FINAL REPORT

TECHNICAL MEMORANDUM – I-710 EIR/EIS INITIAL FEASIBILITY ANALYSIS

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

This report presents the results and findings of an initial assessment of the feasibility of accommodating various port cargo growth scenarios, given potential limitations of the transportation systems in the I-710 corridor and the rail system in the Los Angeles Basin. The report also assesses the feasibility of two specific project alternatives to meet the Purpose and Need objectives for the I-710 corridor under these different port cargo growth scenarios. More specifically, this task has the following objectives:

- **To evaluate how growth in different major sources of vehicle traffic in the corridor will impact congestion and the ability of potential alternatives to meet the Purpose and Need for the project.** These sources of vehicle traffic include passenger travel (auto and transit), port trucking, and local/regional trucking serving non-port businesses and households in the study area.

- **To evaluate how various reasonable port cargo growth scenarios will impact congestion and the ability of potential alternatives to meet the Purpose and Need for the project.** The alternative port cargo growth scenarios, which are described in more detail in other technical memoranda and summarized later in this report, reflect different assumptions about the ability of the Port to expand marine terminal facilities, as well as constraints in the rail system. Specific questions that need to be answered about how alternative port cargo growth scenarios affect alternatives definition and the feasibility of meeting the Purpose and Need objectives include the following:

  - Do any of the alternative port cargo growth scenarios create traffic volume levels in the corridor that will be difficult to accommodate with some combination of maximum build capacity, Transportation System Management/Travel Demand Management (TSM/TDM), maximum rail utilization, and Alternative Goods Movement Technology alternatives?
  - Do the impacts of the alternative port cargo growth scenarios vary by location in the corridor, and how might this affect the configuration of project build alternatives?
  - What are the peak period and peak hour traffic congestion levels under the different port cargo growth scenarios, and what additional capacity is needed to meet Purpose and Need objectives given these projected levels of congestion?

- **To evaluate how maximum rail utilization, given potential rail capacity opportunities and constraints, affects the feasibility of meeting Purpose and Need objectives under the alternative port cargo growth scenarios.** This evaluation involves the integration of findings from the Railroad Goods Movement Study conducted for this environmental impact report/environmental impact statement (EIR/EIS) into the Initial Feasibility Analysis. Since the maximum rail share varies by port cargo growth scenario and is related to assumptions about rail capacity expansion (both intermodal terminal capacity and mainline capacity), the analysis of maximum rail share is integral to the analysis of the port cargo growth scenarios.

- **To evaluate the feasibility of meeting project Purpose and Need objectives under the various port cargo growth scenarios if TSM/TDM and alternative goods movement technologies are considered.**

The Initial Feasibility Analysis (IFA) focuses on the congestion and roadway capacity Purpose and Need objectives for the I-710 corridor, providing the information necessary to determine the feasibility of adding sufficient capacity to meet the objectives under the various scenarios and alternatives that were evaluated. There are other Purpose and Need objectives that need to be considered before selection of the final alternatives that will be subject to more detailed analysis in the Draft EIR/EIS. These other Purpose and Need objectives will be considered during alternatives screening, and will be considered for a broader range of potential build alternatives than those considered in the IFA. Further, it is very likely that the TSM/TDM and/or Alternative Goods Movement Technology project alternatives can be combined with other build alternatives later in the study. The intent of this IFA report is not to screen these alternatives out from further consideration at this time, but to analyze and determine the relative impacts of these alternatives on congestion on the transportation system relative to the no-build alternative.

At the conclusion of the IFA, a decision will be made as to which of the port cargo growth forecasts to carry forward as the basis for the analyses in the EIR/EIS. The report is intended to provide information necessary to make this decision.

2.0 APPROACH

The methodology used to conduct the IFA was a high-level "screenline" approach that is summarized in a separate technical memorandum provided to the Traffic and Forecasting Working Group (I-710 EIR/EIS: Initial Feasibility Analysis Framework, September 15, 2008). Additional detail concerning how this methodology was implemented is presented in the Technical Appendix to this report. It should be noted that the purpose of the methodology was to allow for high-level comparisons of the various scenarios and alternatives in order to achieve the objectives outlined in the previous section. It is not intended to serve as the final analysis of the alternatives evaluated in this report. For the purposes of final analysis of alternatives and preliminary engineering, more detailed transportation and environmental modeling and traffic operations analysis will be conducted at a later date. Traffic estimates provided in the report will be refined for this purpose.

The general approach for conducting the IFA can be summarized as follows.

1. The first step in the process was to develop a baseline forecast of traffic volumes in the corridor for the year 2035 based on an existing travel demand model. The travel demand model selected for this purpose was the Southern California Association of Governments (SCAG) model as used in the 2008 Regional Transportation Plan (RTP). The model was first run for a 2008 base year, and the results were compared with traffic counts. Adjustments to the model were made to achieve consistency with the counts (calibration and validation). These adjustments were incorporated into the forecast year version of the model, which was run using the 2035 "Baseline" scenario from the SCAG RTP. The Baseline scenario includes all planned, programmed, and/or funded projects in the region (and in the study area), but was modified to eliminate any projects in the study area that would be considered as part of build alternatives in the EIR/EIS. The model results for the I-710 mainline and several key parallel facilities were then compared with other studies of the corridor. When the SCAG model results were clearly inconsistent with those of other studies and the results of other studies were more reflective of current or known conditions, the model results were adjusted appropriately. The model development, validation, and calibration process and the baseline model results will be described in more detail in a separate technical memorandum.

2. The baseline model results were used as inputs to a spreadsheet tool (see IFA methodology memorandum and Technical Appendix), referred to as the "screenline model." This tool compiles results at four lines (or "screenlines") that summarize traffic forecasts at locations on the I-710 mainline, the I-110 mainline, the I-605 mainline, and several north-south parallel arterials to the east and west of the I-710 at four locations. A map of these screenlines is presented in Figure 1. The reason for selecting these specific screenlines and roadways is described in more detail in the IFA Methodology Memorandum and the Technical Appendix. The screenline model approach allows an analyst to very quickly conduct repeated analyses based on variations in scenario assumptions. The screenline model uses inputs from the travel demand model about future baseline traffic conditions and routes used to and from key origins and destinations in the corridor, and calculates new traffic volumes and congestion levels at each of the screenline locations. Thus, the different scenarios can be compared with respect to their traffic impacts at these screenlines.

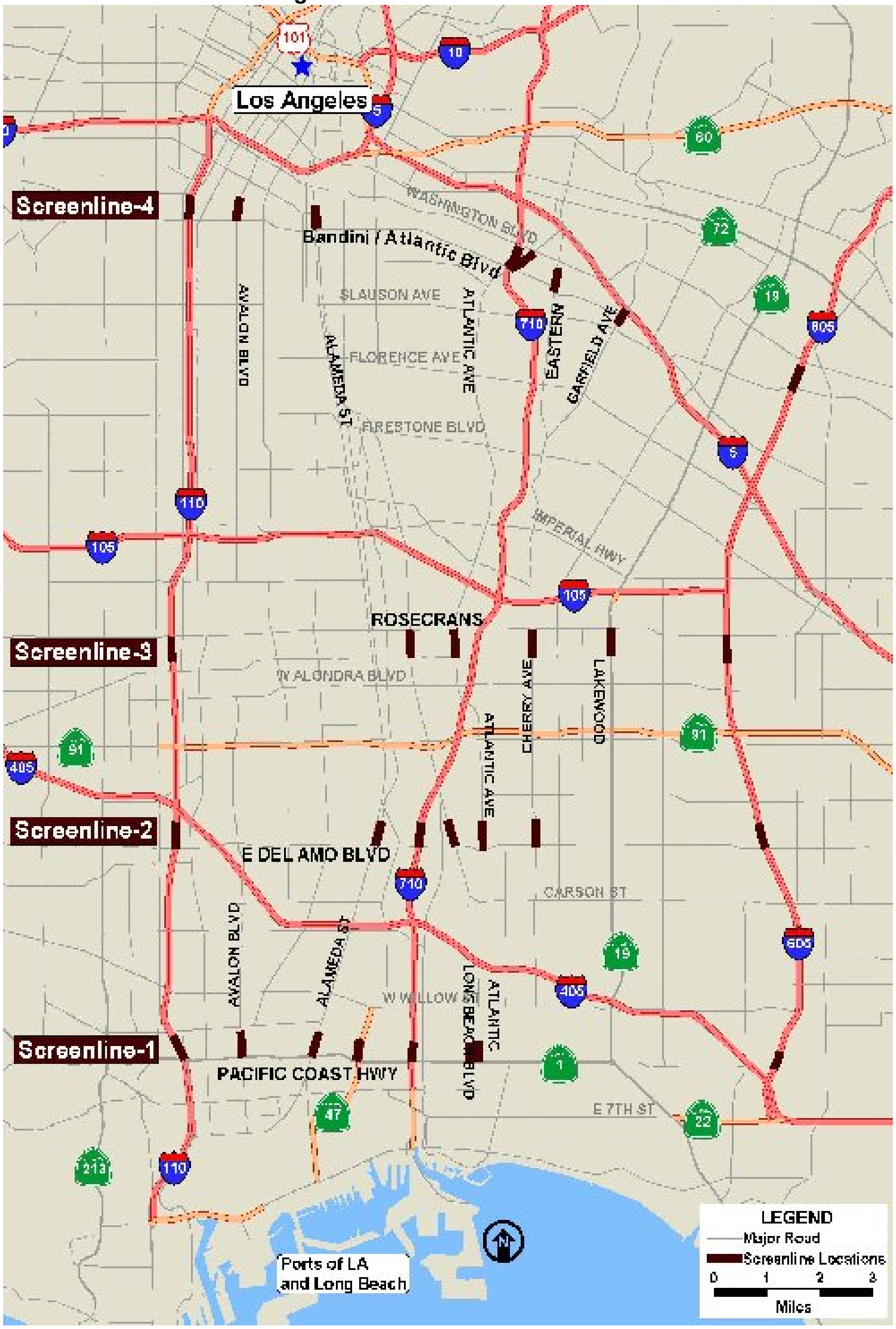
3. Since a major objective of the IFA was to evaluate the impacts of different port cargo growth scenarios and alternatives that are directed at port cargo transport, a major input to the screenline model was the ports' truck trip generation model, Quick Trip (QT). QT produces

an estimate of the number of truck trips inbound and outbound at the ports by varying input assumptions about the amount of cargo handled at each terminal; the mode share used to transport the cargo (local trucking, on-dock rail, and off-dock rail); and the distribution of port cargo movements by operating shifts (day shift, night shift, and hoot owl shift). QT was used to simulate the effects of changes in port cargo volume levels and rail utilization, as well as to estimate the impacts of changes in gate operating hours, empty container management strategies (preliminary analysis points to a potential reduction in truck trips of the order of around 7% to 8% due to an increase in import empty container reuse for exports from 10% to 20%), and truck trips going to near-dock and off-dock intermodal terminals.

4. In order to evaluate a scenario, the screenline model was used to estimate port truck trips under that scenario, to allocate this and other non-port traffic to the screenline locations, and to adjust the capacity assumptions to reflect any effects of the alternatives.

5. Data from traffic counts conducted in this and other studies and the information about the hourly distribution of port trucks included in QT were used to estimate the fraction of auto and truck traffic occurring during the peak hours of the mid-day and the peak commute time periods to allow for the evaluation of peak congestion conditions, and to estimate the number of lanes for autos (General Purpose (GP) lanes) and trucks (truck lanes and/or GP lanes) that would be required to accommodate all of the traffic on the I-710 during peak conditions.

Figure 1. Screenline Locations



One feature of the screenline model forecasts that is important to highlight is the way in which certain “secondary” port truck trips and future warehouse locations are treated. To consider the case of secondary port truck trips, consider the case of imports (the reverse patterns are true for exports). Some containers enter the port and are trucked to a warehouse location, where the contents of the container are unloaded and repacked in different, usually larger containers. These larger containers are then trucked to a rail intermodal terminal for rail shipment, or they are carried by over-the-road trucks to other locations, both in our outside of Southern California. This practice, which is known as transloading, is generally not captured effectively in the SCAG model. A simple procedure was developed to estimate these trips, based on known information about the percent of containers that are transloaded and information about transload locations that are available from other studies. In the results presented in this report, when referring to “port trucks,” these secondary truck trips are included. The results, however, do not present these secondary transload trips separately.

A second issue is that both the port model and the SCAG model assume that the inland ends of port truck trips will have the same geographic distribution in the future as they do today. This is highly unlikely, since most of these trips today go to or come from warehouse locations in the Gateway Cities and the older warehouse districts in Los Angeles and Orange County. These warehouse locations have limited expansion capability, and future demand for warehouse space is likely to significantly exceed this capacity. The location of new warehouses serving international trade is very uncertain, although what is clear is that it will be some distance inland from the current locations and most likely to the north and/or east of the I-710 study area. An estimate of the amount of containers that would need to be transported to these new locations, based on the growth potential in existing warehouse districts, was developed and used as the basis for evaluating potential future markets for alternative goods movement technology systems. Because of the uncertainty associated with these future locations and because no previous studies of the I-710 corridor have included forecast impacts of these new warehouse locations, the trip patterns produced by the model do not take these new locations into account. However, a sensitivity test was conducted in this IFA to illustrate the potential impact on the I-710 of traffic moving to new locations north and east of the study area. This is described in more detail in the discussion of findings later in this report.

3.0 PORT CARGO GROWTH SCENARIOS AND ALTERNATIVES

3.1 PORT CARGO GROWTH SCENARIOS

The IFA considers three alternative port cargo growth scenarios. These scenarios, which have been previously presented to the I-710 Technical Advisory Committee and Project Committee, vary with respect to assumptions about the amount of available marine terminal capacity at the ports, the availability and utilization of on-dock intermodal rail terminal capacity at the marine terminals, the availability of near-dock intermodal terminal capacity (intermodal terminals generally within five miles of the ports), the availability and location of off-dock intermodal terminals, and the availability and limitations of rail mainline capacity.

The port cargo growth scenarios were developed after a review of the most recent San Pedro Bay Port Cargo Forecasts, which demonstrate that the demand for future cargo growth, based on national and world economic trends, exceeds any reasonably expected level of marine terminal capacity estimated by the two ports. A more detailed discussion of port cargo growth forecasts was prepared and presented to the TFWG previously (*Draft Technical Memorandum – I-710 EIR Port Cargo Forecast*, May 22, 2008). All three of the scenarios assume that roughly 40 percent of the cargo will be carried by direct rail intermodal. Direct rail refers to cargo that gets onto the rail system in the same container in which it arrived (in the case of imports) or will depart (in the case of exports) by ship. Some of this direct rail cargo is transported to/from the port by truck if it gets onto or off of the rail system at an off-dock terminal. As a point of comparison, last calendar year (2007) both ports combined, handled 15.7 million Twenty Foot Equivalent Units (TEUs). The three port cargo growth scenarios are:

1. **Port high cargo growth scenario without near-dock intermodal terminal expansion.** This scenario assumes that marine terminal capacity at the ports is expanded from current levels, based on existing plans by the two ports to accommodate growth to approximately 43 million TEUs annually. Along with marine terminal expansion, it assumes that the ports will expand their existing on-dock rail terminal capacity to allow for 30 percent of total containerized cargo to be loaded onto rail at the ports. It assumes that the Union Pacific (UP) and Burlington Northern Santa Fe (BNSF) will both be unsuccessful in getting their near-dock expansion plans approved. These plans if approved would expand UP's Intermodal Container Transfer Facility (ICTF) and build a new BNSF terminal, the Southern California International Gateway (SCIG). As a result of not being able to make these near-dock terminal expansions, the railroads would be forced to pursue strategies that would involve a combination of expanded operations at existing downtown yards (mostly through changes in operating practices), expansion of selected existing rail yards where they have available property that they already own, and/or development of new intermodal terminals in locations such as Victorville. It also assumes that the railroads will be able to accommodate this growth in cargo volume on their mainline tracks after completing ongoing capacity expansion projects and by increasing the length of trains. In some locations, additional mainline capacity (third and fourth tracks) will be necessary. This is discussed in more detail in Section 4.3 of this report, and the analysis supporting all rail assumptions is provided in the *Railroad Goods Movement Study, Draft Final Report*, (October 2008).

2. **High port cargo growth with near-dock intermodal terminal expansion.** This scenario is the same as the previous scenario, except that it assumes that the UP will expand its existing near-dock intermodal terminal (ICTF), and that the BNSF will build a new near-dock intermodal terminal (SCIG). This scenario is expected to reduce truck traffic on I-710 as compared with the previous high port cargo growth scenario, due to the diversion of truck trips to the near-dock terminals that would have otherwise been destined to the off-dock terminals.

3. **Low port cargo growth.** This scenario assumes that the ports are unable to expand marine terminals beyond their existing terminal footprint, but they are able to achieve some improved operating efficiencies. This would result in growth to 28.5 million TEUs annually. Because marine terminals are not expanded, associated on-dock rail projects are not built, thereby limiting the amount of containers that can be loaded on-dock to approximately 5.5 million TEUs. As in the high port cargo growth without near-dock terminal expansion scenario, it is assumed that ICTF will not be expanded and SCIG will not be built. Both railroads will need to expand their existing intermodal terminal capacity, and they will do so in the same ways as described in the high port cargo growth scenario. In the low port cargo growth scenario, it is further assumed that the large increase in train volume will make it difficult for the railroads to continue the practice of operating longer trains, and that they will have right-of-way constraints that limit their ability to build new mainline track beyond what is currently under construction.

A summary of these scenarios is presented in the Table 1.

Table 1. Port Cargo Growth Scenarios
(in Million TEUs)

Scenario	Port Cargo Volume Forecast	40% Direct Rail	Projected On-Dock Terminal Throughput	Projected Near-Dock Terminal Throughput	Remaining Off-Dock Capacity Needed	Container Movements by Truck Likely to Occur on I-710 North of PCH
High port cargo growth without near-dock terminal expansion	43	17.1	12.8	1.4	2.9	28.5
High port cargo growth with near-dock terminal expansion	43	17.1	12.8	4.3	0.0	25.6
Low port cargo growth	28.5	11.4	5.6	1.4	4.4	21.5

3.2 TSM/TDM AND ALTERNATIVE GOODS MOVEMENT TECHNOLOGY ALTERNATIVES

3.2.1 Transportation Systems Management/Travel Demand Management (TSM/TDM)

This alternative both increases the effective capacity of the corridor through combinations of traffic management, intelligent transportation systems (ITS), parking management, and advanced logistics practices (TSM) and manages demand through combinations of increased transit services and port operating hours (TDM). The strategies assumed for this analysis are presented below. Note that a number of strategies are discussed in the *Multimodal Review Report*, but transportation agencies in the I-710 corridor already have incorporated many of these strategies in the 2035 Baseline Alternative. Where this is the case, the baseline assumptions for these strategies are noted below.

Freeways

- Adaptive ramp metering at approximately 13 sites along I-710, providing an estimated eight-percent capacity[1] improvement over No-Build, and
- ITS Corridor Management implementation on I-710, I-110, and I-605, providing an average capacity[1] improvement of six percent

Interchanges/Arterial

- Peak-period parking restrictions on key arterials (Atlantic Blvd., Cherry Ave., Garfield Ave., Eastern Ave., and Long Beach Blvd.), providing additional capacity increases over No-Build of 700 passenger car equivalents (PCEs) per hour per lane;[2]
- Additional ITS implementation on Atlantic Ave., Cherry Ave., Eastern Ave., and Long Beach Blvd., providing an effective capacity increase of 23 percent over No-Build (including the effects of the parking restrictions cited above); and
- Additional ITS implementation on all other arterials crossing each screenline, providing an additional effective capacity increase of six percent over No-Build.

Goods Movement Strategies

- Empty Container Management (ECM). This would involve Internet-based systems to match importers and exporters so that empty containers could be moved directly between the two without the need for additional trips to store the empty containers at the marine terminals. Though the ports' initial experiment with an ECM program has

[1] TSM Project Evaluation Final Report: Signal Synchronization and Bus Speed Improvements MTA Contract PS-4330-0894

[2] Task No. 4.2 Phase I Project Evaluation Report, Signed Synchronization and Bus Speed Enhancement Projects, prepared for Los Angeles Metropolitan Transportation Authority, URS, September, 2003.

been largely unsuccessful, there is some reason to believe that this was caused by institutional (rather than technical) problems. Assuming that these institutional issues can be addressed in the future, ECM could be considered as part of the TSM/TDM alternative for the IFA. However, the baseline assumptions provided by the ports for all cargo growth scenarios already provide for a very aggressive ECM strategy (20 percent reuse levels for empty containers as compared to 5 to 10 percent today). Prior studies for the ports suggest that this is the maximum practical limit for this strategy. Thus, a 20% empty container reuse is also considered under the TSM/TDM alternative.

