

## 2.0 PROJECT ALTERNATIVES

### 2.1 PROJECT DESCRIPTION

As described in Chapter 1.0, the Interstate 710 (I-710) Corridor is a vital transportation artery, linking the Ports of Los Angeles and Long Beach (POLA and POLB) to southern California and beyond. An essential component of the regional, statewide, and national transportation system, it serves both passenger and goods movement vehicles. As a result of population growth, cargo container growth, increasing traffic volumes, and aging infrastructure, the I-710 Corridor experiences serious congestion and safety issues.

This chapter describes the I-710 Corridor Project and the design alternatives that were developed to meet the defined purpose(s) while avoiding or minimizing environmental impacts. The alternatives are Alternative 5A, I-710 Widening and Modernization; Alternative 6A, I-710 Widening plus Freight Corridor (Trucks); Alternative 6B, I-710 Widening plus Freight Corridor (Zero-Emission Vehicles); and Alternative 6C, I-710 Widening plus Tolloed Freight Corridor (Zero-Emission Vehicles). Alternative 1 (No Build) is also discussed in this chapter. The estimated costs of these alternatives are summarized in Table 2.1-1.

**Table 2.1-1 Estimated Costs (Billion \$)**

Alternative	R/W-Utilities	Construction	Total
5A	0.35	2.24	2.59
6A	0.96 to 0.98	4.12 to 4.14	5.10
6B	0.95 to 0.98	4.26 to 4.32	5.21 to 5.28
6C	0.95 to 0.98	4.33 to 4.37	5.28 to 5.33

Source: Draft Project Report, June 2012.

Note: Estimates are in 2010 dollars and do not include support costs.

In addition to traditional sources of transportation funding such as Federal/State gas tax funds and local Measure R sales tax funds, The Los Angeles County Metropolitan Transportation Authority (Metro) is also evaluating the potential applicability of a Public-Private Partnership (PPP) for the I-710 Corridor Project. A PPP is a mutually beneficial collaboration between a public agency and a private sector entity. Through this contractual arrangement, the skills and assets of each sector are shared in delivering a service or facility for the use of the general public. PPP's are increasingly being used as a means of funding and expediting completion of major public infrastructure projects in the United States.

## 2.2 I-710 CORRIDOR PROJECT EIR/EIS ALTERNATIVES DEVELOPMENT PROCESS

### 2.2.1 I-710 MAJOR CORRIDOR STUDY

The Major Corridor Study (MCS) was initiated to analyze the traffic congestion, safety, and mobility problems along the I-710 Corridor and to develop transportation solutions to address these problems, as well as some of the quality of life concerns experienced in communities along the I-710 Corridor.

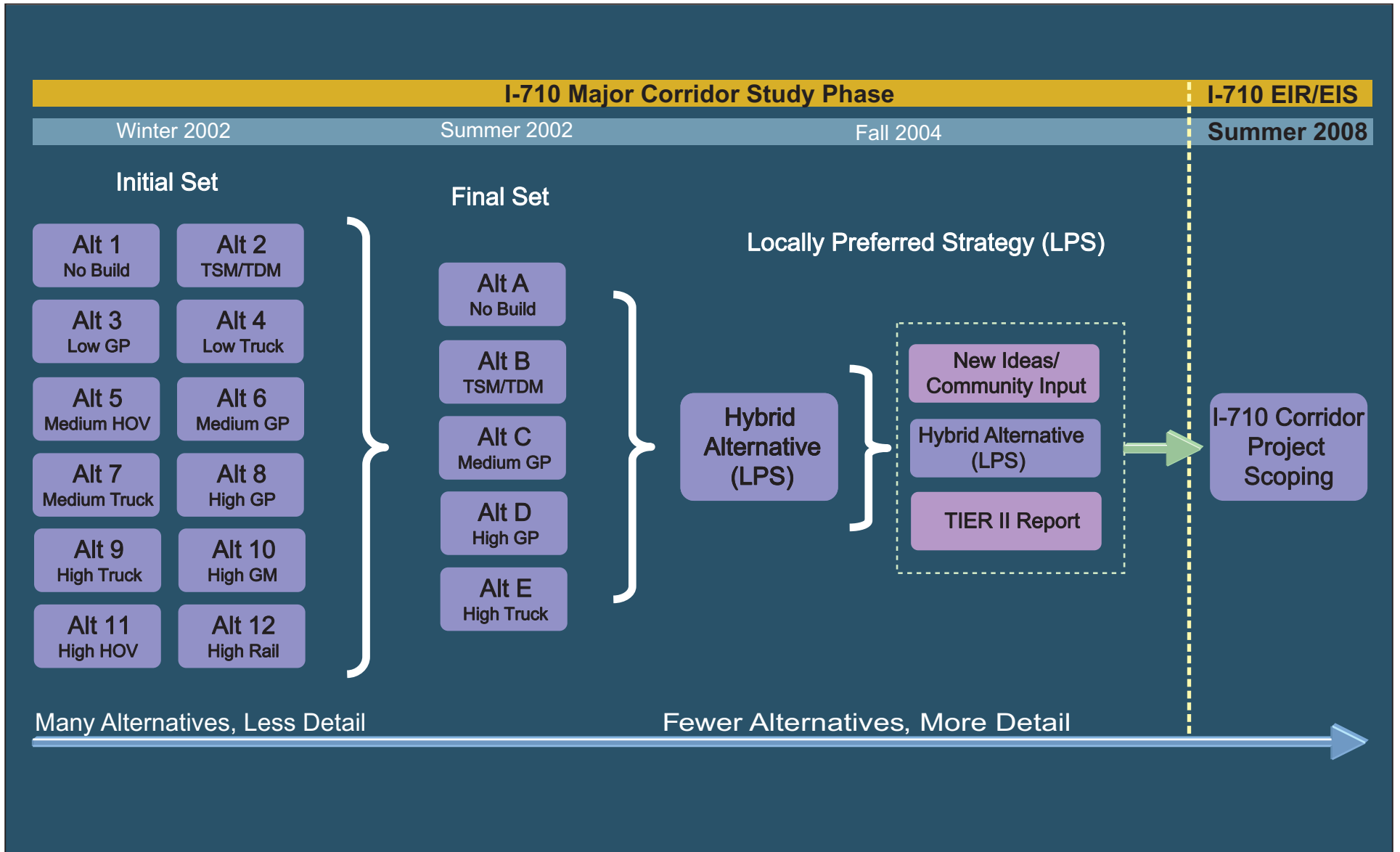
During the first 24 months of the MCS, existing and future conditions on the I-710 Corridor were assessed, a Purpose and Need Statement was developed, and several transportation alternatives were analyzed. By April 2003, five alternatives had been evaluated in detail and information on their benefits, costs, and impacts was made available to the public (more detail provided in the *I-710 Major Corridor Study*, November 2004). Please see Figure 2.2-1, which provides a diagram of the MCS process.

As a result of the MCS, a Draft Hybrid Design Concept was developed to provide improvements to I-710 focused on improving safety; addressing heavy-duty truck demand as well as General Purpose traffic; improving reliability of travel times; and separating automobiles and trucks to the greatest extent possible while limiting right-of-way impacts.

### 2.2.2 I-710 CORRIDOR PROJECT ALTERNATIVES SCREENING ANALYSIS

Subsequent to the MCS, the project partners for the I-710 Corridor Project were identified. The California Department of Transportation (Caltrans), Metro, Gateway Cities Council of Governments (GCCOG), POLA, POLB, Southern California Association of Governments (SCAG) and the Interstate 5 Joint Powers Authority (I-5 JPA) entered into a funding agreement for the preparation of preliminary engineering and environmental documentation for the I-710 Corridor Project. In August 2008, a formal public scoping process was initiated for the I-710 Corridor Project. As part of scoping, six preliminary alternatives were presented to the public for consideration with various levels of investment, ranging from Alternative 1 to the Locally Preferred Strategy (LPS) adopted in the I-710 MCS. For more information on the scoping process, please see the *I-710 Corridor Scoping Summary Report* (December 2008), as well as Chapter 5.0 (Comments and Coordination).

The initial set of seven proposed alternatives for the I-710 Corridor Project comprised an Alternative 1 and six build alternatives, one of which (Alternative 6) was based on the LPS identified in the I-710 MCS. Figure 2.2-2 shows this initial set of alternatives. A more detailed description of the Initial Set of Alternatives can be found in the I-710 Corridor Project Environmental Impact Report/Environmental Impact Statement (EIR/EIS) Baseline Alternatives Analysis Report (April 2009).



**KEY**

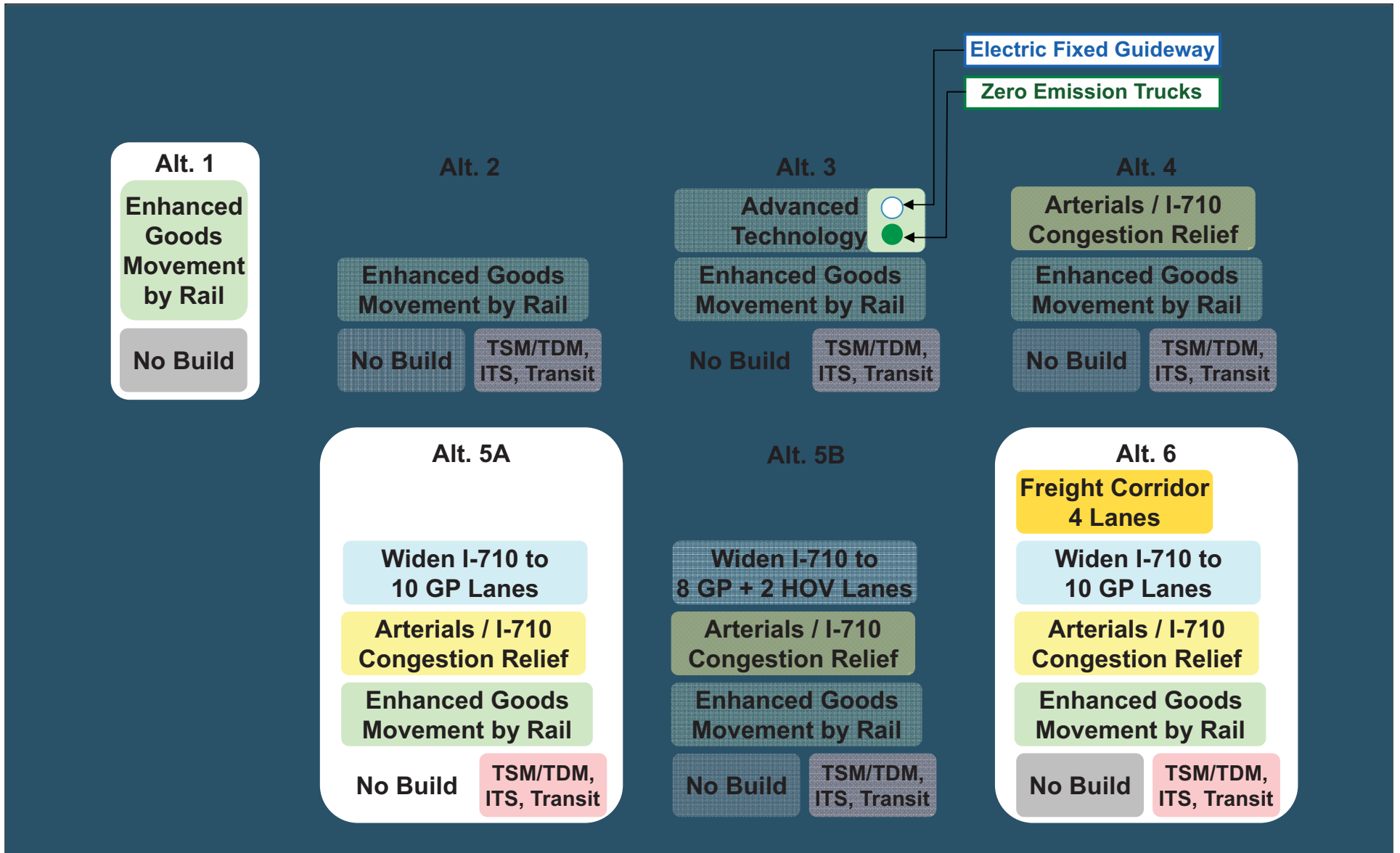
- GP** - General Purpose Lane
- HOV** - High Occupancy Vehicle
- TSM/TDM** - Transportation System Management/Transportation Demand Management
- GM** - Goods Movement

FIGURE 2.2-1

*I-710 Corridor Project EIR/EIS*  
 Alternatives Screening Process

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**KEY**



- Alternatives Screened Out During Scoping



- Alternatives Carried Forward into EIR/EIS

FIGURE 2.2-2

*I-710 Corridor Project EIR/EIS*  
Initial Set of Alternatives and  
Screening Recommendations

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Following the close of public comment for the scoping process, an alternatives screening analysis was conducted to determine whether any alternatives should be modified or withdrawn from further consideration. In this screening phase, a conceptual level of analysis was performed on the initial set of seven alternatives to provide comparative information on their relative benefits, costs, and impacts. The measures used to distinguish the differences among these alternatives addressed areas such as improvements to traffic mobility, traffic safety, air quality, and health effects; impacts to environmental resources; right-of-way impacts, and capital costs. This analysis applied screening criteria to distinguish among the relative benefits, impacts, and costs of the alternatives. These criteria measured the performance of the alternatives relative to the project goals designated in the *Alternatives Screening Report* (2009) and multiple measures were used to provide comparative information.

Based on the screening analysis and on guidance received from the I-710 advisory committees, including the I-710 Technical Advisory Committee (TAC) and the I-710 Community Advisory Committee (CAC), a recommendation was developed that identified certain alternatives (and key features or components) to be carried forward in the technical studies for the EIR/EIS. The screening evaluation favored those alternatives that best responded to multiple elements of the screening criteria over those initial alternatives that could only respond to a limited number of screening criteria. In most cases, alternatives that were included as a component of other larger alternatives were screened out as standalone alternatives, as they did not adequately address the I-710 Corridor Project's defined purpose and need. The various I-710 Corridor Project advisory and technical committees, their memberships, and responsibilities are discussed in detail in Section 5.6, Community Participation Process.

The following discussion summarizes the Initial Set of Alternatives, including their relative performance and key trade-offs, and the critical factors that led to the technical screening recommendation for each alternative. Refer to the *Final Technical Memorandum - Alternatives Screening Analysis* (2009) for additional details.

#### 2.2.2.1 ALTERNATIVE 1: NO BUILD

Alternative 1 was recommended to be carried forward. Alternative 1 is a requirement of the California Environmental Quality Act (CEQA) and National Environmental Policy Act of 1969 (NEPA) process because it provides the existing and future environmental baselines against which other alternatives are compared. For the purposes of CEQA, the baseline is the existing 2008 conditions. Please see the discussion in Section 2.3, Project Alternatives, for more detail regarding Alternative 1.

#### 2.2.2.2 ALTERNATIVE 2: TSM/TDM/TRANSIT/ITS

Alternative 2 was not recommended to be carried forward into the environmental process as a standalone alternative. While Alternative 2 includes transit, policy, Intelligent Transportation Systems (ITS) application, and operational improvements that have a beneficial effect on mobility in the Study Area, the screening analysis demonstrated that these transportation improvements did not go far enough in resolving the worst of the congestion problems, air quality issues, design elements that need updating, and safety concerns that affect motorists and residents within the overall I-710 Corridor. Alternative 2 also did not update design elements on I-710, nor did it provide the desired separation between trucks and automobile traffic. At best, Alternative 2 provides a 6 to 7 percent improvement in service levels on I-710 and approximately a 5 percent improvement in nitrogen oxide (NO<sub>x</sub>) emissions, with a negligible effect in diesel particulate matter (DPM) emissions compared to the No Build Alternative. Alternative 2 also does not eliminate I-710 design deficiencies, nor does it provide the needed separation between trucks and general purpose traffic. However, the screening results did confirm that the Transportation Systems Management/Transportation Demand Management (TSM/TDM), transit, and ITS improvements included in Alternative 2 would provide value to the project. All of Alternative 2 was recommended for inclusion in the reduced set of alternatives as a component of the other alternatives selected to be carried forward for more detailed environmental studies.

#### 2.2.2.3 ALTERNATIVE 3: GOODS MOVEMENT ENHANCEMENT BY RAIL AND/OR ADVANCED TECHNOLOGY

Alternative 3 was not recommended to be carried forward as a standalone alternative. This alternative was focused on maximum goods movement by rail and goods movement enhancement through an array of advanced “zero-emission” technologies, including fixed guideway technologies (e.g., magnetically levitated container transport system (MagLev), electrified freight rail, and electric-powered trucks. While key features of Alternative 3 demonstrated needed emissions reduction benefits, as well as the ability to markedly reduce heavy-duty truck traffic on the I-710 general purpose lanes as a stand-alone alternative, Alternative 3 did not sufficiently relieve traffic congestion on the I-710 mainline according to several of the mobility measures, nor did it address the existing safety and design elements that need updating on the I-710 compared to other alternatives. Therefore, the electric-powered (zero-emission) truck advanced technology component of Alternative 3 was selected for its positive air quality benefits and integrated into another recommended alternative (see the following discussion of Alternative 6B). As described later in this chapter (Section 2.6.2), a technology screening step was performed in the *Alternatives Goods Movement Technology Study* (January 2009), to select this specific type of zero-emission technology. Additionally, at the recommendation of the I-710 TAC, the Enhanced Goods Movement by Rail component was removed from Alternative 3 because these projects and other efforts to maximize the amount of goods movement by rail would not be completed as part of the I-710 Corridor Project. With the



exception of where there is uncertainty regarding future proposed near-dock rail expansion projects such as the Southern California International Gateway (SCIG) and Intermodal Container Transfer Facility (ICTF), most of these rail projects, which will be environmentally cleared and funded by other agencies, are included in Alternative 1 (No Build) as part of the future No Build condition in the I-710 Corridor.

#### 2.2.2.4 ALTERNATIVE 4: ARTERIAL HIGHWAY AND I-710 CONGESTION RELIEF IMPROVEMENTS

Alternative 4 was not recommended to be carried forward into the environmental process as a standalone alternative. Like Alternative 2, Alternative 4 would not provide adequate improvements on its own to fully address the I-710 Corridor Project's purpose and need. This alternative would not accommodate the high future traffic volumes generated by population and employment growth and the forecasted cargo growth. However, the screening analysis found that the arterial highway improvements and the I-710 mainline congestion relief elements of Alternative 4 would be valuable components to include in the alternatives recommended to be carried forward for more detailed environmental analysis.

#### 2.2.2.5 ALTERNATIVE 5A: TEN GENERAL PURPOSE LANES

Alternative 5A contains all the components of Alternatives 1 through 4. Alternative 5A was recommended to be carried forward in the environmental studies as a standalone alternative. Alternative 5A had the second-best performance on measures of congestion reduction (volume-to-capacity [v/c] ratio) and I-710 mainline travel time. It also ranked second among the screened alternatives in air emission reductions. Alternative 5A also performed well in the screening measures related to traffic safety and right-of-way impacts. Therefore, Alternative 5A was recommended for inclusion in the Reduced Set of Alternatives to be carried forward for more detailed environmental analysis.

#### 2.2.2.6 ALTERNATIVE 5B: EIGHT GENERAL PURPOSE LANES PLUS TWO HOV LANES

Alternative 5B contains all the components of Alternatives 1 through 4. Alternative 5B was not recommended to be carried forward into the environmental process. From a physical standpoint, Alternative 5B closely resembles Alternative 5A except that two of the proposed lanes would operate as high-occupancy vehicle (HOV) lanes rather than general purpose lanes. The screening analysis demonstrated that Alternative 5B had lower benefits compared to Alternative 5A because the HOV lanes under Alternative 5B would not be utilized as much as the proposed general purpose lanes under Alternative 5A, most likely due to the parallel HOV lanes on both Interstate 110 (I-110) and Interstate 605 (I-605). However, Alternative 5B contains the drawbacks with regard to potential right-of-way impacts as Alternative 5A, without the corresponding level of mobility benefits. Therefore, Alternative 5A was recommended over Alternative 5B.

#### 2.2.2.7 ALTERNATIVE 6: ALTERNATIVE 5 WITH ADDITION OF FOUR SEPARATED FREIGHT MOVEMENT LANES

As the highest-performing alternative for mobility and traffic safety measures, Alternative 6 was the only alternative estimated to reduce the peak-period v/c ratio on the I-710 mainline below the level indicating congestion conditions. It also was estimated to generate the lowest percentage of heavy-duty trucks sharing the general purpose lanes with automobiles and to result in the greatest reduction in freeway design elements that need updating, both of which are key indicators of improved traffic safety. Alternative 6 was recommended for inclusion in the Reduced Set of Alternatives because it was the only alternative determined to fully address the mobility problems on the I-710 Corridor and was considered to respond best to the need for improved traffic safety due to its separation of truck and automobile traffic. Additionally, it was recommended that Alternative 6 be carried forward in the environmental process as a standalone alternative, along with a new variation of Alternative 6 that included Alternative 3's advanced technology component.

Alternative 6 was recommended to have two variations: (1) Alternative 6A (previously labeled Alternative 6), which would include ten general purpose lanes and four separated freight movement lanes (freight corridor) for use by all heavy-duty trucks, whether powered by diesel engines or engines with lower or zero emissions; and (2) Alternative 6B, which would include ten general purpose lanes and incorporate Alternative 3's advanced technology component by including four separated freight movement lanes. This advanced technology would include, but not be limited to, electric-powered trucks, which could receive electric power from on-board rechargeable batteries by an electric power distribution system employing overhead catenary wires to provide power to conventional electric motors in each vehicle, or embedded in the pavement of the freight movement lanes powering either linear-induction-motor or linear-synchronous-motor systems (or other concepts), or future zero-emission technologies to be developed or designed as part of the freight movement corridor. The design of the freight corridor will also assume possible future conversion, or initial construction, as feasible (which may require additional environmental analysis and approval), of a fixed-guideway family of alternative container transport technologies (e.g., Maglev).

