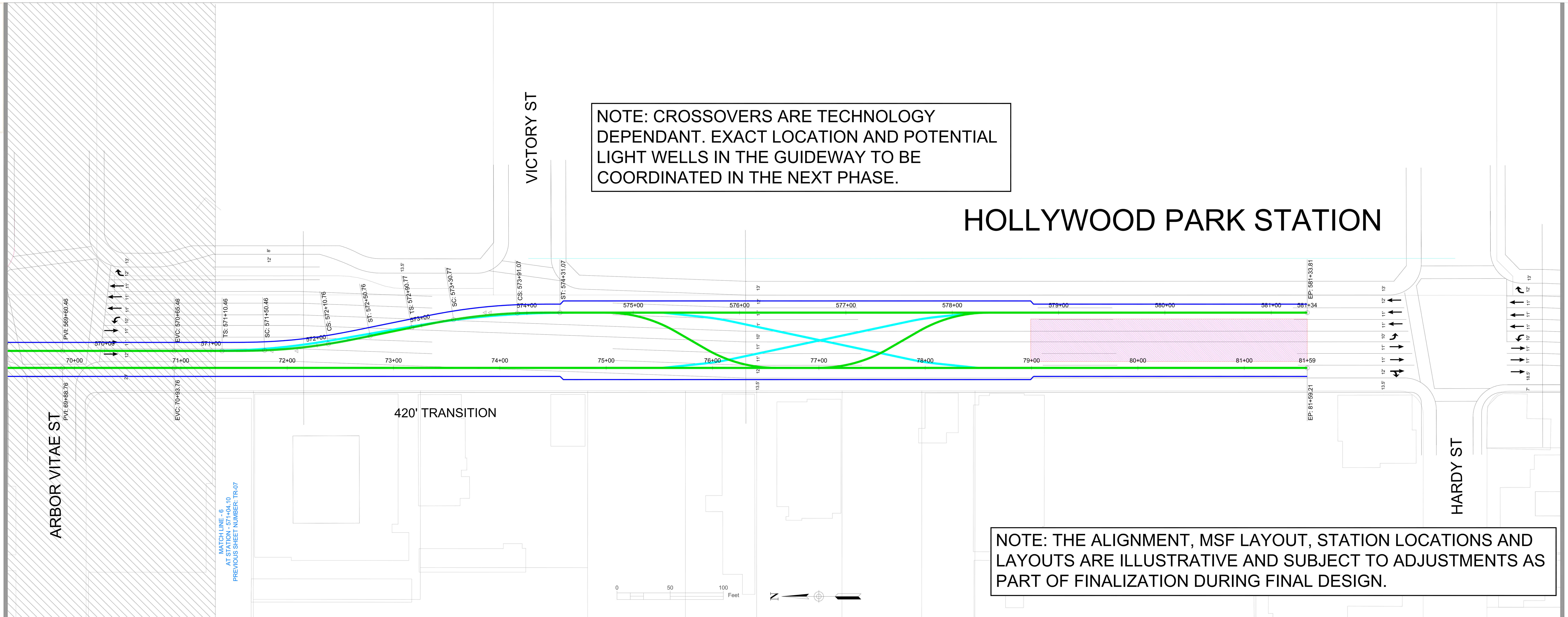
PROJECT PACKAGE:

Revision		
No.	Date	Description

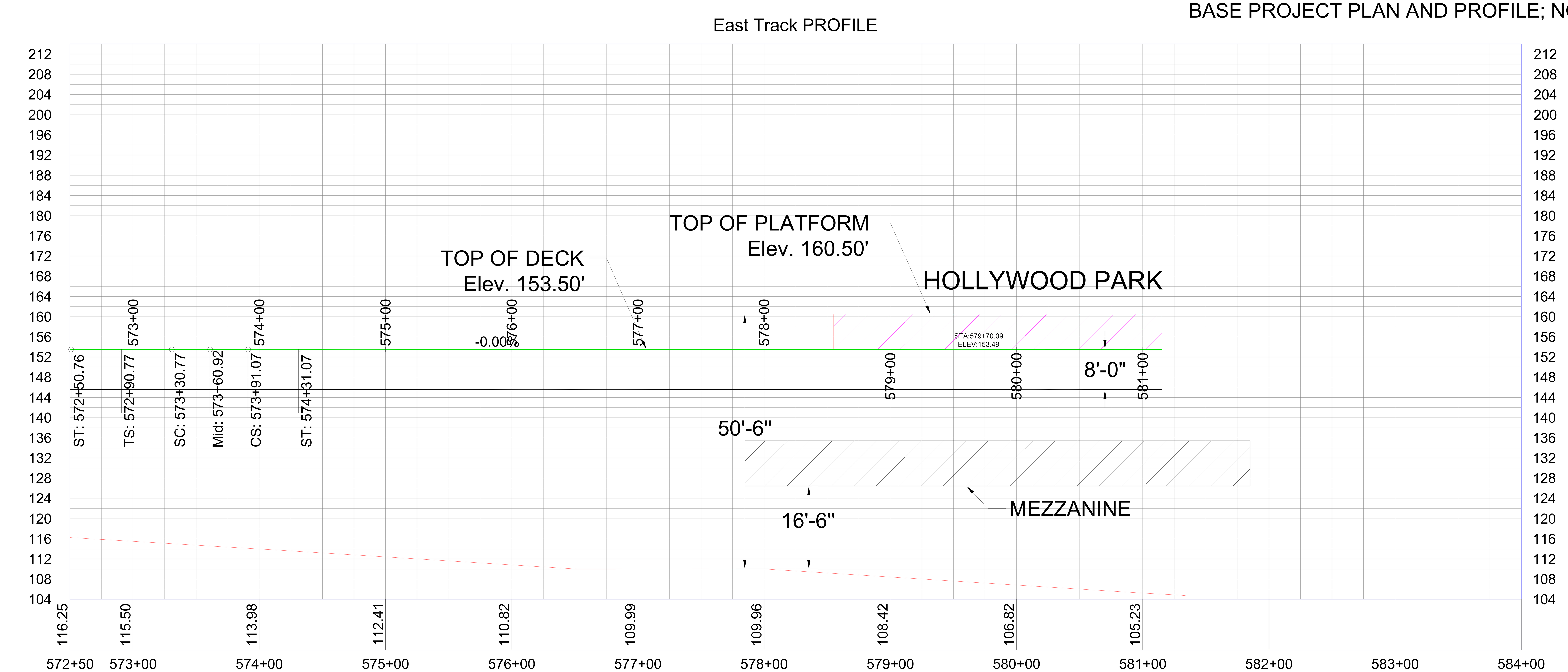
Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

TR-06

PROJECT: 1341
DATE: 11-04-2020



BASE PROJECT PLAN AND PROFILE; NOV 2020.



DRAFT - FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:

Revision

No.	Date	Description

Drawn By:
Checked By:
Approved By:

TR-07

PROJECT: 1341
DATE: 11-04-2020

Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

Appendix B: Prairie Ave. Utility Review Summary

MEMORANDUM

Date: May 31, 2019

To: Louis Atwell, City of Inglewood
Peter Puglese, City of Inglewood

From: Iris Yuan, Lea+Elliott, Inc.

CC: Lisa Trifiletti, Omar Pulido – Trifiletti Consulting
Sanjeev Shah, Sambit Bhattarcharjee, Eduardo Cuadra – Lea+Elliott, Inc.
Desiree Gonzales – Pacifica Services, Inc.

Subject: Inglewood Transit Connector
Utility Analysis Summary

This memo summarizes the review of the utilities along Prairie Ave. for the Inglewood Transit Connector and the identification of those utilities to be avoided during the planning for the column locations.

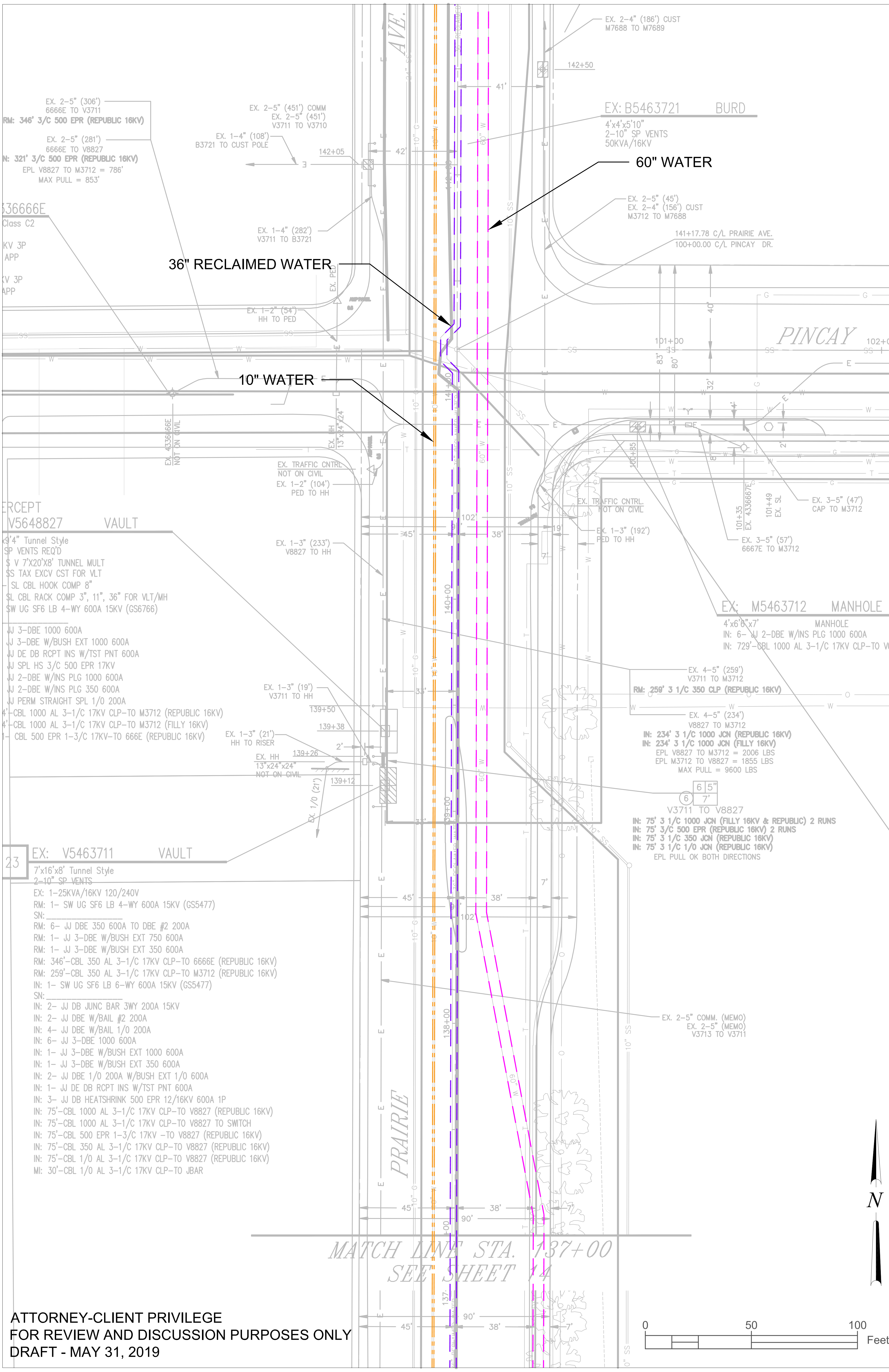
During the September 13, 2018 meeting between the ITC team and the City of Inglewood, the City noted that any utilities along Prairie Ave. could be relocated with the exception of the large water and sewer pipes.

The City provided the utilities along Prairie Ave. for review (file name: Inglewood-Utilities.dwg).

In reviewing this drawing, the following large water and sewer pipes were identified as those to be avoided:

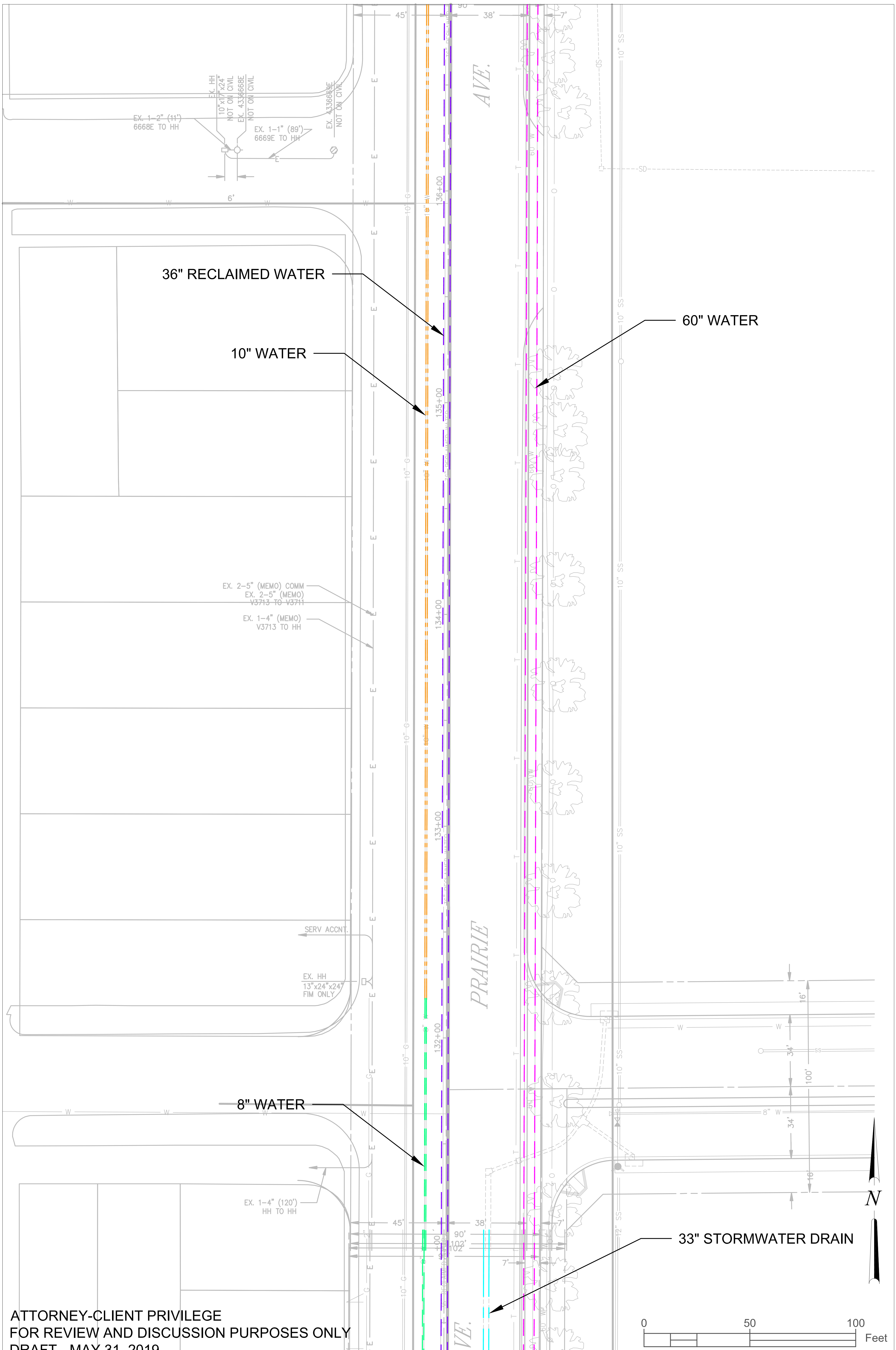
- 60" Water
- 36" Reclaimed Water
- 33" SD (Stormwater Drain)
- 39" SD (Stormwater Drain)
- 60" SD (Stormwater Drain)
- 8" Water
- Connections to the stormwater drains

These water, reclaimed water, and stormwater drain pipes, along with the connections to the sewer drain, are shown in Attachment A: Prairie Ave Utility Review Drawings.



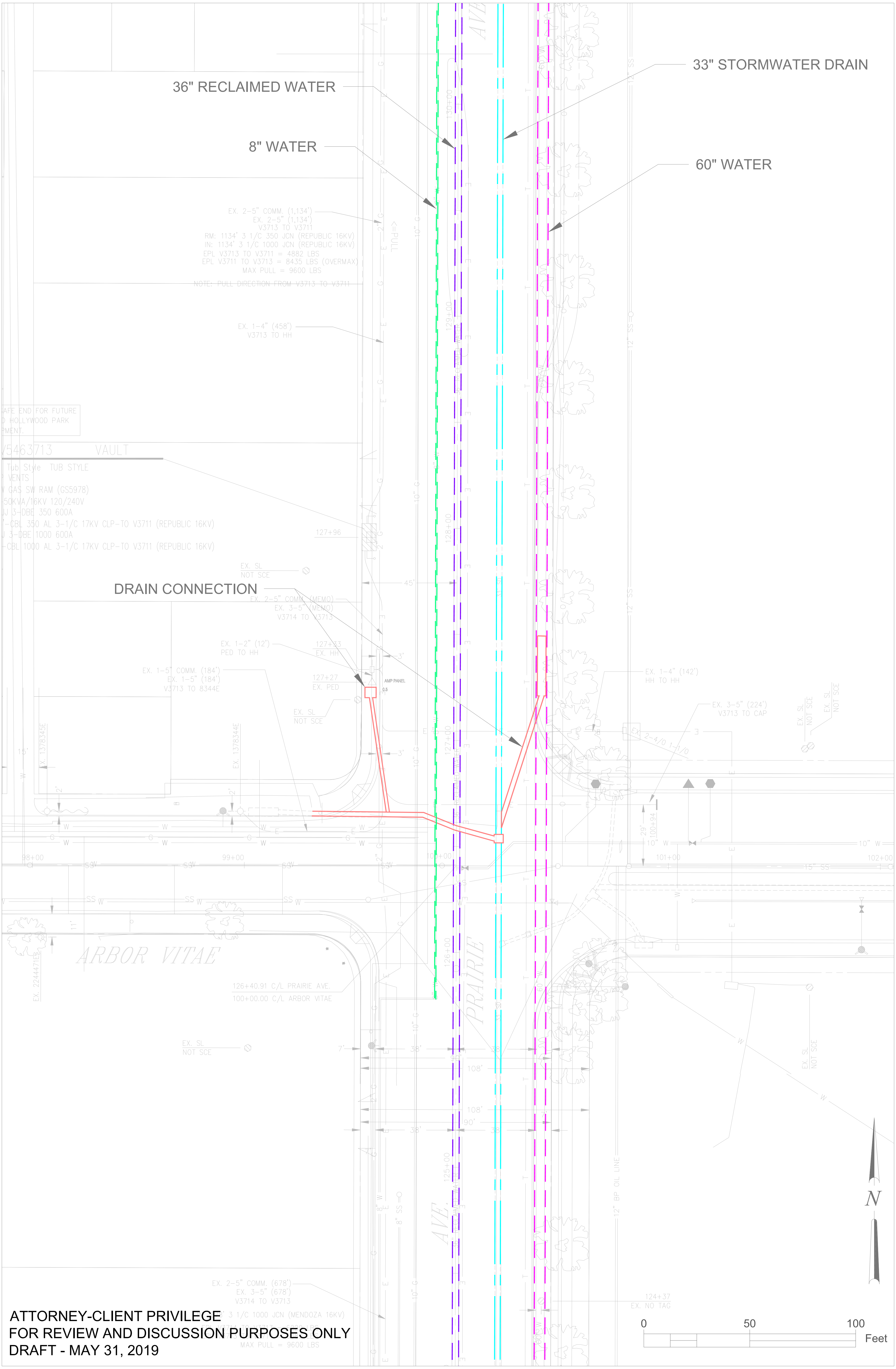
ATTORNEY-CLIENT PRIVILEGE
FOR REVIEW AND DISCUSSION PURPOSES ONLY
DRAFT - MAY 31, 2019

PRAIRIE AVE. UTILITY REVIEW (PAGE 1)

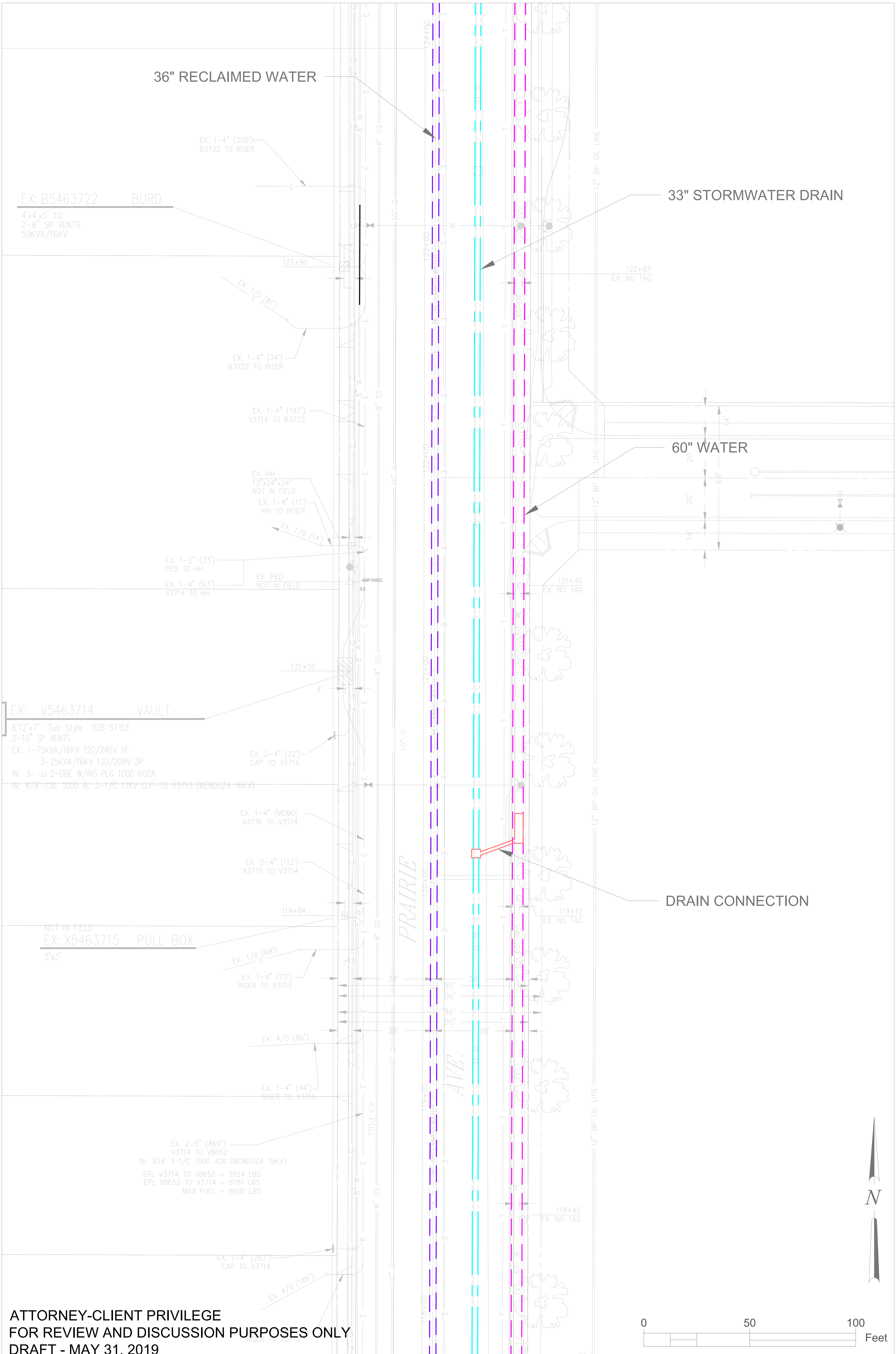


ATTORNEY-CLIENT PRIVILEGE
FOR REVIEW AND DISCUSSION PURPOSES ONLY
DRAFT - MAY 31, 2019

PRAIRIE AVE. UTILITY REVIEW (PAGE 2)

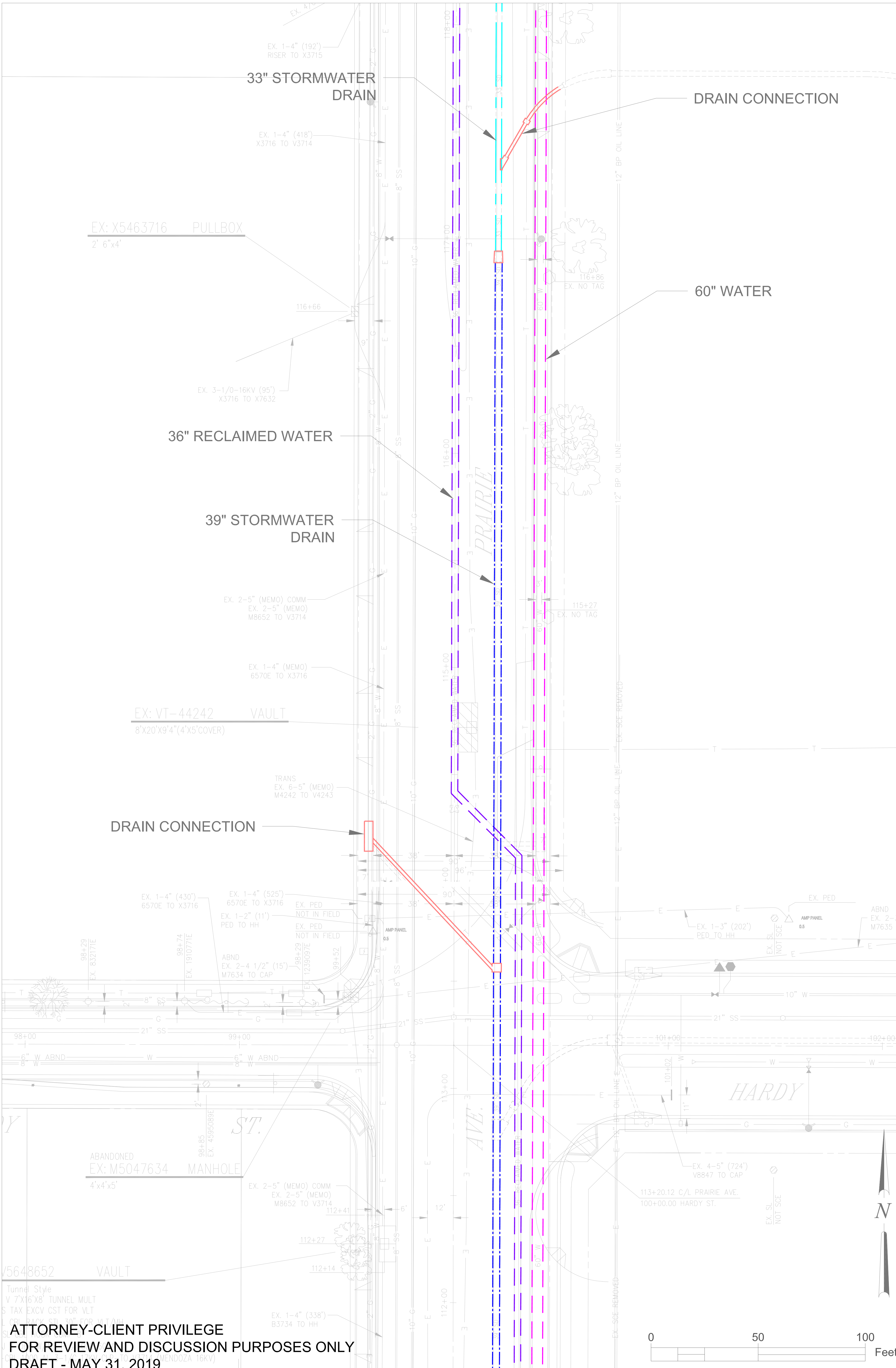


PRAIRIE AVE. UTILITY REVIEW (PAGE 3)

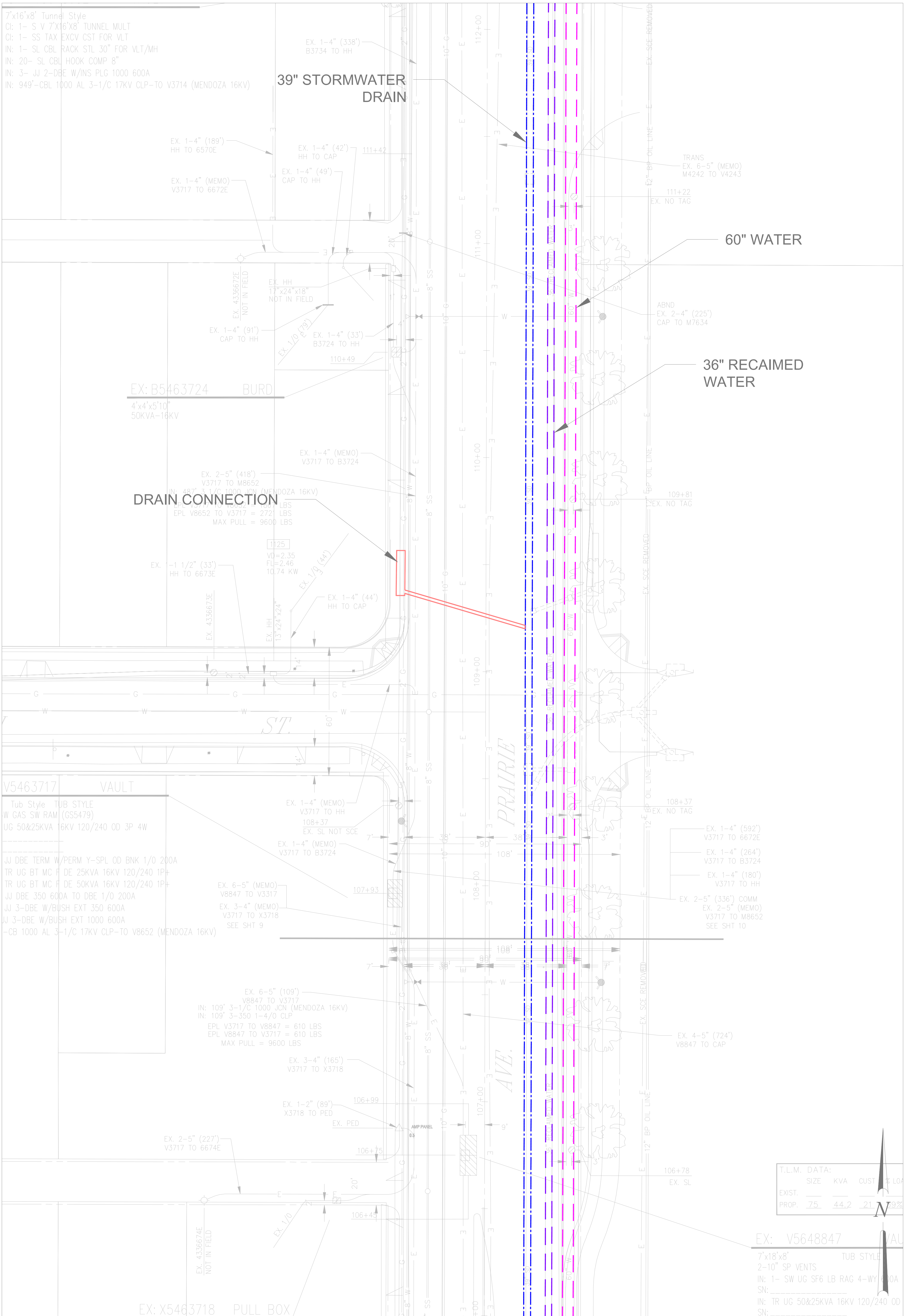


ATTORNEY-CLIENT PRIVILEGE
FOR REVIEW AND DISCUSSION PURPOSES ONLY
DRAFT - MAY 31, 2019

PRAIRIE AVE. UTILITY REVIEW (PAGE 4)

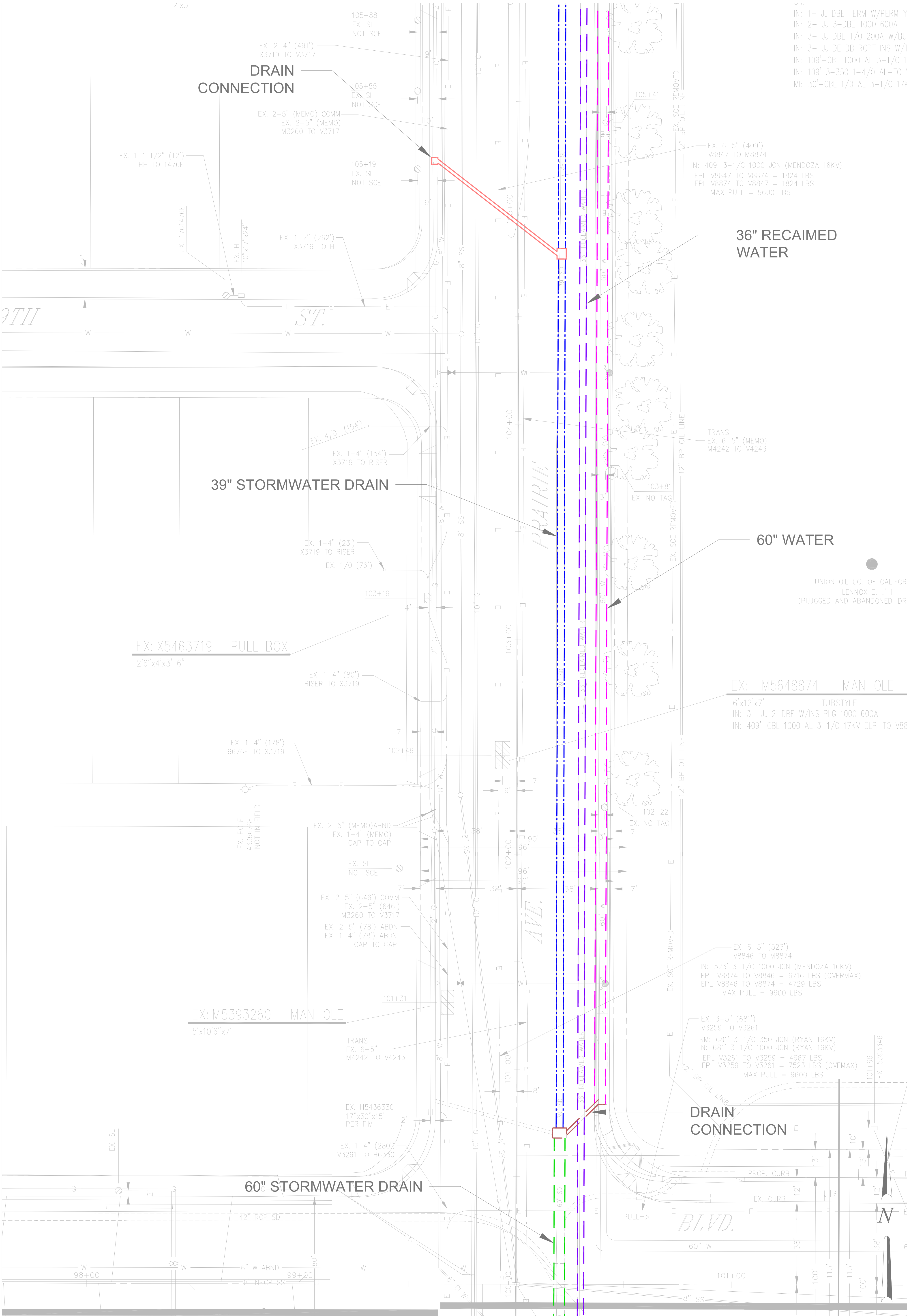


PRAIRIE AVE. UTILITY REVIEW (PAGE 5)



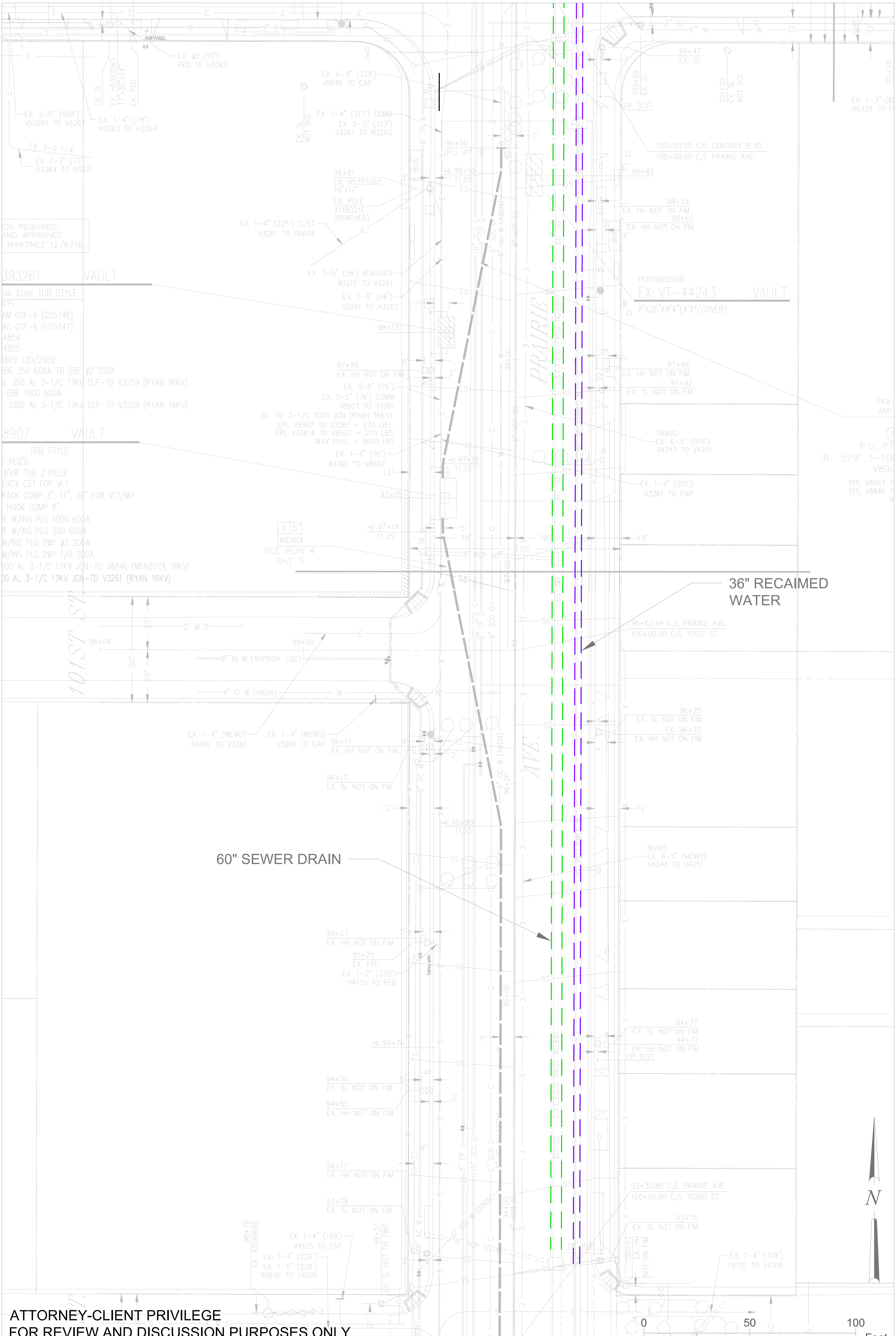
ATTORNEY-CLIENT PRIVILEGE
FOR REVIEW AND DISCUSSION PURPOSES ONLY
DRAFT - MAY 31, 2019

PRAIRIE AVE. UTILITY REVIEW (PAGE 6)



ATTORNEY-CLIENT PRIVILEGE
FOR REVIEW AND DISCUSSION PURPOSES ONLY
DRAFT - MAY 31, 2019

PRAIRIE AVE. UTILITY REVIEW (PAGE 7)



ATTORNEY-CLIENT PRIVILEGE
FOR REVIEW AND DISCUSSION PURPOSES ONLY
DRAFT - MAY 31, 2019

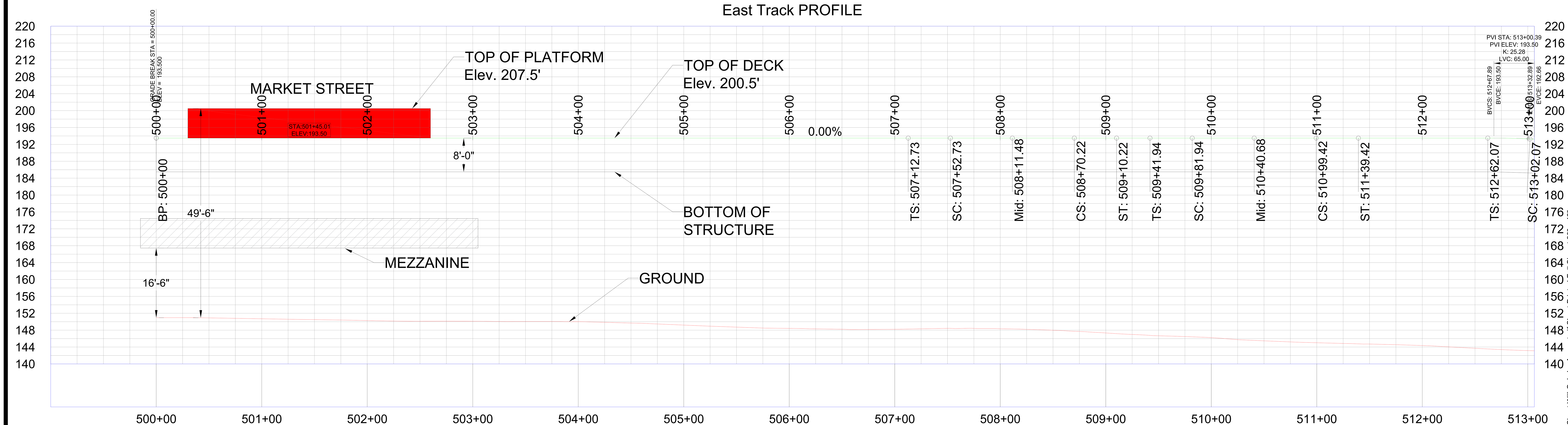
PRAIRIE AVE. UTILITY REVIEW (PAGE 8)

Appendix C: Five Station Alignment

ATTORNEY-CLIENT PRIVILEGE
FOR REVIEW AND DISCUSSION PURPOSES ONLY
DRAFT - MAY 23, 2019

Drawn By:
Checked By:
Approved By:

East Track PROFILE



Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

DRAFT- FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

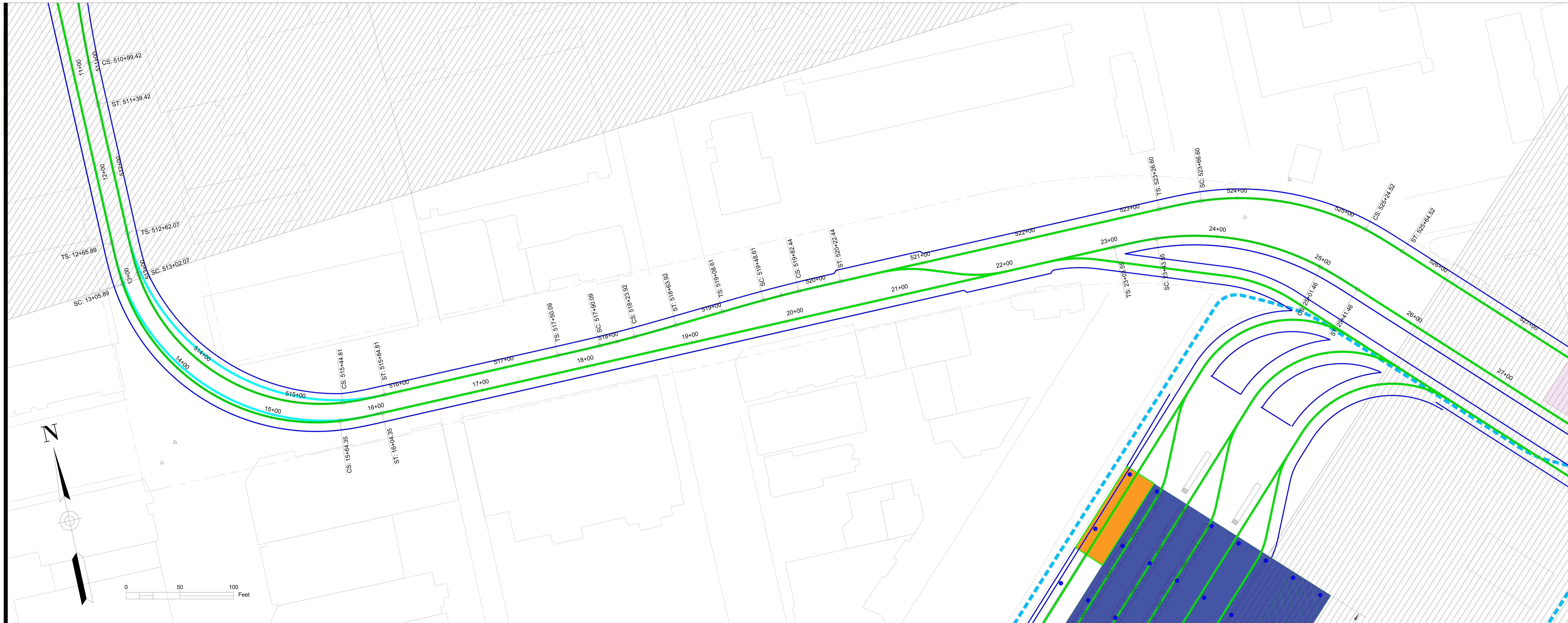
PROJECT PACKAGE:
APM REFERENCE DRAWINGS

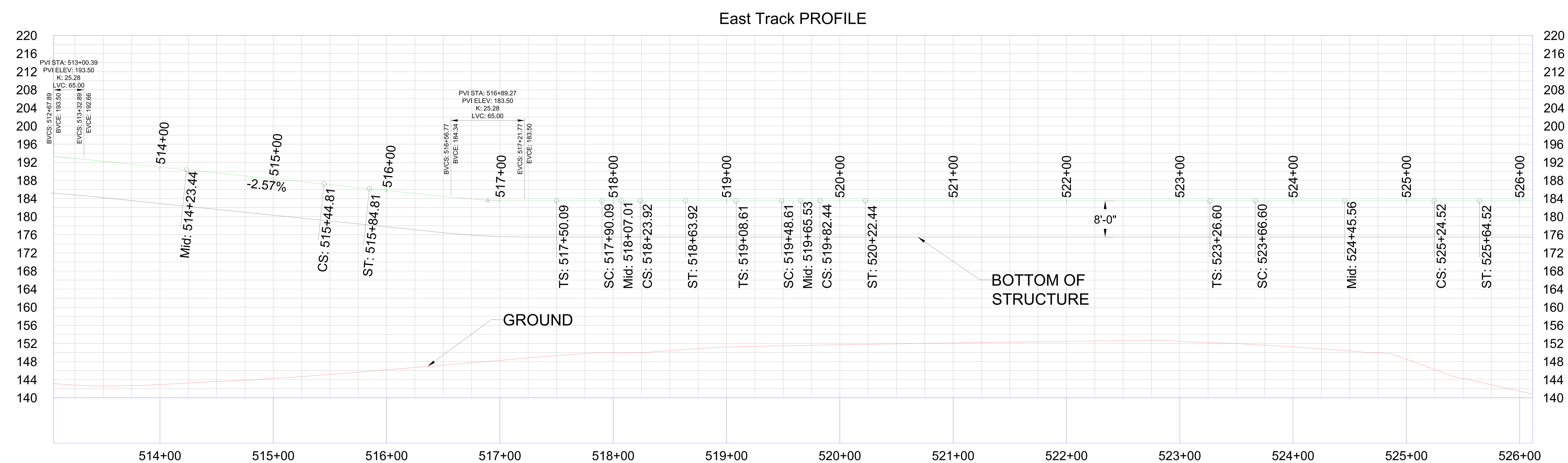
Revision		
No.	Date	Description

Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

TR-01

PROJECT: 1920
DATE:





Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

DRAFT- FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:
APM REFERENCE DRAWINGS

Revision

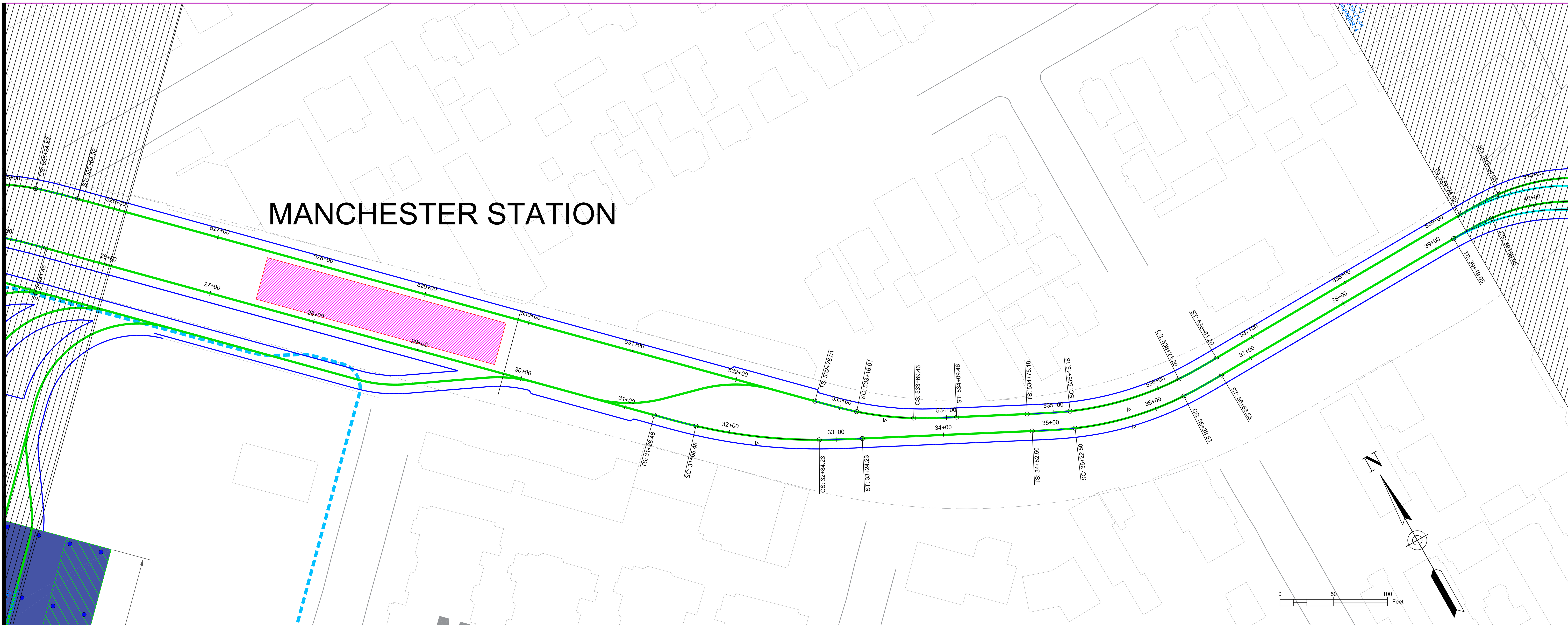
No.	Date	Description

TR-02

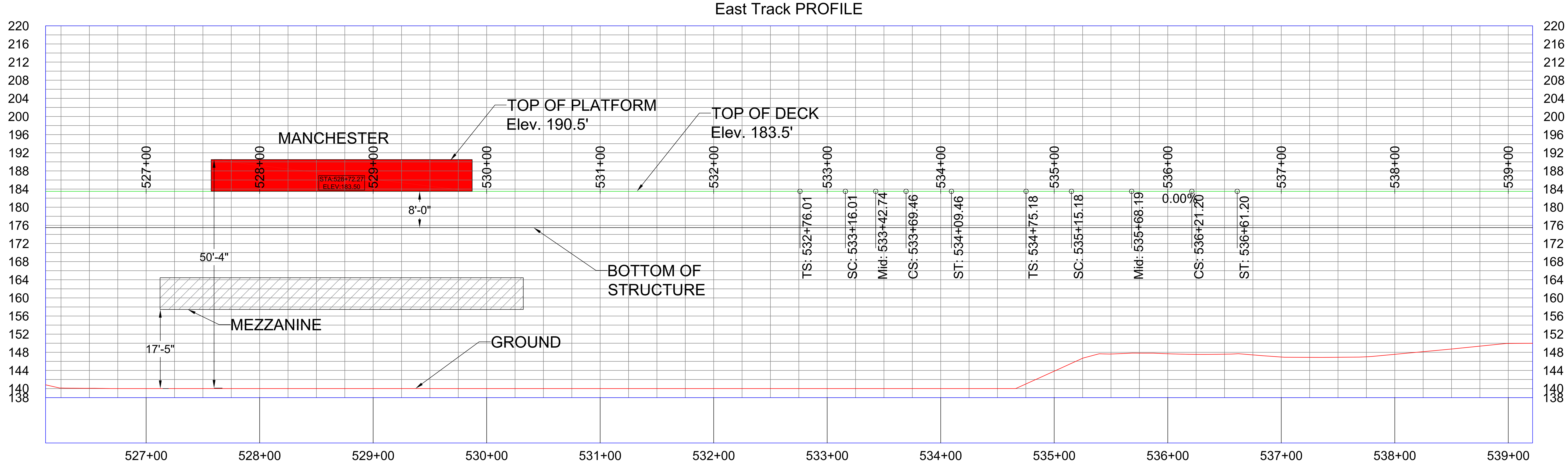
PROJECT: 1920
DATE:

Drawn By: E.CUADRA
Checked By: S.BHATTA
Approved By: L.COLEMAN

Drawn By: E.CUADRA
Checked By: S.BHATTA
Approved By: L.COLEMAN



East Track PROFILE



Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

DRAFT- FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:
APM REFERENCE DRAWINGS

Revision

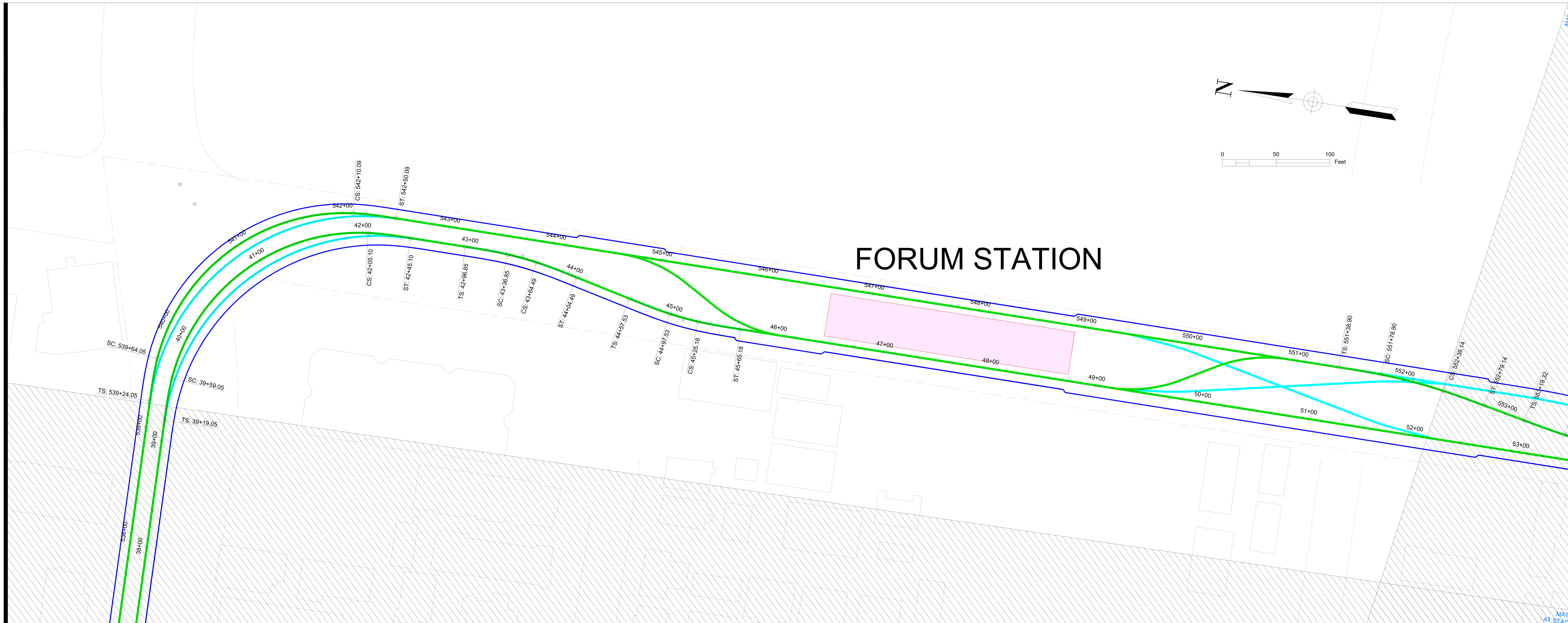
No.	Date	Description

TR-03

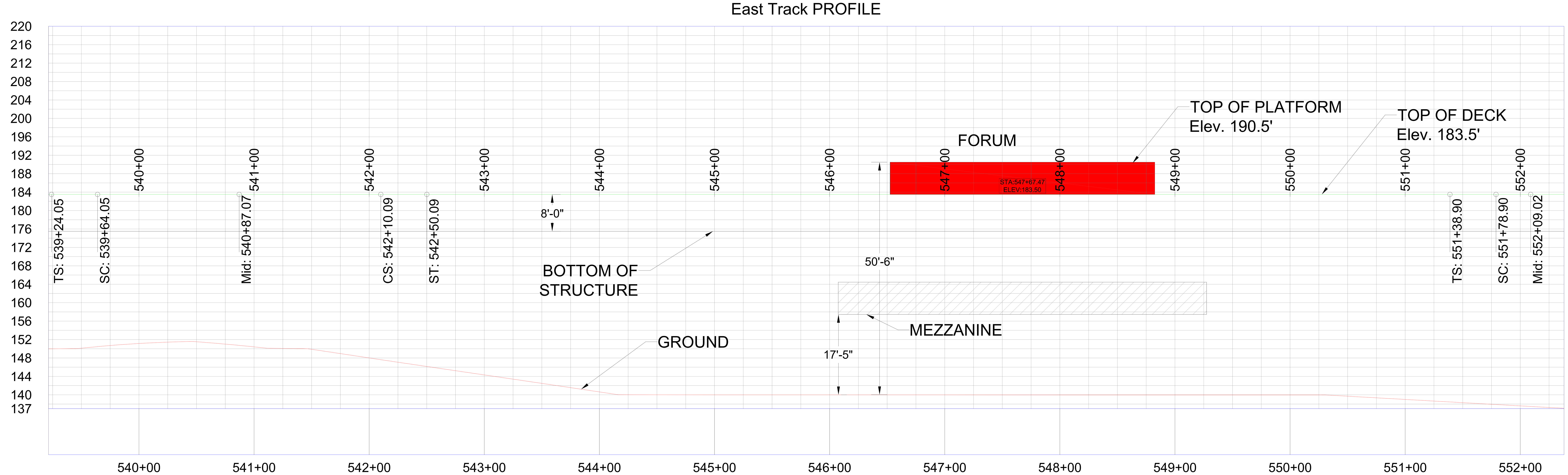
PROJECT: 1920
DATE:

Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

Drawn By: E.CUADRA
Checked By: S.BHATTA
Approved By: L.COLEMAN



East Track PROFILE



Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

DRAFT- FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:
APM REFERENCE DRAWINGS

