Arterial Smart Corridor Projects

Final Report

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Prepared for: Gateway Cities Council of Governments
Los Angeles County Metropolitan Transportation Authority

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1.0 Introduction

The Gateway Cities Transportation Strategic Implementation Plan will bring several transportation and planning studies, projects, and other issues in the Gateway Cities area into one analysis to understand the interrelationships of all projects and impacts to the local communities, leading to a funding and financing plan and an implementation strategy. This Technology Implementation and Analysis builds upon the Gateway Cities Technology Plan for Goods Movement study, detailing how technology can be leveraged to improve the efficiency of goods movement in the Gateway Cities and the larger Los Angeles County region. It includes several elements, including:

2. Develop system requirements and architecture for a freight-focused traveler information system.
3. Inventory, analyze, and prioritize conceptual design concepts for arterial smart corridors; and develop conceptual design concepts for freeway gaps.
4. Develop I-710 connected/platooned truck technology conceptual design and infrastructure requirements.
5. Design a connected test corridor.
6. Design a concept of operations for the I-710 freight corridor.
7. Conduct research on zero emissions freight technology.
8. Investigate Truck Enforcement Network Sites (TENS) on I-405 and I-710.

The objective of this document is to present the draft prioritization criteria, methodology, and ranking for the selection of up to eight arterial corridors for deployment of arterial ITS technologies under Element 3 above. This task will identify opportunities for the deployment of arterial ITS technologies in a coordinated and sustainable manner that demonstrates clear benefits to goods movement efficiency, and facilitates advancement into arterial smart corridor project design and implementation.
The Arterial Smart Corridors project objectives are to:

- Reduce recurrent intersection delay and improve travel time reliability and information, fuel consumption, and emissions on designated truck route arterials through cross-jurisdictional signal coordination and updated signal controllers and systems;
- Fill ITS coverage gaps along identified truck route arterials for freight traffic management and traveler information;
- Generate data for the provision of real-time traveler information to drivers and freight operators through the use of mid-block detection or other enhanced detection;
- Generate data for ongoing performance measurement/management of the regional arterial network;
- Improve incident detection and management on arterials, as well as improve freight traffic management and traveler information, in response to freeway incidents and emergency situations; and
- Utilize a variety of ITS and technology improvements to accomplish these, including, but not limited to, adaptive signal control, detection, closed-circuit television (CCTV) cameras, changeable message signs (CMS), communications, blue-tooth technology, third-party transportation data, etc.

Once the arterials are agreed upon, the study team will identify potential projects for arterial ITS deployment on the eight arterial corridors with the greatest needs and potential opportunities for improvement.

The team will then develop conceptual design concepts for these corridors, including corridor limits, recommended signal improvements, recommended ITS and other technology improvements, and cost estimates. The development of the Arterial Smart Corridor project will be coordinated with the other technology elements. The selected Arterial Smart Corridors would provide advanced traffic management capabilities and greatly enhanced traveler information to the goods movement community and will benefit other traffic as well.

1.1 ARTERIAL NETWORK

The Gateway Cities Technology Plan for Goods Movement Final Initial Conceptual Project Description Report identified an initial set of significant goods movement corridors as potential candidates for technology enhancements as Arterial Smart Corridors (see Figure 1.1). The Report includes additional technical information to support this project. While additional corridors can be added, this potential and initial subset covers a significant portion of the Gateway Cities subregion along the important drayage freight travel corridor largely defined by the I-710 freeway.
Figure 1.1  Potential Arterials of Significance for Goods Movement
2.0 Arterial Prioritization Methodology and Initial Results

2.1 Prioritization Criteria and Methodology

Nine proposed criteria for ranking and selecting the arterials most in need of Smart Corridor technology to benefit goods movement are listed in Table 2.1. In order to score each arterial corridor, the criteria feature high, medium, and low tiers, with higher tiers indicating greater need and opportunity for Arterial Smart Corridor technology. Under this method, high tiers receive three points, medium tiers receive two points, and low tiers receive one point. Each criterion receives equal weighting, and scores totaled across all criteria to obtain a corridor score reflecting overall need. Table 2.1 presents the recommended criteria and thresholds proposed for use in prioritizing the arterial corridors.

<table>
<thead>
<tr>
<th>Proposed Criteria</th>
<th>Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Truck Volumes</td>
<td>High – Greater than or equal to 2,000 daily truck vehicles miles traveled per arterial mile in core segments</td>
</tr>
<tr>
<td>◒</td>
<td>Medium – Greater than or equal to 1,000 daily truck vehicles miles traveled per arterial mile in core segments</td>
</tr>
<tr>
<td>○</td>
<td>Low – Less than 1,000 daily truck vehicles miles traveled per arterial mile in core segments</td>
</tr>
</tbody>
</table>
## Prioritization Methodology for Ranking Arterial Smart Corridor Projects

### Volume/Capacity (V/C)
- **High**: Significant congestion based on average V/C in core segments (more opportunity to improve corridor with improvements)
- **Medium**: Moderate congestion based on average V/C in core segments
- **Low**: Limited congestion based on average V/C in core segments (less opportunity to improve corridor with improvements)

### Countywide Significant Arterial Network (CSAN)
- **High**: On CSAN
- **Low**: Not on CSAN

### On-Street Parking
- **High**: Limited on-street parking is available for the corridor (minimal potential conflicts with trucks)
- **Medium**: Moderate amount of on-street parking is available for the corridor (moderate potential conflict with trucks)
- **Low**: A significant amount of on-street parking is available for the corridor (high potential conflicts with trucks)

### Freeway Access
- **High**: Arterial roadway provides several points (at least 3 east-west and 4 north-south) of direct access to a freeway facility and/or arterial roadway provides direct access to the proposed I-710 freight corridor facility
- **Medium**: Arterial roadway provides one or two points of direct access to a freeway facility
- **Low**: Arterial roadway does not provide direct access to a freeway facility

### Connectivity
- **High**: Several clusters of warehousing, likely transload facilities, and railyards, are located on the arterial corridor
- **Medium**: A few clusters of warehousing, likely transload facilities, and railyards, are located on the arterial corridor
- **Low**: Limited access to warehousing, likely transload facilities, and railyards

### Safety
- **High**: More than four arterial corridor intersection safety hotspots (that could be improved with corridor improvements)
- **Medium**: Two to four arterial corridor intersection safety hotspots (that could be improved with corridor improvements)
- **Low**: One or no arterial corridor intersection safety hotspots
Appendix A describes each criterion in more detail and outlines several criteria that were considered, but not recommended for inclusion.