### 2.3 PROJECT ALTERNATIVES

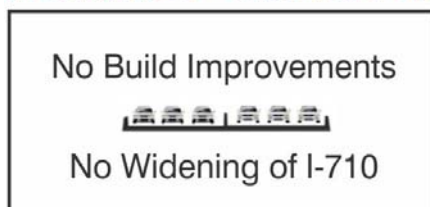
Subsequent to the completion of the Alternatives Screening Analysis described above, the I-710 Funding Partners agreed that a tolling option should be added to the freight corridor component of Alternatives 6A and 6B to provide a possible revenue source to fund the improvements. This alternative is known as Alternative 6C. Descriptions of the I-710 Corridor Project alternatives evaluated in this Draft EIR/EIS are provided below and include the No Build Alternative (Alternative 1) and four build alternatives (Alternatives 5A and 6A/B/C). Discussion of alternatives considered in the I-710 Corridor Project alternatives screening analysis but withdrawn from further consideration is provided in Section 2.6. A schematic depiction of each

alternative is provided to assist the reader in visualizing the basic components of each alternative. As with any major transportation project, the project design and alternatives description presented in this Draft EIR/EIS is preliminary and subject to refinement as a result of more detailed studies and public input. Should changes occur, the alternatives description and environmental analyses will be updated accordingly.

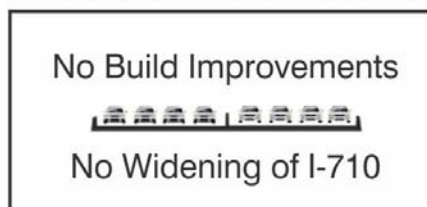
As shown in the following sections, the build alternatives build on one another, and each build alternative includes the planned and programmed projects and improvements of the No Build Alternative. In addition, each build alternative includes the lower number build alternatives. For example, Alternative 6A includes the TSM and ITS improvements provided in Alternative 5A.

### 2.3.1 NO BUILD ALTERNATIVE

#### Alternative 1 - South of I-405

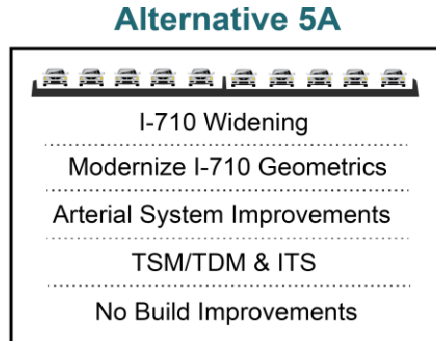


#### Alternative 1 - North of I-405



Alternative 1 would maintain the current configuration of the existing I-710 Corridor. There would be no capacity-increasing improvements to the I-710 mainline; only approved and planned projects included in SCAG's 2008 Regional Transportation Plan (RTP) and 2008 Regional Transportation Improvement Program (RTIP) are considered part of the Alternative 1. Additionally, as described in Section 2.2.2, I-710 Corridor Project Screening Analysis, the assumption of maximum goods movement by rail is included in Alternative 1. The rail elements assumed in the Alternative 1 include on-dock rail improvements, Burlington Northern Santa Fe/Union Pacific (BNSF/UP) Railroad Mainline Capacity Improvements, and Intermodal Freight Rail Facilities. Please refer to the I-710 Corridor Project EIR/EIS Baseline Alternatives Analysis Report (May 2009) for more detail regarding these elements. Alternative 1 provides the basis for comparison of 2035 no build conditions with the 2035 build alternatives.

2.3.2 ALTERNATIVE 5A: I-710 WIDENING AND MODERNIZATION



Alternative 5A proposes to widen the I-710 mainline eight general purpose lanes south of Interstate 405 (I-405) and up to ten general purpose lanes north of I-405 (on I-710 northbound and on I-710 southbound). This alternative will modernize the design at the I-405 and State Route 91 (SR-91) interchanges, modernize and reconfigure most local arterial interchanges throughout the I-710 corridor, modify freeway access at various locations, and shift the I-710 centerline at various locations to reduce right-of-way impacts. Figure 2.3-1 shows Alternative 5A and its key features.

In addition to improvements to the I-710 mainline and the interchanges, Alternative 5A also includes TSM/TDM, Transit, and ITS improvements. TSM improvements include provision of or future provision of ramp metering at all locations and the addition of improved arterial signage for access to I-710. Parking restrictions during peak periods (7:00 a.m.–9:00 a.m.; and 4:00 p.m.–7:00 p.m.) will be implemented on four arterial roadways: Atlantic Blvd. between Pacific Coast Hwy. and State Route 60 (SR-60); Cherry Ave./Garfield Ave. between Pacific Coast Hwy. and SR-60; Eastern Ave. between Cherry Ave. and Atlantic Blvd.; and Long Beach Blvd. between San Antonio Dr. and Firestone Blvd. Transit improvements that will be provided as part of the I-710 Corridor Project include substantially increased service on all Metro Rapid routes and local bus routes in the Study Area. Section 2.4.1.9 provides more detail on these transit improvements. ITS improvements include updated fiber-optic communications to interconnect traffic signals along major arterial streets to provide for continuous, real-time adjustment of signal timing to improve traffic flow as well as other ITS technology improvements.

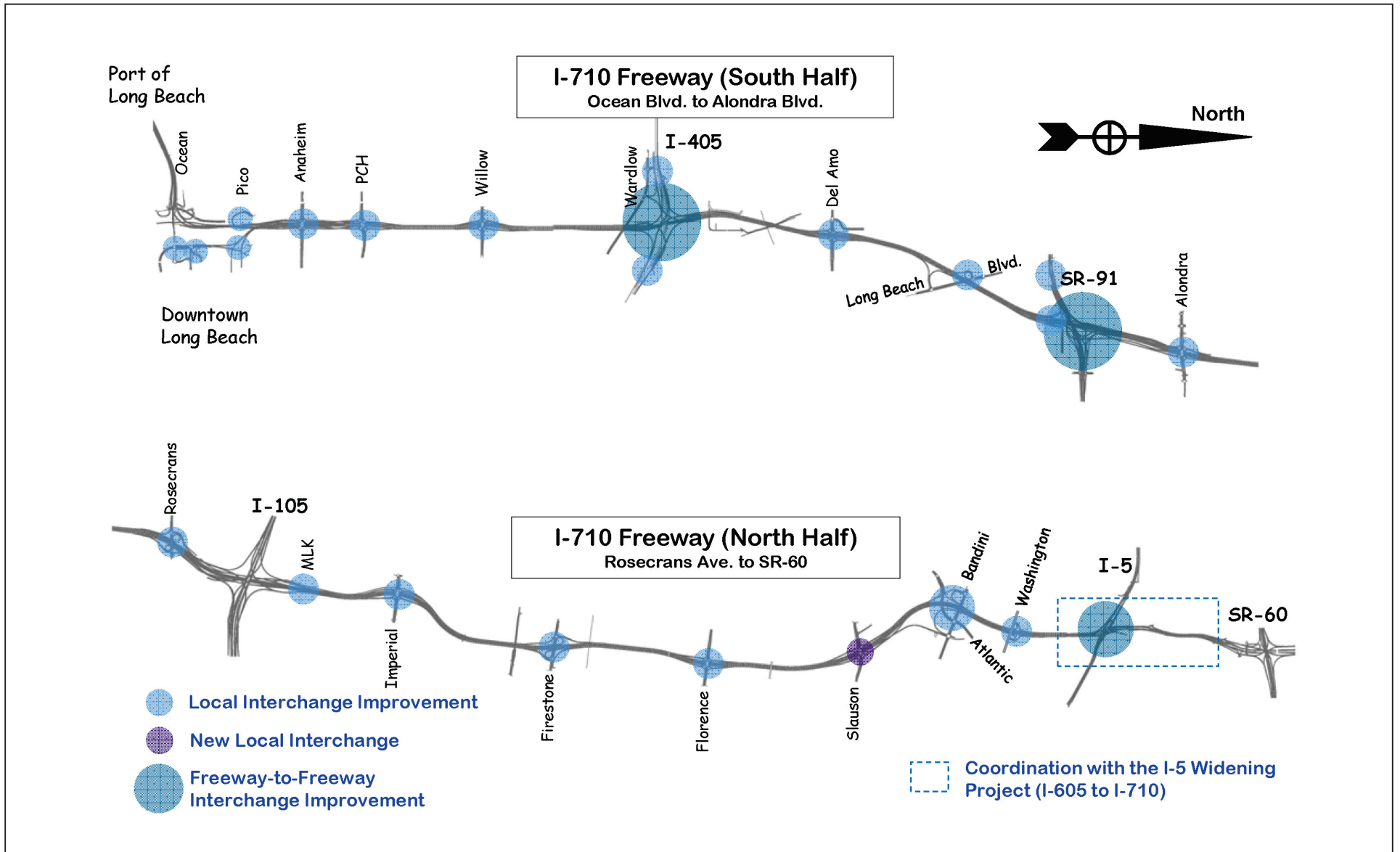


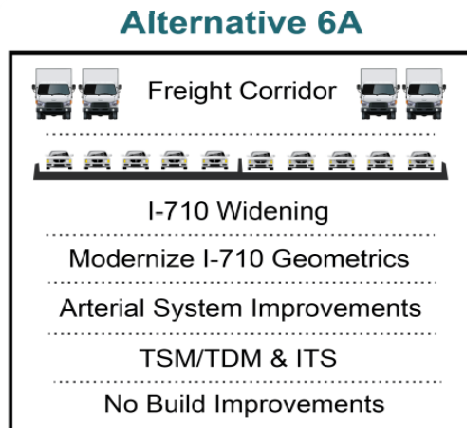
FIGURE 2.3-1

I-710 Corridor Project EIR/EIS  
Alternative 5A Key Features

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2.3.3 ALTERNATIVE 6A: I-710 WIDENING AND MODERNIZATION PLUS FREIGHT CORRIDOR (TRUCKS)



Alternative 6A includes all the components of Alternatives 1 and 5A as described above. In addition, this alternative includes a separated four-lane freight corridor to be used by conventional trucks. It should be noted that all trucks, including those using this freight corridor are expected to be newer (post-2007) projected diesel/fossil-fueled trucks (new or retrofitted engines required per new State regulations and local programs [San Pedro Bay Ports Clean Air Action Plan Clean Truck Program]) that will generate lower emissions than the trucks using the I-710 Corridor today. Regulations adopted by California Air Resources Board (ARB) after the Notice of Preparation (NOP) date will require a fleet of newer vehicles, beyond natural fleet turnover.<sup>1</sup> The Ports' Clean Air Action Plan (CAAP) will accelerate the implementation of some of these rules for trucks coming to/from the Ports. Figure 2.3-2 shows Alternative 6A and its key features.

The freight corridor would be located on an elevated structure with two lanes in each direction between Ocean Blvd. and the intermodal rail yards in the cities of Vernon and Commerce. Dedicated entry and exit points to and from the freight corridor within the project limits are described below:

- Harbor Scenic Dr. (Southern Terminus)
- Pico Ave.

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<sup>1</sup> ARB, "Regulation to Control Emissions from In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks," adopted on October 12, 2008, <http://www.arb.ca.gov/regact/2007/drayage07/drayage07.htm>, and "Truck and Bus Regulation," adopted December 2008, (<http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm>).

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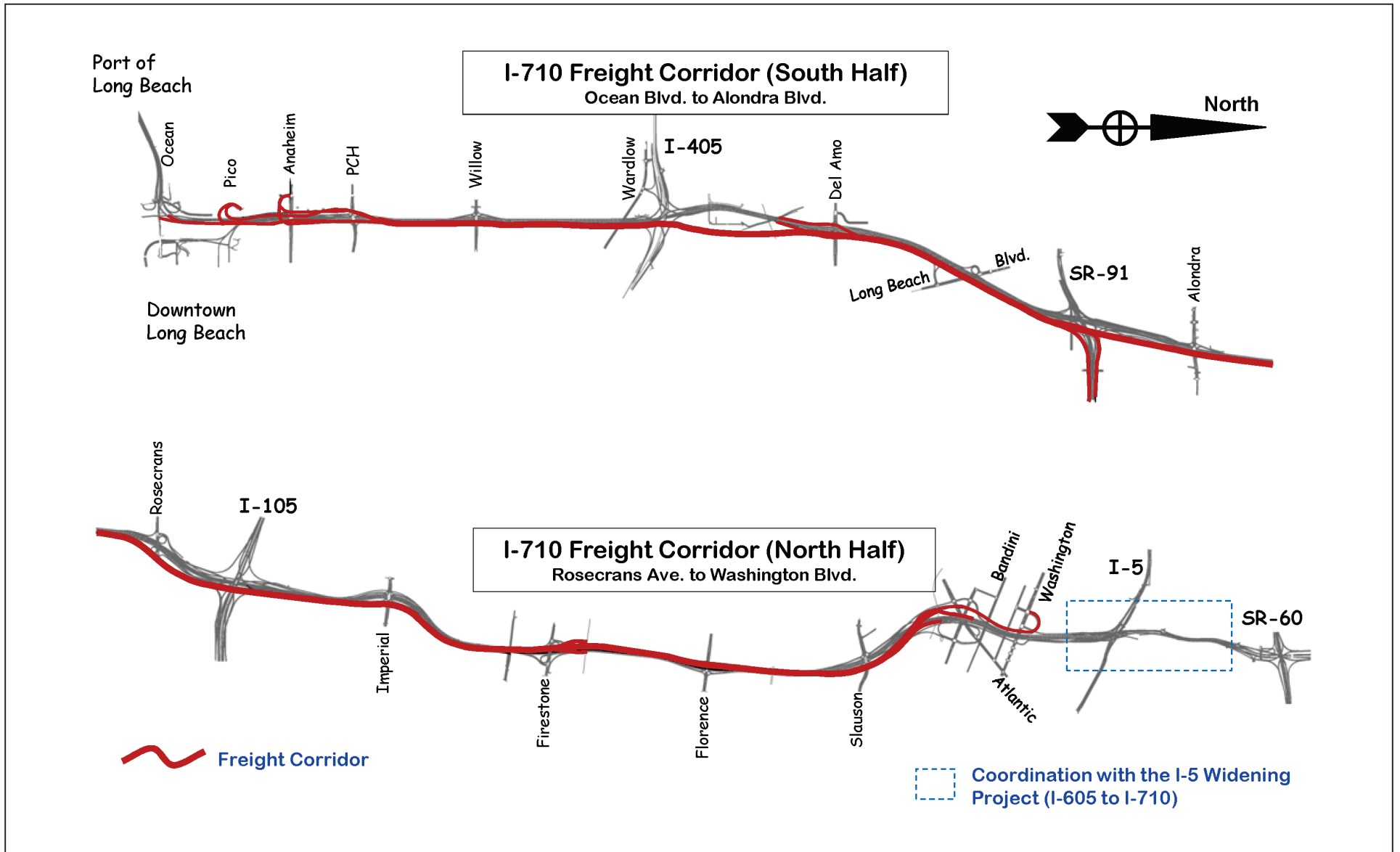


FIGURE 2.3-2

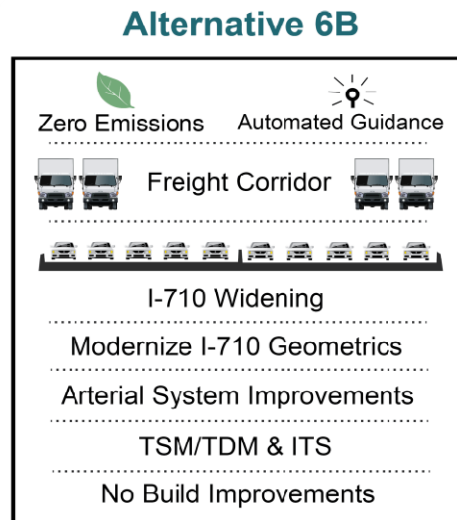
I-710 Corridor Project EIR/EIS  
 Alternatives 6A/B/C Key Features

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- Anaheim St.
- I-710/I-405 Interchange
- I-710/SR-91 Interchange
- I-710/Interstate 105 (I-105) Interchange
- I-710/Patata St.
- Atlantic Blvd./Bandini Blvd./Washington Blvd.
- Sheila St. (Northern Terminus)

2.3.4 ALTERNATIVE 6B: I-710 WIDENING AND MODERNIZATION PLUS FREIGHT CORRIDOR (ZERO-EMISSION VEHICLES)



Alternative 6B includes all the components of Alternative 6A described above and consists of the same footprint as Alternative 6A. Further, this alternative would restrict the use of the freight corridor to zero-emission trucks rather than conventionally powered trucks. Figure 2.3-2 shows Alternative 6B and its key features. This proposed zero-emission truck technology is assumed to consist of trucks powered by electric motors in lieu of internal combustion engines and producing zero tailpipe emissions while traveling on the freight corridor. The specific type of electric motor is not defined, but feasible options include linear induction motors, linear synchronous motors or more prevalent in-vehicle conventional brushless DC motors. The power

systems for these electric propulsion trucks could include, but is not limited to, road-connected wayside power (e.g., overhead catenary electric power distribution system), as well as a variety of possible hybrid power sources with dual-mode operation (with a Zero-Emission Vehicle mode) such as Range Extender Electric Vehicle (with a Fuel Cell or Turbine along with a ZEV operations mode), fully Electric Vehicle (with rechargeable batteries or power, alternative fuel hybrids, (e.g., zero-NO<sub>x</sub> dedicated fuel engines (Compressed Natural Gas, Renewable Natural Gas, Hydrogen [H<sub>2</sub>] Internal Combustion Engine), coupled with a range extender battery power Electric Vehicle mode (turbine power battery charging). These hybrid variations would be powered by their electric motors while traveling along the freight corridor and use their hybrid engines for both motive power and to recharge their batteries when not traveling for the freight corridor. For purposes of the I-710 Corridor Project EIR/EIS, the zero-emission electric trucks are assumed to receive electric power while traveling along the freight corridor via an overhead catenary electric power distribution system (road-connected power). This proposed power distribution system is similar systems used to power electric trolley buses (e.g., in San Francisco) and requires traction power substations sited along the freight corridor to distribute electricity from the regional electrical power grid to the catenary system. See Figure 2.3-3 for examples of zero-emission truck technology.

Energy consumption is based upon the maximum number of vehicles expected on the freight corridor at any one time. As such, a minimum of 26 electrical substations, providing 25-kilovolt (kV) output are required. The stations are spaced approximately 4,000 feet apart and are located within the proposed rights-of-way for Alternatives 6A/B/C. Each substation requires approximately 25,000 square feet. Southern California Edison (SCE) has confirmed that current and planned local electrical distribution systems and power supplies are sufficient to accommodate the alternative's energy demand.

Alternative 6B also includes the assumption that all trucks using the freight corridor will have an automated vehicle control system that will steer, brake, and accelerate the trucks under computer control while traveling on the freight corridor. This will safely allow for trucks to travel in "platoons" (e.g., groups of 6–8 trucks) and theoretically, increase the capacity of the freight corridor from a nominal 2,350 passenger car equivalents per lane per hour (pces/lane/hr) (approximately 1,200 trucks per lane per hour) (as assumed in Alternative 6A) to 3,000 pces/lane/hr (1,500 trucks/lane/hr) in Alternative 6B.<sup>1</sup>

The design of the freight corridor will also allow for possible future conversion, or be initially constructed, as feasible (which may require additional environmental analysis and approval), of

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<sup>1</sup> *I-710 Freight Corridor White Paper on Proposed Capacity Enhancements* – March 2010.

## Examples of Hybrid and Zero Emissions Heavy Duty Trucks



## Zero Emission Trucks



FIGURE 2.3-3

*I-710 Corridor Project EIR/EIS*

**Zero Emissions Technology**

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a fixed-track guideway family of alternative freight transport technologies (e.g., Maglev). However, the fixed-track family of technologies is not evaluated in this EIR/EIS, as they have been determined to be inferior to electric trucks in terms of cost and ability to readily serve the multitude of freight origins and destinations served by trucks using the I-710 corridor.<sup>1</sup>

Recently, Siemens Corporation has developed a working prototype of a hybrid electric/diesel-electric truck which operates in zero tailpipe emissions mode while drawing electricity from an overhead catenary system (OCS) similar to those used to power light rail transit vehicles and assumed as the electric power distribution source on the freight corridor in Alternatives 6B and 6C. The commercial viability of these types of trucks will be assessed over the next several years as part of demonstration projects being developed by local agencies such as South Coast Air Quality Management District (SCAQMD), the Ports and Metro.

Although zero-emission trucks are currently in limited use, development and deployment of this technology involves the following four steps:

- Research and development;
- Technology development and demonstration;
- Pre-production deployment and assessments; and
- Early production deployments.

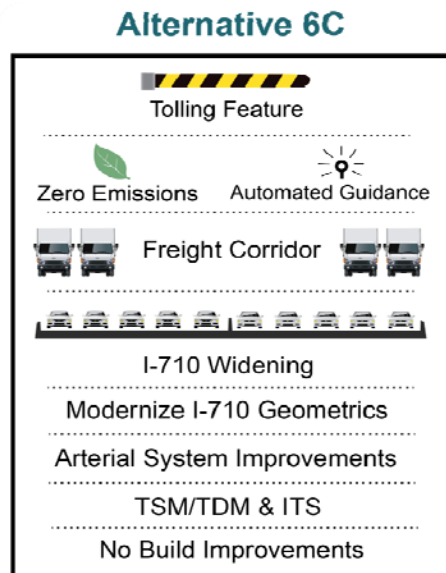
Clean Transportation Solutions (CALSTART), a nonprofit, member-supported organization, in coordination with Metro and support from SCAQMD, has been examining the commercial viability of zero-emission freight movement vehicles. Their goal is to facilitate the development, validation, and commercialization of market-sustainable, zero-emission goods movement vehicles by implementing the above steps. Commercial truck manufacturers would be encouraged to develop these zero-emission trucks by creating a market demand for these vehicles through both financial incentives (e.g., subsidies to vehicle purchasers and/or tax credits to manufacturers) and policies and regulations (e.g., Ports Clean Air Action Plan and Clean Truck Regulations). This market demand could be developed at a regional, statewide or national level through various agencies (e.g., ARB, SCAQMD, United States Department of Transportation [USDOT], United States Environmental Protection Agency [USEPA], National Association of Port Authorities) and may require new local, State and/or Federal legislation and

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<sup>1</sup> Final Technical Memorandum - Alternatives Screening Analysis WBS ID:165.05.15 Appendix C: Alternative Technology Screening Analysis.

regulations. This information was presented to the I-710 Corridor Advisory Committee at their meeting of July 2010 (see presentation posted on the I-710 Corridor Project website at: [http://www.metro.net/projects\\_studies/I710/images/Zero-Emission-Freight-Corridor-Program-Design-for-Market-Transformation-July-2010.pdf](http://www.metro.net/projects_studies/I710/images/Zero-Emission-Freight-Corridor-Program-Design-for-Market-Transformation-July-2010.pdf)).

2.3.5 ALTERNATIVE 6C: I-710 WIDENING AND MODERNIZATION PLUS TOLLED FREIGHT CORRIDOR



Alternative 6C includes all the components of Alternative 6B as described above and consists of the same footprint as Alternatives 6A and 6B. Further, this alternative would toll trucks using the freight corridor. Although tolling trucks in the freight corridor could be done under either Alternative 6A or 6B, for analytical purposes, tolling has only been evaluated for Alternative 6B, as this alternative provides for higher freight corridor capacity than Alternative 6A due to the automated guidance feature of Alternative 6B.