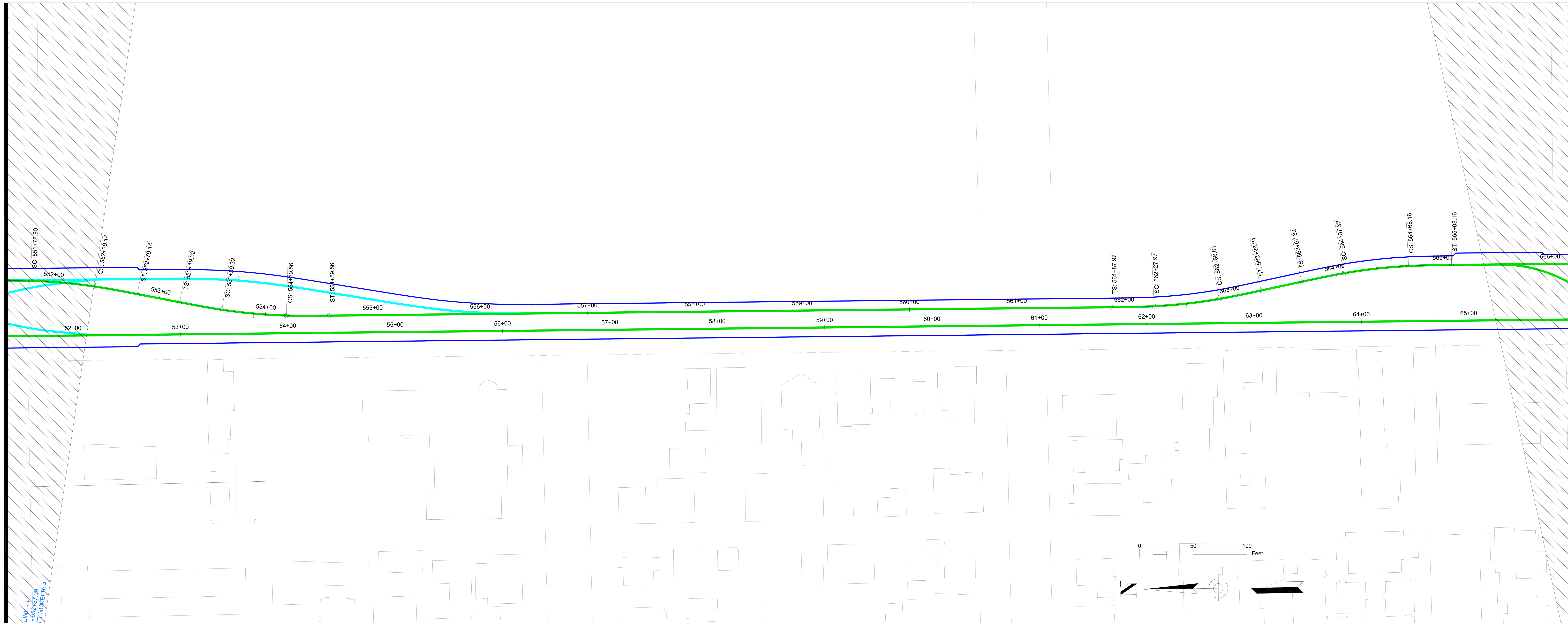
Revision		
No.	Date	Description

Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

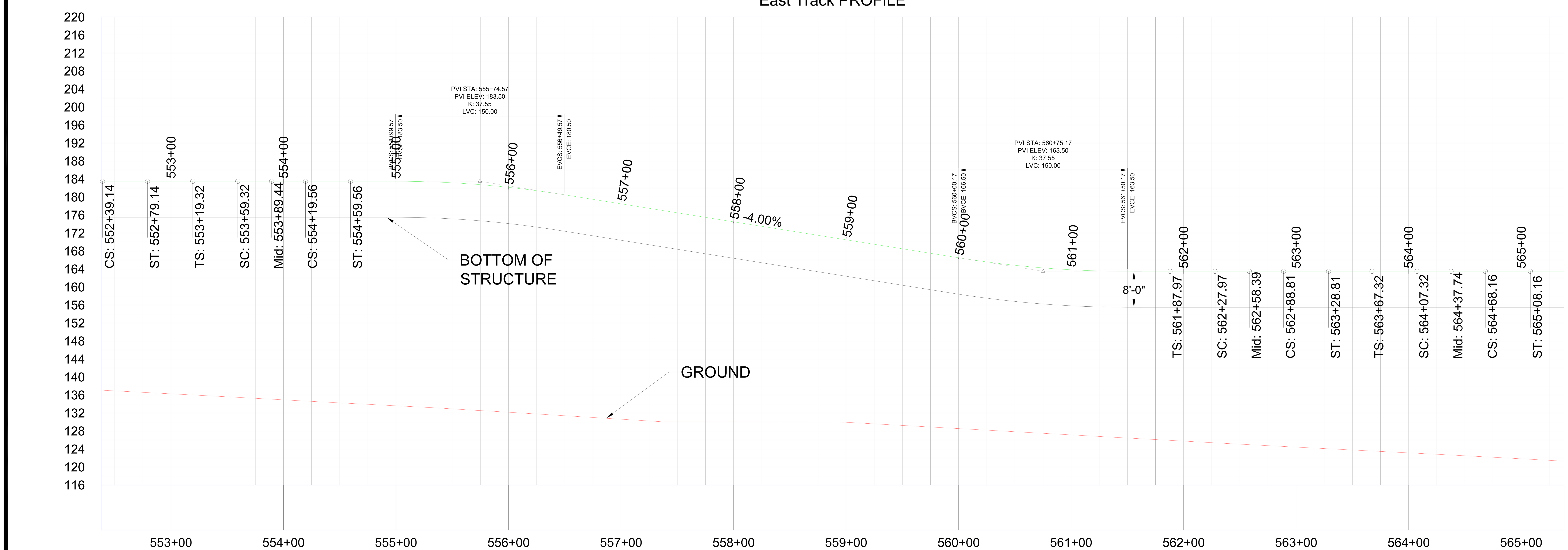
TR-04

PROJECT: 1920
DATE:

Drawn By: E.CUADRA
Checked By: S.BHATTA
Approved By: L.COLEMAN



East Track PROFILE



Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

DRAFT- FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:
APM REFERENCE DRAWINGS

Revision

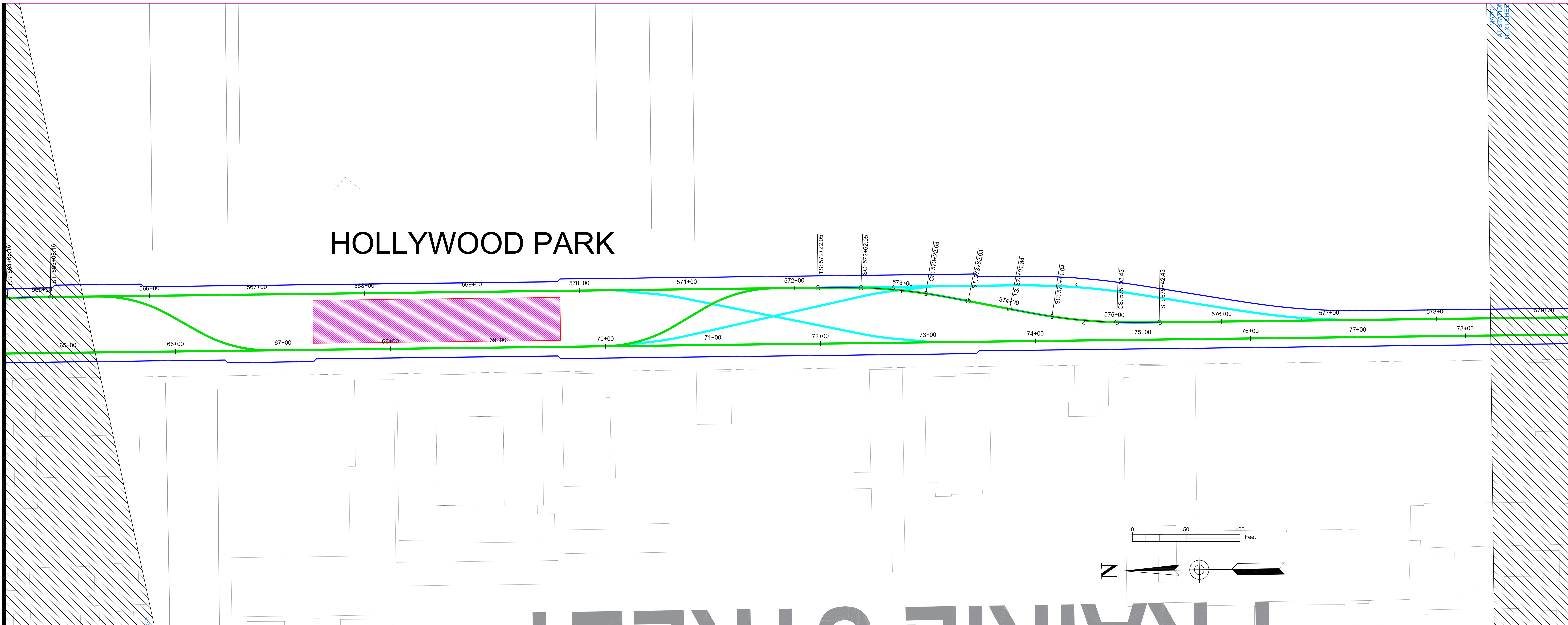
No.	Date	Description

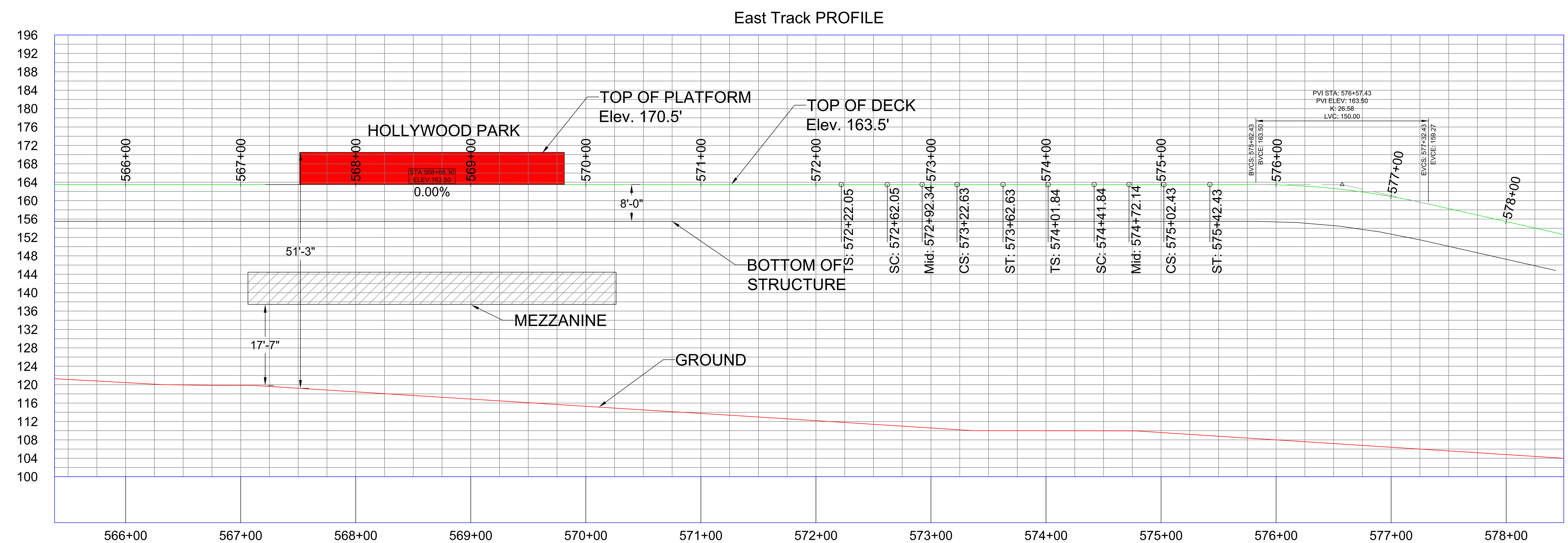
Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

TR-05

PROJECT: 1920
DATE:

Drawn By: E.CUADRA
Checked By: S.BHATTA
Approved By: L.COLEMAN





Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

DRAFT- FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:

APM REFERENCE DRAWINGS

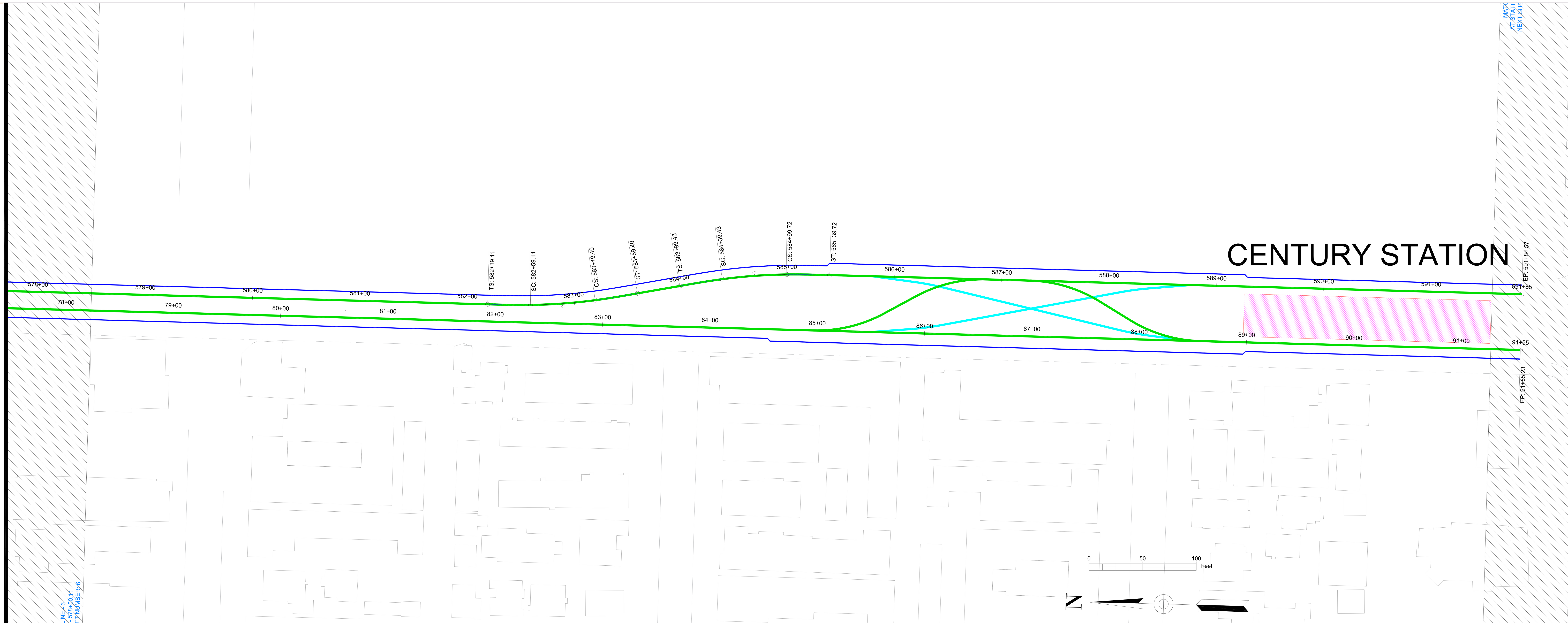
Revision		
No.	Date	Description

Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

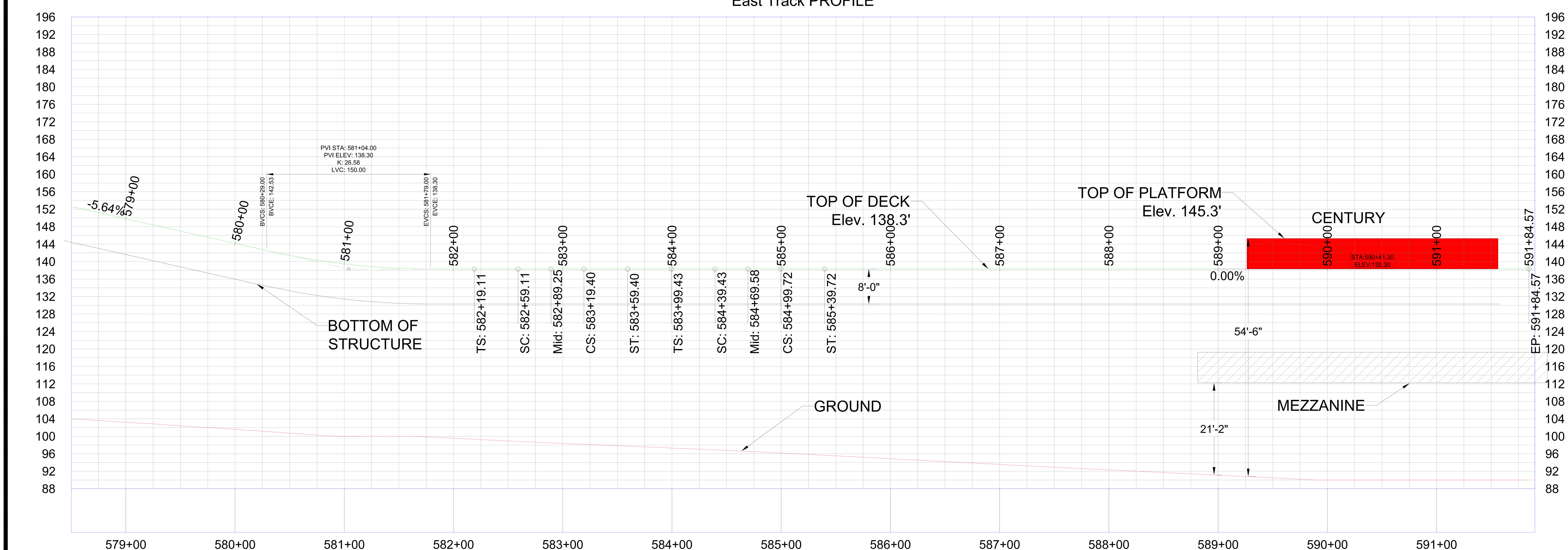
TR-06

PROJECT: 1920
DATE:

Drawn By: E.CUADRA
Checked By: S.BHATTA
Approved By: L.COLEMAN



East Track PROFILE



Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

DRAFT- FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

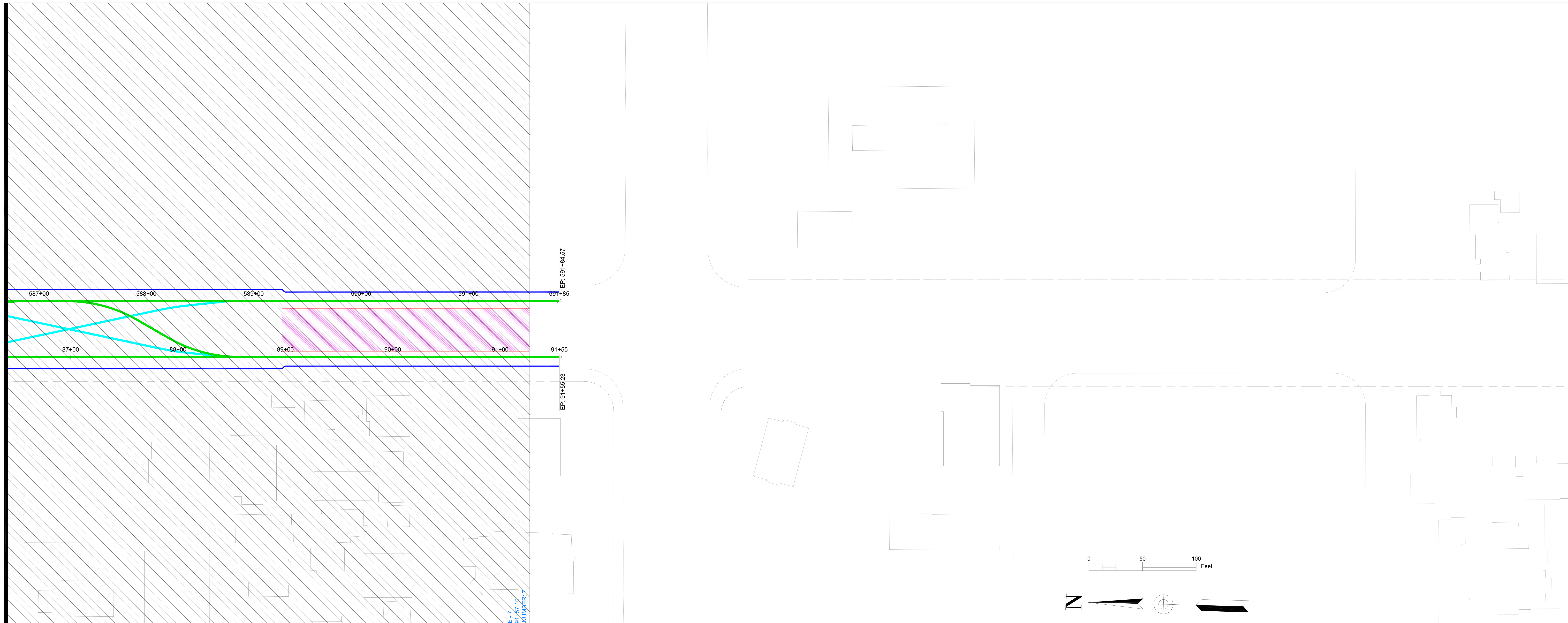
PROJECT PACKAGE:
APM REFERENCE DRAWINGS

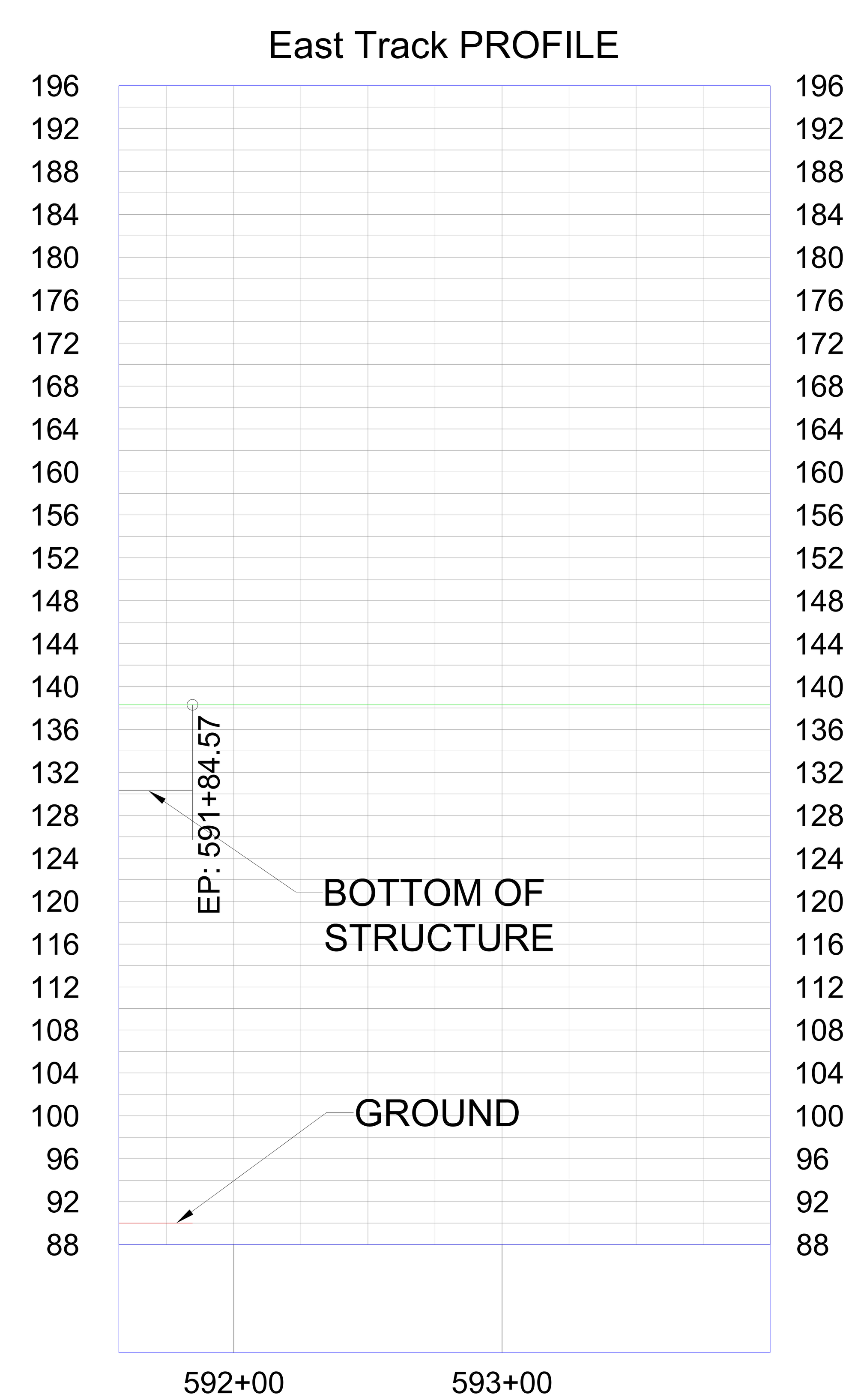
Revision		
No.	Date	Description

TR-07

PROJECT: 1920
DATE:

Drawn By: E.CUADRA
Checked By: S.BHATTA
Approved By: L.COLEMAN





Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

DRAFT- FOR INTERNAL DISCUSSION PURPOSES ONLY

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT PACKAGE:
APM REFERENCE DRAWINGS

Revision		
No.	Date	Description

Scales Labeled on This Sheet Will Only be Accurate if Sheet Printed Full Size at 30" x 42"

TR-08

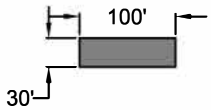
PROJECT: 1920
DATE:

Appendix D: Potential Locations for Traction Power Substations

Appendix D: Potential Locations for Traction Power Substations

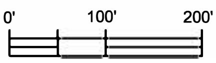
- Approximate locations for the traction power substations are identified. The exact size of the available properties is to be determined.
- The location of the substation within each of the identified areas is to be determined.
- Each substation is approximately 3000 sq ft with a building height of approximately 15 to 20 ft.

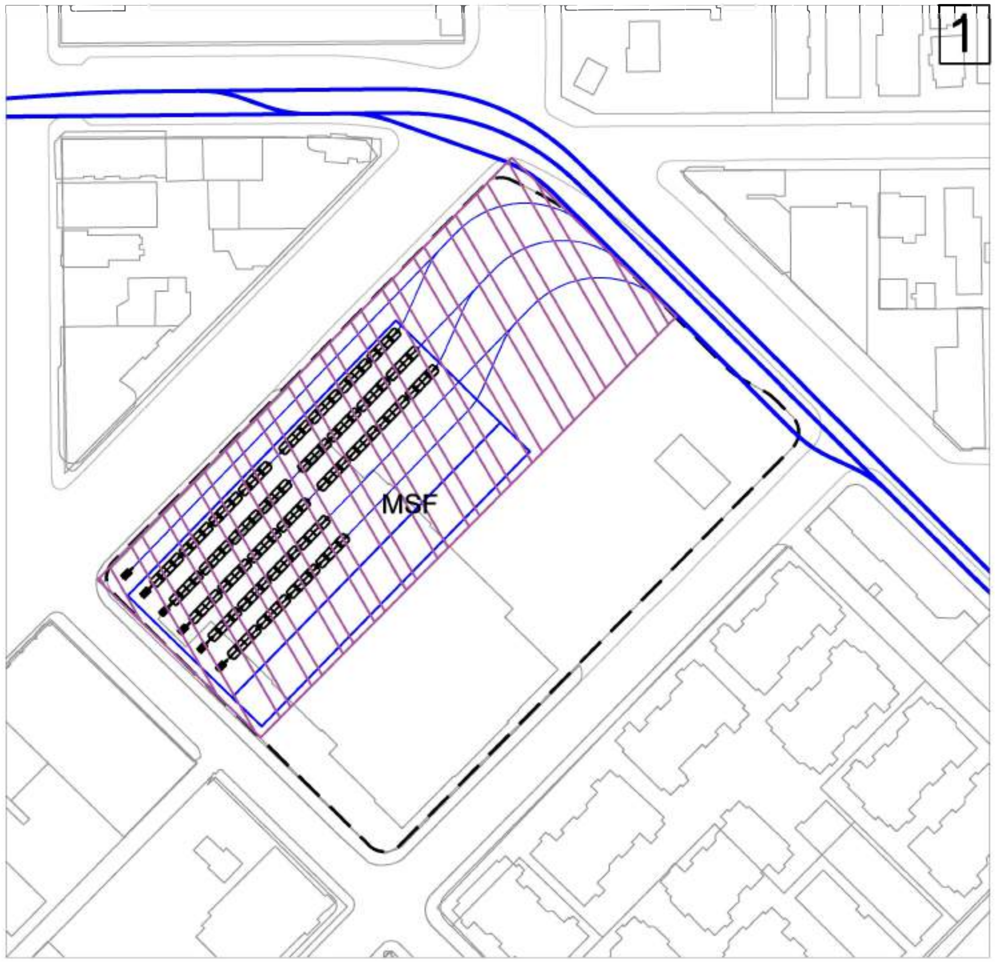
TPSS size (to scale with drawings)

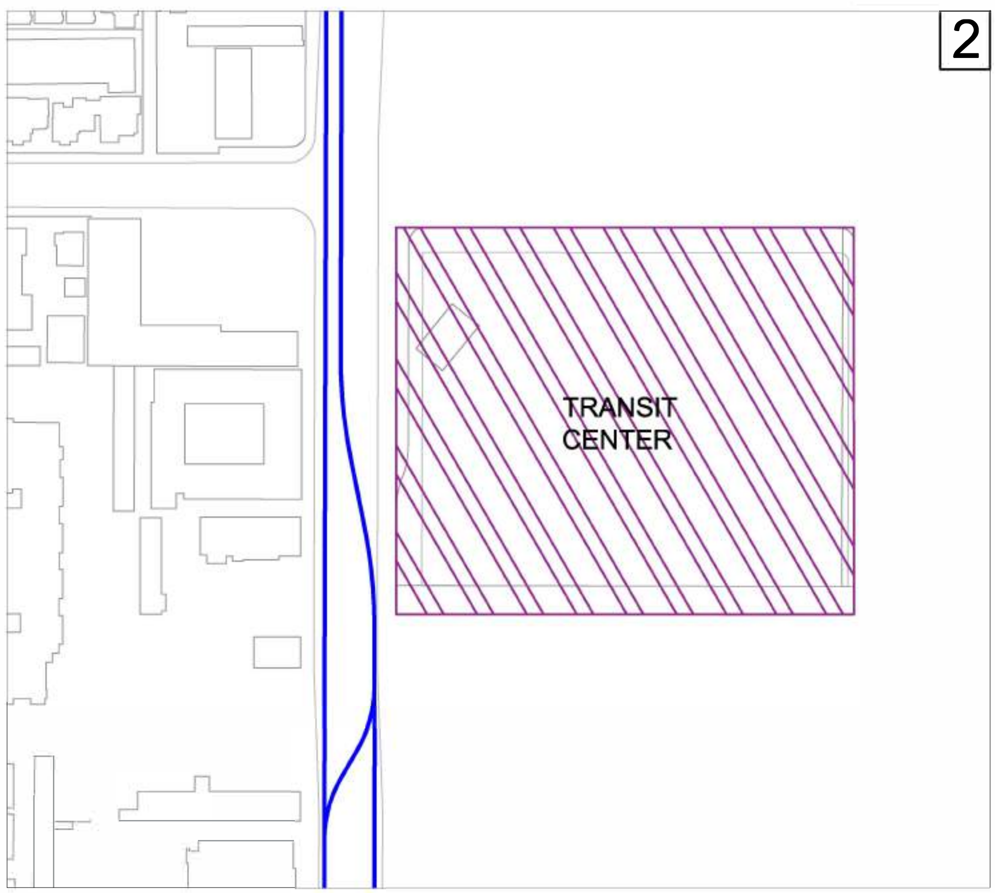


- Parking and any additional area for fencing (if deemed necessary) is in addition to the 3000 sq ft.
- Alignment is representative only. Further refinements may occur.

Drawing Scale: 1" = 200'







Appendix E: Correspondence with Southern California Edison

Yuan, Iris

From:	Danielle Chanes <DANIELLE.CHANES@sce.com>
Sent:	Tuesday, August 6, 2019 1:45 PM
To:	Oscar Marroquin; Omar Pulido
Cc:	Jeffrey Kline; Perla Solis; Kennedy, G. John; Yuan, Iris; Michelle Marquez-Riley; Andrew J Peterson; Dylan Kasten; Gerald Frolich
Subject:	RE: (External):RE: Inglewood Hollywood Park Rail

Hello Omar,

We have completed the requested study for the Inglewood Transit Connector project. There is only one existing 16kV circuit along Market Street. This circuit can accommodate the proposed 10MVA of load. For the requested redundancy, new infrastructure will be required. A further study is needed to determine the scope of work for the new infrastructure.

Moving forward, Dylan Kasten will be the Field Engineer for this project.

Please let us know if there are any questions or concerns.

Thanks.

Danielle Chanes
Field Engineer
Distribution Engineering | Metro West
T. (310)-608-5050 | (PAX: 35050)
M. (310)-710-4921

Dominguez Hills Service Center

Yuan, Iris

From:	Dylan Kasten <dylan.t.kasten@sce.com>
Sent:	Tuesday, September 17, 2019 8:55 AM
To:	Omar Pulido; Oscar Marroquin; Danielle Chanes
Cc:	Jeffrey Kline; Perla Solis; Kennedy, G. John; Yuan, Iris; Michelle Marquez-Riley; Andrew J Peterson; Gerald Frolich; Lisa Trifiletti; 'Joe Gibson (jgibson@meridianconsultantsllc.com)'
Subject:	RE: (External):RE: (External):RE: Inglewood Hollywood Park Rail

Hi Omar,

Distribution Engineering has completed a high level Distribution Study to determine the amount of load we can accommodate, as well as the required upgrades. With full redundancy proposed for the Inglewood Transit system, it is critical that the results are based on accurate projected loading values for the future service year of 2026. The project will need to be reevaluated by SCE Distribution Engineering once the project develops and as details are finalized. The results are as follows:

Maximum Allowable Load:
Distribution Engineering has determined that the maximum load (at the present time) that can be accommodated is 10 MVA.

Infrastructure Upgrades / Work Required:
To accommodate the requested 10 MVA of load with full redundancy, the following upgrades would be needed:

- 1500' of new civil work/duct banks
- 1860' of new 1000 JCN cable
- 1700' of upgrading/re-cabling existing SCE Primary cable to 1000 JCN
- Two new Gas Switches

These values and upgrades are based on the current projected loads for 2026. SCE's distribution system is dynamic and is subject to change as we approach the 2026 date. As the project details develop, SCE can effectively plan for this new load.

Thanks,

Dylan Kasten
Field Engineer 1 | Metro West
Dominguez Hills SC
Office: 310-608-5065 (35065)
Mobile: 310-613-0163

Appendix 3.0.2

Envision Inglewood

ENVISION Inglewood

Connecting People, Places, and the Future

JUNE 2018

TABLE OF CONTENTS

1. INTRODUCTION

2. INGLEWOOD TRANSIT CONNECTOR ALTERNATIVES

3. PRELIMINARY RIDERSHIP PROJECTIONS

LIST OF FIGURES

LIST OF FIGURES CONTINUED

LIST OF TABLES

ACKNOWLEDGEMENTS

OFFICE OF THE MAYOR AND CITY COUNCIL, CITY OF INGLEWOOD

Honorable Mayor James T. Butts, Jr.
George W. Dotson, Councilmember, 1st District
Alex Padilla, Councilmember, 2nd District
Eloy Morales, Councilmember, 3rd District
Ralph L. Franklin, Councilmember, 4th District

STAFF, CITY OF INGLEWOOD

Louis A. Atwell, PE, Public Works Director
Christopher Jackson, Senior Economic + Community Development Manager
Mindala Wilcox, Planning Manager
Peter Puglese, Senior Engineer
Victor Nuñez, Senior Engineer
Elsa Moreno, GIS Analyst

TEAM OF CONSULTANTS

Ernesto Camacho, President | Chief Executive Officer, Pacifica Services
Desiree De La O, Vice President, Pacifica Services
Michelle Marquez, Senior Project Engineer, Pacifica Services
Charlotte Ramos Stadlemann, Environmental Planner, Pacifica Services

Lisa Lopez Trifiletti, Principal, Trifiletti Consulting
Omar Pulido, Senior Project Director, Trifiletti Consulting
Perla Solis, Planning Associate, Trifiletti Consulting
Marietta Torriente, Marketing, Trifiletti Consulting
Jason D'Andrea, Data + Policy Analyst, Trifiletti Consulting

Srinath Raju, PE, President | Chief Executive Officer, Raju Associates
Chris Muñoz, Senior Transportation Engineer, Raju Associates

Chris Robert, President, The Robert Group

1. INTRODUCTION

1.1 BACKGROUND

An exciting transformation for the City of Inglewood is underway as it becomes "The City of Champions" and is redefined as a world-class sports and entertainment center in the greater Los Angeles region. As of August 2017, sales tax revenue in the City of Inglewood increases have outpaced the Los Angeles County average, and property values are up more than 100% since 2012. These accomplishments have been driven by a number of completed and on-going projects in the City. The Metro Crenshaw/LAX Line is set to open in 2019, which will enhance transit access to the City. The Forum's revitalization now actively hosts the largest entertainment acts in the country. The redevelopment of approximately 298 acres at Hollywood Park includes new residential, commercial, and recreational uses, and at the centerpiece is the construction of the Los Angeles Rams and Los Angeles Chargers new National Football League (NFL) stadium.

Additionally, in 2018, the Los Angeles Clippers of the National Basketball Association (NBA) announced a proposal to relocate their headquarters, training facilities and new arena to the City, and a new Los Angeles Philharmonic state-of-the-art music and cultural campus for the Youth Orchestra Los Angeles (YOLA) designed by renowned architect Frank Gehry, will also be headquartered in Inglewood. All of these new venues are bringing new energy and opportunity to the City and are contributing to its social and economic well-being.

As investment in Inglewood has burgeoned in the last several

Figure 1.1-1: Youth Orchestra of Los Angeles (YOLA)

Source: LA Phil/YOLA

years, it has injected the local economy with new jobs, retail, entertainment and residential opportunities. As Inglewood is transformed into a major regional activity center, it also means that the number of trips in and around the City are anticipated to increase. Based on historic traffic counts, traffic volumes have been increasing at the rate of 1.5% per year and many key intersections and key highway corridors are already experiencing congestion. According to the traffic study for the Hollywood Park Stadium Alternative Project performed by Linscott Law & Greenspan in 2015, while roughly 85% of patrons are anticipated to use privately-owned vehicles and 15% will rely on transit or charter buses for stadium events and games, these modes will still compete to utilize the same traffic corridors within the City that may be physically constrained or congested. Moreover, Southern California Association of Government's (SCAG) 2016 RTP/SCS Regional Travel Demand Forecasting Model projects substantial socioeconomic and demographic growth throughout the six-county southern California region. According to SCAG, population, housing and employment growth are expected throughout the cities of Los Angeles, Inglewood, Culver City, unincorporated areas of Los Angeles County and portions of the South Bay Cities consisting of El Segundo, Hawthorne and others. The City is working to manage this growth in a sustainable and responsible way, ensuring that residents, businesses and visitors have convenient and efficient access to new destinations and resources.

Building on the tremendous progress the Los Angeles County Metropolitan Transportation Authority (Metro) has made to develop the County's regional rail network and to create more transportation options associated with the opening of the Crenshaw/LAX Line, Inglewood's existing transportation infrastructure and circulation system should be updated, capacity should be increased on major arterial streets where possible, Metro and municipal bus operations and service should be enhanced, and most importantly, the Metro Rail system should connect directly to the City's major activity centers.

To address these critical mobility issues, Inglewood has partnered with Metro to perform a focused analysis of viable transit connection options from the Metro Crenshaw/LAX light rail line to the Los Angeles Stadium and Entertainment District at Hollywod Park development (LASED). With the City's input, Metro explored how best to connect Inglewood's future LASED to Metro's rail system via a high-capacity transit connection. The Metro study analyzed 1) an Interlined Operability 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 2) Independent Operability options for independent services that could provide a connection from the Metro Rail system at nearby Metro stations along the Crenshaw line to the NFL Stadium. At the conclusion of the study, the City and Metro agreed that the Interlined Operability Scenario is infeasible due to its cost and complexity that would be created on the Metro Rail system.

Consistent with Metro's recommendations, Inglewood has continued to analyze several Independent Operability transit connections to the City's activity centers. The City has assembled an experienced consultant team to continue to define the transit connection concepts, initiate the environmental analysis and clearance process, launch a stakeholder engagement process, and develop an overall project implementation and delivery strategy, which will include the pursuit of an Enhanced Infrastructure Financing District. This report describes the City's further examination and comparative analysis of alternative transit connection concepts, a more detailed analysis of transit ridership potential, rough-order-of-magnitude project cost estimates, and a brief discussion of a project implementation strategy. Based on a deeper understanding of The City's mobility goals and objectives, this report includes a recommendation for the City's preferred conceptual alignment for the Inglewood

Figure 1.1-2: Los Angeles Stadium and Entertainment District at Hollywood Park (LASED) City of Inglewood Revitalization Rendering

Source: LASED Website, 2018

Transit Connector Project. The Inglewood Transit Connector Project will be further defined as part of the environmental review process, and develop project delivery and implementation strategies.

1.2 INGLEWOOD TRANSIT CONNECTOR GOALS AND OBJECTIVES

The City of Inglewood provides a compeling example of what communities can accomplish when leaders, local organizations and citizens join forces to change the status quo and improve the quality of life. In recent years, the City has made great strides to improve the quality and delivery of essential public services and update its transportation infrastructure. Today, Metro is working to complete the construction of the Crenshaw/LAX Line into Inglewood by 2019, increasing access to public transportation for local residents. Stations at Aviation/Century, Westchester/Veterans, Downtown Inglewood, Fairview Heights, Hyde Park, Leimert Park, MLK Jr., and Expo/Crenshaw are currently under construction. The Metro Crenshaw/LAX will extend light rail transit from the existing Metro Expo Line Station at Crenshaw/Exposition Boulevards to the Metro Green Line station at Aviation/Century Boulevards, and will provide a transit connection to Los Angeles International Airport (LAX) via the City of Los Angeles' Automated People Mover (APM) system at the Airport Metro Connector 96th Street Transit Station. The approximately 8.5 mile light rail transit line will include two stations in Inglewood including the Fairview Heights station and the Downtown Inglewood station. As the City experiences a historic revitalization and benefits from Metro's major transit investment, it is important to synergize and build upon the new development occurring within City boundaries.

The City is now also working diligently to prepare for the LASED opening and is developing a comprehensive Inglewood Sports and Entertainment Center Transportation Management and Operations Plan (TMOP). Preliminary analysis indicates that Stadium events could generate over 10,000 additional trips in the AM peak hours, and over 15,000 additional trips during the PM peak hours. The Stadium will provide more than 9,000 parking spaces, consistent with the Hollywood Park Specific Plan requirements, and will also rely on off-site satellite parking with event shuttle service. Yet, while buses, Transportation Network Companies, taxis, shuttles, and other modes will be critical transportation options to access the City's event centers, these modes will still compete with existing roadway traffic and may not provide a convenient time-certain connectivity compared to an elevated rail connection. The physical capacity of the exisiting local and regional roadway network may challenge the ability of visitors to conveniently access the City's amenities. While a comprehensive satellite parking and shuttle program is being developed for operation on the Stadium's opening day, requisite staging areas will still entail drop-off and pick-up facilities at each end, potentially diverting valuable real estate from its hightest and best use. Additionally, even if patrons elect to use transit to Inglewood, the City's new sports and entertainment centers are located approximately 1.5 to 2 miles away from regional transit, leaving a critical last-mile gap.

Accordingly, the City is wholly committed to providing world-class transportation connections to its new state-of-the-art sports and entertainment center and is working diligently to define and propose a last-mile fixed guideway transit connector, referred to as the Inglewood Transit Connector Project. Mobility and direct transit access to the City's new activity centers are critical top priorities, especially given local and regional goals to increase transportation choices, reduce greenhouse gas emissions, improve air quality and human health, and encourage sustainable development patterns. Specifically, the City's goals and objectives for the Inglewood Transit Connector Project are to:

- Encourage intermodal transportation systems by providing convenient, reliable, time-certain transit service and direct transit accessibility and connectivity to the City's major activity centers.
- Reduce the City's traffic congestion and alleviate growing

Figure 1.2-1: Existing Metro Connections to the City of Inglewood

Source: Trifiletti Consulting, 2018

demand on the existing roadway network for both event and non-event days.

- Increase transit mode split and reduce trips and overall vehicle miles traveled to the City's major activity centers, which will improve overall air quality, public health, environmental outcomes and reduce greenhouse gas emissions.
- Activate and synergize with development and redevelopment within the City and enhance the City's economic development, social cohesion, equity and community resilience.
- Connect its community and citizens to jobs, education, services, destinations within the City and within the region, and support regional efforts to become more efficient, economically strong, equitable and sustainable.

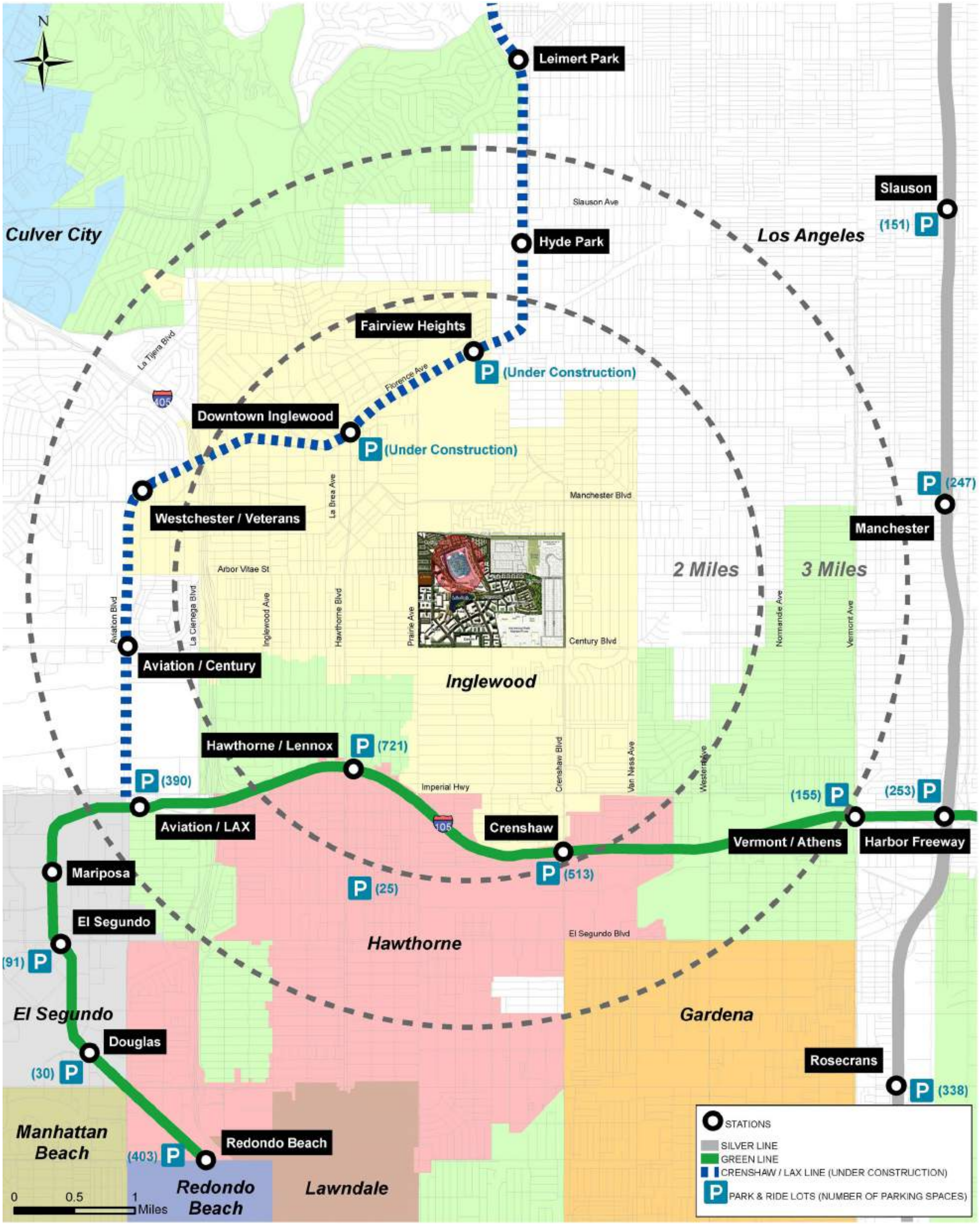
The City has evaluated several independent last-mile fixed guideway transit connector options, comparing these options against key screening criteria and evaluating each option against the City's stated goals and objectives. The City recognizes that an efficient and effective transportation network is essential to achieving the full benefits of this ongoing and widespread investment.

Table 1.2-1: Metro Rail Stations Near City of Inglewood

METRO RAIL STATIONS NEAR CITY OF INGLEWOOD	APPROXIMATE WALKING DISTANCE TO HOLLYWOOD PARK NFL STADIUM
Aviation/Century	2.5 miles
Westchester/ Veterans	2.2 miles
Downtown Inglewood	1.3 miles
Fairview Heights	1.7 miles
Aviation/LAX	3.5 miles
Hawthorne/Lennox	1.8 miles

Source: Google Maps, 2018

Figure 1.2-2: Metro Park & Ride Lots Within Study Area



Source: Trifiletti Consulting, 2018

1.3 INGLEWOOD MOBILITY PLAN

Working in collaboration with the Southern California Association of Governments (SCAG), Metro, Caltrans, and surrounding transportation agencies and municipalities, the City has launched several parallel and coordinated transportation planning and programming efforts. The City of Inglewood's Circulation Element from the City's General Plan, which was adopted in 1992, will also be updated to reflect the City's long-range infrastructure needs and updated transportation goals, objectives, plans and projects. The Mobility Plan will include performance measures aligned with the City's vision, goals, and objectives, and will include short-term and long-term transportation improvements and policy recommendations designed to improve and enhance the City's local and regional transportation networks. The Inglewood Transit Connector Project will be proposed as the centerpiece and backbone of the Inglewood Mobility Plan.

Figure 1.3-1: Envision Inglewood Website - Mobility Plan Illustration

1.4 EXISTING AND FUTURE LAND USE AND TRANSPORTATION CONDITIONS

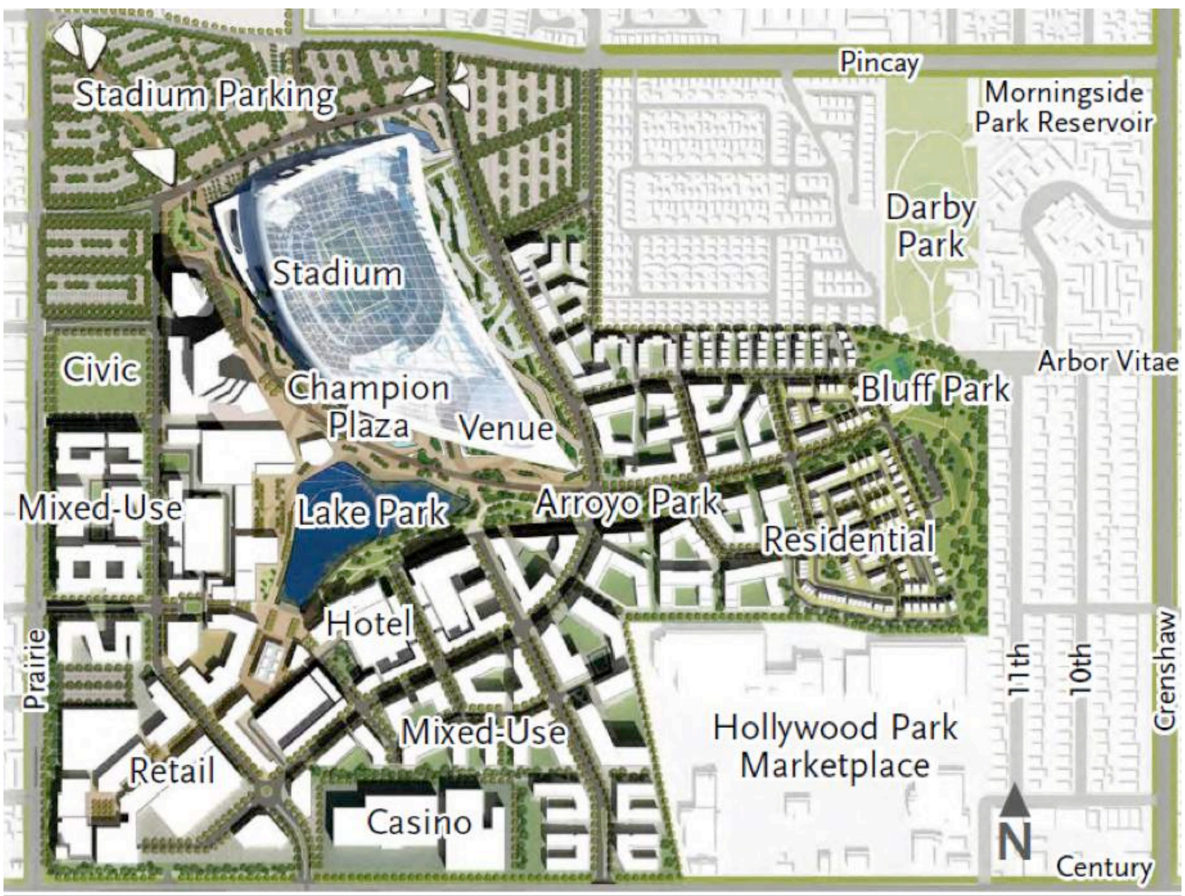
Located a few miles from downtown Los Angeles, the Silicon Beach tech corridor in West Los Angeles and just east of the Los Angeles International Airport and Gateway to Los Angeles hotel and business district, the City of Inglewood is a centrally located area that is seeing new construction and renewed economic development.

The following important projects under construction or proposed within the City are highlighted below.

1.4.1 Los Angeles Stadium and Entertainment District at Hollywood Park (LASED)

The LASED project, a new mixed-use, master planned community on the site of the former Hollywood Park racetrack and equestrian training facility, started construction in 2014 and is slated for completion by 2023. The project will transform underutilized asphalt lots and the former racetrack into a vibrant mixed-use community. The project includes a number of new uses including 2,500 residential units, 890,000 square feet of retail, 780,000 square feet of office and a 300-room hotel, as well as 25 acres of new recreational and park amenities for the City. The signature component of the project is new 75,000-seat NFL stadium, which includes a 6,000-seat performance venue that will be home to both the NFL Los Angeles Rams and Los Angeles Chargers teams. The stadium is set to open in 2020.

Figure 1.4-1: Los Angeles Stadium and Entertainment District at Hollywood Park (LASED) Site Plan



Source: City of Inglewood

According to Moody's Analytics, the LASED project is expected to generate nearly $1 billion in tourist expenditures for the City, pump $3.8 billion per year into the local economy, and add $18.7 to $28 million annually to the City's general fund. The LASED project includes roadway infrastructure upgrades, to modernize traffic systems with intelligent traffic signal systems (ITS) and a state-of-the-art traffic management command center, and implement physical mitigation measures at various intersections along Prairie Avenue and Century Boulevard.

1.4.2 The Forum

Constructed in 1967, The Forum, a multi-purpose indoor arena, has served for decades as one of the region's premier sports and entertainment venues. In 2014, The Forum completed a multi-million-dollar renovation and was added to the National Register of Historic Places. The Forum now actively hosts the largest entertainment acts in the country and is scheduled to host events during the 2028 Summer Olympic games.

1.4.3 The Proposed Inglewood Basketball and Entertainment Center

In June 2017, the NBA's Los Angeles Clippers team announced a proposal to construct a new arena and sports facility in Inglewood designed to host the team and other non-sporting events. In February 2018, the City initiated the environmental clearance process for the proposed project by releasing the Notice of Preparation (NOP) for a Draft Environmental Impact Report (EIR). The proposed project is located on approximately 27 acres and includes an 18,000 fixed seat arena, an approximately 85,000-square foot team practice and athletic training facility, approximately 55,000 square feet of LA Clippers team office space, approximately 25,000-square foot sports medicine clinic for team and potential general public use, approximately 40,000 square feet of retail and other ancillary uses that would include community and youth-oriented space, an outdoor plaza with an approximate area of 260,000 square feet including landscaping, outdoor basketball courts, outdoor community gathering space, and parking facilities sufficient to meet the needs of the proposed uses.

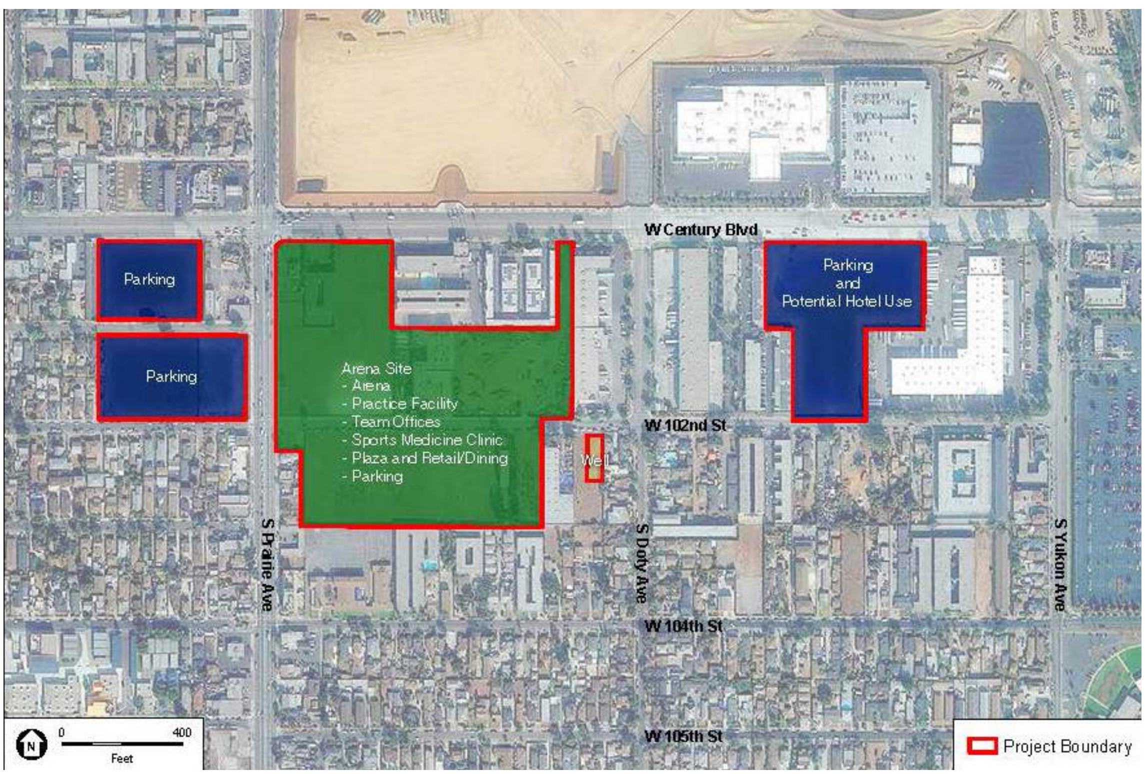
Figure 1.4-2: Los Angeles Stadium and Entertainment District at Hollywood Park (LASED) Rendering

Source: LASED Website, 2018

Figure 1.4-3: The Forum

Source: City of Inglewood, 2018

Figure 1.4-4: Proposed Inglewood Basketball and Entertainment Center Preliminary Site Plan



Source: City of Inglewood, Notice of Preparation, 2018

1.4.4 Market Street

The City of Inglewood is also working to revitalize downtown Inglewood in time to synergize with the future Metro Crenshaw/LAX station. The City is encouraging the design and development of new residential, mixed-use and retail oriented projects along Inglewood's Market street along with signage, marketing, landscaping and traffic calming improvements. Situated in the heart of Inglewood's Historic Core, The Miracle Theater was once connected to greater Los Angeles by the Red Car system. Today's Metro Crenshaw/LAX line will stop in downtown Inglewood just three blocks from The Miracle on Market Street. Classic theaters throughout Los Angeles are currently being re-energized as vital cultural venues. In the late 1940s through the early 1960s, Inglewood's Market Street hosted Hollywood film premieres at several movie houses including The Fox Theater, The United Artist's Theater, and The Ritz Theater. Built in 1937, The Ritz (now revived as The Miracle) is once again home to local and international entertainment. Featuring music, movies, comedy, and community events, The Miracle Theater provides a venue for arts and culture on Market Street.