### 2.2 INITIAL PRIORITIZATION RESULTS

Table 2.2 shows the prioritization results. The table includes the arterial corridor name, whether the corridor is east-west (E-W) or north-south (N-S), the results of the criteria (high, medium, or low) and associated score, and the overall score. This data-driven prioritization approach helped to identify the strongest candidate arterials for smart corridor investment. The gray highlighted corridors are those selected for further assessment. These are also represented visually on Figure 2.1.

<table>
<thead>
<tr>
<th>Truck Route Designation</th>
<th>Community Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>High – Over two-thirds of the arterial corridor is a designated truck route</td>
<td>High – None (or very little) of the arterial corridor has sensitive community facilities (schools, parks, bicycle/pedestrian facilities, transit routes, etc.)</td>
</tr>
<tr>
<td>Medium – About one-third to two-thirds of the arterial corridor is a designated truck route</td>
<td>Medium – A portion of the arterial corridor has sensitive community facilities (schools, parks, bicycle/pedestrian facilities, transit routes, etc.)</td>
</tr>
<tr>
<td>Low – Less than one-third of the arterial corridor is a designated truck route</td>
<td>Low – The entire (or large portion) of the arterial corridor has sensitive community facilities (schools, parks, bicycle/pedestrian facilities, transit routes, etc.)</td>
</tr>
</tbody>
</table>
### Table 2.2  Arterial Smart Corridor Prioritization Results

<table>
<thead>
<tr>
<th>Arterial</th>
<th>Direction</th>
<th>Truck Volumes</th>
<th>V/C</th>
<th>CSAN</th>
<th>On-Street Parking</th>
<th>Freeway Access</th>
<th>Connectivity</th>
<th>Safety</th>
<th>Truck Route</th>
<th>Community Sensitivity</th>
<th>Overall Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>6th St/Whittier Blvd</td>
<td>E-W</td>
<td>○1</td>
<td>○2</td>
<td>●3</td>
<td>○2</td>
<td>○3</td>
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<td>○1</td>
<td>○3</td>
<td>○1</td>
<td>17</td>
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<tr>
<td>223rd St. / Wardlow Rd</td>
<td>E-W</td>
<td>○2</td>
<td>○3</td>
<td>○3</td>
<td>○2</td>
<td>○3</td>
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<td>○3</td>
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<td>○2</td>
<td>○1</td>
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<td>Slauson Ave</td>
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<td>Washington Blvd</td>
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</tr>
</tbody>
</table>

● = High (3 points)  ○ = Medium (2 points)  ○ = Low (1 point)
Based on the results of the prioritization process and the identification of community sensitive facilities, the following eight corridors are recommended for advancement into the conceptual design concepts phase. In some cases the corridor endpoints have been adjusted to avoid community sensitive portions of the corridor. Table 2.3 shows the corridors with endpoints and Figure 2.1 shows their locations.

Table 2.3 Initial Arterial Smart Corridors for Advancement

<table>
<thead>
<tr>
<th>North-South</th>
<th>Southern Endpoint</th>
<th>Northern Endpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda Street</td>
<td>Harry Bridges Blvd</td>
<td>6th Street/Whittier Blvd</td>
</tr>
<tr>
<td>Garfield Ave/Cherry Ave</td>
<td>Anaheim Street</td>
<td>6th Street/Whittier Blvd</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>East-West</th>
<th>Western Endpoint</th>
<th>Eastern Endpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandini Blvd</td>
<td>I-110</td>
<td>Garfield</td>
</tr>
<tr>
<td>Del Amo Blvd</td>
<td>I-110</td>
<td>I-710*</td>
</tr>
<tr>
<td>Manchester Ave/Firestone Blvd</td>
<td>I-110</td>
<td>I-605</td>
</tr>
<tr>
<td>Pacific Coast Hwy</td>
<td>I-110</td>
<td>I-710*</td>
</tr>
<tr>
<td>Slauson Ave</td>
<td>I-710**</td>
<td>I-605</td>
</tr>
<tr>
<td>Washington Blvd</td>
<td>I-110</td>
<td>I-605</td>
</tr>
</tbody>
</table>

*Corridor east of I-710 is not recommended for advancement due to presence of community sensitive facilities.

**Corridor west of I-710 is not recommended for advancement due to presence of community sensitive facilities.

Other arterial highway corridors that should also be considered for second-round of ITS deployment for freight include the following (or a portion of them):

- Pico Ave
- Anaheim St.
- Atlantic Blvd.
- Carson St.
- 223rd St/Wardlow St.
- Florence Blvd.
- Imperial Hwy
- Rosecrans Ave.
Figure 2.1  Initial Arterial Smart Corridors for Advancement
3.0 Existing Infrastructure on Advanced Corridors Overview

The advanced arterial corridors were assessed to gather any available information on existing ITS infrastructure. Locations of traffic signals, CCTV, CMS, or other ITS technologies were compiled for the advanced corridors and are presented in Figures 3.1. It was determined that these arterial corridors did not have much in the way of ITS infrastructure deployed at this time. For the most part, these corridors have traffic signals and some detection/CCTV associated with these signals.

The majority of the signals are managed by the City in which they operate. There are some Caltrans operated signals along the arterials at their interchanges with the freeways. There are also some county operated signals (e.g., along Alameda Street, Del Amo Boulevard, Atlantic Avenue corridors). The City of Cudahy does not operate its own traffic signals and following cities passively manage their signals (i.e., signals may be operated by another agency):

- Bell Gardens;
- Huntington Park;
- Lynwood;
- Signal Hill;
- Paramount;
- Bell; and
- Maywood.

The following cities actively manage their traffic signals during peak and exception periods and have deployed some ITS devices, although not on the advanced arterial corridors:

- Compton;
- South Gate;
- Commerce; and
- Vernon.
The following jurisdictions actively manage their traffic signals during the day and have adopted large scale deployment of ITS devices:

- Caltrans;
- LA County Public Works; and
- Long Beach.