Per Federal statute, unless otherwise excepted, all Interstate highways must be toll-free. However, current exceptions relating to tolling of Interstate highways include Value Pricing Pilot Program; Express Lanes Demonstration Project; the Interstate System Reconstruction and Rehabilitation Pilot Program; and the Interstate System Construction Toll Pilot Program. Should Alternative 6C be selected as the preferred alternative, tolling would be implemented pursuant to one of these exceptions.

Tolls would be collected using electronic transponders, which would require overhead sign bridges and transponder readers like the SR-91 toll lanes currently operating in Orange County, where no cash toll lanes are provided. The toll pricing structure would provide for collection of



higher tolls during peak travel periods. Tolls would be collected to help fund the construction and operation of the project. Trucks using the freight corridor would pay a toll in exchange for the travel time savings and trip time reliability offered by the freight corridor as compared to the adjacent general purpose lanes or alternative routes.

### 2.3.6 DESIGN OPTIONS

For Alternatives 6A/B/C, three design options for the portion of I-710 between the I-710/Slauson Ave. interchange to just south of the I-710/I-5 interchange are under consideration. These configurations will be fully analyzed so that they can be considered in the future selection of a Preferred Alternative for the project. These options are as follows:

#### 2.3.6.1 DESIGN OPTION 1

Design Option 1 applies to Alternatives 6A/B/C and provides access to Washington Blvd. using three ramp intersections at Washington Blvd.

#### 2.3.6.2 DESIGN OPTION 2

Design Option 2 applies to Alternatives 6A/B/C and provides access to Washington Blvd. using two ramp intersections at Washington Blvd.

#### 2.3.6.3 DESIGN OPTION 3

Design Option 3 applies only to Alternative 6B<sup>1</sup> and removes access to Washington Blvd. at its current location. The ramps at the I-710/Washington Blvd. interchange would be removed to accommodate the proposed freight corridor ramps in and out of the rail yards. The southbound off-ramp and northbound on-ramp access would be accommodated by Alternative 6B in the vicinity of the existing interchange by the proposed new southbound off-ramp and the northbound on-ramp at Oak St. and Indiana St. These two ramps are proposed as mixed-flow ramps (freight connector ramps that would also allow automobile traffic). However, the southbound on-ramp and the northbound off-ramp traffic that previously used the Washington Blvd. interchange would be required to access the Atlantic Blvd./Bandini Blvd. interchange located south of the existing Washington Blvd. interchange to ultimately reach I-710.

#### 2.3.6.4 ZERO-EMISSION TRUCK EXTENSION DESIGN OPTION (ALTERNATIVES 6B AND 6C ONLY).

This option will provide the ability for zero-emission trucks to operate in zero-emission mode via an extension of the overhead catenary electric power distribution system on I-710 in both the northbound and southbound directions between the northern terminus of the freight corridor

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<sup>1</sup> Design Option 3 only applies to Alternative 6B because it was not included in the travel demand modeling for either Alternative 6A or 6C.

connector ramps to/from the I-710 general purpose lanes, located south of the Bandini Blvd./I-710 interchange and the SR-60 mainline overcrossing of the I-710. These zero-emission electric trucks are assumed to receive electric power while traveling along the two outermost general purpose lanes (in each direction) via an overhead catenary electric power distribution system (road-connected power, as along the freight corridor). The zero-emission trucks exiting (northbound) or entering (southbound) the freight corridor are assumed to be operating in zero-emission mode under this design option along this segment of I-710.

## 2.4 DESIGN FEATURES OF ALTERNATIVE 5A

Design Features of Alternative 5A are described below. Details of these project features are shown in Appendix O, Concept Plans.

### 2.4.1 PERMANENT PROJECT COMPONENTS

#### 2.4.1.1 MAINLINE IMPROVEMENTS

As shown in previously referenced Figure 2.3-1 and in Appendix O, Concept Plans, the following mainline improvements are part of Alternative 5A:

- Widen the I-710 mainline (combined northbound and southbound) to eight general purpose lanes south of Pico Ave./Alondra Blvd. and ten general purpose lanes north of Del Amo Blvd. with the exception of the following:
  - Between the Alondra Blvd. northbound off-ramp and the westbound SR-91 to northbound I-710 connector; and
  - Within the I-105 interchange, between the eastbound and westbound I-105 connectors.
- Shift the freeway centerline east horizontally at the following locations:
  - Anaheim St. (100 feet)
  - Pacific Coast Hwy. (200 feet)
  - Willow St. (35 feet)
  - Wardlow St. (45 feet)
  - South of Artesia Blvd./SR-91 (40 feet)
  - Atlantic Blvd./Alondra Blvd. (80 feet)

- Imperial Hwy. (200 feet)
- South of Southern Ave. (70 feet)
- Shift the freeway centerline west horizontally at the following locations:
  - Del Amo Blvd. (120 feet)
  - Long Beach Blvd. (45 feet)
  - North of Firestone Blvd. (45 feet)
  - Florence Ave. (100 feet)

The mainline will be raised as much as eight feet above existing grade around Washington Blvd. over the BNSF Railroad's Hobart Yard and as much as five feet above existing grade over UP Railroad's East Yard.

Additional auxiliary lanes will be provided at various locations between the interchanges.

#### 24.12 FREEWAY-TO-FREEWAY INTERCHANGES

Please see Figure 2.4-1 and Appendix O (Concept Plans) for details.

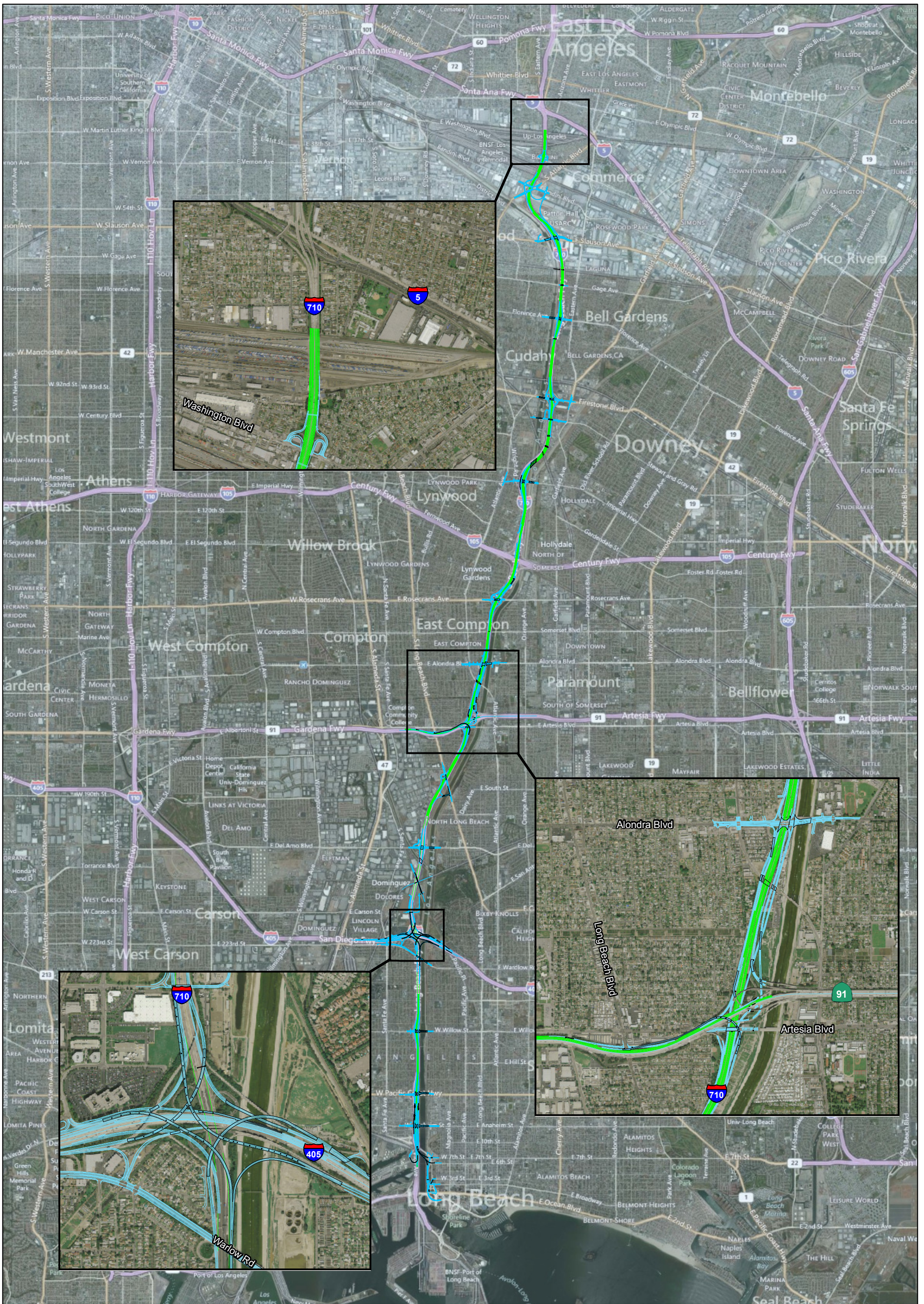
**I-710/I-405.** The following improvements will be made to the I-710/I-405 interchange:

- The existing three-quadrant cloverleaf configuration will be replaced by a four-level configuration with direct connections.
- All eight existing connectors will be realigned and replaced.
- All collector-distributor (CD) roads will be removed.

**I-710/SR-91.** The following improvements will be made to the I-710/SR-91 interchange:

- The existing internal loop for the northbound I-710 to westbound SR-91 connector will be replaced with a flyover connection.

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LEGEND

- Mainline
- Ramps, Collectors and Distributors
- Elevated Structure



0 3750 7500  
Feet

SOURCE: Bing (2009); URS(05/2011)

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FIGURE 2.4-1

*I-710 Corridor Project EIR/EIS*  
Alternative 5A Improvements to  
Freeway to Freeway Interchanges

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- The westbound SR-91 to northbound I-710 connector will retain an alignment close to its existing alignment, but will be braided<sup>1</sup> with the northbound Alondra Blvd. off-ramp and the eastbound SR-91 to the northbound I-710 connector.
- The eastbound SR-91 to northbound I-710 connector will be moved to tie in north of the westbound SR-91 to the northbound I-710 connector. This connector will also be braided with the northbound Alondra Blvd. off-ramp to separate the two movements. This will require new structures that continue over Atlantic Blvd.
- The southbound I-710 to eastbound SR-91 connector will be braided with the southbound Alondra Blvd. on-ramp to separate the two movements.
- There will also be a braid between the new flyover northbound I-710 to the westbound SR-91 connector and the Long Beach Blvd. on-ramp along westbound SR-91.
- The SR-91 connectors will separate from northbound I-710 altogether and split into a new flyover connector, followed by a split in the Artesia Blvd. off-ramp, and will continue to the existing alignment of the northbound I-710 to the eastbound SR-91 connector.

**I-710/I-105.** The following improvements will be made to the I-710/I-105 interchange:

- The northbound I-710 to the eastbound I-105 connector will diverge near the existing divergence location. A new separation structure is required on the connector approach to accommodate the new Rosecrans Ave. on-ramp alignment that will pass below.
- A new one-lane slip ramp will be added to connect the westbound I-105 to the southbound I-710 connector to the southbound Rosecrans Ave. off-ramp.
- The southbound divergence locations for the eastbound and westbound I-105 connectors will be reconstructed.

#### 2.4.1.3 LOCAL ARTERIAL INTERCHANGES AND RELATED ROADWAY IMPROVEMENTS

Improvements will be made to the local arterial interchanges listed in Table 2.4-1. Please refer to Figure 2.4-2 for detail regarding these improvements. Appendix O, Concept Plans can also be referenced for detailed plans of the entire I-710 Corridor Project.

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<sup>1</sup> A braided ramp is a ramp that passes over or under another ramp on a structure.

**Table 2.4-1 Local Interchanges, Crossings, and Frontage Roads with  
I-710 – Alternative 5A**

No.	Location	Improvements
1	Ocean Blvd.	Widen between the bridge over Shoreline Dr. and Golden Shore St. to provide right-turn lanes in each direction
2	Golden Shore St.	Realign and reconstruct between Ocean Blvd. and Broadway
3	Pico Ave.	<ul style="list-style-type: none"> <li>▪ NB on-ramp structure will be replaced by a metered single-lane on-ramp</li> <li>▪ Relocation of SB off-ramp 0.5 mile north of Anaheim St.</li> </ul>
4	Shoemaker Bridge/ Shoreline Dr.	Replacement to two-lane left-hand-side on- and off-ramps and removal of 9th and 10th St. ramps
5	Broadway	Realign and reconstruct between Shoreline Dr. and Golden Shore St.
6	3rd St.	Realign and reconstruct between Shoreline Dr. and Golden Ave.
7	6th St.	Replace to tie into the existing alignment west of Maine Ave.
8	7th St.	Replace to tie into the existing alignment west of Maine Ave.
9	Anaheim St.	Existing four-quadrant cloverleaf configuration will be replaced by a single-point urban interchange configuration
10	Pacific Coast Hwy.	Existing four-quadrant configuration will be replaced by a single-point urban interchange configuration
11	Willow St.	Existing four-quadrant cloverleaf configuration will be replaced by a single-point urban interchange configuration
12	Del Amo Blvd.	Existing modified three-quadrant cloverleaf configuration will be replaced by a single-point urban interchange configuration
13	Susana Rd.	Realign and reconstruct for approximately 1,500 feet to include two lanes in each direction from Del Amo Blvd. to the north
14	208th St.	Realign and reconstruct north of its current alignment from 800 feet west of the I-710 mainline to the Metro Rail Blue Line maintenance facility
15	Carson St.	Extend from the Dominguez Retention Basin to the Metro Rail Blue Line maintenance facility and widen to one lane in each direction
16	Via Alcade Ave.	Relocate to the west in its current lane configuration
17	Long Beach Blvd.	<ul style="list-style-type: none"> <li>▪ Existing one-quadrant cloverleaf configuration will be modified and the SB I-710 to WB Long Beach Blvd. off-ramp will be removed</li> <li>▪ Widen SB I-710 loop off-ramp</li> <li>▪ WB off-ramp to Long Beach Blvd. braided with the NB I-710 to WB SR-91 connector</li> <li>▪ Two through lanes in each direction</li> </ul>
18	Artesia Blvd.	EB Artesia Blvd. on-ramp to SB I-710 will merge with the EB SR-91 to SB-710 connector alongside Coolidge Park
19	Alondra Blvd.	Existing partial cloverleaf/tight diamond configuration will be replaced with a single-point urban interchange
20	Rosecrans Ave.	<ul style="list-style-type: none"> <li>▪ SB Rosecrans Ave. off-ramp will split off the collector-distributor road and pass below the entrance connector from I-105</li> <li>▪ Rosecrans Ave. will be reconstructed to two through lanes in each direction between the Los Angeles River bridge and Gibson Ave.</li> <li>▪ East of Gibson Ave., a dedicated ramp lane will be added on EB Rosecrans Ave., connecting to the SB I-710 on-ramp</li> </ul>