- Expanded Off Peak Program (PierPASS). With significant growth in port truck traffic volumes in the future, the ability of night time terminal gates to handle this growth would necessitate expansion of the existing PierPASS, Inc. program, Off Peak, to allow for greater use of port terminal gates for both night shifts (second shift from 6:00 p.m. to 3:00 a.m., and Hoot shift from 3:00 a.m. to 8:00 a.m.) through mechanisms such as appointment systems. The baseline assumptions provided by the ports already assume a very aggressive use of night gates by port trucks (60 percent for the day shift, 20 percent for the second shift, and 20 percent for the Hoot shift, as compared to a combined 30 to 35 percent in the second and Hoot shifts today). Since the second shift is the same duration as the day shift, it is theoretically possible to handle as much traffic in the second shift as in the day shift.

  The ports believe that they may not have the legal authority at present to require this type of operation as a condition of their lease agreements. There are also questions as to whether or not there are any programs that could be implemented by PierPASS, Inc. that would be effective in increasing the share of night gate operations beyond what is assumed in the baseline. Nonetheless, a sensitivity analysis was conducted in the IFA to determine the traffic impact of a future expanded operation resulting in gate truck traffic distribution of 40 percent in the day shift, 40 percent in the second shift, and 20 percent in the Hoot shift.

Transit

- Additional bus shuttles (as part of the Blue/Green Lines);
- Expanded Metro Blue Line and Green Line service;
- Expanded local, express, and Metro Rapid Bus services; and
- Enhanced community bus service (e.g., local circulators in Long Beach, Commerce, and Paramount).

Transit service increases resulting in a 25 percent increase in transit trips over the baseline were assumed for these TSM/TDM transit strategies, which produces a study area-wide peak period auto trip reduction of approximately 3 percent. It should be noted that the baseline travel forecasts predict an approximate 10 percent transit mode share of home-based work trips in the study area (among the highest work trip transit shares in the Southern California region).

3.2.2 Alternative Goods Movement Technology System (Alt Tech)

The goods movement technology systems assumed in this analysis are based on the results of the *Alternative Goods Movement Technology Feasibility Study* draft report. This alternative includes an advanced goods movement technology system to move containers between the Ports of Los Angeles and Long Beach and the intermodal rail yards in Commerce and Vernon.

The portion of this system within the I-710 Corridor study area (approximately 18 miles) could serve some share of the projected 2035 near-dock and off-dock rail intermodal container market demand, with no intermediate stops between the northern and southern termini of the system.

Additional market demand assumptions include the following:

- The on-dock market will continue to be served by rail and, therefore, would not be served by the Alternative Goods Movement Technology system; and
- In addition to the combined current near-dock and off-dock rail intermodal markets, the Alternative Goods Movement Technology application within the study area could be considered an initial segment of a future, larger, regional network that could be used to transport containers to regional warehousing, distribution, and intermodal facilities elsewhere in the Los Angeles Basin and in the Inland Empire (See previous discussion of the need for expanded inland warehousing in Section 2.0 of this report.).

The total potential cargo container trip market demand identified for the Alternative Goods Movement Technology is shown in Tables 2, 3, and 4. These tables also relate the beyond I-710 market estimates to the primary port forecast growth scenarios and demand conditions, in addition to the near-dock and off-dock estimates. These estimates were derived based on a detailed analysis conducted by The Tioga Group involving the assessment of total forecast international containerized cargo demand for warehousing in the region (estimated separately for the high and the low growth scenarios), and future warehousing capacity constraints in the study area. The difference between the total forecast warehousing demand and available future warehousing capacity in the study area is estimated to be the “Beyond I-710 Corridor” market presented in Tables 2, 3 and 4 below.

Table 2. Alt Tech Market Analysis for the High Port Cargo Growth Without Near-Dock Terminal Expansion Scenario (in Millions)

Market Served	TEU Annual	40-Foot Cargo Container Equivalents Annual
Off Dock Rail	2.9	1.6
Near Dock Rail	1.4	0.8
Beyond I-710 Corridor	6.8	3.7

Table 3. Alt Tech Market Analysis for the High Port Cargo Growth With Near-Dock Terminal Expansion Scenario (in Millions)

Market Served	TEU Annual	40-Foot Cargo Container Equivalents Annual
Off Dock Rail	0.0	0.0
Near Dock Rail	4.3	2.3
Beyond I-710 Corridor	6.8	3.7

Table 4. Alt Tech Market Analysis for the Low Port Cargo Growth Scenario (in Millions)

Market Served	TEU Annual	40-Foot Cargo Container Equivalents Annual
Off Dock Rail	4.4	2.4
Near Dock Rail	1.4	0.8
Beyond I-710 Corridor	4.5	2.4

4.0 FINDINGS

The findings of this IFA are presented in this section as answers to a series of major questions, which include the following:

- How do the different port cargo growth scenarios impact congestion and the feasibility of meeting Purpose and Need objectives?
- How does the TSM/TDM alternative impact congestion and the feasibility of meeting Purpose and Need objectives?
- How does the Maximum Rail and Alternative Goods Movement Technology alternative impact congestion and the feasibility of meeting Purpose and Need objectives?

In answering these questions, we focus on the impacts on the I-710. The IFA did produce analysis of impacts on other north-south freeways and arterials, and these data are presented in the Technical Appendix to this report. However, the findings of the analysis of the I-710 freeway answer most of the key questions posed in this analysis.

The analysis of each of the questions posed above generally proceeds in the following manner:

- For the different port cargo growth scenarios, impacts on port truck volumes and total traffic volumes are first described.
- For each scenario, changes in daily traffic volumes on the I-710 are analyzed and differences among scenarios and alternatives are highlighted.
- Peak period conditions are analyzed to describe general congestion impacts.
- Peak hour congestion conditions are evaluated and compared across scenarios and alternatives and the lane requirements necessary to accommodate all of the traffic predicted on the I-710 during the peak hour is analyzed and compared across scenarios and alternatives.

4.1 HOW DO THE DIFFERENT PORT CARGO GROWTH SCENARIOS IMPACT CONGESTION AND THE FEASIBILITY OF MEETING PURPOSE AND NEED OBJECTIVES?

In this section of the report, we examine the impact of the various port cargo growth scenarios on traffic congestion in the I-710 corridor. This section focuses on the traffic and congestion impacts of the various growth scenarios under the No Build alternative. Subsequent sections

(4.2 and 4.3) will present the results for the TSM/TDM and Alternative Goods Movement Technology system alternatives.

4.1.1 Trip Growth in the I-710 Study Area

Future traffic growth in the I-710 study area is markedly different when compared with the rest of the Southern California region. The study area is generally a low growth area as compared to the rest of the region. The communities in the study area are largely older built-out areas without much room for growth. Table 5 shows trip growth projections for different categories of trips in the baseline forecast model between 2008 and 2035 (AM peak period, 6:00 a.m. to 9:00 a.m.) for the study area, as compared to the rest of the region. The forecast is for 9 to 10 percent overall trip growth for trips with either or both trip ends in the study area, as compared to overall regional trip growth of 25 percent for this same period (see Table source for reference). While trips passing through the study area are likely to be growing at a higher rate than the trips with at least one end in the study area, these forecasts suggest relatively low growth in traffic as compared to today, and this is generally borne out when looking at overall changes in congestion levels.

Table 5. AM Peak Period Trip Growth Projections, 2008 to 2035

	Study Area to Elsewhere	Within Study Area	Elsewhere to Study Area
Drive Alone	8%	10%	7%
Shared Ride 2	9%	9%	9%
Shared Ride 3+	10%	9%	11%
Light-HDT	8%	6%	8%
Medium-HDT	7%	0%	7%
Heavy-HDT	67%	85%	56%
Total	**9%**	**10%**	**9%**
			Regional Trips Growth = 25%

Source: SCAG 2008 RTP Model, Baseline Scenario. In this table, HDT refers to Heavy-Duty Truck. Light-HDT is a truck with a Gross Vehicle Weight (GVW) rating of 8,500 to 14,000 lbs.; medium-HDT is a truck with a GVW rating of 14,000 to 33,000 lbs., and heavy-HDT is a truck with a GVW rating of over 33,000 lbs.

What is, of course, most striking about forecast traffic growth in the study area is the growth in heavy truck trips, driven largely by port growth. This means that trucks are becoming a much larger share of total traffic over time and because they take up much more roadway capacity per vehicle than autos (for example, based on a PCE factor of 2, each truck on an average takes up the roadway capacity equivalent to two autos), the impact on overall traffic congestion levels will be greater than the overall trip growth patterns shown in Table 5.

Also, since trucks are much less likely to seek alternative arterial routes to I-710 than autos, they will take over more and more of the freeway capacity, diverting more autos to the parallel arterials.

Table 6 presents information about growth in port trucks and compares the port cargo growth scenarios. Port truck trips for the high growth scenarios are expected to result in 128 percent growth as compared to 2007 gate counts (more than doubling). **In 2035, the low growth scenario results in only 11 percent lower daily port truck trips as compared to the high growth scenarios even though the low growth scenario has 33 percent lower containerized cargo throughput compared to the high growth scenarios.** This is because in the low growth scenario there is much less on-dock rail capacity than in the high growth scenarios – in fact there is an increase in the total forecast number of containers and truck trips going to off-dock terminals in the low growth scenario as compared to the high growth scenarios. Containers moving to off-dock terminals also generate more truck trips per container than do containers that are moving by truck to local/regional markets (taking into account the re-positioning of equipment that is required).

Table 6. Port Truck Trip Growth

Port Cargo Growth Scenario	Total Daily Port Truck Trips
2007	50,200
2035 High Cargo Growth (43.0 M annual TEUs)	114,400
2035 Low Cargo Growth (28.5 M annual TEUs)	102,200

4.1.2 Traffic Growth Patterns – I-710[3]

Figure 2 presents a comparison of average daily traffic by vehicle class on I-710 screenlines under the No Build Alternative between the different port cargo growth scenarios. The following findings can be drawn from this figure:

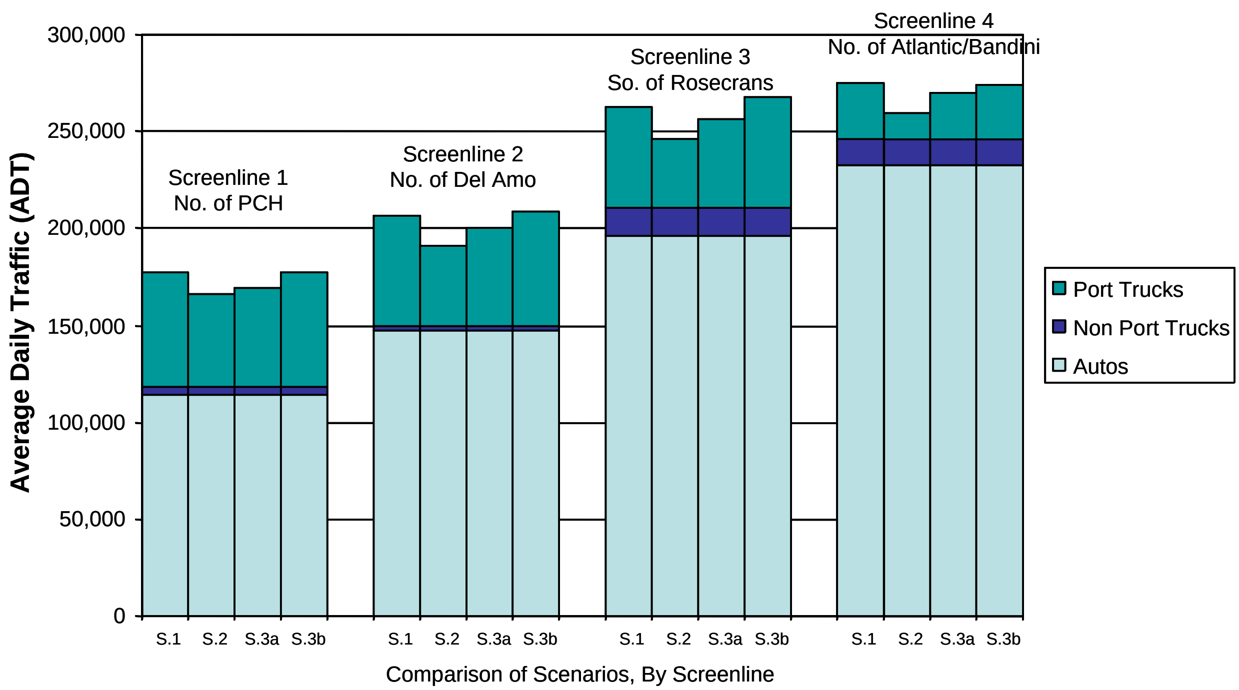
- **Total traffic volumes generally increase from south to north along the I-710 corridor with a peak occurring north of SR 91**, reflecting the traffic added by the key east-west connecting freeways at SR 91 and I-105. This is true of all three cargo growth scenarios. Auto traffic also follows this overall pattern.

- **Total truck traffic on I-710 also peaks north of SR 91, although the contribution of port traffic (even including transload trips) declines steadily from south to north**. The one exception is that in the low growth scenario, port truck volumes are relatively constant from Screenline 1 (at PCH) to Screenline 2 (at Del Amo). Total truck volumes

[3] The traffic analysis in this summary report focuses on the I-710 mainline. Summaries of the full screenline results for the other freeways and arterials studied are shown in the Technical Appendix.

are highest in the high growth scenario without expanded near dock intermodal capacity and they peak at 66,600 daily trucks north of SR 91. Including transload trips, the highest port truck volumes also occur at this location, with approximately 51,600 in the high growth scenario. These port truck forecasts are generally lower than forecasts

Figure 2. I-710 2035 ADT, Alternative 1 – Future Baseline/No Build



Scenarios:	S.1: Port High Growth, no SCIG	S.3a: Port Low Growth (without Longer Trips)
	S.2: Port High Growth, with SCIG	S.3b: Port Low Growth (with Longer Trips)

previously presented in the SR 91/I-605/I-405 Corridor Study. This is due to reductions in the forecast for port cargo growth, even for the highest growth scenarios in this study and slightly higher forecasts of on-dock rail share as compared to earlier studies.[4]

- **<u>The high cargo growth scenario with expanded near-dock capacity has the lowest relative growth in port truck traffic while the high growth scenario without expanded near-dock capacity has the highest relative growth in port truck traffic on I-710 among all the cargo growth scenarios.</u>** This is due to the elimination of a significant number of trips to the Commerce and Vernon intermodal yards, which in this scenario would go instead to the expanded near-dock yards. This change in off-dock

[4] SR 91/I-605 Needs Assessment Study, Gateway Cities Council of Governments in association with Meyer, Mohaddes Associates, September 2005.

container moves not only reduces truck trips throughout the mid and north ends of the corridor, but it also reduces I-710 traffic at the south end since many trucks will use Alameda street (if coming from the West Basin area at the Port of Los Angeles) or SR 47/103 (if coming from Terminal Island) instead of using I-710 in order to access the near-dock terminals. As noted in the previous section, the relative percentage differences in port truck volumes in the low growth scenario as compared to either of the high growth scenarios are lower than might be expected when compared against the percentage differences between the scenarios in overall cargo throughput. This is due to an increase in off-dock container moves in the low growth scenario as compared to either of the high growth scenarios. When all this is taken into account, the low growth scenario, in fact, has higher port truck volumes at all I-710 screenlines as compared to the high growth scenario with expanded near-dock intermodal capacity.

- **The relative reductions in total daily traffic on I-710 between the high growth scenario without expanded near dock and the high growth with expanded near dock are in the range of 9 percent to 12 percent; whereas, the relative reductions in total daily traffic on I-710 between the high growth scenario without expanded near-dock and the low growth scenario are between 3.5 percent and 6.5 percent**. This means that contrary to general expectations, it is in fact the high growth scenario with expanded near dock that results in the lowest forecast daily truck volumes (and consequently, lowest forecast total traffic volumes) on I-710 and not the low growth scenario, even though the low growth scenario has a significantly lower total port container throughput volume compared to the high growth scenarios. Further, the relative differences in traffic volumes between the high and low growth scenarios decline moving north through the corridor due the higher number of off-dock trips in the low growth scenario.

A sensitivity test was conducted to determine the potential impact of changes in future locations of warehouses serving international cargo. In this sensitivity test, the low growth scenario was used. The analysis is only meant to provide an indication of the potential impact of future warehouse locations. Since none of the existing models or previous analyses incorporate estimates of trips to new warehouse locations, we do not believe it is appropriate to extend this approach to all of the baseline scenarios, and the reader is cautioned against drawing broad conclusions from the sensitivity analysis. However, as an indication of potential impacts, it is informative. The results of the sensitivity case are also presented in Figure 2. The key findings with respect to this sensitivity analysis are as follows.

- **Changes in warehouse locations are likely to have noticeable traffic volume impacts throughout the I-710 corridor.** Comparing the port truck volumes between scenarios S.3a and S.3b in Figure 2, the biggest impacts in total truck traffic are observed to occur at Screenline 3, south of Rosecrans, where truck traffic would be increased by 18 percent. Moving further north, the relative impact on I-710 decreases (10 percent increase in truck traffic) as trucks are forecast to shift to I-605 in order to access new warehouse locations to the east. Until truck traffic begins moving to I-605 to access destinations to the east, the impact of the new warehouse locations is to increase overall traffic on I-710 by about six to seven percent, as compared to the low growth scenario without consideration of the new warehouse locations.

- **The impact on overall traffic on I-710 is only marginally more pronounced than the difference between the high growth scenario without expanded near-dock and the low growth scenario without consideration of new warehouse locations.**

4.1.3 Congestion Impacts of Alternative Port Cargo Growth Scenarios

A critical Purpose and Need issue considered in the IFA is the traffic congestion impact of different cargo growth scenarios on I-710. A metric associated with congestion is the metric that best determines if a scenario can be accommodated with capacity that might be reasonably available in any of the I-710 alternatives. If the scenario or alternative can be accommodated within the potentially available capacity of the build alternatives (such as the high levels of increased capacity associated with the Locally Preferred Strategy from the Major Corridor Study), then the other implications for meeting Purpose and Need can be analyzed during the remainder of the alternatives screening process.

Figures 3, 4 and 5 compare traffic levels in PCEs[5] for the different port cargo growth scenarios under the No Build alternative for the AM peak, PM peak and Mid-Day time periods on each of the I-710 screenlines. Table 7 reports a common congestion measure, volume-to-capacity ratio (V/C) for each of the scenarios; for the AM peak, Mid-Day, and PM peak periods; and for each screenline location on I-710. A V/C of over 1.0 is indicative of congested conditions and a low Level of Service (LOS). Assessing the V/C ratio for an entire multi-hour period can be a bit deceptive since highway capacity requirements are generally established based on a peak hour. So a V/C of near 1.0 over a multiple hour period should still be considered to indicate a congested freeway.