Some of the management systems that have been deployed in the area include:

- Kimley-Horn KITS (e.g., LA County, Carson, Huntington Park, Lynwood);
- Econolite Centracs (e.g., South Gate);
- Siemens i2tms (e.g., Downey); and
- TransCore TransSuite (e.g., Vernon).

The County’s Traffic Signal Synchronization Program (TSSP) started in 1988 involved upgrading the traffic signals along a route to improve mobility. The following arterial corridors advanced for this study are part of (or are planned) the TSSP:

- Alameda Street – Planned for 2016 from Nadeau St. to Greenleef Blvd.;
- Garfield Ave/Cherry Ave – Existing from Atlantic Blvd. to Pacific Coast Highway;
- Bandini Blvd – Construction from Alameda St. to Garfield Ave.;
- Manchester Ave/Firestone Blvd – Existing from Alameda St. to Garfield Ave., Ryerson Ave to Steward and Gray Rd., and I-605 to Rosecrans Ave.;
- Pacific Coast Hwy - Existing;
- Slauson Ave – Concept from Santa Fe Ave to Scott Ave
- Washington Blvd – Planned from Atlantic Blvd. to Whittier Blvd.
Figure 3.1   Existing Signal Infrastructure
4.0 Planned Projects on Advanced Corridors Overview

As part of the Smart Corridors analysis process, the project team examined planned construction projects along these corridors. These project may impact the needs of the corridor for ITS infrastructure and create opportunities for low cost coordination with planned construction.

In total, there are a few relevant projects, ranging from streetscape improvements to roadway reconstruction. These projects are shown in Figure 4.1. Notable projects include the following:

- **Washington Blvd.:** A roadway widening and reconstruction project for Washington Blvd. from Indiana Street to I-5/Telegraph Road. The roadway will be widened from 2 lanes to 3 lanes in each direction, turn radii increased, medians constructed, and traffic signals upgraded.

- **Garfield Blvd./Washington Blvd.:** One of two potential Metro Gold Line Eastside Extension alignments runs along a portion of the Garfield Blvd. and Washington Blvd. corridors. This project is currently in Draft EIS/EIR phase.

- **Garfield Blvd./Slauson Blvd.:** This project includes intersection reconstruction and a new bus stop shelter at intersection of Garfield and Slauson Boulevards.

Based on the limited number and impact of these planned projects, it is recommended that no corridors be removed from consideration due to planned projects. Any recommendations for the Washington Boulevard corridor should take advantage of pending construction as an opportunity for the installation of upgraded ITS devices.
Figure 4.1 Planned Projects

- Hardscape, landscape, and streetscape improvements at Los Angeles Trade Technical College
- Washington Blvd. road widening (from 4 to 6 lanes), roadway reconstruction, signal upgrades
- Metro Gold Line Eastside Extension, 2 potential alignments, one of which includes eastern portion of Garfield Blvd. and Washington Blvd. (Currently in Draft EIS/EIR phase)
- Garfield/Slauson intersection reconstruction and new bus shelter
- Study report for the intersection of Firestone Blvd. & Union Pacific Railroad (operations/safety)
5.0 Other Corridor Specific, Regional and Institutional Issues/Considerations

5.1 Corridor Specific Issues/Considerations

Alameda Street

Alameda Street is a north-south corridor running from 6th Street in Los Angeles to E Harry Bridges Boulevard in the Wilmington neighborhood near the ports of Los Angeles and Long Beach. Along almost all of its route, Alameda Street is paralleled by the Alameda Corridor, a major rail connection. As defined, the Alameda Street corridor begins in an industrial area near Downtown Los Angeles. It connects with the I-10 freeway before intersecting with Washington Blvd., a major east-west corridor. Alameda Street then constitutes the border between industrial Vernon and the more residential Central-Alameda neighborhood of Los Angeles. South of Slauson Avenue—another major east-west corridor—the corridor passes through a mix of residential, industrial, and commercial areas in Huntington Park. This mix of land uses continues southward as the corridor passes the I-105 freeway until the SR-91 Gardena Freeway, connecting to the latter. At this point, Alameda Street passes through an industrial area that includes many warehouses and distribution centers. Between Dominguez Street and the I-405 freeway, the neighborhood is a mix of residential, commercial, and industrial. After connecting with the I-405, Alameda Street passes a large Union Pacific intermodal facility. Next, the corridor passes through an area of refineries, followed by a mixed residential and industrial area. The route passes Anaheim Street near the Terminal Island Freeway, which connects to the Ports of Los Angeles and Long Beach. It terminates along the northern border of the Port of Los Angeles. In addition to Washington Blvd., Slauson Avenue, and Anaheim Street, Alameda Street intersects three other key east-west corridors: Del Amo Blvd., Firestone Blvd., and Wardlow Road.
Garfield Avenue/Cherry Avenue

The Garfield Avenue/Cherry Avenue corridor runs from Anaheim Street in Long Beach to Whittier Blvd. in Montebello. At its southern end, the corridor is mainly residential until Willow St., where the land use becomes a mix of residential, commercial, and industrial. Cherry Avenue passes to the west of Long Beach Airport and a large Boeing facility. As it continues northward, the corridor remains a mix of residential, commercial, and industrial uses. After connecting with the SR-91 freeway, the corridor becomes Garfield Avenue and takes on a more industrial character. However, after its connection with the I-105 Century Freeway, the corridor once again passes through a mix of residential, commercial, and industrial uses. At Gage Avenue, Garfield enters the City of Commerce, where the corridor becomes exclusively industrial except for a short residential stretch near its terminus in unincorporated East Los Angeles and Montebello. Along this segment, Garfield Avenue connects with I-5. Additionally, the Garfield/Cherry corridor intersects a multitude of key corridors: Artesia Boulevard, Del Amo Boulevard, Firestone Boulevard, Pacific Coast Highway, Slauson Avenue, Wardlow Road, and Washington Boulevard. The corridor does experience some areas of congestion: Rosecrans Avenue to Imperial Highway, Florence Blvd. to Slauson Avenue, and Washington Blvd. to Whittier Blvd.