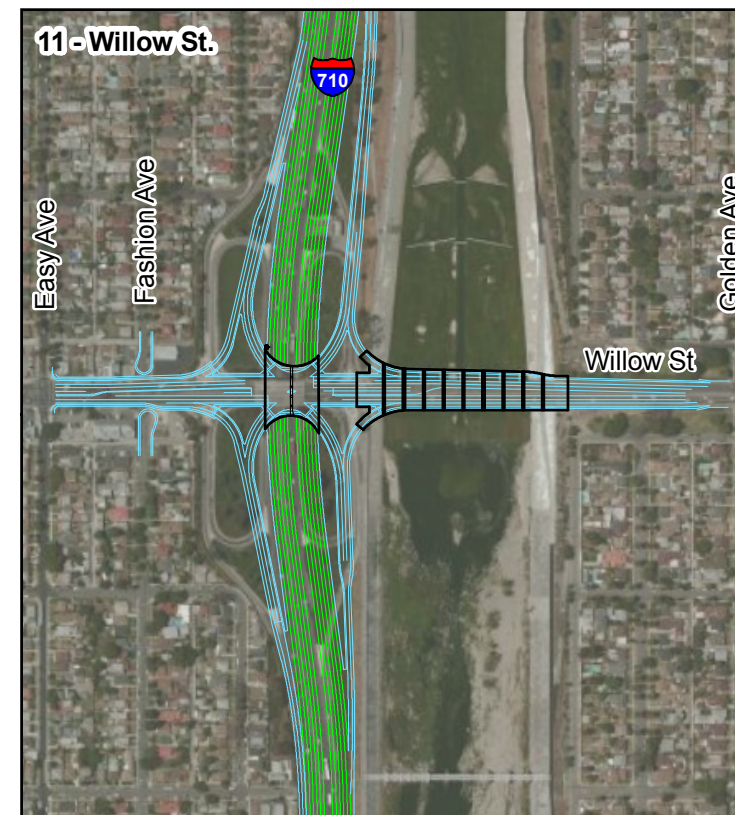
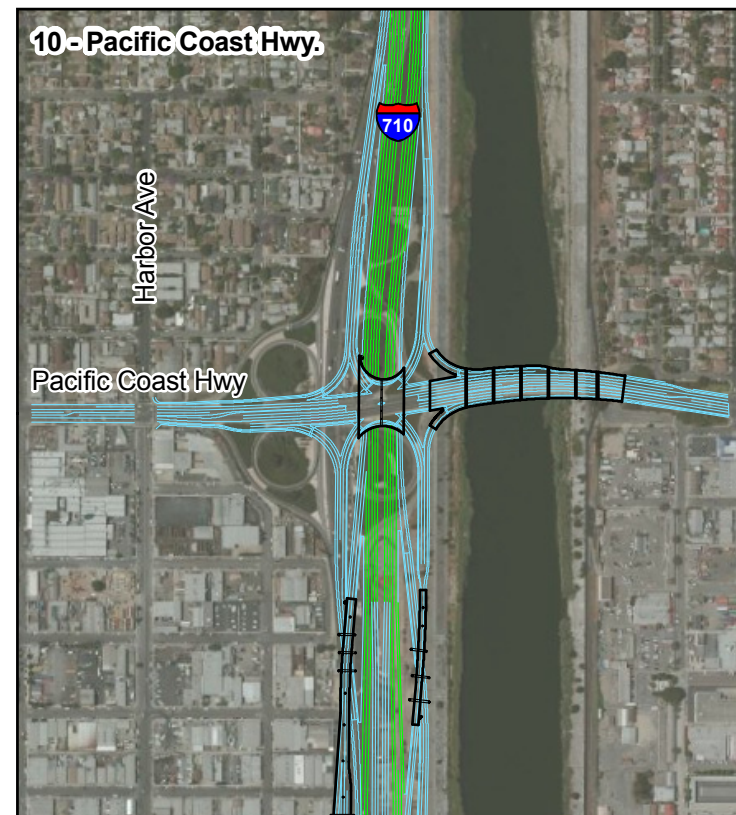
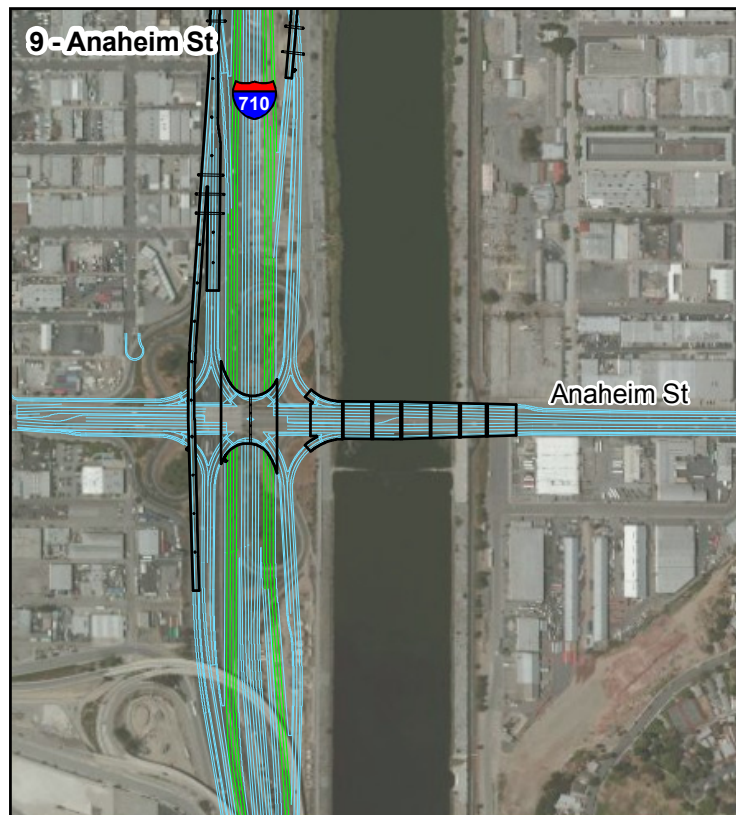
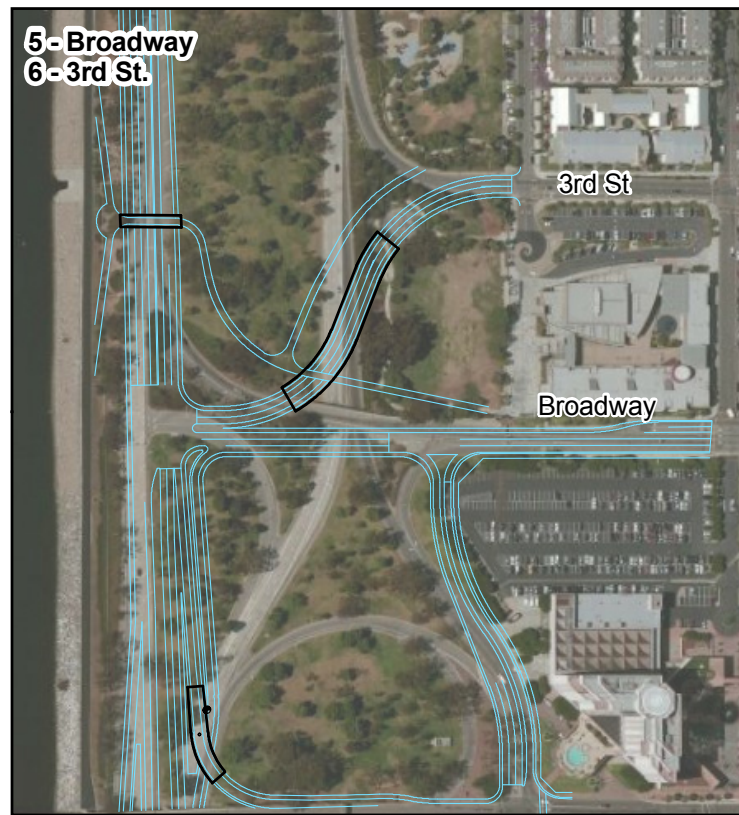
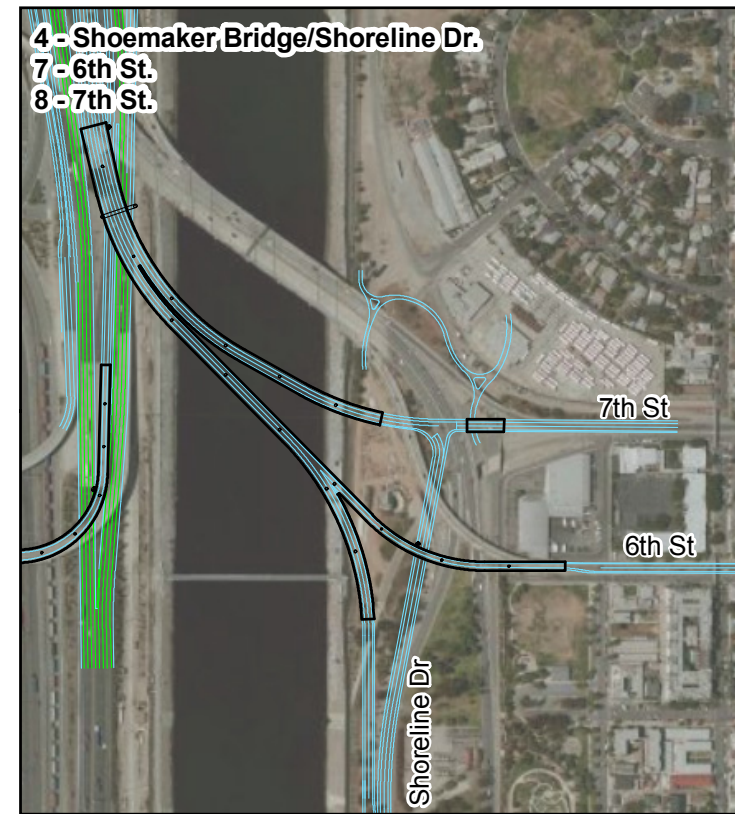
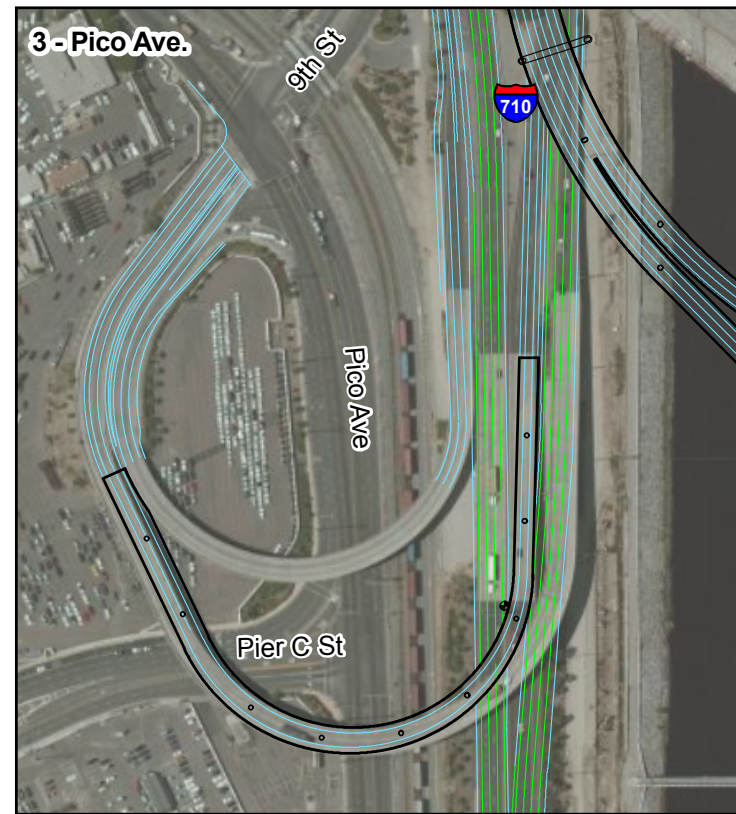
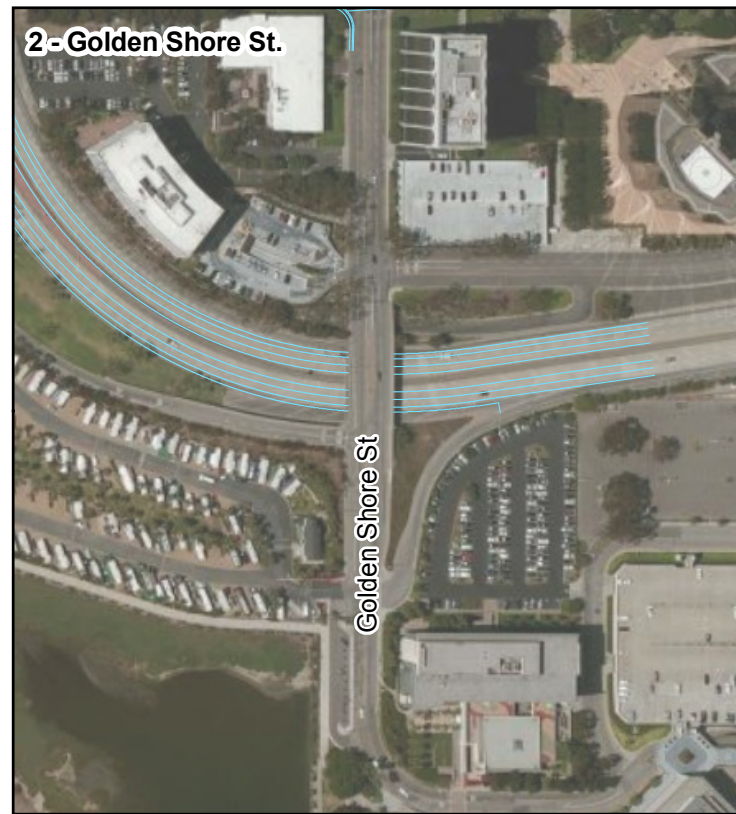
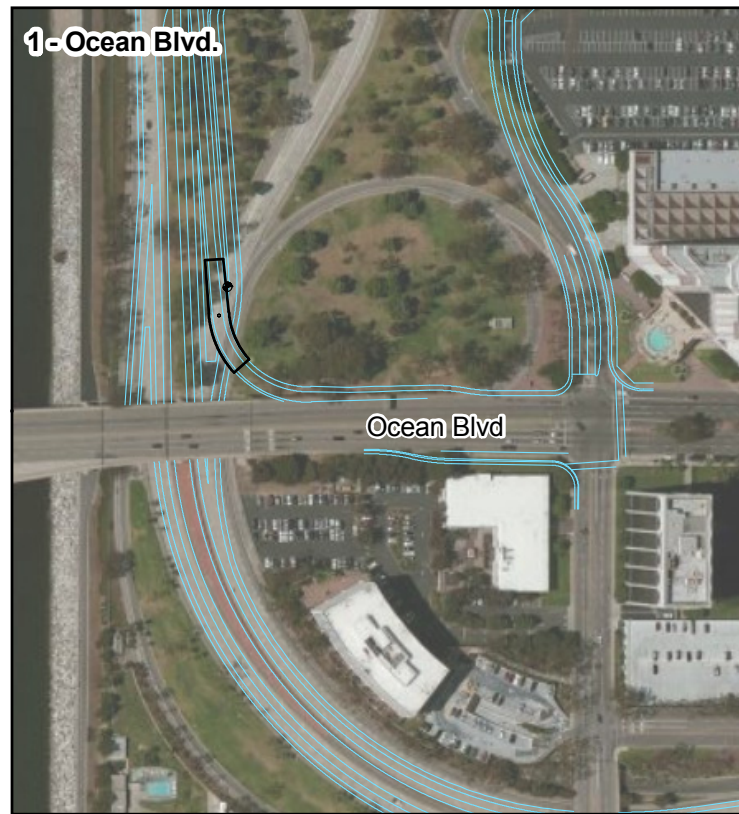
**Table 2.4-1 Local Interchanges, Crossings, and Frontage Roads with I-710 – Alternative 5A**

No.	Location	Improvements
21	Martin Luther King Jr. Blvd.	SB one-lane off-ramp will be moved further north, combining with the SB Imperial Hwy. off-ramp
22	Imperial Hwy.	<ul style="list-style-type: none"> <li>▪ Existing modified four-quadrant cloverleaf configuration will be replaced by a single-point urban interchange.</li> <li>▪ Imperial Hwy. will be reconstructed to three through lanes in each direction between Wright Rd. and the Los Angeles River bridge</li> </ul>
23	Southern Ave.	New overcrossing will span I-710, the Los Angeles River, and frontage roads
24	E. Frontage Rd.	Reconstruct but will remain a two-way street with one lane in each direction
25	W. Frontage Rd.	Addition of two-way street extending from W. Frontage Rd. to connect to Southern Ave.
26	Firestone Blvd.	<ul style="list-style-type: none"> <li>▪ Existing partial cloverleaf configuration will be retained. However, the interchange will be entirely reconstructed with a new overcrossing and new ramps</li> <li>▪ Firestone Blvd. will be reconstructed to three through lanes in each direction between National Ave. and the Los Angeles River bridge</li> </ul>
27	Florence Ave.	Existing four-quadrant configuration will be replaced by a single-point urban interchange configuration
28	Slauson Ave.	New connection to I-710 and will feature a single-point urban interchange configuration
29	Atlantic Blvd./Bandini Blvd. Interchange	Replaced by a two-quadrant cloverleaf
30	Bandini Blvd.	Reconstruct to carry three through lanes in each direction
31	Atlantic Blvd.	Realign and reconstruct between the Los Angeles River bridge and the 26th St. overcrossing
32	Washington Blvd.	The existing NB and SB ramps will be modified to meet the reconstruction and widening of the I-710 mainline

EB = eastbound  
 I-710 = Interstate 710  
 NB = northbound

SB = southbound  
 WB = westbound

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LEGEND

- Mainline
- Ramps, Collectors and Distributors
- Elevated Structure



NO SCALE

SOURCE: Bing Maps (c.2008)

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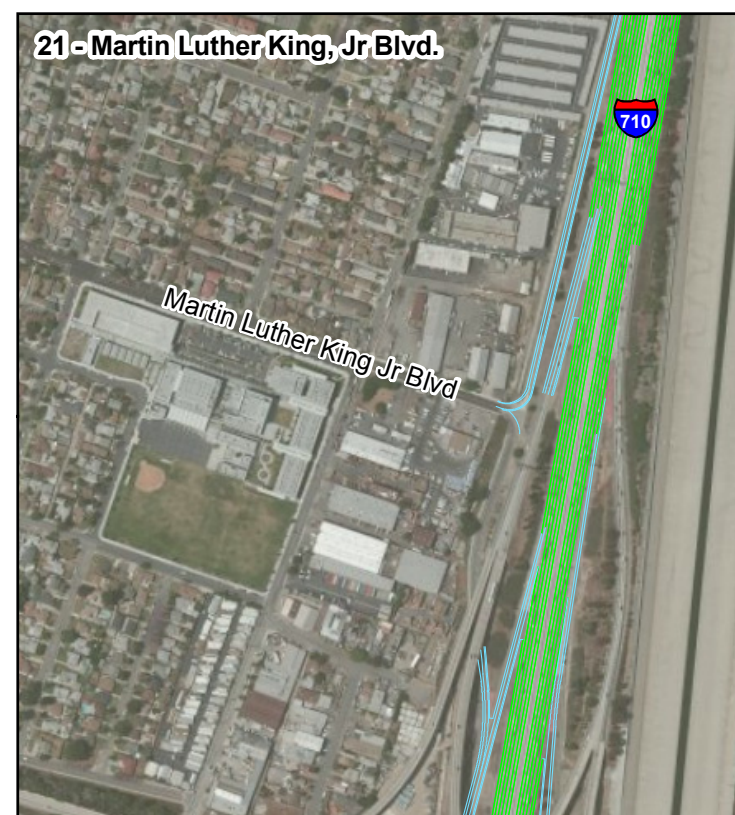
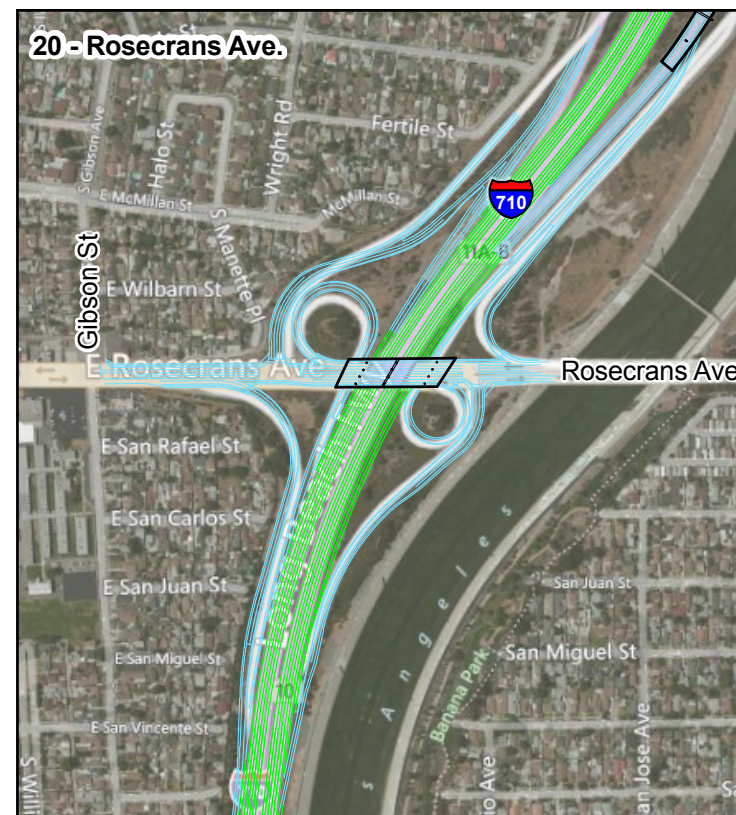
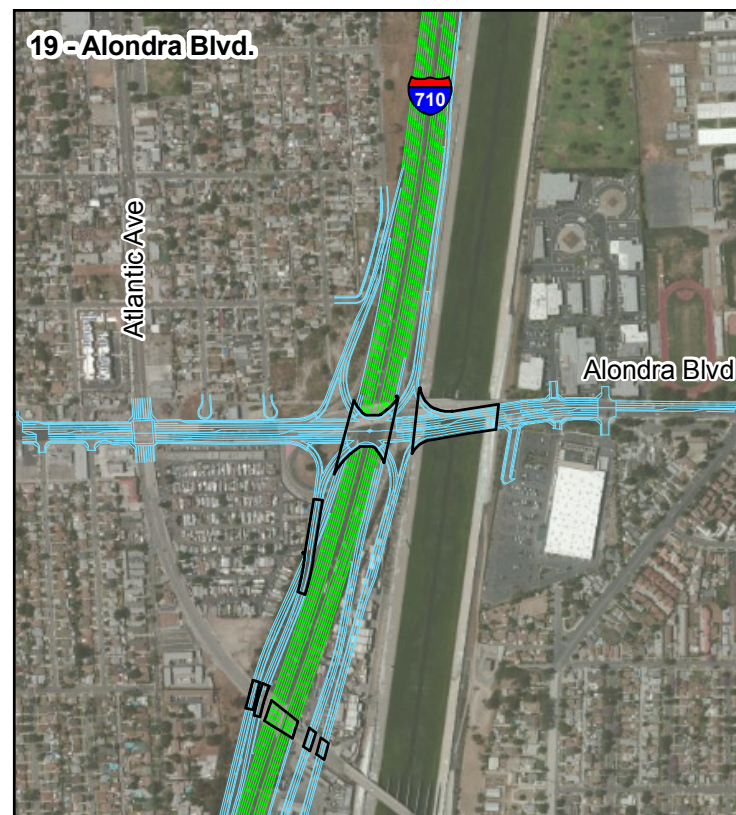
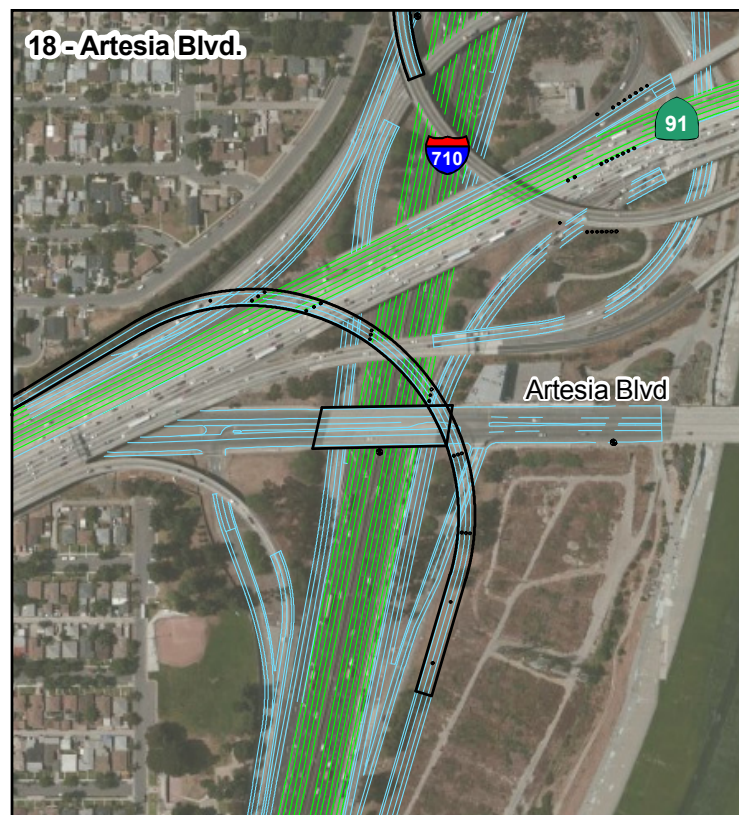
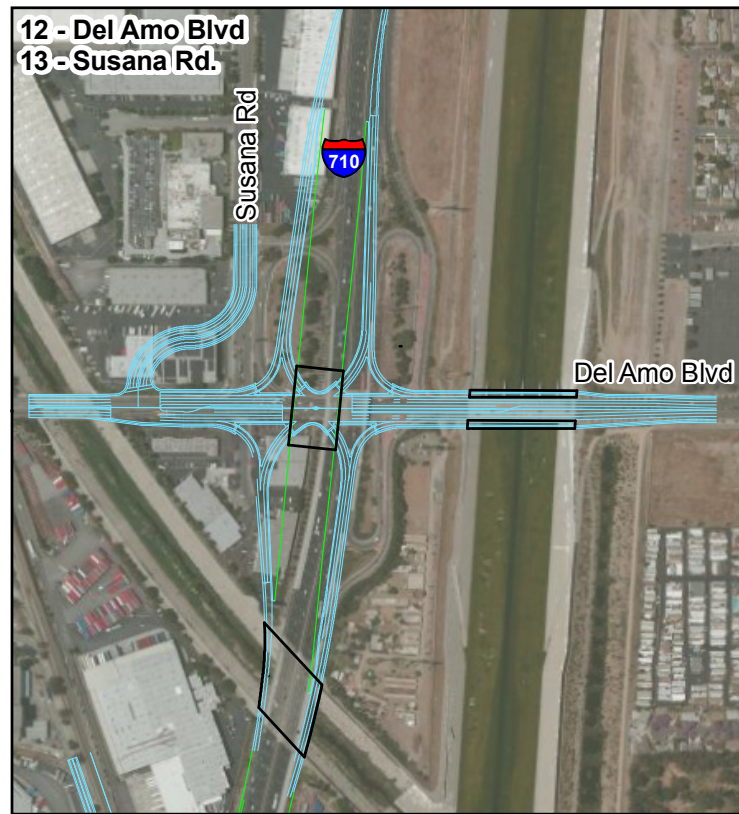
FIGURE 2.4-2

Sheet 1 of 3

I-710 Corridor Project EIR/EIS  
Alternative 5A Improvements to Local Arterial  
Interchanges, Crossings, and Frontage Roads

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LEGEND

- Mainline
- Ramps, Collectors and Distributors
- Elevated Structure



NO SCALE

SOURCE: Bing Maps (c.2008)