Figure 1.4-5: Screening of HBO Series, *Insecure: Season 2,* Miracle Theater on Market Street, Fall 2017

Source: Miracle Theater Website, 2018

1.5 EXISTING FREEWAY/ ARTERIAL ROADWAYS

Four major interstate highways serve the Inglewood area, including the Santa Monica Freeway (I-10) and Glenn Anderson Freeway (I-105), running east/west, the San Diego Freeway (I-405) running north/south and the Harbor Freeway (I-110) running north/south just east of the Study Area. The I-10, I-105, I-110 and the I-405 experience high levels of congestion, particularly during peak commute periods. I-105 and I-405 experience heavy traffic throughout the day as they provide regional access to West Los Angeles and Los Angeles International Airport.

The roadway system in the City is primarily a grid that includes arterials, collectors, and local roads. A major arterial thoroughfare is a high-capacity urban road with the primary function of delivering traffic from collector roads to freeways or expressways, and between urban centers at the highest level of service possible.

According to the City of Inglewood 1992 Circulation Element, the following streets within in the City are classified as major arterials:

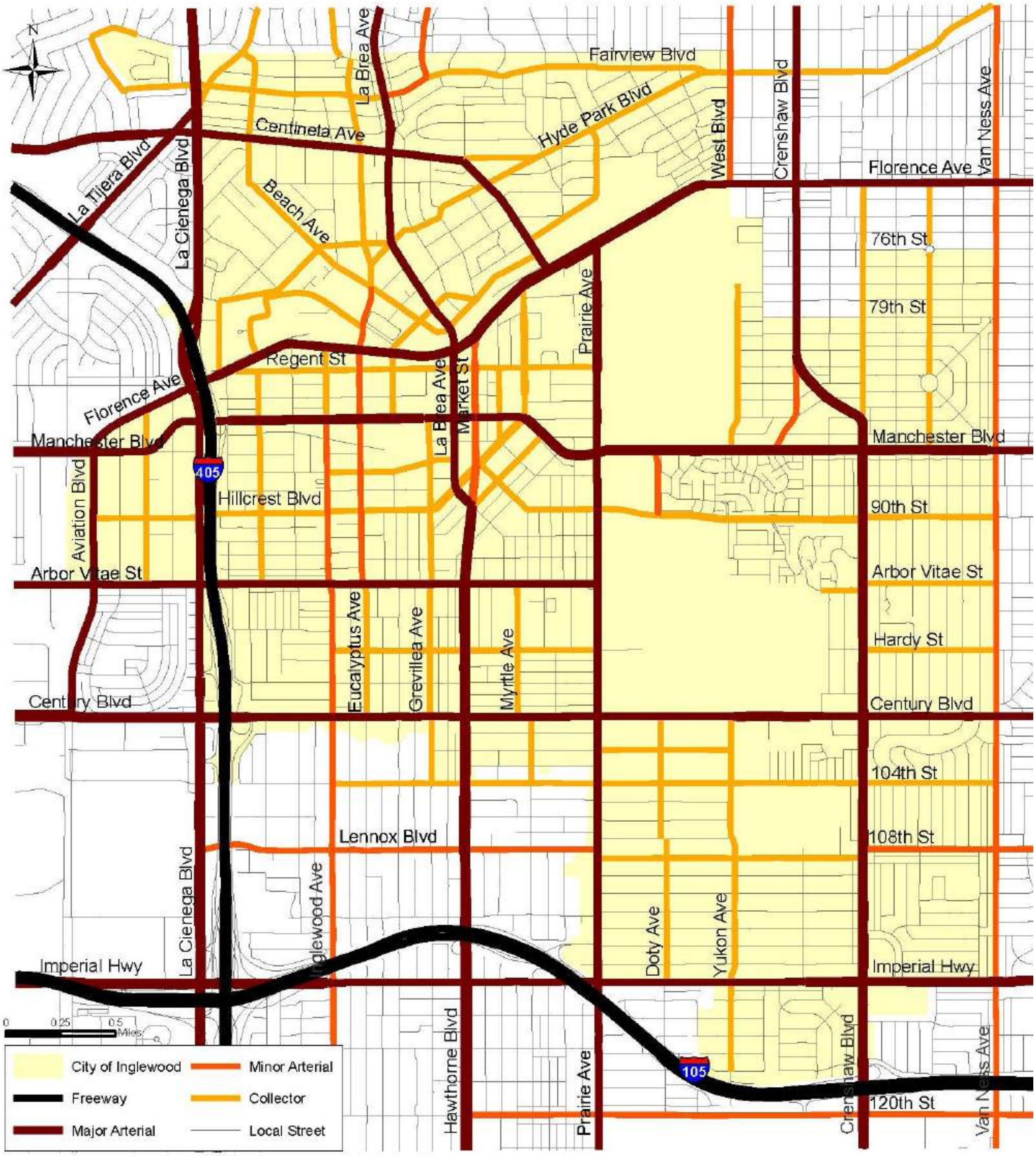
1. Arbor Vitae Street
2. Centinela Avenue
3. Century Boulevard
4. Crenshaw Boulevard
5. Florence Avenue
6 Hawthorne Boulevard
7. Imperial Highway
8. La Brea Avenue
9. La Cienega Boulevard
10. Manchester Boulevard
11. Prairie Avenue

Minor or secondary arterials are similar to major arterials except that they may be discontinuous within the city, may carry less traffic volume and/or may serve as extensions of other major arterials. According to the City of Inglewood 1992 Circulation Element, the following streets within the Study Area is classified as a minor arterial:

1. Crenshaw Drive
2. Eucalyptus Avenue (Beach to Arbor Vitae)
3. Fairview Boulevard (La Brea to Overhill)
4. Kareem Court (Forum Road)
5. Inglewood Avenue (south of Manchester)
6. Lennox Boulevard
7. Market Street (Florence to La Brea)
8. Overhill Drive
9. Van Ness Avenue
10. West Boulevard (north of Florence)
11. 108th Street (east of Crenshaw)

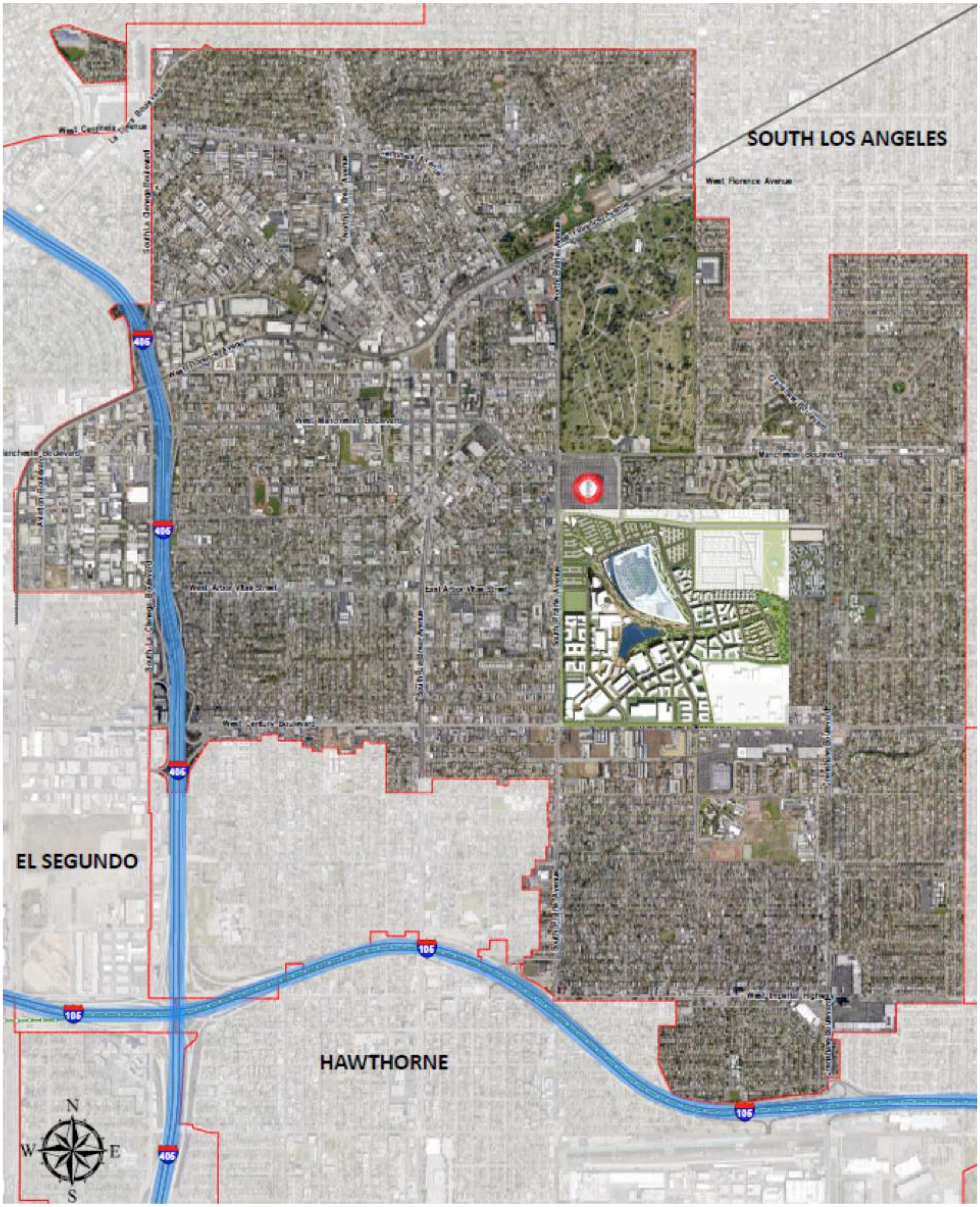
Figure 1.5-1 illustrates Inglewood's freeway and roadway system (arterial, collector, and local streets).

Figure 1.5-1: City of Inglewood General Plan: Circulation Element, 1992



Source: City of Inglewood, 1992

Figure 1.5-2: City of Inglewood, 2018



Source: Trifiletti Consulting, 2018

1.6 FUTURE FREEWAY/ ARTERIAL ROADWAYS

Several roadway improvements within the City of Inglewood are either programmed or under construction. They include:

- Century Boulevard Corridor Improvements.
- Prairie Avenue Corridor Improvements.
- Florence Avenue and Centinela Avenue Roadway Segment Improvements.
- Citywide Intelligent Transportation System (ITS) Improvements.
- Other intersection improvements.

Several regional improvements outside the City's jurisdiction that would have a positive impact on traffic flow, network connectivity and circulation are either proposed as mitigations or are being planned as part of the SCAG's RTP/ SCS and Metro's Long Range Transportation Plan (LRTP). They include:

- I-405 Improvements.
- La Cienega Boulevard Corridor Improvements.
- I-105 Fast-Track Implementation Improvements
- Other improvements.

Additionally, several specific intersection improvements are anticipated as project design features or traffic mitigations required as part of the Hollywood Park Development Project, including but not limiting to, at the following intersections:

- Re-stripe eastbound Arbor Vitae approach.
- Modifications of traffic signal improvements at Arbor Vitae/Prairie, Hardy/Prairie, Prairie/Century, Doty/ Century and Yukon/Century.
- Upgrade seven intersections with ITS traffic signal improvements per the EIR including Crenshaw/Century, Prairie/Century, Doty/Century, Yukon/Century, Club Drive/Century, 11th Ave/Century and Van Ness/Century
- Install southbound right-turn lane at Crenshaw and Century Boulevards.
- New private access road to the Hollywood Park Casino.

1.7 INGLEWOOD EXISTING TRANSIT

Transit service in Inglewood is provided by Metro and the City of Inglewood. The characteristics of bus services in the City of Inglewood are summarized in Table 1.7-1and Table1.7-2, while Figures 1.7-2 and 1.7-3 illustrate existing transit routes for all bus and rail lines within the City.

A combination of Metro Local and Rapid buses provide service to the City of Inglewood, with limited service during weekends and evenings. Inglewood is currently serviced by City-operated I-Line and Metro transportation agencies. The Metro lines serving Inglewood include: Lines 40, 102, 110, 111, 115, 117, 120, 126, 209, 210, 211, 212/312, 217, 442, 607, 625, 710, and 740. These lines connect the City of Inglewood to the greater Los Angeles region. Metro's new LAX/Crenshaw is currently under construction and will provide service to Inglewood at the Downtown Inglewood Station at Florence Avenue and Market Street. An additional Crenshaw/LAX will be built immediately adjacent to the City of Inglewood at Westchester/Veteran at the southwest border of the City.

As part of the City's Mobility Plan and Event Transportation Management and Operations Plan, the City is working with Metro and other municipal bus operators to increase and enhance transit service to City of Inglewood destinations.

Table 1.7-1: Metro Bus Service in the City of Inglewood

OPERATOR	ROUTE	SERVICE AREA		ANNUAL ROUTE RIDERSHIP
		FROM/TO	TO/FROM	
Metro	40	Downtown Los Angeles	South Bay Galleria	8,649
	102	LAX City Bus Center	South Gate	33
	110	Playa Vista	Bell Gardens	2,840
	111	LAX	Norwalk Station	4,305
	115	Playa Del Rey	Norwalk Station	8,734
	117	City Bus Center	Downey	9,359
	120	LAX	Whittwood Town Center	1,177
	126	Manhattan Beach & Valley Dr.	Hawthorne Station	3
	209	Wilshire Center	Athens	88
	210	Hollywood/Vine Station	South Bay Galleria	4,452
	211	Redondo Beach	Inglewood	413
	212	Hawthorne/Lennox Station	Hollywood/Vine Red Line Station	10,788
	442	Hawthorne/Lennox Station	Downtown Los Angeles	118
	607	Inglewood Transit Center	Inglewood Transit Center	87
	710	Wilshire Center	South Bay Galleria	3,761
	740	Jefferson Park	South Bay Galleria	1,734

Source: Metro, 2018

Note: This data is for all Metro bus routes that pass through the City of Inglewood, is limited to activity that occurs within City boundaries, and includes boarding and alighting on weekdays and weekends.

Table 1.7-2: Exisiting and Future Rail Service in the City of Inglewood

METRO RAIL LINE	DESCRIPTION
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 by 2030.

Source: Metro, 2018

Figure 1.7-1 Envision Inglewood Website Illustration

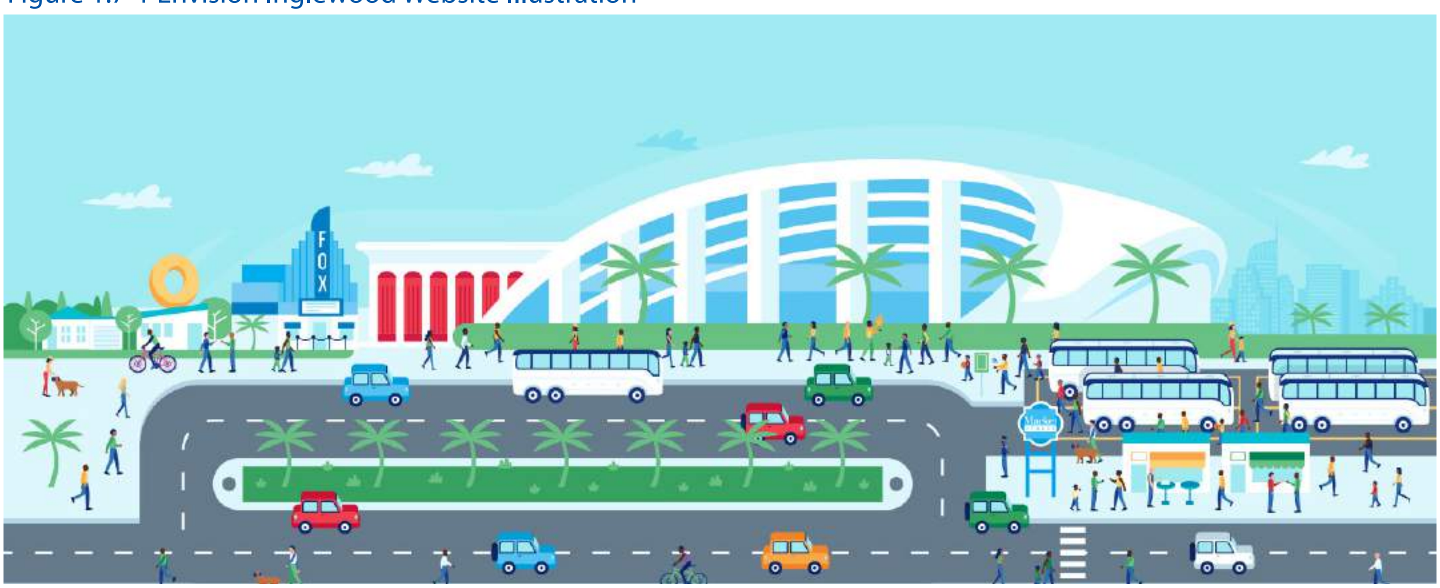
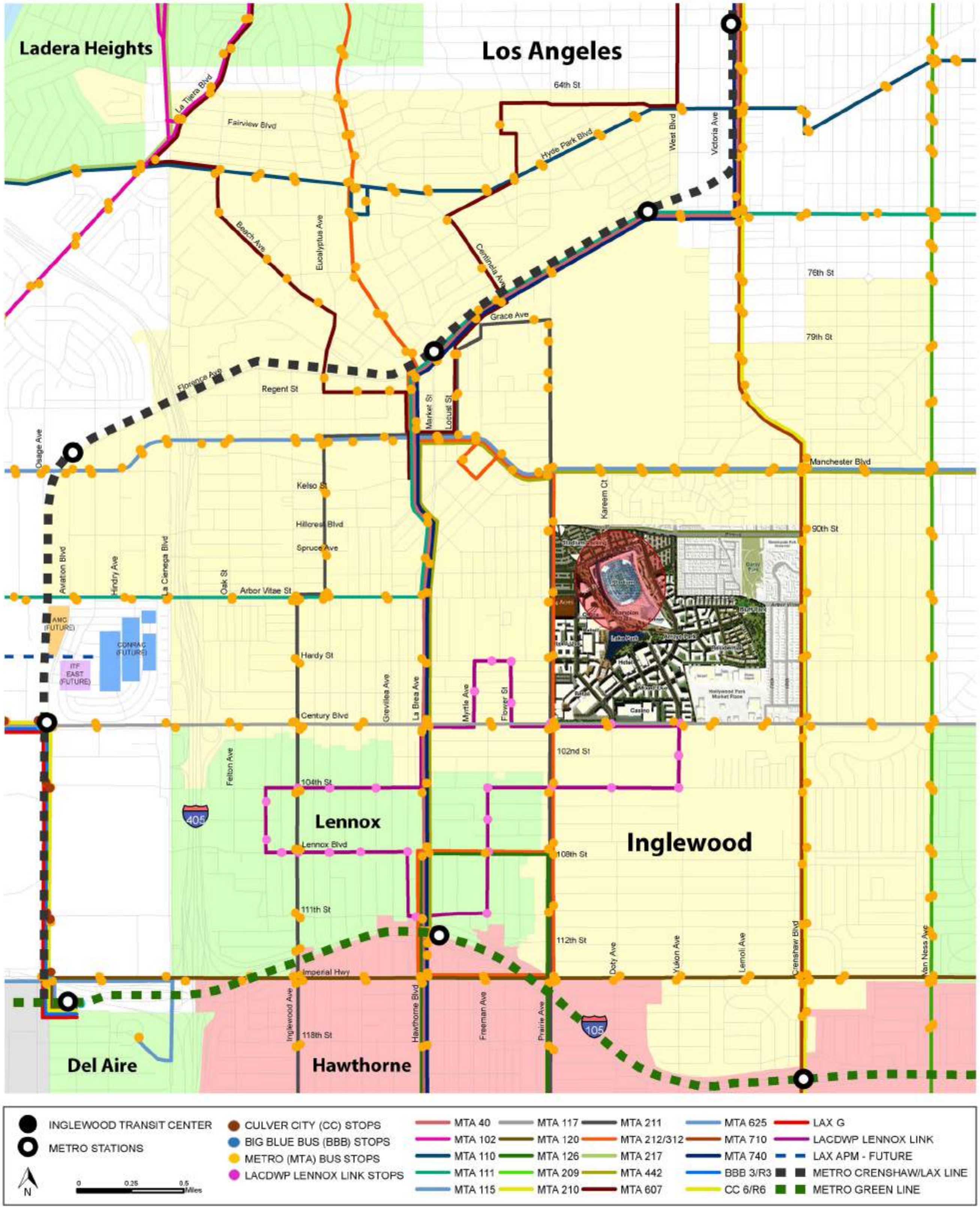


Figure 1.7-2: Metro Bus Transportation Network in the City of Inglewood



Source: Raju Associates, 2018

Figure 1.7-3: Current Metro Rail Conectivity Throughout the City of Inglewood

Source: Trifiletti Consulting, 2018

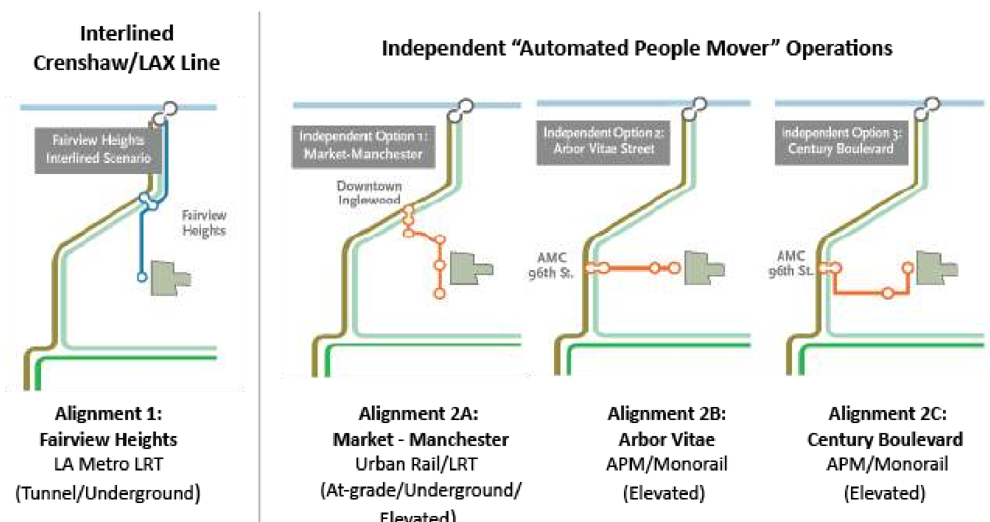
1.8 METRO CITY OF CHAMPIONS/ INGLEWOOD (NFL) PROJECT STUDY

Metro completed the City of Champions/Inglewood (NFL) Project Focused Analysis of Transit Connection Study in July 2017. Metro's study analyzed a potential underground rail transit connection from the under-construction Metro Crenshaw/LAX Fairview Heights at-grade light rail station at Florence south Prairie Avenue to the NFL Stadium/ Hollywood Park mixed-use development. The study evaluated the feasibility of using high-capacity transit technology to serve the Los Angeles Stadium and Entertainment District at Hollywood Park under an Interlined Operability Scenario and Independent Operability Scenarios. The Metro study concluded the following, summarized below and in Figure 1.8-1:

- Alignment 1 Fairview Heights: The Interlined Operability Scenario looked at a branch from the Crenshaw/LAX Line in a subway under Prairie Avenue.
- Alignment 2A Market-Manchester: An independent urban rail transit connection to Downtown Inglewood to leverage Market Street in In glewood's historic core and to promote economic development opportunities in the City.
- Alignment 2B Arbor Vitae: An independent automated people mover transit connection to the Airport Metro Connector 96th Street Transit Station via Arbor Vitae Street to provide connections to LAX and Metro's major multi-modal hub at the AMC 96th Street Transit Station.
- Alignment 2C Century Boulevard: An independent automated people mover transit connection to the Airport Metro Connector 96th Street Transit Station via Century Boulevard to provide connections to LAX and Metro's major multi-modal hub at the AMC 96th Street Transit Station.

Regarding 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. Future "Long term" connections to the Green Line and Hawthorne were identified but not recommended for further study at this phase and were not included in Metro's analysis.

Figure 1.8-1: Metro Transit Alternatives



Source: Metro/AECOM, 2017

Table 1.8-1: Summary of Metro City of Champions/Inglewood (NFL) Project Study Findings

		INTERLINED WITH CRENSHAW/LAX LINE	INDEPENDENT		
			OPTION 1: DOWNTOWN VIA MARKET-MANCHESTER	OPTION 2: ARBOR VITAE	OPTION 3: CENTURY
CAPACITY GOAL	MAXIMUM CAPACITY	5,400 passengers/hr	13,500 passengers/hr	18,000 passengers/hr	
	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-$990 million	$563 million - $1.049 billion
	OPERATION & MAINTENANCE COST (2017$)[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	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
AVG 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
PRIVATE/PUBLIC PARTNERSHIP OPPORTUNITIES		Low	High	High	High

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: Metro/AECOM

The Metro study concluded that interlined operations with the Crenshaw/LAX line offered some advantages associated with a one-seat ride (thus avoiding passenger transfers) inter-operability and maintenance of fleet. However, the Metro study found a one-seat ride would introduce complexities to Metro regional network operations due to the introduction of an additional route to Los Angeles Stadium and Entertainment District at Hollywood Park. The operational headways for the overlapping routes must account for the route demands, which differ. For example, the special events/ game-day ridership demands on the Inglewood Transit Connector are exponentially higher than the peak hour demands of the other Metro rail routes. Metro deemed the Interlined Operability alternative not feasible due to the costs and operational impacts on the regional system.

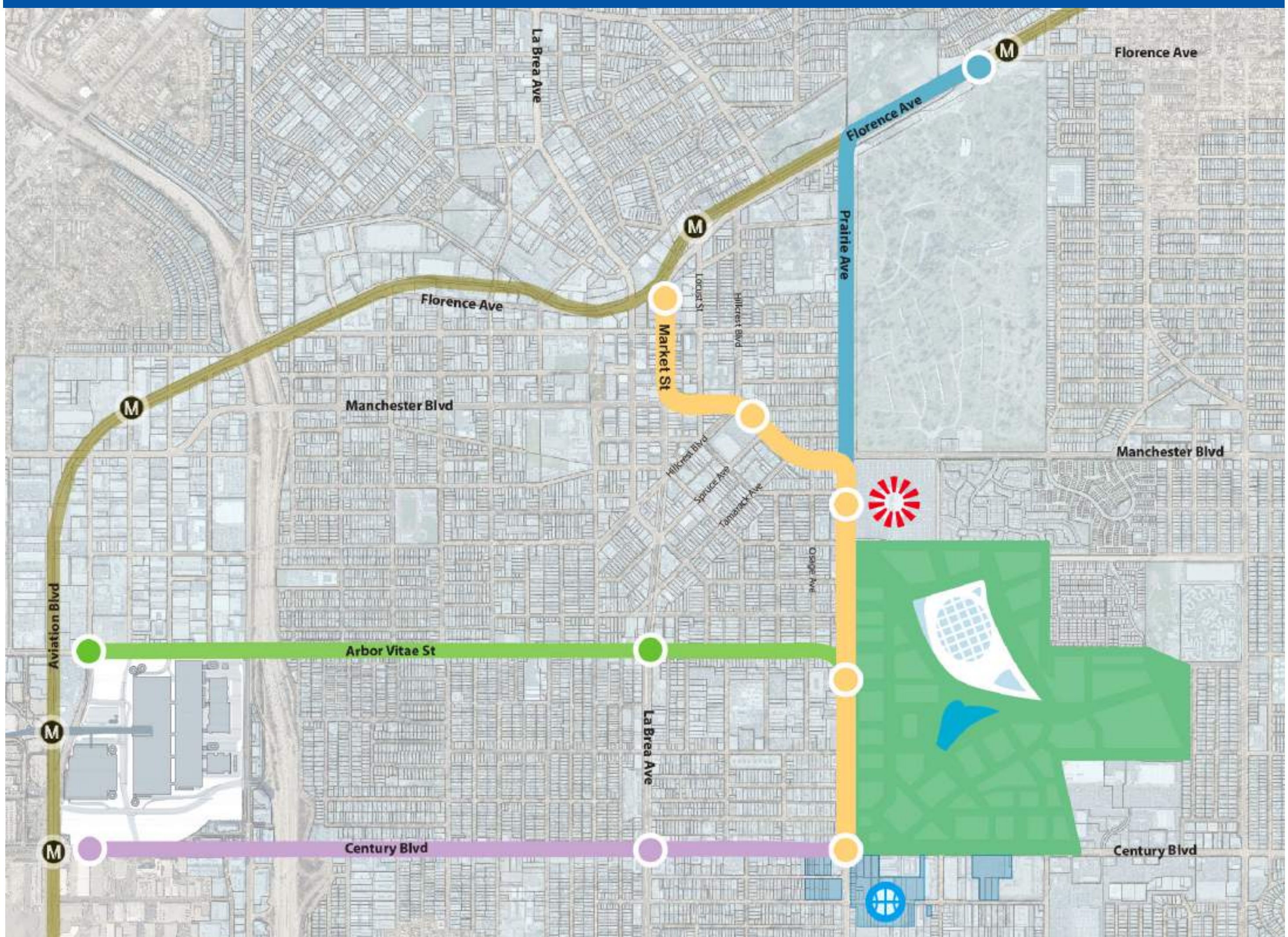
The Metro study concluded the following:

- The existing and planned venues within the City of Inglewood are major traffic generators with a high event driven transit mode share.
- Independent APM operations would better serve the event driven ridership.
- The single seat interlined operation would introduce complexities and added costs to the mainline rail operations.
- While Metro deemed the Interlined Option not viable, it recommended that the City further develop independent automated people mover options to serve major development sites.
- A public-private-partnership strategy and an Enhanced Infrastructure Financing District is recommended, especially since Measure M and the Metro Long Range Transportation Plan do not earmark funding for such a project.

Figure 1.8-2: Iconic Market Street Sign

Source: Olivia Niland for Neon Tommy, 2014

2. INGLEWOOD TRANSIT CONNECTOR ALTERNATIVES



2.1 INGLEWOOD TRANSIT CONNECTOR ALTERNATIVES

To build upon the work initiated by Metro, the City refined the Inglewood Transit Connector Alternatives to achieve the City's goals and objectives. Accordingly, this Study evaluates the following four conceptual transit alternatives, all consisting of elevated APM Systems:

- Alternative A: Market-Manchester Alignment
- Alternative B: Fairview Heights Alignment
- Alternative C: Arbor Vitae Alignment
- Alternative D: Century Boulevard Alignment

This Study is evaluating for overall project feasibility, and therefore it should be stressed that each alternative is based on a conceptual, preliminary design. Engineering would undoubtedly result in shifts and modifications to the overall project design, including stations, platforms and support facilities. Yet, preliminary conceptual designs are provided so that various alternative concepts can be compared with one another and feasibility issues can be identified.

Each of the alternatives described in Sections 2.2 through 2.5 provide an assessment of APM technologies with key findings on the candidate technologies that would be viable for the Inglewood Transit Connector Project. The specific technology is expected to be selected through a competitive procurement process and is not dependent on the selection of the preferred alignment. A number of alternative features and project characteristics are expected to be comparable to each other. These non-differing characteristics are 1) station size, configuration and locations/distances serving the key traffic generators; 2) guideway right-of-way and elevations; 3) maintenance and storage facilities; and 4 passenger convenience/amenities. It is assumed for purposes of this analysis that each station and station access will be comparable across the Alternatives. This Report also includes specific details associated with each of these non-differentiating characteristics.

Los Angeles Clippers

2.2 ALTERNATIVE A: MARKET-MANCHESTER ALIGNMENT

The Market-Manchester Alignment (Alternative A) is an aerial alignment that runs approximately one-quarter of a mile along Market Street between Florence Avenue and Manchester Boulevard, where it transitions east along Manchester Boulevard for approximately half a mile to Prairie Avenue. The alignment continues for approximately one mile south of Manchester Boulevard along Prairie to Century Boulevard. This Alternative provides service to downtown Inglewood, The Forum, Los Angeles Stadium and Entertainment District at Hollywood Park, and the proposed Inglewood Basketball and Entertainment Center. This is the shortest alignment concept in comparison to other options. The mainline length of this alternative is approximately 1.8 miles, dual-lane, and includes an anticipated five stations as illustrated in Figure 2.2-1. The station locations and number were identified to provide connections to the traffic generators/development, and potential opportunities for further development/investment.

Alternative A (see Figure 2.2-1) is designed to connect major development sites to Metro LAX/Crenshaw line station at downtown Inglewood and presents an opportunity for integration with local economic activity, current and future transit-oriented development, and other initiatives in the downtown/commercial district of Inglewood. Unlike the 2017 Metro study's urban rail technology and at-grade segment at Market Street, the City's option is proposed to be elevated so that the Inglewood Transit Connector would not compete for the same roadway network as other road-based vehicles.

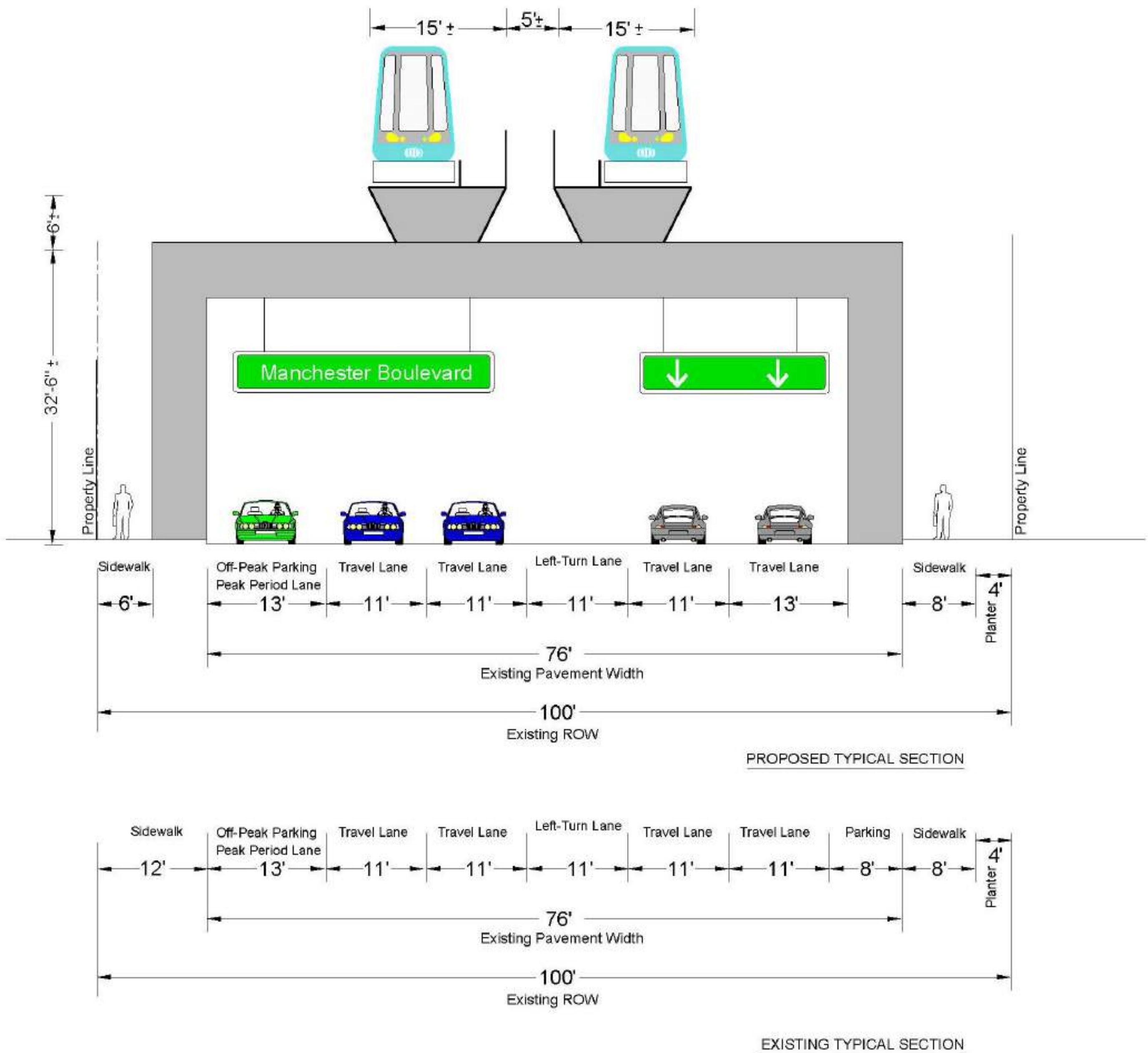
Possible intermodal facility locations to capture road-based traffic such as buses, transportation network comapnies (TNCs), taxis, and private vehicles, and facilitate a convenient transfer to the Internet Transit Connector have been identified (see Figure 2.2-1). These potential intermodal facilities provide an opportunity to limit the amount and type of road-based traffic into the area especially during special events. Such limits may be voluntary, based on convenience, and/or controlled through regulatory policies such as possible congestion pricing for access.

Source: City of Inglewood

Figure 2.2-1: Alternative A: Market-Manchester Alignment

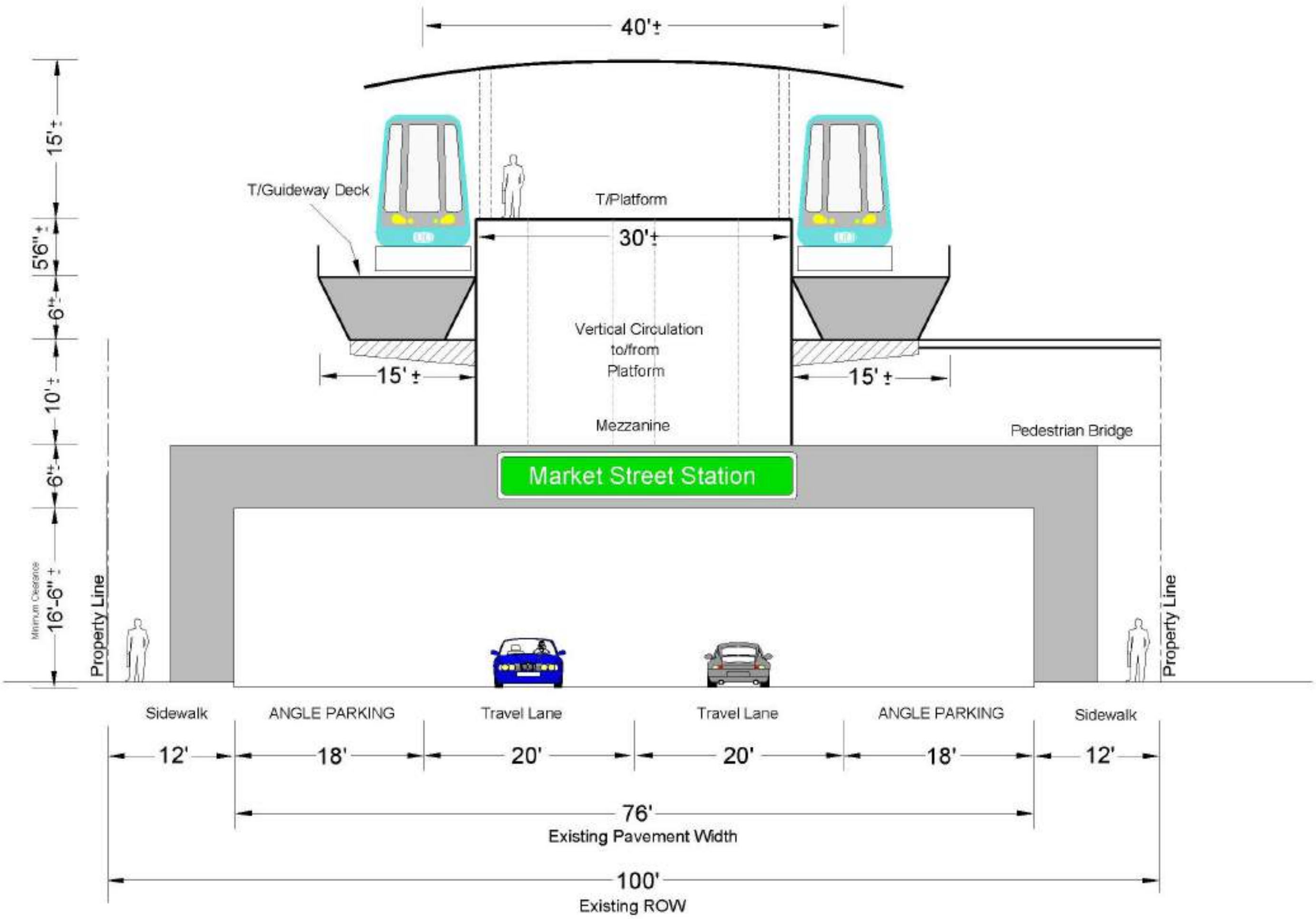
Source: Trifiletti Consulting, 2018

Figure 2.2-2: Alternative A: Market-Manchester Alignment
Manchester Boulevard, Looking West in Between Stations



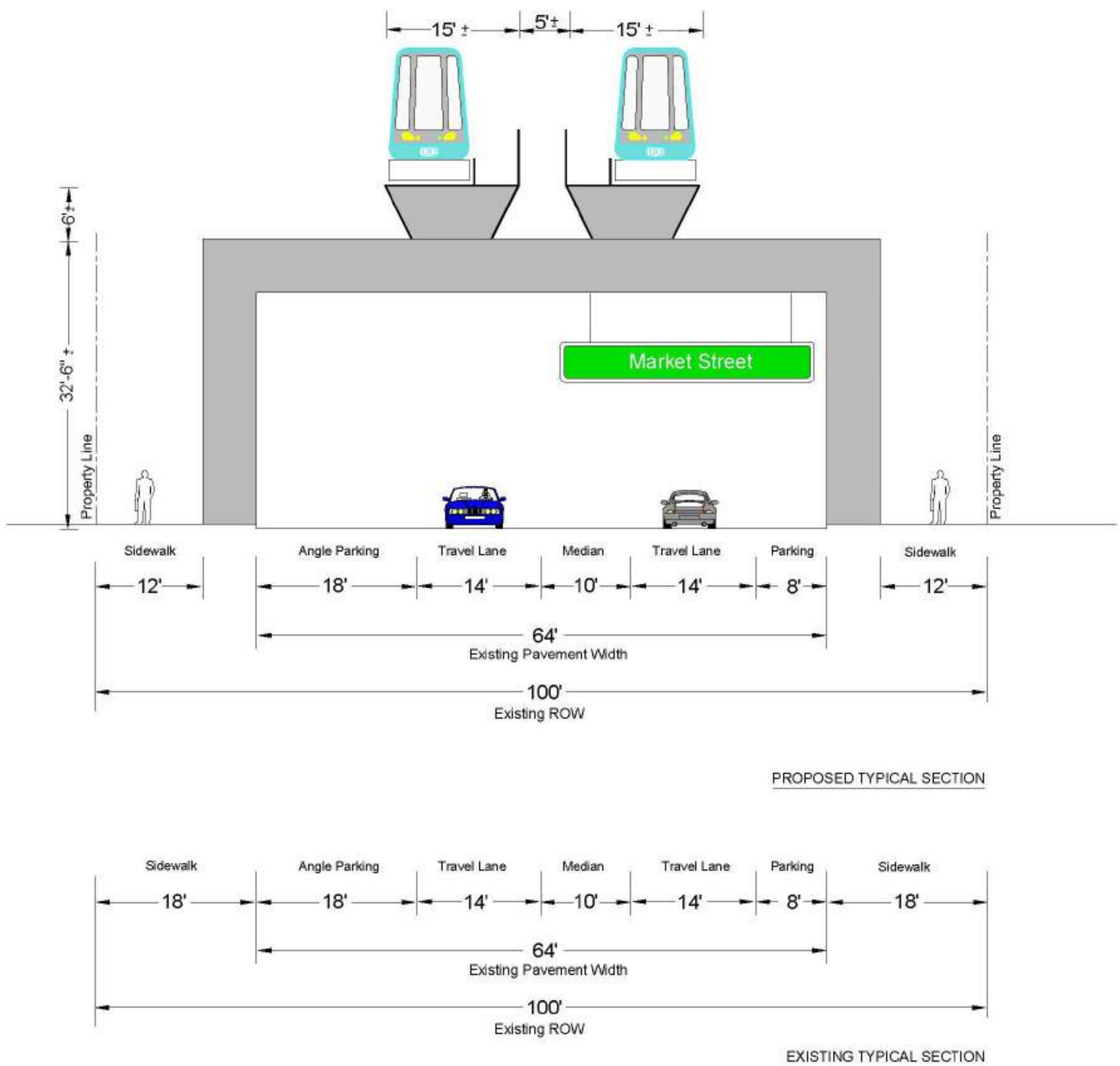
Source: Raju Associates, 2018

Figure 2.2-3: Alternative A: Market-Manchester Alignment
Manchester Boulevard, Looking West at Station



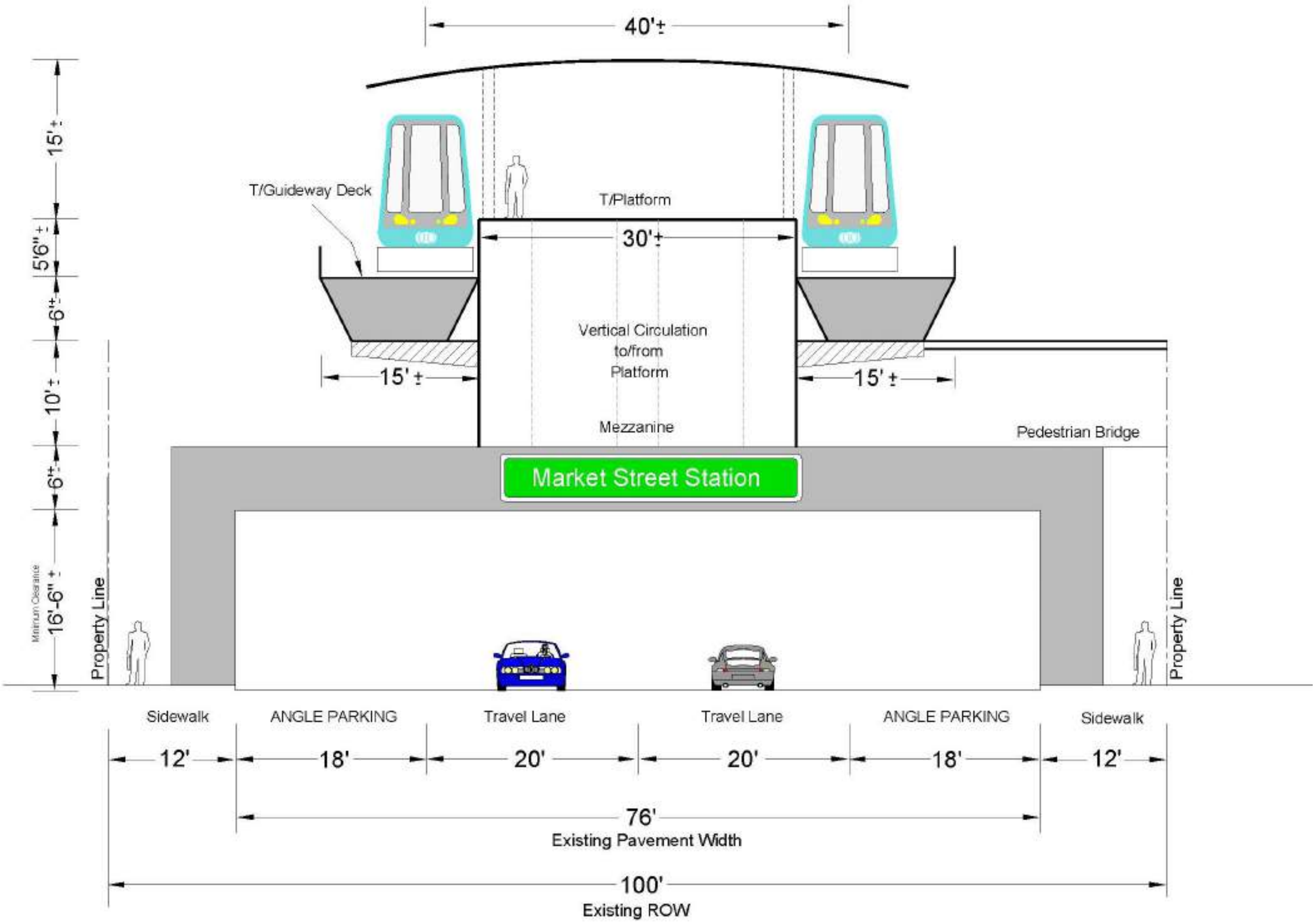
Source: Raju Associates, 2018

Figure 2.2-4: Alternative A: Market-Manchester Alignment
Market Street, Looking North between Regent St and Queen St



Source: Raju Associates, 2018

Figure 2.2-5: Alternative A: Market-Manchester Alignment
Market Street Looking North at Station



Source: Raju Associates, 2018

2.3 ALTERNATIVE B: FAIRVIEW HEIGHTS ALIGNMENT

The City identified an independent elevated APM System as a refined alternative connecting directly to the Fairview Heights Station along Prairie Avenue. The Fairview Heights Alignment (see Figure 2.3-1) is an aerial alignment that runs approximately one-half mile along Florence Avenue between Prairie Avenue and West Boulevard. The alignment then transitions south along Prairie Avenue for approximately one and three-quarter miles between Florence Avenue to Century Boulevard. This Alternative provides service to downtown Inglewood, The Forum, LASED, and the proposed Inglewood Basketball and Entertainment Center. The mainline length of this alternative is approximately 2.2 miles, dual lane, and includes an anticipated four stations as illustrated in Figure 2.3-1. The number of stations and their locations were identified based on providing connections to traffic generators/development. Further development opportunities are limited by Edward Vincent Jr. Park, Inglewood Cemetery, and residential areas; furthermore, Alternative B would not service the downtown Inglewood area.

A possible intermodal facility location to capture road-based traffic such as buses, TNCs, taxis, and private vehicles, and facilitate a convenient transfer to the ITC has been identified. This potential intermodal facility provides an opportunity to limit the amount and type of road-based traffic into the area especially during special events. Such limits may be voluntary based on convenience, and/or regulatory through policies including possible congestion pricing for access.

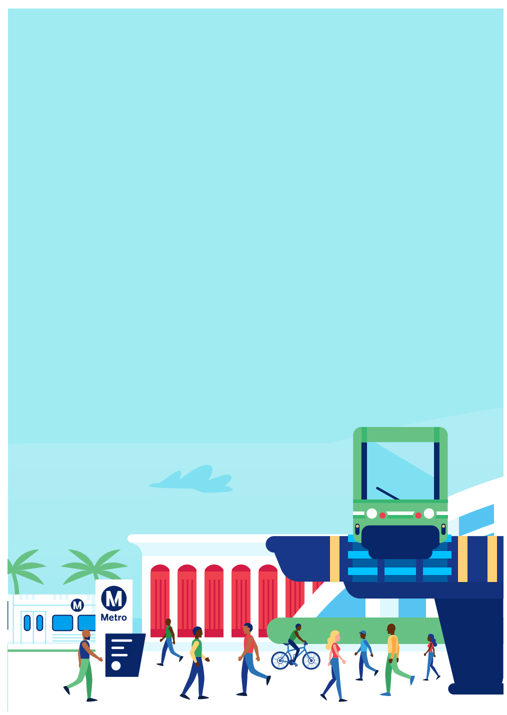
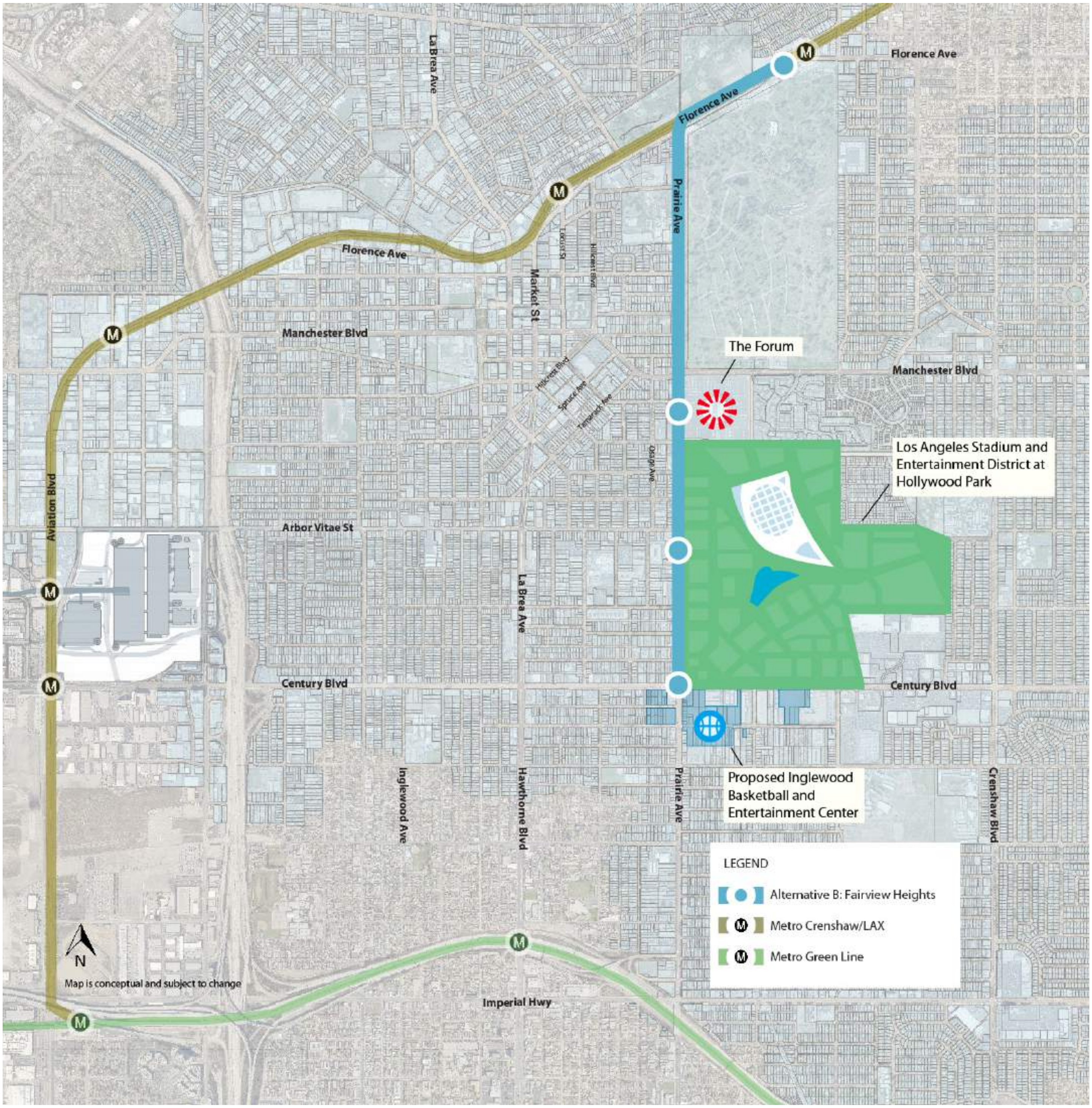
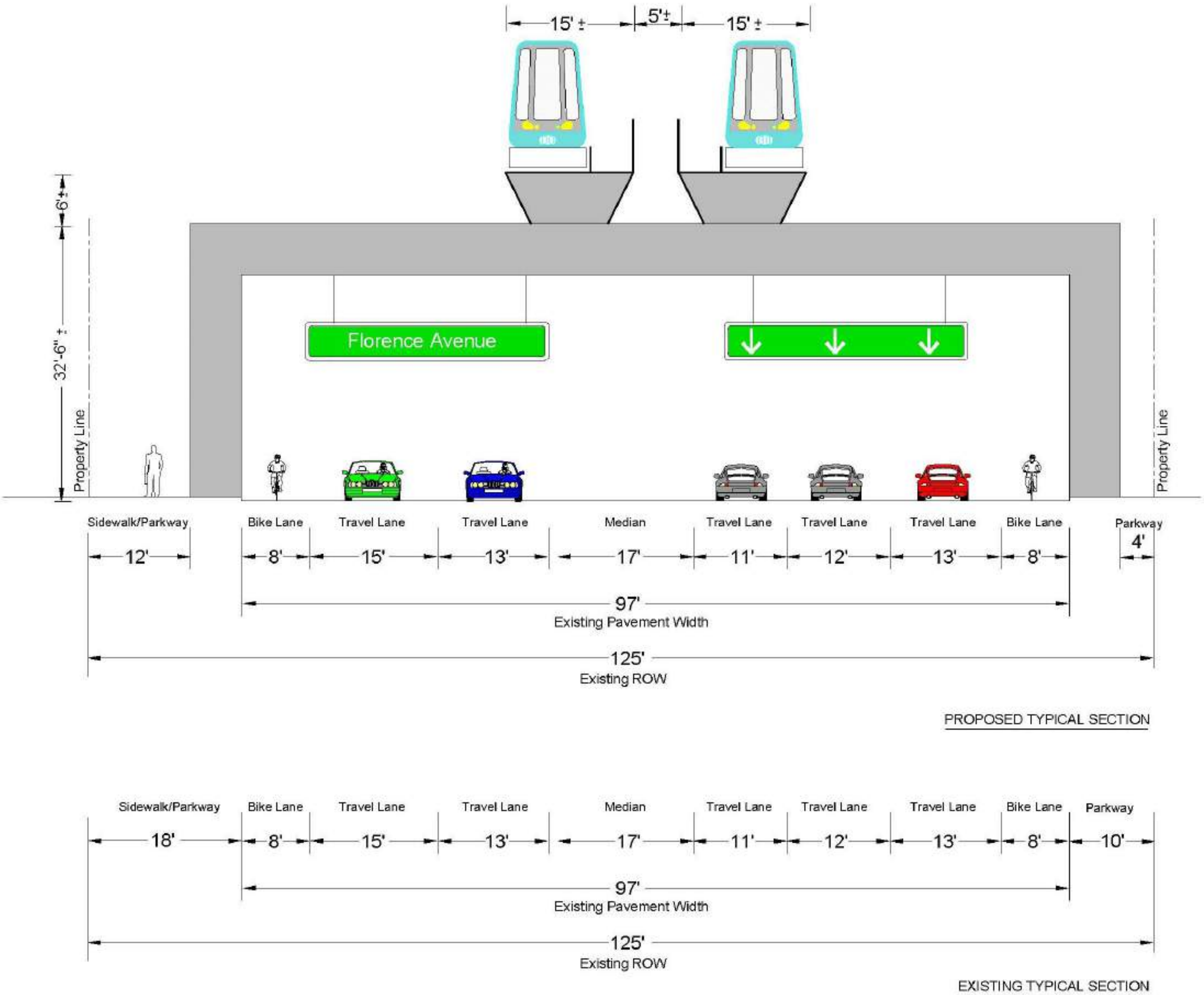


Figure 2.3-1: Alternative B: Fairview Heights Alignment



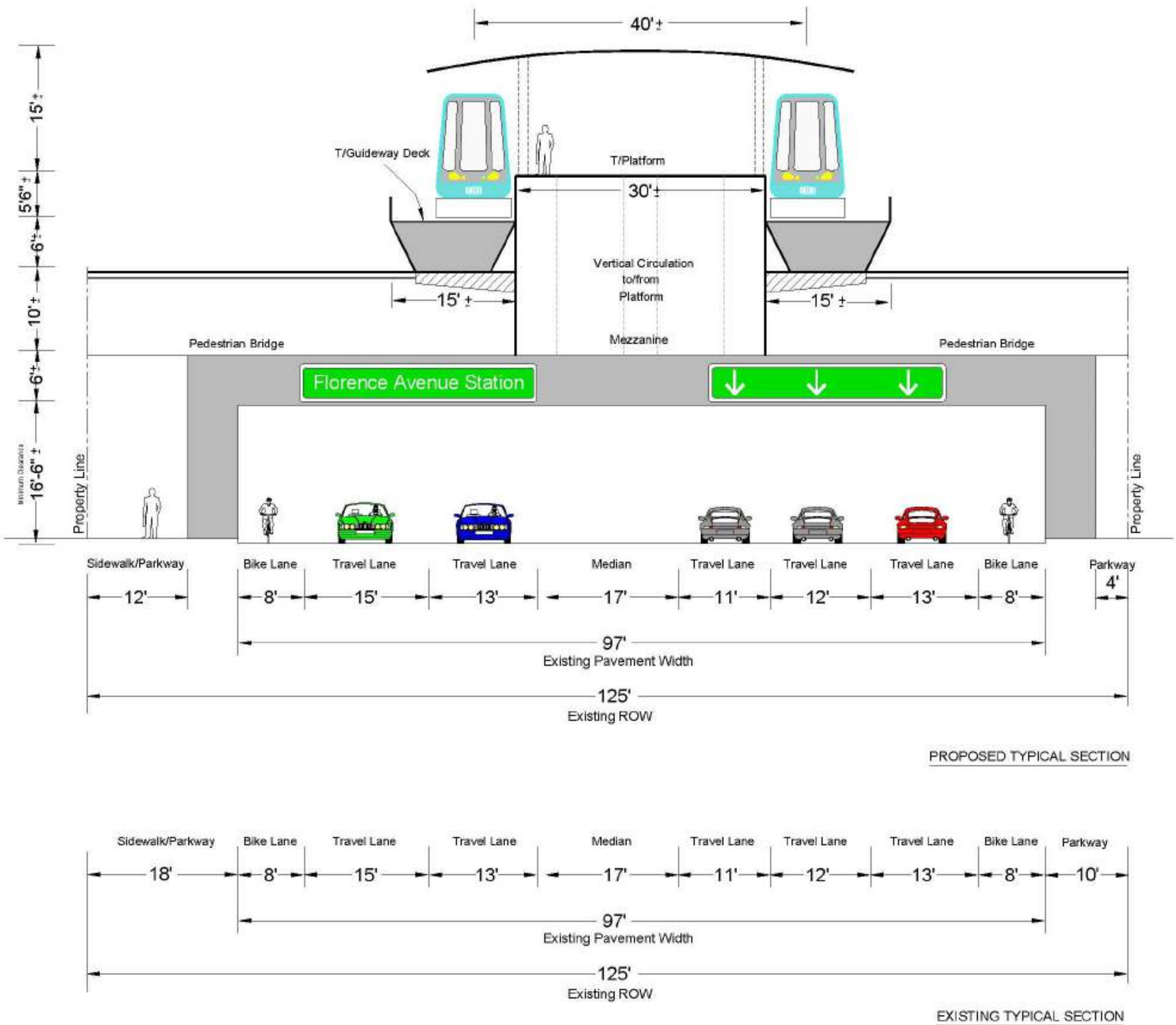
Source: Trifiletti Consulting, 2018

Figure 2.3-2: Alternative B: Fairview Heights Alignment
Florence Avenue, Looking West in Between Stations



Source: Raju Associates, 2018

Figure 2.3-3: Alternative B: Fairview Heights Alignment
Florence Avenue, Looking West at Station



Source: Raju Associates, 2018

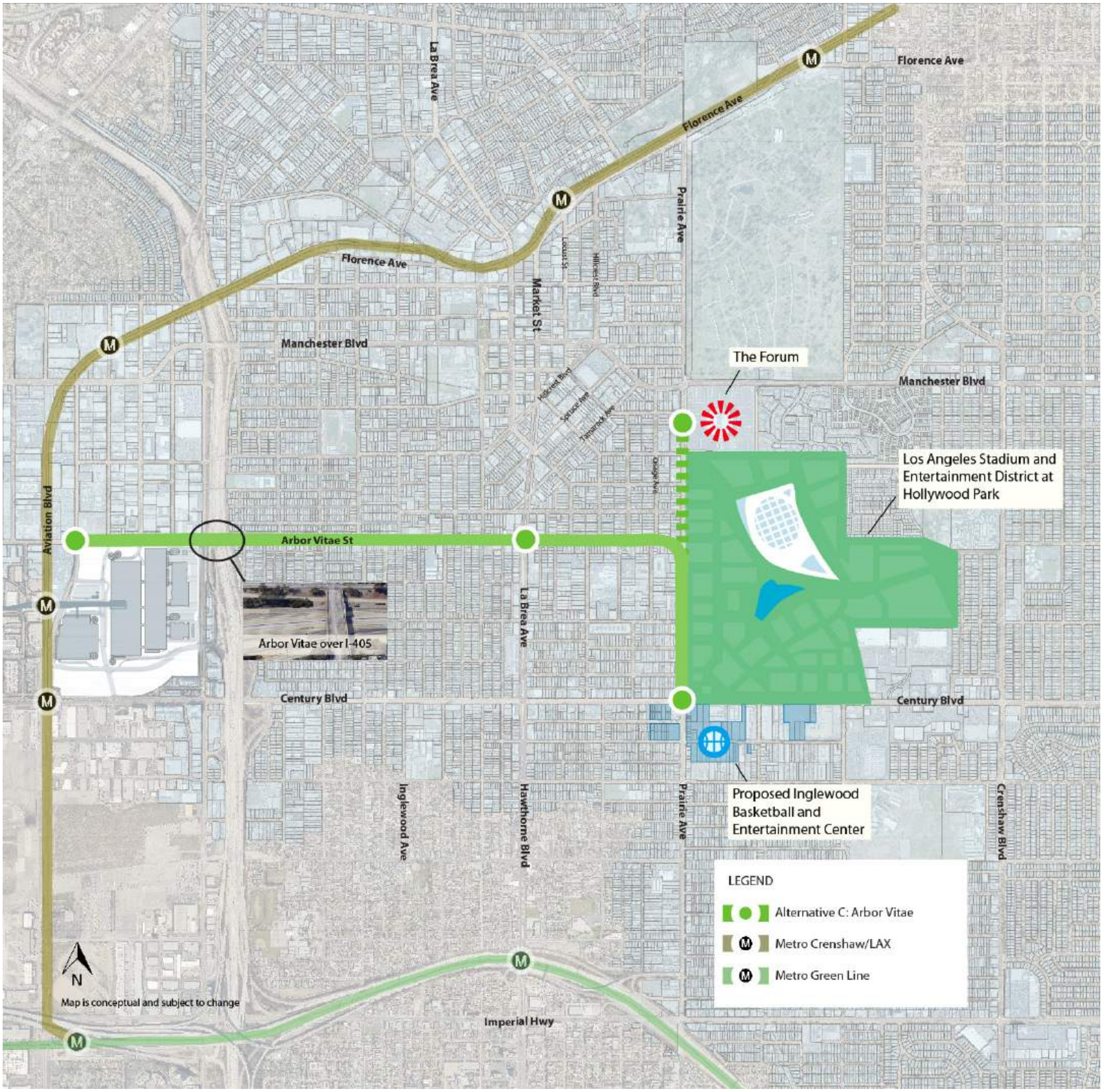
2.4 ALTERNATIVE C: ARBOR VITAE ALIGNMENT

The Arbor Vitae Alignment (Alternative C) is an aerial alignment concept that runs approximately two miles along Arbor Vitae Street from Aviation Boulevard to Prairie Avenue, where it transitions south, and potentially north, along Prairie Avenue for approximately one half mile to Century Boulevard. This Alternative provides service to The Forum, LASED, and the proposed Inglewood Basketball and Entertainment Center. Alternative C presents the opportunity to directly connect to the Los Angeles International Airport (LAX) and its Landside Access Modernization Program (LAMP) that includes substantial parking opportunities, a consolidated rental car center, planned regional multi-modal hub served by both Metro's Crenshaw/LAX and Green Lines, various Metro and municipal bus lines, and the LAX Automated People Mover system. Although this alternative connects to a planned multi-modal hub, development opportunities are limited in downtown Inglewood since it will not serve the area.