Bandini Boulevard/41st Street/38th Street/37th Street

The Bandini Boulevard/41st Street/38th Street/37th Street corridor runs from I-110 in Los Angeles eastward to Garfield Avenue in the City of Commerce. Because it runs almost entirely through the cities of Vernon and Commerce, this corridor is primarily industrial. In addition to the industrial uses flanking the route, there are also a number of distribution and logistics centers located nearby. Of particular note is the large BNSF intermodal facility located just north of Bandini between Downey Road and the I-710 Freeway in the City of Commerce. Along its route, the Bandini Blvd./41st St./38th St./37th St. corridor intersects several key north-south corridors, including Alameda Street, Atlantic Blvd., Eastern Avenue, and Garfield Avenue. Additionally, it offers connections with the I-710 Freeway, as well as the I-5 Freeway near its eastern terminus. While the corridor experiences low levels of congestion, it does see moderate to high truck volumes along its entire length.

Del Amo Boulevard

The Del Amo Boulevard corridor runs from I-110 to the west to the I-605 Freeway in Cerritos to the east. The corridor begins at its western end in an industrial area with several freight logistics firms are located. There is also a Kinder Morgan Watson refinery located in this area. Major destinations along this portion of the corridor include the Lakewood Shopping Center. Del Amo connects with several major north-south corridors including Alameda St.,
Atlantic Ave., Cherry Ave., and Long Beach Blvd. The Del Amo corridor experiences congestion west of the I-710 freeway. After connecting with the I-710 freeway and crossing the Los Angeles River, Del Amo becomes a primarily residential thoroughfare until the corridor’s terminus at the I-605 Freeway. Truck traffic is moderate between Atlantic Ave. and the I-710. For these reasons the ITS technology for freight is not recommended east of I-710.

**Manchester Avenue / Firestone Boulevard**

The Manchester Avenue/Firestone Boulevard corridor, as defined, runs from the I-110 Freeway in the City of Los Angeles to the I-605 Freeway in Norwalk. For the duration of the route, it generally serves as a commercial street with residential neighborhoods located beyond these businesses. Between Otis Street and the I-710 in South Gate, Firestone Blvd. passes through an industrial area where several transport companies are also located. Other major destinations along the route include El Paseo Shopping Center. Firestone serves as a key commercial corridor through Downtown Downey, and also passes a large mall (Stonewood Center). Firestone Boulevard connects both the northbound and southbound directions of the I-710 and I-605 freeways. It also intersects several major north-south corridors, including Alameda Street, Atlantic Avenue, and Garfield Avenue. Several segments of the corridor experience congestion, including the stretch between Alameda Street and Long Beach Blvd., as well as between Atlantic Blvd. and Garfield Avenue near the I-710 interchange. The latter segment of the corridor also experiences moderate truck traffic.

**Pacific Coast Highway**

The Pacific Coast Highway (PCH) corridor as it is defined runs from the I-110 Harbor Freeway in the Los Angeles neighborhood of Wilmington to 1st Street near the Long Beach/Seal Beach border, just east of the San Gabriel River. Along the initial stretch of the corridor east of the I-110, PCH is a commercial street, with residential neighborhoods located beyond these businesses. Just east of Blinn, PCH passes over Alameda Street, with connections to this major north-south corridor via ramp (O Street). At this point, PCH travels over the Alameda Corridor and through an area of refineries and trucking company facilities located along the Dominguez Channel. Along this segment, PCH has moderate truck volumes, and experiences high levels of congestion. After traveling over CA-103 (Terminal Island Freeway), the route serves as a commercial corridor in West Long Beach. It then connects with I-710 via a cloverleaf interchange before crossing over the Los Angeles River. Roughly mid-way between the Los Angeles River and Cherry Avenue, PCH intersects with Atlantic Avenue, a major north-south corridor. PCH continues as a mixed commercial and residential street throughout the remainder of the route. Major destinations in this area include Long Beach City College. East of I-710 PCH is mostly commercial and residential and, in this stretch, deployment of ITS specifically for freight is not recommended.
Slauson Avenue

The Slauson Avenue corridor runs east-west between the I-110 Harbor Freeway in Los Angeles to the I-605 Freeway in Whittier. Along the western end of this corridor, Slauson is an industrial corridor, with some residential areas interspersed. The corridor passes through a particularly dense area of industrial and logistics operations between Avalon Blvd. and Central Ave. Between Compton Avenue and Downey Road, Slauson Ave. straddles the border of industrial Vernon and more residential Huntington Park, passing through a mix of residential, commercial, and industrial areas. After Downey Road, Slauson Avenue becomes the City of Maywood’s main commercial corridor. Beyond the street’s businesses lie residential neighborhoods. Slauson Ave. then crosses I-710, though it does not have on-ramps or off-ramps to the freeway. Between I-710 and I-5, the corridor passes through business parks and industrial areas located in the City of Commerce, with a brief stretch of residential. Slauson Ave. offers both on-ramps and off-ramps for southbound I-5, but only an off-ramp for northbound I-5. For the next segment of the route, the street passes through an area that is generally industrial. Along the remainder of the route, the corridor is a mix of residential and commercial uses. Slauson Avenue intersects with several key north-south corridors, including Alameda Street, Atlantic Avenue, Eastern Avenue, and Garfield Avenue. Additionally, the corridor experiences congestion at its eastern and western ends. Since Slauson Ave. west of I-710 is mostly commercial and residential plus some public schools, it is recommended not to install ITS technology on Slauson west of I-710.