[5] A PCE factor of 2.0 was used for trucks to calculate total traffic volume in PCEs

Figure 3. I-710 2035 AM Peak Period Traffic Volumes (PCEs), Alternative 1 – Future Baseline/No Build

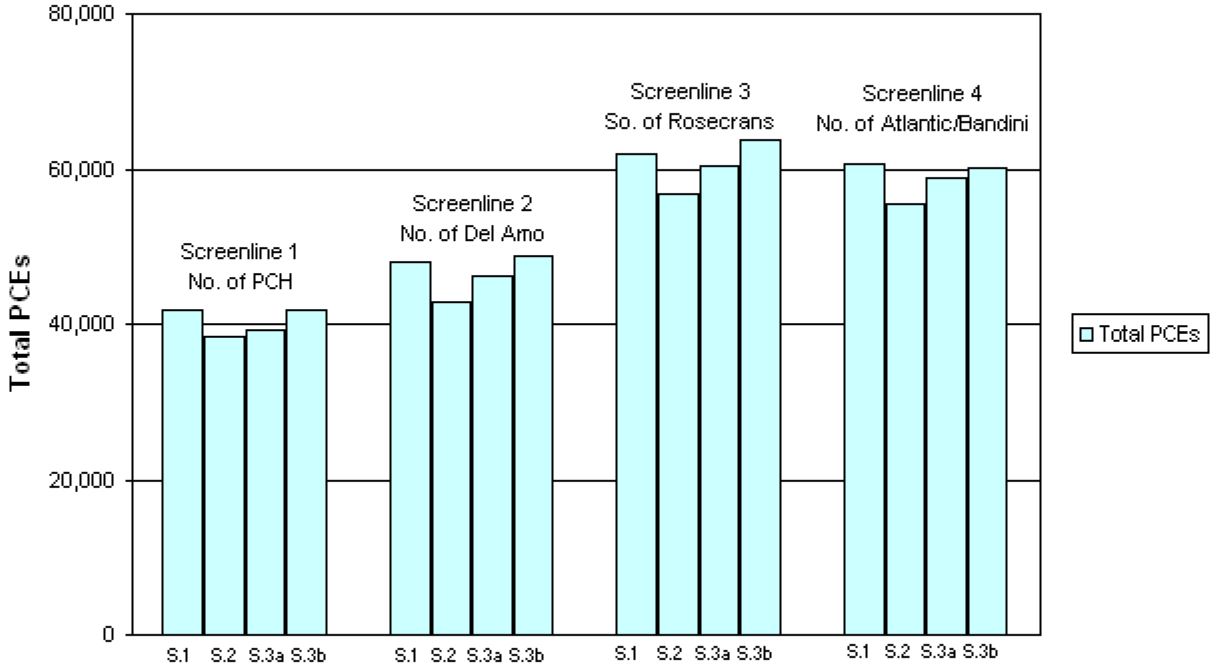
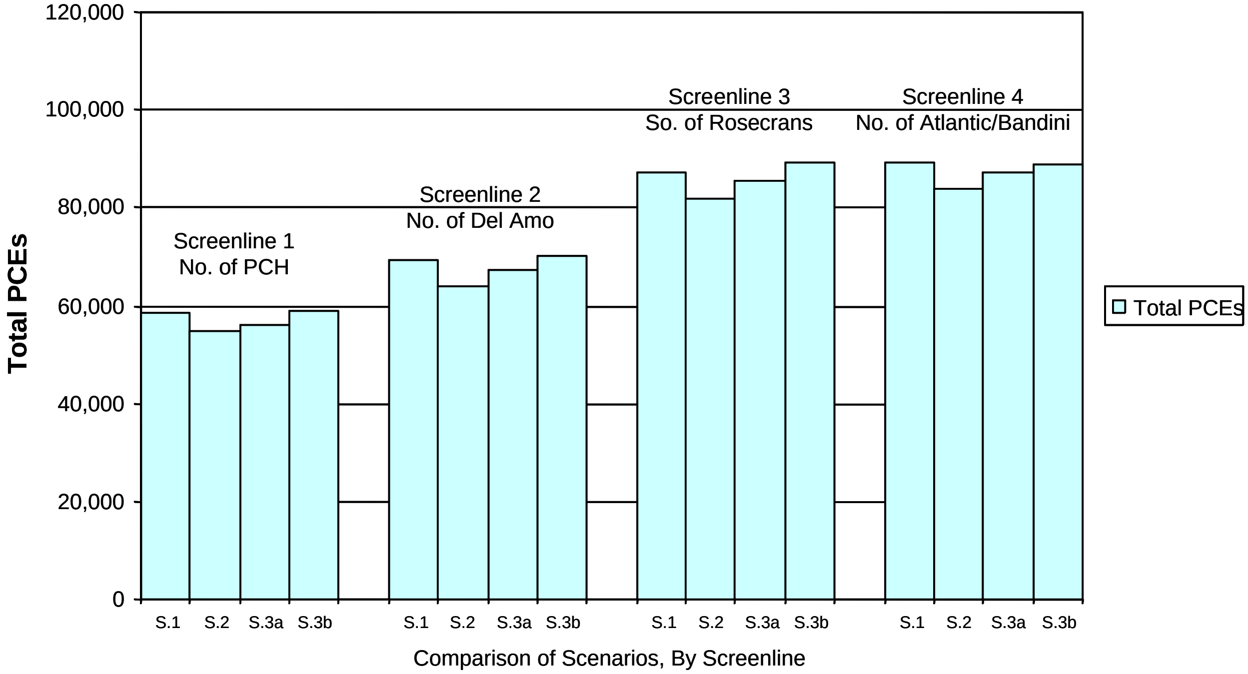
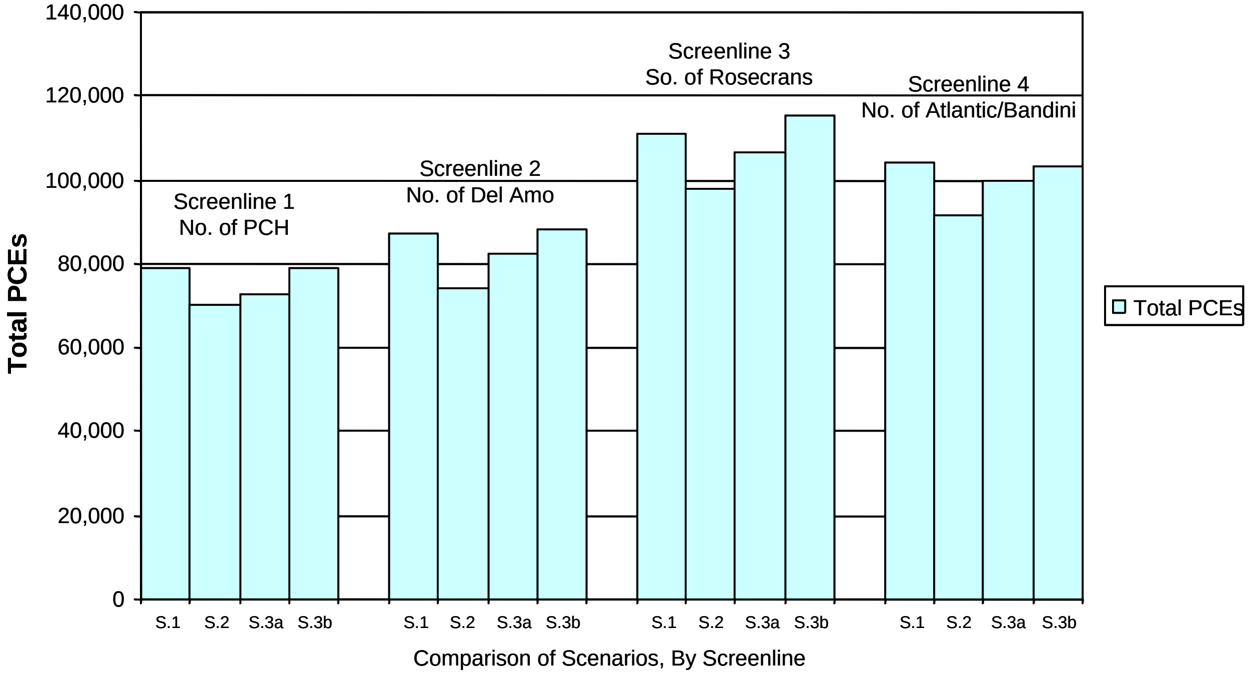


Figure 4. I-710 2035 PM Peak Period Traffic Volume (PCEs), Alternative 1 – Future Baseline/No Build



Scenarios:	S.1: Port High Growth, no SCIG	S.3a: Port Low Growth (without Longer Trips)
	S.2: Port High Growth, with SCIG	S.3b: Port Low Growth (with Longer Trips)

Figure 5. I-710 2035 Mid-Day Period Traffic Volume (PCEs), Alternative 1 – Future Baseline/No Build



Scenarios:	S.1: Port High Growth, no SCIG	S.3a: Port Low Growth (without Longer Trips)
	S.2: Port High Growth, with SCIG	S.3b: Port Low Growth (with Longer Trips)

Table 7. I-710 2035 V/C Ratios – No-Build Alternative

	AM Peak		Mid-Day		PM Peak	
	NB	**SB**	**NB**	**SB**	**NB**	**SB**
SL1						
High growth	1.2	1.1	1.2	1.0	1.3	1.1
High growth with near-dock	1.1	1.0	1.1	0.9	1.2	1.1
Low growth	1.1	1.0	1.1	0.9	1.2	1.1
Low growth with new warehouse locations	1.2	1.1	1.2	1.0	1.3	1.2
SL2						
High growth	0.9	1.0	0.9	0.8	1.1	0.9
High growth with near-dock	0.8	0.8	0.7	0.7	1.0	0.9
Low growth	0.9	0.9	0.8	0.8	1.1	0.9
Low growth with new warehouse locations	0.9	1.0	0.9	0.9	1.1	0.9
SL3						
High growth	1.0	1.1	1.0	0.9	1.2	1.0
High growth with near-dock	0.9	1.0	0.9	0.8	1.1	0.9
Low growth	1.0	1.0	0.9	0.8	1.2	1.0
Low growth with new warehouse locations	1.0	1.1	1.0	0.9	1.2	1.0
SL4						
High growth	1.0	1.2	1.0	1.0	1.3	1.2
High growth with near-dock	1.0	1.1	0.8	0.9	1.2	1.2
Low growth	1.0	1.2	0.9	1.0	1.2	1.2
Low growth with new warehouse locations	1.0	1.2	0.9	1.0	1.2	1.2

The following findings can be observed:

- **All of the screenlines under all of the cargo growth scenarios experience significant congestion in at least one of the peak periods. The greatest levels of congestion in all scenarios are experienced during the PM peak period.** Screenline 2 is the least congested of the locations on the I-710, and Screenlines 1 and 4 are particularly congested relative to their No-Build capacity. Mid-day congestion is pronounced due to the high volume of trucks on I-710 as compared to typical urban freeways. For the six-hour, mid-day period in at least one-half of the combinations of direction, screenline, and growth scenario, the I-710 experiences a V/C of over 0.9

averaged over the entire period. Peak-hour congestion levels will always be higher than these V/C averaged over a period.

- **The high growth scenario without expanded near-dock capacity will place serious strains on the I-710 throughout the day.** The subsequent lane requirements analysis will show that it may be possible to accommodate this forecast traffic with the amount of capacity contemplated in the highest capacity build alternatives currently being analyzed. However, this does not take into account the changing trip patterns to more distant warehouses that are likely to be characteristic of future logistics patterns in the region, which would result in incremental truck traffic demand on I-710 (and on I-605 in the north end of the study area), and the need for additional capacity on these facilities to handle this incremental demand.

  Examining the patterns of growth in traffic by screenline in the sensitivity test comparing the Low Growth scenario with future warehouse locations with the Low Growth Scenario without future warehouse locations, at Screenline 3 (the screenline with the highest lane requirements) the V/C might increase by over four percent between the two scenarios. This level of increase in traffic under the High Growth Scenario without Expanded Near-Dock Capacity due to the potential traffic impacts of future warehouse locations outside the study area will be on the borderline of what appears to be able to be accommodated with the available I-710 right of way.

- **While still congested for many periods of the day, the High Growth Scenario with Expanded Near-Dock Capacity results in the smallest relative increase in overall congestion levels on I-710 among all four of the growth scenarios.** This scenario does cause increased congestion on other parallel facilities near the terminals (such as Alameda street and Terminal Island Freeway) due to increased truck traffic to/from near-dock terminals, but the main focus of the analysis presented in this report for the comparative assessment of the growth scenarios is traffic volumes and congestion conditions on I-710.

- **The relative differences in the congestion impacts on I-710 between the Low Growth Scenario and the High Growth Scenario without Expanded Near-Dock Capacity are lower than expected, largely because of the increase in port truck traffic to off-dock intermodal terminals in the case of the Low Growth Scenario.** Consequently, the Low Growth Scenario is observed to be still a relatively congested scenario.

- **Accounting for the potential future locations of additional warehouses in inland locations has a noticeable negative impact on congestion levels on I-710.** This sensitivity test was only conducted for the Low Growth scenario but it does result in overall congestion levels on I-710 throughout the day that give it almost the same traffic and congestion impacts on I-710 as the High Growth Scenario without Expanded Near-Dock Capacity. This shows the high sensitivities of congestion on I-710 associated with the consideration of the impacts of future warehouse locations, and the importance of addressing this issue in the subsequent alternatives analysis process for the I-710 EIR/EIS.

4.1.4 I-710 Peak Hour Congestion and Lane Requirements Analysis

A final analysis of traffic conditions for the growth scenarios looks at peak hour congestion conditions and the implications for future capacity needs on I-710. During the peak hour, the highest levels of congestion are experienced. Since this occurs most prevalently on the I-710 during the PM peak, the analysis examines this period and the Mid-Day, when truck volumes peak.

Tables 8 through 11 show the forecast peak hour volume of vehicles by class (autos, port trucks, and regional trucks) and equivalent PCEs in order to evaluate the congestion conditions and lane requirements on I-710 during the day. Lane requirements for I-710 were calculated separately for trucks and autos to give a sense of the number of truck lanes versus general purpose (GP) traffic lanes that might be appropriate at different points along the freeway to meet forecast levels of traffic demand. The assumptions used in this analysis include a freeway lane capacity of 2000 PCEs per hour per lane and an average of 2.0 PCEs per truck for both port and non-port trucks. Peak hour percentages by time period were derived from the I-710 traffic counts taken for this study. As a point of comparison, the Hybrid Locally Preferred Strategy (LPS) from the I-710 Major Corridor Study includes 10 GP lanes (five in each direction) and 4 truck lanes (two in each direction). There are two points that need to be remembered in reviewing these results:

- Not all trucks will use the truck lanes even when there is available capacity unless they are prohibited from using the GP lanes. Current roadway design plans do not include exits/entries from/to the truck lanes at all locations where trucks can enter or exit I-710 today. Given the various trip patterns of trucks, it is likely that some fraction of trucks will use the GP lanes to access particular destinations. Analysis of these trip patterns, which would also feed into the determination of the need for adjustments to current roadway design plans to potentially include additional entry/exit ramps on the truck lanes, is more effectively accomplished with a full travel demand model as opposed to the more limited screening tool used in this report. This will be accomplished in the next phase of this project. However, as a point of reference, in the I-710 Major Corridor Study, estimates of between 70 to 90 percent of the trucks using the proposed truck lanes were developed using the travel demand model developed for that study. Therefore, there should always be capacity assumed to be needed on the GP lanes to accommodate a fraction of the trucks.

- The current alternative plans do not allow for auto usage of the freight corridor (truck lanes). Thus, even though the total number of lanes required to accommodate the forecast traffic at a particular screenline might not exceed 14 lanes, if the lane requirement for autos is greater than 10 lanes, there may still be peak period congestion in a particular location, especially if "spillover" of trucks wanting to use the GP lanes is taken into account. This issue could be potentially alleviated to a certain extent under the TSM/TDM alternative by reducing auto traffic demand through increased transit service and increased capacity on the GP lanes through ITS measures such as ramp metering.

Table 8. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 – High Growth Scenario Without Expanded Near-Dock – No-Build Alternative

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	114,688	4,100	0.7	3,625	0.6	3.9	3,225	0.5	2,850	0.5	3.0	5,250	0.9	5,375	0.9	5.3	GP
Port Trucks	58,947	3,775		4,000			4,950		4,600			4,350		3,000			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	62,423	4,275	0.7	4,050	0.7	4.2	5,700	1.0	4,700	0.8	5.2	4,500	0.8	3,025	0.5	3.8	Truck
Total PCE	239,534	8,375	1.4	7,675	1.3	**9**	8,925	1.5	7,550	1.3	**9**	9,750	1.6	8,400	1.4	**10**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	147,431	5,600	0.6	5,200	0.7	5.4	4,450	0.5	4,125	0.5	4.3	7,600	0.8	6,000	0.8	6.8	GP
Port Trucks	57,367	3,850		3,450			5,125		4,150			4,550		2,875			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	59,301	3,975	0.4	3,600	0.5	3.8	5,325	0.6	4,425	0.6	4.9	4,600	0.5	2,950	0.4	3.8	Truck
Total PCE	266,033	9,575	1.1	8,800	1.1	**10**	9,775	1.1	8,550	1.1	**10**	12,200	1.4	8,950	1.1	**11**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	195,687	6,050	0.6	8,725	0.9	7.4	4,850	0.5	7,025	0.7	5.9	9,325	0.9	8,925	0.9	9.1	GP
Port Trucks	51,610	3,700		2,875			4,875		3,475			4,300		2,400			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	66,564	5,250	0.5	3,400	0.3	4.3	7,500	0.8	4,375	0.4	5.9	5,000	0.5	2,725	0.3	3.9	Truck
Total PCE	328,815	11,300	1.1	12,125	1.2	**12**	12,350	1.2	11,400	1.1	**12**	14,325	1.4	11,650	1.2	**13**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	232,152	7,125	0.8	9,975	1.1	8.6	6,125	0.7	8,800	1.0	7.5	9,925	1.1	10,900	1.2	10.4	GP
Port Trucks	29,684	2,325		1,375			3,200		1,600			2,925		1,075			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	43,414	3,475	0.4	2,125	0.2	2.8	4,975	0.6	2,775	0.3	3.9	3,450	0.4	1,600	0.2	2.5	Truck
Total PCE	318,980	10,600	1.2	12,100	1.3	**12**	11,100	1.2	11,575	1.3	**12**	13,375	1.5	12,500	1.4	**13**	Total

Table 9. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 – High Growth Scenario With Expanded Near-Dock – No-Build Alternative

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	114,688	4,100	0.7	3,625	0.6	3.9	3,225	0.5	2,850	0.5	3.0	5,250	0.9	5,375	0.9	5.3	GP
Port Trucks	48,330	3,100		3,275			4,100		3,725			3,600		2,425			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	51,806	3,600	0.6	3,325	0.6	3.5	4,850	0.8	3,825	0.6	4.3	3,750	0.6	2,450	0.4	3.1	Truck
Total PCE	218,300	7,700	1.3	6,950	1.2	**8**	8,075	1.3	6,675	1.1	**8**	9,000	1.5	7,825	1.3	**9**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	147,431	5,600	0.6	5,200	0.7	5.4	4,450	0.5	4,125	0.5	4.3	7,600	0.8	6,000	0.8	6.8	GP
Port Trucks	41,435	2,875		2,375			3,850		2,850			3,450		1,975			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	43,369	3,000	0.3	2,525	0.3	2.8	4,050	0.5	3,125	0.4	3.6	3,500	0.4	2,050	0.3	2.8	Truck
Total PCE	234,169	8,600	1.0	7,725	1.0	**9**	8,500	0.9	7,250	0.9	**8**	11,100	1.2	8,050	1.0	**10**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	195,687	6,050	0.6	8,725	0.9	7.4	4,850	0.5	7,025	0.7	5.9	9,325	0.9	8,925	0.9	9.1	GP
Port Trucks	35,678	2,700		1,800			3,600		2,175			3,200		1,500			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	50,632	4,250	0.4	2,325	0.2	3.3	6,225	0.6	3,075	0.3	4.7	3,900	0.4	1,825	0.2	2.9	Truck
Total PCE	296,951	10,300	1.0	11,050	1.1	**11**	11,075	1.1	10,100	1.0	**11**	13,225	1.3	10,750	1.1	**12**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	232,152	7,125	0.8	9,975	1.1	8.6	6,125	0.7	8,800	1.0	7.5	9,925	1.1	10,900	1.2	10.4	GP
Port Trucks	13,752	1,350		300			1,900		300			1,825		175			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	27,482	2,500	0.3	1,050	0.1	1.8	3,675	0.4	1,475	0.2	2.6	2,350	0.3	700	0.1	1.5	Truck
Total PCE	287,116	9,625	1.1	11,025	1.2	**11**	9,800	1.1	10,275	1.1	**11**	12,275	1.4	11,600	1.3	**12**	Total

Table 10. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 – Low Growth Scenario – No-Build Alternative

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	114,688	4,100	0.7	3,625	0.6	3.9	3,225	0.5	2,850	0.5	3.0	5,250	0.9	5,375	0.9	5.3	GP
Port Trucks	51,406	3,225		3,575			4,200		4,100			3,700		2,700			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	54,882	3,725	0.6	3,625	0.6	3.7	4,950	0.8	4,200	0.7	4.6	3,850	0.6	2,725	0.5	3.3	Truck
Total PCE	224,452	7,825	1.3	7,250	1.2	**8**	8,175	1.4	7,050	1.2	**8**	9,100	1.5	8,100	1.4	**9**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	147,431	5,600	0.6	5,200	0.7	5.4	4,450	0.5	4,125	0.5	4.3	7,600	0.8	6,000	0.8	6.8	GP
Port Trucks	51,446	3,500		3,050			4,625		3,700			4,125		2,550			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	53,380	3,625	0.4	3,200	0.4	3.4	4,825	0.5	3,975	0.5	4.4	4,175	0.5	2,625	0.3	3.4	Truck
Total PCE	254,191	9,225	1.0	8,400	1.1	**9**	9,275	1.0	8,100	1.0	**9**	11,775	1.3	8,625	1.1	**11**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	195,687	6,050	0.6	8,725	0.9	7.4	4,850	0.5	7,025	0.7	5.9	9,325	0.9	8,925	0.9	9.1	GP
Port Trucks	46,162	3,350		2,550			4,375		3,075			3,875		2,100			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	61,116	4,900	0.5	3,075	0.3	4.0	7,000	0.7	3,975	0.4	5.5	4,575	0.5	2,425	0.2	3.5	Truck
Total PCE	317,919	10,950	1.1	11,800	1.2	**12**	11,850	1.2	11,000	1.1	**12**	13,900	1.4	11,350	1.1	**13**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	232,152	7,125	0.8	9,975	1.1	8.6	6,125	0.7	8,800	1.0	7.5	9,925	1.1	10,900	1.2	10.4	GP
Port Trucks	24,004	1,800		1,225			2,450		1,400			2,275		925			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	37,734	2,950	0.3	1,975	0.2	2.5	4,225	0.5	2,575	0.3	3.4	2,800	0.3	1,450	0.2	2.1	Truck
Total PCE	307,620	10,075	1.1	11,950	1.3	**12**	10,350	1.2	11,375	1.3	**11**	12,725	1.4	12,350	1.4	**13**	Total