Crossing over the I-405 and a narrow right-of-way along Arbor Vitae Street poses significant obstacles for Alternative C. Crossing over the I-405 requires coordination with Caltrans, Los Angeles Department of Transportation and Los Angeles World Airports. However, since Arbor Vitae Street crosses over the I-405, the complexity of the coordination is expected to be less than the Century Boulevard Alignment (Alternative D). East of La Brea Avenue, the roadway section only includes one through-lane in each direction and one parallel parking lane. This section would require significant modifications to accommodate the alignment and create potential major impacts to existing small businesses as well as possible neighborhood displacement.

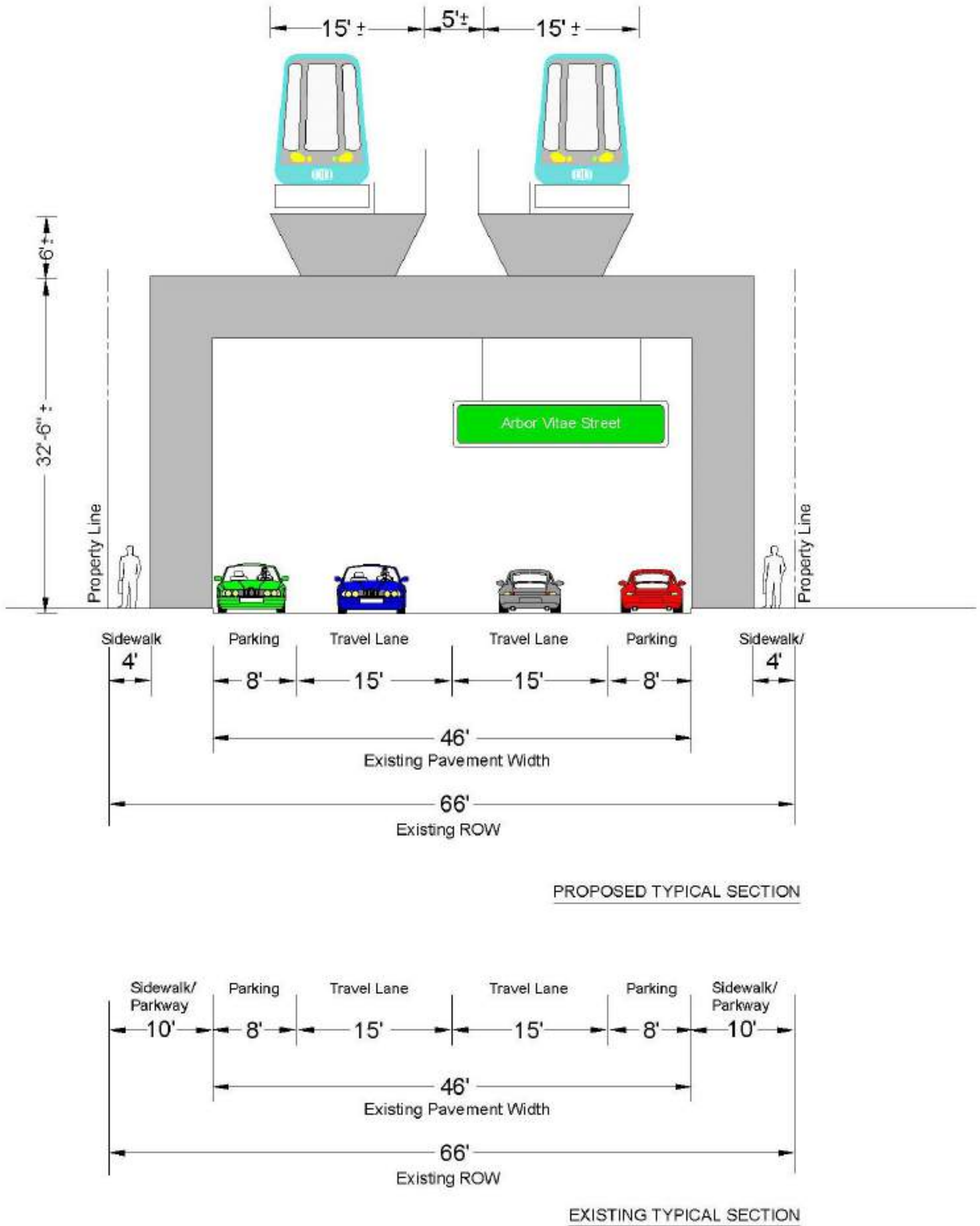
Possible intermodal facility locations to capture road-based traffic such as buses, TNCs, taxis, and private vehicles and facilitate a convenient transfer to the ITC have been identified. These potential intermodal facilities provide an opportunity to limit the amount and type of road-based traffic into the area especially during special events; such limits may be voluntary based on convenience, and/or controlled through regulatory policies including possible congestion pricing for access.

Figure 2.4-1: Alternative C: Arbor Vitae Alignment



Source: Trifiletti Consulting, 2018

Figure 2.4-2: Alternative C: Arbor Vitae Alignment
Arbor Vitae Street, Looking West in Between Stations



Source: Raju Associates, 2018

2.5 ALTERNATIVE D: CENTURY BOULEVARD ALIGNMENT

The Century Boulevard Alignment (Alternative D) is an aerial alignment concept that runs approximately two miles along Century Boulevard from Aviation Boulevard to Prairie Avenue, where it transitions north along Prairie Avenue for approximately one mile to south of Manchester Boulevard. This Alternative provides service to The Forum, LASED, and the proposed Inglewood Basketball and Entertainment Center. Alternative D provides the opportunity to directly connect to a regional multimodal facility served by Metro's Crenshaw/LAX and Green Lines, various Metro and municipal bus lines, and the LAX automated people mover (APM) system.

To connect to the multimodal facility, Alternative D would be required to cross the I-405 on the south side of the LAX LAMP development near Manchester Square. A preliminary review indicates that the transition from an elevated segment to a level sufficient under the I-405 may not be feasible due to the short distance available and the real estate constraint between Century Boulevard and the LAX LAMP development at Manchester Square. Crossing over and under the I-405 would require coordination with Caltrans, Los Angeles Department of Transportation and Los Angeles World Airports. This alignment does not present the opportunity for integration with local economic activity, current and future transit-oriented development, and other initiatives in downtown Inglewood.

Possible intermodal facitlity locations to capture road-based traffic such as buses, TNCs, taxis, and private vehicles and facilitate a convenient transfer to the ITC have been identified (see Figure 2.5-1). These potential intermodal facilities provide an opportunity to limit the amount and type of road-based traffic into the area especially during special events. Such limits may be voluntary based on convenience and/or controlled by regulatory policies including possible congestion pricing for access.

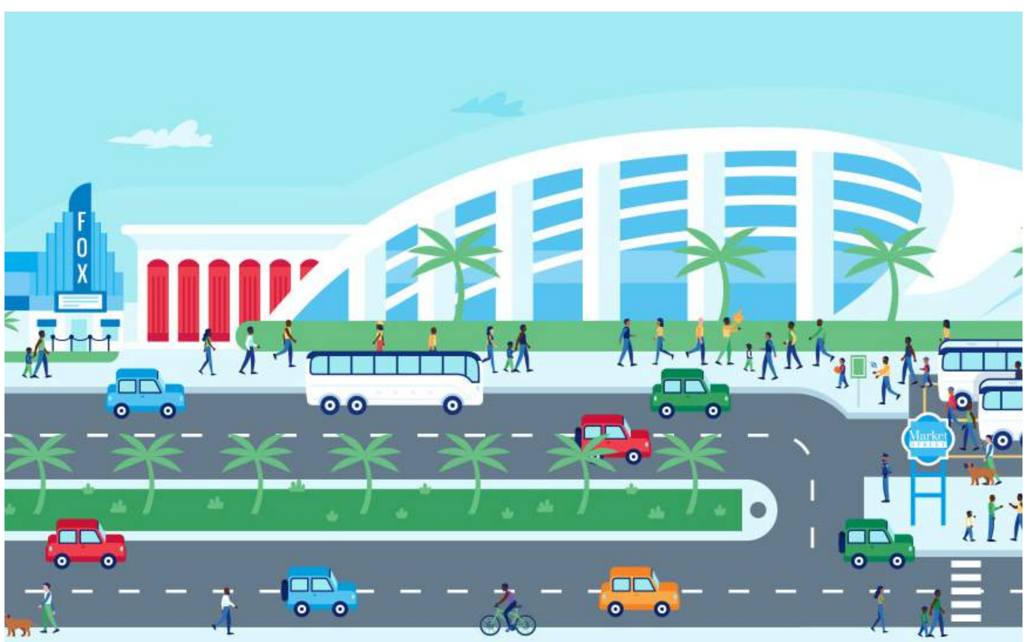
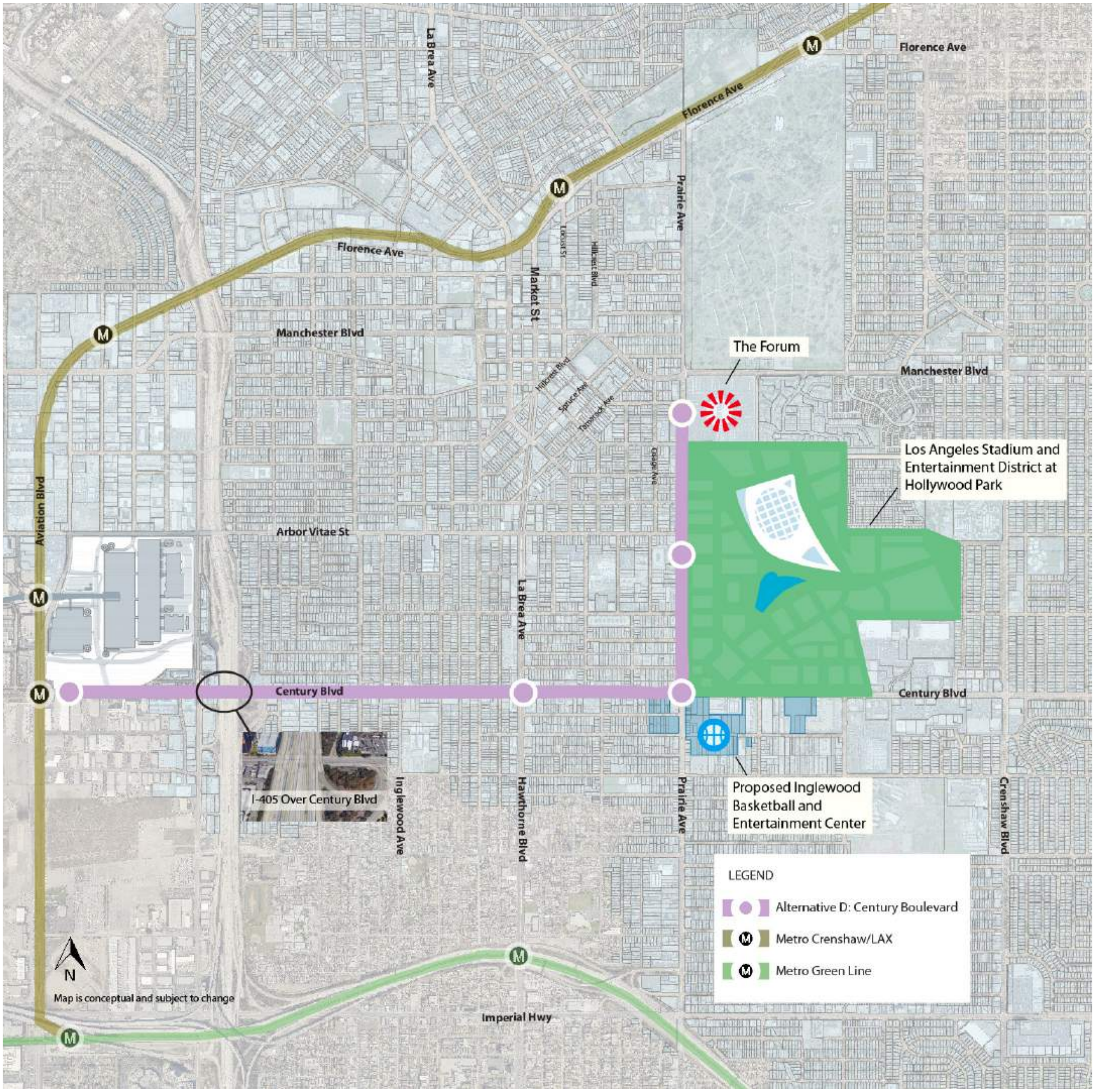
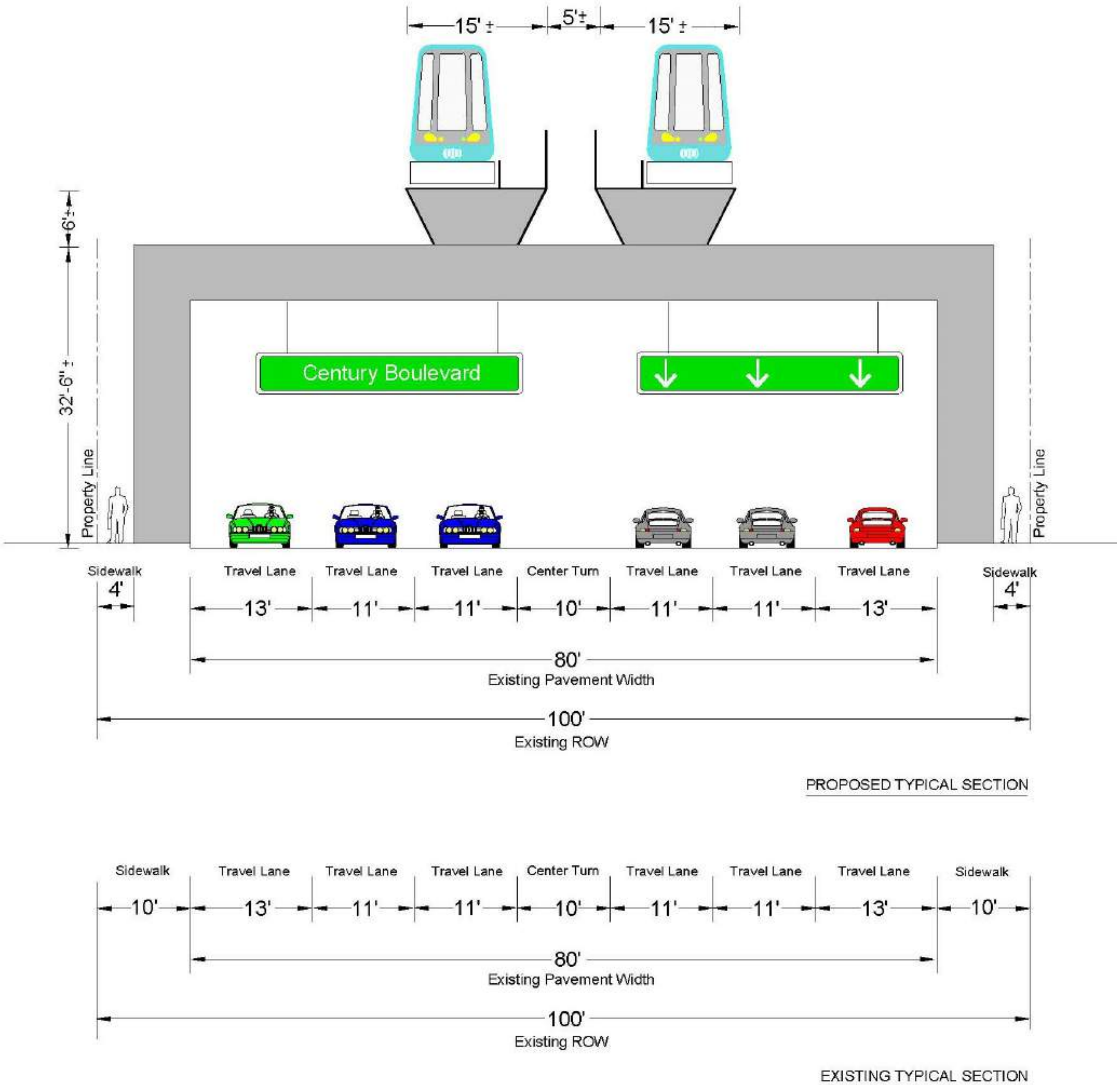


Figure 2.5-1: Alternative D: Century Boulevard Alignment



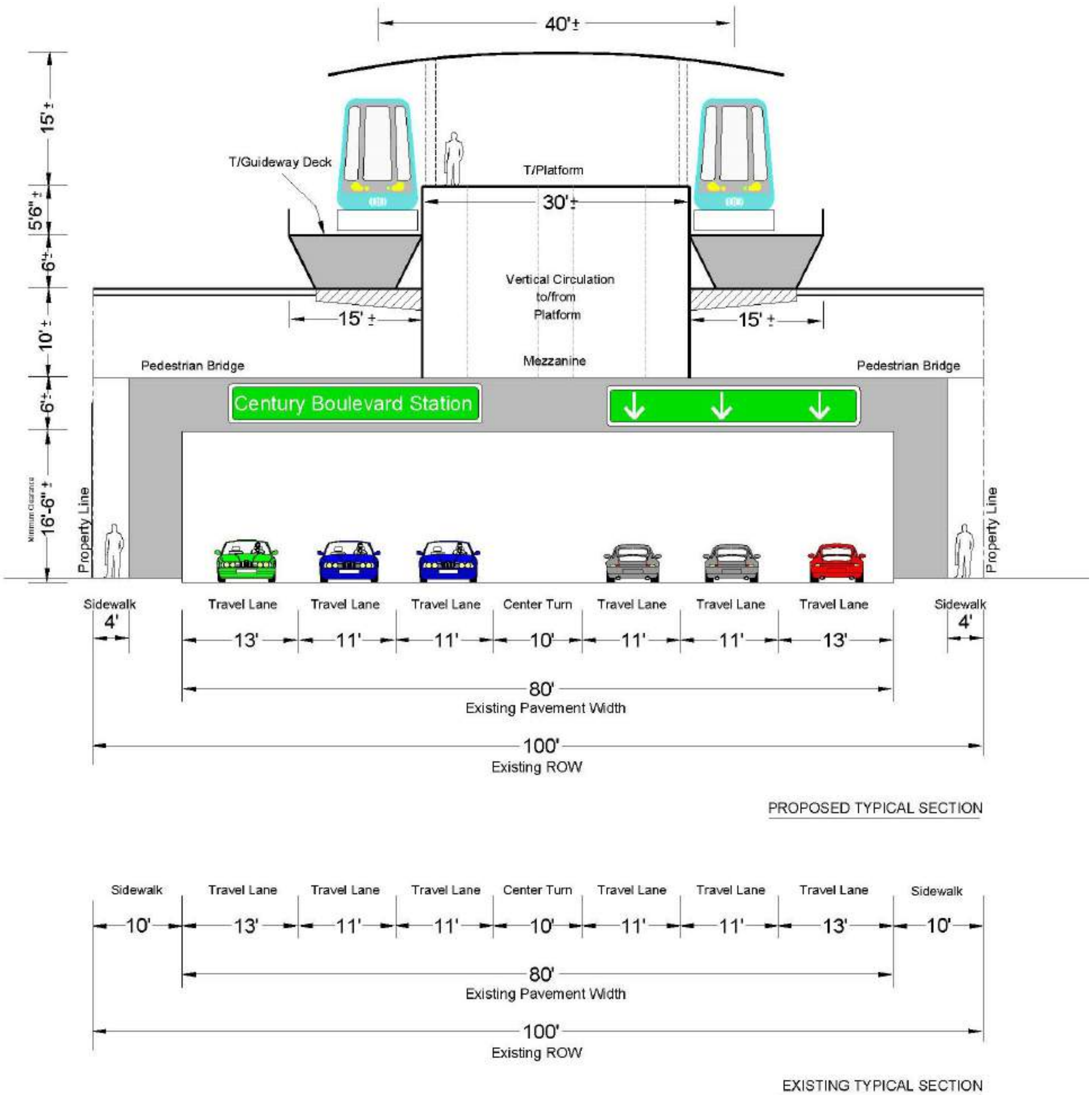
Source: Trifiletti Consulting, 2018

Figure 2.5-2: Alternative D: Century Boulevard Alignment
Century Boulevard, Looking West in Between Stations



Source: Raju Associates, 2018

Figure 2.5-3: Alternative D: Century Boulevard Alignment
Century Boulevard, Looking West at Station



Source: Raju Associates, 2018

2.6 TRANSIT TECHNOLOGY ASSESSMENT

The City also evaluated a range of transit technologies to determine the viable classes of technologies that can potentially meet the anticipated requirements for the Inglewood Transit Connector. Driverless technologies have been presumed as these are similar to manually operated technologies except that with an automated train control system, the driverless technologies can be operated at shorter (more frequent) headways. The system performance requirements will be established after the selection of the locally preferred alternative and further project development. Such system requirements will drive the ultimate selection of the optimal technology. Manually operated technologies have been removed from consideration as they will not be able to meet the operational requirements (i.e. short headways) to meet the anticipated line capacity demands, nor fit within the geometric constraints given the short system route and the high peak ridership demands from special events and game days at the key ridership generators.

The range of such technologies are considered to be a class of Automated Guideway Transit or APM Systems. Differentiation is primarily based on the size of the vehicles, guideway mounting, propulsion and guidance systems. The candidate transit technologies are:

- Personal Rapid Transit (PRT)
- Large and Small Monorails
- Cable-propelled APMs
- Self-propelled Rubber-Tired APMs
- Large Steel Wheel-Rail APMs

Table 2.6-1 provides a summary of the typical characteristics of the different potential technologies.

Table 2.6-1: Summary of Technology Specifications of Modes Considered

MODES	TYPICAL APPLICATION AND OPERATIONS	TYPICAL CAR LENGTH (ft)	TYPICAL CAR CAPACITY (Pax/car at 2.7 to 3.5 sf/pax)	TYICAL OPERATING SPEEDS (mph)	GUIDEWAY/ ALIGNMENT ROW CHARACTERISTICS
Personal Rapid Transit (PRT)	Designed to provide nonstop, origin-to-destination service to individuals or small groups of passengers with multiple cars operating in a network. To date, network size has been very limited.	10 to 15 feet	Small (max four to six passengers seated)	Typical low operating speed (less than 25mph) but some suppliers claim up to 40 mph	Five to seven feet per guideway (excluding emergency walkway) Min. turning radius capability of 16 feet, but preferable 20-25 feet or higher.
Small Monorails	Provides line haul type service connecting multiple stations. May be operated as a shuttle or pinched loop with multiple trains following each other stopping at every station before turning back at the end of line stations. Applied when geographically compact area. May operate on top of the guideway, or be suspended from the guideway.	15-20 feet (typical trains can be six to eight cars long)	12 to 20	20 to 30 mph	Seven to eight feet per guideway (excluding emergency walkway) includes vehicle overhang. Min. turning radius capability of 50 feet, but preferable 150 feet or higher. At turnback – requires guideway structure movement to switch tracks.
Large Monorails	Provides line haul type service connecting multiple stations. May be operated as a shuttle or pinched loop with multiple trains following each other stopping at every station before turning back at the end of line stations. Applied when geographically compact area. May operate on top of the guideway, or be suspended from the guideway.	40 feet (typical trains can be four to five cars long)	55 to 70	30 to 55 mph	12 feet per guideway
Cable Propelled APMs	Provides line haul service connecting multiple stations. Applied when geographically compact area. Typically operated as a shuttle where trains operate on their track shuttling back and forth between the end-of-line stations. Trains are "pulled" by cables with "cars" attached to the cable with grips. Cable drives between station pairs. Detachable grips available with some technology suppliers – to facilitate multiple trains operating behind each other with trains turning back at end of line stations. Requires that station pair distances be roughly uniform to maintain synchronized operations.	25-30 feet (typical trains can be up to five to seven cars long)	35 to 55	25 to 30 mph	10 to 12 feet per guideway (excluding emergency walkway) Min. turning radius capability of 75 feet, but preferable 150 feet or higher.
Self Propelled Rubber-Tired APMs	Provides line haul type service connecting multiple stations. Typically operated in a pinched loop with multiple trains following each other stopping at every station before turning back at the end of line stations; can also be operated in shuttle operations where a train shuttles back and forth on same track between the stations. Applied when geographically compact area. Typically applied when operational flexibility is required, and when system is implemented in phases – as future expansion is more easily accommodated compared to monorails or cable propelled technologies. Applied at airports (landside and airside), as well as downtown circulators.	40-42 feet (typical two to four car trains, but up to six car trains)	50 to 75	30 to 50 mph	12 feet per guideway (excluding emergency walkway) Min. turning radius capability of 75 feet, but preferable 150 feet or higher.

Source: Trifiletti Consulting, 2018

Figure 2.6-1: Personal Rapid Transit Examples - Heathrow Airport, Morgantown, WV and Masdar, UAE

Source: Heathrow Airport


Source: Morgantown, WV

Personal Rapid Transit - Key Considerations:

- Small, limited operating systems with limited capacities.
- Small cars with limited interior capacity, maximum of 4 to 6 passengers, and low headroom.
- Low operating speed, less than 25 mph.
- Only three small starter systems with very limited complexity and capacity, though this technology has been developed for over 30 years.
- Operating headway and resulting system capacity remains controversial. PRT suppliers claim that the operating headways can be as close as 0.5 seconds to get higher capacities. However, this has not been service proven, even on a test track, with a representative operating fleet and guideway configuration. To accommodate such a high vehicle volume, the infrastructure at the stations and bypass lanes would be substantially larger than for larger vehicle APM systems.


Source: Masdar, UAE

Figure 2.6-2: Small Monorail Guideway and Switch Examples

Source: Bombardier Monorail at Newark Airport

Source: Bombardier Monorail at Newark Airport

Small Monorails - Key Considerations

- Small vehicles/cabins with single doors.
- Longer, narrower vehicles for same number of passengers.
- Fixed vehicle length.
- Limited flexibility to extend train length by coupling due to front and tail car nose.
- Relatively small guideway but large guideway replacement switches.

Figure 2.6-3: Large Monorail Guideway and Switch Examples

Source: Bombardier Monorail in Las Vegas

Large Monorails - Key Considerations

- Larger cabins with one or two bi-parting door sets.
- Fixed vehicle length.
- Limited flexibility to extend train length by coupling due to front and tail car nose.
- Inefficient vehicle floor use due to bogies – longer vehicle per number of passengers.
- Relatively small guideway but massive guideway replacement switches.
- Ability to support competitive procurement with the number of active suppliers with technically mature and/or ready for deployment technologies.

Source: Bombardier Monorail in Las Vegas

Figure 2.6-4: Cable-Propelled APM Examples

Source: BART, Oakland International Airport

Source: Aerotrén, Mexico City International Airport

Figure 2.6-5: Self-Propelled APM Examples

Source: Bombardier Innovia 100, George Bush (Houston) Intercontinental Airport

Source: Bombardier Innovia 200, Phoenix Sky Harbor International Airport

Figure 2.6-6: Large Steel Wheel-Rail APM Examples

Source: Bombardier Innovia ART 300 APM System at JFK

Self Propelled Large Steel Wheel Rail APM - Key Considerations:

- Vehicles typically longer than rubber-tired vehicles, 55 feet compared to 40 feet.
- Flexible train length: one to six cars.
- Shuttle, loop, and pinched loop operating modes.
- Higher operating speeds, typically 50 to 60 mph.
- Generally applied to urban/metro systems that are longer and have more stations.
- Steel wheel-rail noise, particularly in curves.

2.7 TECHNOLOGY EVALUATION

Technologies were evaluated against a set of defined criteria to provide a preliminary assessment of viable systems that are suitable for further evaluation and consideration.

- Ability to fit within the site-specific constraints.
- Ability to fit the scope and scale of the project.
- Ability to meet anticipated ridership demand, in terms of peak hour demand or line capacity.
- Flexibility of operations in terms of different train lengths
    - Train lengths would be longer during peak periods and shorter during off-peak periods to maintain the same frequency and service levels.
- Ability to expand the fleet size with minimal or no disruption to ongoing normal passenger service during peak operational hours.
- Ability to extend the system with minimal or no disruption to ongoing passenger service.
- Viability/availability of technology suppliers as measured by 1) longevity of business providing new systems and continued operations and maintenance; 2) at least one technology application proven in passenger service; and 3) applications of comparable size/scale to the Inglewood Transit Connector proposed project.

Table 2.7-1 Summary of How Each Technology is Evaluated According to the Criteria

CRITERIA	PRT	SMALL MONORAIL	LARGE MONORAIL	CABLE-PROPELLED	RUBBER-TIRED APM	LARGE STEEL-WHEEL RAIL APM
Ability to fit within site specific constraints/ geometry	Yes	Yes	Yes	Yes	Yes	Maybe
Fits the project scope and scale	No	No	Maybe/Yes	No	Yes	Maybe
Ability to meet peak hour ridership (line capacity)	No	No	Maybe/Yes	No	Yes	Yes
Flexible train length operations	No	No	No	No	Yes	Yes
Expand fleet size with minimal to no disruption	Yes	Yes	Yes	No	Yes	Yes
Extend system with minimal to no disruption	Yes	Yes	Yes	No	Yes	Yes
Viability/availability of suppliers	Yes	Yes/Limited	Yes	Yes	Yes	Yes
Maintain consideration for the Inglewood Transit Connector Project	No	No	Yes	No	Yes	Maybe

Source: Trifiletti Consulting, 2018

The analysis concluded that PRT, small monorails, and cable-propelled APMs are not appropriate for the Inglewood Transit Connector project. To determine the viability of steel wheel-rail APMs, further analysis is required. Although steel wheel-rail APMs could provide the passenger capacity necessary to meet the demand generated by the activity centers and have been successfully applied to larger systems in the US such as the JFK Air Train, which is more than ten miles long with eight stations, the technology cannot accommodate the tight right-of-way, and curves, including a minimum turning radius of 120 feet, which is anticipated for the proposed project alternatives. Therefore, it is highly unlikely that steel wheel-rail APMs will be suitable for the Inglewood Transit Connector Project.

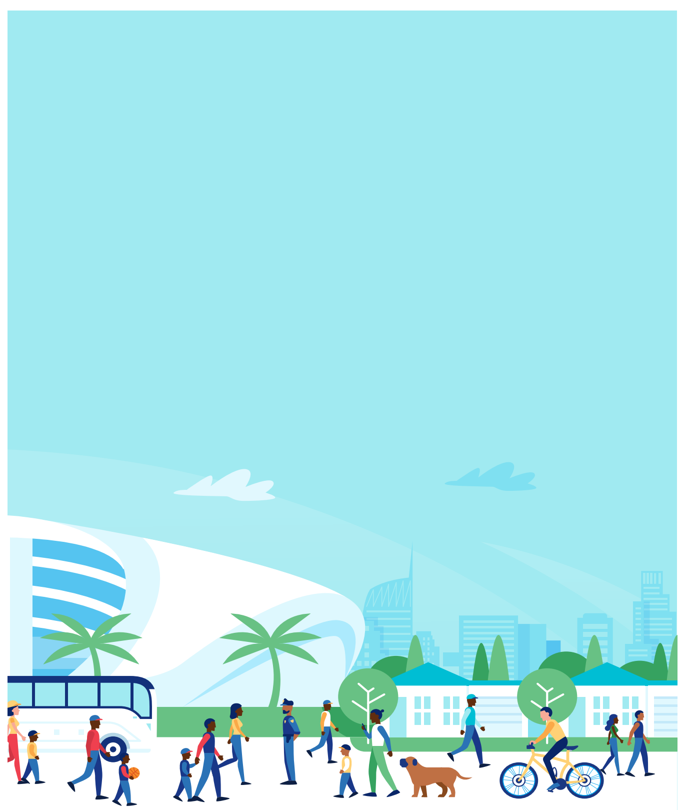
Large monorail systems can provide the necessary passenger capacity for both event and non-event days to newly constructed, under construction, and proposed activity centers. However, train lengths are not readily adjustable, and technology suppliers may not have the ability to fit their technology within the project's constraints, such as the line capacity/demand requirement, the tight right-of-way, and curves anticipated for the proposed alternatives. These are not technical flaws, but they may have an impact on the commercial competitiveness, as a total cost of ownership, of the monorail technology. This is not definitively known and further evaluation, including technology maturity and readiness for deployment is recommended as part of the further project definition process for the locally preferred alternative.

2.8 STATIONS

APM stations accommodate passengers boarding/de-boarding to and from the APM vehicles. Station platforms also provide the required space for passengers to circulate between the station platform and the adjacent facilities. Stations are required to be fully accessible to passengers with disabilities.

Each of the alternatives are described in Sections 2.2 through 2.5. Section 2.6 provides details of the technology assessment of APM technologies with key findings on the candidate technologies applicable to the project; the specific technology is expected to be selected through a competitive procurement process that is not alternative dependent.

Since all the alternatives consist of elevated APM systems, typical station configurations and requirements will be similar and are not differentiators between the different alternatives. Any adjustments to station locations and configurations at this stage would apply equally to each of the alternatives. Station location and configurations will be refined and adjusted for the selected preferred alternative as the project is further developed, in coordination with the activity generator facility designs, site specific passenger access/egress concepts, and to address utility and right-of-way constraints for the preferred alternative.



At this time, the anticipated locations of stations have been established for each of the alternatives and illustrated in Figures 2.2-1, 2.3-1, 2.4-1, 2.5-1. The station locations were primarily designed to serve the key event and activity generators in the City.

Because ridership projections for the alternatives are comparable, as described in Section 3, the station occupant load at the key stations can be expected to be similar. The worst case loading for any station is governed by life safety constraints to address a scenario where two fully loaded trains are brought to the same station under an emergency or failure mode. NFPA-130 establishes life safety requirements for fixed guideway transit systems. It requires that all passengers must be evacuated to a point of safety within a set amount of time. For normal operational conditions, the station must be designed in a manner to ensure that all de-boarding passengers are able to get off the station platform before the arrival of the next train. Specific station designs will be site-specific and will be defined as the project development progresses for the preferred alternative.

Typical station descriptions provided below are based on accommodating a large class of automated guideway transit vehicles; the transit technology most likely to be applied to the project. Due to the variation that may occur between technologies within this class, the station configuration can be expected to be adjusted as part of the design development phase once the transit system technology has been selected.

2.8.1 Platform Configurations

Many different platform configurations are possible. Some configurations are more appropriate than others dependent upon the location within the system and the type of facility or area served by the station, security and passenger flow considerations, level of service, cost, and other factors. As described below, and illustrated in Figure 2.8-1 platform configurations may be:

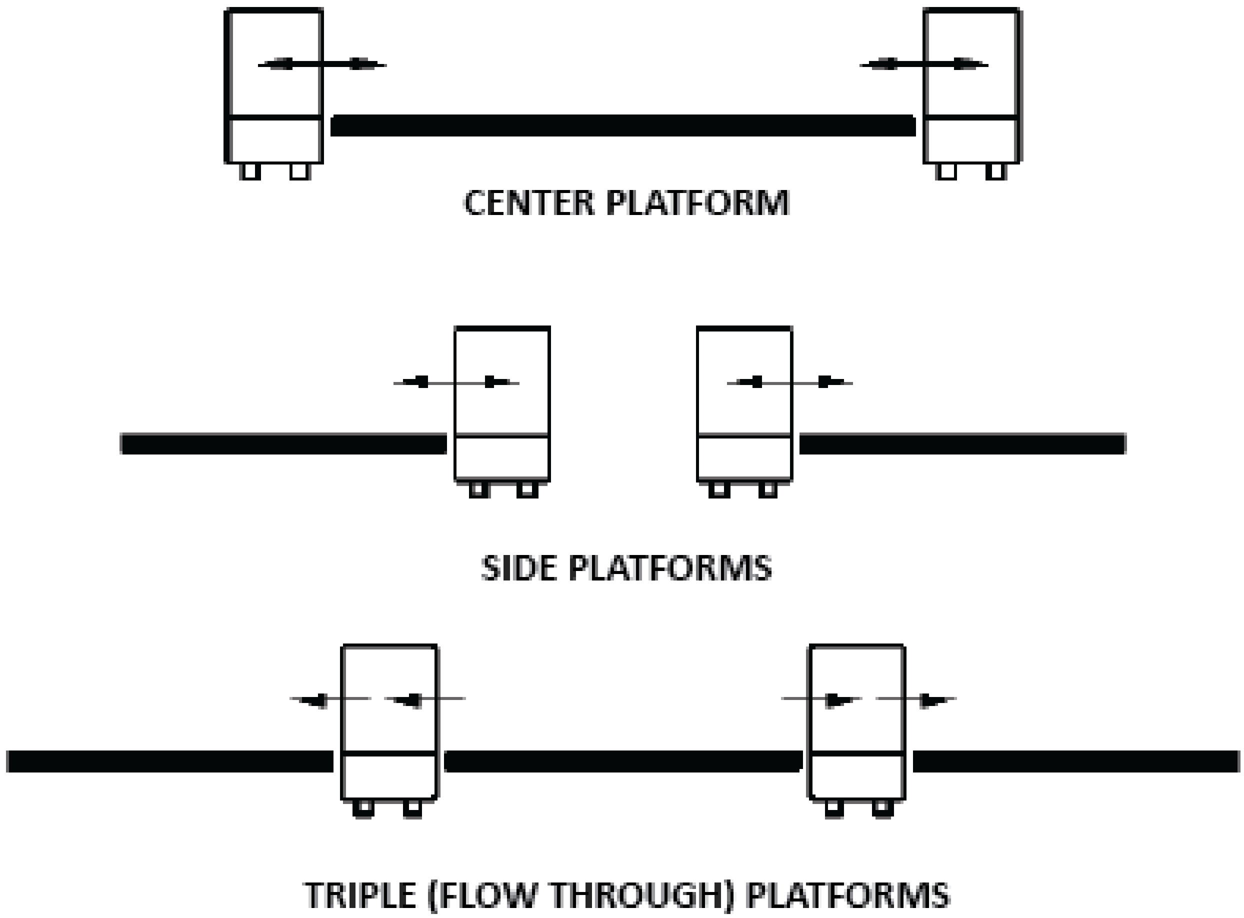
1. Center Platforms - are located between relatively widely spaced guideways and serve as both boarding and de-boarding platforms for passengers traveling in either direction on the System.

2. Side Platforms - are located outside guideways. Each side platform generally serves as a boarding and de-boarding platform for passengers traveling in one direction only on a pinched-loop system, and in either direction on shuttle systems.

3. Triple (flow through) Platforms - combine a center platform with side platforms. Side platforms usually serve de-boarding passengers and the center platform serves as a boarding platform. Triple platforms are sometimes referred to as flow through platforms because the flow of boarding and de-boarding passengers is through APM vehicles.

Center platforms can be more compact in size and less expensive than comparable side or triple platforms because center platforms generally require less infrastructure. Additionally, they provide a consistent and easier wayfinding scheme for passengers, where the decision on direction of travel is made once the passenger is on the platform. The specific platform configuration is expected to be defined in coordination with the activity generators and site specific requirements related to ability to fit the station. Since all alternatives serve the same activity centers within the City's business district, it is reasonable to expect that the station configurations will remain consistent across each of the different alternatives. For the purpose of this, center platform configuration is assumed since it is the most compact in size and thus expected to have the least physical impact compared to the other platform configurations.

Figure 2.8-1: Typical Platform Configurations



Source: Trifiletti Consulting, 2018

Vertical circulation can be provided at one end (single end-loaded) or both ends (double end-loaded) of station platforms, or within the length of the platform (center loaded) for any of these platform configurations:

- Single end-loaded platforms only provide this circulation from one end of the station platform.
- Double end-loaded platforms permit passengers to move from the platform to adjacent facilities, and vice versa, from both ends of the station platform.
- Center loaded platforms require additional platform width since the vertical circulation cores disrupts the circulation within the platform.

For the purpose of this study, platforms are assumed to be either single or double end-loaded to provide the most compact, in size, station platform to minimize the physical impact of the stations.

A mezzanine level is anticipated under the station platform. This mezzanine will provide connectivity to the adjacent facilities through pedestrian walkways.

2.8.2 Station Equipment /Amenities

All stations will be equipped with Public Address systems, static and dynamic signage to provide information to passengers, CCTV to enable central control operators to surveil the operations of each station and make announcements, adjustments and/or take other action as appropriate, as well as emergency telephones and blue light stations in case of emergencies. Since the station platforms are transitory spaces, amenities such as seating and concessions will not be provided at the platform level, but may be provided at the mezzanine level.

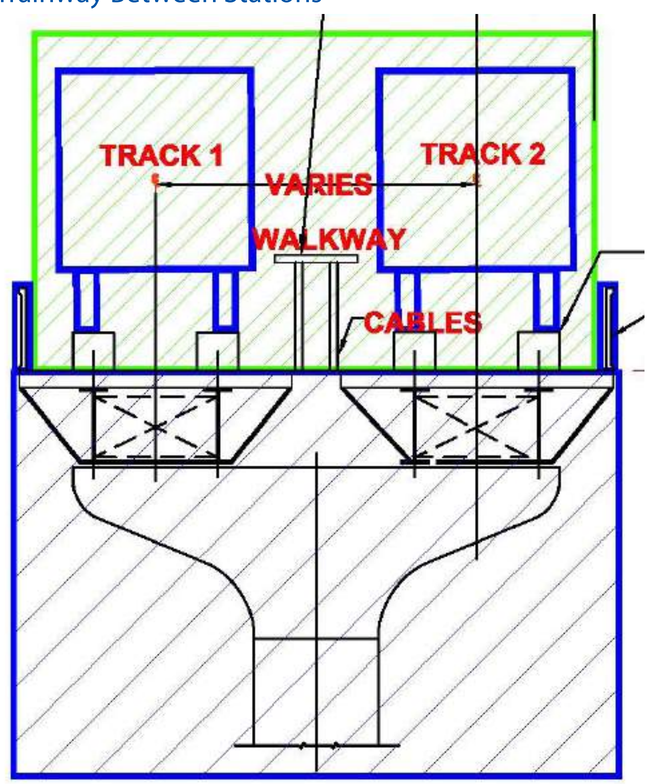
2.8.3 Platform Dimensions

Station platforms are anticipated to be approximately two hundred feet long, excluding vertical circulation, to accommodate the anticipated longest train, and thirty feet wide to accommodate passenger queuing and circulation. A minimum ceiling height of twelve feet would be provided in APM stations to accommodate CCTV cameras and dynamic graphics above the automated platform doors.

2.8.4 Vertical Circulation

Vertical circulation consists of fixed stairs, escalators and elevators. Sufficient vertical circulation elements will be provided to assure that under normal circumstances all de-boarding passengers can clear the platform before the next train arrives. Additionally, all code prescribed emergency egress requirements must be satisfied.

Figure 2.8-2 – Example of Emergency Walkway Along Trainway Between Stations



2.9 MAINTENANCE AND STORAGE FACILITY REQUIREMENTS

All of the alternatives are aerial APM Systems. The selected technology will be applicable equally to each of the alternatives and is not a differentiator between them. Each of the alternatives will require a Maintenance and Storage Facility (M&SF) to perform regular and preventive maintenance of the transit operating system, for storage of the vehicle fleet, as well as for the operations control center where automated train operations are monitored and controlled. The specific design of the M&SF will be driven by the selected M&SF site, which will depend on the alternative selected.

Road access to the M&SF is required for employees, visitors, suppliers, and emergency vehicles. Accommodations must be made for a delivery entrance to load and unload equipment, materials and parts from tractor-trailer trucks. Roadway access is also required near the M&SF to allow APM vehicles to be delivered. In addition, stopping positions for firefighting equipment must be provided adjacent to the Maintenance Facility.

Appropriate space should be provided to allow adequate maneuvering by these ground vehicles. Anticipated M&SF requirements are noted below to define the project requirements. Depending on the available site, the M&SF may be split to fit onto the available site(s); however, a consolidated M&SF is more efficient and preferable.

The M&SF is expected to be an elevated structure that will accommodate the following functions: 1) support of system operations, 2) vehicle storage, and 3) APM system maintenance. Additionally, the transit system operations and maintenance administrative facilities would be co-located within the M&SF.

The following functional areas are required at the M&SF:

- Service and inspection shops.
- Major repair area.
- Vehicle storage areas.
- Inspection and service bays, including under vehicle bays.
- Equipment and materials storage areas.
- Offices, lunch/break areas, restrooms, locker areas, personnel wash facilities.
- Loading platforms, paint booth, and other areas based on design information to be provided by the selected System Supplier.

Design of the facility would also include access roadways, landscaping, exterior lighting, parking, signage, and means of controlling access into and out of the M&SF such as secure fencing. The M&SF design would include the guideway and an access platform at the vehicle floor level with stairs to grade to allow Operations and Maintenance (O&M) personnel access into APM vehicles and other facilities infrastructure, such as lighting required to accommodate the train receiving and departure tracks and its operation.

2.9.1 Operations

Automated system operations will be monitored and controlled from a Central Control Facility within the M&SF. Central Control Operators monitor the system operations aided by CCTV coverage, and alarms that will identify and notify any issues within the system. Depending on the type of issue and/or alarm, the Central Control Operators remotely implement corrective actions to return the system to normal operations as quickly as possible. Additionally, Central Control Operators are the key interface with emergency response. All responses and actions are procedurally defined in the System Operations Plan, the System Safety Program Plan and other documents that are jointly developed by the System Supplier and the Owner's Safety and Security Committee during project implementation.

All equipment for communications, train control, power distribution, SCADA, CCTV, whether along the system train-way, at stations or other locations is connected to equipment at the Central Control Facility.

2.9.2 Maintenance

Maintenance performed on system equipment includes:

- Service: the periodic replacement of consumables and expendables and adjustment of parts to their nominal position, required tolerance, setting, and output.
- Cleaning: interior and exterior cleaning of accumulated trash, dirt, and grime, including graffiti.
- Inspection: periodic inspection of parts, appurtenances and subsystems subject to deterioration and failure.
- Repair: the repair or replacement of a part that has been damaged, has failed, or is nearing the end of its service life.
- Maintenance Information Management and Scheduling: the processing of maintenance information, work reports, failure reports, and system performance data needed to manage the system maintenance program effectively and efficiently.

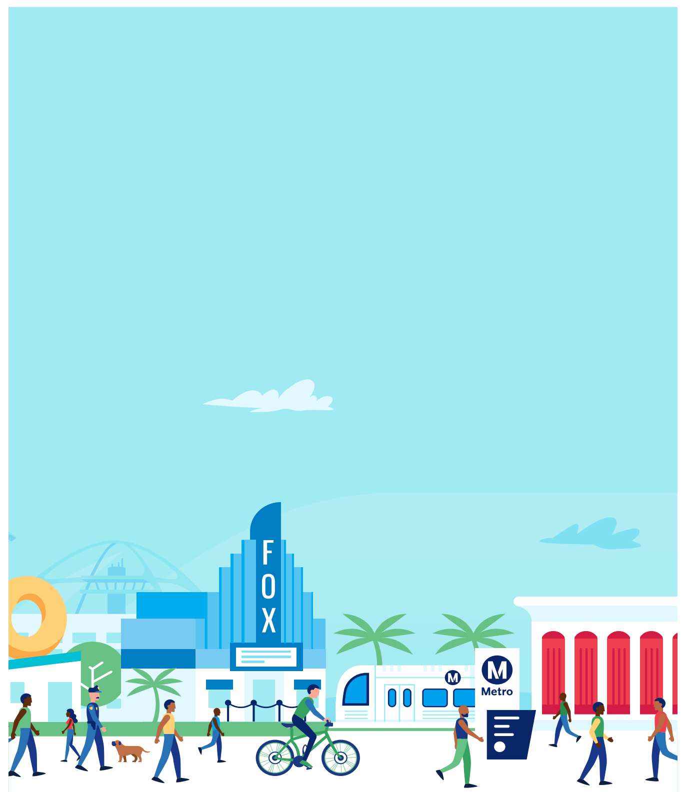
Maintenance facilities include an automatic car wash for vehicle exterior cleaning, maintenance pits with under vehicle access, electronics and mechanical and lubrication workshops, tool and equipment storage, spare parts and consumables storage, shipping/receiving areas, freight elevator, hoists, administrative offices, employee locker rooms/facilities, and sufficient parking.

2.9.3 Spatial Requirements

Approximately four to six acres is estimated to accommodate the M&SF functions as described. Access and egress tracks to and from the M&SF to the mainline would be developed for the preferred alternative. Based on available sites, the M&SF may be functionally split; however, consolidating functions into a fully functional M&SF provides the most efficient and cost-effective solution.

The following overhead clearances are required for the M&SF:

- A minimum vertical clearance of ten feet is required in the shop and shipping/receiving areas.
- A minimum vertical clearance of eight feet is required in office areas.
- A minimum vertical clearance of twenty feet is required in the vehicle heavy maintenance area and designated highbay areas.
- A minimum vertical clearance of fourteen feet is required in the propulsion power substation.



3. PRELIMINARY RIDERSHIP PROJECTIONS

3.1 RIDERSHIP METHODOLOGY

For the purposes of selecting a Locally Preferred Alternative Project, preliminary transit ridership was developed to provide a basis of comparison between alternative concepts for the Inglewood Transit Connector. Further ridership analysis will be completed and refined as part of the future environmental analysis and project definition work.

While the City utilized the early ridership analysis performed by Metro, it updated the ridership analysis with more current available information. The analysis also recognized that the Inglewood Transit Connector Project would be different from a traditional urban/metro regional transit system:

- Compared to a traditional urban/metro transit system which provides regional connectivity, the Inglewood Transit Connector would provide the last-mile connectivity, with relatively small route lengths of approximately one to three miles, between the Metro system to key facilities and trip generators within the City of Inglewood.
- Key trip generators are the various venues within the Inglewood Sports and Entertainment District including the NFL Stadium, The Forum, and the Los Angeles Stadium and Entertainment District at Hollywood Park. The travel demands and ridership are largely driven by scheduled events with peak demands expected to be multiple times higher than those for normal work days and weekends.

To better understand potential future ridership, the City sought to establish the anticipated demands over the course of a year to account for fluctuation over months, weeks and days of the week, and to provide a foundation for developing the anticipated operational scenarios and the appropriate technology, and to provide data in support of the estimation of rough order of magnitude costs.

The typical regional planning models used for estimating ridership on a typical urban/metro transit system were supplemented with additional analysis and models. This study adopted the horizon year of 2040 to maintain consistency with the Southern California Association of Government's (SCAG) Regional Transportation Plan 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy RTP/SCS. SCAG'S RTP utilizes the horizon year of 2040 and provides policy direction for specific improvements, sets forth a transportation plan and sustainable communities strategy for 2040 conditions. This study and related plans need to be consistent with the regional transportation plan and forecasting. Given preliminary available information and data, this Report provides a concept planning level estimate of the anticipated users of the Inglewood Transit Connector system for:

1. Non-event normal day anticipated users based on a calibrated and validated regional travel demand model for the typical work weekday and weekend days. The estimates address the hourly distribution over the day, per direction, with origin and destination to estimate non-event normal day peak ridership.
2. Event day anticipated users, which was informed by preliminary data regarding anticipated events, distribution of the events over the year, days of week, time of day, as well as anticipated attendees, anticipated transportation modes and arrival and departure profiles to and from the events.
   - Event based information was tabulated based on event venue, size and type of event, day and time, and anticipated transportation mode.
   - For event based anticipated transit system users, the City developed estimates of peak hour demand and direction, the duration and time of the peak hour, and the anticipated duration of the event-based demand. This should be established for each event.