Washington Boulevard

The Washington Boulevard corridor runs from the I-110 Freeway just south of Downtown Los Angeles eastward to I-605 in Montebello. Along the initial western portion of the corridor, Washington Boulevard is a mixed industrial and commercial corridor closely paralleling the I-10 Freeway. Between Long Beach Avenue and Downey Road, it passes through the chiefly industrial area surrounding the Los Angeles River. Between Downey Road and I-710, Washington Blvd. runs along a large BNSF intermodal facility in the City of Commerce. The corridor connects to both northbound and southbound I-710. At the I-710, the corridor changes to a commercial one. However, a series of distribution centers are located one block south of Washington along this stretch, and truck traffic volumes are high. Washington Blvd. then connects with I-5 before passing through another stretch of industrial operations. Between Montebello Way and Paramount Blvd., the surrounding land use changes to a mix of commercial and residential. Between Paramount and Rosemead Boulevards, Washington passes a large shopping center, behind which are a number of distribution centers and industrial operations. For the remainder of the corridor, Washington passes through residential neighborhoods. Along its route, Washington Blvd. intersects several key north-south corridors, including Alameda Street, Atlantic Blvd., Eastern Avenue, and Garfield Avenue. Except for
the final segment east of Montebello Way, Washington is a congested roadway, and is one of the most congested corridors in the subregion.

5.2 REGIONAL AND INSTITUTIONAL ISSUES/ CONSIDERATIONS

Additional regional and institutions factors should also be considered for this prioritization and the ultimate Arterial Smart Corridor recommendations. These include considerations such as: continued and long-term operations and maintenance; central versus local control of systems operations; integration with existing systems; alternative route options; potential impacts of I-710 zero emission freight corridor operations; balancing east-west versus north-south geographic distribution; etc. In this case, the goal was to select eight Arterial Smart Corridors to improve goods movement in the Gateway Cities area. While some of these considerations may not influence the recommended corridors, they need to be considered as part of the Arterial Smart Corridor conceptual design concepts.

- Continued and Long-Term Operations and Maintenance – One of the major problems with ITS systems is that long-term operations and maintenance costs are not considered. To maximize benefits and effectiveness of the Arterial Smart Corridor technologies, the deployments will need to be effectively operated, maintained, and funded.

- Central versus Local Control – It is likely that the most effective operations for the Arterial Smart Corridors would be centrally controlled so the focus is on regional goods movement. However, there may be a need to provide an option for the systems to be locally controlled to handle special circumstances such as special events.

- Integration with Existing Systems - The cities and county have a variety of signal systems in operation or planned. There is a need for local control capabilities and integration with the various local systems.

- I-710 Zero Emission Freight Corridor and TENS Impacts – Arterials providing access to the proposed I-710 zero emission freight corridor facility were considered in the freeway criteria, however, to maximize effectiveness of the I-710 zero emission freight facility operations, including these arterials is important, particularly near the access locations. Bandini and Washington scored high enough for inclusion in the assessment included in this report. However, Pico, Anaheim, and Atlantic did not and may need to be considered. Carson is another arterial that may need further consideration as it may be used for access to the Truck Enforcement Network Site (TENS).

- Geographic Distribution – The recommended Arterial Smart Corridors for implementation should also consider north-south and east-west distribution
to accommodate diversion alternatives for incident, special event, and construction activities to maximize efficient goods movement in the area. The initial corridors for advancement discussed in this section have fairly strong geographic distribution in the north-south direction with two corridors parallel to I-710 (see Figure 1.1). The east-west initial arterial corridors are focused to the northern and southern portions of the Gateway Cities region with no corridors between Manchester/Firestone and Del Amo. An east-west corridor between SR-91 and I-105 may need to be further considered to provide a more centrally located Arterial Smart Corridor option (Artesia, Alondra, Rosecrans).
6.0 Recommended Initial Corridors

As noted earlier, based on the results of the prioritization process, the following eight corridors are recommended for advancement into the conceptual design concept phase. These designs are shown in the following Section.

These initial corridors will be reviewed for opportunities for enhanced signal coordination systems (arterial highways only) and ITS field devices (such as traffic management cameras and dynamic message signs).

Table 6.1 Initial Arterial Smart Corridors for Advancement

<table>
<thead>
<tr>
<th>North-South</th>
<th>Southern Endpoint</th>
<th>Northern Endpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda Street</td>
<td>Harry Bridges Blvd</td>
<td>6th Street/Whittier Blvd</td>
</tr>
<tr>
<td>Garfield Ave/Cherry Ave</td>
<td>Anaheim Street</td>
<td>6th Street/Whittier Blvd</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>East-West</th>
<th>Western Endpoint</th>
<th>Eastern Endpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandini Blvd</td>
<td>I-110</td>
<td>Garfield</td>
</tr>
<tr>
<td>Del Amo Blvd</td>
<td>I-110</td>
<td>I-710*</td>
</tr>
<tr>
<td>Manchester Ave/Firestone Blvd</td>
<td>I-110</td>
<td>I-605</td>
</tr>
<tr>
<td>Pacific Coast Hwy</td>
<td>I-110</td>
<td>I-710*</td>
</tr>
<tr>
<td>Slauson Ave</td>
<td>I-710**</td>
<td>I-605</td>
</tr>
<tr>
<td>Washington Blvd</td>
<td>I-110</td>
<td>I-605</td>
</tr>
</tbody>
</table>

*Corridor east of I-710 is not recommended for advancement due to presence of community sensitive facilities.

**Corridor west of I-710 is not recommended for advancement due to presence of community sensitive facilities.
7.0 Conceptual Designs and Costs

This section outlines the Conceptual Designs for the eight selected initial corridors. These corridors were reviewed for opportunities for enhanced signal coordination systems (arterial highways only) and ITS field devices (such as traffic management cameras and dynamic message signs). Specifically, the following guidelines and assumptions were used in developing the estimates:

- The corridor and segments would have complete surveillance coverage, allowing CCTV to see every part of the corridor.
- The corridor would have arterial CMS placed at key decision points. These points were either at access points to key interstates or other key arterials.
- The corridors entire inventory of signal would be remain the same however new cabinets, controllers and associated software would be replaced.
- Placement of all CCTV and arterial CMS were collocated wherever possible with the existing signal systems, thereby reducing additional power and communication infrastructure.
- The cost estimates assume that each corridor will utilize buried fiber optic communications. Wireless is also a potential solution but in order to plan for the most expensive potential investment fiber was selected.
- The costs estimates utilized were derived from a local Southern California city and verified/modified based on national estimates from other similar installations.