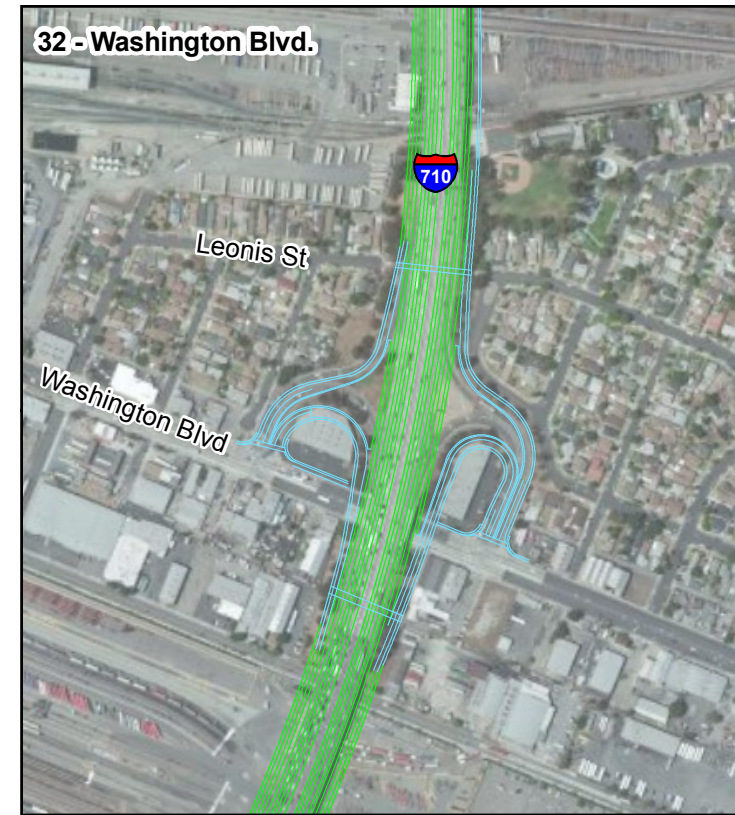
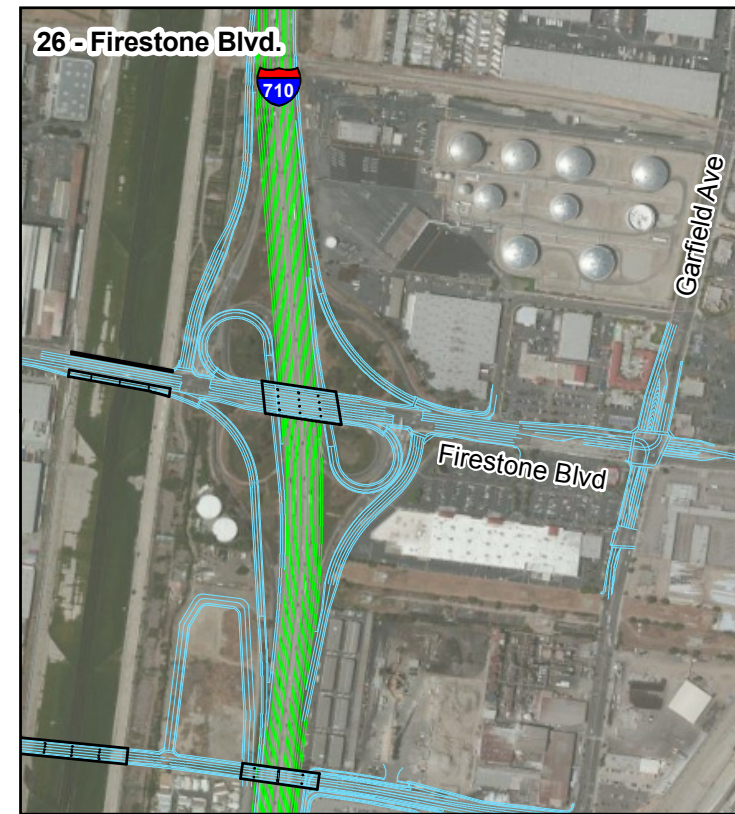
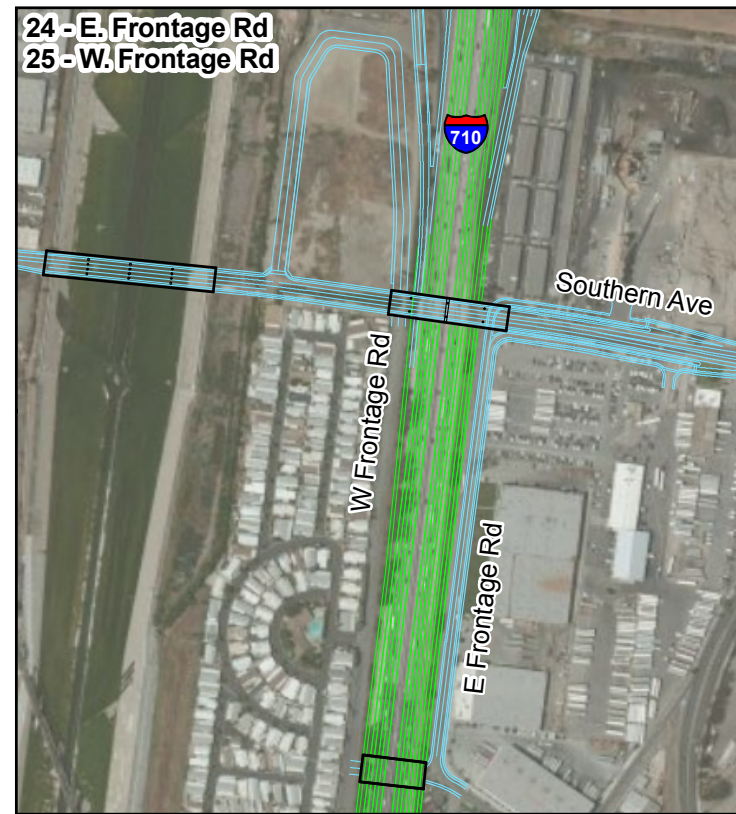
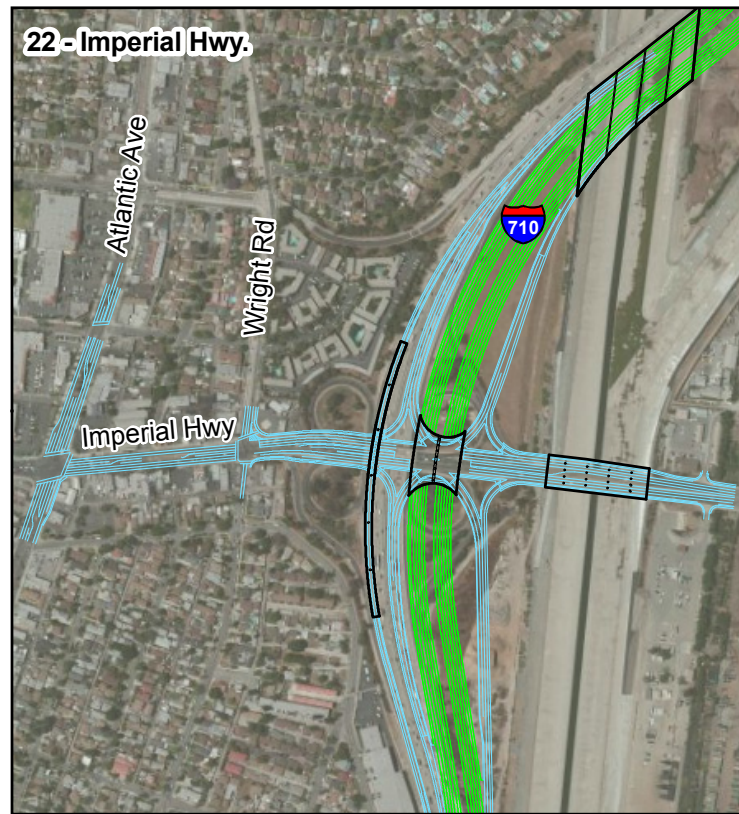
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FIGURE 2.4-2  
Sheet 2 of 3

I-710 Corridor Project EIR/EIS  
Alternative 5A Improvements to Local Arterial  
Interchanges, Crossings, and Frontage Roads

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LEGEND

- Mainline
- Ramps, Collectors and Distributors
- Elevated Structure



NO SCALE

SOURCE: Bing Maps (c.2008)  
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FIGURE 2.4-2  
 Sheet 3 of 3

*I-710 Corridor Project EIR/EIS*  
 Alternative 5A Improvements to Local Arterial  
 Interchanges, Crossings, and Frontage Roads

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#### 24.14 ARTERIAL INTERSECTION IMPROVEMENTS

Improvements to 42 local arterial intersections within the Study Area are also proposed as part of Alternative 5A. Table 2.4-2 lists these intersections, and Figure 2.4-3 shows their locations. These improvements generally consist of lane restriping or minimal widening to provide additional intersection turn lanes that will reduce traffic delay and improve intersection operations for those intersections with project level of service (LOS) F.

#### 24.15 BRIDGES

Bridges under Alternative 5A that will be widened, replaced, added, or removed are shown on Figure 2.4-4.

#### 24.16 MAJOR DRAINAGE FACILITIES

Under Alternative 5A, a total of 24 river channel structures (roadway bridges) would be modified, including 22 Los Angeles River locations, one Compton Creek location, and one Rio Hondo location. Construction of new columns or piers and extension of existing piers will occur at each of these locations, all oriented to the channel flow direction within the existing channels. Additionally, there will be modifications to existing pump stations and new pump stations added; and potential locations for detention basins and biofiltration swales/biofiltration strips.<sup>1</sup> Figure 2.4-5 shows these facilities.

#### 24.17 RETAINING WALLS

Retaining walls are required to retain fill or cut slopes to minimize the need to acquire additional right-of-way throughout the I-710 Corridor. Retaining walls are also required along the outside shoulder in many locations throughout the Study Area to reduce impacts and minimize additional right-of-way requirements. The wall locations for both build alternatives are shown in Appendix O, Concept Plans. The outside shoulder retaining walls' heights will range from approximately two feet to 15 feet.

#### 24.18 MAJOR UTILITY RELOCATIONS

Implementation of Alternative 5A will necessitate substantial relocation of existing utilities. The relocation of existing utilities is a component of the project description, and the relocated utility infrastructure is included in the project footprint/disturbance limits. The effects of the utility relocation are evaluated in this EIR/EIS, including the short-term construction effects of demolition and construction, as well as the long-term effects of operation of the new utility

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<sup>1</sup> A bioswale is a landscape element designed to remove silt and pollution from surface runoff water.

**Table 2.4-2 Arterial Intersection Improvements**

<b>No.<sup>1</sup></b>	<b>Location</b>	<b>Improvements</b>
13	Anaheim/Magnolia	Add separate left-turn lane on NB approach
14	Anaheim/Pacific	Add separate left-turn lane on NB and SB approaches Add separate right-turn lane on EB and WB approaches
16	Anaheim St./Cherry St.	Add separate right-turn lane on EB approach
18	Alameda St./O St.	Restripe to add an extra right-turn lane on WB approach
20	Pacific Coast Hwy./ Pacific Ave.	Add a separate right-turn lane on EB and WB approaches
21	Pacific Coast Hwy./ Long Beach Blvd.	Add a separate left-turn lane on EB and WB approaches
25	Sepulveda Blvd./ Alameda St.	Add a WB right-turn lane and a SB through lane. Restripe NB through/left-turn lane to NB left-turn lane and SB through/left-turn lane to SB left-turn lane.
28	Willow St./Long Beach Blvd.	Add an extra left-turn lane on EB and WB approaches
29	Willow St./Atlantic Ave.	Add a left and right-turn lane on NB and SB approaches
30	Willow St./Cherry Ave.	Add a separate right-turn lane on EB and WB approaches Add an extra left-turn lane on NB approach
35	Del Amo Blvd./Long Beach Blvd.	Add an extra left-turn lane on NB and SB approaches
36	Del Amo Blvd./ Atlantic Ave.	Add an extra left-turn lane on NB and SB approaches
37	Del Amo Blvd./Cherry Ave.	Add an extra left-turn lane EB, WB and SB approaches
38	Del Amo Blvd./ Lakewood Blvd.	Add an additional left-turn lane on all approaches
39	Artesia Blvd./Long Beach Blvd.	Add an additional left-turn lane (change from single to double) on WB approach
41	Alondra Blvd./Santa Fe Ave.	Add a separate right-turn lane on NB approach
44	Alondra Blvd./ Garfield Ave.	Add a separate left-turn lane on NB and SB approaches
45	Alondra Blvd./ Paramount Blvd.	Add a separate left-turn lane on WB approach
48	Rosecrans Ave./Santa Fe Ave.	Add a left-turn lane (change from single to dual left) on WB approach
49	Rosecrans Ave./Long Beach Blvd.	Add separate right-turn lanes on EB and WB approaches Add an additional left-turn lane (change from single to dual left) on both NB and SB approaches
50	Rosecrans Ave./ Atlantic Ave.	Add separate right-turn lanes on all four approaches Add a left-turn lane (change from single to dual left) on all four approaches
51	Rosecrans Ave./ Garfield Ave.	Add a left-turn lane (change from single to dual left) on NB, SB and EB approaches
52	Rosecrans Ave./ Paramount Blvd.	Add a separate right-turn lane on NB approach
54	Imperial Hwy./Long Beach Blvd.	Add a left-turn lane (change from single to dual left) on WB approach

**Table 2.4-2 Arterial Intersection Improvements**

No. <sup>1</sup>	Location	Improvements
55	Imperial Hwy./Atlantic Ave.	Add a left-turn lane (change from single to dual left) on NB and SB approaches
57	Imperial Hwy./Paramount Blvd.	Add an extra left-turn lane (change from single to dual left) on both WB and SB approaches
59	Firestone Blvd./California Ave.	Add separate right-turn lane on NB and SB approaches Add a left-turn lane (change from single to dual left) on NB and SB approaches
60	Firestone Blvd./Atlantic Ave.	Add separate right-turn lanes on EB approach Add a left-turn lane (change from single to double left) on WB and NB approaches
61	Firestone Blvd./Garfield Ave.	Add a separate left-turn lane on EB approach Add a separate right-turn lane on NB approach
62	Firestone Blvd./Paramount Blvd.	Add separate right-turn lane on WB approach Add a left-turn lane (change from single to dual left) on all approaches
63	Florence Ave./Alameda St.	Add separate right-turn lane on NB, SB, and WB approaches Add a left-turn lane (change from single to dual left) on WB approach
64	Florence Ave./Atlantic Ave.	Add a separate right-turn lane on SB approach Add a left-turn lane (change from single to dual left) on NB approach
68	Slauson Ave./Alameda St.	Add a separate right-turn lane on SB approach
69	Slauson Ave./Soto St.	Add separate right-turn lanes on NB and SB approaches
71	Slauson/Eastern	Add separate left-turn lane on NB and SB approaches
73	Slauson/Garfield Ave.	Add a separate right-turn lane on NB and SB approaches
106	Humphreys/Cesar Chavez	Restripe to provide a two-way left-turn lanes on EB and WB approaches
146	Santa Fe Ave./223rd St.-Wardlow Rd.	Add a left-turn lane (change from single to dual left) on the WB approach Add a right-turn lane (change from single to dual right) on the SB approach
151	Slauson Ave./Santa Fe Ave.	Add separate right-turn lane on NB and SB approaches Add a left-turn lane (change from single to dual left) on the EB and WB approaches
152	Pacific Blvd./Gage Ave.	Add a separate right-turn lane on NB approach
153	Santa Fe Ave./Gage Ave.	Add a separate right-turn lane on EB and WB approaches Add an extra left-turn lane (change from single to dual left) on the NB and SB approaches
161	Del Amo Blvd./Susana Rd.	Add a left-turn lane (change from single to dual left) on SB approach Add a separate left-turn lane on NB approach Restripe SB through/left-turn lane to SB through lane

Source: Traffic Impact Analysis, URS 2011.

<sup>1</sup> Intersection numbers are not sequential. The intersection numbers were assigned in the Traffic Impact Analysis (URS 2011) that evaluated over 150 intersections in the I-710 Corridor Project Study Area.

EB = Eastbound  
NB = Northbound

SB = Southbound  
WB = Westbound

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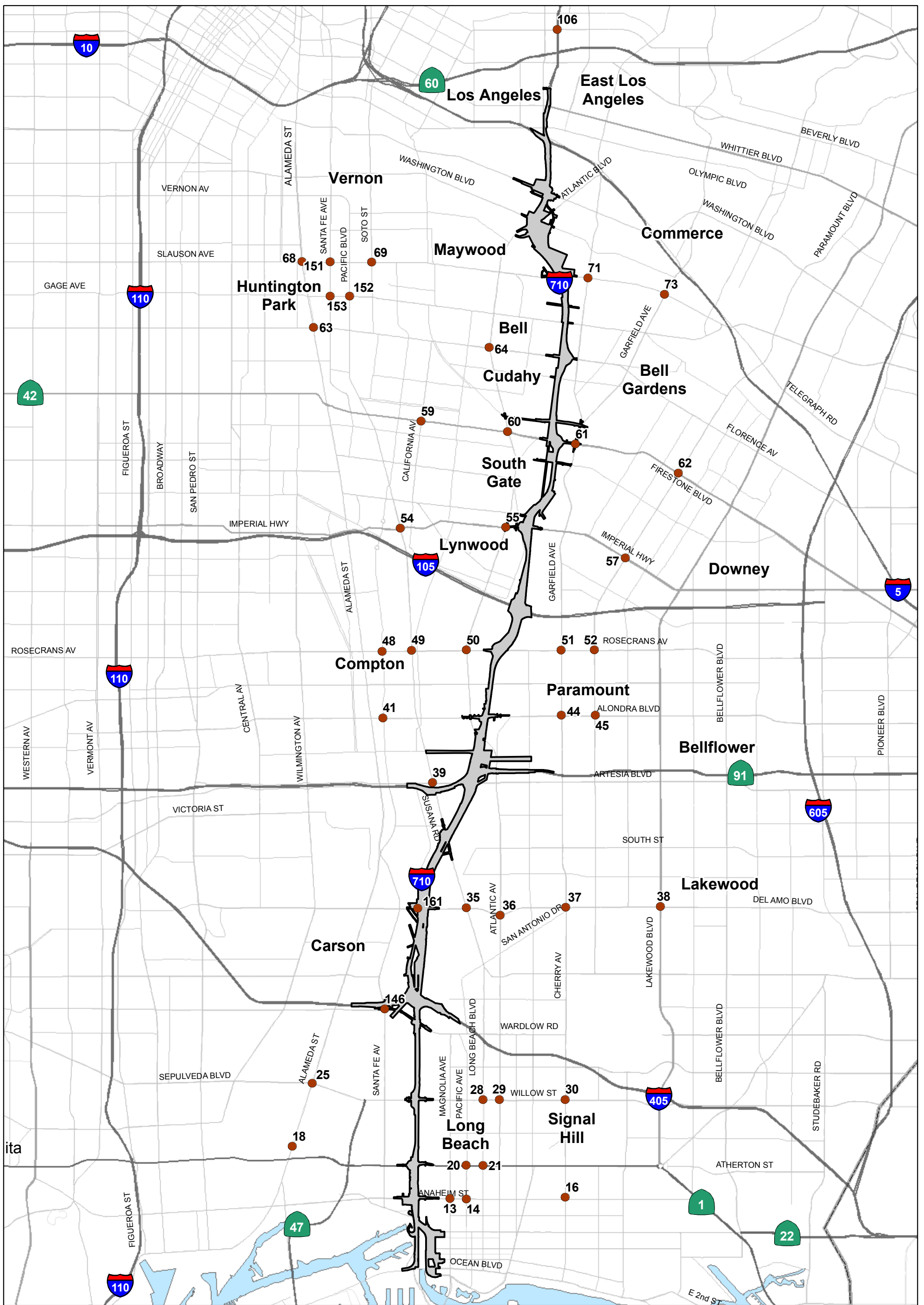
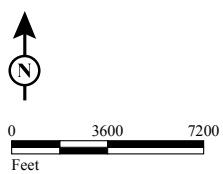


FIGURE 2.4-3

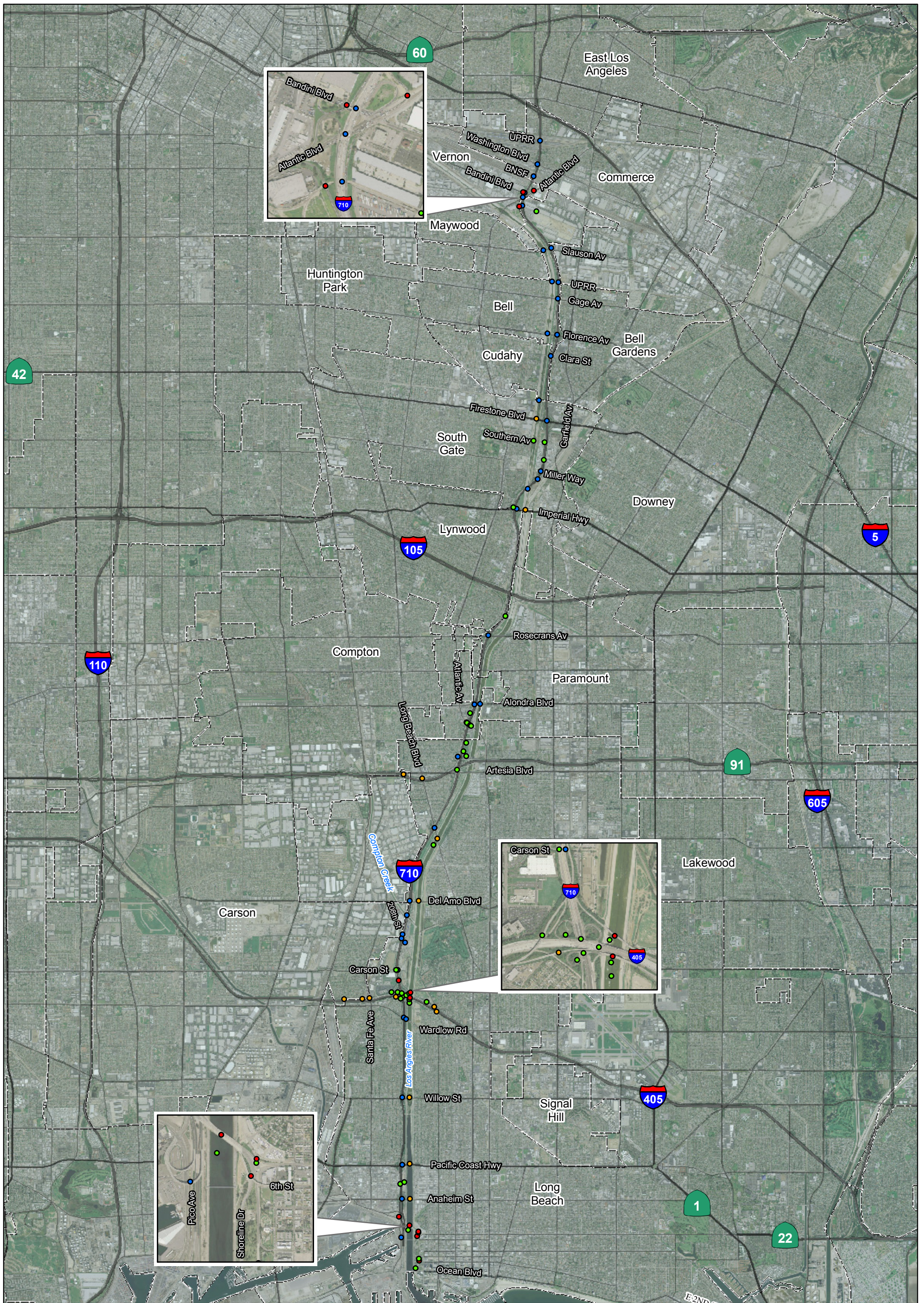
LEGEND

- Project Location
- Arterial Intersection Improvements



Note: Intersection numbers are not sequential. The intersection numbers were assigned in the Traffic Impact Analysis (URS 2011) that evaluated over 150 intersections in the I-710 Corridor Project study area.