A preliminary total anticipated user demand was identified by overlapping the non-event normal day ridership with preliminary event-based ridership estimates. The overall ridership estimation is based on initial assumptions that will be refined and researched as the Inglewood Transit Connector Project moves into the project definition and environmental clearance phase, and as other proposed projects are more fully defined.

The preliminary ITC transit ridership analysis included the following scenarios:

1. Weekday non-event conditions.
2. Weekend non-event conditions.
3. Weekday/weekend event conditions individually at the The Forum, NFL Stadium, the 6,000-seat Performance Arena, and the proposed Inglewood Basketball and Entertainment Center.
4. Estimation of overall yearly non-event and event conditions ridership using information on low and high estimates during events and the number of such events over an entire year. Additionally, average event conditions along with non-event conditions ridership estimates for each of the alignment alternatives under consideration were also developed.

The weekday non-event conditions were simulated using the latest SCAG 2016 RTP/SCS Model, the SCAG 2012 Regional Model including updates to SED databases and transit networks to reflect the various Inglewood Transit Connector alternatives, as well as operational scenarios and associated transit base-network changes. The weekend day non-event conditions were estimated by normalizing weekday ridership estimates using specific weekday and weekend day transit utilization in the study area, provided by Metro.

The event-day conditions were simulated using a spreadsheet-based model based on Metro's mode-split model and actual data related to the event attendees' zip-code information. The NFL game attendees included information on ticket sales data while all other attendees at events at all venues included information on distribution of population by zip-code derived from the SCAG 2012 Regional Model.

3.2 TRANSIT RIDERSHIP RESULTS

Model simulations were performed, and transit ridership estimate results were compiled for each of the alignment alternatives.

3.2.1 Non-Event Normal Conditions

Table 3.2-1 presents the ridership estimates for each alternative on a non-event normal commuter weekday. alternatives A and D have the highest non-event, normal commuter weekday ridership with roughly about 2,000 more riders than Alternatives B and C.

Travel demand models are not available for weekend days. However, transit service characteristics and demand data are available for all days of the week. Transit ridership and service characteristics in 2017 available on weekdays, Saturdays and Sundays were utilized to compute the related utilization of the transit system. Table 3.2-2 and Table 3.2-3 present weekend non-event day estimates for Saturday and Sunday per each alternative.

3.2.2 Event Day Conditions Forecast

Tables 3.2-4, 3.2-5, 3.2-6, and 3.2-7 provide a summary of event ridership profiles for each of the four proposed alternatives. These tables include ridership profiles for both low and high estimates, broken down by types of events at each of the venues.

Based on preliminary ridership analysis, the following key observations can be made:

1. The peak ridership estimate is projected for an LA Rams NFL game high-estimate departure period for all Inglewood Transit Connector alignment alternatives. The variation in peak ridership estimates during that peak timeframe between these alignment alternatives is less than +/- 5%.
2. The ridership projections for the Market-Manchester and Century Boulevard alignments indicate that the maximum ridership estimate occurs on an NFL game event day and is equivalent to 8,985 riders occurring in the one-hour period after the game.

Detailed ridership estimates for each of the Inglewood Transit Connector alignment alternatives by venue and type of event including profiles of arrivals and departures are provided in Appendix B.

Table 3.2-1: Year 2040 Line Level Ridership (Non-Event, Normal Commuter Weekday) Estimates

	RIDERSHIP (ON LINE)		
	PEAK TOTAL	OFF-PEAK TOTAL	TOTAL
Alternative A: Market-Manchester Alignment	3,717	1,252	4,969
Alternative B: Fairview Heights Alignment	2,118	938	3,057
Alternative C: Arbor Vitae Alignment	2,340	1,056	3,396
Alternative D: Century Blvd Alignment	4,194	1,789	5,982

Table 3.2-2: Year 2040 Line Level Ridership (Normal Commuter Weekend – Saturday)

	2040 RIDERSHIP TOTAL	AM 6am – 9am	BASE 9am – 3pm	PM 3pm – 7pm	NT 7pm – end
Alternative A: Market-Manchester Alignment	3,228	412	1,397	918	501
Alternative B: Fairview Heights Alignment	1,986	253	859	565	308
Alternative C: Arbor Vitae Alignment	2,206	281	955	627	343
Alternative D: Century Blvd Alignment	3,886	495	1,682	1,105	604

Table 3.2-3: Year 2040 Line Level Ridership (Normal Commuter Weekend – Sunday)

	2040 RIDERSHIP TOTAL	AM 6am – 9am	BASE 9am – 3pm	PM 3pm – 7pm	NT 7pm – end
Alternative A: Market-Manchester Alignment	2,773	348	1,183	777	424
Alternative B: Fairview Heights Alignment	1,681	214	728	478	261
Alternative C: Arbor Vitae Alignment	1,868	238	808	531	290
Alternative D: Century Blvd Alignment	3,290	420	1,424	936	511

Source: Raju Associates, 2018

This study is consistent with the SCAG Regional Transportation Plan, and automated people mover system will be designed to accommodate future ridership consistent with the regional transportation plan forecasting.

Table 3.2-4: Market-Manchester Alignment Event Ridership Profile Summary

VENUE	EVENT	NO. OF EVENTS	SERVICE HOURS	RIDERSHIP ESTIMATE PROFILES							
				LOW ESTIMATE				HIGH ESTIMATE			
				ARRIVAL[1]		DEPARTURE[2]		ARRIVAL[1]		DEPARTURE[2]	
LASED	NFL Game	20	8	> 2 hours 1-2 hours < 1 hour	731 1,453 3,276	During Game 1-2 hours < 1 hour	546 4,368 546	> 2 hours 1-2 hours < 1 hour	1,504 2,989 6,739	During Game 1-2 hours < 1 hour	1,123 8,985 1,123
	Medium Event	8	6	1-2 hours < 1 hour	1,382 1,843	< 1 hour 1-2 hours	2,534 691	1-2 hours < 1 hour	3,554 4,738	< 1 hour 1-2 hours	6,515 1,776
	Small Event	20	6	1-2 hours < 1 hour	353 461	< 1 hour 1-2 hours	637 177	1-2 hours < 1 hour	1,513 1,974	< 1 hour 1-2 hours	2,731 757
THE FORUM	Large Event	37	6	1-2 hours < 1 hour	415 553	< 1 hour 1-2 hours	760 207	1-2 hours < 1 hour	1,036 1,382	< 1 hour 1-2 hours	1,901 519
	Medium Event	29	6	1-2 hours < 1 hour	277 369	< 1 hour 1-2 hours	506 138	1-2 hours < 1 hour	711 948	< 1 hour 1-2 hours	1,303 355
	Small Event	16	6	1-2 hours < 1 hour	138 184	< 1 hour 1-2 hours	254 69	1-2 hours < 1 hour	474 632	< 1 hour 1-2 hours	868 237
PROPOSED INGLEWOOD BASKETBALL AND ENTER-TAINMENT CENTER*	Clippers Game	44	7	1-2 hours < 1 hour	519 691	< 1 hour 1-2 hours	950 259	1-2 hours < 1 hour	1,096 1,461	< 1 hour 1-2 hours	2,009 548
	Large Event	31	6	1-2 hours < 1 hour	415 553	< 1 hour 1-2 hours	760 207	1-2 hours < 1 hour	1,096 1,461	< 1 hour 1-2 hours	2,009 548
	Medium Event	13	6	1-2 hours < 1 hour	277 369	< 1 hour 1-2 hours	506 138	1-2 hours < 1 hour	711 948	< 1 hour 1-2 hours	1,303 355
	Small Event	17	6	1-2 hours < 1 hour	138 184	< 1 hour 1-2 hours	254 69	1-2 hours < 1 hour	474 632	< 1 hour 1-2 hours	868 237
PERFORMANCE ARENA	Event	75	6	1-2 hours < 1 hour	138 184	< 1 hour 1-2 hours	254 69	1-2 hours < 1 hour	355 474	< 1 hour 1-2 hours	652 178

[1] Arrivals occuring prior to the event, travel southbound
[2] Departures occuring post-event, travel northbound

* Note: Preliminary assumptions regarding events were estimated for proposed Inglewood Basketball & Entertainment Center but will be further developed during its environmental clearance process.

Source: Raju Associates, 2018

Table 3.2-5: Fairview Heights Alignment
Event Ridership Profile Summary

VENUE	EVENT	NO. OF EVENTS	SERVICE HOURS	RIDERSHIP ESTIMATE PROFILES							
				LOW ESTIMATE				HIGH ESTIMATE			
				ARRIVAL[1]		DEPARTURE[2]		ARRIVAL[1]		DEPARTURE[2]	
LASED	NFL Game	20	8	> 2 hours 1-2 hours < 1 hour	731 1,453 3,276	During Game 1-2 hours < 1 hour	546 4,200 714	> 2 hours 1-2 hours < 1 hour	1,504 2,989 6,739	During Game 1-2 hours < 1 hour	1,123 8,640 1,469
	Medium Event	8	6	1-2 hours < 1 hour	1,341 1,789	< 1 hour 1-2 hours	2,460 671	1-2 hours < 1 hour	3,449 4,599	< 1 hour 1-2 hours	6,325 1,725
	Small Event	20	6	1-2 hours < 1 hour	343 447	< 1 hour 1-2 hours	618 171	1-2 hours < 1 hour	1,470 1,916	< 1 hour 1-2 hours	2,651 1,725
THE FORUM	Large Event	37	6	1-2 hours < 1 hour	403 537	< 1 hour 1-2 hours	737 201	1-2 hours < 1 hour	1,006 1,342	< 1 hour 1-2 hours	1,845 503
	Medium Event	29	6	1-2 hours < 1 hour	268 358	< 1 hour 1-2 hours	492 134	1-2 hours < 1 hour	690 920	< 1 hour 1-2 hours	1,265 345
	Small Event	16	6	1-2 hours < 1 hour	134 179	< 1 hour 1-2 hours	245 67	1-2 hours < 1 hour	460 613	< 1 hour 1-2 hours	844 230
PROPOSED INGLEWOOD BASKETBALL AND ENTER-TAINMENT CENTER*	Clippers Game	44	7	1-2 hours < 1 hour	503 671	< 1 hour 1-2 hours	922 252	1-2 hours < 1 hour	1,063 1,418	< 1 hour 1-2 hours	1,950 532
	Large Event	31	6	1-2 hours < 1 hour	403 537	< 1 hour 1-2 hours	737 201	1-2 hours < 1 hour	1,063 1,418	< 1 hour 1-2 hours	1,950 532
	Medium Event	13	6	1-2 hours < 1 hour	268 358	< 1 hour 1-2 hours	492 134	1-2 hours < 1 hour	690 920	< 1 hour 1-2 hours	1,265 345
	Small Event	17	6	1-2 hours < 1 hour	134 179	< 1 hour 1-2 hours	245 67	1-2 hours < 1 hour	460 613	< 1 hour 1-2 hours	844 230
PERFORMANCE ARENA	Event	75	6	1-2 hours < 1 hour	134 179	< 1 hour 1-2 hours	245 67	1-2 hours < 1 hour	345 460	< 1 hour 1-2 hours	632 172

[1] Arrivals occuring prior to the event, travel southbound
[2] Departures occuring post-event, travel northbound

* Note: Preliminary assumptions regarding events were estimated for proposed Inglewood Basketball & Entertainment Center but will be further developed during its environmental clearance process.

Source: Raju Associates, 2018

Table 3.2-6: Arbor Vitae Alignment
Event Ridership Profile Summary

VENUE	EVENT	NO. OF EVENTS	SERVICE HOURS	RIDERSHIP ESTIMATE PROFILES							
				LOW ESTIMATE				HIGH ESTIMATE			
				ARRIVAL[1]		DEPARTURE[2]		ARRIVAL[1]		DEPARTURE[2]	
LASED	NFL Game	20	8	> 2 hours 1-2 hours < 1 hour	694 1,381 3,112	During Game 1-2 hours < 1 hour	519 4,419 519	> 2 hours 1-2 hours < 1 hour	1,428 2,840 6,402	During Game 1-2 hours < 1 hour	1,067 8,537 1,067
	Medium Event	8	6	1-2 hours < 1 hour	1,306 1,741	< 1 hour 1-2 hours	2,395 653	1-2 hours < 1 hour	3,358 4,477	< 1 hour 1-2 hours	6,157 1,679
	Small Event	20	6	1-2 hours < 1 hour	334 435	< 1 hour 1-2 hours	602 167	1-2 hours < 1 hour	1,431 1,865	< 1 hour 1-2 hours	2,580 715
THE FORUM	Large Event	37	6	1-2 hours < 1 hour	392 522	< 1 hour 1-2 hours	718 196	1-2 hours < 1 hour	980 1,306	< 1 hour 1-2 hours	1,795 489
	Medium Event	29	6	1-2 hours < 1 hour	261 348	< 1 hour 1-2 hours	479 131	1-2 hours < 1 hour	672 895	< 1 hour 1-2 hours	1,231 335
	Small Event	16	6	1-2 hours < 1 hour	131 174	< 1 hour 1-2 hours	239 65	1-2 hours < 1 hour	448 597	< 1 hour 1-2 hours	821 224
PROPOSED INGLEWOOD BASKETBALL AND ENTER-TAINMENT CENTER*	Clippers Game	44	7	1-2 hours < 1 hour	489 653	< 1 hour 1-2 hours	898 245	1-2 hours < 1 hour	1,035 1,380	< 1 hour 1-2 hours	1,899 518
	Large Event	31	6	1-2 hours < 1 hour	392 522	< 1 hour 1-2 hours	718 196	1-2 hours < 1 hour	1,035 1,380	< 1 hour 1-2 hours	1,899 518
	Medium Event	13	6	1-2 hours < 1 hour	261 348	< 1 hour 1-2 hours	479 131	1-2 hours < 1 hour	672 895	< 1 hour 1-2 hours	1,231 335
	Small Event	17	6	1-2 hours < 1 hour	131 174	< 1 hour 1-2 hours	239 65	1-2 hours < 1 hour	448 597	< 1 hour 1-2 hours	821 224
PERFORMANCE ARENA	Event	75	6	1-2 hours < 1 hour	131 174	< 1 hour 1-2 hours	239 65	1-2 hours < 1 hour	335 448	< 1 hour 1-2 hours	616 168

[1] Arrivals occuring prior to the event, travel eastbound
[2] Departures occuring post-event, travel westbound

* Note: Preliminary assumptions regarding events were estimated for proposed Inglewood Basketball & Entertainment Center but will be further developed during its environmental clearance process.

Source: Raju Associates, 2018

Table 3.2-7: Century Boulevard Alignment Event Ridership Profile Summary

VENUE	EVENT	NO. OF EVENTS	SERVICE HOURS	RIDERSHIP ESTIMATE PROFILES							
				LOW ESTIMATE				HIGH ESTIMATE			
				ARRIVAL[1]		DEPARTURE[2]		ARRIVAL[1]		DEPARTURE[2]	
LASED	NFL Game	20	8	> 2 hours 1-2 hours < 1 hour	783 1,557 3,510	During Game 1-2 hours < 1 hour	585 4,680 585	> 2 hours 1-2 hours < 1 hour	1,504 2,989 6,739	During Game 1-2 hours < 1 hour	1,123 8,985 1,123
	Medium Event	8	6	1-2 hours < 1 hour	1,088 2,142	< 1 hour 1-2 hours	2,718 412	1-2 hours < 1 hour	2,610 5,141	< 1 hour 1-2 hours	6,525 989
	Small Event	20	6	1-2 hours < 1 hour	280 536	< 1 hour 1-2 hours	684 107	1-2 hours < 1 hour	1,121 2,142	< 1 hour 1-2 hours	2,735 429
THE FORUM	Large Event	37	6	1-2 hours < 1 hour	326 643	< 1 hour 1-2 hours	816 124	1-2 hours < 1 hour	761 1,499	< 1 hour 1-2 hours	1,904 289
	Medium Event	29	6	1-2 hours < 1 hour	218 428	< 1 hour 1-2 hours	543 82	1-2 hours < 1 hour	522 1,028	< 1 hour 1-2 hours	1,305 198
	Small Event	16	6	1-2 hours < 1 hour	108 214	< 1 hour 1-2 hours	272 41	1-2 hours < 1 hour	348 685	< 1 hour 1-2 hours	870 131
PROPOSED INGLEWOOD BASKETBALL AND ENTER-TAINMENT CENTER*	Clippers Game	44	7	1-2 hours < 1 hour	408 803	< 1 hour 1-2 hours	1,020 155	1-2 hours < 1 hour	805 1,585	< 1 hour 1-2 hours	2,012 305
	Large Event	31	6	1-2 hours < 1 hour	326 643	< 1 hour 1-2 hours	816 124	1-2 hours < 1 hour	805 1,585	< 1 hour 1-2 hours	2,012 305
	Medium Event	13	6	1-2 hours < 1 hour	218 428	< 1 hour 1-2 hours	543 82	1-2 hours < 1 hour	522 1,028	< 1 hour 1-2 hours	1,305 198
	Small Event	17	6	1-2 hours < 1 hour	108 214	< 1 hour 1-2 hours	272 41	1-2 hours < 1 hour	348 685	< 1 hour 1-2 hours	870 131
PERFORMANCE ARENA	Event	75	6	1-2 hours < 1 hour	108 214	< 1 hour 1-2 hours	272 41	1-2 hours < 1 hour	261 514	< 1 hour 1-2 hours	653 99

[1] Arrivals occuring prior to the event, travel eastbound
[2] Departures occuring post-event, travel westbound

* Note: Preliminary assumptions regarding events were estimated for proposed Inglewood Basketball & Entertainment Center but will be further developed during its environmental clearance process.

Source: Raju Associates, 2018

3.2.3 Average Annual Ridership Estimates

The average annual ridership estimates were developed for each of the four Inglewood Transit Connector alignment alternatives as follows:

1. Average weekday and weekend day, Saturday and Sunday, non-event-based ridership estimates were expanded by the number of days of their respective occurrences.
2. Average event-day ridership estimates for each of the types of events at each of the venues were expanded by the number of instances that they occur in a given year.
3. Combination of the above two ridership estimates.

Table 3.7-8 through Table 3.7-10 summarizes the average annual ridership for each of the four alternatives.

Table 3.2-8: Event Day Annual Ridership by Alignment

	EVENT ANNUAL RIDERSHIP				
	LASED	THE FORUM	IBEC	PERFORMANCE ARENA	TOTAL
Alternative A: Market-Manchester Alignment	409,230	184,538	353,992	78,148	1,025,908
Alternative B: Fairview Heights Alignment	404,652	179,132	280,276	75,860	939,920
Alternative C: Arbor Vitae Alignment	387,974	174,368	350,184	73,842	986,368
Alternative D: Century Blvd Alignment	420,248	189,684	374,150	80,328	1,064,410

Source: Raju Associates, 2018

Table 3.2-9: Overall Total Annual Ridership by Alignment

ALIGNMENT	ANNUAL RIDERSHIP
Alternative A: Market-Manchester Alignment	2,578,120
Alternative B: Fairview Heights Alignment	1,894,826
Alternative C: Arbor Vitae Alignment	2,047,055
Alternative D: Century Blvd Alignment	2,933,147

Source: Raju Associates, 2018

Table 3.2-10: Annual Non-Event Related Ridership Estimates

	NUMBER OF DAYS	DAILY RIDERSHIP/ANNUAL RIDERSHIP			
		Alternative A: Market-Manchester Alignment	Alternative B: Fairview Heights Alignment	Alternative C: Arbor Vitae Alignment	Alternative D: Century Blvd Alignment
Weekdays (all Weekdays in the year)	250	4,969/ 1,242,250	3,057/ 764,220	3,396/ 848,878	5,982/ 1,495,567
Saturdays (all Saturdays in the year)	52	3,228/ 167,849	1,986/ 103,259	22,206/ 114,698	3,886/ 202,076
Sundays (all Sundays in the year)	52	2,733/ 142,113	1,681/ 87,427	1,868/ 97,112	3,290/ 171,093
Total Annual		1,552,212	954,906	1,060,687	1,868,737

Source: Raju Associates, 2018

Figure 3.2-1: The Miracle on Market Street

Source: Aero Collective Website, 2018

4. COMPARISON ANALYSIS OF ALTERNATIVES

To identify the the City of Inglewood's locally preferred alternative project, the following screening criteria were established:

- Connection between Metro and key City venues
- Passenger convenience
- Cost and feasibility
- Total costs – Capital and Operations & Maintenance
- Ability to fit within the public right of way constraints and ability to resolve conflicts with utilities
- Ridership potential
- Synergistic Economic Development within the City
- Required Major Coordination Efforts

4.1 PASSENGER CONVENIENCE

Passenger convenience is measured by the criteria defined below:

1. Reliable Connection to Inglewood Activity Centers: convenient service with minimum delay, wait, and travel times to LASED, The Forum, and the proposed Inglewood Basketball and Entertainment Center.
2. Regional Connectivity: ease of transferring to and from the Metro Rail system and potential intermodal facilities that would be served by various Metro and municipal bus lines
3. Safety and Security: all the alternatives are elevated APM systems that will operate within a defined right-of-way. All Fixed Guideway Transit Systems, such as the APM, are subject to oversight by the California Public Utilities Commission (CPUC) which will determine whether the system is safe to carry passengers and issue the operating certificate.

Each of the alternatives are described in Section 2.2 through 2.5. Section 2.6 provides details of the technology assessment of APM technologies with key findings on the candidate technologies applicable to the project. The specific technology is expected to be selected through a competitive procurement process, which is not alternative dependent. Multiple characteristics of the alternatives are expected to be comparable to each other across the alternatives, and will not provide any differentiation between them.

For the selection of the Locally Preferred Alternative (LPA), passenger convenience is expected to be similar among all alternatives, and therefore, is a non-differentiating characteristic because:

- All alternatives will provide a time-certain travel experience, i.e. reliable connection to the key traffic generators.
- All alternatives will provide a transfer connection to Metro and each alternative will be designed to include an intermodal facility that would serve various Metro and municipal bus lines.
- Station locations, configurations, access and amenities will be comparable across all alternatives.
- All alternatives will be subject to CPUC requirements.

4.2 COST AND FINANCIAL FEASIBILITY

As the Inglewood Transit Connector Project is refined, cost estimates will be updated and developed. Nonetheless, to assist the comparative analysis of alternative concepts, in project evaluation, the City developed preliminary cost estimates based on a conceptual level project definition for each of the alternatives. System cost estimates considered demand, capacity, and technology needs.

APM systems are comprised of two major elements, the Operating System and Fixed Facilities, which are integrated into a fully functional total system. The Operating System consists of vehicles, running track, guideway equipment, propulsion power, automatic train control and communications subsystems, station and wayside equipment, maintenance equipment and other elements. Fixed Facilities include guideway infrastructure, stations, buildings for the Maintenance and Storage Facilities (M&SF), Command and Control Facilities, propulsion power substations and other facilities upon which Operating System elements are installed by the APM system supplier.

Estimates of probable costs for the APM Operating System and the Fixed Facilities were prepared for each of the Alternatives, based on a concept level definition and are presented herein.

4.3 CAPITAL COSTS

4.3.1 APM Operating System Capital Cost

APM Operating Systems are proprietary designs that are typically procured as complete packages. The major subsystems, such as vehicles, tracks, switches and control systems, station equipment, from different suppliers cannot be mixed to form a system. Operating Systems are typically procured under a turnkey design, supply and installation contract. The Operating System of an APM application is specially configured using supplier developed equipment designs that are applied to satisfy site-specific requirements. As a result, costs within the APM industry vary widely on a project by project basis as APM suppliers implement their unique proprietary technology for a particular system. Costs for different projects by the same supplier may also vary significantly because of differences in fleet size, capacity requirements, and performance requirements. Probable capital costs for the APM Operating System were developed and estimated based on historical cost information and applied to this project considering factors such as guideway length, configuration and number of passenger stations, size of the M&SF, number of propulsion power substations and fleet size.

Globally, there are likely only a handful APM Operating System suppliers with technically mature technologies capable of providing a system that will meet the anticipated performance requirements of this project within the site specific constraints. A competitive procurement environment is essential and inherently assumed in developing the estimate of probable costs.

4.3.2 Fixed Facility Cost Estimates

In contrast with the Operating System, there are a substantially larger number of potential entities capable of designing and building the fixed facilities elements. The estimated probable cost of the fixed facility elements was developed based on a concept level definition of the different fixed facility elements including similar transit projects within the Los Angeles Metropolitan area. Estimated unit costs for the different elements are noted below:

- Aerial guideway, per linear feet of dual lane: $7,000 per linear foot.
- Stations, including pedestrian bridge to sidewalks, and excluding Operating System elements: $20 M per station.
- Maintenance and Storage Facility, excluding Operating System elements: $40 M.
- Utility infrastructure: $2,000 per linear foot of dual lane.

Table 4.3-1: Capital Cost Estimate (Conceptual) - 2018$

	Alternative A: Market-Manchester Alignment	Alternative B: Fairview Heights Alignment	Alternative C: Arbor Vitae Alignment	Alternative D: Century Blvd Alignment
System Length	1.8 route miles	2.2 route miles	3.0 route miles	3.1 route miles
Number of Stations	5	4	5	5
Traction Power Substations	2	2	3	3
Number of Cars ("Generic") Operating Fleet/Total Fleet	28/32	28/32	28/32	28/32
APM OPERATING SYSTEM CAPITAL COST ESTIMATE				
Guideway, Wayside, ATC, Power and Communication Systems and Maintenance Equipment	$62 M	$70 M	$90 M	$93 M
Rolling Stock/Fleet	$75 M	$75 M	$75 M	$75 M
Other Costs not included above including but not limited to other equipment, System Supplier's PM/Engineering/T&C, bonds, insurance, etc. (at 30%)	$42 M	$43.5 M	$49.5 M	$50.4 M
Subtotal Estimate of Operating System Probable cost	$179M	$188.5 M	$214.5 M	$218.4
FIXED FACILITY COST ESTIMATE (CONCEPTUAL) – 2018$				
Stations and Ped bridges structure and Building systems	$100 M	$80 M	$ 100 M	$ 100 M
Aerial Guideway (incl. columns, foundations)	$66.6 M	$ 81.3 M	$110.9 M	$ 114.6 M
Maintenance and Storage Facility Structure and Building Systems	$40 M	$ 40 M	$ 40 M	$ 40 M
Utility Infrastructure, Traction and building power substations, housekeeping power equipment and distribution (downstream from utility connection points)	$19 M	$23 M	$31.7 M	$ 32.7 M
Other Costs not included above such as and including DB Contractor's engineering/CM/etc, bonds, insurance etc. (est. 30%)	$68 M	$ 68 M	$ 85 M	$ 86 M
SubTotal – Estimate of Fixed Facility Probable cost	$293.6 M	$ 292.3 M	$ 367.6 M	$ 373.3 M
Subtotal (Operating System + Fixed Facilities)	$472.6 M	$480.8 M	$582.1 M	$591.7 M
Contingency (30%)	$141.8 M	$144.3 M	$174.6 M	$177.5 M
TOTAL ESTIMATED PROBABLE CAPITAL COST (2018$) [1, 2]				
TOTAL COST [1, 2]	$614.4 M	$625.1 M	$756.7 M	$ 769.2 M

1. Right of way acquisition, environmental and physical mitigations, parking/intermodal center costs and costs of other infrastructure are not included since these are not defined and subject to future analysis and input from other city and regional transportation plans/studies.
2. Owner soft costs not included – Owner soft costs cover Owner's management costs including Owner retained consultants etc.

Source: Pacifica Services, Trifiletti Consulting, 2018

4.3.3 Operations and Maintenance Cost Estimates

Operations and maintenance cost estimates are provided for each of the alternatives below.

There are two components: 1) APM Operating System operations and maintenance, and 2) Fixed Facility/ infrastructure operations and maintenance.

The APM Operating System operations and maintenance cost estimates address the operations and maintenance of the Operating System components including the vehicles, the automatic train control system, the traction and auxiliary power distribution systems and communication systems, all of which are the components that when fully integrated, provide the reliable and safe transportation service that is desired. Staffing consists of central control operators, supervisors, mechanical and electrical shop technicians, as well as management, administrative and janitorial staff necessary for the APM Operating System. Costs for regular preventive maintenance, as well as spare parts and consumables are included, however, costs for major overhauls and capital asset replacement are not included. The typical design service life of an APM Operating System is approximately 25 to 30 years. Major overhauls and capital asset replacement can be expected to occur at year fifteen of service. Considering that the Operating System characteristics are similar for all the alternatives, the major overhaul and capital asset replacement costs are considered to be approximately comparable and not expected to change the comparative costs between the alternatives. Since the project is at a conceptual definition phase, the estimate of probable cost is based on a concept level operations plan considering the fleet and anticipated annual fleet miles.

Fixed Facility operations and maintenance cost estimates address the following scope of work: regular inspections and routine repairs to the infrastructure, ncluding guideway structure, station structure, maintenance and storage facility structure, power substation structure, and the electro-mechanical systems within that are not part of the APM Operating System. These electro-mechanical systems include housekeeping power systems, building heating-ventilation-air-conditioning systems, escalators and elevators, fire management systems, and other similar building management systems. An estimate of probable annual O&M costs for the Fixed Facilities is approximately 1.5% of the total Fixed Facility capital cost.

Estimates of probable annual operations and maintenance costs are shown in Table 4.3-2.

Table 4.3-2: Annual Operations and Maintenance Cost Estimate (Conceptual) – 2018$

	Alternative A: Market-Manchester Alignment	Alternative B: Fairview Heights Alignment	Alternative C: Arbor Vitae Alignment	Alternative D: Century Boulevard Alignment
System Length	1.8 route miles	2.2 route miles	3.0 route miles	3.1 route miles
Number of Stations	5	4	5	5
Traction Power Substations	2	2	3	3
#Number of Cars ("Generic") Operating Fleet/Total Fleet	28/32	28/32	28/32	28/32
ESTIMATE OF FIXED FACILITY ANNUAL O&M COSTS (EXCLUDING UTILITIES)				
Estimate of Fixed Facility Annual O&M Costs (excluding Utilities)	$5 M	$5 M	$6 M	$6 M
ESTIMATE OF OPERATING SYSTEM ANNUAL O&M COSTS				
Operating System Annual O&M Cost Estimate (excl Utilities, mid-life over-hauls and capital asset replacement/ rejuvenation)	$6 M			
Estimates annual reserve for mid life overhaul, capital asset rejuvenation etc.	$3 M			
Sub Total – Estimate of Annual O&M Costs including reserves for Operating System capital asset rejuvenation	$14 – $15 M			
Contingency (30%)	$ 4.2 - $ 4.5 M			
Total Estimate of Annual O&M Costs including reserves for Operating System capital asset rejuvenation [1]	$18.2 - $19.5 M			

1. Assumes a Design-Build-Operate-Maintain delivery strategy with a 25 to 30-year term with Contractor responsible for all operations/maintenance of contractor delivered assets. Does not include cost of utilities or Owner soft costs.

Source: Pacifica Services, Trifiletti Consulting, 2018

4.4 ENGINEERING AND PHYSICAL FEASIBILITY

Physical constraints and engineering feasibility are key factors to selecting the Locally Preferred Alternative for the Inglewood Transit Connector Project. Because all alternatives are elevated APM systems with similar design and constructability aspects, this section focuses on areas where the alignment characteristics differ, specifically the available right-of-way and location of underground utilities.

4.4.1 Ability to Fit Within the Right-of-Way

This section summarizes a preliminary analysis on the right-of-way acquisitions that may be required for the Project alternatives. The four alternatives have stations along their respective alignments that may involve redevelopment in the areas adjacent to the stations. In addition to station areas, additional property acquisitions may be required for Maintenance Storage Facilities and traction power stations. As part of the detailed design and environmental review analysis of the preferred alternative, specific property acquisition requirements will be established for the preferred alternative as part of the next stage of the project development during the EIR phase.

Alternative A: Market-Manchester Alignment:

The right-of-way along Alternative A ranges from approximately 93 feet to 112 feet, thus minimal property acquisitions due to utilities are anticipated. The alignment would be located primarily on the street right-of-way with the exception of a segment on the northeast quadrant of Market Street and Manchester Boulevard where the alignment transitions east onto Manchester Boulevard from Market Street. Potential acquisition or right-of-way easement requirements at the southwest quadrant of Prairie Avenue and Arbor Vitae Street are projected.

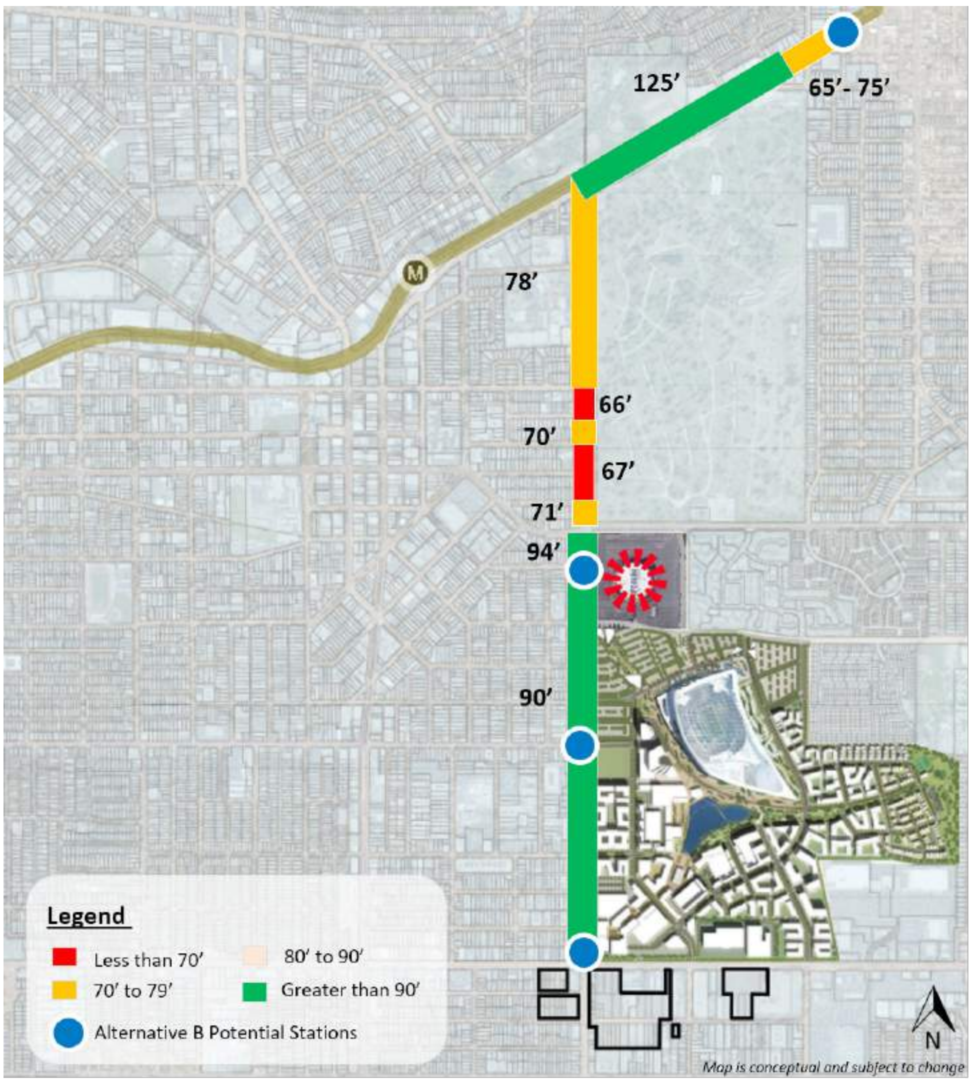
Figure 4.4-1 Alternative A: Right-of-Way Analysis

Source: Trifiletti Consulting, Raju Associates, 2018

Alternative B: Fairview Heights Alignment:

Although Alternative B is located primarily within the street right-of-way, there is limited roadway width between Florence Avenue and Manchester Boulevard (Figure 4.4-2). Potentially significant property impacts to the Inglewood Cemetery are anticipated because the alignment transitions from Florence Avenue which has a wide right-of-way of 125 feet, to Prairie Avenue, which has a right-of-way of 78 feet. Furthermore, the right-of-way of Prairie Avenue decreases to less than 70 feet south of Regent Street. This would potentially further impact the Inglewood Cemetery and would potentially conflict with utility infrastructure.

Figure 4.4-2: Alternative B: Right-of-Way Analysis

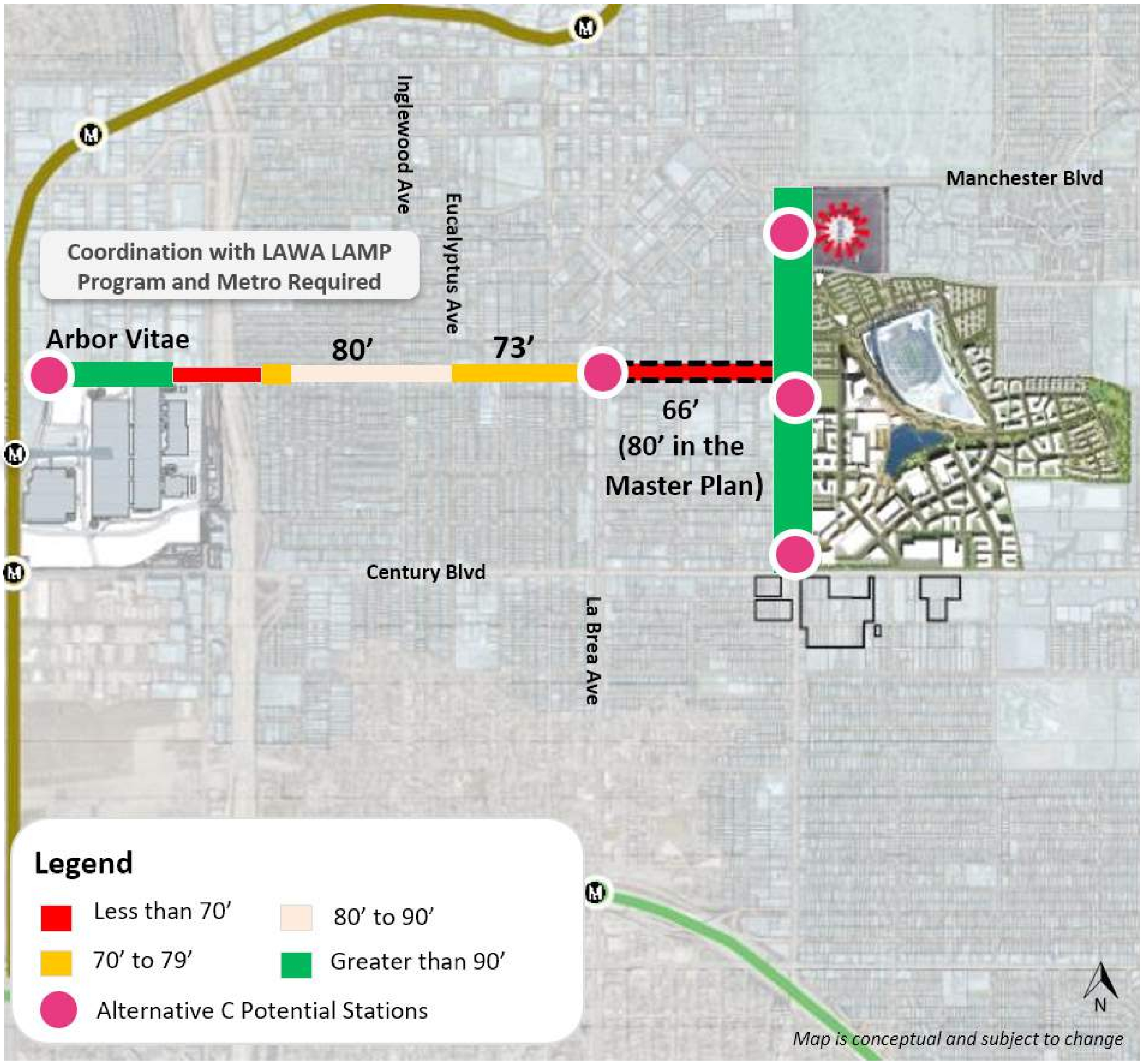


Source: Trifiletti Consulting, Raju Associates, 2018

Alternative C: Arbor Vitae Alignment:

Alternative C: Arbor Vitae Alignment right-of-way ranges from 100 feet to 66 feet, narrowing of the right-of-way east of Eucalyptus Avenue (Figure 4.4-3). Given the narrow right-of-way, this concept would potentially require acquisition of existing small business and possible neighborhood displacement. It would also potentially have adverse economic and fiscal impacts to local businesses along Arbor Vitae due to potentially reduced visibility, potential loss of on-street parking during construction and potential permanent removal of on-street parking spaces to accommodate the alignment.

Figure 4.4-3: Alternative C: Right-of-Way Analysis

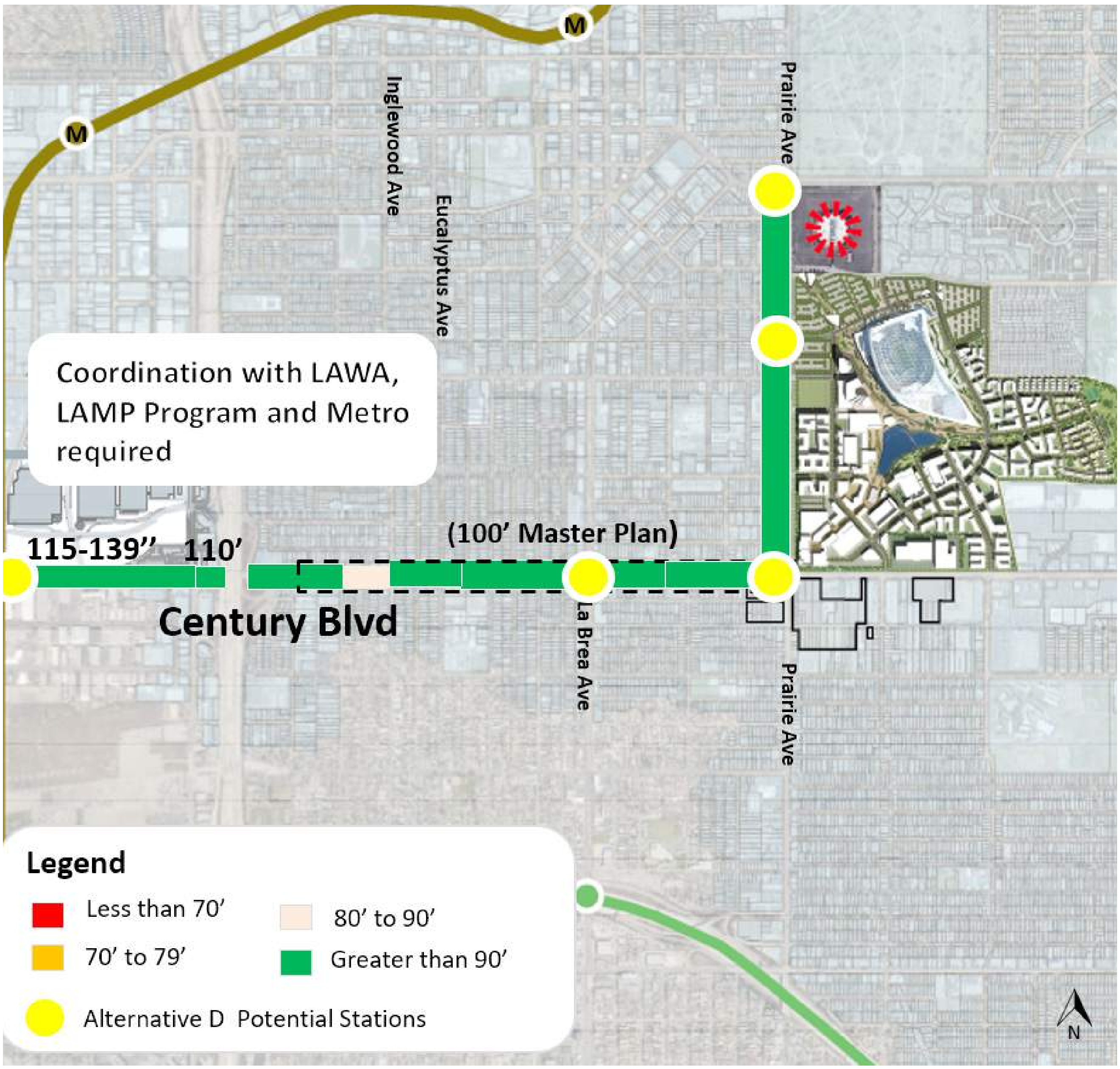


Source: Trifiletti Consulting, Raju Associates, 2018

Alternative D: Century Boulevard Alignment:

Alternative D has a wide right-of-way of at least 100 feet (Figure 4.4-4) and a continuous center median. Major utilities are located along Century Boulevard and may pose significant conflicts. Major property acquisitions or a major utility relocation effort are required if Alternative D is the selected alternative. Although Century Boulevard has a wide right-of-way of at least 100 feet and a continuous medium, major utilities are located along Century Boulevard and pose significant conflicts that may require a major utility relocation effort or property acquisitions to avoid utilities. Additionally, the I-405 crosses Century Boulevard with a single 100-foot bridge span impeding over or under clearance.

Figure 4.4-4: Alternative D: Right-of-Way Analysis



Source: Trifiletti Consulting, Raju Associates, 2018

4.4.2 Ability to Address/Resolve Underground Utility Conflicts

Utility information has been provided from the following agencies and utility purveyors:

- City of Inglewood
- Southern California Gas Company, Transmission Department
- Southern California Gas Company, Northwest Distribution Region
- Los Angeles Department of Water and Power
- Los Angeles Department of Public Works
- West Basin Municipal Water District

For the purpose of selecting a Locally Preferred Alternative, the available utility information was examined by overlaying the transit alignment alternatives to determine whether there were any fatal flaws. For this analysis, a fatal flaw is deemed to be a utility conflict that could not be resolved through design to avoid the conflict or by providing for a technically viable utility relocation. A conflict resolution that requires the relocation of a major utility, i.e. a utility that serves a regional base, is considered technically non-viable. The utility identification and assessment process consisted of requests for information from various agencies and utility purveyors. Data obtained included existing and planned major utilities within the project limits. Data and utility maps were prepared for major identified utilities. These maps have been incorporated into preliminary project concept plans for each alternative concept and included in Appendix A.

Available data did not provide exact utility locations in terms of plan and profile; rather, exact utility locations will be determined during project implementation by utilizing ground penetrating radar and/or other methods. During the environmental review of the locally preferred alternative, the City will perform a more comprehensive utility analysis, including depths, width of utilities, material makeup, condition of utility, and clearance requirements to address potential significant impacts and mitigation measures.

Alternative A: Market–Manchester Alignment:

Potential obstacles along the Alternative A alignment include a 36-inch West Basin Water District recycled water line at street centerline and several utilities within fifteen feet along Prairie Avenue. A large 60-inch Department of Water and Power (DWP) main pipe and a 33-inch storm drain line are located on the east side of Prairie Avenue, approximately 20 to 40 feet from centerline. Underground electrical lines, including vaults, are primarily concentrated along or adjacent to easterly and westerly sidewalks and do not pose a major impediment to the Alternative A alignment.

Existing utilities along the northern portion of the alignment pose minimal obstacles for placement of guideway columns. However, due to the span of utilities tie-ins and crossings along Manchester Boulevard at Hillcrest Boulevard, Spruce Avenue, Manchester Drive and Manchester Terrace, placement of guideway columns in this alignment should avoid relocation of gravity flow utilities including sewer and storm drains.

Utilities along the Alternative A route do not pose as major conflicts, and these conflicts could be resolved as there is sufficient roadway width along Market Street, Manchester Boulevard and Prairie Avenue (see Figure 4.4-5). As part of the detailed design of the preferred alternative, the City will conduct site investigations to determine exact utility locations and coordinate column placements to avoid or resolve conflicts, or relocate based on costs versus benefits.

Figure 4.4-5: Utilities Along Alternative A: Market-Manchester

Source: Trifiletti Consulting, Raju Associates, 2018

Alternative B: Fairview Heights Utility Analysis:

Based on preliminary research, minor utility pipes, as well as lateral connections to these pipes, from adjacent properties, have been identified along Florence Avenue. Existing utilities, including sewer, gas and water mains along these streets pose minimal obstacles for placement of guideway columns; however, various utility crossings at the curve alignment transition at Florence Avenue and Prairie Avenue should be avoided.

Several utilities along Prairie Avenue have been identified within close proximity, approximately fifteen feet, to this preliminary project alignment alternative. A 36-inch recycled water line travels along the easterly side of Prairie Avenue and transitions to the centerline of the street at Grace Avenue. A large 60-inch LADWP water main and a 33-inch storm drain line are located toward the southerly end of the alignment on the east side of Prairie Avenue, approximately twenty to forty feet from centerline. These utilities may pose significant obstacles but would not be considered to render the alignment infeasible at this stage.

Underground electrical lines, including vaults, are primarily concentrated along or adjacent to easterly and westerly sidewalks and do not pose a concern. Non-gravity flow utilities, including water service lines, may be relocated vertically, i.e. lowered, in lieu of horizontal relocation. Utility crossings including electrical and relatively large sized storm drain lines are primarily found at street intersections. Extensive utility crossings have been identified south of Manchester Boulevard, at Kelso Street/Pincay Drive, and north of Arbor Vitae Street. Guideway column placements should be avoided near these utility crossings and street intersections.

Utilities along alternative B pose a significant obstacle but relocations are not considered infeasible at this stage. As part of the detailed design of the preferred alternative, the City will conduct site investigations to determine exact utility locations and coordinate column placements to avoid or resolve conflicts.

Figure 4.4-6: Utilities along Alternative B: Fairview Heights Alignment

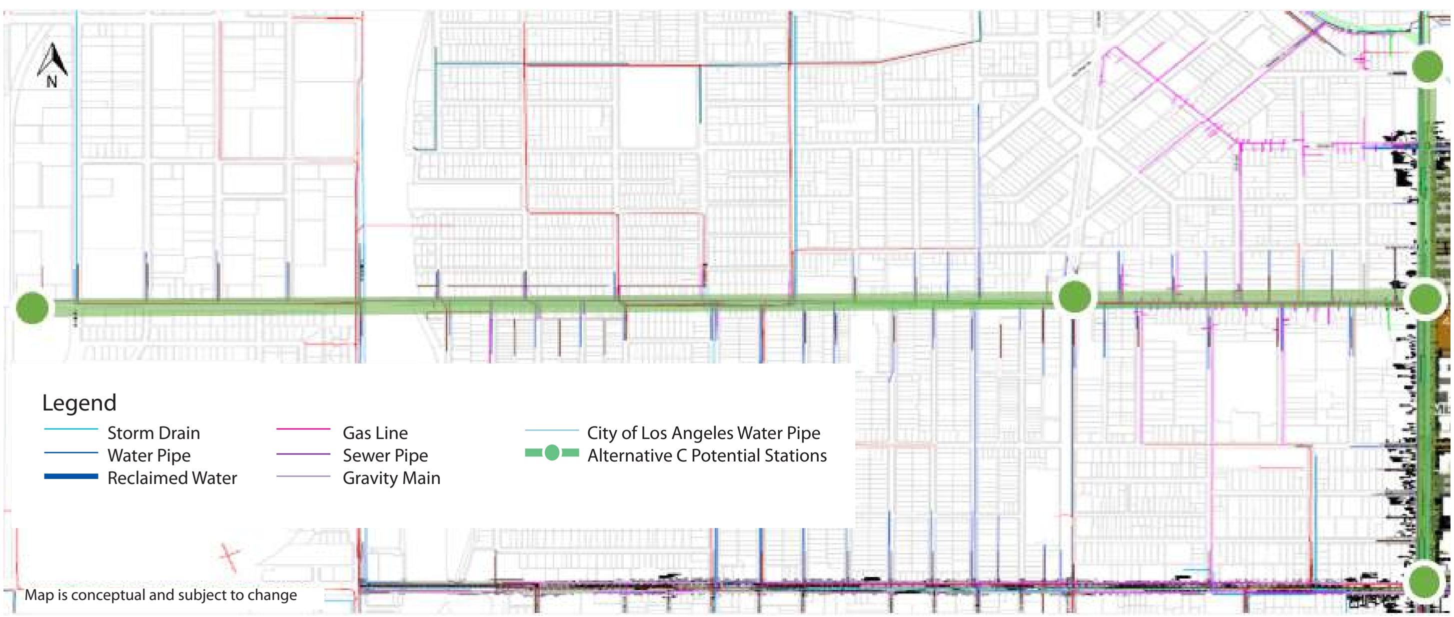
Source: Trifiletti Consulting, Raju Associates, 2018

Alternative C: Arbor Vitae Utility Analysis:

The most significant utilities identified as part of preliminary research for this alignment alternative includes an eight to ten inch sewer pipe along the centerline of Arbor Vitae Street between Eucalyptus Avenue and La Brea Avenue, a 36-inch recycled water line along Prairie Avenue centerline within fifteen feet of the preliminary alignment. A large 60-inch DWP water main and a 33-inch storm drain line are located at the east side of Prairie, approximately twenty to forty feet from centerline. Together, these utilities may pose significant obstacles but relocation would not be considered infeasible at this stage. Underground electrical lines, including vaults, are primarily concentrated along or adjacent to sidewalks and do not pose a major impediment. Non-gravity flow utilities, including water service lines, may be relocated vertically, i.e. lowered, in lieu of horizontal relocation.

Due to narrowing of the right-of-way east of Eucalyptus Avenue (Figure 4.4-7), there are potential major impacts to existing small businesses and possible neighborhood displacement. During detailed design of the preferred alternative, the City will conduct site investigations for exact utility locations and coordinate column placements to avoid or resolve conflicts or relocate utilities based on cost versus benefit to the project.

Figure 4.4-7: Utilities Along Alternative C: Arbor Vitae Alignment



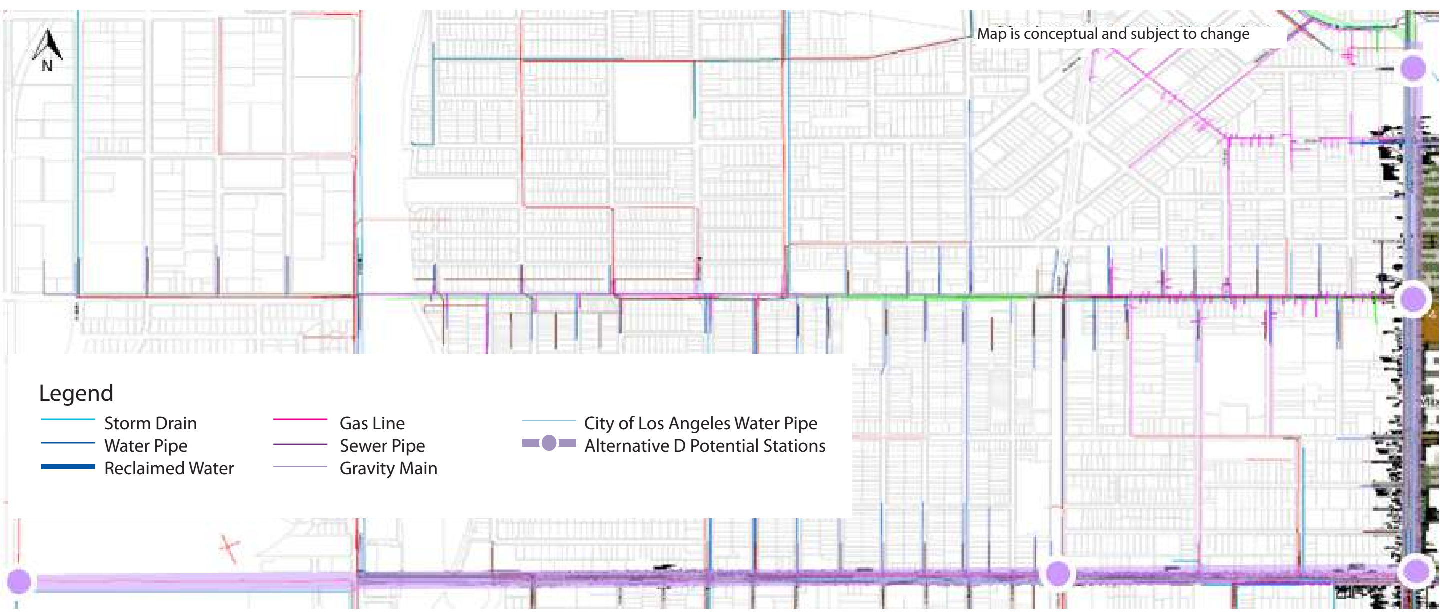
Source: Trifiletti Consulting, Raju Associates, 2018

Alternative D: Utilities Along Century Boulevard:

Overhead power lines are located along and crossing Century Boulevard from east of Felton Avenue to Condon Avenue. Clearance requirements for these power lines should be considered when evaluating this alignment. Additional underground electrical lines are located along Alternative D including crossings between Grevillea and Burn Avenue and at the intersection of Prairie Avenue and Century Boulevard. Figure 4.4-8 illustrates utilities located along alternative D at a high level.

Although Century Boulevard has a wide right-of-way of at least 100 feet (Figure 4.4-8) and a continuous center median, major utilities are located along Century Boulevard and pose significant conflicts that may require a major utility relocation effort or property acquisitions to avoid utilities. Major property acquisitions or a major utility relocation effort are required if Alternative D is the selected alternative. Additionally, the I-405 crosses Century Boulevard with a single 100-foot bridge span impeding over or under clearance. As part of the detailed design of the preferred alternative, the City will conduct site investigations to determine exact utility locations and coordinate column placements to avoid or resolve conflicts or relocate utilities based on cost versus benefit to the project.

Figure 4.4- 8: Utilities along Alternative D: Century Boulevard Alignment



Source: Trifiletti Consulting, Raju Associates, 2018

4.5 OPERATIONAL ANALYSIS

Ridership analysis supports the following assumptions for the development of sufficient information for a conceptual definition of probable costs, and preliminary conceptual APM system performance, (i.e., travel times and operations):

- Because ridership projections between the different alternatives vary only marginally, the highest projections were assumed for fleet sizing and operations.
- Normal day service: approximately sixteen hours a day from 5 AM to 9 PM.
- Highest per direction ridership projection is approximately 400 passengers-per-hour-per-direction. Over a year, this equates to 5,840 service hours.
- When special events service hours are considered, the net annual service hours for normal day service is 3,940 hours.
- Special event ridership estimates range between low and high, and reflect the anticipated arrival and departure profile for attendees. The required service hours are a maximum of eight hours for NFL Game Day, and six hours for the other events.
- For the purposes of this study, service requirements were assumed based on no overlap between special events. While some overlap may occur, it is expected that this would be addressed as part of service scheduling once events calendars are better defined as part of regular service coordination between the ITC and the venues.

4.5.1 Car Capacity and Travel Times

The estimated APM peak hour ridership is used as an initial basis to determine operational capacity needs and fleet requirements. One other variable in estimating system capacity is the estimated space that passengers will occupy while riding the APM system. Because the Inglewood Transit Connector is the last mile urban transit connector, a passenger space allocation of 2.7 square feet per passenger has been assumed; this is consistent with urban metro systems.

Different technologies have different size cars, and therefore different passenger capacity per car. For the purpose of this analysis, an average APM car has been assumed to provide a capacity of between 75 and 90 passengers per car. This assessment is subject to update based on further project development for the preferred alternative.

The dwell time at each station depends on the number of boarders and de-boarders at each station. An average dwell time of 30 seconds has been assumed for each station. While this is sufficient for the average APM car with dual door sets on each side of the car, this assumption also provides for some operational flexibility wherein station dwell times can be adjusted based on the actual boarding and de-boarding at the stations.