At a macro level, the combined scope of these projects is significant. These corridors cover over 77 miles, would replace over 270 intersections, include 107 CCTV and 23 arterial CMS. It would be a significant regional undertaking spanning multiple jurisdictions. The total cost of this program would be over $29 million. It should be noted that if a full scale replacement in kind of each intersection were to be done the cost would increase significantly. After driving the corridors and reviewing the existing systems, the study team felt that this replacement in-kind was not needed.

Tackling such a large scale regional signal smart corridor project can be challenging due to the number of municipalities involved and the wide variety of
technical expertise from city to city. There have been a number of successful large scale multi-jurisdictional signal programs such as this around the country. One example is Operation Green light in Kansas City. In this program, the MPO created a specific programing, design, and construction team. The MPO staffed it with project management signal experts, demonstrated the benefits to the region, secured joint memorandum of understandings to devise a staged process that not only upgraded the region’s signal system, but also fund operations and maintenance; including a well thought out ongoing timing program. It is recommended that if the Gateway Cities is interested in pursuing this effort, a similar program that can build regional agreements and provide a funding and design and construction mechanism outside the traditional municipality region be developed.

Conceptual Design Maps of the each corridor illustrating the signalized intersections to be replaced, the location of CCTV cameras as well as the DMS can be found in Appendix B. A summary table illustrating costs can be found below.
<table>
<thead>
<tr>
<th>Corridor #</th>
<th>Corridor</th>
<th>distance (miles)</th>
<th>complete new intersection</th>
<th>2070 controller</th>
<th>332 cabinet</th>
<th>Devices</th>
<th>CCTV with pole and foundation</th>
<th>Communications with fiber optic and conduit</th>
<th>Sub-total</th>
<th>design 10%</th>
<th>mobilization 10%</th>
<th>contingency 5%</th>
<th>total construction</th>
<th>cost per mile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alameda</td>
<td>17.2</td>
<td>0</td>
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<td>199,500</td>
<td>57</td>
<td>285,000</td>
<td>7</td>
<td>525,000</td>
<td>20,000</td>
<td>230,000</td>
<td>56</td>
<td>4,089,735</td>
<td>5,329,235</td>
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<tr>
<td>2</td>
<td>Bandini</td>
<td>7.1</td>
<td>0</td>
<td>14</td>
<td>49,000</td>
<td>14</td>
<td>70,000</td>
<td>2</td>
<td>150,000</td>
<td>10,000</td>
<td>115,000</td>
<td>13</td>
<td>1,675,800</td>
<td>2,039,800</td>
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<td>3</td>
<td>Cherry/Garfield</td>
<td>16.7</td>
<td>0</td>
<td>9</td>
<td>206,500</td>
<td>9</td>
<td>295,000</td>
<td>5</td>
<td>375,000</td>
<td>26,000</td>
<td>299,000</td>
<td>59</td>
<td>3,956,089</td>
<td>5,131,589</td>
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<td>11</td>
<td>38,500</td>
<td>11</td>
<td>55,000</td>
<td>2</td>
<td>150,000</td>
<td>4,000</td>
<td>46,000</td>
<td>11</td>
<td>1,084,185</td>
<td>1,373,685</td>
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<tr>
<td>5</td>
<td>Manchester/Firestone</td>
<td>7.1</td>
<td>0</td>
<td>44</td>
<td>154,000</td>
<td>44</td>
<td>220,000</td>
<td>3</td>
<td>225,000</td>
<td>16,000</td>
<td>184,000</td>
<td>44</td>
<td>2,554,386</td>
<td>2,179,170</td>
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<tr>
<td>6</td>
<td>Pacific Coast Highway</td>
<td>7.4</td>
<td>0</td>
<td>28</td>
<td>98,000</td>
<td>28</td>
<td>140,000</td>
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<td>28</td>
<td>1,758,870</td>
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<td>7</td>
<td>Slauson</td>
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<td>49,000</td>
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<td>70,000</td>
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<td>1,319,355</td>
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<td>8</td>
<td>Washington Blvd</td>
<td>11.7</td>
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<td>46</td>
<td>161,000</td>
<td>46</td>
<td>230,000</td>
<td>3</td>
<td>225,000</td>
<td>16,000</td>
<td>184,000</td>
<td>46</td>
<td>2,776,500</td>
<td>3,576,500</td>
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<td>9</td>
<td>Total</td>
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<td>273</td>
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<td>22</td>
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<td>1,230,000</td>
<td>271</td>
<td>19,214,910</td>
<td>23,312,700</td>
</tr>
</tbody>
</table>

Cost Estimates:
- **Sign Controller Devices**: $275,000 to $955,500
- **CCTV and Fiber Optic**: $199,500 to $3,576,500
- **Total Construction**: $19,214,910 to $23,312,700
- **Cost per Mile**: $287,014 to $377,245
8.0 Appendix A - Criteria for Selecting Arterial Smart Corridors – Technical Details

The following nine criteria were used in ranking and selecting Arterial Smart Corridors:

1. Truck volumes;
2. Level of Congestion – V/C;
3. Arterial of significance – Metro CSAN;
4. On-street parking;
5. Provides access to freeway and/or proposed I-710 freight corridor facility;
6. Connectivity to key goods movement intermodal facilities or trip origins/destinations;
7. Safety;
8. Truck route designation – Designated truck route; and
9. Community sensitivity – Highlights sensitive community facilities along the corridor (e.g., schools, parks, bus routes, bicycle and pedestrian facilities, etc.).

We considered eight additional criteria, but did not recommend them for use in the prioritization process:

1. Level of Congestion – Speed or Delay;
2. Arterial of Significance – Federal Highway Administration (FHWA) or California Department of Transportation (Caltrans) principal arterial;
3. Number of lanes;
4. Pavement condition;
5. Truck route designation – Key truck intersections;
6. Truck route designation – Prohibited truck routes;
7. Existing ITS infrastructure – Traffic Signal Synchronization Program (TSSP),
   CCTV, CMS, other ITS; and
8. Planned arterial improvements.

To acquire the data to support these measures, we engaged in a data collection
effort that involved contacting staff at the Los Angeles County Metropolitan
Transportation Authority (LA Metro), the Los Angeles County Department of
Public Works, Caltrans, several local cities, and other consulting firms; and
coordinated with other elements of the Gateway Cities Strategic Transportation
Plan, teams involved in LA Metro’s Countywide Significant Truck Arterial
Network (CSTAN) study, and other regional and local stakeholders.