Table 11. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 – Low Growth Scenario With New Warehouse Locations – No-Build Alternative

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	114,688	4,100	0.7	3,625	0.6	3.9	3,225	0.5	2,850	0.5	3.0	5,250	0.9	5,375	0.9	5.3	GP
Port Trucks	59,199	3,725		4,025			4,875		4,700			4,375		3,125			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	62,675	4,225	0.7	4,075	0.7	4.2	5,625	0.9	4,800	0.8	5.2	4,525	0.8	3,150	0.5	3.8	Truck
Total PCE	240,038	8,325	1.4	7,700	1.3	**9**	8,850	1.5	7,650	1.3	**9**	9,775	1.6	8,525	1.4	**10**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	147,431	5,600	0.6	5,200	0.7	5.4	4,450	0.5	4,125	0.5	4.3	7,600	0.8	6,000	0.8	6.8	GP
Port Trucks	59,027	3,950		3,575			5,200		4,325			4,700		2,975			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	60,961	4,075	0.5	3,725	0.5	3.9	5,400	0.6	4,600	0.6	5.0	4,750	0.5	3,050	0.4	3.9	Truck
Total PCE	269,353	9,675	1.1	8,925	1.1	**10**	9,850	1.1	8,725	1.1	**10**	12,350	1.4	9,050	1.1	**11**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	195,687	6,050	0.6	8,725	0.9	7.4	4,850	0.5	7,025	0.7	5.9	9,325	0.9	8,925	0.9	9.1	GP
Port Trucks	57,139	3,975		3,325			5,225		4,000			4,700		2,750			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	72,093	5,525	0.6	3,850	0.4	4.7	7,850	0.8	4,900	0.5	6.4	5,400	0.5	3,075	0.3	4.2	Truck
Total PCE	339,873	11,575	1.2	12,575	1.3	**13**	12,700	1.3	11,925	1.2	**13**	14,725	1.5	12,000	1.2	**14**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	232,152	7,125	0.8	9,975	1.1	8.6	6,125	0.7	8,800	1.0	7.5	9,925	1.1	10,900	1.2	10.4	GP
Port Trucks	28,181	2,050		1,500			2,775		1,750			2,575		1,175			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	41,911	3,200	0.4	2,250	0.3	2.7	4,550	0.5	2,925	0.3	3.7	3,100	0.3	1,700	0.2	2.4	Truck
Total PCE	315,974	10,325	1.1	12,225	1.4	**12**	10,675	1.2	11,725	1.3	**12**	13,025	1.4	12,600	1.4	**13**	Total

Table 12. shows the comparisons of V/Cs and lane requirements on I-710 screenlines for the No-Build alternative between the various growth scenarios

Table 12. I-710 V/C and Lane Requirements Comparisons between Scenarios, 2035 – No Build Alternative

	High Port Cargo Growth *with* Near-Dock Expansion			High Port Cargo Growth *without* Near-Dock Expansion			Low Port Cargo Growth			Low Port Cargo Growth with New Warehouse Locations		
	AM	Mid-Day	PM	AM	Mid-Day	PM	AM	Mid-Day	PM	AM	Mid-Day	PM
Screenline 1												
Total Traffic (PCEs)	14,650	14,750	16,325	16,050	16,475	19,150	15,075	15,225	17,200	16,325	16,500	18,300
Volume/Capacity (North, South)	1.3 , 1.2	1.3 , 1.[illegible]	1.5 , 1.3	1.4 , 1.3	1.5 , 1.3	1.3 , 1.4	1.3 , 1.2	1.1 , 1.2	1.5 , 1.4	1.[illegible] , 1.3	1.5 , 1.3	1.6 , 1.4
Number of Lanes Required												
Total General Purpose Lanes	4	3	6	4	3	6	4	3	6	4	3	6
Total Truck Lanes	4	5	4	5	6	4	4	5	4	5	6	4
Screenline 2												
Total Traffic (PCEs)	16,325	15,750	19,150	16,375	18,325	21,150	17,625	17,375	20,400	18,500	18,575	21,400
Volume/Capacity (North, South)	1 , 1	0.9 , 0.9	1.2 , 1	1.1 , 1.1	1.1 , 1.1	1.4 , 1.1	1 , 1.1	1 , 1	1.3 , 1.[illegible]	1.1 , 1.1	1.1 , 1.1	1.4 , 1.1
Number of Lanes Required												
Total General Purpose Lanes	6	5	7	6	5	7	6	5	7	6	5	7
Total Truck Lanes	3	4	3	4	5	4	4	5	4	4	5	4
Screenline 3												
Total Traffic (PCEs)	21,350	21,175	23,375	23,425	23,750	25,975	22,750	22,850	25,250	24,150	24,525	26,725
Volume/Capacity (North, South)	1 , 1.1	1.1 , 1	1.3 , 1.1	1.1 , 1.2	1.2 , 1.1	1.4 , 1.2	1.1 , 1.2	1.2 , 1.1	1.4 , 1.[illegible]	1.2 , 1.3	1.3 , 1.2	1.5 , 1.2
Number of Lanes Required												
Total General Purpose Lanes	8	6	10	8	6	10	8	6	10	8	6	10
Total Truck Lanes	4	5	3	5	6	4	4	8	4	5	7	4
Screenline 4												
Total Traffic (PCEs)	20,650	20,075	23,375	22,700	22,675	25,875	22,025	21,725	25,075	22,550	22,400	25,625
Volume/Capacity (North, South)	1.[illegible] , 1.2	1.[illegible] , 1.[illegible]	1.[illegible] , 1.3	1.2 , 1.3	1.2 , 1.3	1.5 , 1.4	1.1 , 1.3	1.2 , 1.3	1.4 , 1.4	1.1 , 1.[illegible]	1.2 , 1.3	1.4 , 1.4
Number of Lanes Required												
Total General Purpose Lanes	9	8	11	9	8	11	9	8	11	9	8	11
Total Truck Lanes	2	3	2	3	4	3	3	4	3	3	4	3

Figures 6 and 7 summarize the V/C results presented in tables 8 through 11 for the Mid-day and PM Peak periods for the northbound direction in a graphical format. Figure 8 presents the lane requirements comparison on I-710 at each screenline across the different cargo growth scenarios for the No Build alternative in a graphical format. The GP and truck lane requirements in Figure 8 are rounded off (for example, fractional lane requirements are rounded off to the next highest integer number, and if the lane requirement is determined to be an odd number, it is rounded off to the next higher even number), so they may not be exactly comparable with the lane requirements results presented in tables 8 through 11.

Figure 6 I-710 Comparison of Mid-Day Peak Hour V/C (Northbound) between Cargo Growth Scenarios, No Build Alternative, 2035

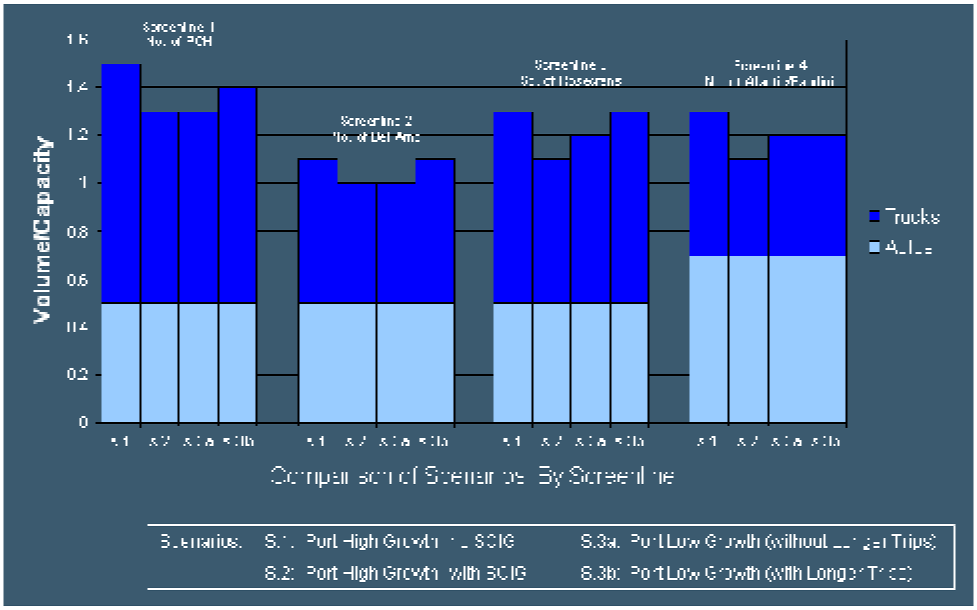


Figure 7 I-710 Comparison of PM Peak Hour V/C (Northbound) between Cargo Growth Scenarios, No Build Alternative, 2035

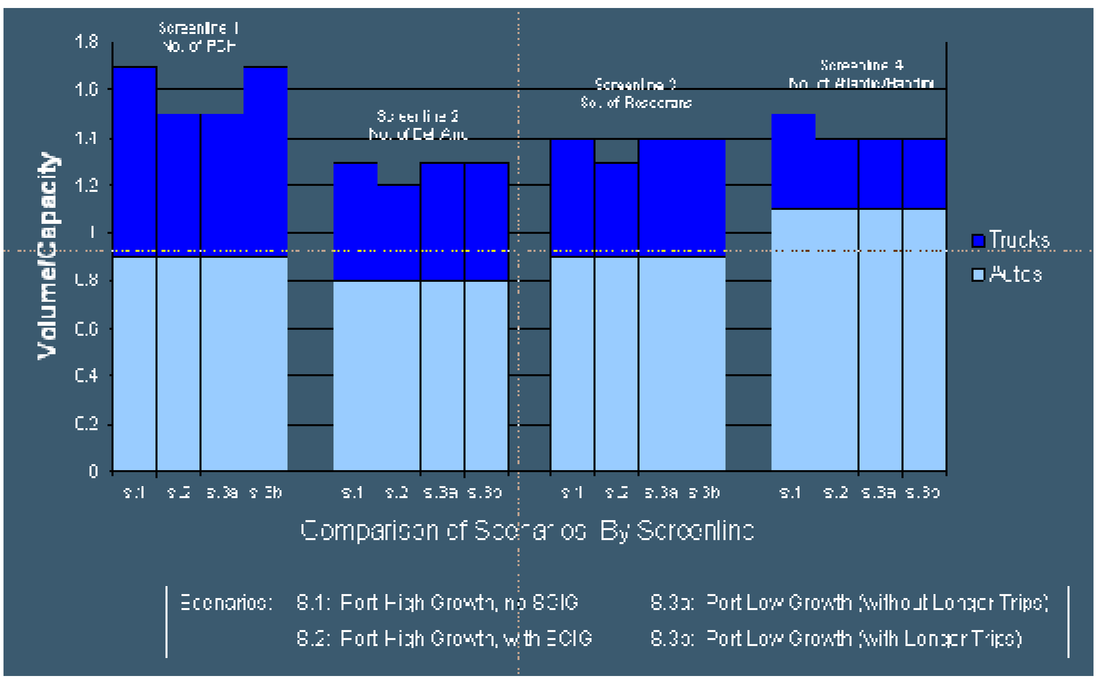
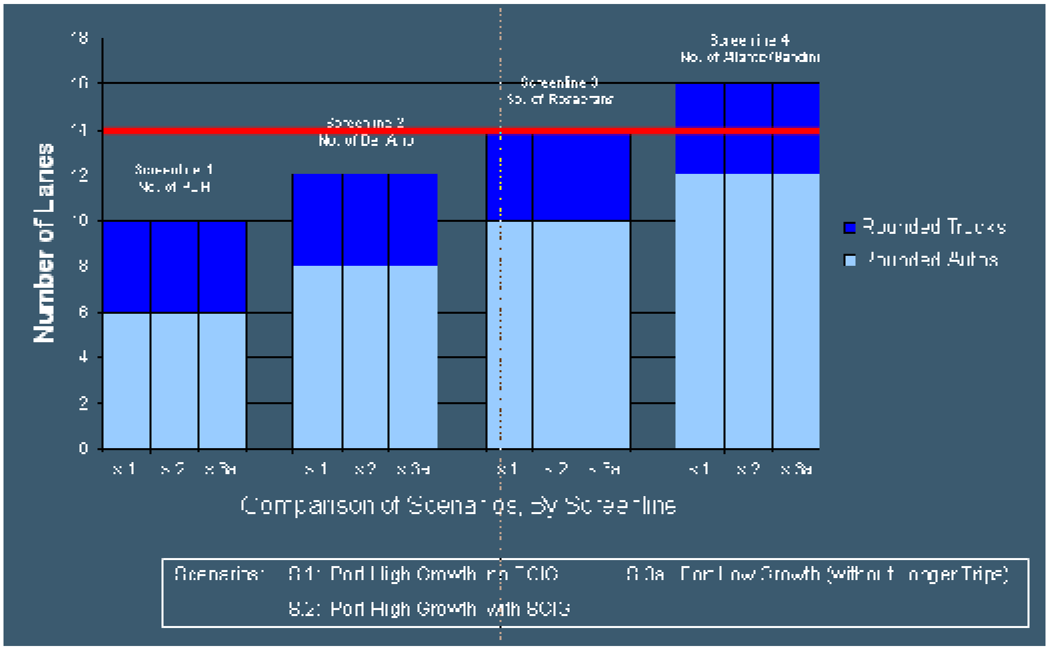


Figure 8 I-710 Lane Requirements Comparisons between Scenarios by Screenline, No Build Alternative, 2035



Peak hour V/C results by direction for each time period (AM peak, Mid-day, and PM peak) on I-710 screenlines for each of the growth scenarios are presented in the "Total PCE" row in Tables 8 through 11 (Note that these are peak hour, not peak period, results). These results are estimated by dividing the total PCEs by direction by the total capacity on I-710 at each of the screenlines. The analysis of peak hour conditions from these tables provides the following findings:

- **Peak hour V/C exceeds 1.0 for all periods of the day for all screenlines and for all growth scenarios**. Thus, there is a clear need for additional capacity (or reduced demand) throughout the corridor as compared to today. The fact that Mid-Day peak hour V/C is forecast to be 1.0 or higher in almost every scenario shows the significant impact of trucks on I-710 traffic congestion throughout the day even with the greater use of port terminal gates at night at the port assumed in the 2035 baseline forecasts as compared to today.

- **The peak hour V/C on I-710 is 1.4 or higher in the PM at Screenline 4 in every growth scenario**. This is due more to high forecast levels of auto traffic than truck traffic since at this northern location, trucks from the port have shifted to the east onto I-605.

- **The north end screenlines (Screenline 3 and 4 volumes) suggest the need for the 14 lanes of capacity on I-710 contemplated in the LPS for all of the port cargo growth scenarios, except the High Growth Scenario with Expanded Near-Dock**. However, it should be noted that in all of the scenarios, there does not appear to be enough GP lane capacity with 10 lanes at Screenline 4. The high volume of auto traffic and some "spillover" of trucks will create a GP lane requirement for more than 10 lanes. The north end screenlines have high lane requirements in the two Low Growth scenarios analyzed because of this high auto traffic and because of the higher volume of traffic to off-dock intermodal terminals than is experienced in either of the High Growth scenarios.

- **The Mid-Day demand for truck lanes is likely to exceed the proposed number of truck lanes (assuming four truck lanes) at all screenlines, except Screenline 4 for all of the growth scenarios.** Thus, there should be an expectation of significant Mid-day truck usage of the I-710 GP lanes.

- **Lane requirements on I-710 at the two southern screenlines (south of SR 91) appear to be less than what is contemplated in the LPS.** At Screenline 1 it appears that future demand could be accommodated in all growth scenarios with a total of 10 lanes, although 12 might be more advisable. At Screenline 2, 12 lanes appear to be sufficient to meet demand. The High Growth Scenario with Expanded Near-Dock capacity has the lowest level of lane requirements compared to the other growth scenarios. For this scenario, at both Screenlines 1 and 2, it appears possible to accommodate demand with a total of 10 lanes (including both GP and truck lanes).

4.2 HOW DOES THE TSM/TDM ALTERNATIVE IMPACT CONGESTION AND THE FEASIBILITY OF MEETING PURPOSE AND NEED OBJECTIVES?

4.2.1 Review of How the TSM/TDM Alternative Affects Travel Demand and System Capacity

Figure 9 presents the comparisons of average daily traffic volumes by screenline and vehicle class under the TSM/TDM Alternative between the different port cargo growth scenarios. Note that the low growth scenario with future warehouse locations (S.3b) was not analyzed under the TSM/TDM alternative (it was only analyzed under the No-Build alternative to assess the sensitivity of congestion on I-710 due to the consideration of future warehouse locations relative to the scenario without the consideration of future warehouse locations).

Table 13 summarizes how each of the proposed TSM/TDM measures in Alternative 2 affects demand and capacity both on the I-710 mainline and on arterial highways. Demand is estimated to be reduced by approximately three percent for autos through the implementation of increased transit services (building off an already high transit share for the corridor in the baseline forecast). It is also estimated that there will be a total of approximately six percent increase in capacity from ITS elements.

Figure 9. I-710 2035 ADT, Alternative 2 – TSM/TDM Improvements

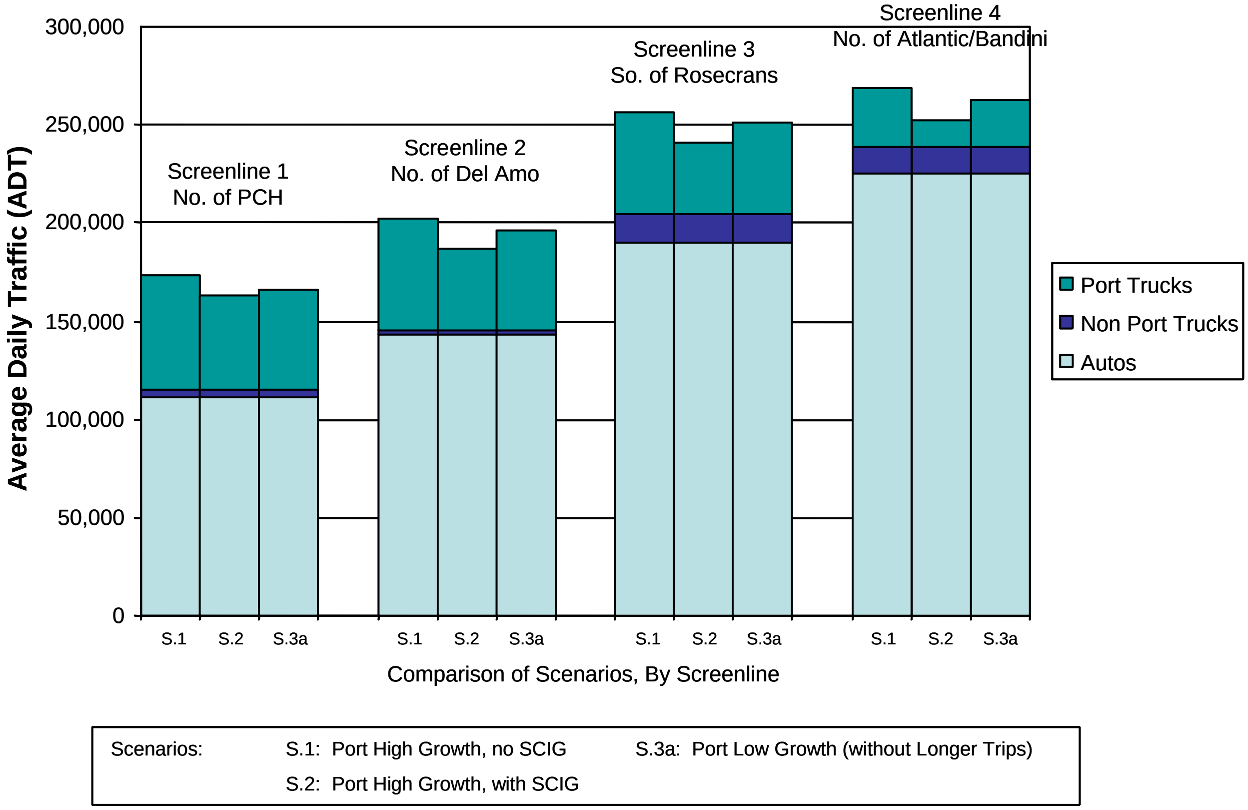
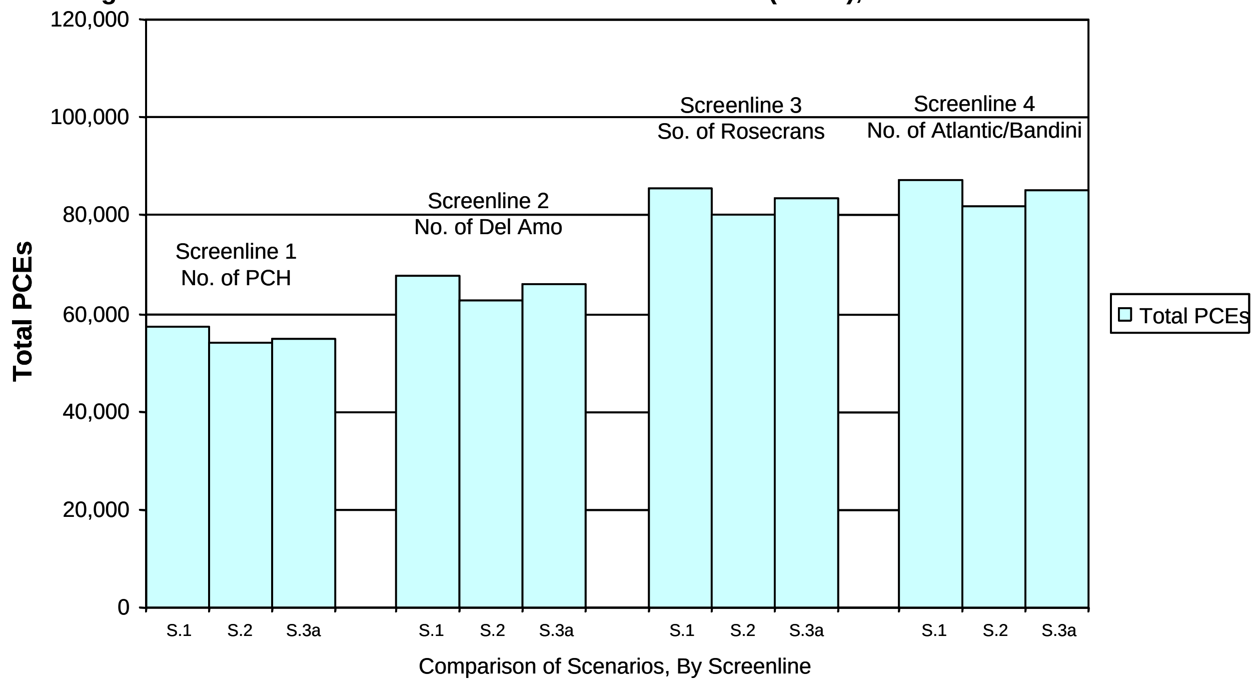