Operation of a train over the system for the different alternatives was estimated based on preliminary track geometry and limits on velocity, acceleration and jerk, which is the rate of acceleration. A maximum cruise speed of 50 mph was assumed with speed limits applied in sections of the route to prevent speed surges, or spikes, that would be uncomfortable for passengers. Dwell times of 30 seconds were assumed for each station stop, and then adjusted to achieve round trip times that are equally divisible by the desired minimum operating headway capability. The resulting estimated round-trip times for each of the alternatives are:

- Alternative A: Market-Manchester:
    - Round Trip Time: 770 seconds
- Alternative B: Fairview Heights:
    - Round Trip Time: 710 seconds
- Alternative C: Arbor Vitae (T-alignment to equitably serve all sites):
    - Round Trip Time: 750 seconds
- Alternative D: Century Boulevard:
    - Round Trip Time: 760 seconds

The round-trip time is driven not only by the route length but also the geometry, which places speed limits, and the number of stations.

4.5.2 Fleet Estimate

Line capacity is normally defined as the number of passengers-per-hour-per-direction (PPHPD) that the system can carry past any particular point. Determining factors are the operating headway capability and the passenger capacity per train, which is the number of cars per train, or the train length. Preliminary train simulations indicate that the round-trip times between the different alternatives are within 10% of each other. The number of operating trains must be a whole number. For the purpose of this study, the longest round-trip time of 770 seconds has been used to establish the line capacities based on different operating fleet and headway scenarios. Assuming that a generic train car can carry 75 passengers, the line capacities for varying headways and train lengths are provided below:

Table 4.5-1 Estimated Line Capacities

NUMBER OF TRAINS	HEADWAY (SECONDS)	LINE CAPACITY 4-CAR TRAIN (PPHPD)	LINE CAPACITY 2-CAR TRAIN (PPHPD)	LINE CAPACITY 1-CAR TRAIN (PPHPD)
8	96.3	11,221	5,610	2,805
7	110.0	9,818	4,909	2,455
6	128.3	8,416	4,208	2,104
5	154.0	7,013	3,506	1,753
4	192.5	5,610	2,805	1,403
3	256.7	4,208	2,104	1,052
2	385.0	2,805	1,403	701
1	770.0	1,403	701	351

Source: Trifiletti Consulting, Raju Associates, 2018

Operating Fleet Scenario to Meet Anticipated Demands: The high ridership projections are used as the basis to determine the operating fleet; variation in the ridership over the day and/or special event duration is not considered at this stage of concept planning. This approach provides for robust concept planning, sufficient flexibility to respond to ridership refinement as better data and information is available, and establishes a conservative estimate for the fleet size, and capital and operations/maintenance costs. It establishes a conservative business case for evaluation in making appropriate project related policy decisions.

Table 4.5-2 Estimated Line Capacities

SERVICE	DEMAND (PPHPD)	NORMAL PLUS SPECIAL EVENT DEMAND (PPHPD)	OPERATING FLEET	CAPACITY PROVIDED (PPHPD)	NUMBER OF ANNUAL SERVICE HOURS
Normal Day	400	400	Operate 2-1 car trains at 385 s headways (total 2 cars operating)	701	3940
Small Events	870	1270	Operate 4-1 car trains at 192.5 s headways (total 4 cars operating)	1403	648
Medium and Large Events incl. Clipper Games	2012	2412	Operate 4-2 car trains at 192.5 s headways (total 8 cars operating)	2805	924
NFL Stadium Small Event	2735	3135	5-2 car trains operating at 154 s headways	3506	120
NFL Stadium Medium Event	6525	6925	5-4 car trains operating at 154 s headways	7013	48
NFL Stadium Game Day	8985	9385	7-4 car trains operating at 110 s headways (total 28 car operating fleet)	9818	160

Source: Trifiletti Consulting, Raju Associates, 2018

Based on the above analysis, the following assumptions are being used to develop rough order of magnitude costs and will support the next level of planning and project definition work:

- Fleet Size: 32 generic cars (28 operating fleet cars, plus 4 spare cars).
- Maximum Cruise Speed: At least 50 mph.
- Minimum Operating Headway: Not greater than 110 seconds.
- Maximum Round Trip Time: 770 seconds (12 minutes 50 seconds).
- Station Dwell Times: 30 seconds.
- Train Operations: Ability to operate different length trains from 1-car (approx. 45 feet long) to up to a 4-car train (approx. 175 feet long train).
- Operating Headways:
    - Normal Day and Weekend – no less frequently than 6 – 6 ½ minutes.
    - Special Events – no less frequently than between 1 ½ to 3 ½ minutes depending the special event.

5. INGLEWOOD TRANSIT CONNECTOR RECOMMENDED ALIGNMENT

The Market–Manchester Alignment (Alternative A) is recommended for further study, as the alternative would provide a direct connection between downtown Inglewood and the major activity centers. Alternative A presents the opportunity for integration with local economic activity, current and future transit-oriented development and other initiatives in the downtown/commercial district of Inglewood. This alternative would also minimize utility relocations, and construction impacts to the adjacent commercial and residential uses along the alignment.

The alignment is approximately 1.8 miles of dual-lane guideway with five anticipated stations. The anticipated stations were identified with the objective of serving traffic generators, current, proposed or potential, with an intuitive and convenient connection. The exact station locations and number of stations will be refined as part of the future environmental impact report (EIR) phase in coordination with the City, stakeholders and through the continuing public outreach process. At this time, the anticipated station locations are:

- Market Street/Downtown Inglewood Crenshaw/LAX Metro Station.
- Manchester Boulevard at or near Market Street.
- The Forum.
- Los Angeles Stadium and Entertainment District at Hollywood Park.
- Proposed Inglewood Basketball and Entertainment Center.

The other alternatives were not recommended for future consideration as they are fundamentally inconsistent with community goals. Alternative B would require one major transition from Florence Avenue onto Prairie Avenue that would potentially impact the Inglewood Cemetery and does not generate economic development opportunities within the City. Alternative C is located primarily on Arbor Vitae Street whose right-of-way ranges from 100 feet to 66 feet. This would potentially require acquisition of existing small businesses and possible neighborhood displacement. It would have adverse economic and fiscal impacts to local businesses along Arbor Vitae Street due to potentially reduced visibility, potential loss of on-street parking during construction and potential permanent removal of on-street parking spaces to accommodate the alignment. In addition to design challenges, Alternative D is located along a corridor that contains major utilities which may potentially pose significant conflicts that may require a major utility relocation effort or property acquisitions along Century Boulevard to avoid utilities.

Alternative D presents the opportunity to directly connect to a regional multimodal facility served by Metro's Crenshaw/LAX and Green Lines, various Metro and municipal bus lines, and the LAX APM system. However, to connect to the multimodal facility, the alignment would have to cross the I-405 on the south side of the LAX APM system. Crossing over the I-405 would require coordination with Caltrans, the Los Angeles Department of Transportation and Los Angeles World Airport and would pose design challenges as the transition from an elevated segment to a level sufficient under the I-405 may not be feasible due to the short distance available and the real estate constraint between Century Boulevard and the LAX LAMP Manchester Square development.

Table 5.0-1 presents key characteristics for each alternative. Summary of the key findings and conclusions of the screening analysis are listed below:

- For the Fixed Guideway Transit Alternatives, the preferred technology is an Automated People Mover technology, which could be rubber tired, steel wheel or monorail technology.
- All alternative alignments provide a comparable level of passenger service and convenience, including connectivity to Metro and the key traffic generators within the City.
- While alternatives A and D demonstrate the greatest ridership potential for "normal" non-event days, the degree to which each of the alternatives is able to relieve road-based congestion and improve overall air quality is generally comparable. The potential ridership for alternatives A and D have heavier ridership than the Alternatives B and C, however, challenges associated with Alternative D, including the utility relocation challenges, challenges with crossing the I-405 freeway, project costs,

- The total cost of ownership for Alternatives A and B is lowest, and is comparable. Because ridership potential is comparable, these two Alternatives offer the lowest cost per rider.

While each of the alternatives can be constructed, the impacts during construction, and the duration of construction varies. This relative measure of construction impacts is, in the context of this report, termed constructability. The impacts during construction are driven by 1) length of alignment, 2) extent of underground utility (which introduce conflicts to be resolved) and 3) traffic impacts due to construction work affecting roadways.

All alternatives traverse Prairie Avenue, as such it is the remaining segments of the alignment that are the differentiators. Alternative A has little or no major utility within the corridor, has a sufficiently wide right of way and the shortest alignment. Thus, it is best in terms of constructability. Alternative D (Century Boulevard) and Alternative C (Arbor Vitae Street) are the least attractive. While Century Boulevard is wide, there are major utilities along the corridor and a narrow sidewalk - this will likely impact the roadway travel lanes and possibly impact properties to place foundations and columns. Arbor Vitae Street is a narrow right-of-way, and will impact properties during construction and also traffic along a narrow right of way. Additionally, both alternatives cross the I-405 introducing construction logistical and traffic mitigation challenges. Alternative B, north of Prairie Avenue is a narrow right-of-way - during construction, impacts to the cemetery and the residences are expected. While Alternative B is more attractive than C or D, it is less attractive than Alternative A.

Underground options were preliminarily reviewed and discarded due to the significantly higher costs, but more importantly due to conflicts with the major underground utilities along Prairie Avenue - which is common to all alternatives. Transitioning from an underground to an elevated option along Prairie would cutoff major roadways at the transition - a fatal flaw to traffic circulation and capacity.

The Market–Manchester Alternative (Alternative A) performs well on a number of key measures including projected high annual ridership (2,578,120), minimal conflicts related to utility and construction impacts, and provides economic opportunities for downtown Inglewood.

Furthermore, based on outreach efforts conducted during the phase of study, stakeholders and representatives from local jurisdictions indicated their support for Alternative A. Initial stakeholder meetings were conducted, includiing meetings with the Inglewood City Council, block clubs, neighborhood watch groups, Inglewood Rotary, businesses, merchant groups, and early feedback has indicated support for Alternative A. As part of the environmental clearance process robust stakeholder outreach will be continued and conducted to help define the Inglewood Transit Connector Project, including project design, stakeholder locations, intermodal facilities, and over all interface with the City's major activity centers and pedestrian realm.

Therefore, it is recommended that the Alternative A: Market-Manchester, be advanced as the preferred alternative for further review as part of the environmental review process.

Table 5.0-1: Screening Results of the Inglewood Transit Connector Alternatives

	Alternative A: Market-Manchester Alignment	Alternative B: Fairview Heights Alignment	Alternative C: Arbor Vitae Alignment	Alternative D: Century Blvd Alignment
Length of System (approximately)	1.8 miles	2.2 miles	3 miles	3.1 miles
Connection to Metro	Yes at Downtown Inglewood Station	Yes at Fairview	Yes	Yes
Service to Key Venues	Comparable	Comparable	Comparable	Comparable
Right-of-way impacts/ability to resolve	Minimal	Potential impact to Inglewood Cemetery	Potential impacts to small businesses and residences	Property acquisitions likely due to major utility relocations
Potential impacts, based on available roadway width	Minimal	Potential impact to Inglewood Cemetery	Potential impacts to small businesses and residences	Property acquisitions likely due to major utility relocations
Utility Conflicts/ability to resolve with relocations	Minimal/Good	Minimal/Good (with potential impacts to Inglewood Cemetery)	Minimal/Good (with potential impacts to small businesses and residences)	Major/Limited (major utilities with impacts driving property acquisitions)
Annual Ridership	2,578,120	1,894,826	2,047,055	2,933,147
Passenger Convenience	Comparable	Comparable	Comparable	Comparable
Synergistic Economic Development within City	Good	Limited	Limited	Limited
Required Major Coordination Efforts	Coordinate with Metro	Coordinate with Metro	Coordinate with Metro, LAWA and Caltrans (I-405)	Coordinate with Metro, LAWA and Caltrans (I-405)
Estimate of Probable Capital Cost (2018 $) [1, 2]	$614.4M	$625.1M	$756.7M	$ 769.2M
Estimate of Probable Annual O&M Cost (2018 $) [3]	$18.2 - $19.5 M			

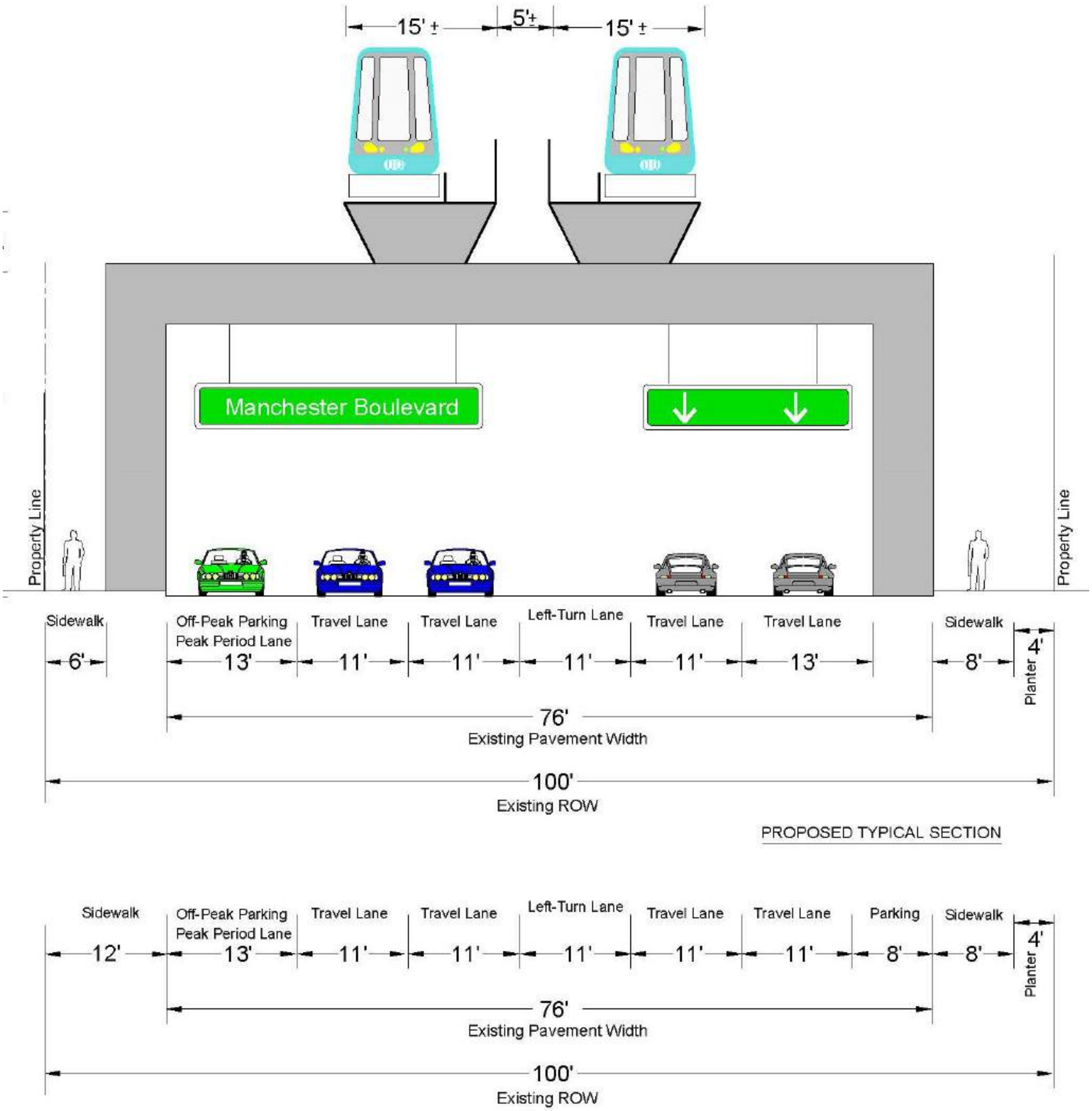
1. Right of way acquisition, environmental and physical mitigations, parking/intermodal center costs and costs of other infrastructure are not included since these are not defined and subject to impacts/influence from other city and regional transportation plans/studies.
2. Owner soft costs not included – Owner soft costs cover Owner's management costs including Owner retained consultants etc.
3. Assumes a Design-Build-Operate-Maintain delivery strategy with a 25-30 year term with Contractor responsible for all operations/maintenance of contractor delivered assets. Does not include cost of utilities or Owner soft costs.

Source: Raju Associates, Trifiletti Consulting, Pacifica Services, 2018

Figure 5.0-1: Alternative A: Market-Manchester Alignment

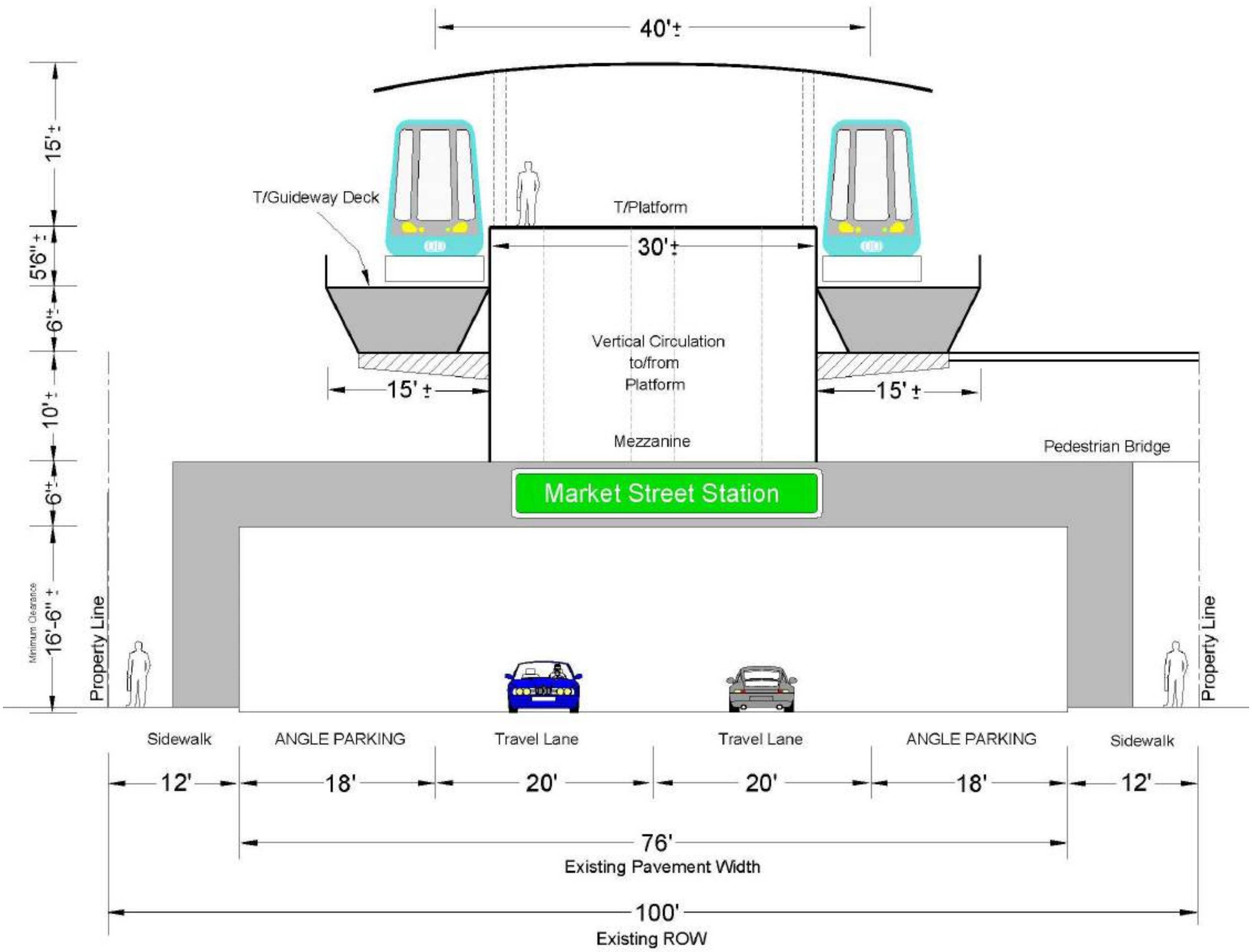
Source: Trifiletti Consulting, 2018

Figure 5.0-2: Alternative A: Market- Manchester Alignment
Manchester Boulevard, Looking West in Between Stations



Source: Raju Associates, 2018

Figure 5.0-3: Alternative A: Market-Manchester Alignment
Market Street, Looking West at Station



Source: Raju Associates, 2018

Intermodal facilities are preliminarily located at each end of the alignment, at Market Street and near the Prairie/Century intersection. The objective is to provide an opportunity for passengers on buses, shared ride vehicles, TNCs, and taxis to conveniently transfer to the APM system for the final journey into the City. This strategy is consistent with the objective of relieving traffic demands within the City's commercial district by providing a convenient transfer to the final destination. This also alleviates additional demand on real estate currently used for parking that can now be utilized for its highest and best use. The intermodal facilities will be appropriately sized to accommodate traffic projections that will vary based on special events and is likely to consist of a surface lot with convenient vehicle access and egress and curb cuts to facilitate short-term stopping to pick up or discharge passengers to and from the APM system. Specifics will be developed as part of the environmental impact report (ERI) phase of the Project and in coordination with the City, stakeholders and input from public outreach programs.

6. NEXT STEPS
7. FUNDING/FINANCING STRATEGY
8. PROCUREMENT STRATEGY

6. NEXT STEPS

The City will further define the Market-Manchester Alignment as the locally preferred alternative, and will now launch the environmental review process pursuant to the California Environmental Quality Act (CEQA). The specific configurations and station locations, intermodal facilities and other various technical and design characteristics will be identified and developed in coordination with the key City departments and stakeholders, including the community, residential, civic organizations, business groups and potentially impacted property owners. The project definition work and the environmental analysis will also include coordination with third-party agencies including but not limited to Metro, Los Angeles County Regional Planning and Public Works, Caltrans, SCAG, and the City of Los Angeles. Public engagement will continue throughout the environmental and public process.

To support the environmental and project delivery process, the City will conduct and include engineering and other technical studies and will continue to assess and identify potential project designs, environmental impacts, operational profiles, cost estimates, ridership and overall environmental benefits. This further analysis will supplement this report and produce more detailed project benefits and description designed to be fully integrated into the transit network and transportation system. Next steps include launching the environmental process pursuant to CEQA, which includes releasing the Notice of Preparation and commencing the preparation of a Draft Environmental Impact Report.

7. FUNDING/FINANCING STRATEGY

The Project shall seek funding as a special district and form an Enhanced Infrastructure Finance District (EIFD). The project shall seek the EIFD formation concurrently with the environmental process through CEQA and fulfill subsequent requirements of the EIFD along with the requirements of the environmental process. The City will also explore and seek all available public funds at the local, state and federal level, and will also develop innovative project delivery strategies to establish public-private partnerships and/or joint funding and development tools.

8. PROCUREMENT STRATEGY

The Metro study concluded and recommended a public-private-partnership/concessionaire strategy to deliver the project, primarily due to Metro's inability to fund the project, which is not included in either the Measure M Expenditure Plan or the Metro Long Range PTransportation Plan. It is critical to understand that such a strategy still requires the Owner to have sufficient debt capacity/revenue generation capacity/strategy to provide the back stop on the contract. Additionally, the City must consider its own strategy for entering into such a transaction, including but not limited to establishing a special purpose entity, or identifying policies to assure financing to support the back-stop on the contract. To that end, consultation with stakeholders, the City's legal counsel and policy makers is essential as the strategy is developed further for the City's locally preferred alternative for the Inglewood Transit Connector Project.

9. APPENDICES

Appendix A: Utility Analysis Memo
Appendix B: Ridership Memo
Appendix C: Cost Estimates Memo
Appendix D: July 2017 Transit Connection Study

Appendix 3.0.3

Inglewood Transportation Center Design Guidelines, December 2020

DESIGN GUIDELINES
INGLEWOOD TRANSIT CONNECTOR

DECEMBER 2020

TABLE OF CONTENTS

TABLE OF CONTENTS

1.0 INTRODUCTION

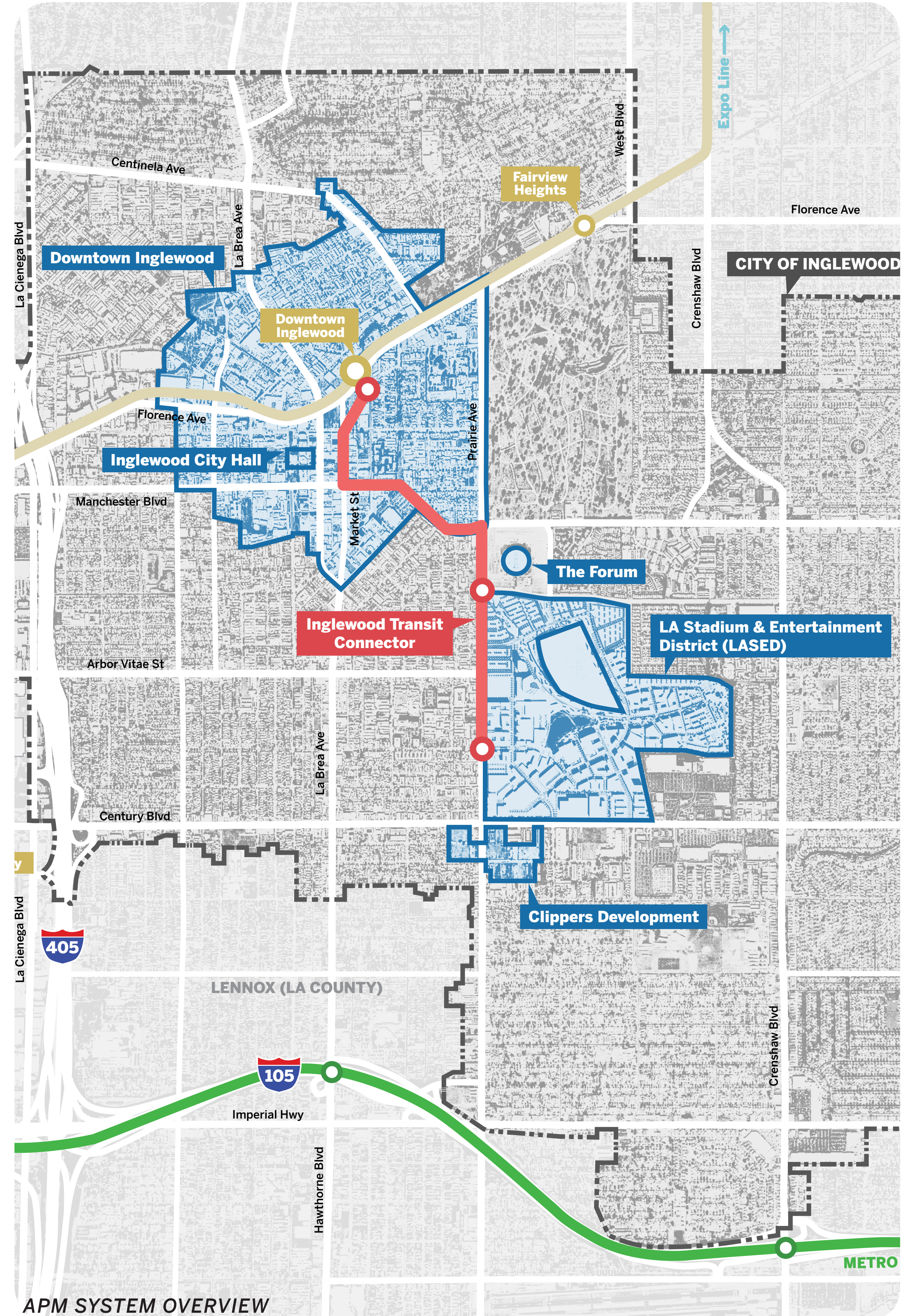
INTRODUCTION

1.1 OVERVIEW AND PURPOSE

The Inglewood Transit Connector (ITC) Design Guidelines (Design Guidelines) establish the City of Inglewood's comprehensive vision for the transit experience to bring patrons to downtown Inglewood and the surrounding entertainment and business venues. These guidelines are intended to integrate the design of new and existing facilities and to create a passenger experience that reflects the City's history and architecture, while providing design guidance for the proposed ITC project. The Design Guidelines apply to all components of the ITC project which is comprised of, among other things, the Automated People Mover (APM) guideways, stations, support facilities, and parking areas. These guidelines also apply to areas of the public realm affected by the ITC project including streetscapes, roadways, landscape and hardscape areas.

The overall purpose of the Design Guidelines is to provide a framework for enhancing the experience in and around downtown Inglewood in a way that is consistent with both the existing urban context and future development vision. These guidelines encourage the development of sustainable and user-friendly spaces with a focus on unified high quality architecture and urban design. They will also shape a seamless interaction between a variety of users including pedestrians, cyclists, transit riders, and automobile drivers with an emphasis on the public experience. All guidelines listed are to be implemented to the extent feasible for the ITC project.

Design guidelines for the public realm govern streetscapes and other affected areas at the grade level. They establish the overall vision for public streets and spaces along the ITC project alignment right-of-way. They also establish aspirational goals for the look and feel of the development of existing and future projects on properties along the alignment. These guidelines are to be applied in conjunction with existing land use plans, specific plans and the City's urban design guidelines. In the event of any conflict or inconsistency, it is the City's intent that the ITC Design Guidelines shall control and supersede any such land use plans, specific plans, and/or urban design guidelines. In the absence of any conflict or inconsistency, design-related elements of such plans and guidelines will be considered and may be implemented to the extent feasible and in keeping with the overall project vision set forth in the ITC Design Guidelines.



APM SYSTEM OVERVIEW

INTRODUCTION
1.2 VISION AND GOALS

VISION

As the City of Inglewood continues to define itself as a world-class sports and entertainment center with both existing and new developments within the greater Los Angeles region, there are growing opportunities for the City to optimize the public experience by implementing smart transportation strategies.

By providing transit access from the LA Metro LAX/Crenshaw line to Inglewood's entertainment centers, the proposed Inglewood Transit Connector (ITC) will integrate the City of Inglewood with the greater Los Angeles region. The ITC is an elevated Automated People Mover system comprised of three stations that will serve as a distinctive and unified system befitting "The City of Champions."

GOALS

- Integrate with existing local communities, and harmonize new developments within the city.
- Optimize Inglewood's vehicular network by reducing future traffic congestion and alleviating growing demand on existing roadways.
- Enhance the public experience by facilitating ease of movement in and around Inglewood.
- Provide a distinct gateway that represents the spirit of Inglewood.
- Create attractive and functional streetscapes, roadways and pedestrian connections.
- Create a hierarchy of street level spaces that provide a rich and diverse variety of experiences.
- Deliver a project in accordance with the City of Inglewood's overall sustainability goals and objectives.

SIGNAGE | CITY OF INGLEWOOD

OLD HOLLYWOOD PARK

FOX THEATER

INTRODUCTION
1.3 AREA CONTEXT

Located near downtown Los Angeles, the Silicon Beach tech corridor, the Los Angeles International Airport and a substantial hotel, retail and business district, the City of Inglewood is well positioned at the center of renewed economic development in Southern California. The following are important projects recently completed, under construction or proposed within the City:

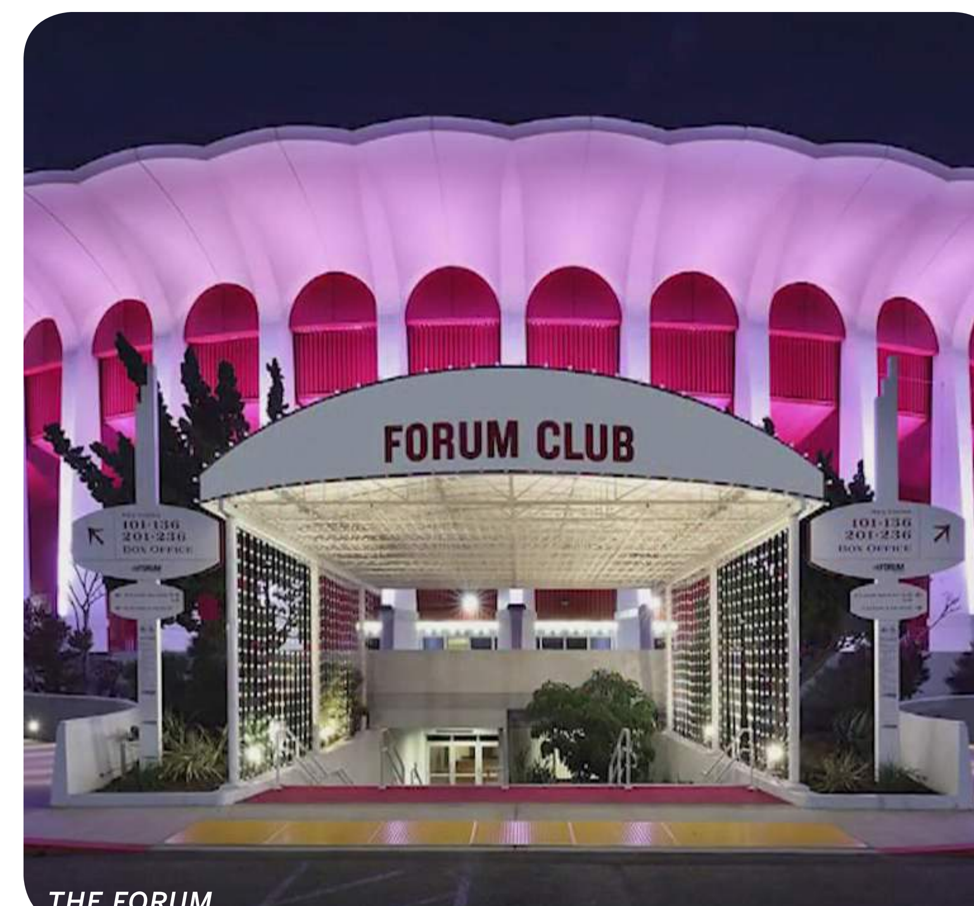
1.3.1 LOS ANGELES STADIUM AND ENTERTAINMENT DISTRICT (LASED) AT HOLLYWOOD PARK

The Los Angeles Stadium and Entertainment District (LASED) project, a new mixed-use, master planned community on the site of the former Hollywood Park Racetrack and Equestrian Center started construction in 2014 and is slated for completion by 2023. The project will transform underutilized asphalt lots and the former racetrack into a vibrant mixed-use community. The project includes a number of new uses including 2,500 residential units, 890,000 square feet of retail, 780,000 square feet of office and a 300-room hotel, as well as 25 acres of new recreational and park amenities for the City. At the centerpiece of Hollywood Park is the new $5 billion-dollar, 70,240 seat National Football League (NFL) SoFi Stadium to be shared by both the Los Angeles Rams and Los Angeles Chargers. The SoFi Stadium will host Super Bowl LVI in Winter 2022, the 2026 FIFA World Cup, and the 2028 Summer Olympic Games. The LASED project includes roadway infrastructure upgrades, modernized traffic systems with intelligent traffic signals(ITS), a state-of-the-art traffic management command center, and improvements at various intersections along Prairie Avenue and Century Boulevard.

1.3.2 THE FORUM

Constructed in 1967, the Forum is a multi-purpose indoor arena which for decades has served as one of the region's premier sports and entertainment venues. In 2014 the Forum completed a multi-million-dollar renovation and was added to the National Register of Historic Places. The Forum now actively hosts some of the largest entertainment programs in the country and is scheduled to host events during the 2028 Summer Olympic games.

SOFI STADIUM



THE FORUM

1.3 AREA CONTEXT

INGLEWOOD BASKETBALL AND ENTERTAINMENT CENTER

1.3.3 INGLEWOOD BASKETBALL AND ENTERTAINMENT CENTER (IBEC)

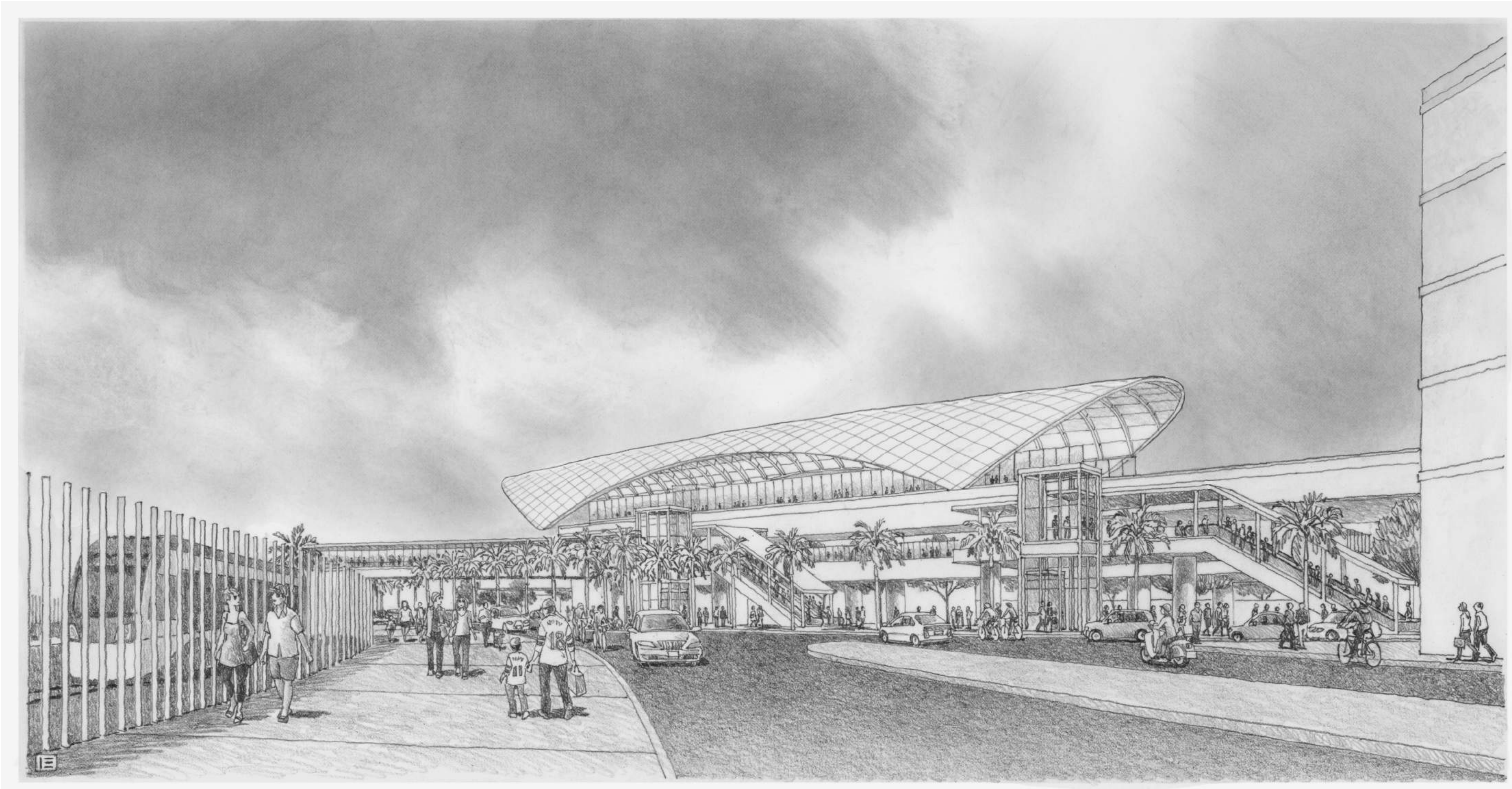
In June 2017 the National Basketball Association's Los Angeles Clippers announced a proposal to construct a new arena and sports facilities in Inglewood designed to host the team's events and other non-sporting programs. In August 2020, the City approved the final environmental impact report for the Inglewood Basketball and Entertainment Center (IBEC). The IBEC project is located on approximately 27 acres and includes an 18,000 fixed seat arena, an approximately 85,000 square foot team practice and athletic training facility, approximately 55,000 square feet of LA Clippers team office space, approximately 25,000 square foot sports medicine clinic for team and potential general public use, approximately 40,000 square feet of retail and other ancillary uses that would include community and youth-oriented space, an outdoor plaza with an approximate area of 260,000 square feet including landscaping, outdoor basketball courts, outdoor community gathering space, and parking facilities sufficient to meet the needs of the proposed uses.

METRO PURPLE LINE

1.3.4 MARKET STREET

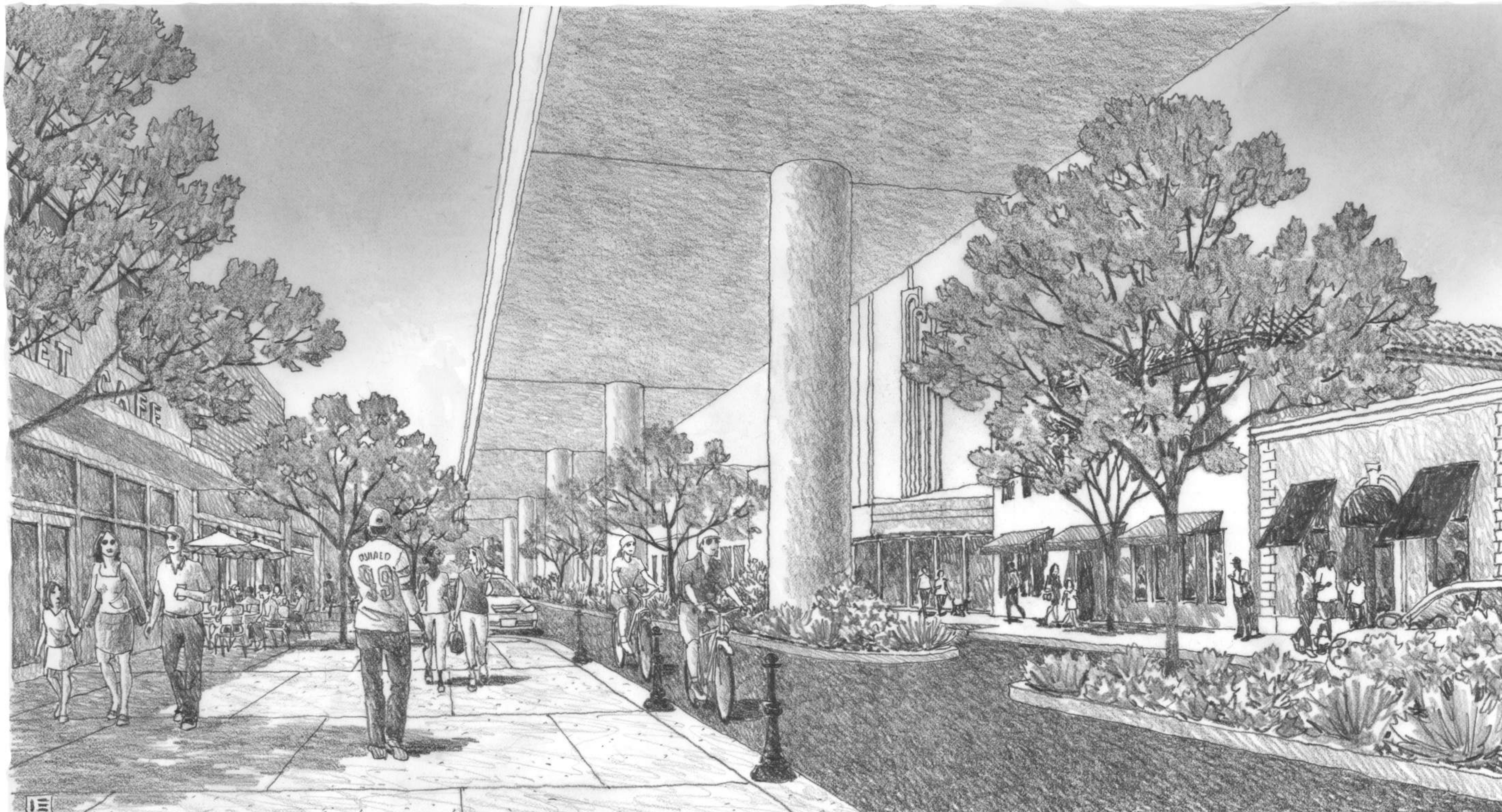
Inglewood is also working to revitalize its downtown in order to integrate with the future LA Metro Crenshaw/LAX station. The City is encouraging the design and development of new residential, mixed-use and retail projects on Market Street. In the late 1940s through the early 1960s, Inglewood's Market Street hosted Hollywood film premieres at several movie houses including The Fox Theater, The United Artist's Theater, and The Ritz Theater. Today's LA Metro Crenshaw/LAX line will stop in downtown Inglewood just blocks away from these historic structures. Classic theaters throughout Los Angeles are currently being re-energized as vital cultural venues and the same opportunity will now exist in Inglewood.

1.3 AREA CONTEXT

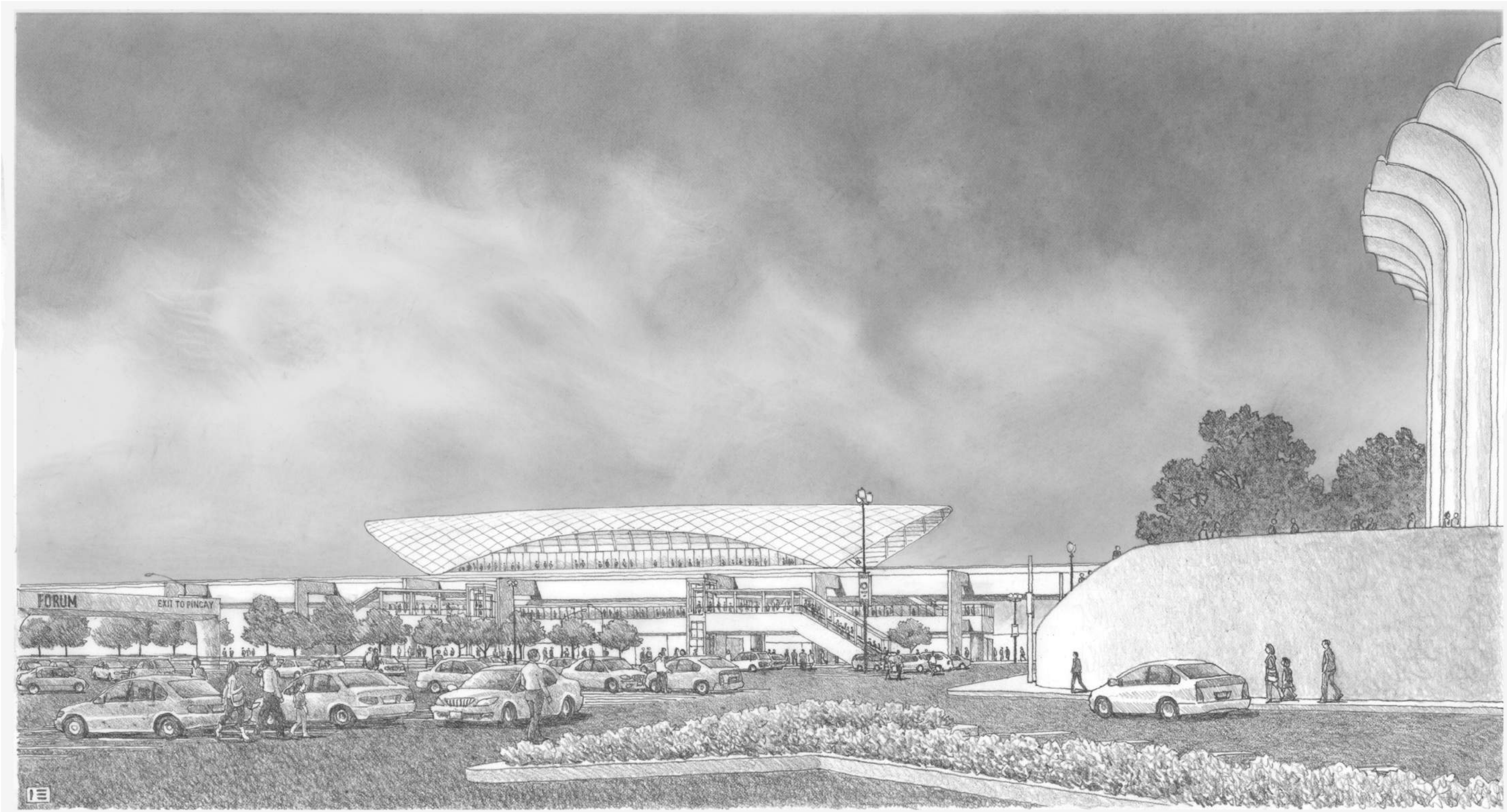


FLORENCE AVENUE AND MARKET STREET

INTRODUCTION
1.3 AREA CONTEXT



MARKET STREET



PRAIRIE AVENUE AND PINCAY DRIVE

2.0
STATIONS, GUIDEWAYS AND RELATED BUILDING ELEMENTS

STATIONS, GUIDEWAYS AND RELATED BUILDING ELEMENTS
2.1 STATION DESIGN

OBJECTIVE:

Stations will be strong architectural focal points and prominent design elements of the ITC Project. The stations will be:

- Identifiable
- Iconic
- Elegant

Station designs will be consistent in both form and function with adjustments as necessary to fit within each specific site. They will also be designed to accommodate adjacent existing local businesses and future developments along the APM guideway. In addition, designs will also accommodate a variety of passenger flows and demands within the stations themselves. The three station designs will enable ease of pedestrian movement both to and from the public realm:

- Market Street/Florence Avenue Station will include a connection from the LA Metro LAX/Crenshaw station.
- Prairie Avenue/Pincay Drive Station will provide service to both the Forum and LASED.
- Prairie Avenue/Hardy Street Station will provide service to LASED and the IBEC.

STATIONS, GUIDEWAYS AND RELATED BUILDING ELEMENTS
2.1 STATION DESIGN

GUIDELINES:

Massing

1. The form will be sleek and monolithic.

2. The design will be modern in style.

3. The station canopy will be the dominant architectural feature.

4. The station canopy will provide shade and protection from inclement weather while allowing for natural ventilation and daylight.

STATIONS, GUIDEWAYS AND RELATED BUILDING ELEMENTS
2.1 STATION DESIGN

Platform and Mezzanine

1. Platform and mezzanine will include the following key areas:
    a. Fare collection
    b. Queuing space
    c. Places for respite
    d. Appropriately sized passenger horizontal and vertical circulation
    e. Operations spaces

2. Space layout will be intuitive, efficient, and ensure passenger safety.

3. Areas will be designated to accommodate graphics, wayfinding signage and/or advertising in a consistent and integrated manner.

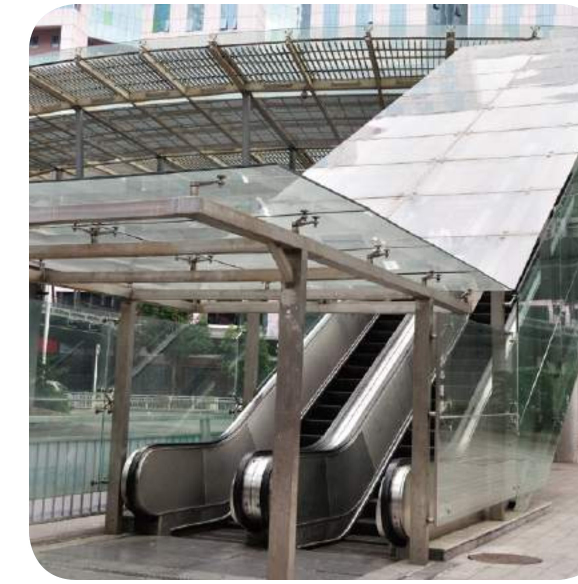
4. The platform edge barrier will be transparent or partially open to protect passengers and the roadway below.

Passenger Circulation

1. Escalators will be transit grade and shielded from inclement weather.

2. Stairs will be provided and sized to meet passenger demand.

3. Elevators enclosures and cabs will be transparent, to the extent feasible, and will allow for clear and unobstructed views.



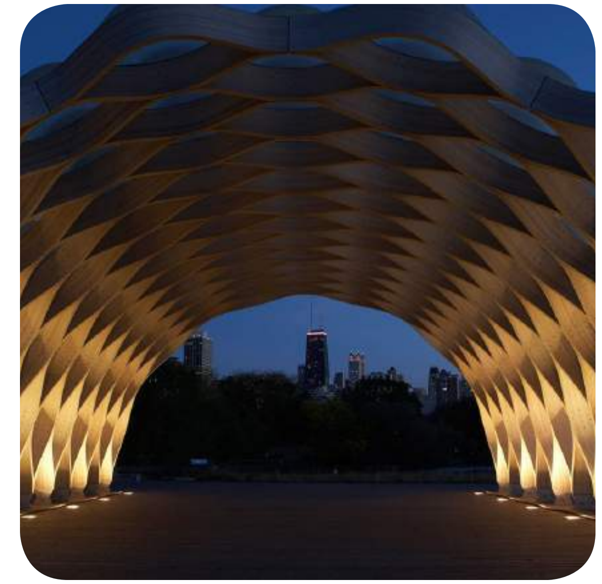
STATIONS, GUIDEWAYS AND RELATED BUILDING ELEMENTS
2.1 STATION DESIGN

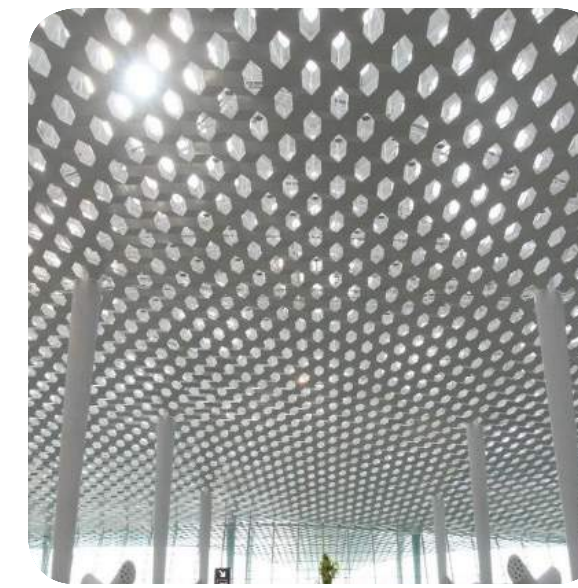
Materials and Color Palette

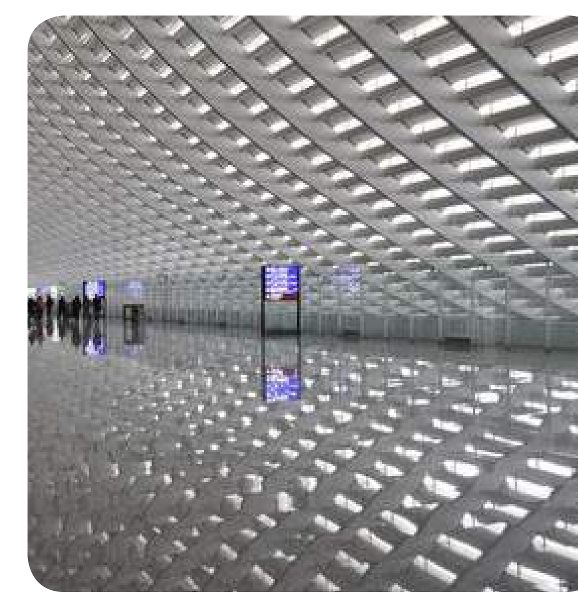
1. Station superstructure may be constructed of exposed concrete or other attractive materials.
2. Canopy materials will be light in color to reduce the urban heat island effect.
3. The color palette will be neutral in tone with color accents as appropriate
4. Material surfaces will be low glare.
5. Materials that are accessible to the public.
6. Materials will be selected that require minimal maintenance and are resistant to graffiti and vandalism.

Lighting

1. Station canopies will have indirect accent lighting.
2. Lighting will clearly highlight pedestrian paths including those to stairs, escalators and elevators.
3. Accent and functional lighting will be strategically placed to minimize impacts on adjacent properties.
4. Accent and functional lighting controls will be programmable and sensor controlled to allow for various settings such as daytime, nighttime, and event lighting.







STATIONS, GUIDEWAYS AND RELATED BUILDING ELEMENTS
2.2 GUIDEWAY AND SUPPORT STRUCTURE DESIGN

OBJECTIVE:

The APM guideway is intended to be simple, elegant, and will be a unifying feature between stations. The guideway architecture will create a sense of movement that connects the stations.

GUIDELINES:

Superstructure

1. Guideway superstructure, including bents and column supports will be designed to read as one family.

2. Guideway profiles will be streamlined and with a horizontal expression.

3. Edges will be minimal in thickness to reduce perceived mass.

4. Transitions at crossovers will be smooth and rounded, rather than angular and sharp (in plan view).

5. Guideway superstructure soffit will be smooth.

6. Conduits, guideway equipment, walkways, drainage systems, and other utilities will be concealed from public view to the extent feasible.

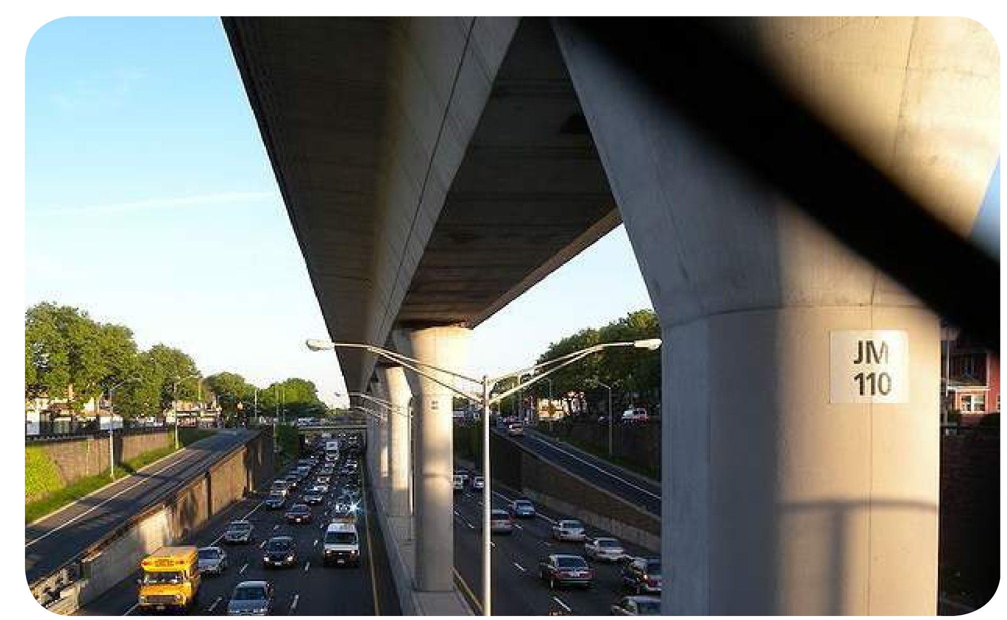
2.2 GUIDEWAY AND SUPPORT STRUCTURE DESIGN

Supports

1. Column form will be consistent, integrated with the guideway superstructure, and designed to read as one a family.

2. Column superstructure configuration is listed in order of preference.
   a. Center column superstructure
   b. Cantilevered superstructure
   c. Straddle bents

3. Column size, space, and span will be balanced and optimized such that:
   a. Minimal column size with consistent spacing is preferred .
   b. Maximum distance between columns is preferred in balance with the proportion of the depth of the beam.
   c. Eccentrically loaded columns will need to be oblong in shape.
   d. Column locations and sizes will accommodate traffic and pedestrian safety.



2.2 GUIDEWAY AND SUPPORT STRUCTURE DESIGN

Materials and Color Palette

1. Guideway superstructure may be exposed structural concrete.
2. Color palette will be neutral in tone and complement the station palette.
3. Materials will be resistant to graffiti and vandalism in areas accessible to the public.