Full corridor extents were used for the evaluation process, though ultimately
three corridors had endpoints adjusted to avoid facilitating increased truck traffic
near community sensitive facilities and segments.

In the following section, each criterion is described in more detail.

### 8.1 CRITERIA

**Truck Volumes**

Truck volumes provide a measure of how many trucks utilize a particular
corridor and the potential benefits for improving corridor performance. Truck
volumes and V/C from the I-710 Corridor Project Environmental Impact Report
(EIR)/Environmental Impact Statement (EIS) formed the basis for the map in
Figure 1.1, generated under the Technology Plan project. This same information
could be used for the truck volume criteria. However, the data is limited to the
I-710 corridor study area. As such, the truck volume analysis was restricted to
the data available from the I-710 study area.

Figure 7.1 contains a snapshot from a spreadsheet containing the Total 2008
Truck Volume data (combined port and nonport) with links color-coded
according to truck volume.

**Level of Congestion – V/C**

V/C provides a measure of corridor congestion. Similar to the truck volumes,
V/C data is available from the I-710 Corridor Project EIR/EIS. Figure 7.2
contains V/C information with green-colored cells representing V/C < 0.9;
yellow is 0.9 ≤ V/C < 1.0; and red cells represent V/C ≥ 1.0. V/C ratios are
averaged across each corridor to determine the overall performance.
Figure 7.1  Total Truck Volumes

Gateway Cities - 2008 Major Arterial Truck Volumes in I-710 Corridor

Legend
Truck Volumes
Total (2008 Port and 2008 Non-Port)
- 0
- 1 - 500
- 501 - 1,000
- 1,001 - 1,500
- 1,501 - 2,000
- 2,001 - 3,000
- 3,001 - 5,000
- 5,001 - 6,000
- 6,001 - 10,500

Source: I-710 EIR/EIS Model Runs
Arterial of Significance – Metro CSAN

Arterials identified as significant to goods movement and/or regional mobility should be recognized. These corridors also are likely to represent opportunities to build on future investments. CSAN is a countywide network of significant...
arterials that was developed in 2007 to assist Metro in determining how the County’s arterial system is functioning for advance planning purposes. CSAN roadways were identified using primary and secondary selection criteria, including the FHWA/Caltrans functional class, CMP roadways, regional transit routes, traffic volumes, goods movement significance, number of lanes, direct access to freeways, traffic operations and significance in ITS Master Plan, multijurisdictional connectivity and continuity, use as a freeway alternate, multimodal corridors, major activity centers, network spacing needs, gap closures, and connectivity with adjacent counties. Ideally, for this criterion, the CSTAN currently being identified would be used. However, the CSTAN project will not be complete in time for this prioritization effort. Where available, data being collected and utilized for the CSTAN project were used for this prioritization effort for consistency purposes.

Every corridor reviewed falls within the CSAN network so in this instance a map of the CSAN network is not provided.

Source: LA Metro.

**On-Street Parking**

Arterials with significant on-street parking present potential conflicts between trucks and automobiles. Arterials that provide limited on-street parking would be given higher priority as they support more unobstructed flow of commercial vehicles. This criteria was assessed qualitatively using Google Earth.

**Provides Access to Freeway**

Arterials that provide connections to freeways to minimize conflicts would be given higher priority. These facilities also provide support for potential incident and congestion management purposes. In addition, arterials that provide direct connections to the proposed I-710 freight facility are given higher priority. Figure 7.3 shows freeway access points that are connected to the arterial corridor candidates.

**Connectivity to Key Goods Movement Trip Origins/Destinations**

Roadways providing connections between key goods movement travel markets represent an opportunity to address goods movement needs. Figure 7.4 shows the locations of warehouses, likely transload facilities, and off-dock railyards in the Gateway Cities area. Arterials providing access to these important truck trip generators receive recognition under this criterion.

**Safety**

Crashes create delays that can be addressed or reduced through investment in ITS, such as improved traveler information, traffic management, and incident
management. Figure 7.5 shows arterial intersection safety hotspots, based on the total number of recorded crashes from 2009 to 2011 (analysis by Iteris).

**Truck Route Designation**

Designated truck routes should be an indicator that trucks are desired to use the roadway. Improving mobility on roadways carrying freight can help support local economic activity. In most cases, local agencies have identified designated truck routes through their jurisdiction. Figure 7.6 shows Gateway Cities truck routes.

**Community Sensitivity**

The potential truck corridors for arterial smart corridor implementation may have local community sensitivity facilities which would not be desirable, such as schools, parks, and bicycle and pedestrian facilities. Additionally, roads shared with bus routes were also considered community sensitive. Routes with no or fewer local community sensitivity facilities would be better options. Figure 7.7 presents the community sensitive locations or facilities.
Figure 7.3 Freeway Access Points
Figure 7.4   Warehouse, Railyards, and Port Access Locations
Figure 7.5  Arterial Safety Hot Spots

Source: California Highway Patrol (CHP) Statewide Integrated Traffic Records System (SWITRS) and Iteris.
Figure 7.6  Gateway Cities Designated Arterial Truck Routes

Source: Caltrans, local agency municipal codes, maps, etc..

Note: The Cities of Los Angeles, Vernon, Cudahy, and Santa Fe Springs either do not have designated truck routes or only list prohibited truck routes.
Figure 7.7  Gateway Cities Community Sensitive Locations or Facilities
8.2 CONSIDERED BUT NOT PROPOSED CRITERIA

Level of Congestion – Speed Differential
Travel speed compared to posted speed limit also could be an indicator of congestion levels. Travel speeds could be obtained from third-party data vendors, and posted speed limits are available from the travel demand model. This measure was not proposed for consideration as the data were not readily available and V/C data were already available.

Level of Congestion – Delay
Delay is another measure of congestion available from the travel demand model. Due to the differing lengths of each corridor, if delay is utilized, it should be normalized to a per mile basis.

Arterial of Significance – FHWA or Caltrans Principal Arterial
These roadways would include all principal (urban and rural) arterials in the FHWA system. Since this is one of the primary selection criterion under the CSAN, this criterion could be dropped and just use CSAN.