Table 13. TSM/TDM Assumptions

Strategy	Implementation	Locations	Effect
ITS Implementation	Freeway ITS	I-710, I-110 and I-605	6% Capacity Improvement
	Targeted Arterial ITS	Atlantic Ave., Cherry Ave., Eastern Ave., and Long Beach Blvd. by 23%	23% Capacity Improvement
	General Arterial ITS	All other arterials on Screenlines	6% Capacity Improvement
Ramp Metering	Adaptive Ramp Metering	Deployed at I-710 ramp at PCH (Screenline 1)	8 % Capacity Improvement
Peak Hour Parking Restrictions	Adds a Lane of Capacity in Each Direction	Deployed at key Screenline arterials (Atlantic Ave., Cherry Ave., Garfield Ave., Eastern Ave. and Long Beach Blvd.)	700 PCEs/hour per lane capacity increase
Transit Expansion	Transit service level increase	Increase in rail and bus transit service levels within Study Area	Study Area-wide Auto Trip Reduction of 3%

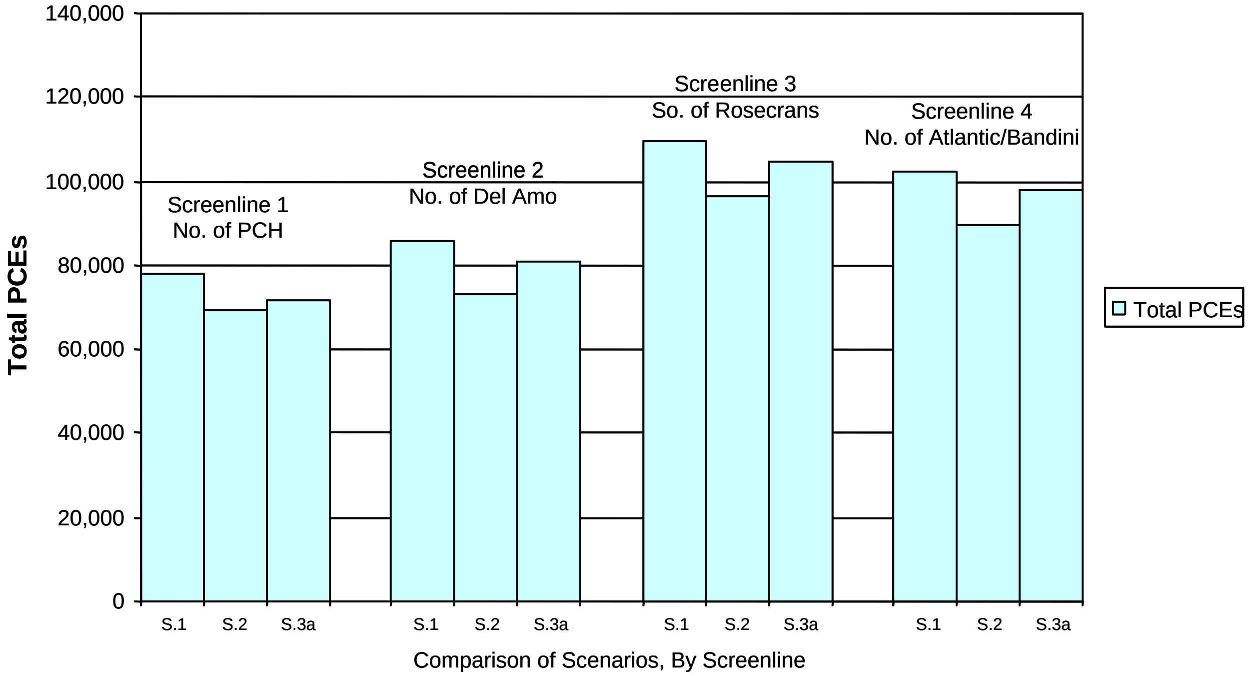
Figures 10 and 11 provide a comparison of the total traffic volumes (in PCEs) for the TSM/TDM alternative in the PM Peak and Mid-Day time periods between the different port cargo growth scenarios.

Figure 10. I-710 2035 PM Peak Period Traffic Volumes (PCEs), Alternative 2 – TSM/TDM



Scenarios:	S.1: Port High Growth, no SCIG	S.3a: Port Low Growth (without Longer Trips)
	S.2: Port High Growth, with SCIG	

Figure 11. I-710 2035 Mid-Day Period Traffic Volumes (PCEs), Alternative 2 – TSM/TDM



Scenarios:	S.1: Port High Growth, no SCIG	S.3a: Port Low Growth (without Longer Trips)
	S.2: Port High Growth, with SCIG	

An additional sensitivity analysis version of the TSM/TDM alternative (expanded TSM/TDM) was developed and tested. In this alternative, the presumed use of the port terminal gates at night was expanded beyond the use of gates at night assumed in the baseline No-Build scenarios. The baseline temporal assumptions for port gate truck traffic distributions were 60 percent day shift, 20 percent night shift, and 20 percent hoot shift. In the sensitivity analysis, the assumption is 40 percent day shift, 40 percent night shift, and 20 percent hoot shift. Figures 12 and 13 show the comparisons of total volumes (in PCEs) for the Mid-day and PM Peak time periods for the low port cargo growth scenario between the TSM/TDM alternative and the expanded TSM/TDM alternative.

Figure 12. I-710 2035 Mid-Day Period Traffic Volumes (PCEs), Low Growth Scenario, Compare TSM/TDM Alternative(s)

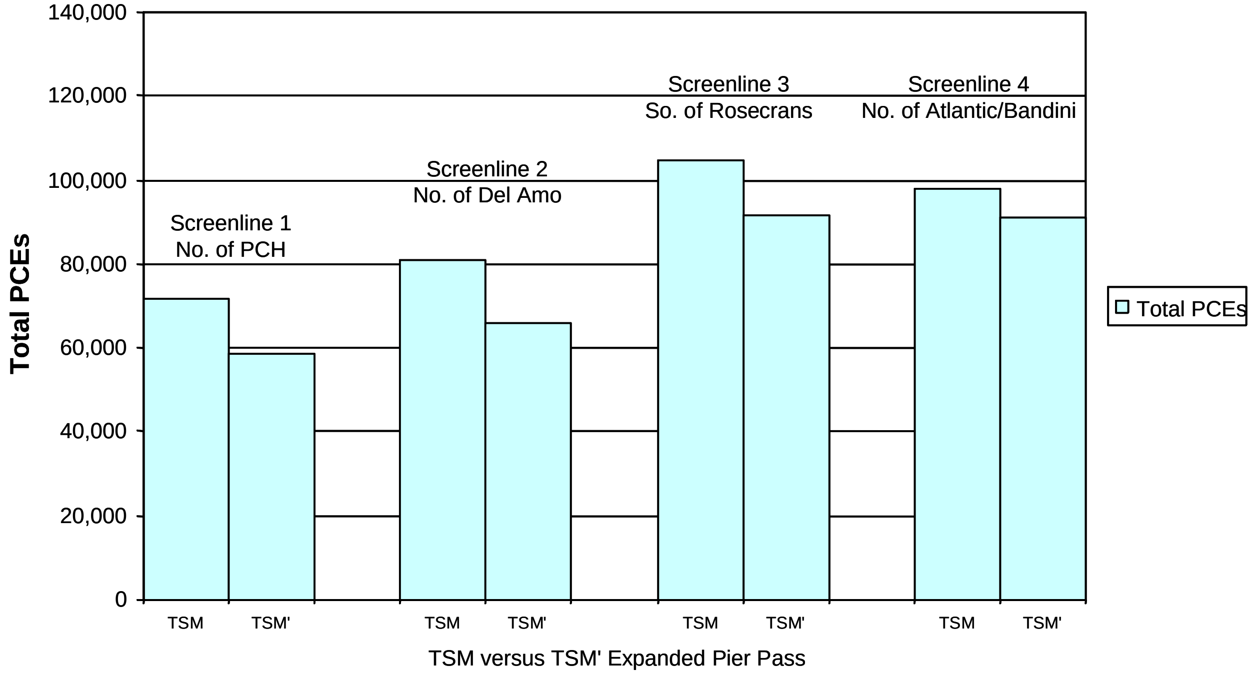
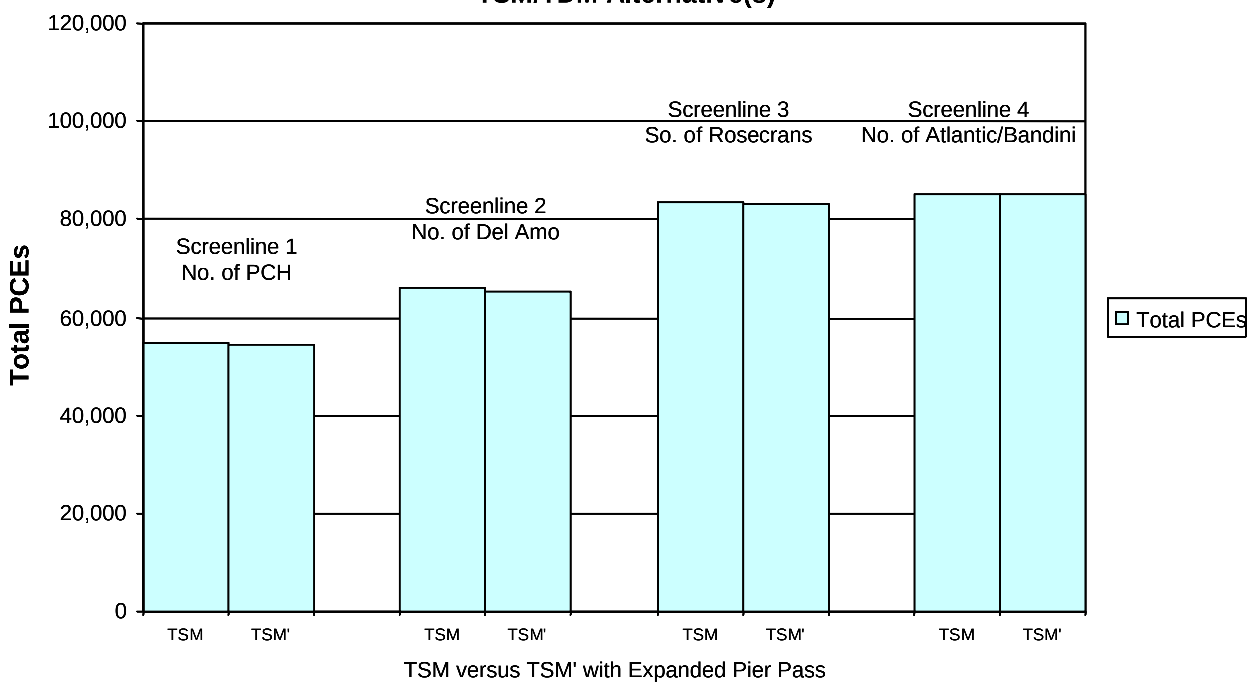


Figure 13. I-710 2035 PM Peak Period Traffic Volumes (PCEs), Low Growth Scenario, Compare TSM/TDM Alternative(s)



As seen from Figure 13, note that in the PM peak period, the relative impact of expanded PierPASS on I-710 screenline traffic volumes is marginal compared to the mid-day period (Figure 12). This is because the PM peak period (3 pm to 7 pm) overlaps both the day and the night shifts at the marine terminals. So a notable share of the truck diversion from the day to the night shift as a result of the expanded PierPASS program would still result in truck traffic moving in the PM peak period on the I-710. Also, the relative impacts in terms of total PCEs generally tend to decrease moving north along the corridor (with almost no impact on Screenline 4) as port trucks account for a small share of the total traffic in the north end of the corridor.

4.2.2 Impacts on Congestion of the TSM/TDM Alternative

The I-710 capacity is increased from the No-Build alternative to account for the effects of the TSM/TDM ITS elements. Table 14 displays the comparative V/C ratios on I-710 for the mid-day and peak periods at each of the screenline locations.

Table 14. I-710 2035 V/C Ratios – TSM/TDM Alternative

	AM Peak		Mid-Day		PM Peak	
	NB	**SB**	**NB**	**SB**	**NB**	**SB**
SL1						
High cargo growth	1.1	1.0	1.1	0.9	1.2	1.1
High cargo growth with expanded near dock	1.0	0.9	1.0	0.8	1.1	1.0
Low cargo growth	1.1	1.0	1.0	0.9	1.1	1.0
Low cargo growth with expanded PierPASS	1.0	0.9	0.8	0.7	1.1	1.1
SL2						
High cargo growth	0.9	0.9	0.8	0.8	1.0	0.9
High cargo growth with expanded near-dock	0.8	0.8	0.7	0.7	0.9	0.8
Low cargo growth	0.8	0.9	0.8	0.7	1.0	0.8
Low cargo growth with Expanded PierPASS	0.8	0.8	0.6	0.6	0.9	0.9
SL3						
High cargo growth	0.9	1.0	0.9	0.8	1.1	0.9
High cargo growth with Expanded Near-Dock	0.8	0.9	0.8	0.7	1.0	0.9
Low cargo growth	0.9	1.0	0.9	0.8	1.1	0.9
Low cargo growth with Expanded PierPASS	0.9	0.9	0.7	0.7	1.0	0.9
SL4						
High cargo growth	1.0	1.1	0.9	0.9	1.2	1.1
High cargo growth with Expanded Near-Dock	0.9	1.0	0.8	0.8	1.1	1.1
Low cargo growth	0.9	1.1	0.8	0.9	1.1	1.1
Low cargo growth with Expanded PierPASS	0.9	1.1	0.8	0.8	1.1	1.1

The increase in capacity and the decrease in auto volume attributable to the TSM/TDM alternative combine to have a noticeable impact on overall congestion levels on I-710. The reader is cautioned, however, to remember that V/C ratios averaged over multi-hour periods will be lower than peak hour V/C and the levels of congestion exhibited in Table 14 are still significant. Findings from this analysis are summarized below:

- Congestion levels on Screenline 2 have dropped to the point where only one location and time period shows V/C greater than 1.0.

- Screenline 3 also shows signs of reduced congestion below a V/C of 1.0, except in the northbound direction in the PM peak period.

- While this level of congestion relief is important, it is not clear from this analysis that there is a reduction in need for expanded capacity on I-710 based on the TSM/TDM alternative alone.

- **The increased use of night gates at the port would have the desired effect of reducing congestion levels during the day at the south end of the I-710 (north of PCH) as compared to TSM/TDM alternative without this shift in port operations.** However, this effect is not significant further north on the freeway due to the reduced fraction of port trucks to total traffic. **Increased use of gates at night does have one negative effect on I-710 traffic, in that it results in a slight increase in southbound truck traffic in the PM peak period throughout the corridor.** This is consistent with observed data from the current PierPASS Off Peak program and appears to be related to the increase in trucks moving to the port late in the PM peak period (typically between the hours of 5:00 p.m. and 7:00 p.m.) in order to be at the port terminals for the opening of the gates for the night shift at 6:00 p.m. **There is also a marked increase in night time traffic, which is up between 30 percent and 40 percent in the period after 7:00 p.m.** For example, at the northbound direction only at Screenline 1, there are likely to be as much as 3,700 PCEs of traffic, or the equivalent of almost two full lanes of traffic until at least 11:00 p.m. Even though there is a notable increase in night time traffic as a result of the expanded PierPASS scenario, the lane requirements are still driven by PM peak period conditions as this is the most congested period at all the screenlines. As noted above, in fact the expanded use of night gates is exacerbating PM peak period congestion on I-710 in the south end compared to the scenario without expanded PierPASS. In order for this scenario to serve as an effective strategy in alleviating PM peak period congestion on I-710 and consequently, reduce the lane requirements, it would have to incorporate additional mechanisms such as variable pricing and appointment systems. However, due to inadequate information on the consideration by the ports to implement these programs in the future, as well as the potential feasibility of their implementation, the IFA is unable to incorporate the impacts on congestion and lane requirements associated with these mechanisms as part of this scenario.

4.2.3 Peak Hour Congestion and Lane Requirements Analysis for the TSM/TDM Alternative

Tables 15 to 18 provide results of the analysis of peak hour congestion and lane requirements under the TSM/TDM alternative. Findings from this analysis are the following:

- **<u>While TSM/TDM does have an impact on peak hour congestion, it is not enough to bring the peak-hour V/C level below 1.0 at any screenline, suggesting that additional capacity would still be needed</u>.** However, with TSM/TDM, future conditions on Screenline 2 (at Del Amo) will have V/C lower than 1.0 for most of the day.

- **<u>Traffic could be accommodated in the south end of I-710, even for the High Growth Scenario without Expanded Near-Dock with 10 total lanes of capacity and with 8 total lanes for the other scenarios</u>.** If there are to be truck lanes, there would still need to be 10 lanes to accommodate all of the auto traffic. Elimination of truck lanes at the south end of the freeway would make it possible to reduce overall lane requirements. However, trucks would utilize more than 50 percent of the GP lane capacity most of the day.

- **<u>At the north end of I-710 (north of SR 91), there appears to be a need for the full 14 lanes of capacity of the LPS in all scenarios except the High Growth Scenario with Expanded Near-Dock Intermodal Capacity</u>.** At the northernmost screenline, the auto traffic alone requires the full 10 GP lanes and if truck lanes are added, 14 lanes will be required. In the High Growth Scenario with Expanded Near-Dock Intermodal Capacity, the reduction in trips to the off-dock yards reduces the projected lane requirements to 12 lanes, although it would be difficult to meet this demand while including 4 truck lanes due to the forecast auto demand during the PM peak hour.