Lighting

1. Where provided, guideway indirect accent lighting will complement station lighting design.
2. Light fixtures will be concealed or minimally visible to the extent feasible.
3. Accent and functional lighting will be strategically placed to minimize spillover to adjacent properties.
4. Code required lighting along the guideway will be designed to minimize visibility from the ground level.

STATIONS, GUIDEWAYS AND RELATED BUILDING ELEMENTS
2.3 MAINTENANCE AND STORAGE FACILITY

OBJECTIVE:

The Maintenance and Storage Facility (MSF) will be easily-accessible by employees who serve and maintain APM trains.

GUIDELINES:

Massing

1. Massing and height will be minimized to the extent feasible and the minimum height will be derived from the function and program of the facility.

2. Rooftop equipment will be fully screened.

2.3 MAINTENANCE AND STORAGE FACILITY

Materials and Color Palette

1. Transparent glazing shall be provided, maximizing daylight to the extent feasible.

2. Color palette to be uniform and neutral in tone with accent colors where appropriate

3. Material surfaces to be low glare.

4. Materials will be selected that require minimal maintenance and are resistant to graffiti and vandalism.

5. Roof surface will be light in color to reduce the urban heat island effect.

Lighting

1. Where provided, functional lighting will be placed to minimize spillover to adjacent properties.

2. Building entrances will be well lit.

3. Lighting will clearly highlight pedestrian paths including those to ramps, stairs, escalators and elevators.

STATIONS, GUIDEWAYS AND RELATED BUILDING ELEMENTS
2.4 PASSENGER WALKWAY

OBJECTIVE:

Passenger walkways, where required, will be designed to provide clear and direct access from neighboring developments to the APM station(s).

GUIDELINES:

Massing

1. Walkways will be:
    a. Functional and simple in form.
    b. Complementary to the overall APM system design and visually integrated with the stations.
    c. Naturally ventilated while providing protection from wind driven rain, and sun.
    d. Transparent, providing natural daylight and views for pedestrians moving to and from the stations.
    e. Designed to include transparent or partially open screen walls of appropriate height to ensure the safety of pedestrians and the roadway below.

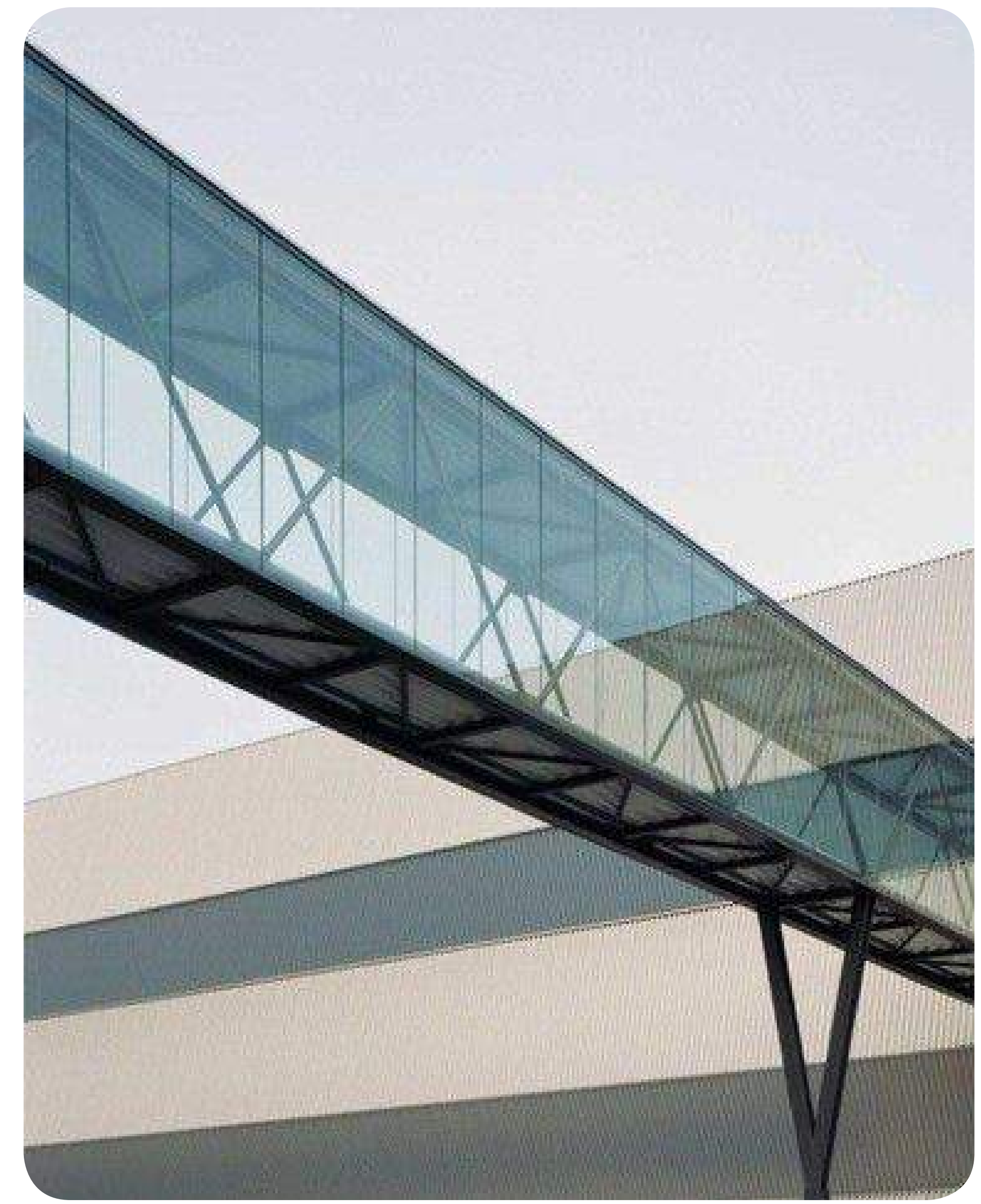
STATIONS, GUIDEWAYS AND RELATED BUILDING ELEMENTS
2.4 PASSENGER WALKWAY

Materials and Color Palette

1. Walkways will be able to accommodate graphics, wayfinding signage and/or advertising within designated areas.
2. Color palette to be uniform and neutral in tone with color accents where appropriate.
3. Material surfaces will be low glare.
4. Materials that are accessible to the public will be resistant to graffiti and vandalism.

Lighting

1. Overall Lighting design will not interfere with roadway traffic below.
2. Accent lighting will complement station lighting design.
3. Accent and general lighting controls will be programmable and sensor controlled to allow for daytime, nighttime, and event settings.



STATIONS, GUIDEWAYS AND RELATED BUILDING ELEMENTS
2.5 OTHER ARCHITECTURAL ELEMENTS

WALLS AND FENCES
OBJECTIVE:

Walls and fences for security and screening purposes as required will balance functionality with aesthetics to create an attractive environment.

GUIDELINES:

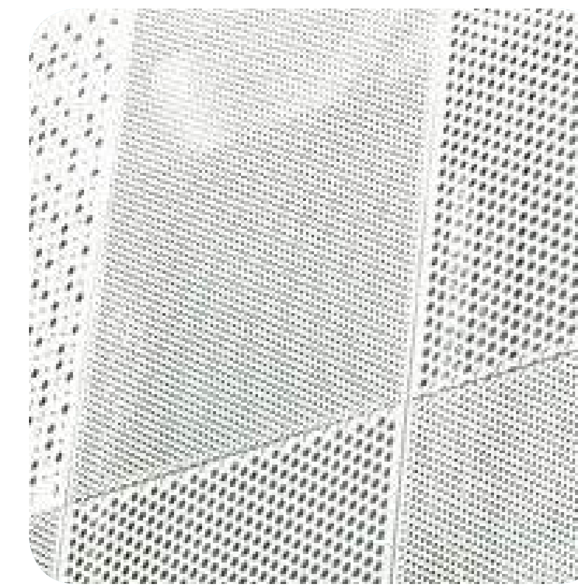
1. Decorative security walls and fences will be selected to screen and protect elements as required and will:
    a. Enclose equipment to minimize visual exposure to the public.
    b. Allow for space around equipment required for operations.

2. Screening and Security Fencing to be chosen from a set of options previously approved by the City of Inglewood.

3. Long expanses of walls and fences will be broken up with textural or recessed elements, landscape pockets, or changes in material.

4. Landscape elements are to be used in combination with walls and fences, but not in lieu of, where appropriate.



3.0 PUBLIC REALM AND STREETSCAPE GUIDELINES

PUBLIC REALM AND STREETSCAPE

3.1 General Public Realm and Streetscape Guidelines

OBJECTIVE:

Implement complete street design on areas that are adjacent to APM Guideway alignment. Accommodate all modes of transportation on streets, with particular attention to public transit vehicles and pedestrians. Provide places where people can gather and opportunities for activation of local businesses on adjacent parcels.

GUIDELINES:

1. Streetscape adjacent to APM stations will support significant pedestrian flows and provide easy access to local businesses.

2. Urban amenity areas will be designed to allow for places to sit and gather, and encourage social interaction.

3. Sidewalks will be lined with trees, where possible, to provide shade and create a comfortable, walkable pathway.

4. Future developments that are adjacent to APM stations will be easy to access and have attractive pedestrian connections.

PUBLIC REALM AND STREETSCAPE
3.2 STREETSCAPE

OBJECTIVE:

Streetscapes include roads, sidewalks, furnishings, lighting, landscapes and other open space amenities which combine to define the character of the street. At Market Street, Manchester Boulevard and Prairie Avenue, the ITC project will create a spacious public realm with wide sidewalks, planting areas and amenity zones that can accommodate large volumes of pedestrian traffic.

PUBLIC REALM AND STREETSCAPE
3.2 STREETSCAPE
3.2.1 SIDEWALKS

OBJECTIVE:

The sidewalk is a fundamentally important space within a neighborhood. The sidewalk represents the pedestrian realm and is located between the street curb and the property line. The primary function of the sidewalk is to provide a safe and accessible means of travel for pedestrians. The secondary function is to provide a vibrant place where people can enjoy the urban environment.

GUIDELINES:

1. Sidewalks will be sized to accommodate a wide variety of pedestrian traffic.

2. Pavement material and finish to be consistent with City of Inglewood's Public Works standards.

3. Beyond the typical standard, alternate paving typologies may be considered as follows:
    a. Unique paving patterns at areas of interests.
    b. Variations in paving material to help to define separation of spaces.
    c. Simple variations in concrete surfacing and textures.

PUBLIC REALM AND STREETSCAPE
3.2 STREETSCAPE
3.2.2 PLAZA AND OTHER URBAN AMENITY AREAS

OBJECTIVE:

The project should encourage the development of plazas and other urban amenity areas to the extent feasible. A plaza is an open area located in an urban context that encourages public gathering. Smaller underutilized spaces, contiguous to the sidewalk, provide additional opportunities for seating and other amenities.

GUIDELINES:

1. Plazas will feature landscape and seating elements.

2. Plazas will accommodate flexible opportunities for retail and other local businesses.

3. Urban amenity areas which are smaller than plazas have the same programmatic options but will not include as wide a range of uses.

4. Urban amenity areas will respond to their particular context and maximize available space in order to have the most beneficial impact on the streetscape and public realm.

PUBLIC REALM AND STREETSCAPE
3.2 STREETSCAPE
3.2.3 LIGHTING

OBJECTIVE:

Street lights are essential for creating a lively and safe nighttime environment. Street lights should be dual-purpose and provide lighting for the roadway and pedestrian-scale lighting for sidewalks as applicable.

Pedestrian lighting creates a more comfortable level of light for pedestrians and contributes to the overall experience and identity of the street. It also improves security and safety by properly illuminating sidewalks, curb ramps, barriers and informational signage for users.

GUIDELINES:

1. City of Inglewood's requirements for street and pedestrian lighting will be followed.

2. Along primary pedestrian circulation routes, light fixtures and incidental light sources will provide a continuous light level of 3-foot candles to help pedestrians better distinguish color, size, and shape.

3. Any unique lighting effects created by guideways and stations must be considered and street and pedestrian lighting will be designed to consistently meet the standard of lighting established by City of Inglewood requirements.

PUBLIC REALM AND STREETSCAPE
3.2 STREETSCAPE
3.2.4 STREET TREES

OBJECTIVE:

Street trees and integrated landscaping foster an attractive, comfortable, and walkable environment. Trees add value by cooling down streets and sidewalks on hot days, providing zones for respite, improving air quality, and assisting with reduction of embodied carbon and stormwater runoff.

GUIDELINES:

1. Trees will be planted on both sides of the roadway where possible to create an allee.
2. Trees will be positioned at regular intervals relative to APM guideway column supports to create a consistent rhythm.
3. Within each median, below the APM guideway at Market Street, a combination of street trees and plantings will be provided. They will be composed in a manner that responds to the guideway support and any other streetscape elements.
4. City of Inglewood's approved street tree list will be used as a basis for all sections.
5. Trees that can flourish in areas of heavy shade created by the APM guideway will be prioritized.

PUBLIC REALM AND STREETSCAPE
3.2 STREETSCAPE
3.2.4 STREET TREES (CONTINUED)

6. Trees that allow for visibility to the other side of the street will be part of the selection criteria.

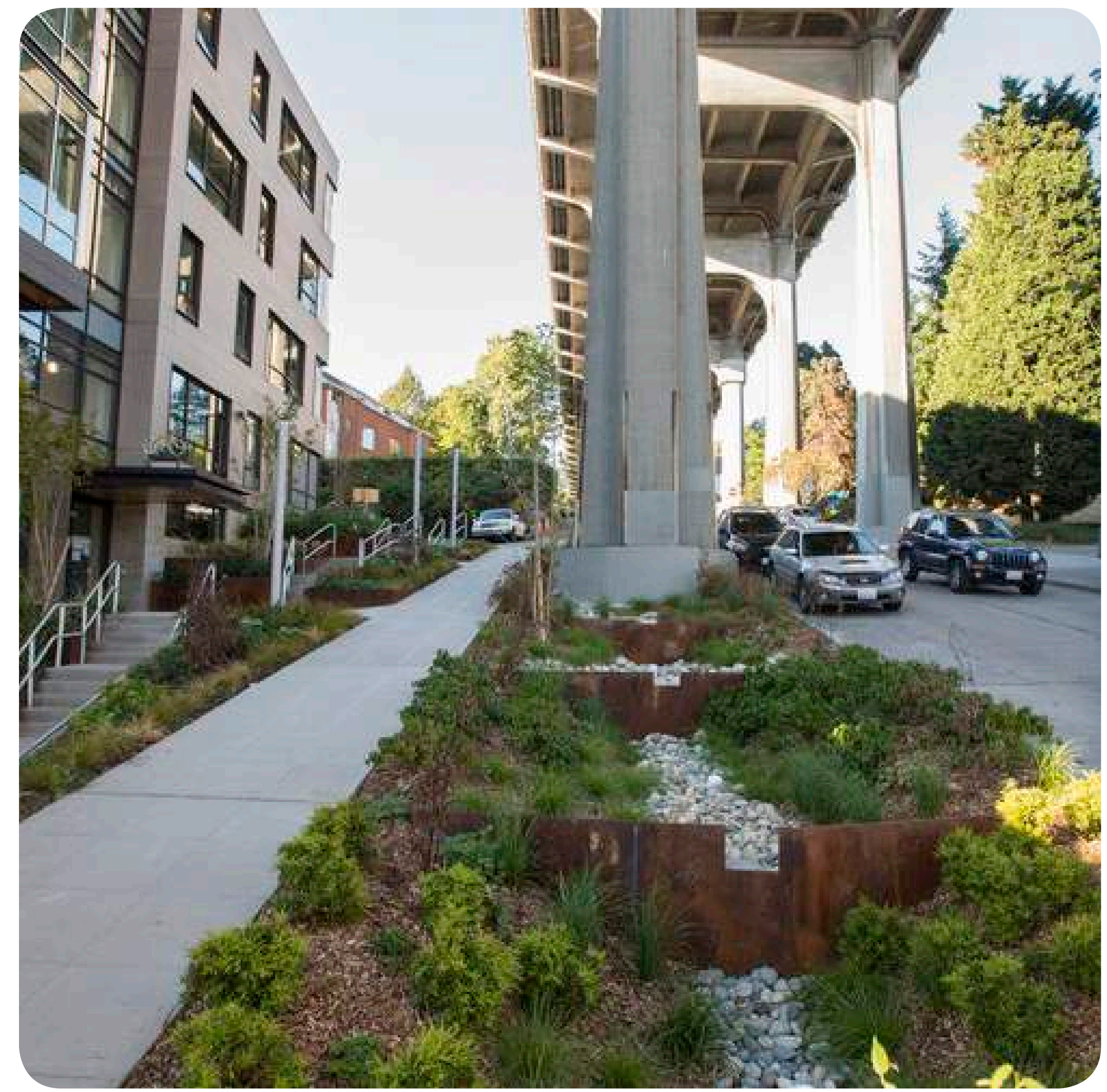
7. An arborist report surveying the health of all existing trees along the length of the APM Guideway will be required.

8. Where feasible, existing trees will remain.

9. The quantity and species of existing trees removed by the ITC Project will be replaced in accordance with the City's current landscape guidelines.

10. Protected species in the Inglewood Municipal Code, Tree Preservation will remain.

11. City of Inglewood guidelines for tree spacing will be followed, considering species of trees and the desired canopy coverage.



PUBLIC REALM AND STREETSCAPE
3.2 STREETSCAPE
3.2.5 PLANTINGS

OBJECTIVE:

Install small scale landscape adjacent to streets in planting zones to help soften the street corridor and provide clear separation between pedestrians and vehicular traffic.

GUIDELINES:

1. A combination of plants will be used to create seasonal horticultural “events”, visual interest and texture on the ground plane.
2. Planting zones will capture stormwater runoff where feasible, and allow for infiltration into the ground.
3. Pass-through and step out areas between planting zones should be paved with permeable pavers to allow for water infiltration where feasible.
4. At planting zones within or adjacent to publicly occupied spaces, plants that are potentially hazardous to pedestrians and pets will not be utilized.
5. Selected plants will tolerate radiant heat from the sidewalk or street surface.
6. Low maintenance and drought tolerant plants will be prioritized, particularly those that do not require irrigation upon maturity.

PUBLIC REALM AND STREETSCAPE

3.2 STREETSCAPE

3.2.6 IRRIGATION

OBJECTIVE:

The design and installation of supplemental irrigation systems will be necessary for the establishment of new trees and plantings.

GUIDELINES:

1. Irrigation will conform to the City of Inglewood water conservation requirements.

2. Irrigation will be installed at all trees and planting zones.

PUBLIC REALM AND STREETSCAPE
3.2 STREETSCAPE
3.2.7 SITE FURNISHING

OBJECTIVE:

Street furnishings along Market Street, Manchester Boulevard, and Prairie Avenue contribute to an improved street life, providing places for respite, interaction, and comfort. They also encourage socialization and increase enjoyment of the urban environment. The aesthetic qualities of furnishings will complement each other and visually reinforce the overall design of the streetscape.

GUIDELINES:

1. Seating may be provided in areas with high concentrations of pedestrian activity.
2. Seating will be integrated with raised planter beds where appropriate.
3. Seating will be designed to accommodate transit users and will be provided at transit stops.
4. Seating will be designed and configured to discourage loitering.
5. Waste and recycling receptacles will be located at pedestrian walkways, seating areas, transit stops, public plazas, and other pedestrian gathering areas.

PUBLIC REALM AND STREETSCAPE
3.2 STREETSCAPE
3.2.7 SITE FURNISHING (CONTINUED)

6. Waste and recycling receptacles will be placed close to the street on the sidewalk, ideally in immediate proximity to each intersection with at least one receptacle per intersection provided.

7. Additional receptacles in pass-through zones are encouraged on high-traffic and retail streets.

8. All trash receptacles must be covered.

9. Bike racks must be durable and sturdy and designed to enable both wheels of a bicycle to be safely secured.

10. Bike racks will be located along walkways, near building entrances, intersections, transit stations, bus shelters, and any other pedestrian gathering areas, to the extent feasible.

PUBLIC REALM AND STREETSCAPE
3.2 STREETSCAPE
3.2.8 PARKING LOTS

OBJECTIVE:

Surface parking lots located on Market Street and Manchester Boulevard will be attractive and well-lit. Plants will be incorporated to provide shade and decorative separation of spaces, to the extent feasible. Trees and plantings cool the parking lot surface during warm days, reduce stormwater runoff, and beautify the parking lot area.

GUIDELINES:

1. Distinctive markings and wayfinding elements that ensure clear separation between pedestrians and vehicles will be provided where feasible.
2. Emergency call boxes will be incorporated.
3. Permeable concrete or permeable pavers will be used at parking stalls at surface parking lots. Asphalt will be used at drive aisles.
4. Planting zones will be provided to separate parking stalls from sidewalks,
5. Trees will be planted at a minimum ratio of one tree per 10 parking spaces, not including the trees along the street edge of the parking lot.
6. Landscaping should be spaced so as not to obstruct traffic or obscure visibility.

4.0 SUSTAINABILITY

SUSTAINABILITY
4.1 PURPOSE AND APPLICABILITY

The sustainability guidelines establish a list of green measures to be incorporated into the design, construction, and operation of facilities of the ITC. The ITC project will be designed and constructed to achieve Silver Award Certification under the Envision™ Sustainable Infrastructure Rating System.

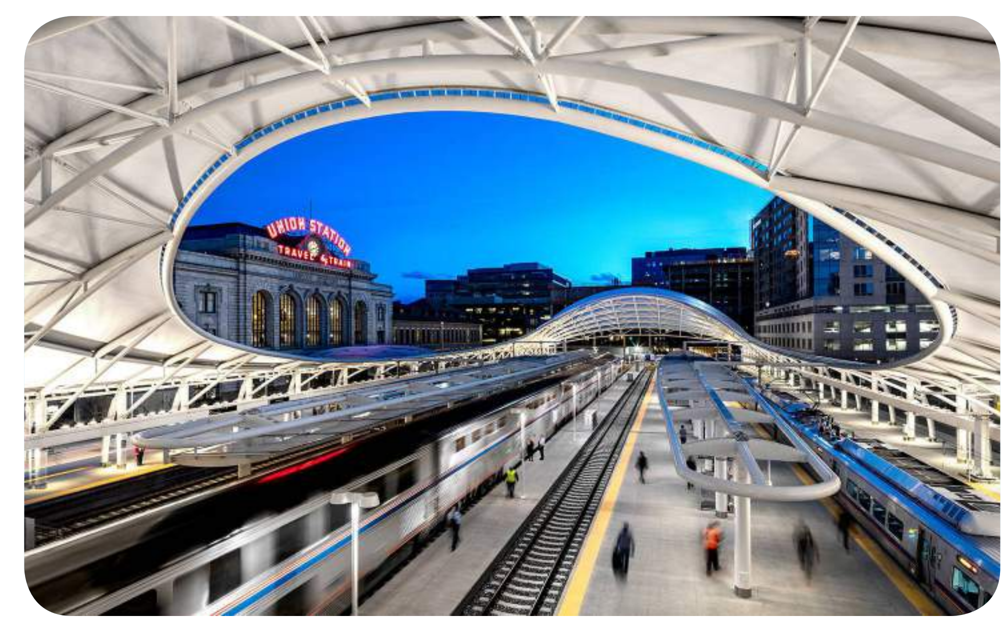
In addition, the guidelines below identify the City's applicable sustainability priorities for the ITC project. These priorities should be incorporated as much possible into the project design while achieving the required Envision Silver Award certification.

These guidelines apply to all components of the ITC project including the APM guideway and stations, passenger walkways and the MSF. A life cycle assessment (LCA) may be conducted to compare various design alternatives to identify the lowest impact approach.

SUSTAINABILITY
4.2 GENERAL GUIDELINES
4.2.1 INTEGRATED DESIGN

GUIDELINES:

The ITC project should use an integrated design approach to arrive at design decisions. Integrated design brings together all major design disciplines including architecture, planning, structural, landscape, mechanical, electrical and plumbing and other specialties in order to collaborate in the most effective way to meet programmatic goals with lowest feasible lifecycle environmental impacts. Design teams should also consider including representatives from facilities maintenance and future users to make informed decisions about how projects will be used and maintained.



SUSTAINABILITY
4.2 GENERAL GUIDELINES
4.2.2 SITE DESIGN

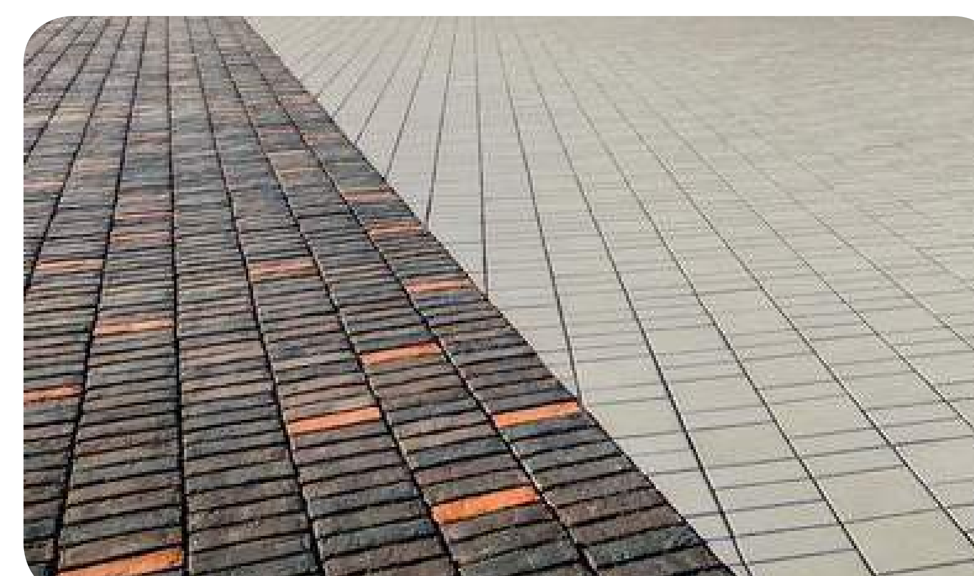
The following is provided for reference only. Please keep the components of this section in mind during the development of the project. The designer shall report on which of the components can be achieved in accordance with, or in addition to, the required Envision Silver Award certification.

OBJECTIVE:

While the core of the ITC project is anchored in public transportation, the project should also facilitate the use of other low impact forms of transportation such as walking, bicycling, carpooling, and the use of electric and alternative fuel vehicles.

To facilitate this objective, stairways and pedestrian pathways should be designed to be easily identified, accessible, comfortable and visually appealing. Similarly, bike parking, carpool parking, electric vehicle charging stations and public transportation connections should be convenient and easy to locate.

The ITC project should also incorporate landscaped outdoor spaces and to reduce heat island impacts. Reductions could be achieved by reducing hardscape areas and increasing landscape. Landscaped areas can serve to reduce heat island effects while also functioning as stormwater detention and treatment. Other strategies for heat island reductions include the use of cool roof materials and light colored construction materials.



4.2 GENERAL GUIDELINES

4.2.2 SITE DESIGN

SITE PLANNING TABLE

	GUIDELINES	APM GUIDEWAY & STATIONS	MSF	TRANSIT CENTER
01	Provide vegetated open space equal to 30% of the total project site area (including building footprint), with a minimum of 25% of that outdoor space being vegetated or having overhead vegetated canopy.	M	M	M
02	Implement strategies to reduce impact from storm water runoff for at least the 85th percentile of regional or local rainfall events using low-impact development (LID) and green infrastructure. Project must conform with City of Inglewood LID standards	F	M	M
03	Drainage systems designs must manage and capture Stormwater runoff to the maximum extent feasible through, in order of priority: infiltration, evapotranspiration, capture and use, and treatment with a high removal efficiency biofiltration/biotreatment system.	M	M	M
04	Provide secure bicycle parking for 5% of tenant-occupied motorized vehicle parking capacity, with a minimum of one space, and locate bicycle storage within 200 yards from a bicycle network that connects to services that are within a 3-mile bicycling distance of the project boundary.	F	F	F
05	Provide changing/shower facilities to support bicycle commuting. Provide at least one on-site shower with changing facility for the first 100 regular building occupants and one additional shower for every 150 regular building occupants thereafter.	N/A	F	N/A
06	Designate 5% of all parking spaces used by the project as preferred parking for green vehicles, including low-emitting, fuel-efficient and carpool/van pool vehicles.	M	M	M
07	Provide infrastructure including electrical system capacity and raceways for future electric charging stations for 10% of total parking spaces.	M	M	M
08	Provide vegetative or man-made shading devices for all fenestration on east-, south-and west-facing walls.	M	M	M
09	For opaque wall areas use wall surfacing with solar reflectance index (SRI) 25 (aged), for 75% of opaque wall areas	M	M	M
10	Reduce heat island effect- Hardscape per City of Inglewood EECAP. Use one or a combination of strategies 1 through 4 for 75% of site hardscape: Provide shade trees (mature within 5 years of occupancy). Use light-colored materials with an initial solar reflectance value of at least 0.30. Use open-grid pavement system or a pervious or permeable pavement system. Use solar panel arrays to create a canopy shade system.	M	M	M
11	Reduce heat island effect per City of Inglewood EECAP. Use roofing materials having a minimum 3-year aged solar reflectance and thermal emittance or install a roof with a thermal mass over the roof membrane, including areas of vegetated (green) roofs	M	M	M
12	Energy systems will be monitored through a Building Management System (BMS) and submetering, resulting in an integrated energy management system.	M	M	M

M= Mandatory, F= If Feasible, N/A= Not Applicable, Y= Yes, N= No

SUSTAINABILITY
4.2 GENERAL GUIDELINES
4.2.3 ENERGY EFFICIENCY

The following is provided for reference only. Please keep the components of this section in mind during the development of the project. The designer shall report on which of the components can be achieved in accordance with, or in addition to, the required Envision Silver Award certification.

OBJECTIVE:

The purpose of this section is to achieve energy efficiency and maximize the use of renewable energy in the project above and beyond minimum code requirements.

GUIDELINES:

Where California Energy Efficiency Standards apply, the project should be 15% more energy efficient than allowed. For energy-using equipment not governed by California Energy Efficiency Standards, best available energy efficient technologies should be used. Advanced commissioning of building systems should be conducted to ensure systems are operating as designed.

To achieve energy use reduction, passive strategies taking advantage of the favorable local climate should be considered where feasible. The use of solar canopies as shade structures in addition to roof-mounted solar is another energy saving strategy.

SUSTAINABILITY
4.2 GENERAL GUIDELINES
4.2.3 ENERGY EFFICIENCY

ENERGY EFFICIENCY AND RENEWABLE ENERGY TABLE

	GUIDELINES	APM GUIDEWAY & STATIONS	MSF	TRANSIT CENTER
01	Newly installed outdoor lighting power is no greater than 90% of the Title 24, Part 6 calculated value of allowed outdoor lighting power.	M	M	M
02	For building projects that include indoor lighting or mechanical systems, but not both, the Energy Budget is no greater than 90% of the Title 24, Part 6 Energy Budget for the Proposed Design Building. Low water/ Full Sun/ CA Native	F	M	M
03	For building projects that include indoor lighting and mechanical systems, the Energy Budget is no greater than 85% of the Title 24, Part 6 Energy Budget for the Proposed Design Building.	M	M	M
04	Use on-site renewable energy for at least 1% of the annual electrical use.	F	F	F
05	Participate in the local utility's renewable energy portfolio program that provides a minimum of 50% electrical power from renewable sources. Maintain documentation through utility billings.	F	F	F
06	If solar is not immediately feasible, prewire for future rooftop electrical solar system.	M	M	M
07	Traction elevators shall have a regenerative drive system that feeds electrical power back into the building grid when the elevator is in motion.	M	M	F
08	A parked elevator shall turn of its car lights and fan automatically until the elevator is called for use.	M	M	F
09	An escalator shall have a VVVF motor drive system that is fully regenerative when the escalator is in motion.	M	M	F
10	Design high performance energy systems for and employ techniques in steel framing to avoid thermal bridging.	M	M	F
11	Conduct whole building commissioning for all building systems covered by Title 24, Part 6, process systems and renewable energy systems.	M	M	F
12	Energy systems will be monitored through a Building Management System (BMS) and submetering, resulting in an integrated energy management system.	M	M	F

M= Mandatory, F= If Feasible, N/A= Not Applicable, Y= Yes, N= No

SUSTAINABILITY
4.2 GENERAL GUIDELINES
4.2.4 WATER EFFICIENCY AND CONSERVATION

The following is provided for reference only. Please keep the components of this section in mind during the development of the project. The designer shall report on which of the components can be achieved in accordance with, or in addition to, the required Envision Silver Award certification.

OBJECTIVE:

In order to reduce excessive water consumption, the project should identify and implement appropriate opportunities to reduce or eliminate potable water use indoors and in landscape areas.

SUSTAINABILITY
4.2 GENERAL GUIDELINES
4.2.4 WATER EFFICIENCY AND CONSERVATION

WATER EFFICIENCY AND CONSERVATION TABLE

	GUIDELINES	APM GUIDEWAY & STATIONS	MSF	TRANSIT CENTER
01	Capture rain water and reuse for toilet flushing, car/train washing, and/or irrigation.	F	F	F
02	Connect to and use municipal recycled water for landscape irrigation, toilet flushing, or car or train washing.	F	F	F
03	Filter and reuse wash/rinse water for car/ train wash.	M	M	M
04	Reuse greywater for landscape irrigation	F	F	F
05	Design xeriscape landscape to use no water irrigation once plants are established.	M	M	M
06	Use drought tolerant/ low water use plants with drip irrigation.	M	M	M
07	Use weather-based irrigation controller.	N/A	M	M
08	Install low flow faucets, low flow flush futures (HET) 1.28 gallons per flush or less.	M	M	M
09	Install showerheads with max flow rate of 2.0 gallons per minute or less (GPM).	N/A	M	F
10	Use best available water efficiency technologies for cooling towers.	M	M	M
11	Use recycled water in place of potable water at concrete batch plant.	F	F	F
12	Install separate submeters shall be installed as follows: For each individual leased, rented or other tenant space within the building projected to consume more than 100 gal/day. Where separate submeters for individual building tenants are unfeasible, for water Supplied to the following subsystems: a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s) b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s) c. Steam and hot-water boilers with energy input more than 500,000 Btu/h (147 kW	N/A	F	M
13	Cooling Tower Water use cycles will be optimized for chemical use reduction in water treatment.	N/A	F	F

M= Mandatory, F= If Feasible, N/A= Not Applicable, Y= Yes, N= No

SUSTAINABILITY

4.2 GENERAL GUIDELINES

4.2.5 MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

The following is provided for reference only. Please keep the components of this section in mind during the development of the project. The designer shall report on which of the components can be achieved in accordance with, or in addition to, the required Envision Silver Award certification.

OBJECTIVE:

In order to reduce the environmental impact from the use of construction materials, the project should minimize the use of virgin materials. This can be accomplished by increasing the use of materials that are: reused, recycled, rapidly renewable, locally sourced, and durable. In order to determine the best approach to reducing the overall environmental impact from use of materials, a life cycle assessment (LCA) could be used.

4.2 GENERAL GUIDELINES

4.2.5 MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

MATERIAL CONSERVATION AND RESOURCE EFFICIENCY TABLE

	GUIDELINES	APM GUIDEWAY & STATIONS	MSF	TRANSIT CENTER
01	Select building materials or products for permanent installation on the project that have been harvested or manufactured in California or within 500 miles of the project site. Select building materials or products for permanent installation on the project that have been harvested or manufactured in California or within 500 miles of the project site.	F	F	F
02	Divert construction and demolition debris from the landfill. All projects must divert at least 75% of construction and demolition debris and 100% of uncontaminated land clearing debris (green waste, soil, rocks).	M	M	M
03	An end-of-life plan, including deconstruction & reusability/recyclability of materials, will be developed.	M	M	M
04	At least 50%, with a goal of 95% , of operational waste will be diverted from landfill through robust recycling and e-waste infrastructure.	M	M	M
05	Use rapidly renewable materials made from plants harvested within a ten-year cycle.	F	F	F
06	Use salvaged, refurbished, refinished or reused materials.	M	M	M
07	Use materials, equivalent in performance to virgin materials, with a total (combined) recycled content value (RCV) of not be less than 15% of the total material cost of the project.	F	F	F
08	Use concrete made with recycled content such as fly ash or slag.	M	M	M
09	Use concrete made with recycled aggregate.	M	M	M
10	Conduct a whole building life cycle assessment, including operating energy, showing at least 10% improvement above baseline building.	F	M	F

M= Mandatory, F= If Feasible, N/A= Not Applicable, Y= Yes, N= No

SUSTAINABILITY
4.2 GENERAL GUIDELINES
4.2.6 ENVIRONMENTAL QUALITY

The following is provided for reference only. Please keep the components of this section in mind during the development of the project. The designer shall report on which of the components can be achieved in accordance with, or in addition to, the required Envision Silver Award certification.

OBJECTIVE:

The project will provide a high quality, sustainable indoor environment that protects and enhances the health and comfort of occupants.

GUIDELINES:

Regularly occupied spaces should be designed to maximize natural daylighting and views of the outdoors. Individual occupant comfort should be considered by maximizing the use of individual controls in thermal and lighting systems. Indoor spaces should use high efficiency air filtration and should create a comfortable indoor acoustical environment. Materials and systems should be selected that will provide for a healthy indoor environment including considerations of off-gassing.

SUSTAINABILITY
4.2 GENERAL GUIDELINES
4.2.6 ENVIRONMENTAL QUALITY
ENVIRONMENTAL QUALITY TABLE

	GUIDELINES	APM GUIDEWAY & STATIONS	MSF	TRANSIT CENTER
01	Provide temporary ventilation during construction in accordance with Section 121 of the California Energy Code, CCR, Title 24, Part 6 and Chapter 4 of CCR, Title 8.	M	M	M
02	If the HVAC system is used during construction, use return air filters with a MERV of 8.	M	M	M
03	Flush out the building with outside air prior to occupancy or perform Indoor Air Quality (IAQ) testing prior to occupancy.	M	M	M
04	Cover duct openings and protect of mechanical equipment during construction.	M	M	M
05	Select adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks that comply with local or regional air pollution control or air quality management district rules where applicable or SCAQMD Rule 1168 VOC limits.	M	M	M
06	Install low emitting carpet, carpet cushion and carpet adhesive in the building interior to meet the requirements of the Carpet and Rug Institute's Green Label program.	M	M	M
07	Use materials with no added urea formaldehyde including insulation, wood products, particle board, fiberboard, and adhesives.	M	M	M
08	Install entryway systems to prevent contaminants from entering buildings.	F	M	M
09	In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air prior to occupancy that provides at least a MERV of 13.	M	M	M
10	Install CO2 monitors in regularly occupied areas.	M	M	M
11	Design for thermal and lighting comfort by providing for individual work spaces to control their own environment and for the majority of shared spaces to have independent lighting and thermal controls.	N/A	M	N/A
12	Provide daylit spaces for building occupants.	N/A	M	M
13	Design exterior wall and roof-ceiling assemblies for buildings exposed to a noise level of 65 dB Leq-1Hr during any hour of operation shall have exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).	M	F	M
14	Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.	N/A	F	M
15	Install HVAC and refrigeration equipment that does not contain HCFCs.	M	M	M

M= Mandatory, F= If Feasible, N/A= Not Applicable, Y= Yes, N= No

5.0 IMPLEMENTATION PROCESS FOR SPECIFIC PROJECT DESIGN AND REVIEW

IMPLEMENTATION PROCESS FOR SPECIFIC PROJECT DESIGN AND REVIEW

5.1 APPLICABILITY

APPLICABILITY:

The ITC Design Guidelines shall only apply to the ITC system (as defined in Chapter 1 of the ITC Design Guidelines). Additionally, the ITC Design Guidelines shall be taken into the consideration by the City (including, without limitation, its Public Works Department and Planning and Building Safety Divisions) when reviewing other, non-ITC projects located within or adjacent to the Transit Corridor Overlay Zone areas to the maximum extent feasible as part of the review process(es) applicable to such project pursuant to the City's Municipal Code.

5.2 AUTHORITY AND IMPLEMENTATION

AUTHORITY AND IMPLEMENTATION:

The Public Works Director or his/her designee shall, in consultation with the Planning Division Manager or his/her designee, have the authority to review each ITC system project for compliance with all applicable provisions of (i) the ITC Design Guidelines, (ii) all additional technical, aesthetic, and other specifications contained in the procurement document(s) for the applicable ITC system component(s), and (iii) all requirements of the Mitigation Monitoring and Reporting Program set forth in the ITC's Final Environmental Impact Report.

[Note: Additional details regarding review timelines and other submittal requirements are in the process of being developed by the Department of Public Works, in consultation with other City departments and its consultant team. Chapter 5 will be supplemented with these additional details when available.]

END

Appendix 3.0.4

ITC Construction Scenarios or the EIR, June 2020

Inglewood Transit Connector (ITC): Construction Scenarios for the Environmental Impact Report (EIR)

June 30, 2020
City of Inglewood

Prepared by Pacifica Services Inc.

Table of Contents

2.6.1. CONSTRUCTION SCENARIOS

2.6.1.0 Construction Phases:

Construction of the proposed Project would occur in four phases throughout a five-year period between 2022 and 2026. The first phase of construction would be the demolition of the commercial property for the Market Street Station, for the Vons and gas station on Manchester, and for the commercial building on the southeast corner of Manchester and Market Street. The phase will also include the start of the MSF structure; this construction would begin at the end of 2023 and finish by the end of 2023. The second phase of construction would occur along Prairie Avenue from Hardy Street to Manchester Boulevard; this construction would begin early 2023 and finish early 2025. The third phase of construction would occur along Manchester Boulevard from Prairie Avenue to Market Street, and Market Street from Manchester Boulevard to Florence Avenue; this construction would begin early 2024 and finish early 2026. The fourth phase of construction would occur along the entire length of the alignment and primarily incudes installation of the Automated People Mover (APM) System's operations, and testing and commissioning; this work would begin mid- 2023 and finish by approximately mid-2026; the initial activities for phase four (The manufacturing of the APM Operating System) would occur off-site with on-site activities beginning to occur towards the end of the phase one construction when sufficient aerial structure is available for the installation of the equipment.

In order to meet schedule constraints, multiple project phases mentioned above may be under design and construction concurrently to meet the requirements of a design-build delivery strategy. Construction of the proposed Project is contingent on Project approvals, which are projected to be obtained in 2021. The general sequence of construction developed for analysis in this environmental impact report (EIR) represents the best available information.

Due to site constraints, primarily along Prairie Avenue and Manchester Boulevard, just-in-time deliveries of construction materials would be required during off-peak hours and / or night hours. Additionally, construction of the APM guideway, columns and station components that could impact Prairie Avenue and Manchester Boulevard would be primarily constructed during the off-peak hours and night hours in order to minimize impacts to daily commuter traffic and potential event traffic. Where certain construction activities (such as foundations) may require partial roadway/lane closures, it is expected that the maintenance of traffic strategy will include potential lane reversals (or contra-flow) during the peak hours in the peak hour direction – which would be different between the a.m. and p.m. peak hours. Assumptions for construction shifts are as follows:

- APM guideway, columns and station components located along Prairie Avenue and Manchester Boulevard would be constructed over a 16 hour / day schedule with two shifts. The night shift would occur from approximately 11:00 p.m. to 7:00 a.m., the day shift would occur from approximately 7:00 a.m. to 3:00 p.m. Other minimal construction work could occur between 3:00 p.m. to 11:00 p.m. Delivery of construction materials would occur during the night shift, as would most lane closures. Construction activities during the day shift would primarily consist of work that could proceed without requiring lane closures or significant disruption to daily commuter traffic and potential event traffic along Prairie Avenue and Manchester Boulevard.

- APM guideway, columns and station components located along Market Street between Manchester Avenue and Florence Avenue, and other remaining construction activity would occur over a 16 hour / day schedule with two shifts. The morning shift would occur from approximately 7:00 a.m. to 3:00 p.m., and the evening shift from approximately 3:00 p.m. to 11:00 p.m.

Phase 1: Demolition of commercial property for Market Street Station, for Vons and the gas station on Manchester, and the commercial building on the southeast corner of Manchester and Market Street. The phase will also include the start of construction for the (MSF) Maintenance and Storage Facility Structure.

The first phase would include the demolition of property acquisitions, building demolitions, utility relocations, cast-in-place (CIP) columns and slabs, foundations for the initial construction of the Maintenance and Storage Facility (MSF). Additional work in the area will commence in Phase 4 for the completion of the aerial construction of the APM and the Hollywood Park Station. After the demolition, the remaining asphalt flatwork area within the lot will provide suitable space for construction staging including but not limited to space for equipment storage, material staging and storage, temporary concrete batch plants, if needed, contractor jobsite trailers, and on-site parking for construction staff throughout the entire project duration. As previously discussed, the first phase of construction would occur between the end of 2022 and the end of 2023. Major elements include the following:

- This stage of construction would focus on the demolition of property/parcel acquisitions, as needed. Some of the areas to be demolished will be used for construction staging.
- Utility locations for protection in place, possible utility relocations, and new utility installation for utilities such as: electrical, water lines, gas lines, storm drains, sewer lines, temporary traffic signals and streetlights.
- Removal and disposal of existing sidewalks, roadways, landscape, medians, and demolition as needed, including the new or temporary pavement and asphalt for road work and sidewalks.

The installation of the traction power substation will occur at TPSS and at the Maintenance Storage Facility (MSF) for the electrical equipment and subsystems.

Maintenance and Storage Facility (MSF)

The demolition of the existing Vons building, gas station, and other building structures will allow the construction of the building structure and traction power substation. Remediation of the underground storage tanks at the gas station will be required as part of the demolition. The remaining asphalt flatwork area within the lot will provide suitable space for construction staging including but not limited to space for equipment storage, material staging and storage, temporary concrete batch plants, if needed, contractor jobsite trailers, and on-site parking for construction staff throughout the entire project duration.

Phase 2: Prairie Avenue from Arbor Vitae Street to Manchester Boulevard

The second phase would include enabling the construction sequence of the APM along Prairie Avenue from the Hardy Street intersection to Manchester Boulevard. This phase includes demolition, utility relocations, foundations, CIP columns, straddle bents and the precast trapezoidal troughs and girders, and the construction of the MSF. Additional work in the area will commence in Phase 4 for the APM system installation, testing and commissioning, and the Forum Station. As previously discussed, the second phase of construction would occur between early 2023 and early 2025.

- Removal of existing sidewalks, roadways, landscaping, and demolition as needed. This work includes new or temporary pavement and asphalt for road work and sidewalks.

- Utility work including potential relocations, protection in place where feasible, and new utility installations including but not limited to electrical, water, gas, storm drains, sewer lines, temporary traffic signals and streetlights.

- Completion of the MSF building shell, roofing structure, and second level platform for the storage and testing of trains.

- The installation of a K-Rail system to delineate the construction area, which includes approximately twenty-two feet of public ROW from the westerly face of curb, excluding sidewalks, along Prairie Avenue from Hardy Street to Manchester Boulevard. This area will include the mobilization of equipment, drilling, crane operations and concrete pump outriggers for the excavation and installation of concrete foundations, concrete piles, single and double concrete columns, beam girders and cantilevered bents for the aerial construction. The twenty-two feet would span several foundations and columns to minimize the construction area into phased construction staging sections along Prairie Avenue. To minimize traffic impacts, in the event that partial lane closures are necessary for a longer duration, lane reversals (or contra-flow) will be implemented to facilitate the peak hour traffic direction.

- The contractor would then switch to the east side of Prairie Avenue and install the K-rail system again to delineate the construction area and utilize approximately fifteen-feet of public ROW starting from the easterly face of curb, excluding sidewalk, from Hardy Street to Manchester Boulevard. If needed, contractor may also utilize an easement or utility setback to secure staging areas. These areas would include the installation of foundations, CIP columns, single and double concrete columns, beam girders and cantilevered bents for the aerial construction. The fifteen-foot staging area would span several foundations and columns to minimize the construction area into phased construction staging sections along Prairie Avenue. To minimize traffic impacts, in the event that partial lane closures are necessary for a longer duration, lane reversals (or contra-flow) will be implemented to facilitate the peak hour traffic direction.

- Installation of the traction power substations prefabricated building for the electrical equipment and subsystems at the MSF and Civic Center ITF sites. The station at the Civic Center ITF may be below grade.

- Aerial construction of the railway formwork with precast trapezoidal troughs and steel girders, and completion of stations and mezzanines with vertical circulation elements. This work would include temporary closures during the following activities for safety measures:

    - During the formwork phase, traffic would not be allowed to pass underneath the structure.
    - During formwork and concrete placement of the cast-in-place trapezoidal box trough and/or the uses of precast/prestressed “I” steel girders and platforms. temporary lane closures would be necessary.

- The staging and holding area for the delivery of girders and beams will be located in the MSF staging area; delivery to the construction area will occur when required

Phase 3: Manchester Boulevard from Prairie Avenue to Market Street, and Market Street from Manchester Boulevard to Florence Avenue

The third phase would include enabling the construction sequence of the APM along Manchester Boulevard from Prairie Avenue to Market Street, and Market Street from Manchester Boulevard to Florence Avenue. The work will include an above-ground pedestrian access walkway to the Metro Crenshaw/LAX Line's Downtown Inglewood Station, property acquisitions, building demolition, utility relocation, foundations, CIP columns, straddle bents and the precast trapezoidal troughs and girders. This phase includes sitework completion to the MSF. Additional work in the area will commence in Phase 4 for the APM system installation, testing and commissioning, for the three (3) stations. As previously discussed, the third phase of construction would occur between late 2025 and early 2026.

- Utility work including potential relocations, protection in place where feasible, and new utility installations including but not limited to electrical, water, gas, storm drains, sewer lines, temporary traffic signals and streetlights.

- Removal of existing sidewalks, roadways, landscaping, and demolition as needed. This work includes new or temporary pavement and asphalt for road work and sidewalks.

- The installation of a K-Rail system to delineate the construction area, which includes approximately twenty-two feet of public ROW from southerly face of curb, excluding sidewalks, along Manchester Boulevard from Prairie Avenue to Market Street. This area will include the mobilization of equipment, drilling, crane operations and concrete pump outriggers for the excavation and installation of concrete foundations, concrete piles, single and double concrete columns, beam girders and cantilevered bents for the aerial construction. The twenty-two feet would span several foundations and columns to minimize the construction area into phased construction staging areas along Manchester Boulevard. To minimize traffic impacts, in the event that partial lane closures are necessary for a longer duration, lane reversals (or contra flow) will be implemented to facilitate the peak hour traffic direction.

- The contractor would then switch to the north side of Manchester Boulevard and install the K-rail system again to delineate the construction area and utilize approximately twenty-two feet of public ROW starting from the northerly face of curb, excluding sidewalks, from Prairie Avenue to Market Street. This area will include the mobilization of equipment, drilling, crane operations and concrete pump outriggers for the excavation and installation of concrete foundations, concrete piles, single and double concrete columns, beam girders and cantilevered bents for the aerial construction. The twenty-two-foot staging area would span several foundations and columns to minimize the construction area into phased construction staging sections along Manchester Boulevard. To minimize traffic impacts, in the event that partial lane closures are necessary for a longer duration, lane reversals (or contra-flow) will be implemented to facilitate the peak hour traffic direction.

- The installation of the traction power substation prefabricated building for the electrical equipment and subsystems.

- The completion of the MSF.

- Aerial construction of the railway formwork with precast trapezoidal troughs and girders, and completion of stations and mezzanines with vertical circulation elements. This work would include temporary closures during the following activities for safety measures:

  - During the formwork phase, traffic would not be allowed to pass underneath the structure.
  - During formwork and concrete placement of the cast-in-place trapezoidal box trough and/or the uses of precast/prestressed "I" steel girders and platforms. temporary lane closures would be necessary.
  - The staging and holding area for the delivery of girders and beams will be located in the MSF staging area; delivery to the construction area will occur when required

Market Street from Manchester Boulevard to Florence Avenue

This sub-phase will include the mobilization of equipment, demolition, utility relocations, excavation and installation of piles for the foundations and single and double columns, CIP columns, straddle bents and the precast trapezoidal troughs and girders.

- Utility work including potential relocations, protection in place where feasible, and new utility installations including but not limited to electrical, water, gas, storm drains, sewer lines, temporary traffic signals and streetlights.

- Removal of existing sidewalks, roadways, landscaping, medians, demolition of buildings, as needed, and a contractor staging area. This work includes new or temporary pavement and asphalt for road work and sidewalks.

- The installation of two rows of K-Rail systems along Market Street to delineate the rectangular perimeter of the construction area, which includes approximately twenty-five feet of public ROW in the center of Market Street, starting from Manchester Boulevard to Florence Avenue. This area will include the mobilization of equipment, drilling, crane operations and concrete pump outriggers for the excavation and installation of concrete foundations, concrete piles, single and double concrete columns, beam girders and for supports directly under the guideway. To minimize traffic impacts, in the event that partial lane closures are necessary for a longer duration, lane reversals (or contra-flow) lanes may be implemented to facilitate the peak hour traffic direction.

- Aerial construction of the railway formwork with precast trapezoidal troughs and steel girders, and completion of stations and mezzanines with vertical circulation elements. This work would include temporary closures during the following activities for safety measures:

  - During the formwork phase, traffic would not be allowed to pass underneath the structure.
  - During formwork and concrete placement of the cast-in-place trapezoidal box trough and/or the uses of precast/prestressed "I" steel girders and platforms. temporary lane closures would be necessary.
  - The staging and holding area for the delivery of girders and beams will be located in the MSF staging area and at the Market/Florence CVC shopping center that will be demolished; delivery to the construction areas will occur when required.

Phase 4: APM Operation Systems Manufacturing and Installation, Testing and Commissioning

The fourth phase would include enabling the completion of the aerial construction elements including the installation of the APM system's operations, track work, station platform equipment and systems, completion of the traction power substations, testing and commissioning of the full APM system, completion of all surface construction activities including but not limited to all electrical, mechanical and utilities energizations. As previously discussed, the fourth phase of construction would occur between late-2025 and mid-2026.

- These components will have temporary lane closures and/or a K-rail system as needed, for accessing the aerial construction platforms, installation of equipment, completion of platforms, stations and electrical systems. To minimize traffic impacts, in the event that partial lane closures are necessary for a longer duration, lane reversals (or contra-flow) will be implemented to facilitate the peak hour traffic direction.

2.6.1.1 Construction Hours

Construction activity would primarily occur over a 16 hour / day schedule with two shifts, either a morning shift from approximately 7:00 a.m. to 3:00 p.m. and an evening shift from approx. 3:00 p.m. to 11:00 p.m., or a morning shift from approximately 7:00 a.m. to 3:00 p.m. and a night shift from approximately 11:00 p.m. to 7:00 a.m.

Due to site constraints, primarily along Prairie Avenue and Manchester Boulevard, just-in-time deliveries of construction materials would be required during off-peak hours and / or night hours. Additionally, construction of the APM guideway, columns and station components that could impact Prairie Avenue and Manchester Boulevard would be primarily constructed during the off-peak hours and night hours in order to minimize impacts to daily commuter traffic and potential event traffic. Delivery of construction materials would occur during the night shift, as would most lane closures. Construction activities during the day shift would primarily consist of work that could proceed without requiring lane closures or significant disruption to daily commuter traffic and potential event traffic along Prairie Avenue and Manchester Boulevard. Additionally, it can be anticipated that some minor activity would occur during periods in between construction shifts for logistics, moving equipment, etc. An adjusted workload intensity is assumed for these periods of minor activity, as shown in red in the ITC Construction Intensity Assumptions table below.

Pursuant to Section 5-41 of the Inglewood Municipal Code, construction between the hours of 8:00 p.m. and 7:00 a.m. of the next day will require a permit from the Permits and License Committee of the City. The proposed Project will secure a permit(s) from the Permits and License Committee to allow for construction work activities to occur between the hours of 8:00 p.m. and 7:00 a.m. Due to safety and/or noise concerns, evening and nighttime activities may be less than daytime activities. The anticipated hourly construction intensity has therefore been adjusted across the evening and nighttime hours, as indicated below.

ITC Construction Intensity Assumptions

Morning/Evening Shift (7am-3pm, 3pm-11pm)			Morning/Night Shift (7am-3pm, 11pm-7am)		
	Hour	Hourly Work		Hour	Hourly Work Intensity
	12:00 AM – 1:00 AM	25%		12:00 AM – 1:00 AM	50%
	1:00 AM – 2:00 AM	25%		1:00 AM – 2:00 AM	50%
	2:00 AM – 3:00 AM	25%		2:00 AM – 3:00 AM	50%
Nighttime	3:00 AM – 4:00 AM	25%	Nighttime	3:00 AM – 4:00 AM	50%
	4:00 AM – 5:00 AM	25%		4:00 AM – 5:00 AM	50%
	5:00 AM – 6:00 AM	25%		5:00 AM – 6:00 AM	50%
	6:00 AM – 6:59 AM	25%		6:00 AM – 6:59 AM	50%
	7:00 AM – 8:00 AM	100%		7:00 AM – 8:00 AM	100%
	8:00 AM – 9:00 AM	100%		8:00 AM – 9:00 AM	100%
	9:00 AM – 10:00 AM	100%		9:00 AM – 10:00 AM	100%
	10:00 AM – 11:00 AM	100%		10:00 AM – 11:00 AM	100%
	11:00 AM – 12:00 PM	100%		11:00 AM – 12:00 PM	100%
	12:00 PM – 1:00 PM	100%		12:00 PM – 1:00 PM	100%
Daytime	1:00 PM – 2:00 PM	100%	Daytime	1:00 PM – 2:00 PM	100%
	2:00 PM – 3:00 PM	100%		2:00 PM – 3:00 PM	100%
	3:00 PM – 4:00 PM	100%		3:00 PM – 4:00 PM	50%
	4:00 PM – 5:00 PM	100%		4:00 PM – 5:00 PM	50%
	5:00 PM – 6:00 PM	100%		5:00 PM – 6:00 PM	50%
	6:00 PM – 6:59 PM	100%		6:00 PM – 6:59 PM	50%
	7:00 PM – 8:00 PM	75%		7:00 PM – 8:00 PM	38%
Evening	8:00 PM – 9:00 PM	75%	Evening	8:00 PM – 9:00 PM	38%
	9:00 PM – 9:59 PM	75%		9:00 PM – 9:59 PM	38%
Nighttime	10:00 PM – 11:00 PM	50%	Nighttime	10:00 PM – 11:00 PM	25%
	11:00 PM – 12:00 AM	25%		11:00 PM – 12:00 AM	50%

Construction Sequence

The construction sequence are subsections to the construction phases mentioned above and consist of the tasks to occur in the pre-construction, surface construction, aerial construction and light construction for the APM. Listed below are activity and tasks.

Subsection / Activity	Tasks
2.6.1.2 **Pre-Construction**	Assemble/draw design drawings packages, commence off site manufacturing, commence acquisitions, locate utilities, permits and sequence, commence surveying requirements, establish traffic control plan, establish detours and haul routes, erect safety devices and noise barriers, select staging areas, mobilize construction equipment in staging area.
2.6.1.3 **Surface Construction**	Commence demolition of existing sidewalk and road surfaces; clear and grub landscape, as needed for each phase, construct foundations, cast-in-place columns, straddle bents and preparation for aerial construction. Utilities improvements and or installation of new utilities, streetlights and traffic signals, building demolition, MSF construction, traction power substations, roadway construction and adjoining guideways for each phase.
2.6.1.4 **Aerial Construction**	Construct aerial structure guideways with precast trapezoidal troughs and girders, compete stations and mezzanines with vertical circulation elements (elevators, escalators etc.).
2.6.1.5 **Light Construction**	Architectural interior and exterior features for the Maintenance and Storage Facility and passenger stations, systems installation and testing, train control systems, communication systems for all phases.

The subsections below describe in detail, the characteristics of each construction category: surface construction, aerial construction, MSF construction, traction power substations and light construction.