Number of Lanes
Numbers of lanes represent how much capacity could be served on the arterial. This criterion was excluded since V/C was utilized. Higher priority would be given to more lanes in each direction. This data is available from the travel demand model.

Pavement Condition
Poor pavement condition could be an indicator of reduced capacity on a roadway. For this prioritization effort, since the focus is on Smart Corridor deployments, data are not readily available, and the timeline for this effort, this criterion is not proposed for use.

Key Truck Intersections
In 1996, a project studied the practices of the trucking industry and conflicts between goods movement by trucks through individual communities, and identified over 100 truck impacted intersections. Several improvements have been made over the years to improve these locations. Due to the age of this effort, it is proposed that designated truck routes be used for the prioritization criterion rather than key truck intersections.
Prohibited Truck Routes

Arterial routes prohibited from use by trucks also should be factored into the prioritization. It is recommended that prohibited truck routes be excluded from consideration at the onset since this data are not readily available and designated truck routes can be used.
9.0 Appendix B – Conceptual Corridors
Figure 9.1 Alameda Street

Quick Facts
Overall Score = 22
# of miles = 17.2
# of Signals = 57

Corridor Overview
Alameda Street is a north-south corridor running from 6th Street in Los Angeles to E Harry Bridges Boulevard in the Wilmington neighborhood near the ports of Los Angeles and Long Beach. Along almost all of its route, Alameda Street is paralleled by the Alameda Corridor, a major rail connection. As defined, the Alameda Street corridor begins in an industrial area near Downtown Los Angeles. It connects with the I-10 freeway before intersecting with Washington Blvd., a major east-west corridor. Alameda Street then constitutes the border between industrial Vernon and the more residential Central-Alameda neighborhood of Los Angeles.
The Garfield Avenue/Cherry Avenue corridor runs from Anaheim Street in Long Beach to Whittier Blvd. in Montebello. At its southern end, the corridor is mainly residential until Willow St., where the land use becomes a mix of residential, commercial, and industrial. However, after its connection with the I-105 Century Freeway, the corridor once again passes through a mix of residential, commercial, and industrial uses. The corridor does experience some areas of congestion: Rosecrans Avenue to Imperial Highway, Florence Blvd. to Slauson Avenue, and Washington Blvd. to Whittier Blvd.
Garfield Avenue/Cherry Avenue - South

Quick Facts
Overall Score = 21
# of Miles = 16.7
# of Signals = 59

Corridor Overview
The Garfield Avenue/Cherry Avenue corridor runs from Anaheim Street in Long Beach to Whittier Blvd. in Montebello. At its southern end, the corridor is mainly residential until Willow St., where the land use becomes a mix of residential, commercial, and industrial. However, after its connection with the I-105 Century Freeway, the corridor once again passes through a mix of residential, commercial, and industrial uses. The corridor does experience some areas of congestion: Rosecrans Avenue to Imperial Highway, Florence Blvd. to Slauson Avenue, and Washington Blvd. to Whittier Blvd.
The Bandini Boulevard/41st Street/38th Street/37th Street corridor runs from I-110 in Los Angeles eastward to Garfield Avenue in the City of Commerce. Because it runs almost entirely through the cities of Vernon and Commerce, this corridor is primarily industrial. Of particular note is the large BNSF intermodal facility located just north of Bandini between Downey Road and the I-710 Freeway in the City of Commerce. Additionally, it offers connections with the I-710 Freeway, as well as the I-5 Freeway near its eastern terminus. While the corridor experiences low levels of congestion, it does see moderate to high truck volumes along its entire length.
Figure 9.5  Del Amo Boulevard

The Del Amo Boulevard corridor runs from I-110 to the west to the I-710 Freeway to the east. The corridor begins at its western end in an industrial area with several freight logistics firms are located. There is also a Kinder Morgan Watson refinery located in this area. After connecting with the I-710 freeway and crossing the Los Angeles River, Del Amo becomes a primarily residential thoroughfare until the corridor’s terminus at the I-605 Freeway. The Del Amo corridor experiences congestion west of the I-710 freeway. Additionally, truck traffic is moderate between Atlantic Ave. and the I-710.
Figure 9.6  Manchester Avenue / Firestone Boulevard

The Manchester Avenue/Firestone Boulevard corridor, as defined, runs from the I-110 Freeway in the City of Los Angeles to the I-605 Freeway in Norwalk. For the duration of the route, it generally serves as a commercial street with residential neighborhoods located beyond these businesses. Between Otis Street and the I-710 in South Gate, Firestone Blvd. passes through an industrial area where several transport companies are also located. Several segments of the corridor experience congestion, including the stretch between Alameda Street and Long Beach Blvd., as well as between Atlantic Blvd. and Garfield Avenue near the I-710 interchange.
Figure 9.7  Pacific Coast Highway

Quick Facts
Overall Score = 21
# of Miles = 11.6
# of Signals = 41

Corridor Overview
The Pacific Coast Highway (PCH) corridor as it is defined runs from the I-110 Harbor Freeway in the Los Angeles neighborhood of Wilmington to I-710.
Figure 9.8  Slauson Avenue

The Slauson Avenue corridor runs east-west between the Los Angeles river to the I-605 Freeway in Whittier. Along the western end of this corridor, Slauson is an industrial corridor. Between the river and I-5, the corridor passes through business parks and industrial areas. Additionally, the corridor experiences congestion at its eastern and western ends.
Figure 9.9 Washington Blvd.

**Quick Facts**
- Overall Score = 25
- # of Miles = 11.7
- # of Signals = 46

**Corridor Overview**
The Washington Boulevard corridor runs from the I-110 Freeway just south of Downtown Los Angeles eastward to I-605 in Montebello. Along the initial western portion of the corridor, Washington Boulevard is a mixed industrial and commercial corridor closely paralleling the I-10 Freeway. Between Long Beach Avenue and Downey Road, it passes through the chiefly industrial area surrounding the Los Angeles River. Between Downey Road and I-710, Washington Blvd. runs along a large BNSF intermodal facility in the City of Commerce. Except for the final segment east of Montebello Way, Washington is a congested roadway, and is one of the most congested corridors in the subregion.