Table 15. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 – High Growth without Expanded Near Dock, TSM/TDM Alternative

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	111,273	3,975	0.6	3,525	0.6	3.5	3,125	0.5	2,775	0.4	2.8	5,075	0.8	5,225	0.8	4.9	GP
Port Trucks	58,947	3,775		4,000			4,950		4,600			4,350		3,000			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	62,423	4,275	0.7	4,050	0.6	3.9	5,700	0.9	4,700	0.7	4.9	4,500	0.7	3,025	0.5	3.5	Truck
Total PCE	236,119	8,250	1.3	7,575	1.2	**8**	8,825	1.4	7,475	1.2	**8**	9,575	1.5	8,250	1.3	**9**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	143,042	5,425	0.6	5,050	0.6	4.9	4,325	0.5	4,025	0.5	3.9	7,375	0.8	5,825	0.7	6.2	GP
Port Trucks	57,367	3,850		3,450			5,125		4,150			4,550		2,875			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	59,301	3,975	0.4	3,600	0.4	3.6	5,325	0.6	4,425	0.5	4.6	4,600	0.5	2,950	0.3	3.6	Truck
Total PCE	261,644	9,400	1.0	8,650	1.0	**9**	9,650	1.0	8,450	1.0	**9**	11,975	1.3	8,775	1.0	**10**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	189,860	5,875	0.6	8,475	0.8	6.8	4,700	0.4	6,825	0.6	5.4	9,050	0.9	8,675	0.8	8.4	GP
Port Trucks	51,610	3,700		2,875			4,875		3,475			4,300		2,400			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	66,564	5,250	0.5	3,400	0.3	4.1	7,500	0.7	4,375	0.4	5.6	5,000	0.5	2,725	0.3	3.6	Truck
Total PCE	322,988	11,125	1.0	11,875	1.1	**11**	12,200	1.2	11,200	1.1	**12**	14,050	1.3	11,400	1.1	**13**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	225,240	6,925	0.7	9,675	1.0	7.8	5,950	0.6	8,525	0.9	6.8	9,625	1.0	10,575	1.1	9.5	GP
Port Trucks	29,684	2,325		1,375			3,200		1,600			2,925		1,075			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	43,414	3,475	0.4	2,125	0.2	2.6	4,975	0.5	2,775	0.3	3.7	3,450	0.4	1,600	0.2	2.4	Truck
Total PCE	312,068	10,400	1.1	11,800	1.2	**11**	10,925	1.1	11,300	1.2	**11**	13,075	1.4	12,175	1.3	**12**	Total

Table 16. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 – High Growth With Expanded Near-Dock, TSM/TDM Alternative

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	111,273	3,975	0.6	3,525	0.6	3.5	3,125	0.5	2,775	0.4	2.8	5,075	0.8	5,225	0.8	4.9	GP
Port Trucks	48,330	3,100		3,275			4,100		3,725			3,600		2,425			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	51,806	3,600	0.6	3,325	0.5	3.3	4,850	0.8	3,825	0.6	4.1	3,750	0.6	2,450	0.4	2.9	Truck
Total PCE	214,885	7,575	1.2	6,850	1.1	**7**	7,975	1.3	6,600	1.0	**7**	8,825	1.4	7,675	1.2	**8**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	143,042	5,425	0.6	5,050	0.6	4.9	4,325	0.5	4,025	0.5	3.9	7,375	0.8	5,825	0.7	6.2	GP
Port Trucks	41,435	2,875		2,375			3,850		2,850			3,450		1,975			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	43,369	3,000	0.3	2,525	0.3	2.6	4,050	0.4	3,125	0.4	3.4	3,500	0.4	2,050	0.2	2.6	Truck
Total PCE	229,780	8,425	0.9	7,575	0.9	**8**	8,375	0.9	7,150	0.8	**8**	10,875	1.1	7,875	0.9	**9**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	189,860	5,875	0.6	8,475	0.8	6.8	4,700	0.4	6,825	0.6	5.4	9,050	0.9	8,675	0.8	8.4	GP
Port Trucks	35,678	2,700		1,800			3,600		2,175			3,200		1,500			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	50,632	4,250	0.4	2,325	0.2	3.1	6,225	0.6	3,075	0.3	4.4	3,900	0.4	1,825	0.2	2.7	Truck
Total PCE	291,124	10,125	1.0	10,800	1.0	**10**	10,925	1.0	9,900	0.9	**10**	12,950	1.2	10,500	1.0	**12**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	225,240	6,925	0.7	9,675	1.0	7.8	5,950	0.6	8,525	0.9	6.8	9,625	1.0	10,575	1.1	9.5	GP
Port Trucks	13,752	1,350		300			1,900		300			1,825		175			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	27,482	2,500	0.3	1,050	0.1	1.7	3,675	0.4	1,475	0.2	2.4	2,350	0.2	700	0.1	1.4	Truck
Total PCE	280,204	9,425	1.0	10,725	1.1	**10**	9,625	1.0	10,000	1.0	**10**	11,975	1.3	11,275	1.2	**11**	Total

Table 17. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 – Low Growth, TSM/TDM Alternative

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	111,273	3,975	0.6	3,525	0.6	3.5	3,125	0.5	2,775	0.4	2.8	5,075	0.8	5,225	0.8	4.9	GP
Port Trucks	51,406	3,225		3,575			4,200		4,100			3,700		2,700			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	54,882	3,725	0.6	3,625	0.6	3.5	4,950	0.8	4,200	0.7	4.3	3,850	0.6	2,725	0.4	3.1	Truck
Total PCE	221,037	7,700	1.2	7,150	1.1	**8**	8,075	1.3	6,975	1.1	**8**	8,925	1.4	7,950	1.3	**8**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	143,042	5,425	0.6	5,050	0.6	4.9	4,325	0.5	4,025	0.5	3.9	7,375	0.8	5,825	0.7	6.2	GP
Port Trucks	51,446	3,500		3,050			4,625		3,700			4,125		2,550			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	53,380	3,625	0.4	3,200	0.4	3.2	4,825	0.5	3,975	0.5	4.2	4,175	0.4	2,625	0.3	3.2	Truck
Total PCE	249,802	9,050	0.9	8,250	1.0	**9**	9,150	1.0	8,000	0.9	**9**	11,550	1.2	8,450	1.0	**10**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	189,860	5,875	0.6	8,475	0.8	6.8	4,700	0.4	6,825	0.6	5.4	9,050	0.9	8,675	0.8	8.4	GP
Port Trucks	46,162	3,350		2,550			4,375		3,075			3,875		2,100			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	61,116	4,900	0.5	3,075	0.3	3.8	7,000	0.7	3,975	0.4	5.2	4,575	0.4	2,425	0.2	3.3	Truck
Total PCE	312,092	10,775	1.0	11,550	1.1	**11**	11,700	1.1	10,800	1.0	**11**	13,625	1.3	11,100	1.0	**12**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	225,240	6,925	0.7	9,675	1.0	7.8	5,950	0.6	8,525	0.9	6.8	9,625	1.0	10,575	1.1	9.5	GP
Port Trucks	24,004	1,800		1,225			2,450		1,400			2,275		925			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	37,734	2,950	0.3	1,975	0.2	2.3	4,225	0.4	2,575	0.3	3.2	2,800	0.3	1,450	0.2	2.0	Truck
Total PCE	300,708	9,875	1.0	11,650	1.2	**11**	10,175	1.1	11,100	1.2	**11**	12,425	1.3	12,025	1.3	**12**	Total

Table 18. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 – Low Growth, TSM/TDM Alternative with Expanded PierPASS

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	111,273	3,975	0.6	3,525	0.6	3.5	3,125	0.5	2,775	0.4	2.8	5,075	0.8	5,225	0.8	4.9	GP
Port Trucks	51,855	3,000		2,950			2,850		2,750			3,325		3,000			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	55,331	3,500	0.6	3,000	0.5	3.1	3,600	0.6	2,850	0.4	3.0	3,475	0.5	3,025	0.5	3.1	Truck
Total PCE	221,935	7,475	1.2	6,525	1.0	**7**	6,725	1.1	5,625	0.9	**6**	8,550	1.3	8,250	1.3	**8**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	143,042	5,425	0.6	5,050	0.6	4.9	4,325	0.5	4,025	0.5	3.9	7,375	0.8	5,825	0.7	6.2	GP
Port Trucks	51,414	3,150		2,475			2,925		2,375			3,550		2,900			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	53,348	3,275	0.3	2,625	0.3	2.8	3,125	0.3	2,650	0.3	2.7	3,600	0.4	2,975	0.4	3.1	Truck
Total PCE	249,738	8,700	0.9	7,675	0.9	**8**	7,450	0.8	6,675	0.8	**7**	10,975	1.2	8,800	1.0	**10**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	189,860	5,875	0.6	8,475	0.8	6.8	4,700	0.4	6,825	0.6	5.4	9,050	0.9	8,675	0.8	8.4	GP
Port Trucks	46,384	3,075		2,075			2,825		1,950			3,400		2,375			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	61,338	4,625	0.4	2,600	0.2	3.4	5,450	0.5	2,850	0.3	3.9	4,100	0.4	2,700	0.3	3.2	Truck
Total PCE	312,536	10,500	1.0	11,075	1.0	**11**	10,150	1.0	9,675	0.9	**10**	13,150	1.2	11,375	1.1	**12**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	225,240	6,925	0.7	9,675	1.0	7.8	5,950	0.6	8,525	0.9	6.8	9,625	1.0	10,575	1.1	9.5	GP
Port Trucks	25,102	1,725		1,000			1,650		900			2,075		1,100			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	38,832	2,875	0.3	1,750	0.2	2.2	3,425	0.4	2,075	0.2	2.6	2,600	0.3	1,625	0.2	2.0	Truck
Total PCE	302,904	9,800	1.0	11,425	1.2	**11**	9,375	1.0	10,600	1.1	**10**	12,225	1.3	12,200	1.3	**12**	Total

Figures 14 and 15 summarize the V/C results presented in Tables 15 through 18 for the Mid-day and PM Peak periods for the northbound direction in a graphical format. Figure 16 presents the lane requirements comparison on I-710 at screenline 4 for the high cargo growth scenario without expanded near dock between the No Build and the TSM/TDM alternatives. As discussed for Figure 8, the GP and truck lane requirements in Figure 16 are rounded off (for example, fractional lane requirements are rounded off to the next highest integer number, and if the lane requirement is determined to be an odd number, it is rounded off to the next higher even number), so they may not be exactly comparable with the lane requirements results presented in tables 8 and 15 for Screenline 4.

Figure 14 I-710 (Northbound) 2035 Mid-day Peak Hour V/C, TSM/TDM Alternative

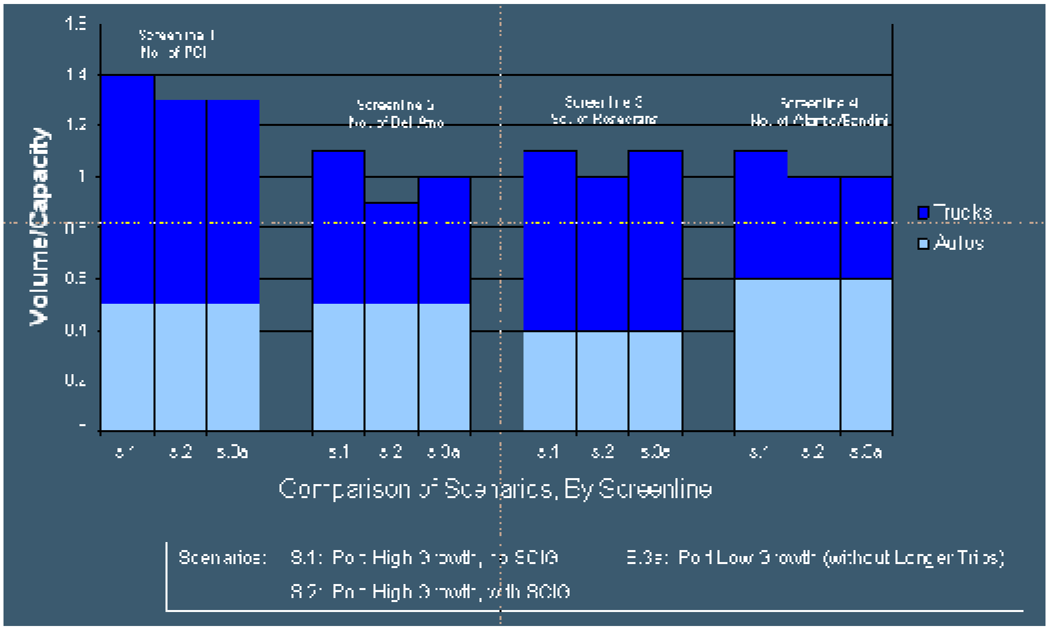


Figure 15 I-710 (Northbound) 2035 PM Peak Hour V/C, TSM/TDM Alternative

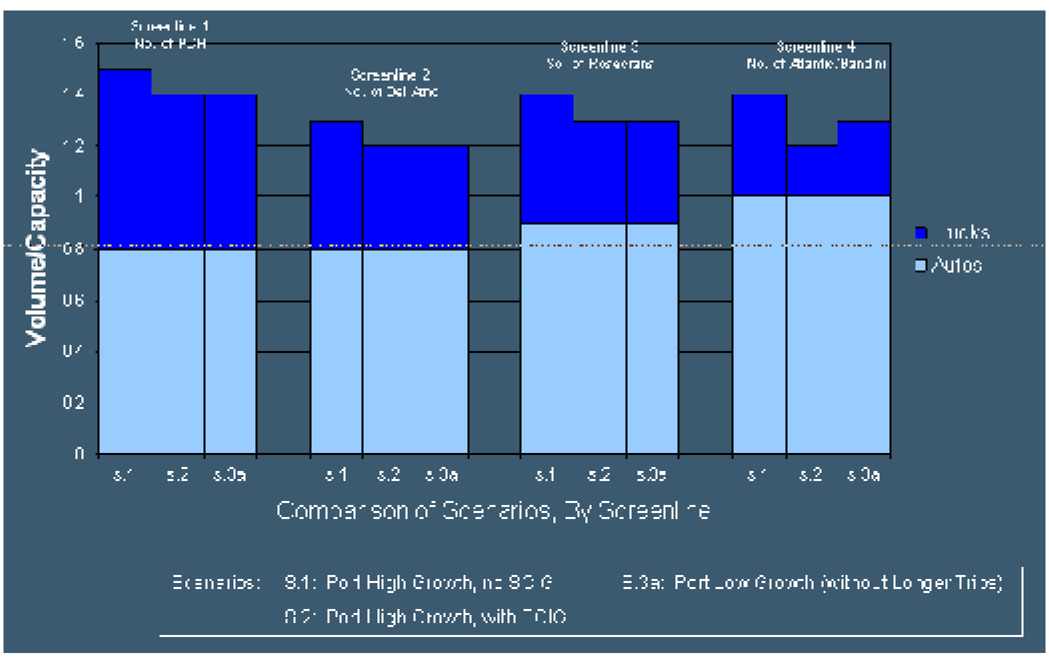
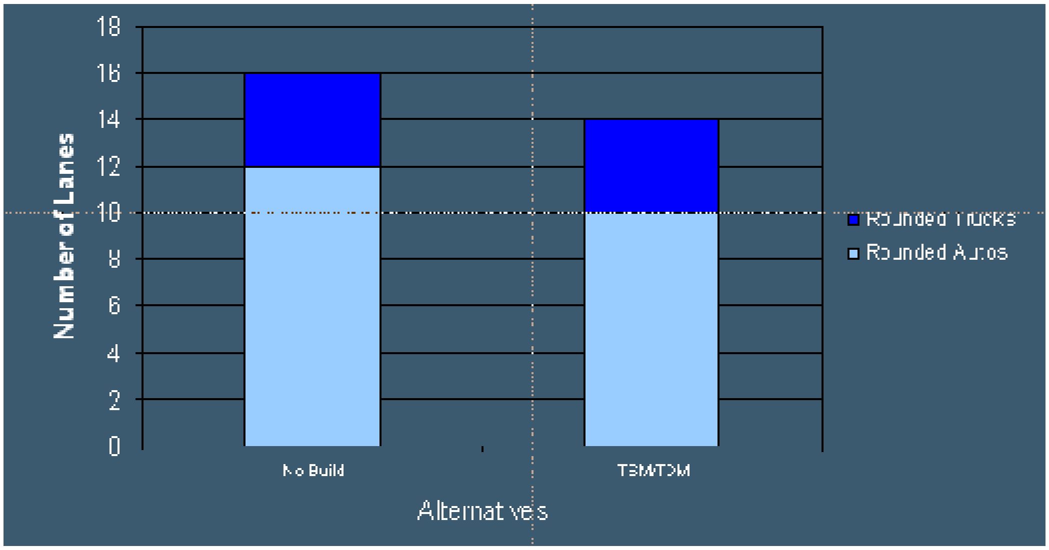


Figure 16 I-710 Lane Requirements Comparisons (Screenline 4) between TSM/TDM and No Build Alternatives, 2035, High Growth Scenario without Expanded Near dock Scenario



4.3 How Does the Maximum Rail and Alternative Goods Movement Technology Alternative impact congestion and the Feasibility of Meeting Purpose and Need Objectives?

4.3.1 The Role of Maximum Rail

The maximum benefit of rail occurs in the High Cargo Growth with Expanded Near-Dock scenario, although both High Cargo Growth scenarios have an equivalent amount of international cargo carried by rail on the mainline system beyond the ports. Both scenarios include a 40-percent direct rail mode share with 30 percent on-dock rail and a higher overall amount of port cargo than in the Low Growth scenario. Without expanded marine terminals at the ports (to accommodate the growth to 43 million annual TEUs of total cargo by 2035), there will not be the ability to expand on-dock rail much beyond current capacity. The additional benefit in the High Cargo Growth with Expanded Near-Dock scenario is the ability to load all international intermodal cargo either at the port or at the near-dock intermodal terminals. This eliminates international intermodal containers that would otherwise be moving on the I-710 north of the PCH screenline in order to access off-dock terminals. Further, trucks from many of the marine terminals traveling to/from the site of the current ICTF and the proposed SCIG would use Alameda Street or SR-47/103, creating a small reduction in truck traffic on I-710 at PCH as compared to the High Growth without Expanded Near-Dock.

The *I-710 Railroad Goods Movement Study* concluded that there were several potential constraints to achieving these maximum rail scenarios. In both High Growth scenarios, even with long trains (current intermodal train lengths serving international cargo have recently grown to at least 8,000-foot in length), there are several locations on the mainline of BNSF and one location for UP, where additional track appears to be necessary to accommodate the projected rail traffic beyond current construction projects. There does appear to be sufficient right of-way to accommodate expansion to a triple track system on the BNSF line at the locations of existing double-track. A stretch of the BNSF mainline through east Fullerton and west Placentia has right of way that appears to be as narrow as 50 to 55 feet for a stretch of about 1.8 miles. Railroad engineers have confirmed that three mainline tracks can be fit into a 50-foot right-of-way, should the need arise to add a third mainline track to these segments in the future. While this would provide sufficient capacity to meet the forecasted future growth in freight, a third mainline track may not provide for future growth in passenger rail service in this segment as well, implying that under this capacity constraint, there would be very limited opportunity to expand Metrolink rail passenger service in this corridor. Expanding passenger service to meet the maximum projected Metrolink ridership demand would require a fourth track in most segments of the rail system.

A second rail constraint is the need for more intermodal terminal capacity in the High Cargo Growth without Expanded Near-Dock scenario. In this scenario, there is not enough intermodal terminal capacity at the existing downtown yards to accommodate this growth in demand. There are a variety of options that the railroads could pursue to meet this demand and these are discussed in the Railroad Goods Movement Study. Based on that analysis, it is assumed that by shifting cargo amongst existing intermodal terminals and building a new intermodal terminal in an inland location in Southern California, both railroads could meet the projected demand for intermodal terminal capacity.

The impact of these constraints on the feasibility of achieving the maximum rail benefits under the High Growth Scenarios involves some speculation as to how the railroads will choose to meet future demand. The following analysis suggests how the existence of mainline constraints associated with the BNSF San Bernardino Subdivision (the mainline with the greatest constraint) is likely to affect the feasibility of the High Growth scenarios.

A mainline capacity constraint on the BNSF line east of downtown Los Angeles would affect truck traffic on I-710 in either of two ways:

- The constraint might limit the amount of direct rail moves from the ports because there simply is not enough capacity to handle the growth implied by the High Growth scenarios. This would either cause cargo to divert to other ports (including the possibility of a new Mexican port) or transportation prices would go up (as railroads “price ration” demand) dampening overall demand for cargo to move through the San Pedro Bay ports. This might become equivalent to a lower cargo growth scenario, similar to the Low Cargo Growth scenario included in this IFA report.

- The constraint could result in BNSF being unable to handle their forecast share of projected demand on the constrained mainline. BNSF would have various options to approach this constraint, but it is unlikely that any of these options would result in a change in truck traffic projections on I-710 as compared to the two High Growth scenarios (although some of the approaches could result in more truck traffic on other routes, particularly east-west routes such as SR-91 or SR-60). Some options serve as examples of how this could evolve:

    - Option 1 – Since UP does have capacity in their system, they would work hard to gain market share at the expense of BNSF. This would result in the same amount of direct rail and the same amount of truck traffic on I-710.
    - Option 2 – BNSF would do everything they can to hold onto their market share. The most logical way they would do this would be to increase the international share handled at Hobart (including the transload cargo coming from warehouses in the Gateway Cities) at the expense of other domestic intermodal traffic that could be shifted to either San Bernardino or a new intermodal terminal in Victorville. Since most of the domestic cargo has Southern California origins/destinations that are either east or northwest of Hobart, the shifting of this traffic to other intermodal yards would have little impact or no impact on forecast I-710 truck volumes. This would likely have a traffic impact on the arterial connections to/from Hobart.
    - Option 3 – In the worst case, BNSF might need to truck some of the international cargo around the mainline bottleneck either to San Bernardino or a new terminal in Victorville. In this case this traffic would be expected to travel to the north end of the I-710 corridor before heading east with a similar distribution of truck traffic split between I-710 and I-605 as is already included in the analysis.