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LEGEND

- New Structure
- Replace Structure
- Widen Structure
- Remove Structure

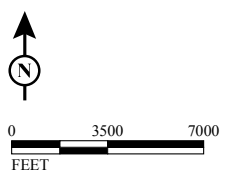
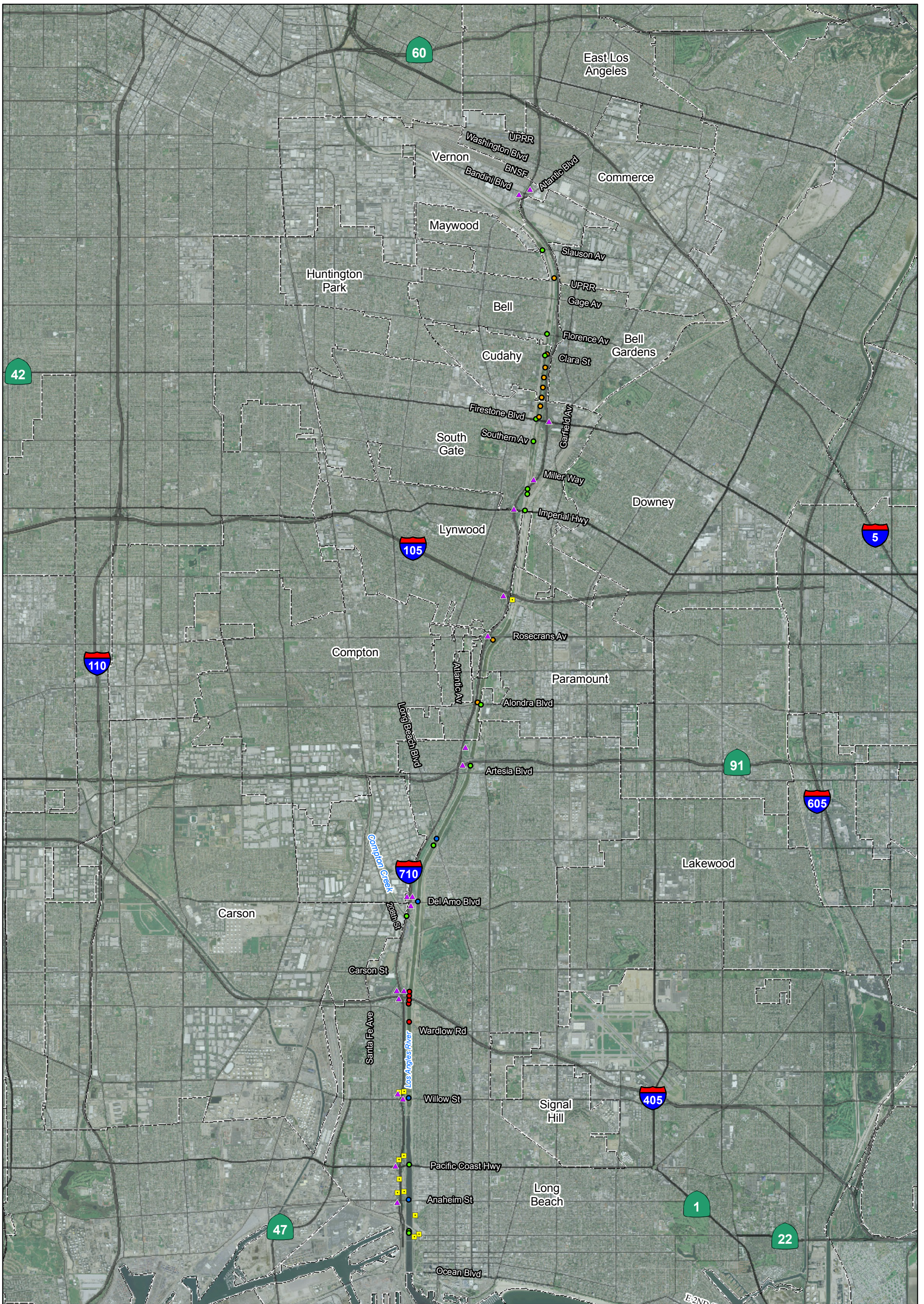


FIGURE 2.4-4

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LEGEND

- Levee modification
- New bents/pier walls
- Extended bents/pier walls
- Replacement of bents/pier walls
- Pump Station
- ▲ Detention Basin/Bioswale

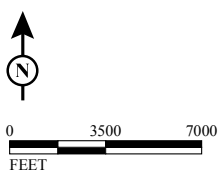


FIGURE 2.4-5

I-710 Corridor Project EIR/EIS

Alternative 5A - Major Drainage Facilities

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infrastructure. A full list of required utility locations can be found in the *I-710 Utility Impacts Report*.

The footprint/disturbance limits, as depicted in the *I-710 Utility Impacts Report*, show the limits of grading necessary to construct the build alternatives. The right-of-way limits, as shown on the detailed maps, are the areas that would be acquired permanently for the build alternatives and that would become State-owned right-of-way for the I-710 Corridor. The right-of-way limits also include permanent easements, as well as areas acquired by Caltrans and relinquished to appropriate cities and/or County of Los Angeles. The anticipated footprint/disturbance limits include grading limits, remedial grading limits, access roads for utilities, utility relocations, erosion control features and materials, bridge improvements and equipment storage areas, and right-of-way limits for the build alternatives.

Some of the project-related utility relocations will require authorization from the California Public Utilities Commission (CPUC). The CPUC has been identified as a Responsible Agency under CEQA. CPUC-approval actions would occur after the EIR/EIS has been certified for the I-710 Corridor Project and the CEQA clearance process is complete. It is anticipated that the CPUC will conduct an independent review of the I-710 Corridor Project EIR/EIS; based on the results of the review, make findings required by Section 15091 of the CEQA Guidelines for each significant effect of the project; and make the findings required by Section 15093 of the CEQA Guidelines, if necessary. The CPUC would also file a Notice of Determination that states it considered the EIR/EIS as prepared by the Lead Agency, and it (CPUC) may then rely on the I-710 Corridor Project EIR/EIS for the issuance of needed permits and approvals. Some of the relocations will be subject to the requirements of GENERAL ORDER (GO) 131-D, SECTION III.A, CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY (CPCN) FOR TRANSMISSION LINE FACILITIES AND SUBSTATIONS THAT OPERATE AT 200 KV OR MORE, which will occur after certification of the I-710 Corridor Project EIR/EIS but prior to approval of utility relocation or grading plans.

Caltrans and Metro are working collaboratively with the utility providers to identify detailed utility relocation requirements for each affected utility. As a result of this coordination, SCE has provided Caltrans and Metro a preliminary project description for the relocation of all SCE facilities that may be affected by the build alternatives. A copy of this preliminary project description is provided in Appendix J, Comments and Coordination. This preliminary project description is based on planning level assumptions and will continue to be refined as more detailed engineering is performed, but was used as a reference in considering the effects of these relocations in this Draft EIR/EIS for the I-710 Corridor Project.

Utility relocations are grouped into the following categories:

- Protect existing utilities in place;
- Replace utilities with new facilities within existing alignments; and
- Replace utilities with new facilities on new alignments.

Discussion of impacts to utilities is provided in Section 3.4, Utilities and Emergency Services. In recognition of the complex utility relocations required for the I-710 Corridor Project, Metro has initiated the preparation of three comprehensive utility relocation studies for the South, Central, and North segments of I-710. The purpose of these studies is to identify utility relocation strategies needed in greater detail now, rather than waiting for final design to begin. As the relocation requirements continue to be refined, additional information may be addressed in the Final EIR/EIS for the I-710 Corridor Project. Refinements to the utility relocation plan after CEQA and NEPA approvals of the I-710 Corridor Project will be subject to subsequent consideration of the potential effects of the adjustments on the proposed relocations. At that time, a determination will be made as to the level of subsequent environmental documentation, if any, that will be required pursuant to Section 21166 of CEQA and Sections 15162 through 15164 of the State CEQA Guidelines, and 40 Code of Federal Regulations (CFR) 1502.9 of the Council on Environmental Quality (CEQ) NEPA Regulations.

All utility relocation planning will be made in concert with the utility provider, with due consideration of system capacity and needs, access and maintenance needs, long-term utility planning considerations, and the transportation improvements necessary to allow the safe and efficient movement of people and goods through the I-710 Corridor. The proposed utility relocation plans will not preclude the evaluation of a reasonable range of alternatives by utility providers in their own future utility corridor studies.

#### 2.4.1.9 TSM/TDM, TRANSIT, AND ITS FACILITIES

Although TSM/TDM measures alone could not satisfy the purpose and need of the I-710 Corridor Project, the following TSM/TDM measures have been incorporated into Alternative 5A for the I-710 Corridor Project:

- Additional ramp metering locations:
  - Eastbound and westbound Anaheim St. to northbound and southbound I-710
  - Eastbound and westbound Willow St. to northbound and southbound I-710

- Eastbound and westbound Pacific Coast Hwy. to northbound and southbound I-710
  - Wardlow Rd. to northbound I-710
- Improved signage on I-710 (e.g., added overhead signs, advanced notification, and changeable message signs).
- Arterial parking restrictions (e.g., no curb parking permitted) during peak periods (e.g., 6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m.) to increase traffic capacity by one lane in each direction at the following locations (shown in Figure 2.4-6):
  - Atlantic Blvd. between Pacific Coast Hwy. and SR-60
  - Cherry Ave./Garfield Ave. between Pacific Coast Hwy. and SR-60
  - Eastern Ave. between Cherry Ave. and Atlantic Blvd.
  - Long Beach Blvd. between San Antonio Dr. and Firestone Blvd.
- Increased service on all Metro Rapid route and local bus routes in the Study Area including:
  - Express bus service
    - Expansion of existing high speed bus service on freeways (e.g., I-605)
    - Increase in corridor Metro Rapid service frequency by about 33 percent, reducing headways by 50 percent (from ten minutes to five minutes) on all Metro Rapid routes in the Study Area
  - Local bus service
    - Increase corridor local bus service (service frequency) by about 68 percent: for bus routes in the Study Area (both Metro and Long Beach Transit), reducing headways greater than 20 minutes by 50 percent and headways less than 20 minutes to ten minutes
    - Expansion of existing community bus service (e.g., local circulators Montebello Transit, Compton Renaissance Transit System, and East Los Angeles Shuttle)

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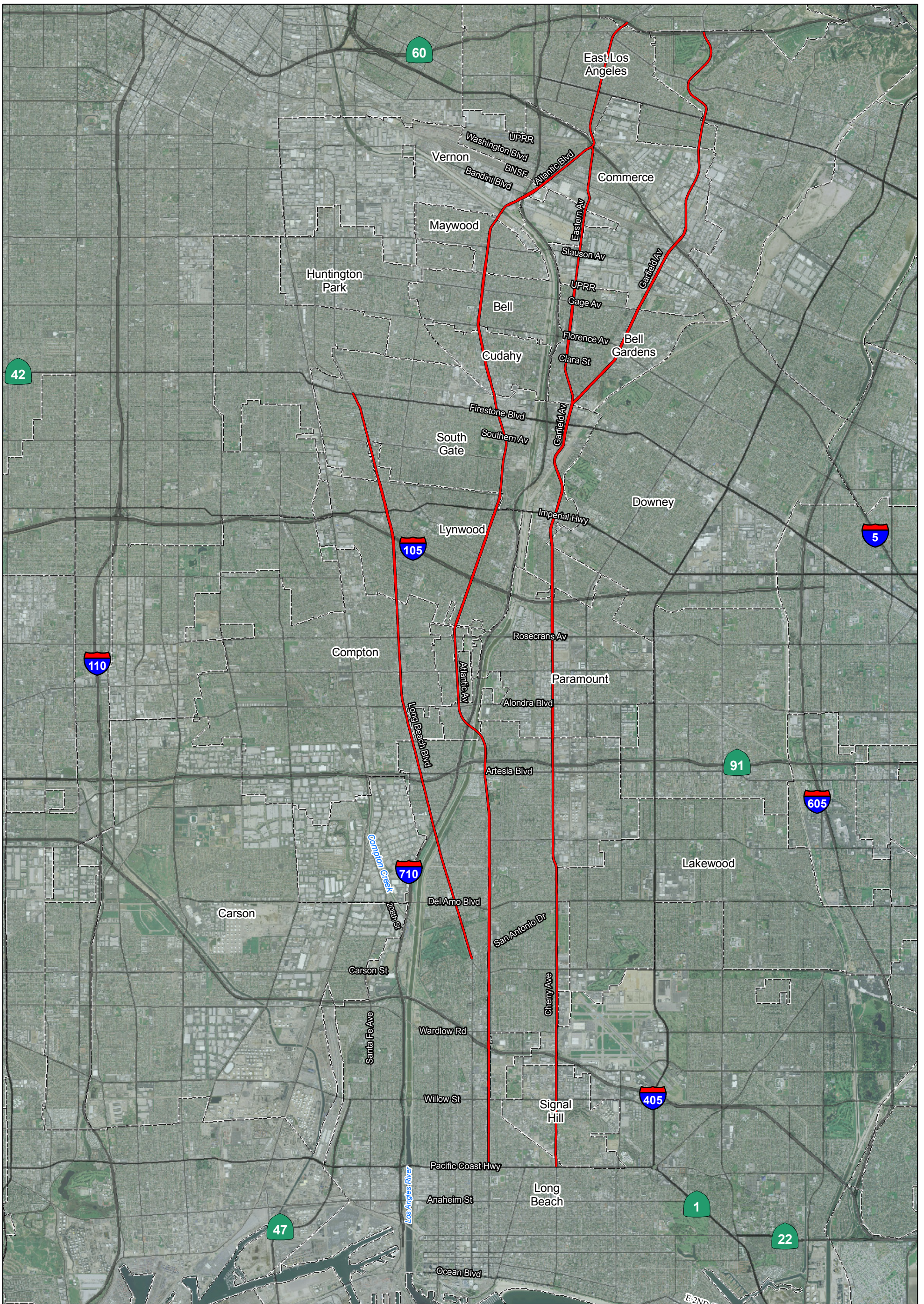
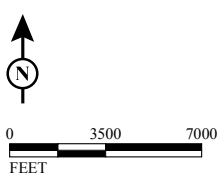


FIGURE 2.4-6

LEGEND

— Parking restrictions during peak periods



SOURCE: DigitalGlobe (2008); TBM (2007)  
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- ITS improvements including updated fiber-optic communications to interconnect traffic signals along major arterial streets to provide for continuous, real-time adjustment of signal timing to improve traffic flow, as well as other technology improvements
- Transportation Management Center (TMC) upgrades and inter-ties necessary to control and monitor the ITS system

#### 2.4.1.10 LANDSCAPING AND IRRIGATION SYSTEMS

Landscaping and irrigation systems would be provided where necessary within the corridor to provide aesthetic treatment, replacement planting, or mitigation planting for the I-710 Corridor Project. Close coordination among Caltrans, Metro, various I-710 corridor committees, and the landscape design consultant on this project has occurred to identify areas available for planting in addition to coordination with Caltrans' Operations and Maintenance Branch to ensure consistency with their objectives and requirements. The *Urban Design and Aesthetics Toolbox Report* (July 2011) has been developed in coordination with these stakeholders and these concepts will be used as to assist the team in determining elements that should be addressed. The design elements provide a wide range of innovative ideas that could be applied within the overall footprint of the proposed I-710 Corridor improvements, which includes not only the freeway right-of-way, but also adjacent communities and cities, and the Los Angeles River. Features included as part of the project design may include drought-tolerant and native landscaping, plants that change colors with the seasons, and use of vines where space is limited. New irrigation systems would be designed to use reclaimed water (if available).

#### 2.4.2 TEMPORARY PROJECT COMPONENTS

##### 2.4.2.1 TRANSPORTATION MANAGEMENT PLAN

The Transportation Management Plan (TMP), a standard measure implemented on all Caltrans construction projects, is designed to minimize construction activity-related motorist delays, queuing, and accidents by the effective application of traditional traffic-handling practices and innovative approaches. The purpose of the TMP is to relieve congestion and maintain traffic flow throughout the alternative routing and surrounding area within the Study Area. The proposed project TMP proposes to keep all lanes open during construction, with the exception of overnight lane closures. Ramp closures will be limited to potential weekend closures and would not exceed a period of one week. The TMP will be finalized during final design but not until funding and final staging/phasing is determined at a later date.

The TMP includes traffic mitigation strategies for the duration of construction, addresses lane closure requirements, and seeks to inform the public and motorists regarding the construction schedule, potential detours, and anticipated traffic delays during construction. A preliminary TMP has been developed and included in the Project Report.

#### 24.22 CONSTRUCTION STAGING

Staging of the construction would be required for all ramp reconstruction, freeway widening, and profile adjustments. The number of through lanes would be maintained by restriping and shifting traffic on the existing lanes to maintain the existing capacity.

All construction activities would be closely coordinated with other construction projects that are occurring. Existing State facilities such as changeable message signs, traffic cameras, and traffic count stations would also be protected during construction. Close coordination would also be needed with the cities within the Study Area, the County of Los Angeles, Caltrans, Metro, and the public to ensure that traffic along I-710 and on surrounding streets remains at an acceptable LOS during construction.

The following procedures have been identified to stage construction of Alternative 5A:

- Project divided into segments
- Segments divided into major components:
  - Interchanges: New ramps and crossing arterials
  - Freeway: Mainline widening
- The following assumptions have been made regarding construction staging:
  - Utilities relocated in advance
  - Periodic ramp and arterial closures
  - No simultaneous adjacent interchange arterial or ramp closures

#### 24.23 TEMPORARY CONSTRUCTION EASEMENTS

Temporary construction easements are used to facilitate construction during a set period for activities related to the construction of a project, including access or materials/equipment staging, etc. Please refer to Appendix O, Concept Plans, for the location of temporary construction easements.

## 2.5 DESIGN FEATURES OF ALTERNATIVES 6A/B/C

Alternatives 6A/B/C include all the features described above for Alternative 5A. The following text discusses features in addition to those discussed above that are unique to Alternatives 6A/B/C.

## 2.5.1 PERMANENT PROJECT COMPONENTS

### 2.5.1.1 FREIGHT CORRIDOR

Alternatives 6A/B/C include a separated freight movement corridor (trucks only) consisting of two lanes in each direction (Figure 2.3-2). It should be noted that in addition to the shifts in the freeway centerline under Alternative 5A (as described in Section 2.4.1.1, Mainline Improvements), Alternatives 6A/B/C will also include a 500-foot mainline shift south of Bandini Blvd. under Design Options 1 and 2. Refer to Appendix O, Concept Plans, for more detailed information.

### 2.5.1.2 FREEWAY-TO-FREEWAY INTERCHANGES

Improvements to the following freeway-to-freeway interchanges are proposed as part of Alternatives 6A/B/C:

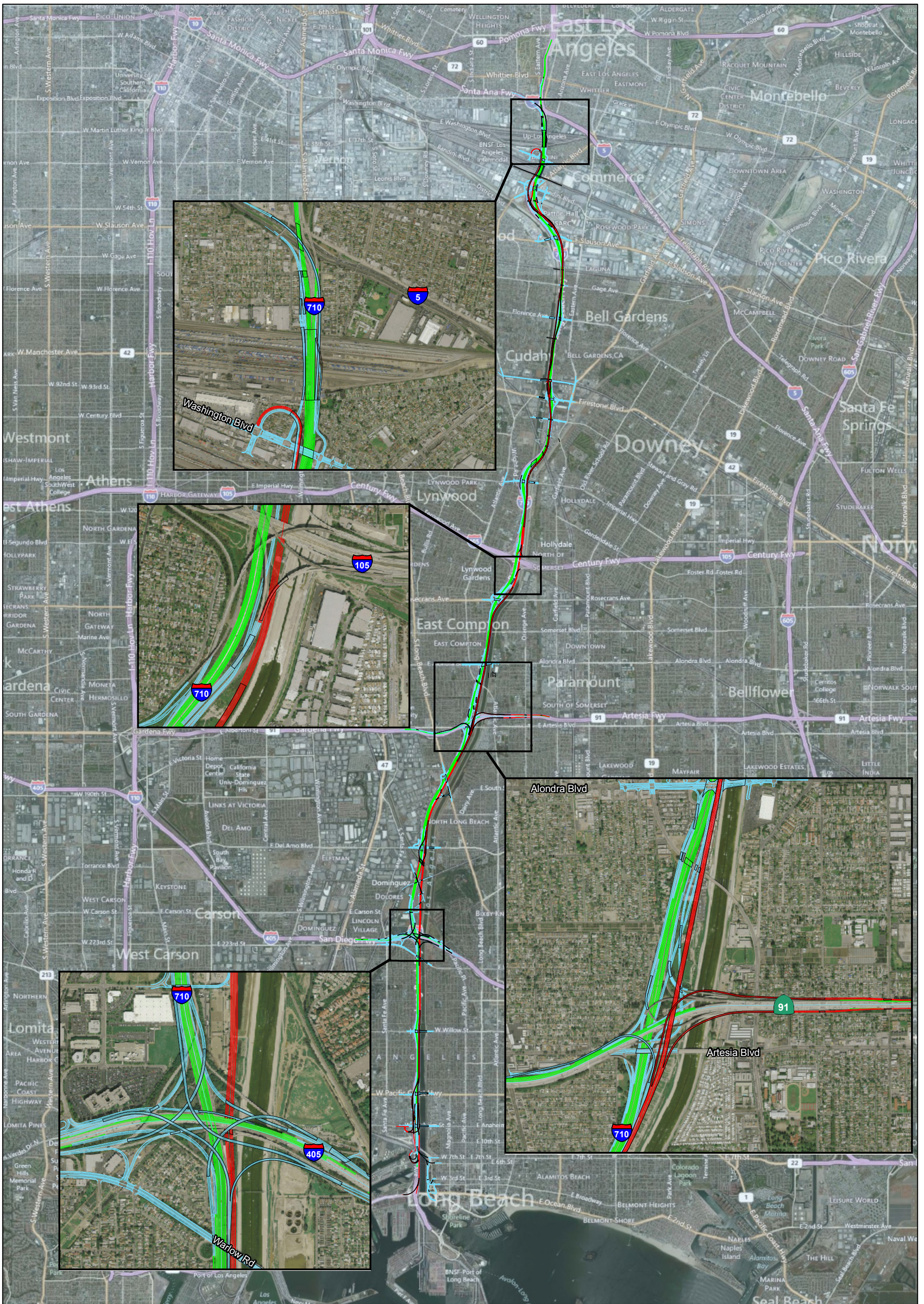
- I-710/I-405
- I-710/SR-91
- I-710/I-5
  - Removal of Eastern Ave. on-ramp to the southbound I-710
  - A new on-ramp at 6th St. to connect to Eastern Ave.
  - Mainline I-710 would be shifted east to reduce impacts west of the I-710/I-5 interchange
  - The southbound five lanes of mainline I-710 would taper to three lanes through the interchange and the northbound would be three lanes through the interchange and increase to four lanes after the interchange

Improvements to freeway-to-freeway interchanges as part of Alternatives 6A/B/C are shown in Figure 2.5-1. Please see Appendix O, Concept Plans, for more detailed information.