2.6.1.2 Pre-Construction

During the final design the contractor will conduct a number of pre-construction activities to determine the most optimal actual construction activities that should be designated into each phase. These activities include the following:

- Prior to beginning construction, it would be necessary to the extent possible, to relocate, modify or protect in place all utilities which would conflict with excavations for cast-in-place columns and traction power substations. Shallow utilities, such as maintenance manholes or pull boxes, which would interfere with excavation work, would require relocation.

- Initiating and identifying utility lines for possible relocation during construction, where the contractor and the utility companies are to protect in place, including high risk utilities such as overhead tension wires, fiber optics, and pressurized transmission mains. Utilities would be modified, protected, and or relocated. Temporary interruptions in services (several hours) may be experienced during relocation or rerouting of utilities.

- Identifying traffic lights and traffic signals for relocation during construction where the contractor can prepare temporary signals and street lighting.

- Geotechnical investigations, which focus on geology, groundwater, seismic, and environmental conditions. The results of this work would guide final design and construction methods for foundations, CIP columns, trapezoidal troughs, aerial construction, building concrete foundations and substations.

- Develop a traffic control plan, to implement temporary road closures or detour traffic away from construction activities and to implement safety protection with handrails, fences, walkways and detour signs for pedestrian and traffic access. Traffic control plans could include strategies such as lane reversals (or contra flow) operations along Prairie Avenue and Manchester Boulevard, or other strategies.

- Identify other potential staging areas for each phase of work for onsite equipment, employee parking, storage and preparation of precast segments. Field offices and/or temporary jobsite trailers would also be located at a designated staging area.

- Location of temporary batch plants within the MSF staging area, which would be required to prepare concrete materials needed for the cast-in-place concrete columns, architectural columns, building concrete pads and replacement of sidewalks and roadways. The facility would consist of silos containing fly ash, lime and cement, heated tanks of asphalt, sand and gravel material storage areas, mixing equipment, above-ground storage tanks, concrete truck loading, and concrete truck washout.

2.6.1.3 Surface Construction

During the surface construction the contractor starts the demolition activities, utilities construction, installation of foundations, CIP concrete columns, MSF construction, traction power substations, and ITF construction. Below are construction activities to occur:

Demolition:

Assumptions for construction demolitions including the following:

- Removal of existing asphalt surface and concrete sidewalks, center medians, utility removal and/or relocation.

- Investigation to determine the type of demolition required for existing building structures, facilities and utilities including open hardscapes and landscapes impacted by surface and aerial construction.

- The demolishing of existing commercial property at the northeast corner of Market Street and Manchester, for the Market Street Station, and for the MSF yields approximately 40,308 cubic yards for debris, for an estimated amount of 1343 trucks to be used. Inclusive with demolition, the contractor will need to address the removal of underground storage tanks from the gas station, and potential removal of contaminated soil.

Utilities

Assumptions for utilities include the following:

- Locate, analyze, and develop utility sequencing plans each utility company and agency

- Develop utility construction plans for protection in place and/or schedule removal, relocation, and installation of new utilities with each agency – temporary shutdowns may occur.

Foundations and Cast-In-Place Columns

Assumptions for foundations and cast-in-place columns (CIP) consist of the following exported soils, daily trucks, and cubic yards:

- The guideway construction sequence would take place with the construction of the foundations, poured-in-place columns, straddle bent plate columns, with the lift and connection of horizontal guideway section into place atop the cast-in-place pile cap columns, and form and pour the top deck.
- Each vertical support column would be supported by the reinforced concrete shaft pile caps approximately 6x12 or 6x9 feet in diameter and vary from 60 to 100 feet deep and will be based on geotechnical conditions and guideway characteristic.
- Each foundation and pile cap would yield spoils to be trucked away and disposed of according to the geotechnical and environmental services report. The estimated volume to be excavated would total approximately **124,474 cubic yards.**
- For acquisitions and easements, including Vons and the existing gas station, we assume a total volume of dirt to be approximately **7,884 cubic yards** and to add approximately **328** trucks more trucks.
- Assuming the use of bottom dump trucks with 24 CY capacity for exporting soils, **5515 trucks** would be needed. Staging of the trucks on the north side of Manchester east of Prairie would occur with spaced interval scheduling for in-time loading. Approximately **260 trucks on any given day** would enter the construction zone areas inside the K-rails and exit the areas per the noted truck haul routes. The majority of the hauling will occur during the night shift to ease traffic congestion. To minimize traffic impacts, in the event that partial lane closures are necessary for a longer duration, lane reversals (or contra-flow) will be implemented to facilitate the peak hour traffic direction.
- Street sweepers would be employed for controlling dust and for keeping the streets clean. Flag men would also be present controlling the flow of traffic during the exporting activity. Contaminated soils would be separated as soon as they are identified before excavation and would also be separated into temporary stockpiles. The soils would be handled, transported, and disposed of in accordance with all applicable regulations.

Resurfacing and Signaling

Perform the repair and/or construction of the following elements, as needed: concrete sidewalks, gutter, curbs, driveways, asphalt improvements, striping, replacement of traffic and pedestrian signage, parking meters, placement of traffic and pedestrian signals, street lighting, hardscape and landscape.

Maintenance and Storage Facility (MSF)

The MSF building would consist of a cast-in-place slab on-grade and concrete cast-in-place columns including a structural concrete cast-in-place elevated slab and seismic joint assembly with a structural steel building with metal deck roof and structure.

Traction Power Substations

The traction power substations would consist of prefabricated buildings on a concrete pad to house the electrical equipment, with concrete masonry unit (CMU) walls, electrical and subsystem connections to the APM guideway. One will be located on the MSF site and another will be at the Civic Center ITF site, which may be above or below ground.

2.6.1.4 Aerial Construction

Aerial construction consists of the above-grade concrete structures and support for the APM and the three (3) above-grade station platforms. Assumptions include that the aerial segments will be constructed as precast trapezoidal troughs and/or using the alternative of precast prestressed concrete "I" Girder placed on cast-in-place concrete columns, with post-tensioning strand for the guideway. The station platforms consist of three levels from ground access to a mezzanine level and a platform level. The station will consist of structural concrete slabs with edge girders and post tension concrete, steel roof structure, and elevators/escalators to APM stations.

2.6.1.5 Light Construction

Light construction will consist of interior and exterior finishes for the MSF building, APM stations, APM train system installation and testing, train control systems, communication systems, completion of electrical and mechanical systems, and minor road work improvements.

2.6.2 Construction Employee Parking and Staging Locations

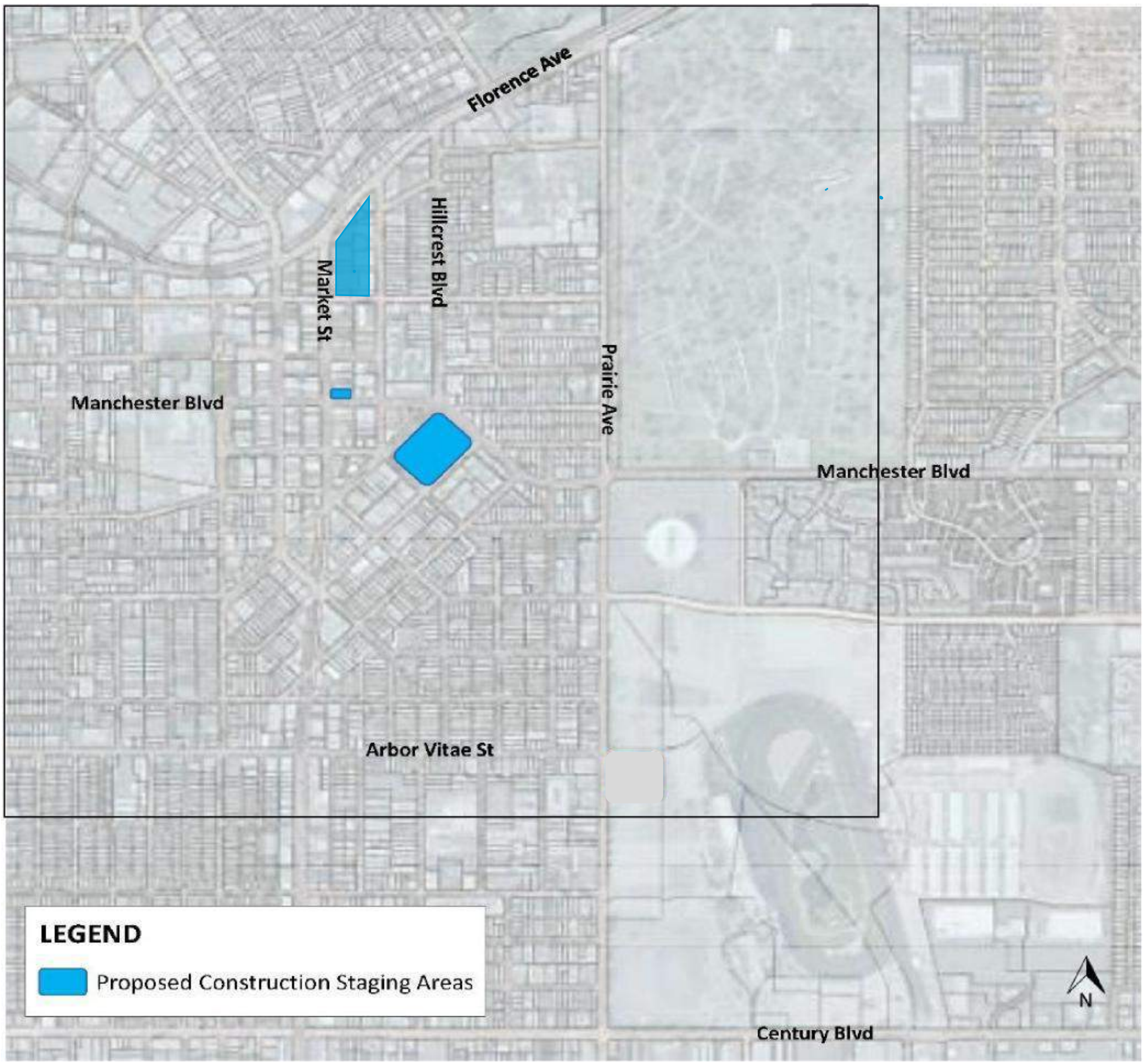
Construction employee parking would be provided within the construction areas and may also serve as temporary parking for construction personnel. Construction employees would be shuttled between construction sites and construction employee parking areas. The contractor also has the option to rent additional parking spaces as needed. In addition, contractor parking could occur at City designated parking lots, included but not limited to the lots listed below, which total approximately 756 parking spaces.

City Owned Parking Lots	# of Spaces
Manchester @ 7th (2901 W. Manchester Blvd.)	12
Manchester @ 12th (3363 W. Manchester Blvd.)	86
Redondo Blvd. @ West Blvd. (west of West Blvd.)	101
Civic Center Library (101 West Manchester Blvd.)	189
Kelso Street between La Brea & Market	34
Nutwood B/O Market (268 Market Street)	25
La Brea @ Kelso	73

Eucalyptus @ Oak	40
Market St. N/O Manchester	6
119 E. Arbor Vitae (Lot G)	30
101 W. Arbor Vitae (Lot F)	0
180 W. Arbor Vitae (Lot E)	36
155 W. Arbor Vitae (Lot D)	21
300 W. Arbor Vitae (Lot C)	41
327 W. Arbor Vitae (Lot K)	13
439 W. Arbor Vitae (Lot H)	22
500 W. Arbor Vitae (Lot I)	17
569-571 W. Arbor Vitae (Lot J)	10

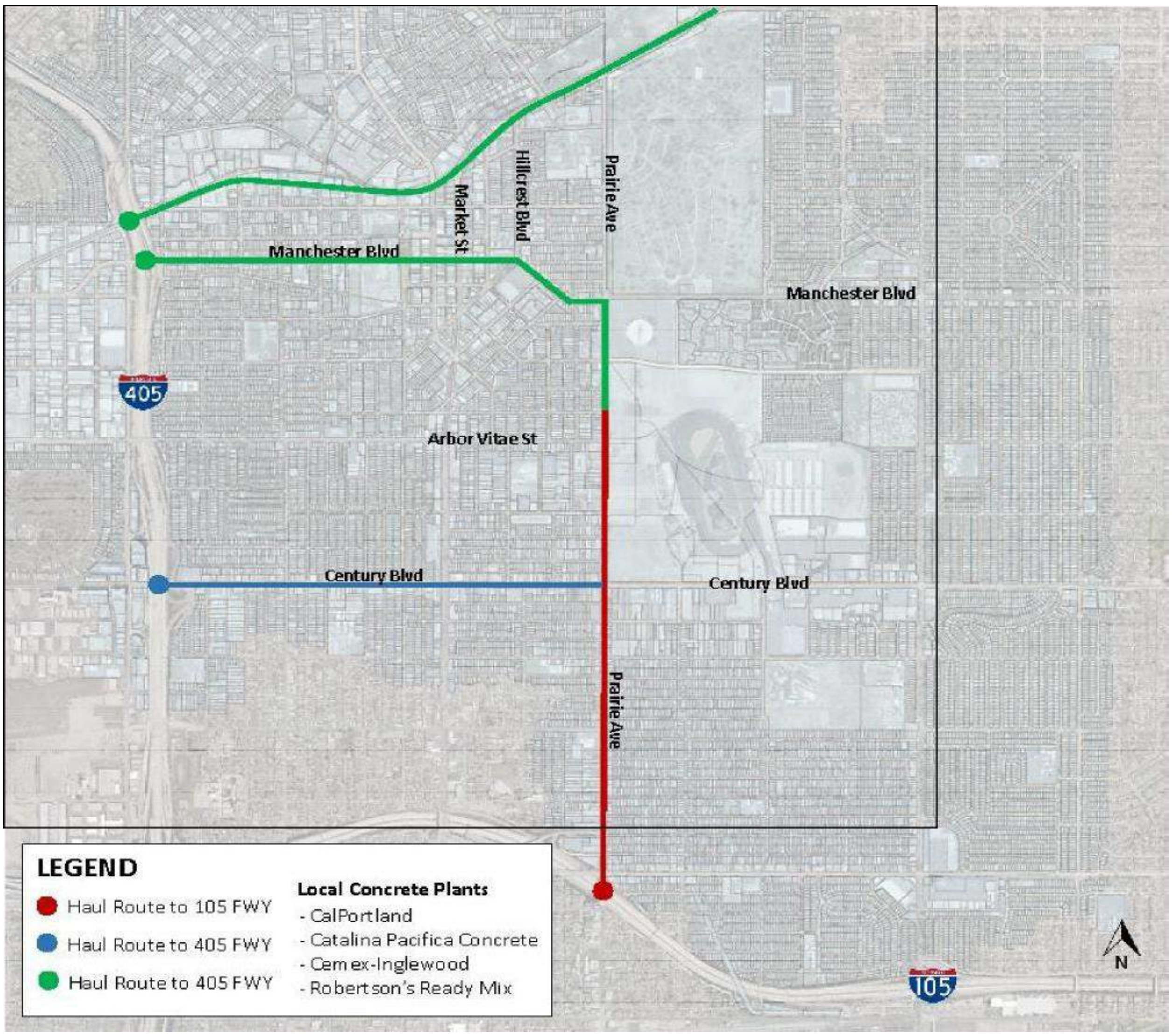
Staging Locations

The constructing staging areas will provide locations for material storage, equipment storage, and construction parking. At each construction staging area, the contractor would implement, as necessary, security and screen fencing, security personnel, and the locking and securing of equipment. Additionally, the proposed Project would incorporate various temporary construction fencing features and sound walls to screen much of the construction activities along major public streets and perimeter roadways. These areas are shown in the Construction Staging Map below:



2.6.3 Construction Haul Routes

As shown, the primary delivery routes include Florence Avenue, Manchester Boulevard, Prairie Avenue and Century Boulevard. For materials delivered to and stored at designated construction staging areas, the contractor's haul routes to and from the Project area would be generally located on public streets. To minimize traffic impacts to streets in and around the proposed Project site, excavated dirt materials/spoils will be hauled during off-peak and night hours. The contractor would develop an excavation plan that further defines the haul routes, dust control, and sweeping and disposal operations at the sites. The map below delineates the delivery and haul routes proposed to be used during construction of the proposed Project:



2.6.4 Construction Equipment

The equipment that would be used during construction may include rail-mounted equipment, drilling rigs, specialized water jet excavators, earth moving equipment, cranes, concrete mixers, flatbed trucks, sand and gravel delivery trucks, dump trucks, compactors, air compressors, generators sets, tractor trailer rigs, loaders, welders. The types of equipment by activity can be found in the chart below:

Off-Road On-Site Equipment: Off-road construction equipment includes dozers, loaders, sweepers and other heavy-duty construction equipment that is not licensed for travel on public highways.

Equipment	HP	Impact Device	Noise Level (dba)	Exposure Limit	Phase 1	Phase 2	Phase 3	Phase 4	Total
Impact Pile Driver	700	Yes	101	8 hr.	1	1	1	0	3
Crane	270	No	85	8 hr.	1	2	2	1	6
Backhoe	127	No	80	8 hr.	5	5	5	0	13
Loader	164	No	80	8 hr.	5	3	2	0	8
Auger Drill Rig	600	Yes	85	8 hr.	1	1	1	0	3
Compressor (air)	150	No	80	8 hr.	6	6	6	3	18
Excavator	396	Yes	85	8 hr.	3	2	2	0	6
Bobcat	72.9	No	85	8 hr.	3	3	4	1	11
Impact Hammer	N/A	Yes	90	8 hr.	6	3	3	2	11
Jackhammer	N/A	Yes	89	8 hr.	7	4	4	2	13
Pneumatic Tools	N/A	Yes	85	8 hr.	15	20	20	8	58
Generator	15plus	No	82	8 hr.	3	3	3	1	10
Warning Horn	N/A	No	85	6 hr.	2	2	2	1	7
Drum Mixer	1.5-5.5	No	80	8 hr.	0	3	3	0	6
Drill Rig Truck	600	Yes	84	8 hr.	1	1	1	0	3

Concrete Saw	24	No	90	8 hr.	4	2	2	1	7
Compactor (ground)	80	Yes	83	8 hr.	3	3	4	0	10
Portable Light Towers for night work	12.2	No	55	8 hr.	4	4	6	3	17
MKN Lifts	49.9	No	75	9 hr.	9	9	10	5	33

On-Road On-Site Equipment: On-road on-site equipment includes shuttle vans transporting construction employees to and from the site(s), on-site pick-up trucks, crew vans, water trucks, dump trucks, haul trucks and other on road-road vehicles licensed to travel on public roadways.

Equipment	HP	Impact Device	Noise Level	Exposure Limit	Phase 1	Phase 2	Phase 3	Phase 4	Total
Demo Dump Trucks	335-475	No	76	8 hr.	1343	0	0	0	1343
Asphalt Removal Trucks	335-475	No	76	8 hr.	172	0	0	0	172
Asphalt Placement Trucks	335-475	No	76	8 hr.	209	0	0	0	209
Soil Spoils Dump Trucks	335-475	No	76	8 hr.	1607	1503	2395	10	5515
Utility Trucks	375-600	No	75	4 hr.	28	39	35	39	123
Welder/Torch	23	No	73	8 hr.	5	5	6	4	20
Water Truck	650	No	74	8 hr.	2	2	2	0	6
Street Sweeper	240	No	74	8 hr.	1	2	2	1	6
Flat Bed Trucks	650	No	74	5 hr.	48	61	65	10	184
Pneumatic Tools	N/A	Yes	85	8 hr.	10	20	20	8	58
Concrete Trucks	430	No	85	8 hr.	10,284	9477	3516	50	21,866
Conc. Pump Trucks	600	No	84	8 hr.	2	2	2	2	8

On-Road Off-Site Equipment: On-road off-site vehicles include personal vehicles for construction employees to travel to and from work, per vehicle, and delivery vehicles for materials and equipment.

Equipment	HP	Impact Device	Noise Level (dba)	Exposure Limit	Phase 1	Phase 2	Phase 3	Phase 4	Total
Pickup Trucks	350	No	75	3 hr.	60	73	80	52	265
Delivery Trucks	650	No	80	4 hr.	52	65	65	35	217

Workforce Estimates / Manpower

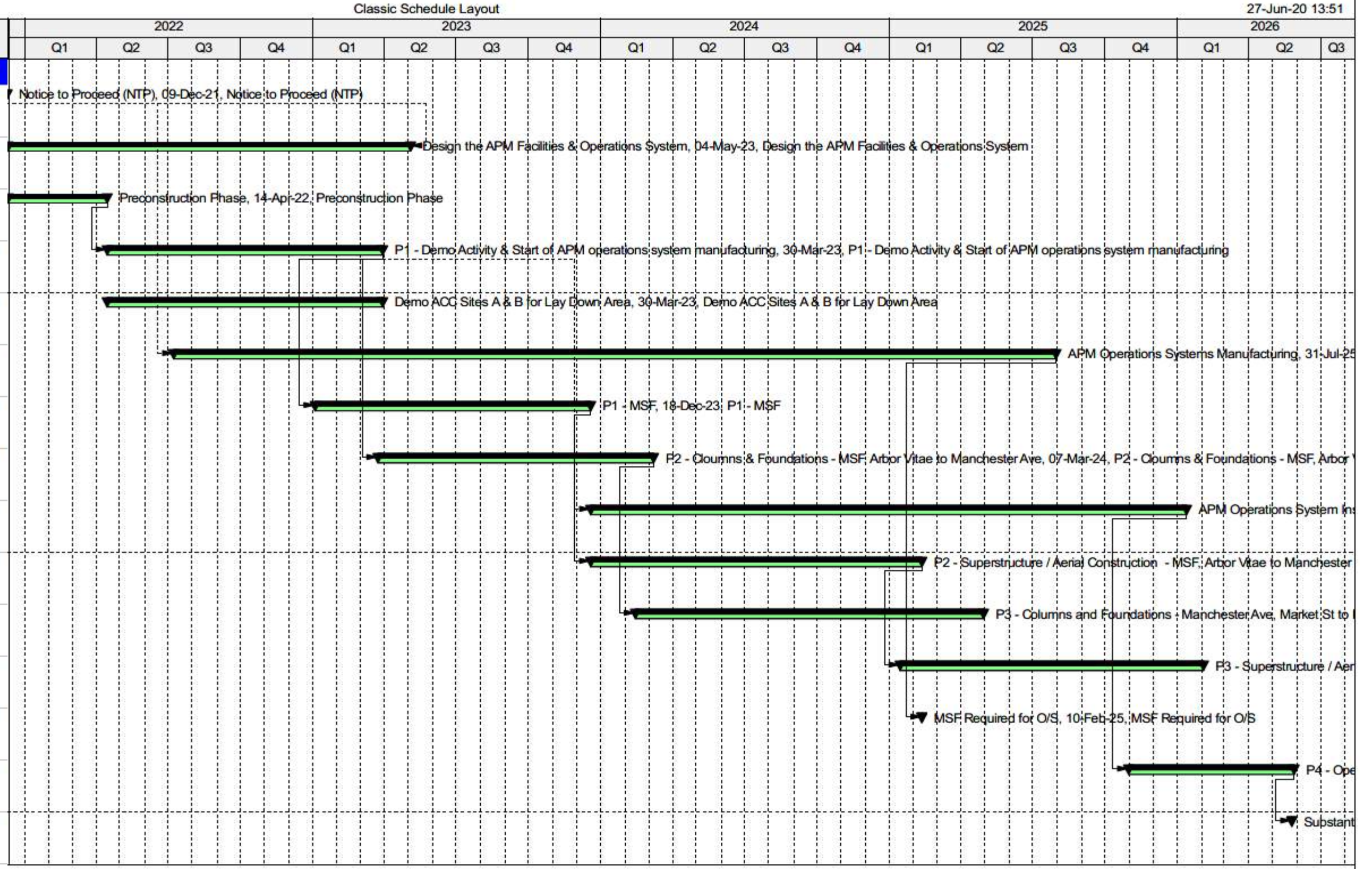
The proposed manpower workforce estimate is based on the phases of construction, which overlap in any calendar year due to the schedule phasing. The workforce estimates include all contractor staff and specialty on-site professionals, and is shown in the table below:

Phase	Approximate Manpower Required
Phase 1	105-140 persons
Phase 2	165-189 persons
Phase 3	210-238 persons
Phase 4	88-123 persons

END OF CONSTRUCTION SCENARIOS

Automated People Mover						Classic Schedule Layout	27-Jun-20 13:51

Activity ID	Activity Name	ginal ation	Remaining Duration	Start	Finish
APM	Automated Peopl	1166	1166	09-Dec-21	28-May-26
1	Notice to Proceed (NTP)	1	1	09-Dec-21	09-Dec-21
2	Design the APM Facilities & Operations System	365	365	10-Dec-21*	04-May-23
3	Preconstruction Phase	90	90	10-Dec-21*	14-Apr-22
4	P1 - Demo Activity & Start of APM operations system manufacturing	250	250	15-Apr-22*	30-Mar-23
5	Demo ACC Sites A & B for Lay Down Area	250	250	15-Apr-22*	30-Mar-23
6	APM Operations Systems Manufacturing	800	800	08-Jul-22*	31-Jul-25
7	P1 - MSF	250	250	03-Jan-23*	18-Dec-23
9	P2 - Cloumns & Foundations - MSF, Arbor Vitae to Manchester Ave	250	250	24-Mar-23*	07-Mar-24
8	APM Operations System Installation	540	540	19-Dec-23*	12-Jan-26
10	P2 - Superstructure / Aerial Construction - MSF, Arbor Vitae to Manchester Ave	300	300	19-Dec-23*	10-Feb-25
11	P3 - Columns and Foundations - Manchester Ave, Market St to Florence Ave	315	315	14-Feb-24*	29-Apr-25
12	P3 - Superstructure / Aerial Construction - Manchester Ave, Market St to Florence Ave	275	275	14-Jan-25*	02-Feb-26
13	MSF Required for O/S	1	1	10-Feb-25*	10-Feb-25
14	P4 - Operations System Testing & Commissioning	150	150	31-Oct-25*	28-May-26
15	Substantial Completion / Start of Passenger Services	1	1	26-May-26*	26-May-26



Actual Level of Effort / Actual Work	Remaining Work / Critical Remaining Work	Milestone / summary	Page 1 of 1	TASK filter: All Activities / © Oracle Corporation

Appendix 3.0.5

ITC Construction Scenarios or the EIR, June 2020

INGLEWOOD TRANSIT CONNECTOR PROJECT
CONSTRUCTION COMMITMENT PROGRAM

INTRODUCTION

The Inglewood Transit Connector (ITC) Project includes this construction commitment program to proactively address the potential effects of the construction of the Project on the community. This Program addresses:

- Construction staging and traffic control requirements
- Maintaining access to parking, businesses, and pedestrian facilities
- Noise and vibration measures
- Air quality measures
- Tree removal and replacement procedures
- Visual measures during construction

For purposes of this Construction Commitment Program (CCP), the following terms are defined:

- "Construction" means the work of removal, demolition, replacement, alteration, realignment, building, fabricating, landscaping of all Project facilities and new fixed facilities to be built and systems and equipment to be procured and installed that are necessary to complete the Project.
- "Construction Staging Plans" means construction phasing/sequencing plans, which may include Traffic Management Plans.
- "Days" means calendar days including Saturdays, Sundays, and legal holidays. See also definition of Working Days.
- "Design" means engineering, architectural and other design work and the resulting maps, plans, specifications, special provisions, drawings, calculations, computer software and estimates which are needed to construct the Project.
- "Design Review" means the process of critical evaluation of plans and specifications by the City and others as necessarily required to verify compliance and to complete the Project.
- "Facility" means real or personal property now or in the future to be located within the City Rights-of-Way, including but not limited to, roadways, pipes, mains, services, meters, regulators and any equipment, apparatus, columns, footings, guideways, station structures, maintenance and storage facility, power substations and/or structure appurtenant thereto or associated therewith.
- "Project" means Inglewood Transit Connector Project within the City of Inglewood.

- "Traffic Management Plan" means the various Worksite Traffic Control Plans and any other measures intended to mitigate impacts on traffic circulation during Construction, which may be included in Construction Staging Plans, for the various stages of Construction.
- "Working Days" or "Workdays' means those days that Inglewood City Hall is open for business.
- "Worksite Traffic Control Plan(s)" means the plans depicting the stages of traffic control for each stage of Construction for the Project.

CONSTRUCTION STAGING & TRAFFIC CONTROL PROGRAM

1. The **City of Inglewood** will establish a **Project Task Force** specifically for the ITC Project. This **Project Task Force** will provide input into worksite traffic control plans and other traffic management plans that are developed for the Project. The Project Task Force will review traffic management plans to ensure the following topics are addressed:

- Coordination with other public infrastructure projects within the City's boundaries
- Detour impact analysis for pedestrian, business, bicycle, and traffic flow
- Coordinate closures and restricted access with all special events
- Notification of the public with use of signage and web-based media
- Coordinate with City of Inglewood and LA County police and fire personnel regarding maintenance of emergency access and response times
- Monitor and coordinate deliveries
- Establish detour routes
- Work with residential and commercial neighbors regarding upcoming construction activities
- Analyze traffic conditions to determine the need for additional traffic signals, signs, lane restriping, signal modifications, etc.

2. The Contractor and its consultants and contractors shall develop and submit **Worksite Traffic Control Plans** to the City of Inglewood that address the following:

- Worksite Traffic Control Plans shall be designed to minimize traffic impacts on residential streets.
- Except as provided in the work hours permit issued by the City, the minimum traffic lane requirements for arterial streets impacted by Construction shall maintain at least the full number of traffic lanes in the peak direction, and if feasible one traffic lane in the off-peak direction, with additional capacity provided through appropriate detour routes. The directional traffic lanes shall be reversible to maintain the peak directional capacity in either direction.
- The minimum traffic requirements for all other commercial and residential streets impacted by construction activities shall be one lane in each direction, unless varied by a City-approved Worksite

Traffic Control Plan that protects the surrounding residential and business neighborhoods and promotes the free flow of traffic along the arterial streets.

- Access shall be maintained to and from all alleys at one or both ends of the alley. If an alley is obstructed at one end such that a turnaround by any vehicle is not feasible, then at its sole expense the Contractor will provide flaggers to control the alley.
- Worksite Traffic Plans shall demonstrate public safety vehicles (such as police, fire, and emergency response), and pedestrian access within the Project area or approved detours at all times.
- Worksite Traffic Plans shall provide adequate street access to City service vehicles, including but not limited to trash pickup and street sweeping service vehicles, during planned service times.
- All existing bus stops must be maintained or if necessary, relocated nearby with appropriate signage working in close coordination with the affected transit providers.
- Sidewalk closures in accordance with an approved Construction Staging Plan or Worksite Traffic Control Plan are permitted only when necessary to facilitate the Contractor's Contract work and when approved by the City.
- To ensure that continued vehicular access to all businesses and community facilities is maintained, including parking needs, the contractor shall provide at least one lane of traffic in each direction on access cross streets that are not going to be dead ended during construction.

3. Roadway Closures

- The City and Contractor shall meet and confer ninety (90) days prior to the planned date of any temporary full street closure to coordinate community outreach for the closure. Such community outreach will include at least one meeting with businesses and residents to discuss and receive comments for each temporary full street closure.
- Temporary directional street closures for ground improvement activities on residential streets may be permitted with prior approval from the City, provided that the Contractor gives thirty (30) days' notice.
- Temporary full street closures are permitted upon thirty (30) days' advance notice to the City only for work activities including but not limited to:
  - Installation of piles,
  - Underground utility work,
  - Installation of columns/substructure and superstructure
  - Installation of decking, and
  - Removal of decking

- If the City determines that traffic impacts have not been sufficiently addressed, then, at any time, the City's traffic engineer may revise the Worksite Traffic Control Plans to incorporate additional measures or to modify traffic control.

- The Contractor shall reimburse the City for the cost of Traffic Control Officers (TCOs) to assist in cut-through traffic on residential streets. The Contractor shall also reimburse the City for the Cost of TCOs for all City-approved special events affected by construction.

- Detour routes during temporary street closures shall be subject to review and approval by the City, provided that the Contractor gives thirty (30) days' notice. Detour routes must not use residential streets unless authorized by the City. Advance public notification of street closures in accordance with the notification process required by the City will be provided.

- Temporary directional street closures for ground improvement activities on residential streets may be permitted with prior approval from the City, provided that the Contractor gives thirty (30) days' notice. The minimum traffic lane requirements at all other times shall be one lane in each direction.

- Construction staging and traffic control requirements (including lane closures, street closures and hauling restrictions) shall be in accordance with the standards set forth in this Article; all Construction Staging Plans, Traffic Management Plans, and any conditions of approval included in a City-issued permit.

4. Preliminary Haul and Overload routes

    - Haul routes and overload/oversized vehicle routes must be reviewed and approved by the City.

    - To the extent possible, truck deliveries of bulk materials such as aggregate, bulk cement, dirt, etc. to the project site, and hauling of material from the project site, shall be scheduled during off-peak hours to avoid the peak commuter traffic periods on designated haul routes. For dirt, aggregate, bulk cement, and all other materials and equipment, truck deliveries would be on designated routes only (freeways and non-residential streets).

    - The City may restrict one or more of the approved haul routes during special events within the City or when lane restrictions affect a haul route, except that the City must leave open at least one haul route at all times.

5. Allowable Work Hours and Workdays

- Allowable work hours and workdays, including after-hours construction, holiday moratorium exceptions and peak hour exemptions shall be in accordance with the standards set forth in Construction Permit issued by the City to the Contractor; and any conditions of approval included in the City-issued permit. Conditions of other City-issued permits shall control over the Contract. Notwithstanding the foregoing, a more restrictive standard in a later-issued permit or plan shall control over a conflicting standard in an earlier issued permit or plan.

- For those activities when construction is permitted to begin at 7:00 AM, traffic control for those activities may begin at 6:30 AM. No other construction is permitted during this one- half hour time.
- No work shall occur when the City has identified a special event permit for Market Street, Manchester Boulevard, or Prairie Avenue.

PEDESTRIAN

1. The Construction Staging Plans and Worksite Traffic Control Plans shall include Pedestrian Access Plans which shall be approved by the City unless deemed unnecessary by the City. Pedestrian Access Plans shall meet the following minimum criteria:

- Pedestrian access to buildings shall be maintained during all times.
- The Contractor shall maintain all crosswalks, unless infeasible to do so. Whenever the Contractor removes a crosswalk from service, the Contractor shall establish and maintain temporary replacement crosswalks as close as practicable to the original crosswalk locations unless the City determines that a replacement crosswalk is not necessary to maintain an adequate level of service. Replacement crosswalks shall be identified and controlled by wayfinding signs approved by the City.
- The Pedestrian Access Plans shall include a program of wayfinding signage.
- The sidewalk shall be used exclusively for pedestrian use and shall not be used for Construction activities or staging unless Construction is taking place within the sidewalk.
- Sidewalks that are being maintained in a temporary condition shall meet all applicable safety standards and meet the following criteria:
  - Sidewalks in a temporary condition in excess of one month shall be constructed of pre-cast concrete panels or cast in place concrete; unless precast or cast in place concrete is infeasible and the City grants approval to use metal replacement panels, asphalt, or other satisfactory material;
  - Sidewalks in a temporary condition of up to one month shall be covered on a temporary basis by materials satisfactory to the City; and
  - Asphalt shall not be used as a temporary sidewalk material unless approved in advance by the City
    - Sidewalks that are being maintained in a temporary condition shall meet then current standards required by the Federal Americans with Disabilities Act and similar California laws for sidewalks being maintained in a temporary condition.
  - Sidewalk closures in accordance with an approved Construction Staging Plan or Worksite Traffic Control Plan are permitted only when necessary to facilitate Contract work and when approved by the City.

- At all times, the Contractor shall protect pedestrians from Construction-related dust and noise, and such protection may include the use of dedicated pedestrian barriers.
- Temporary streetlight and traffic signal foundations outside of the construction work zones shall be wrapped in an aesthetically pleasing material satisfactory to the City and changed out periodically. Overhead electrical wiring shall be maintained in a neatly bundled condition.
- The Contractor will provide crossing guards at hazardous locations requested by the City when crosswalks or sidewalks are closed.
- Unless subject to an approved closure or an approved width-reduction, the minimum sidewalk width shall be five (5) feet and additional width shall be required as necessary to protect the public safety and the operational needs of affected properties within the Project area, when requested by the City. The Contractor shall endeavor to maintain the maximum width of sidewalk possible.

PARKING

1. Parking, staging, or queuing of Project-related vehicles, including workers' vehicles, trucks, and heavy vehicles, shall be prohibited on City streets at all times, including for miscellaneous trips, outside of a permitted workspace identified in a City-approved Worksite Traffic Control Plan or if otherwise approved by the City. The Contractor shall notify the City thirty (30) Days in advance of any agreement for off-street parking with any owner of a private parking facility within the City. In an effort to assist the Contractor meet its obligations hereunder, the City will permit the Contractor parking in assigned staging areas during Construction.
2. The Construction Staging Plans or Worksite Traffic Control Plans developed by the Contractor shall include a parking management plan that observes the conditions set forth in this parking management program.
3. On-street parking may not be used by the Contractor for their vehicles or equipment unless the City agrees that such use is necessary. If the Parties agree that such use is necessary, then a parking management plan satisfactory to the City shall provide for equivalent overnight replacement parking for removed residential permit parking spots at the nearest possible location to the location where parking has been removed. In the event that any on-street metered parking spaces are removed because the work is directly within the subject parking space or a Worksite Traffic Control Plan or other form of traffic control requires the removal of the parking space, including spaces removed by the City to provide loading or valet zones for impacted businesses, the Contractor shall reimburse the City for the City's lost parking meter revenue due to the removal of the metered parking space(s).
4. The Contractor shall mitigate the loss of metered parking spaces by making available an equivalent number of parking spaces in an off-street parking facility located near the lost parking. The parking spaces shall be provided for public use at a rate no greater than the metered parking rate. The Contractor shall provide public notice of the availability of the alternative parking spaces through consultation with businesses and the use of signage. The Contractor shall further post appropriate signage on on-street metered parking spaces when Construction activities may restrict the use of a metered parking space.

5. Parking, staging, or queuing of Project-related vehicles, including workers' vehicles, trucks, and heavy vehicles, shall be prohibited on City streets at all times, including for miscellaneous trips, outside of a permitted workspace identified in a City-approved Worksite Traffic Control Plan or if otherwise approved by the City.
6. Provide public notice of the availability of the alternative parking spaces through consultation with businesses and the use of signage.

TRANSIT, ACCESS, AND CIRCULATION

1. The Contractor shall coordinate with Metro and any other transit service provider to ensure that access and circulation to the bus transit routes are maintained at all times, unless infeasible.
2. The Contractor shall coordinate with Metro and any other service provider to relocate bus stop(s) and provide appropriate wayfinding signage information the users of the system at its own expense. The relocated bus stop shall be at a location closest to the bus stop being temporarily relocated.
3. The Contractor shall coordinate with Metro and any other service provider to facilitate rerouting of the transit bus line. Required wayfinding signage and information dissemination shall be provided by the contractor, at its own expense, to the satisfaction of the City of Inglewood and the transit provider.

NOISE AND VIBRATION CONTROL

1. Construction Noise Control Plan.

   Prior to the issuance of any demolition or construction permit for each phase of project development, the Construction Manager shall develop a Construction Noise Control Plan demonstrating how to ensure increases in ambient noise levels are less than 5 dBA Leq over existing conditions. The Construction Noise Control Plan shall be developed in coordination with a certified acoustical/vibration consultant and the Construction Manager and shall be approved by the City's Director of Public Works prior to construction. The Plan shall include the following elements:

   - Measurements of existing one-hour Leq noise levels at sensitive receptors prior to construction activities.
   - Construction noise measures necessary to ensure increase in noise are less than 5 dBA Leq over existing conditions. This plan could include, but would not be limited to, the following strategies:
     - Install temporary noise barriers that block line-of-sight to sensitive receptors.
     - Reduce the simultaneous use of heavy-duty construction equipment.
     - Operate equipment at the lowest possible power levels.
     - Use solar, battery powered, or hybrid equipment whenever practical.
     - Locate staging areas as far away from sensitive receptors as feasible.

- Work on elevated guideways and stations areas shall use temporary noise barriers where possible.
- Enclose stationary noise sources with acoustical barriers where possible.
  - Stationary noise sources (e.g., generators) shall be muffled and enclosed within sheds, incorporate insulation barriers, or other measures to the extent feasible. Pole power shall be utilized at the earliest feasible point in time, and to the maximum extent feasible in lieu of generators. If stationary equipment such as diesel- or gasoline-powered generators are not enclosed within a shed or barrier, such equipment must be located at least 100 feet from sensitive land uses (e.g., residences, schools, childcare centers, hospitals, parks, or similar uses), whenever possible.
- Impact tools (i.e., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust and external jackets shall be used where feasible to lower noise levels. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible. Limiting the use impact pile drivers and impact hammers operating simultaneously to reduce Lmax noise levels by approximately 7 dBA. Additionally, use of “quiet” pile driving technology (such as auger displacement installation), where feasible in consideration of geotechnical and structural requirements and conditions shall be considered.
- Contractors shall coordinate with Kelso Elementary School administrators to avoid disruptive activities during school hours.

2. Designate Community Affairs Liaison. Designate a Community Affairs Liaison Officer.

   This person's contact information shall be posted around the Project area, in adjacent public spaces, and in construction notifications. The Community Affairs Liaison shall be responsible for responding within 24 hours to any local complaints about construction activities. This Community Affairs Liaison shall receive all public complaints about construction noise and vibration disturbances and be responsible for determining the cause of the complaint and implementation of feasible measures to be taken to alleviate the problem.

   The Community Affairs Liaison shall have the authority to coordinate with a designated construction contractor representative for the purpose of investigating the noise disturbance and undertaking all feasible measures to protect public health and safety and shall ensure that steps be taken to reduce construction vibration levels as deemed appropriate and safe by the designated construction contractor representative. Such steps could include the application of noise and vibration absorbing barriers, substitution of lower noise and vibration generating equipment or activity, rescheduling of noise and vibration-generating construction activity, or other potential adjustments to the construction program to reduce noise and vibration impacts at the adjacent noise and vibration-sensitive receptors.

3. Construction Vibration Reduction Plan. Prior to the issuance of any demolition or construction permit for each phase of project development, a Construction Vibration Reduction Plan shall be prepared to minimize construction vibration at nearby sensitive receptors from vibration created by construction activities. The Plan shall be developed in coordination with a certified acoustical/vibration consultant and the Construction Manager and shall be approved by the City's Director of Public Works. The Plan shall include but not be limited to the following elements to ensure impacts from groundborne vibration are less than significant:

    - A Pre-Demolition and Construction Plan that includes but not limited to:

        - Photos of current conditions of buildings and structures that could be damaged from construction activities. This crack survey shall include photos of existing cracks and other material conditions present on or at the surveyed buildings. Images of interior conditions shall be included if possible. Photos in the report shall be labelled in detail and dated.
        - Identify representative cracks in the walls of existing buildings, if any, and install crack gauges on such walls of the buildings to measure changes in existing cracks during project activities.
        - Crack gauges shall be installed on multiple representative cracks, particularly on sides of the building facing the project.
        - Determine the number and placement of vibration sensors at the affected buildings in consultation with a qualified architect. The number of units and their locations shall take into account proposed demolition and construction activities so that adequate measurements can be taken illustrating vibration levels during the course of the project, and if/when levels exceed the established threshold.
        - A line and grade pre-construction survey at the affected buildings shall be conducted.

    - A Vibration Plan During Demolition and Construction:

        - The Construction Manager shall regularly inspect and photograph crack gauges, maintaining records of these inspections to be included in postconstruction reporting. Gauges shall be inspected every two weeks, or more frequently during periods of active project actions in close proximity to crack monitors.
        - The vibration monitoring system shall measure and continuously store the peak particle velocity (PPV) in inches/second. Vibration data shall be stored on a one-second interval. The system shall also be programmed for two preset velocity levels: a regulatory level that represents when PPV levels would exceed the FTA's threshold of significance for a building given its conditions, and a warning level that is 0.05 inch/second (PPV) less than the regulatory level. The system shall also provide real-time alert when the vibration levels exceed either of the two preset levels.
        - In the event the warning level (PPV) is triggered, the contractor shall identify the source of vibration impacts and establish steps to reduce the vibration levels, including but not limited to halting or staggering concurrent activities and using lower vibratory techniques.

- In the event the regulatory level (PPV) is triggered, the Construction Manager shall halt the construction activities in the vicinity of the Project area and visually inspect the building for any damage. Results of the inspection must be logged. The Construction Manager shall identify the source of vibration generation and provide steps to reduce the vibration level. Vibration measurement shall be made with the new construction method to verify that the vibration level is below the warning level (PPV). Construction activities may then restart.
- In the event damage occurs to historic finish materials due to construction vibration, such materials shall be repaired in consultation with a qualified preservation consultant.
- The Construction Manager shall collect vibration data from receptors and report vibration levels to the City Chief Building Official on a daily basis. The reports shall include annotations regarding project activities as necessary to explain changes in vibration levels.

- Post-Construction:
  - The Construction Manager shall provide a report to the City Chief Building Official regarding crack and vibration monitoring conducted during demolition and construction. In addition to a narrative summary of the monitoring activities and their findings, this report shall include photographs illustrating the post-construction state of cracks and material conditions that were presented in the pre-construction assessment report, along with images of other relevant conditions showing the impact, or lack of impact, of project activities. The photographs shall sufficiently illustrate damage, if any, caused by the project and/or show how the project did not cause physical damage to the buildings. The report shall include analysis of vibration data related to project activities, as well as summarize efforts undertaken to avoid vibration impacts. Finally, a postconstruction line and grade survey shall also be included in this report.
  - The Construction Manager shall be responsible for repairs and damage to buildings if damage is caused by vibration or movement during the demolition and/or construction activities. Repairs may be necessary to address, for example, cracks that expanded as a result of the project, physical damage visible in post-construction assessment, or holes or connection points that were needed for shoring or stabilization. Repairs shall be directly related to project impacts and will not apply to general rehabilitation or restoration activities of the buildings.

4. Construction Equipment Locations (Building Damage). To address potential structural and building damage, the following measures are proposed to reduce vibration impacts:
   - Limit the location of pile driving and vibratory roller activity to not be within 55 feet and 30 feet of the nearest off-site sensitive receptor, respectively.
   - Limit the number of jackhammers operating simultaneously to one (1) piece operating within 45 feet of off-site sensitive receptors.

- In the event impact pile driving is required, equipment shall only be used from the hours of 7:00 AM to 7:00 PM. If feasible, pile driving should use alternative technology such as vibration or hydraulic insertion.

5. Construction Equipment Locations (Human Annoyance). To reduce construction vibration impacts related to human annoyance, the following measures are proposed:
    - Limit the location of pile driving to 310 feet of off-site vibration sensitive receptors.
    - Limit the location of vibratory roller to 150 feet of off-site vibration sensitive receptors.
    - Limit the location of large bulldozer to 85 feet of off-site vibration sensitive receptors.
    - Limit the location of caisson drilling to 85 feet of off-site vibration sensitive receptors.
    - Limit the location of loaded trucks to 75 feet of off-site vibration sensitive receptors.
    - Limit the location of jackhammers to 45 feet of off-site vibration sensitive receptors.
    - Limit the location of small bulldozer to 25 feet of off-site vibration sensitive receptors.

AIR QUALITY

1. Construction contractors shall, at a minimum, use equipment that meets the USEPA's Final Tier 4 emissions standards for off-road diesel-powered construction equipment with 50 horsepower (hp) or greater, for all phases of construction activity, unless it can be demonstrated to the City of Inglewood Planning Division with substantial evidence that such equipment is not available. To ensure that Final Tier 4 construction equipment or better shall be used during the proposed Project's construction, the City of Inglewood shall include this requirement in applicable bid documents, purchase orders, and contracts. The City of Inglewood shall also require periodic reporting and provision of written construction documents by construction contractor(s) and conduct regular inspections to the maximum extent feasible to ensure and enforce compliance.

   Such equipment will be outfitted with Best Available Control Technology devices including a CARB certified Level 3 Diesel Particulate Filters (DPF). Level 3 DPF are capable of achieving at least 85 percent reduction in particulate matter emissions. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by Final Tier 4 emissions standards for a similarly sized engine, as defined by the CARB's regulations. Successful contractors must demonstrate the ability to supply the compliant construction equipment for use prior to any ground disturbing and construction activities. The proposed Project representative will make available to the lead agency and SCAQMD a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used during construction. The inventory will include the horsepower rating, engine production year, and certification of the specified Tier standard. A copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit shall be maintained on site at the time of mobilization for each applicable piece of construction equipment.

If any of the following circumstances listed below exist and the Contractor provides written documentation consistent with project contract requirements, the Contractor shall submit an alternative compliance plan that identifies operational changes or other strategies that can reduce a comparable level of NOx emissions as Tier 4-certified engines during construction activities.

- The Contractor does not have the required type of off-road construction equipment within its current available inventory as to a particular vehicle or equipment by leasing or short-term rent, and the Contractor has attempted in good faith and with due diligence to lease or short-term rent the equipment or vehicle, but the equipment or vehicle is not available for lease or short-term rent within 120 miles of the Project alignment, and the Contractor has submitted documentation to the City of Inglewood showing that the requirements of this exception provision apply.
- The Contractor has been awarded funding by SCAQMD or another agency that would provide some or all of the cost to retrofit, repower, or purchase a piece of equipment or vehicle, but the funding has not yet been provided due to circumstances beyond the Contractor's control, and the Contractor has attempted in good faith and with due diligence to lease or short-term rent the equipment or vehicle that would comply, but the equipment or vehicle is not available for lease or short-term rent within 120 miles of the Project alignment, and the Contractor has submitted documentation to the City of Inglewood showing that the requirements of this exception provision apply.
- Contractor has ordered equipment or vehicle to be used on the construction project in compliance at least 60 days before that equipment or vehicle is needed at the Project alignment, but that equipment or vehicle has not yet arrived due to circumstances beyond the Contractor's control, and the Contractor has attempted in good faith and with due diligence to lease or short-term rent the equipment or vehicle that would comply, but the equipment or vehicle is not available for lease or short-term rent within 120 miles of the project site, and the Contractor has submitted documentation to the City of Inglewood showing that the requirements of this exception provision apply.
- Construction-related diesel equipment or vehicle will be used on the Project alignment for fewer than 20 calendar days per calendar year. The Contractor shall not consecutively use different equipment or vehicles that perform the same or a substantially similar function in an attempt to use this exception to circumvent the intent of this measure.
- Documentation of good faith efforts and due diligence regarding the previous exceptions shall include written record(s) of inquiries (i.e., phone logs) to at least three leasing/rental companies that provide construction on-road trucks and off-road equipment, documenting the availability/unavailability of the required types of truck/equipment. The City of Inglewood will, from time-to-time, conduct independent audit of the availability of such vehicles and equipment for lease/rent within a 120 mile radius of the project site, which may be used in reviewing the acceptability of the Contractor's good faith efforts and due diligence.

2. Equipment such as concrete/industrial saws, pumps, aerial lifts, light stands, air compressors, and forklifts shall be electric or alternative-fueled (i.e., non-diesel). Pole power shall be utilized at the

earliest feasible point in time and shall be used to the maximum extent feasible in lieu of generators. If stationary construction equipment, such as diesel-powered generators, must be operated continuously, such equipment must be Final Tier 4 construction equipment or better and located at least 100 feet from air quality sensitive land uses (e.g., residences, schools, childcare centers, hospitals, parks, or similar uses), whenever possible.

3. At a minimum, require that construction vendors, contractors, and/or haul truck operators commit to using 2010 model year trucks (e.g., material delivery trucks and soil import/export with a gross vehicle weight rating of at least 14,001 pounds), or best commercially available equipment, that meet CARB's 2010 engine emissions standards at 0.01 g/hp-hour of particulate matter and 0.20 g/hp-hour of NOx emissions or newer, cleaner trucks, unless the Contractor provides written documentation consistent with project contract requirements the circumstances identified in MM AQ-1 exist and the Contractor submits an alternative compliance plan. Operators shall maintain records of all trucks associated with Project construction to document that each truck used meets these emission standards. The City of Inglewood shall include this requirement in applicable bid documents, purchase orders, and contracts. Operators shall maintain records of all trucks associated with Project construction to document that each truck used meets these emission standards and make the records available for inspection.
4. Require the use of electric or alternatively fueled (e.g., natural gas) sweepers with high-efficiency particulate air (HEPA) filters.
5. A publicly visible sign shall be posted with the telephone number and person to contact at the City of Inglewood regarding dust complaints. This person shall respond and take corrective action with 24 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.
6. All roadways, driveways, sidewalks, etc., being installed as part of the project should be completed as soon as practical; in addition, building pads should be laid as soon as practical after grading.
7. To the extent feasible, allow construction employees to commute during off-peak hours.
8. Make access available for on-site lunch trucks during construction, as feasible, to minimize off-site construction employee vehicle trips.
9. Every effort shall be made to utilize grid-based electric power at any construction site, where feasible. Grid-based power can be from a direct hookup or a tie into electricity from power poles.
10. Contractors shall maintain and operate construction equipment to minimize exhaust emissions. All construction equipment must be properly tuned and maintained in accordance with the manufacturer's specifications and documentation demonstrating proper maintenance, in accordance with the manufacturer's specifications, shall be maintained on site. Tampering with construction equipment to increase horsepower or to defeat emission control devices must be prohibited.
11. Enter into applicable bid documents, purchase orders, and contracts to notify all construction vendors, contractors, and/or haul truck operators that vehicle and construction equipment idling time will be limited to no longer than five minutes, consistent with the CARB's policy. For any idling that is expected to take longer than five minutes, the engine should be shut off. Notify construction vendors,

contractors, and/or haul truck operators of these idling requirements at the time that the purchase order is issued and again when vehicles enter the Project alignment. To further ensure that drivers understand the vehicle idling requirement, post signs at the proposed Project entry gates and throughout the Project alignment, where appropriate, stating that idling longer than five minutes is not permitted.

VISUAL

Construction activities during evening and nighttime hours may require the use of temporary lighting. To minimize the impact of temporary lighting on adjacent properties. To minimize the impact of temporary lighting on adjacent properties, the following measures shall be implemented:

1. Light plans and measures shall be in accordance with the standards for the City issued Construction Permit and submittals for the Project work at issue; and any conditions of approval included in a City-issued permit. The conditions included in the Construction Permit shall control over other City-issued permits.
2. Temporary lighting will be limited to the amount necessary to safely perform the required work and will be directed downwards and shielded. Care shall be taken in the placement and orientation of portable lighting fixtures to avoid directing lights toward sensitive receptors, including automobile drivers.
3. In addition to minimizing light spill, sensitive receptors and motorists on public streets will not have direct views of the light source (glare) from construction lighting. Light sensitive receptors include but are not limited to residential areas and transient occupancy uses.
4. Light trespass shall not exceed one foot-candle above ambient light level as measured at any adjacent residential and transient properties.
5. Temporary sidewalks and any sidewalk adjacent to Construction activities shall be illuminated to City Standards to protect public safety.
6. Visually obtrusive erosion control devices, such as silt fences, plastic ground cover, and straw bales should be removed as soon as the area is stabilized.
7. Stockpile areas should be located in less visibly sensitive areas and pre-approved by the City. Stockpile locations/laydown/staging areas shall be accessed by construction vehicles with minimal disruption near residential neighborhoods.

TREE REMOVAL AND REPLACEMENT

1. Tree removal will be avoided wherever possible. The Contractor shall strictly comply with a tree removal and replacement plan that will ensure that any landscaping removed as a result of Contract Construction is eventually returned to its condition prior to removal. The tree removal and replacement plan shall be approved in writing by the City before any trees are removed and shall substantially conform to the following requirements:

- New permanent replacement trees shall be a 36-inch box of the same species and planted in the same location as the removed tree when not in conflict with new infrastructure, in which case the City's Public Works Department shall designate an alternative location, type and/or size;
- New permanent replacement palm trees shall be a minimum 20 feet in height

2. The Contractor shall permanently replace trees within six (6) months of restoration and completion of that portion of streets that may impact the tree. To the extent feasible, the Contractor shall permanently replace trees on an ongoing basis so long as doing so does not conflict with future construction.
3. If construction of the project requires pruning of native tree species, the pruning shall be performed in a manner that does not cause permanent damage or adversely affect the health of the trees.
4. The Contractor shall coordinate with the City's Public Works Department to ensure that the tree removal and replacement plan is executed to the satisfaction of Public Works. The Contractor shall maintain all permanent trees and other landscaping installed by the Contractor for a period of three (3) years from the date of planting and shall warranty the trees and landscaping for one (1) year after planting. Prior to the end of the one-year warranty period, the City and the Contractor will conduct an inspection of all permanent replacement trees and landscaping for general health as a condition of final acceptance by the City. If, in the City's determination, a permanent replacement tree or landscaping does not meet the health requirements of the City, then the Contractor shall replace that tree within thirty (30) days. For any permanent trees or landscaping that must then be removed, the original warranty shall be deemed renewed commencing from when the tree or landscaping is replaced.

HAZARDOUS MATERIALS

1. **Building Demolition Plan**- Prior to any demolition occurring, the Contractor shall conduct an evaluation of all buildings built prior to 1980 to be demolished to identify the presence of asbestos containing materials (ACMs) and lead-based paint (LBP). Remediation shall be implemented in accordance with the recommendations of these evaluations to ensure that no ACMs or LBP remain present and to ensure ACMs and LBP are removed to levels established for public safety.
2. **Hazardous Materials Contingency Plan** – Prior to construction, the Contractor shall prepare a plan addressing the potential for discovery of unidentified underground storage tanks (USTs), hazardous materials, petroleum hydrocarbons, or hazardous or solid wastes encountered during construction. This plan shall address UST decommissioning, field screening and materials testing methods, contaminant management requirements, and health and safety requirements to ensure no exposure to hazards or hazardous materials occurs on site and to ensure any materials encountered during construction are removed to levels established for public safety.
3. **Soil Management Plan** – After final construction plans are prepared showing the lateral and vertical extent of soil excavation during construction are prepared the Contractor shall prepare a Soil Management Plan to establish soil reuse criteria, define a sampling plan for stockpiled materials,

describe the disposition of materials that do not satisfy the reuse criteria, and specify guidelines for imported materials.

4. **Health and Safety Plan** – Prior to construction, the Contractor shall prepare a Health and Safety Plan to address the potential for exposure to the constituents of concern identified in the limited Phase II ESA.

BUSINESS AND COMMUNITY SUPPORT PROGRAMS

1. The Contractor and its consultants and contractors shall develop and submit **Business and Community Support Plans** to the City of Inglewood for the purpose of assisting those businesses financially affected by the construction performed. Business Support Plans shall address the following:
   - Advertising support in a local or regional newspaper, social media
   - Notice plans of the schedule for specific planned construction activities, changes in traffic flow, and required short-term modifications to property access
   - Notice plans to all affected property owners if utilities would be disrupted for short periods of time and scheduled major utility shut-offs during low-use periods of the day.
   - Methods by which business owners can convey their concerns about construction activities and the effectiveness of measures during the construction period so activities can be modified to reduce adverse effects.
   - Access plans that ensure that all businesses and service providers are provided with adequate access during construction. Where there is a significant LEP population, signage shall be provided in various languages (as appropriate).
   - Funding for temporary signage and advertising during construction to help businesses that are partially blocked or that have inconvenient access due to construction activity.

Establishment of Project Public Liaison Phone Line: The Contractor shall establish and fund a toll-free phone line that is available twenty-four (24) hours a Day to respond to concerns related to construction disturbances within the City. This phone line shall incorporate a construction relations phone line prompt for immediate live response. Contact information for the public liaison person and phone line shall be included in all Construction notices.