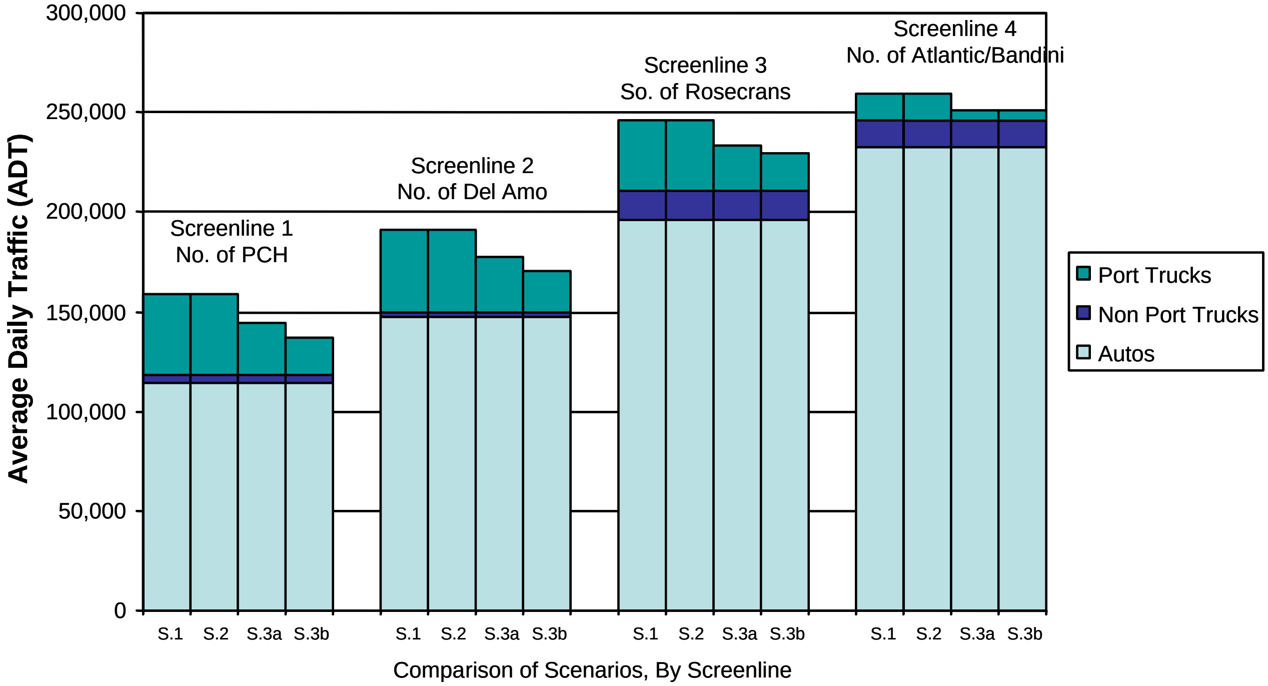
Further analysis of this last option may be required using the more detailed travel demand models that will be employed in the detailed alternatives analysis in the next phase of the project.

4.3.2 Congestion Impacts of Alternative Goods Movement Technology

The analysis of Alternative Goods Movement Technology is based on technology options as described in the *I-710 Alternative Goods Movement Technology Feasibility Study.* These technologies are all zero emission technologies in a variety of technology classes that mostly involve exclusive guideways and some form of electric propulsion.

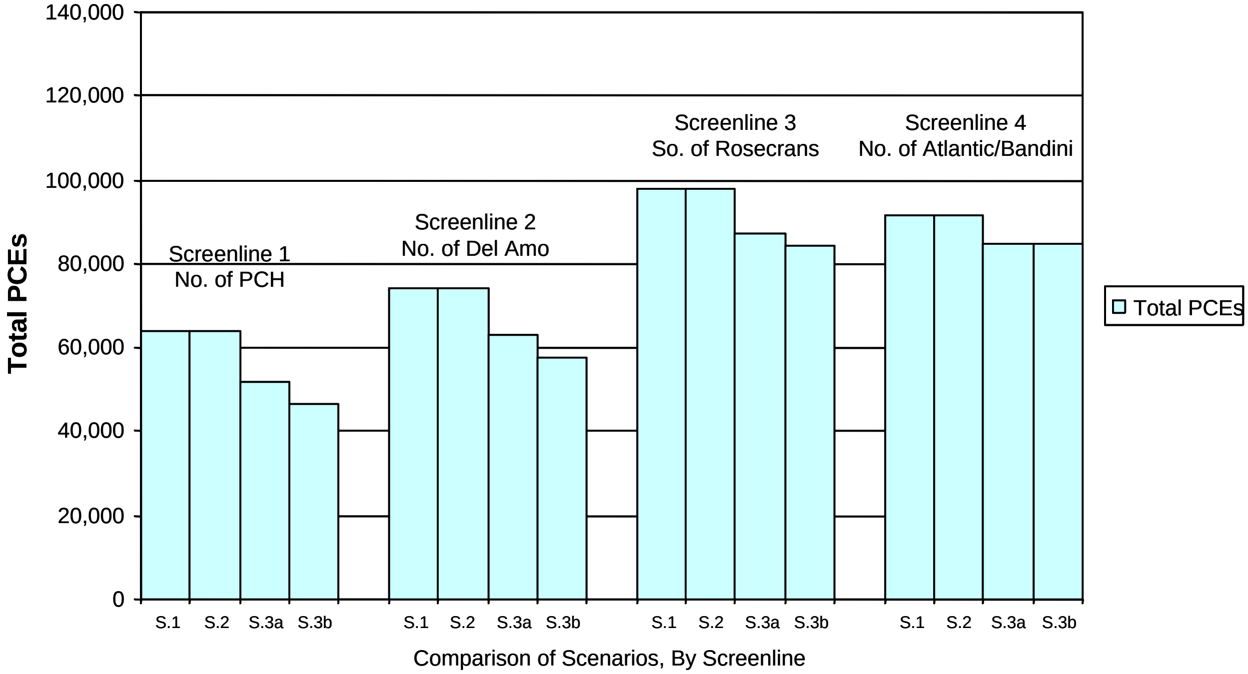
Figure 17 presents a comparison of average daily traffic (ADT) volumes by vehicle class at I-710 screenlines under the Alternative Goods Movement Technology alternative between the different port cargo growth scenarios, while Figures 18 and 19 present the comparisons in total traffic volumes (in PCEs) for the Mid-day and PM Peak time periods. The period V/C values are presented in Table 19.

Figure 17. I-710 2035 ADT Alternative 3 – Alternative Goods Movement Technology



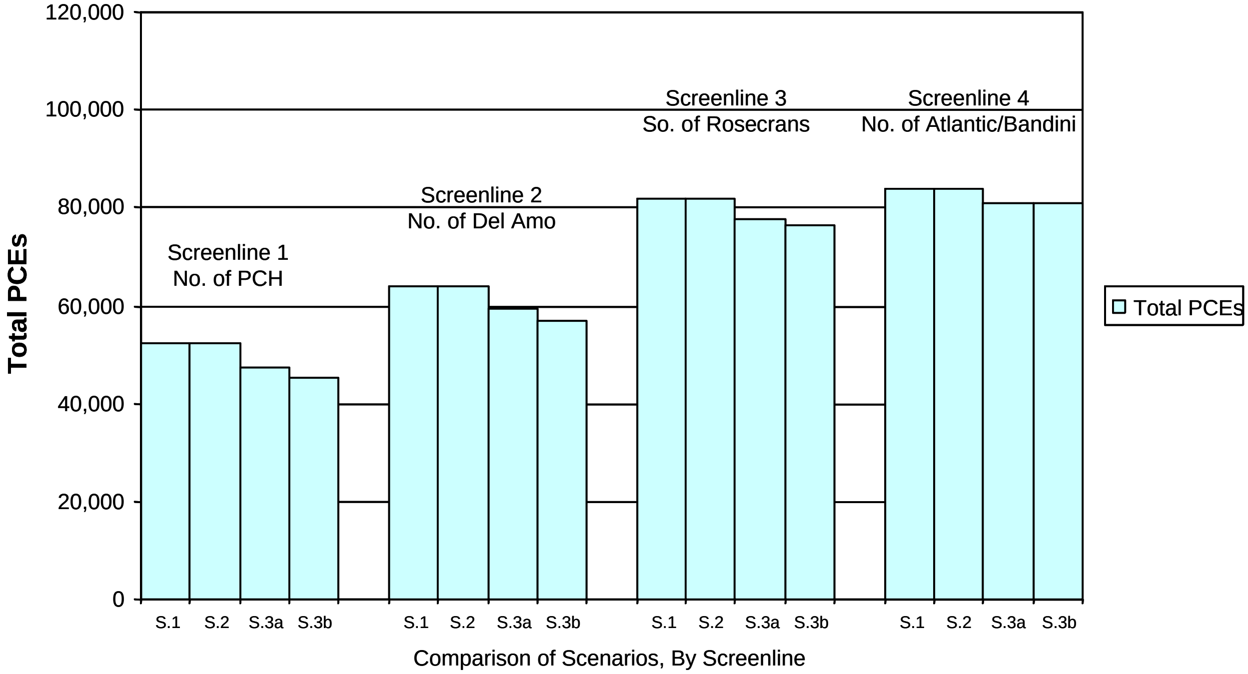
Scenarios:	S.1: Port High Growth, no SCIG	S.3a: Port Low Growth (without Longer Trips)
	S.2: Port High Growth, with SCIG	S.3b: Port Low Growth (with Longer Trips)

Figure 18. I-710 2035 Mid-Day Period Traffic Volumes (PCEs), Alternative 3 – Alternative Goods Movement Technology



Scenarios:	S.1: Port High Growth, no SCIG	S.3a: Port Low Growth (without Longer Trips)
	S.2: Port High Growth, with SCIG	S.3b: Port Low Growth (with Longer Trips)

Figure 19. I-710 2035 PM Peak Period Traffic Volumes (PCEs), Alternative 3 – Alternative Goods Movement Technology



Scenarios:	S.1: Port High Growth, no SCIG	S.3a: Port Low Growth (without Longer Trips)
	S.2: Port High Growth, with SCIG	S.3b: Port Low Growth (with Longer Trips)

Table 19. I-710 2035 V/C Ratios – Alternative Goods Movement Technology Alternative

	AM Peak		Mid-Day		PM Peak	
	NB	**SB**	**NB**	**SB**	**NB**	**SB**
SL1						
High growth	1.1	0.9	1.0	0.8	1.2	1.0
High growth with Expanded Near-Dock	1.1	0.9	1.0	0.8	1.2	1.0
Low growth	0.9	0.8	0.8	0.6	1.0	0.9
Low growth with New Warehouse Locations	0.9	0.7	0.7	0.6	1.0	0.9
SL2						
High growth	0.8	0.8	0.7	0.7	1.0	0.9
High growth with Expanded Near-Dock	0.8	0.8	0.7	0.7	1.0	0.9
Low growth	0.8	0.8	0.6	0.6	1.0	0.8
Low growth with New Warehouse Locations	0.7	0.7	0.6	0.5	0.9	0.8
SL3						
High growth	0.9	1.0	0.9	0.8	1.1	0.9
High growth with Expanded Near-Dock	0.9	1.0	0.9	0.8	1.1	0.9
Low growth	0.8	0.9	0.8	0.7	1.1	0.9
Low growth with New Warehouse Locations	0.8	0.9	0.7	0.7	1.0	0.8
SL4						
High growth	1.0	1.1	0.8	0.9	1.2	1.2
High growth with Expanded Near-Dock	1.0	1.1	0.8	0.9	1.2	1.2
Low growth	0.9	1.1	0.7	0.9	1.1	1.2
Low growth with New Warehouse Locations	0.9	1.1	0.7	0.9	1.1	1.2

The first three scenarios show Alternative Goods Movement Technology serving the near-dock and off-dock intermodal markets only. The final scenario, as a sensitivity test, shows Low Cargo Growth with trips to new projected inland warehouse locations and assumes that the Alternative Goods Movement Technology could capture all of this market, in addition to the near-dock and off-dock intermodal markets. Obviously, this is an extremely ambitious goal especially in light of the likely cost to implement an Alternative Goods Movement Technology System (see *Draft Alternative Goods Movement Technology Feasibility Study*).

The forecasts show reductions in congestion on I-710 compared to the other alternatives as containers are removed from the freeway to use the Alternative Goods Movement Technology system. Findings are presented below:

- **In this alternative, the Low Growth scenario results in the lowest relative level of congestion among all the growth scenarios.** This reflects the relatively high share and total volume of containers handled at off-dock terminals in this scenario as compared to the High Growth Scenario without Expanded Near-Dock. The final scenario takes into account trips to new inland warehouse locations. While these trips represented additional traffic on the north end of the freeway in the No-Build scenario, with alternative goods movement technology all of these container moves are a market for the new Alternative Goods Movement Technology system. In fact, some trucks that would otherwise have been shown going to locations within the Gateway Cities via I-710 would now be carried by the Alternative Goods Movement Technology. This would have an even greater impact on I-710 traffic than would be the case if the new inland trips are not taken into account.

- **While the use of Alternative Goods Movement Technology does reduce period V/C to below 1.0 in a number of locations, there is still traffic congestion on I-710 throughout much of the day in many locations.** The primary benefits of the Alternative Goods Movement Technology are associated with reduced emissions, so it is important to examine how lane requirements would change. If the technology can be accommodated without the need for expanded right of way, it would be a desirable alternative compared to most other build alternatives from the emissions perspective.

4.3.3 Peak Hour Congestion and Lane Requirements with the Alternative Goods Movement Technology Alternative

Tables 20 to 23 show peak hour V/C and lane requirements with the Alternative Goods Movement Technology system. It is important to note that the Alternative Goods Movement Technology options developed in the *Alternative Goods Movement Technology Feasibility Study* are all based on using the same freight corridor right of way width as would be used by the truck lanes. Thus, it would seem appropriate to add the equivalent of four lanes to the lane requirements presented in the tables as a true representation of the equivalent right-of-way requirements. However, if the Alternative Goods Movement Technology system can be accommodated on an elevated structure, with the ability to move trucks on lanes below, this would potentially obviate the need to consider the equivalent of four lanes to be added to the lane requirements presented in the tables.

- **The peak hour V/C on I-710 for the two High Growth scenarios remains above 1.0 even with the Alternative Goods Movement Technology.** While there are significant reductions in peak hour V/C for the High Growth scenario without Expanded Near-Dock compared to the No Build alternative, the results for these two High Growth scenarios are virtually the same as the results for the No-Build alternative for the High Growth with Expanded Near-Dock at Screenlines 2, 3 and 4. This is because in the case of the High Growth with Expanded Near-Dock scenario, there is no off-dock intermodal market to be served by the Alternative Goods Movement Technology. The results for the two High Growth scenarios with Alternative Goods Movement Technology alternative are the same. Also, as described earlier, these results are the same as the results for the No-Build alternative for High Growth with Expanded Near-Dock at Screenlines 2, 3 and 4. However, the use of zero-emission container movement systems to move containers from the marine terminals to the near-dock terminals would provide emission reductions as compared to the No-Build High Growth with Expanded Near-Dock scenario unless electric powered trucks are used.

- **The peak hour V/C for the Low Growth scenario without trips to new inland warehouse locations is still generally above 1.0, but when longer inland trips are taken into account and these are served by the Alternative Goods Movement Technology, the V/C is much closer to 1.0 even in the peak hour.**

- **Lane requirements appear to drop to 8 in the south end and 12 in the north end of I-710 with the Alternative Goods Movement Technology alternative.** However, when the space required for the Alternative Goods Movement Technology guideway is added to the lane requirements for trucks and autos, the Alternative Goods Movement Technology configuration appears to require more right of way than any of the scenarios with the No-Build alternative. However, as discussed earlier, this might not be the case if the Alternative Goods Movement Technology system can be accommodated on an elevated structure above the truck lanes. Further analysis on the most plausible structural configuration of the system would be needed to conclusively determine the total right of way requirements under this alternative. If the Alternative Goods Movement Technology System is of the family of technologies that would use the same roadway structures (through the use of electrified trucks perhaps with the addition of automated steering and vehicle following controls) the lane requirements would be the same as the No-Build scenarios but with substantially lower emissions.

Table 20. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 – High Growth Scenario, Alternative Goods Movement Technology (Near-Dock and Off-Dock Intermodal Markets Only)

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	114,688	4,100	0.7	3,625	0.6	3.9	3,225	0.5	2,850	0.5	3.0	5,250	0.9	5,375	0.9	5.3	GP
Port Trucks	40,843	2,650		2,775			3,475		3,125			3,075		2,000			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	44,319	3,150	0.5	2,825	0.5	3.0	4,225	0.7	3,225	0.5	3.7	3,225	0.5	2,025	0.3	2.6	Truck
Total PCE	203,326	7,250	1.2	6,450	1.1	**7**	7,450	1.2	6,075	1.0	**7**	8,475	1.4	7,400	1.2	**8**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	147,431	5,600	0.6	5,200	0.7	5.4	4,450	0.5	4,125	0.5	4.3	7,600	0.8	6,000	0.8	6.8	GP
Port Trucks	41,435	2,875		2,375			3,850		2,850			3,450		1,975			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	43,369	3,000	0.3	2,525	0.3	2.8	4,050	0.5	3,125	0.4	3.6	3,500	0.4	2,050	0.3	2.8	Truck
Total PCE	234,169	8,600	1.0	7,725	1.0	**9**	8,500	0.9	7,250	0.9	**8**	11,100	1.2	8,050	1.0	**10**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	195,687	6,050	0.6	8,725	0.9	7.4	4,850	0.5	7,025	0.7	5.9	9,325	0.9	8,925	0.9	9.1	GP
Port Trucks	35,678	2,700		1,800			3,600		2,175			3,200		1,500			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	50,632	4,250	0.4	2,325	0.2	3.3	6,225	0.6	3,075	0.3	4.7	3,900	0.4	1,825	0.2	2.9	Truck
Total PCE	296,951	10,300	1.0	11,050	1.1	**11**	11,075	1.1	10,100	1.0	**11**	13,225	1.3	10,750	1.1	**12**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	232,152	7,125	0.8	9,975	1.1	8.6	6,125	0.7	8,800	1.0	7.5	9,925	1.1	10,900	1.2	10.4	GP
Port Trucks	13,752	1,350		300			1,900		300			1,825		175			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	27,482	2,500	0.3	1,050	0.1	1.8	3,675	0.4	1,475	0.2	2.6	2,350	0.3	700	0.1	1.5	Truck
Total PCE	287,116	9,625	1.1	11,025	1.2	**11**	9,800	1.1	10,275	1.1	**11**	12,275	1.4	11,600	1.3	**12**	Total

Table 21. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 - High Growth With Expanded Near-Dock, Alternative Goods Movement Technology (Near-Dock and Off-Dock Intermodal Markets Only)

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	114,688	4,100	0.7	3,625	0.6	3.9	3,225	0.5	2,850	0.5	3.0	5,250	0.9	5,375	0.9	5.3	GP
Port Trucks	40,843	2,650		2,775			3,475		3,125			3,075		2,000			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	44,319	3,150	0.5	2,825	0.5	3.0	4,225	0.7	3,225	0.5	3.7	3,225	0.5	2,025	0.3	2.6	Truck
Total PCE	203,326	7,250	1.2	6,450	1.1	**7**	7,450	1.2	6,075	1.0	**7**	8,475	1.4	7,400	1.2	**8**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	147,431	5,600	0.6	5,200	0.7	5.4	4,450	0.5	4,125	0.5	4.3	7,600	0.8	6,000	0.8	6.8	GP
Port Trucks	41,435	2,875		2,375			3,850		2,850			3,450		1,975			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	43,369	3,000	0.3	2,525	0.3	2.8	4,050	0.5	3,125	0.4	3.6	3,500	0.4	2,050	0.3	2.8	Truck
Total PCE	234,169	8,600	1.0	7,725	1.0	**9**	8,500	0.9	7,250	0.9	**8**	11,100	1.2	8,050	1.0	**10**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	195,687	6,050	0.6	8,725	0.9	7.4	4,850	0.5	7,025	0.7	5.9	9,325	0.9	8,925	0.9	9.1	GP
Port Trucks	35,678	2,700		1,800			3,600		2,175			3,200		1,500			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	50,632	4,250	0.4	2,325	0.2	3.3	6,225	0.6	3,075	0.3	4.7	3,900	0.4	1,825	0.2	2.9	Truck
Total PCE	296,951	10,300	1.0	11,050	1.1	**11**	11,075	1.1	10,100	1.0	**11**	13,225	1.3	10,750	1.1	**12**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	232,152	7,125	0.8	9,975	1.1	8.6	6,125	0.7	8,800	1.0	7.5	9,925	1.1	10,900	1.2	10.4	GP
Port Trucks	13,752	1,350		300			1,900		300			1,825		175			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	27,482	2,500	0.3	1,050	0.1	1.8	3,675	0.4	1,475	0.2	2.6	2,350	0.3	700	0.1	1.5	Truck
Total PCE	287,116	9,625	1.1	11,025	1.2	**11**	9,800	1.1	10,275	1.1	**11**	12,275	1.4	11,600	1.3	**12**	Total