### 2.5.1.3 LOCAL ARTERIAL INTERCHANGES AND RELATED ROADWAY IMPROVEMENTS

Improvements to the following local arterial interchanges are proposed as part of Alternatives 6A/B/C and are listed in Table 2.5-1 and shown in Figure 2.5-2. Please see Appendix O, Concept Plans, for more detailed information.

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LEGEND

- Alternative 6A/B/C Geometrics
- Freight Corridor
- Ramps, Collector and Distributors
- Mainline
- Elevated Structures

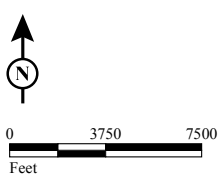
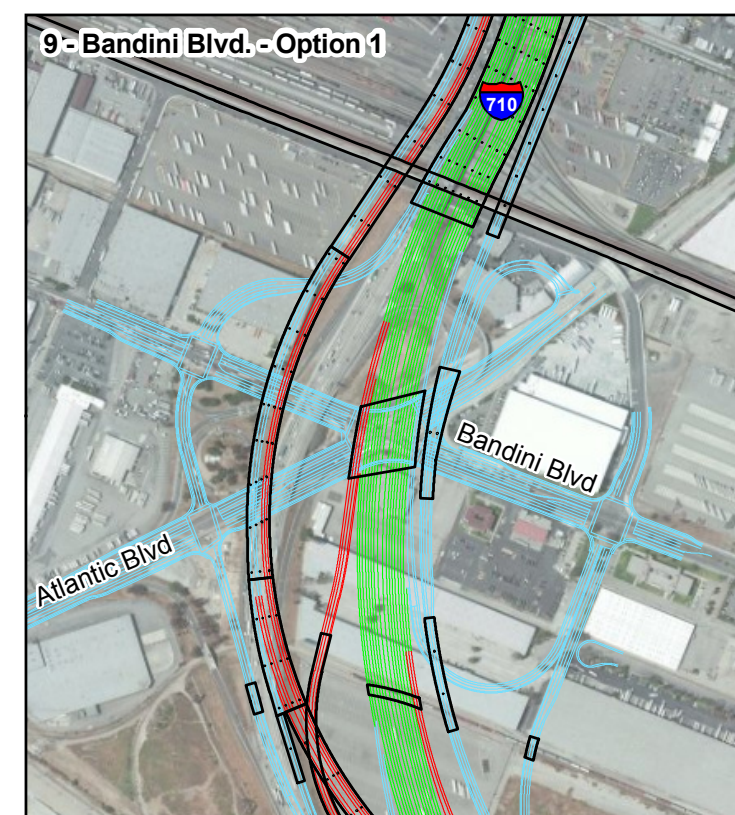
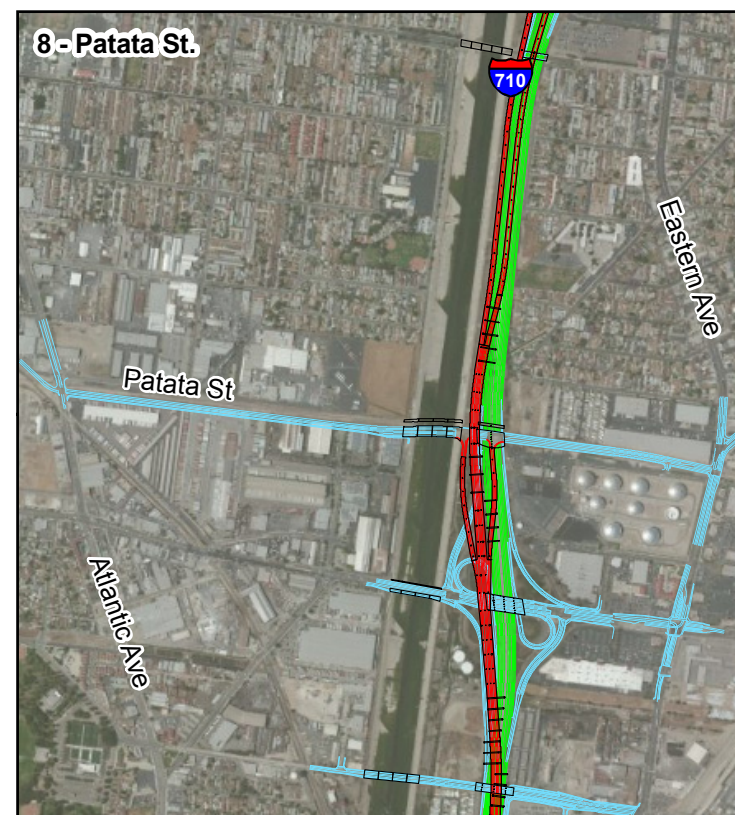
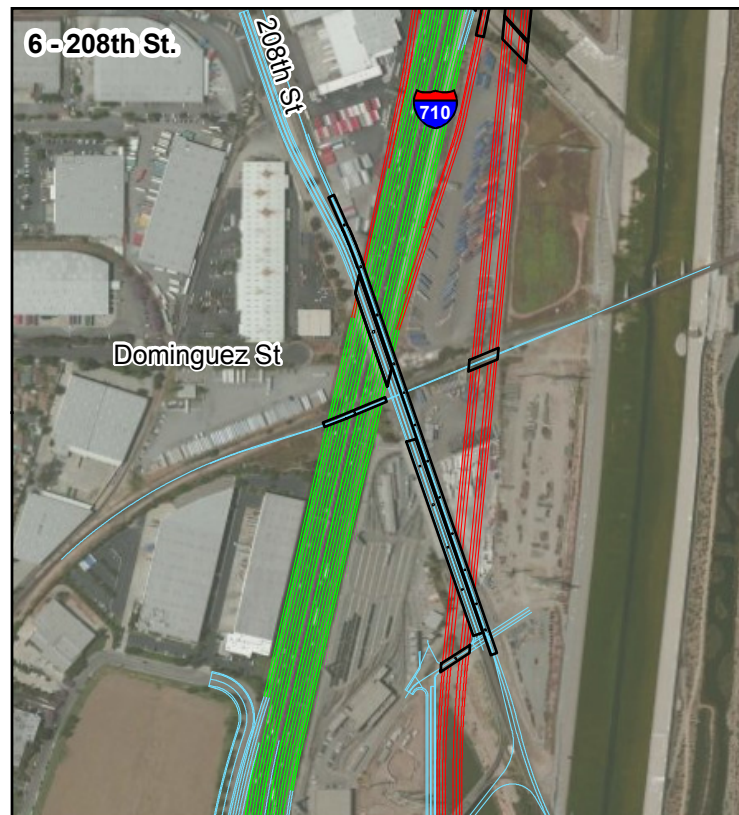
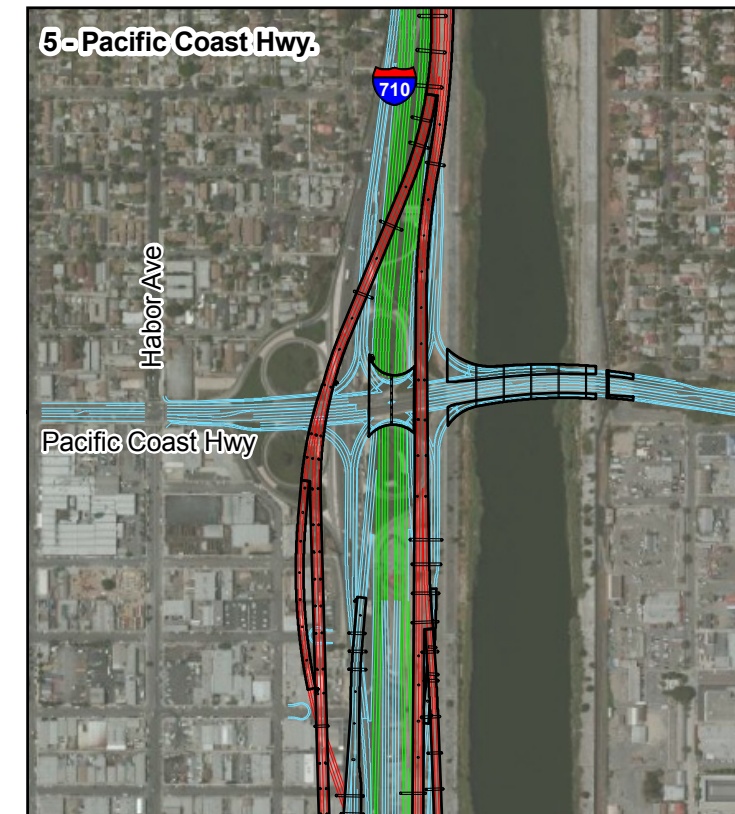
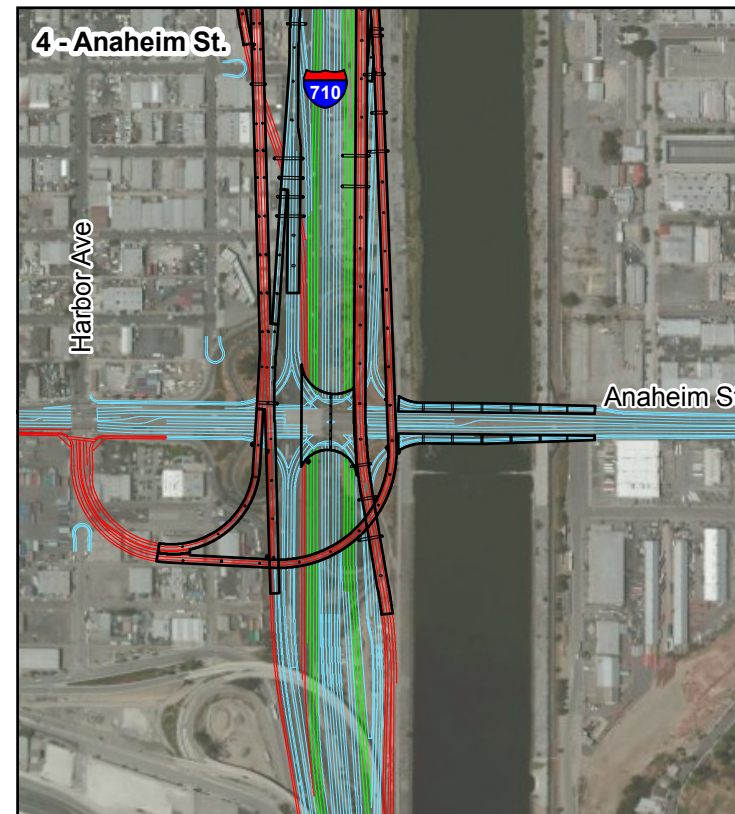
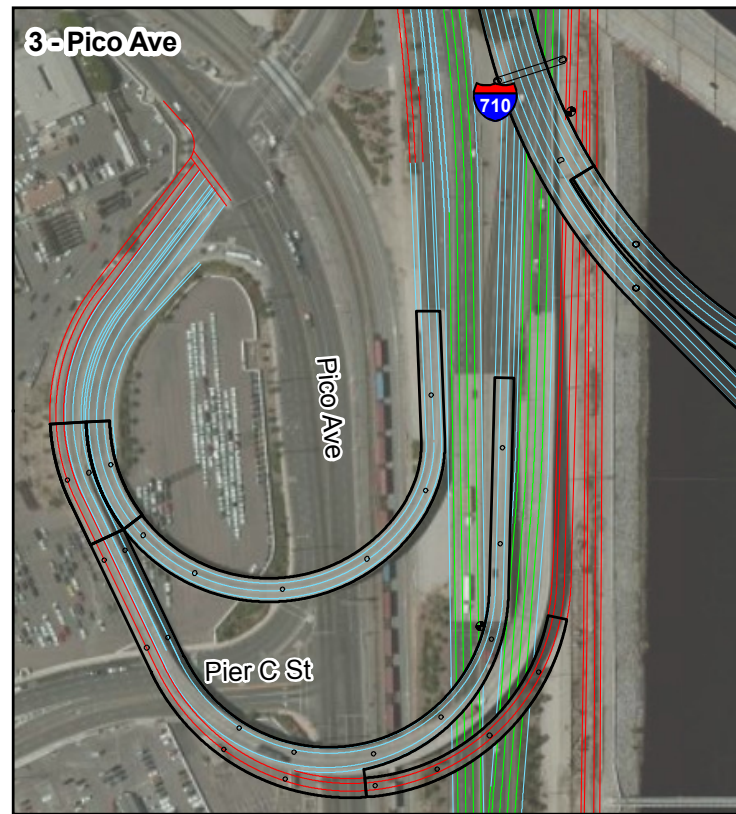


FIGURE 2.5-1

I-710 Corridor Project EIR/EIS  
 Alternatives 6A/B/C Freeway to Freeway  
 Interchange Improvements

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**LEGEND**

Alternative 6A/B/C Geometrics

- Freight Corridor
- Ramps, Collector and Distributors
- Mainline
- Elevated Structures



NO SCALE

SOURCE: Bing Maps (c.2008)

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**FIGURE 2.5-2**

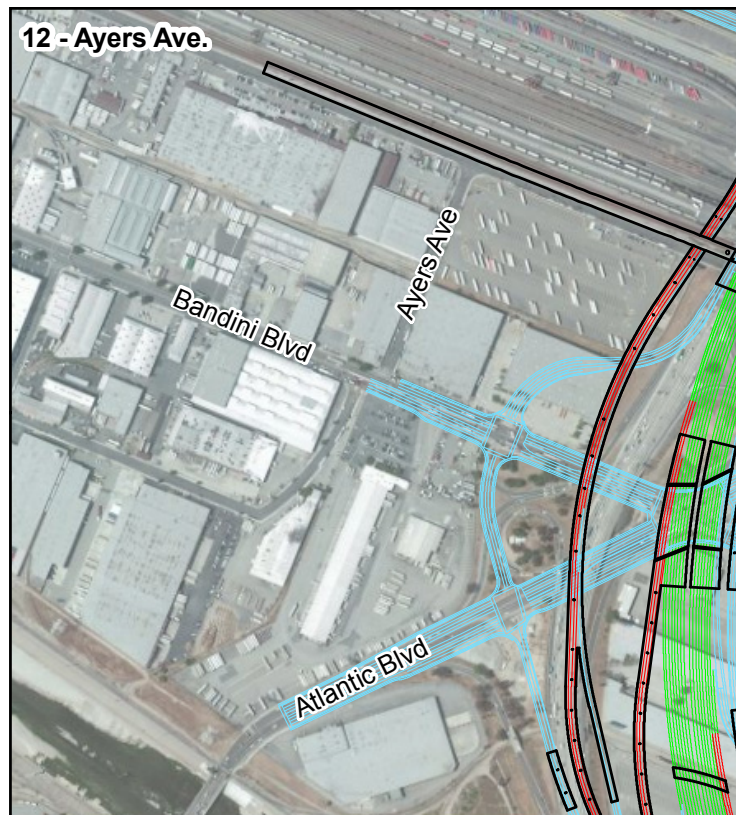
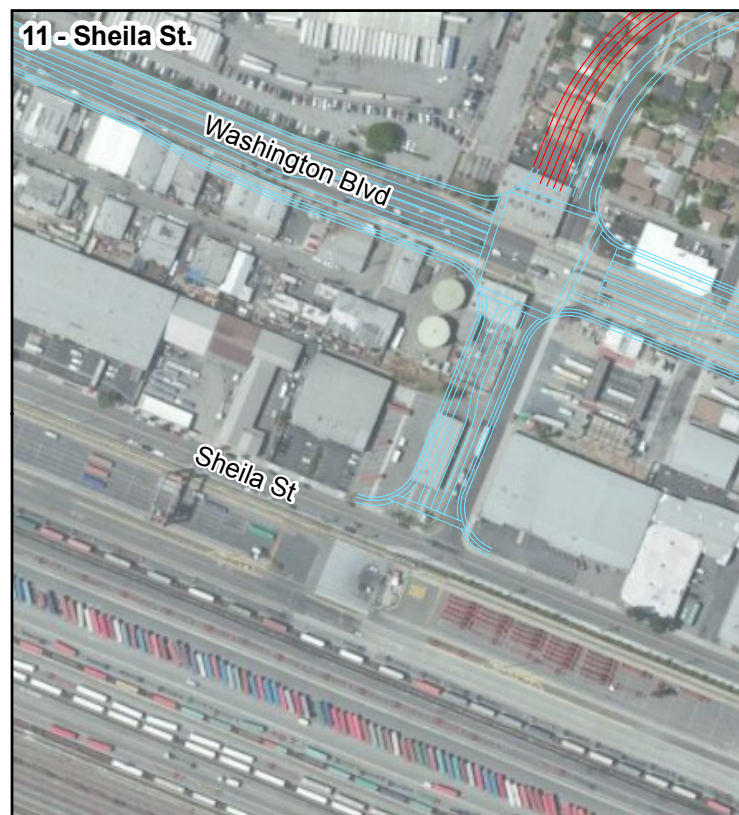
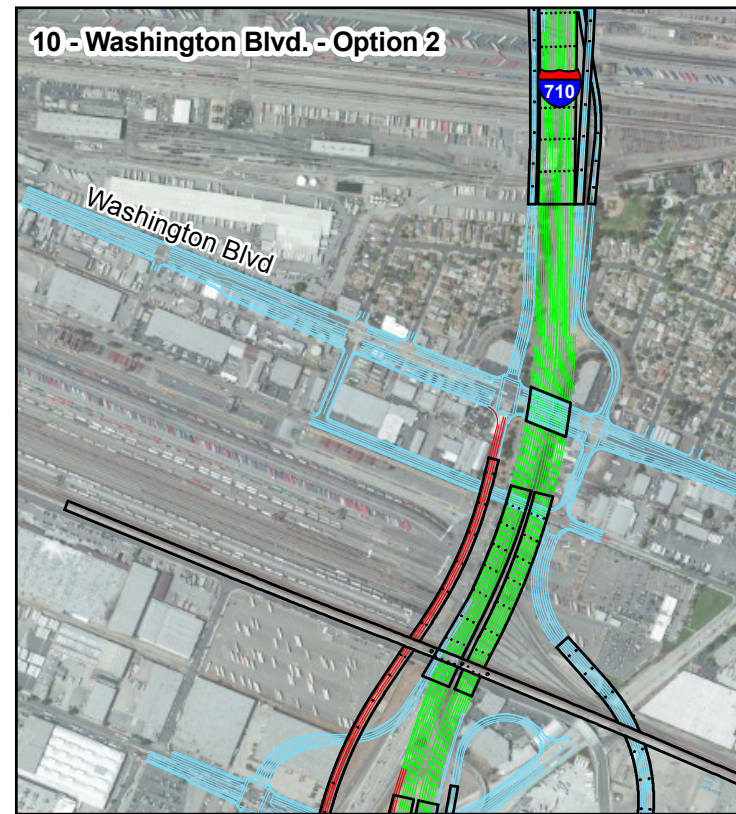
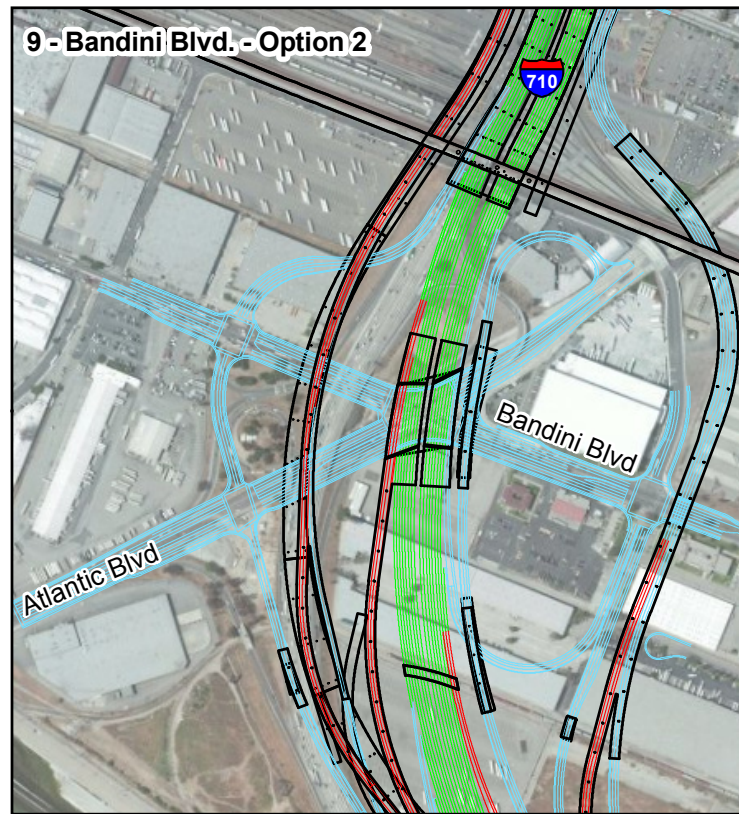
Sheet 1 of 2

*I-710 Corridor Project EIR/EIS*  
 Alternatives 6A/B/C Improvements to Local Arterial Interchanges, Crossings, and Frontage Roads

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LEGEND

Alternative 6A/B/C Geometrics

- Freight Corridor
- Ramps, Collector and Distributors
- Mainline
- Elevated Structures



NO SCALE

SOURCE: Bing Maps (c.2008)

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FIGURE 2.5-2  
Sheet 2 of 2

I-710 Corridor Project EIR/EIS  
Alternatives 6A/B/C Improvements to Local Arterial  
Interchanges, Crossings, and Frontage Roads

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**Table 2.5-1 Local Arterial Interchanges, Crossings, and Frontage Roads with I-710 – Alternatives 6A/B/C**

No.	Location	Improvements
1	Harbor Scenic Dr.	Addition of NB freight corridor on-ramp
2	Ocean Blvd.	Addition of NB freight corridor on-ramp
3	Pico Ave.	Addition of NB and SB freight corridor off-ramps
4	Anaheim St.	Addition of NB and SB freight corridor off-ramps
5	Pacific Coast Hwy.	Addition of SB freight corridor off-ramp
6	208th St.	Addition of NB freight corridor on-ramp
		Addition of SB freight corridor off-ramp
7	Thunderbird Villa Mobile Home Park Undercrossing	Local street connection under I-710 to Thunderbird Villas at Miller Wy.
8	Patata St.	Addition of NB and SB freight corridor on-ramps
9	Bandini Blvd.	Addition of NB freight corridor off-ramp
		Addition of SB freight corridor on-ramp
10	Washington Blvd.	Options 1 and 2 – Addition of NB freight corridor off-ramp and SB freight corridor on-ramp
		Option 3 – Alternative 6B only - Addition of NB freight corridor on-ramp and SB freight corridor off-ramp via Indiana Ave. removing access to Washington Blvd.
11	Sheila St.	Option 3 – Addition of NB freight corridor off-ramp
12	Ayers Ave./Arrowmill	Alternative 6B, Design Option 3 only – Existing access to Washington Blvd. will be removed and replaced with cul-de-sacs.

I-710 = Interstate 710  
 SB = southbound  
 NB = northbound

**25.14 BRIDGES**

In addition to the bridges shown in Figure 2.4-4, the bridges shown in Figure 2.5-3 will be replaced as part of Alternatives 6A/B/C.

**25.15 MAJOR DRAINAGE FACILITIES**

For Alternatives 6A/B/C, a total of 33 channel structures (roadway bridges) are affected, including 28 Los Angeles River locations, four Compton Creek locations, and one Rio Hondo location. Construction of new columns or piers will occur at these locations, all oriented to the channel flow direction within the existing channels. There are approximately 24,600 square feet of new structures within the floodway. These transverse impacts require localized channel modifications to maintain the existing channel hydraulic capacity. The proposed bridge improvements require designs to minimize impacts to the affected water courses and facilities.

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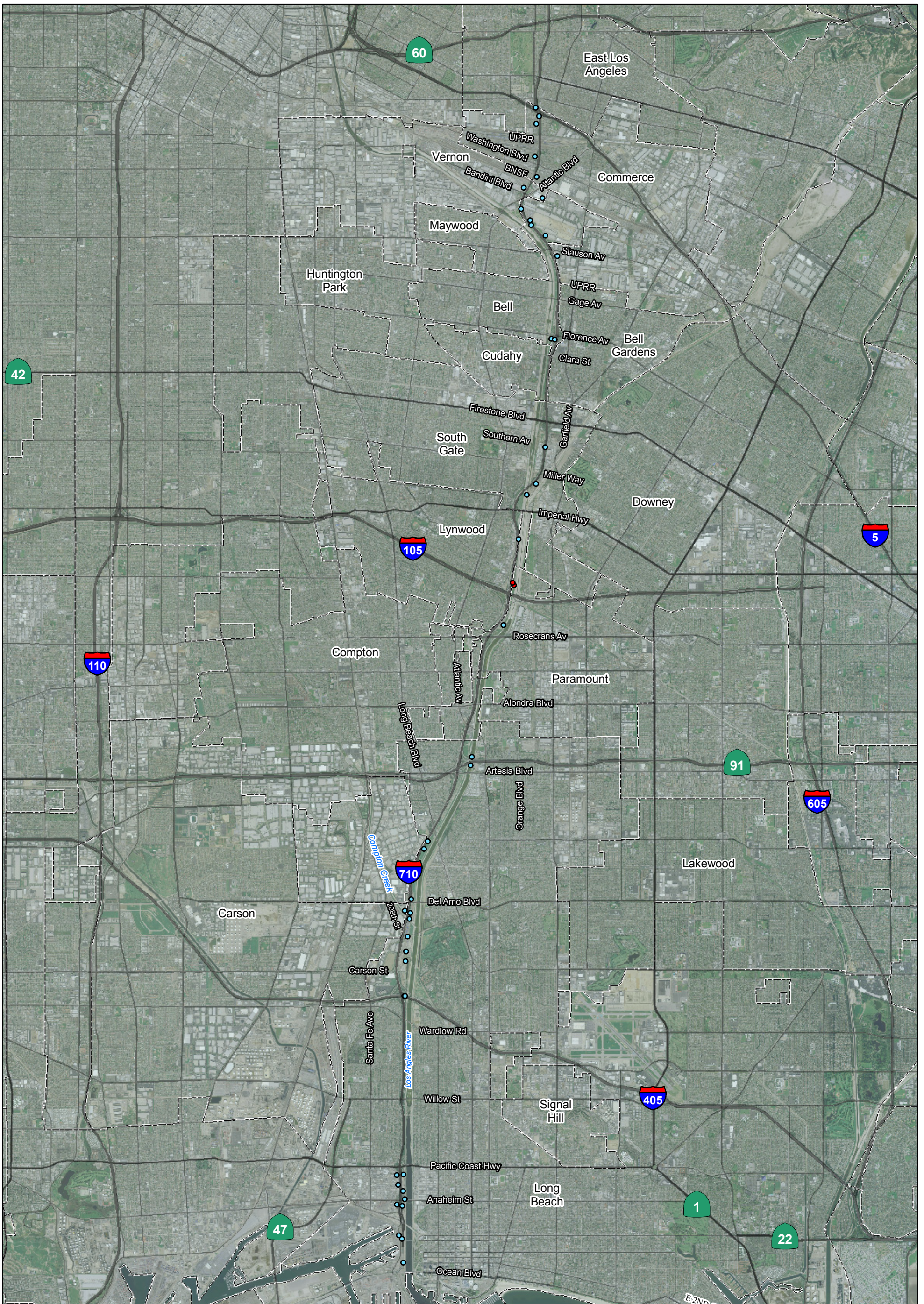


FIGURE 2.5-3

LEGEND

- New Structure
- Replace Structure



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#### 25.1.6 RETAINING WALLS

In addition to those defined for Alternative 5A, the following retaining wall is proposed as part of Alternatives 6A/B/C:

- At the I-710/I-405 interchange, up to 4,000 feet of retaining wall is needed to replace the Los Angeles River levee and to maintain the access road atop the levee. A Section 408 Permit must be approved by the United States Army Corps of Engineers (USACE) for this modification to the Los Angeles River levee.

#### 25.1.7 SCREEN WALLS

Screen walls are used to shield sensitive viewers such as residents, park users, etc. from elements of an environment that may seem aesthetically displeasing. These screen walls can use different features such as texture, translucency, and unique design to enhance the visual environment. In the case of Alternatives 6A/B/C, these screen walls are proposed to be added to any areas of the freight corridor adjacent to sensitive viewers when a noise barrier is not proposed to be provided.

### 2.5.2 TEMPORARY PROJECT COMPONENTS

#### 25.2.1 CONSTRUCTION STAGING

Construction staging concepts were developed to identify how the build alternatives may be constructed and what requirements are needed to ensure safe and manageable implementation. It is recognized that there are several possible strategies for staging a project of this size and complexity. Funding, right-of-way certification, maintenance of traffic, and contractor innovation are all variables that drive the timing, priority, and scope of staged improvements. Recognizing that these variables will change over the course of project development, the concepts are used as an initial baseline to approximate construction duration and estimate costs. The concepts also serve to identify potential constructability issues, key maintenance of traffic assumptions, potential construction emissions, and temporary right-of-way impacts.

For each segment of the proposed project, a sequence of work was developed identifying major elements of the improvements to be constructed by stage. Maintenance of traffic assumptions, including number of lanes maintained, temporary detours, and roadway closures were identified. Stage durations were approximated to provide a range of time expected to construct improvements. The approximate construction duration by segment is included in Table 2.5-2. The freight corridor under Alternatives 6A/B/C may be constructed concurrently with freeway improvements.

**Table 2.5-2 Construction Duration**

<b>Segment</b>	<b>Alternative 5A Duration (months)</b>	<b>Alternatives 6A/B/C Duration (months)</b>
1	81	81
2	77	77
3	85	85
4	54	54
5	80	80
6	93	93
7	12	36

Provided right-of-way certification is obtained, funding and contractor resources are available, and all segments proceed concurrently, the estimated minimum construction duration is approximately eight years.

## 2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER DISCUSSION

During the preliminary studies for the I-710 Corridor Project, six alternatives were identified and studied in an *Alternatives Screening Report* (2009). The six alternatives are: Alternative 1 (No Build), Alternative 2 (TSM/TDM/Transit/ITS), Alternative 3 (Goods Movement Enhancement by Rail and/or Advanced Technology), Alternative 4 (Arterial Highway and I-710 Congestion Relief Improvements), Alternative 5A (Ten General Purpose Lanes), Alternative 5B (Eight General Purpose Lanes plus Two HOV Lanes), and Alternative 6 (Alternative 5 with Addition of Four Separated Freight Movement Lanes). As discussed earlier in this Chapter, Alternatives 1, 5A, and 6A/B/C are evaluated in detail in this EIR/EIS. Alternatives 2, 3, and 4 were considered but withdrawn from further environmental study as stand-alone alternatives. Table 2-6.1 summarizes the purpose for the project and whether the Alternatives 2, 3, 4, and 5B meet the project purpose. The ability of those alternatives to meet the project purpose and other factors considered in evaluating them for consideration in this EIR/EIS are discussed in the following sections. Other factors used in considering the alternatives for further evaluation included whether or not the alternatives (1) failed to meet the most basic project objectives, (2) were infeasible (per CEQA Guidelines Section 15126.6(f)(1)), or (3) were unable to avoid significant environmental impacts.

### 2.6.1 ALTERNATIVE 2: TSM/TDM/TRANSIT/ITS

Alternative 2 included the projects included under Alternative 1 (No Build) plus operational investments, policies, and actions aimed at improving goods movement and passenger automobile and transit travel, as well as reducing the environmental impacts of transportation on cities and operations on the I-710 Corridor through implementation of ITS applications.



**Table 2-6.1 Ability of the Alternatives to Meet the Defined Project Purpose**

Alternative	Does the Alternative Meet the Defined Project Purpose?				
	Improve Air Quality and Public Health	Improve Traffic Safety	Address Need for Modern Design on the I-710 Mainline	Address Projected Traffic Volumes	Address Projected Growth in Population, Employment, and Activities Related to Goods Movement
Alternative 2: Transportation Systems Management and Mass Transit Alternative	Partially	Partially	No	Partially	Partially
Alternative 3: Goods Movement Enhancement	Partially	Partially	No	Partially	Partially
Alternative 4: Arterial Highway and Congestion Relief Improvements	Partially	Partially	Partially	Partially	Partially
Alternative 5B	Partially	Partially	Yes	Partially	Partially

Source: This table is based on the information provided in the *Alternatives Screening Analysis*, May 2009.  
 I-710 = Interstate 710

Alternative 2 was not carried forward as a standalone alternative for detailed evaluation in this EIR/EIS for the following reasons:

- As shown in Table 2-6.1, Alternative 2 would not meet the project purpose to address the need for modern design on the I-710 mainline and would only partially meet the other four purposes. As a result, compared to Alternatives 5A and 6A/B/C, Alternative 2 does not perform as well regarding achieving the project purpose.
- Although Alternative 2 includes transit, policy, ITS application, and operational improvements that would have a beneficial effect on mobility in the Study Area, the Alternatives Screening Analysis<sup>1</sup> demonstrated that these transportation improvements provided limited benefit in addressing the worst of the congestion problems, air quality issues, design elements that need updating, and safety concerns that affect motorists and residents along the I-710 Corridor. Specifically, at best, Alternative 2 would provide a 6 to 7 percent improvement in traffic congestion levels on I-710, in terms of improved v/c ratios, and an approximately 5 percent improvement in NO<sub>x</sub> emissions. It would have a negligible effect on diesel particulate matter emissions compared to Alternative 1. Alternative 2 would also not eliminate design elements that need updating on I-710 to improve safety.

The alternatives screening results did confirm that the components in Alternative 2 would provide value to the overall I-710 Corridor Project. As a result, although Alternative 2 was not carried forward as a standalone alternative, the TSM/TDM and ITS components in Alternative 2 are included as components of Alternatives 5A and 6A/B/C.

## 2.6.2 ALTERNATIVE 3: GOODS MOVEMENT ENHANCEMENT BY RAIL AND/OR ADVANCED TECHNOLOGY

Alternative 3 focused on maximum goods movement by rail and enhancing goods movement in and out of the Ports by implementing an advanced zero-emission container movement technology within the I-710 Corridor. Two families of technology were originally defined: an automated fixed guideway family and a zero-emission truck family. During a technical workshop held to evaluate these alternative goods movement technologies, a third technology family of electrified conventional freight rail was added for consideration. This assumption provided the full range of potential benefits and costs of different zero-emission technologies and design options.

Alternative 3 was not carried forward as a standalone alternative for detailed evaluation in this EIR/EIS for the following reasons:

---

<sup>1</sup> Final Technical Memorandum - Alternatives Screening Analysis WBS ID:165.05.15 (May 2009).

- As shown in Table 2-6.1, Alternative 3 would not meet the project purpose to address the need for modern design on the I-710 mainline and would only partially meet the other four purposes. As a result, compared to Alternatives 5A and 6A/B/C, Alternative 3 does not perform as well regarding achieving the project purpose.
- While key features of Alternative 3 demonstrated needed emissions reduction benefits, as well as the ability to reduce heavy-duty truck traffic on the I-710 general purpose lanes as a standalone alternative, Alternative 3 would not sufficiently relieve traffic congestion on I-710, nor would it address the existing safety and design elements that need updating on I-710 compared to other alternatives.

At the recommendation of the I-710 TAC, the Enhanced Goods Movement by Rail component was removed from Alternative 3 because these projects and other efforts to maximize the amount of goods moved by rail would not be completed as part of the I-710 Corridor Project (they would be completed by other agencies and, therefore, are part of Alternative 1 – No Build). However, the electric-powered (zero-emission) truck advanced technology component of Alternative 3 was selected for its positive air quality benefits and was integrated into Alternatives 6B and 6C. The electric-powered zero-emission technology was chosen to be part of this component of Alternatives 6B and 6C because the *Alternatives Screening Analysis* concluded that the electric/battery truck option would offer more flexibility in serving multiple trip destinations, seamlessly interface with existing container terminal and intermodal rail yard container loading and unloading systems, utilize proven technology components and has the lowest capital cost compared with the fixed guideway and electrified rail options.

### 2.6.3 ALTERNATIVE 4: ARTERIAL HIGHWAY AND CONGESTION RELIEF IMPROVEMENTS

Alternative 4 focused on arterial highways and specific I-710 congestion relief projects that identify and improve existing freeway and updated design elements of arterial intersections causing the greatest congestion and safety impacts. Additionally, Alternative 4 included the maximum arterial highway improvements that could feasibly be implemented in advance of any I-710 improvements. This would incorporate the major north/south and east/west arterial highways within the Study Area, as well as the Study Area intersections identified for the I-710 Corridor Project. Alternative 4 also addressed congestion relief projects, including early-action projects on I-710, by identifying design elements of the existing freeway that need updating causing bottlenecks, congestion, and safety problems.

Alternative 4 was not carried forward as a standalone alternative for detailed evaluation in the EIR/EIS for the following reasons:

- As shown in Table 2-6.1, Alternative 4 would not meet the project purpose to address the need for modern design on the I-710 mainline and would only partially meet the other

four purposes. As a result, compared to Alternatives 5A and 6A/B/C, Alternative 4 does not perform as well regarding achieving the project purpose.

- Alternative 4 could not accommodate the high future traffic volumes generated by population and employment growth and the forecast growth in cargo. When compared to the other alternatives, Alternative 4 slightly outperformed Alternatives 2 and 3 with regard to mobility and safety benefits. However, because the physical improvements to I-710 in Alternative 4 would not be as extensive as those provided in Alternatives 5A, 5B, and 6A/B/C, it was not a top-performing alternative based on those key factors.

However, the screening analysis found that the arterial highway improvements and freeway congestion relief elements of Alternative 4 would be valuable components to include in the alternatives being carried forward for more detailed environmental analysis. As a result, those components of Alternative 4 have been included as components of Alternatives 5A, and 6A/B.

#### 2.6.4 ALTERNATIVE 5B: EIGHT GENERAL PURPOSE LANES PLUS TWO HOV LANES

Alternative 5 proposed improving the I-710 mainline by widening I-710 to include ten lanes throughout the length of the corridor (including through the freeway-to-freeway interchanges) and modernizing its design. Included in this alternative were redesigns of the freeway-to-freeway and arterial interchanges. Alternative 5A proposes ten general purpose lanes and Alternative 5B proposed eight general purpose lanes plus two HOV lanes. Alternatives 5A and 5B also include the components in Alternatives 1, 2, 4, and 5A.

Alternative 5B was not carried forward as a standalone alternative for detailed evaluation in the EIR/EIS for the following reasons:

- As shown in Table 2-6.1, Alternative 5B would only partially meet the five project purposes. As a result, compared to Alternatives 5A and 6A/B/C, Alternative 5B does not perform as well regarding achieving the project purpose.
- Alternative 5B closely resembles Alternative 5A, except that two of the proposed lanes in Alternative 5B would be HOV rather than general purpose lanes. The screening analysis demonstrated that Alternative 5B had lower benefits compared to Alternative 5A because the HOV lanes under Alternative 5B would not be used as much as the general purpose lanes in 5A, most likely due to the parallel HOV lanes on both I-110 and I-605.
- Alternative 5B would result in the same potential right-of-way impacts as Alternative 5A without the corresponding level of mobility benefits.

- Alternative 5B would result in a footprint very similar to the footprint under Alternative 5A. As a result, Alternative 5B would be expected to result in environmental impacts similar to the impacts described in this EIR/EIS for Alternative 5A. As a result, Alternative 5B would not result in substantially fewer impacts and would not avoid the types of impacts that would occur as a result of Alternative 5A.

## 2.7 ANTICIPATED PERMITS AND APPROVALS NEEDED

Table 2.7-1 identifies the permits and/approvals that will or may be required prior to or during construction of the I-710 Corridor Project.

**Table 2.7-1 Permits and/or Approvals Needed**

Agency	Permit/Approval	Timeline
Federal Highway Administration (FHWA)	1. Section 6005 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users for satisfying Air Quality Conformity Requirements	Prior to approval of the Final Environmental Impact Statement (EIS).
	2. Major Project Operational Independence and Non-Concurrent Construction Determination	Prior to approval of the Record of Decision (ROD).
	3. Cost Estimate Review	Prior to Approval of the Final EIS.
	4. Draft Project Management Plan	At least 60 days prior to approval of the ROD.
	5. Final Project Management Plan	90 days after approval of the ROD.
	6. Initial Financial Plan	After approval of the ROD.
	7. Financial Plan Annual Update	Approved annually after approval of the Initial Financial Plan.
	8. Tolling Agreement	Prior to approval of the ROD.
United States Fish and Wildlife Service (USFWS)	Section 7 consultation for Threatened and Endangered Species	A Biological Opinion will be issued prior to the approval of the Final EIS.
United States Army Corps of Engineers (USACE)	1. Section 404 Permit for filling or dredging waters of the United States 2. Section 408 Permit for modification to USACE facility (levees) 3. Consultation with National Marine Fisheries Service (NMFS) regarding Essential Fish Habitat for the Section 404 permits	Applications for the Section 404 and 408 permits will be submitted after the ROD.
Federal Emergency Management Agency (FEMA)	Approval of a Conditional Letter of Map Revision (CLOMR)	After completion of final design.
State Historic Preservation Officer (SHPO)	Concurrence with the California Department of Transportation's (Caltrans) findings of effect	Prior to approval of the Final EIS.
California Department of Fish and Game (CDFG)	1. Section 1602 Lake and Streambed Alteration Agreement	1. Section 1602 Notification is to be submitted and agreement obtained prior to the start of construction.

**Table 2.7-1 Permits and/or Approvals Needed**

<b>Agency</b>	<b>Permit/Approval</b>	<b>Timeline</b>
California Coastal Commission	Coastal Zone Management Act (CZMA) consistency determination	A CZMA consistency determination is needed 90 days prior to issuance of the ROD.
California Public Utilities Commission (CPUC)	<ol style="list-style-type: none"> <li>1. General Order 131-D for relocation of electrical transmission lines between 50 to 200 kilowatts</li> <li>2. Certificate of Public Convenience and Necessity for relocations to electrical transmission lines and gas lines</li> </ol>	After certification of the Final EIR and the filing of a Notice of Determination to complete the CEQA process.
Affected Utilities	Approvals to relocate, protect in place, or remove utility facilities	Prior to any construction that would affect utility facilities.
Burlington Northern Santa Fe (BNSF) Railroad Company and Union Pacific (UP) Railroad	Memorandum of Understanding and a Construction and Maintenance Agreement with the railroads	Prior to any construction within or above railroad right-of-way.
Los Angeles County Regional Water Quality Control Board (RWQCB)	<ol style="list-style-type: none"> <li>1. Section 401 Permit</li> <li>2. Section 402 National Discharge Elimination System (NPDES) (Construction Activity)</li> <li>3. Section 402 NPDES (Groundwater Dewatering)</li> </ol>	<ol style="list-style-type: none"> <li>1. Application will be submitted after the ROD.</li> <li>2. Application will be submitted after the ROD.</li> <li>3. Application will be submitted after the ROD.</li> </ol>
County of Los Angeles and affected cities within the Study Area	<ol style="list-style-type: none"> <li>1. Approval of encroachment permits and street construction permits, street closures and rerouting, and associated improvements in the public right-of-way</li> </ol>	<ol style="list-style-type: none"> <li>1. Actions/permits will be obtained prior to the start of construction.</li> </ol>
Los Angeles County Flood Control District (LACFCD)	<ol style="list-style-type: none"> <li>1. Encroachment permits for improvements affecting LACFCD facilities</li> <li>2. Review a CLOMR and submit it to FEMA.</li> </ol>	Coordination for permits and the CLOMR will occur after the ROD.
Port of Long Beach	Harbor Development Permit (Level II)	A consistency determination is needed 90 days prior to issuance of the ROD.
City of Long Beach	<ol style="list-style-type: none"> <li>1. Coastal Development Permit application for consistency determination</li> <li>2. Concurrence on Section 4(f) de minimis determination for Cesar E. Chavez Park</li> </ol>	<ol style="list-style-type: none"> <li>1. An application will be submitted for a consistency determination after identification of a preferred alternative but prior to the ROD.</li> <li>2. Prior to approval of Final EIS.</li> </ol>
City of Commerce	Concurrence on Section 4(f) de minimis determination for Bandini Park.	Prior to approval of the Final EIS.
Los Angeles County Department of Public Works (LADPW)	Concurrence on Section 4(f) temporary occupancy determination for the Los Angeles River Trail and the Rio Hondo Trail	Prior to approval of the Final EIS.
Watershed Conservation Authority	Concurrence on the Section 4(f) Evaluation and the measures to minimize harm to Parque Dos Rios, including the identification of appropriate land to replace land in the Park used by the I-710 Corridor Project.	Prior to approval of the Final EIS.

<sup>1</sup> After receipt of the Section 404 Permit application, the USACE will determine whether an Individual or Nationwide Permit is applicable.