Table 22. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 – Low Growth Scenario, Alternative Goods Movement Technology (Near-Dock and Off-Dock Intermodal Markets Only)

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	114,688	4,100	0.7	3,625	0.6	3.9	3,225	0.5	2,850	0.5	3.0	5,250	0.9	5,375	0.9	5.3	GP
Port Trucks	25,730	1,650		1,850			2,125		2,000			1,925		1,250			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	29,206	2,150	0.4	1,900	0.3	2.0	2,875	0.5	2,100	0.4	2.5	2,075	0.3	1,275	0.2	1.7	Truck
Total PCE	173,100	6,250	1.0	5,525	0.9	**6**	6,100	1.0	4,950	0.8	**6**	7,325	1.2	6,650	1.1	**7**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	147,431	5,600	0.6	5,200	0.7	5.4	4,450	0.5	4,125	0.5	4.3	7,600	0.8	6,000	0.8	6.8	GP
Port Trucks	27,942	2,050		1,475			2,725		1,775			2,500		1,225			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	29,876	2,175	0.2	1,625	0.2	1.9	2,925	0.3	2,050	0.3	2.5	2,550	0.3	1,300	0.2	1.9	Truck
Total PCE	207,183	7,775	0.9	6,825	0.9	**8**	7,375	0.8	6,175	0.8	**7**	10,150	1.1	7,300	0.9	**9**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	195,687	6,050	0.6	8,725	0.9	7.4	4,850	0.5	7,025	0.7	5.9	9,325	0.9	8,925	0.9	9.1	GP
Port Trucks	22,658	1,900		975			2,475		1,150			2,250		775			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	37,612	3,450	0.3	1,500	0.2	2.5	5,100	0.5	2,050	0.2	3.6	2,950	0.3	1,100	0.1	2.0	Truck
Total PCE	270,911	9,500	1.0	10,225	1.0	**10**	9,950	1.0	9,075	0.9	**10**	12,275	1.2	10,025	1.0	**12**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	232,152	7,125	0.8	9,975	1.1	8.6	6,125	0.7	8,800	1.0	7.5	9,925	1.1	10,900	1.2	10.4	GP
Port Trucks	5,511	350		150			550		325			650		275			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	19,241	1,500	0.2	900	0.1	1.2	2,325	0.3	1,500	0.2	1.9	1,175	0.1	800	0.1	1.0	Truck
Total PCE	270,635	8,625	1.0	10,875	1.2	**10**	8,450	0.9	10,300	1.1	**10**	11,100	1.2	11,700	1.3	**12**	Total

Table 23. I-710 Peak Hour V/C and Lane Requirements Analysis, 2035 - Low Growth Scenario, Alternative Goods Movement Technology (Near-Dock, Off-Dock Intermodal, and Inland Warehouse Markets)

Screenline 1 - North of Pacific Coast Highway (PCH)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	114,688	4,100	0.7	3,625	0.6	3.9	3,225	0.5	2,850	0.5	3.0	5,250	0.9	5,375	0.9	5.3	GP
Port Trucks	18,860	1,250		1,300			1,625		1,425			1,450		875			
Regional Trucks	3,476	500		50			750		100			150		25			
Total Trucks	22,336	1,750	0.3	1,350	0.2	1.6	2,375	0.4	1,525	0.3	2.0	1,600	0.3	900	0.2	1.3	Truck
Total PCE	159,360	5,850	1.0	4,975	0.8	**6**	5,600	0.9	4,375	0.7	**5**	6,850	1.1	6,275	1.0	**7**	Total

Screenline 2 - North of Del Amo Blvd (between I-405 and SR-91)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	147,431	5,600	0.6	5,200	0.7	5.4	4,450	0.5	4,125	0.5	4.3	7,600	0.8	6,000	0.8	6.8	GP
Port Trucks	20,860	1,600		1,000			2,125		1,225			1,950		850			
Regional Trucks	1,934	125		150			200		275			50		75			
Total Trucks	22,794	1,725	0.2	1,150	0.1	1.4	2,325	0.3	1,500	0.2	1.9	2,000	0.2	925	0.1	1.5	Truck
Total PCE	193,019	7,325	0.8	6,350	0.8	**7**	6,775	0.8	5,625	0.7	**7**	9,600	1.1	6,925	0.9	**9**	Total

Screenline 3 - South of Rosecrans Ave. (between SR-91 and I-105)

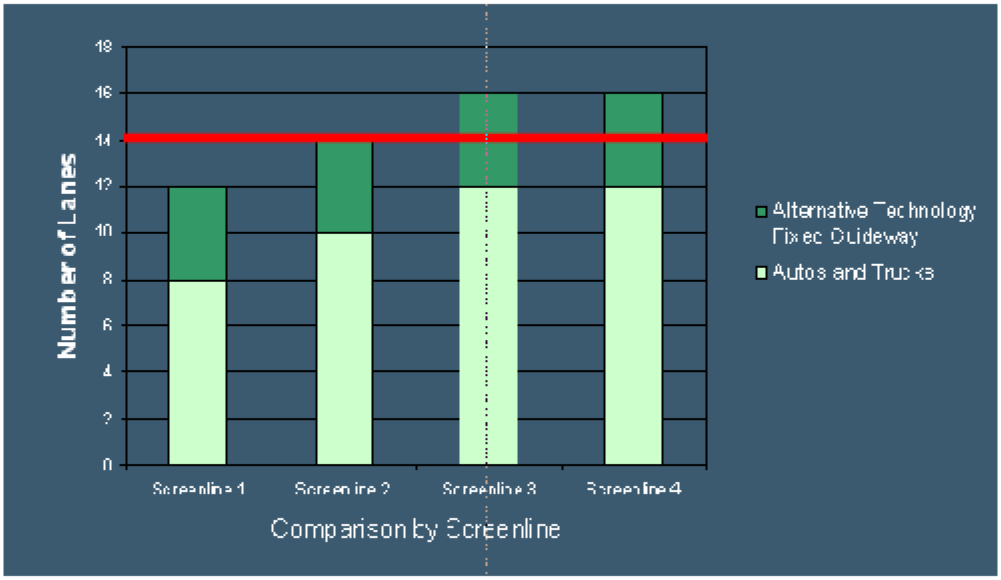
Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	195,687	6,050	0.6	8,725	0.9	7.4	4,850	0.5	7,025	0.7	5.9	9,325	0.9	8,925	0.9	9.1	GP
Port Trucks	18,972	1,650		750			2,150		900			1,950		600			
Regional Trucks	14,954	1,550		525			2,625		900			700		325			
Total Trucks	33,926	3,200	0.3	1,275	0.1	2.2	4,775	0.5	1,800	0.2	3.3	2,650	0.3	925	0.1	1.8	Truck
Total PCE	263,539	9,250	0.9	10,000	1.0	**10**	9,625	1.0	8,825	0.9	**10**	11,975	1.2	9,850	1.0	**11**	Total

Screenline 4 - North of the Atlantic Blvd/Bandini Blvd Intersection (close to the Downtown intermodal yards)

Vehicle Class	Daily Volume	AM Peak Hr (PCE)					Mid-Day Peak Hr (PCE)					PM Peak Hr (PCE)					Lane Type
		North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	North	v/c	South	v/c	Lanes	
Autos	232,152	7,125	0.8	9,975	1.1	8.6	6,125	0.7	8,800	1.0	7.5	9,925	1.1	10,900	1.2	10.4	GP
Port Trucks	5,613	350		225			550		325			650		275			
Regional Trucks	13,730	1,150		750			1,775		1,175			525		525			
Total Trucks	19,343	1,500	0.2	975	0.1	1.2	2,325	0.3	1,500	0.2	1.9	1,175	0.1	800	0.1	1.0	Truck
Total PCE	270,839	8,625	1.0	10,950	1.2	**10**	8,450	0.9	10,300	1.1	**10**	11,100	1.2	11,700	1.3	**12**	Total

Figure 20 presents a graphic showing the lane requirements on I-710 at each of the screenlines for the Alternative Goods Movement Technology alternative under the low cargo growth scenario with longer trips to new warehouse locations. As with figures 8 and 16, the auto and truck lane requirements in Figure 20 are rounded off and may not be exactly comparable with the results presented in Table 23. The figure shows the lane requirements for autos and trucks combined, as well as the equivalent number of lanes required for the Alternative Technology Fixed Guideway.

Figure 20 I-710 Lane Requirements, 2035, Alternative Technology Scenario with Longer Trips



4.4 SUMMARY OF FINDINGS

Tables 24 through 27 present the summary results from the Initial Feasibility Analysis (IFA) for peak hour Volume Capacity (V/C) ratios and lane requirements at each of the I-710 screenlines compared across the various cargo growth scenarios and alternatives. These results are presented to help the reader assess the relative differences in the impacts of the various cargo growth scenarios on congestion, and consequently on lane requirements, along the I-710 corridor, while at the same time evaluate the potential benefits in terms of congestion mitigation and reductions in lane requirements from TSM/TDM and Alternative Goods Movement Technology alternatives in comparison with the No Build alternative.

Table 24. I-710 Peak Hour V/C and Lane Requirements, 2035 – Comparison across Scenarios and Alternatives, Screenline 1

	High Port Cargo Growth *with* Near-Dock Expansion			High Port Cargo Growth *without* Near-Dock Expansion			Low Port Cargo Growth			Low Port Cargo Growth with New Warehouse Locations/Expanded PierPASS (TSM/TDM)		
	AM	Mid-Day	PM	AM	Mid-Day	PM	AM	Mid-Day	PM	AM	Mid-Day	PM
2035 Baseline "No Build"												
Total Traffic (PCEs)	14,000	14,700	10,025	13,050	10,475	10,150	15,075	15,225	17,200	10,025	10,500	10,300
Volume/Capacity (North, South)	1.3, 1.2	1.3, 1.1	1.5, 1.3	1.4, 1.3	1.5, 1.3	1.5, 1.4	1.3, 1.2	1.4, 1.2	1.5, 1.4	1.4, 1.3	1.5, 1.3	1.6, 1.4
Number of Lanes Required												
Total General Purpose Lanes	3.9	3.0	5.3	3.9	3.0	5.3	3.9	3.0	5.3	3.9	3.0	5.3
Total Truck Lanes	3.5	4.3	3.1	4.2	5.2	3.8	3.7	4.6	3.3	4.2	5.2	3.8
TSM/TDM												
Total Traffic (PCEs)	14,425	14,575	16,500	15,825	16,300	17,825	14,850	15,050	16,875	14,000	12,350	16,300
Volume/Capacity (North, South)	1.2, 1.1	1.3, 1	1.4, 1.2	1.3, 1.2	1.4, 1.2	1.5, 1.3	1.2, 1.1	1.3, 1.1	1.4, 1.3	1.2, 1.0	1.1, 0.9	1.3, 1.3
Number of Lanes Required												
Total General Purpose Lanes	3.5	2.8	4.9	3.5	2.8	4.9	3.5	2.8	4.9	3.5	2.8	4.9
Total Truck Lanes	3.3	4.1	2.9	3.9	4.9	3.5	3.5	4.3	3.1	3.1	3.0	3.1
Alternative Technology												
Total Traffic (PCEs)	13,700	13,525	15,875	13,700	13,525	15,875	11,775	11,050	13,975	10,825	9,975	13,125
Volume/Capacity (North, South)	1.2, 1.1	1.2, 1	1.4, 1.2	1.2, 1.1	1.2, 1	1.4, 1.2	1, 0.9	1, 0.8	1.2, 1.1	1.0, 0.8	0.9, 0.7	1.1, 1.0
Number of Lanes Required												
Total General Purpose Lanes	3.9	3.0	5.3	3.9	3.0	5.3	3.9	3.0	5.3	3.9	3.0	5.3
Total Truck Lanes	3.0	3.7	2.6	3.0	3.7	2.6	2.0	2.5	1.7	1.6	2.0	1.3

Table 25. I-710 Peak Hour V/C and Lane Requirements, 2035 – Comparison across Scenarios and Alternatives, Screenline 2

	High Port Cargo Growth *with* Near-Dock Expansion			High Port Cargo Growth *without* Near-Dock Expansion			Low Port Cargo Growth			Low Port Cargo Growth with New Warehouse Locations/Expanded PierPASS (TSM/TDM)		
	AM	Mid-Day	PM	AM	Mid-Day	PM	AM	Mid-Day	PM	AM	Mid-Day	PM
2035 Baseline "No Build"												
Total Traffic (PCEs)	16,325	15,750	19,150	18,375	18,325	21,150	17,525	17,375	20,400	18,600	18,575	21,400
Volume/Capacity (North, South)	1, 1	0.9, 0.9	1.2, 1	1.1, 1.1	1.1, 1.1	1.1, 1.1	1, 1.1	1, 1	1.3, 1.1	1.1, 1.1	1.1, 1.1	1.1, 1.1
Number of Lanes Required												
Total General Purpose Lanes	5.4	4.3	6.8	5.4	4.3	6.8	5.4	4.3	6.8	5.4	4.3	6.8
Total Truck Lanes	2.8	3.6	2.8	3.8	4.9	3.8	3.4	4.4	3.4	3.9	5.0	3.9
TSM/TDM												
Total Traffic (PCEs)	16,000	15,525	18,750	18,050	18,100	20,750	17,300	17,150	20,000	16,375	14,125	19,775
Volume/Capacity (North, South)	0.9, 0.9	0.9, 0.0	1.1, 0.9	1, 1	1, 1	1.0, 1	0.9, 1	1, 0.9	1.2, 1	0.9, 0.9	0.0, 0.0	1.2, 1.0
Number of Lanes Required												
Total General Purpose Lanes	4.9	3.9	6.2	4.9	3.9	6.2	4.9	3.9	6.2	4.9	3.9	6.2
Total Truck Lanes	2.6	3.4	2.6	3.6	4.6	3.6	3.2	4.2	3.2	2.8	2.7	3.1
Alternative Technology												
Total Traffic (PCEs)	16,325	15,750	19,150	16,325	15,750	19,150	14,300	13,550	17,400	13,075	12,400	16,525
Volume/Capacity (North, South)	1, 1	0.9, 0.9	1.2, 1	1, 1	0.9, 0.9	1.2, 1	0.9, 0.9	0.8, 0.8	1.1, 0.9	0.8, 0.8	0.8, 0.7	1.1, 0.9
Number of Lanes Required												
Total General Purpose Lanes	5.4	4.3	6.8	5.4	4.3	6.8	5.4	4.3	6.8	5.4	4.3	6.8
Total Truck Lanes	2.8	3.6	2.8	2.8	3.6	2.8	1.9	2.5	1.9	1.4	1.9	1.5

Table 26. I-710 Peak Hour V/C and Lane Requirements, 2035 – Comparison across Scenarios and Alternatives, Screenline 3

	High Port Cargo Growth *with* Near-Dock Expansion			High Port Cargo Growth *without* Near-Dock Expansion			Low Port Cargo Growth			Low Port Cargo Growth with New Warehouse Locations/Expanded PierPASS (TSM/TDM)		
	AM	Mid Day	PM	AM	Mid Day	PM	AM	Mid Day	PM	AM	Mid Day	PM
2035 Baseline "No Build"												
Total Traffic (PCEs)	21,350	21,175	23,575	23,425	23,750	25,975	22,750	22,850	25,250	24,150	21,625	26,725
Volume/Capacity (North, South)	1.1 , 1.1	1.1 , 1	1.3 , 1.1	1.1 , 1.2	1.2 , 1.1	1.4 , 1.2	1.1 , 1.2	1.2 , 1.1	1.4 , 1.1	1.2 , 1.3	1.3 , 1.2	1.5 , 1.2
Number of Lanes Required												
Total General Purpose Lanes	7.4	5.9	9.1	7.4	5.9	9.1	7.4	5.9	9.1	7.4	5.9	9.1
Total Truck Lanes	3.3	4.7	2.9	4.3	5.9	3.9	4.0	5.5	3.5	4.7	6.4	4.2
TSM/TDM												
Total Traffic (PCEs)	20,925	20,825	23,450	23,000	23,400	25,450	22,325	22,500	24,725	21,575	19,825	24,525
Volume/Capacity (North, South)	1 , 1	1 , 0.9	1.2 , 1	1 , 1.1	1.2 , 1.1	1.3 , 1.1	1 , 1.1	1.1 , 1	1.3 , 1	1.0 , 1.0	1.0 , 0.9	1.2 , 1.1
Number of Lanes Required												
Total General Purpose Lanes	6.8	5.4	8.4	6.8	5.4	8.4	6.8	5.4	8.4	6.8	5.4	8.4
Total Truck Lanes	3.1	4.4	2.7	4.1	5.6	3.6	3.8	5.2	3.3	3.4	3.9	3.2
Alternative Technology												
Total Traffic (PCEs)	21,350	21,175	23,575	21,350	21,175	23,975	19,725	19,025	22,300	19,250	19,450	21,625
Volume/Capacity (North, South)	1 , 1.1	1.1 , 1	1.3 , 1.1	1 , 1.1	1.1 , 1	1.3 , 1.1	1 , 1	1 , 0.9	1.2 , 1	0.9 , 1.0	1.0 , 0.9	1.2 , 1.0
Number of Lanes Required												
Total General Purpose Lanes	7.4	5.9	9.1	7.4	5.9	9.1	7.4	5.9	9.1	7.4	5.9	9.1
Total Truck Lanes	3.3	4.7	2.9	3.3	4.7	2.9	2.5	3.6	2.0	2.2	3.3	1.0

Table 27. I-710 Peak Hour V/C and Lane Requirements, 2035 – Comparison across Scenarios and Alternatives, Screenline 4

	High Port Cargo Growth *with* Near-Dock Expansion			High Port Cargo Growth *without* Near-Dock Expansion			Low Port Cargo Growth			Low Port Cargo Growth with New Warehouse Locations/Expanded PierPASS (TSM/TDM)		
	AM	Mid-Day	PM	AM	Mid-Day	PM	AM	Mid-Day	PM	AM	Mid-Day	PM
2035 Baseline "No Build"												
Total Traffic (PCEs)	20,850	20,075	23,875	22,700	22,575	25,875	22,025	21,725	25,075	22,550	22,400	25,625
Volume/Capacity (North, South)	1.1 , 1.2	1.1 , 1.1	1.4 , 1.3	1.2 , 1.3	1.2 , 1.3	1.5 , 1.4	1.1 , 1.3	1.2 , 1.3	1.4 , 1.4	1.1 , 1.4	1.2 , 1.3	1.4 , 1.4
Number of Lanes Required												
Total General Purpose Lanes	8.6	7.5	10.4	8.6	7.5	10.4	8.6	7.5	10.4	8.6	7.5	10.4
Total Truck Lanes	1.0	2.6	1.5	2.0	3.9	2.5	2.5	3.4	2.1	2.7	3.7	2.4
TSM/TDM												
Total Traffic (PCEs)	20,150	19,625	23,250	22,200	22,225	25,250	21,525	21,275	24,450	21,225	19,975	24,425
Volume/Capacity (North, South)	1 , 1.1	1 , 1	1.3 , 1.2	1.1 , 1.2	1.1 , 1.2	1.4 , 1.3	1 , 1.2	1.1 , 1.2	1.3 , 1.3	1.0 , 1.2	1.0 , 1.1	1.3 , 1.3
Number of Lanes Required												
Total General Purpose Lanes	7.8	6.8	9.5	7.8	6.8	9.5	7.8	6.8	9.5	7.8	6.8	9.5
Total Truck Lanes	1.7	2.4	1.4	2.6	3.7	2.4	2.3	3.2	2.0	2.2	2.6	2.0
Alternative Technology												
Total Traffic (PCEs)	20,850	20,075	23,875	20,650	20,075	23,875	19,600	18,750	22,800	19,575	18,750	22,800
Volume/Capacity (North, South)	1.1 , 1.2	1.1 , 1.1	1.4 , 1.3	1.1 , 1.2	1.1 , 1.1	1.4 , 1.3	1 , 1.2	0.9 , 1.1	1.2 , 1.3	1.0 , 1.2	0.9 , 1.1	1.2 , 1.3
Number of Lanes Required												
Total General Purpose Lanes	8.6	7.5	10.4	8.6	7.5	10.4	8.6	7.5	10.4	8.6	7.5	10.4
Total Truck Lanes	1.0	2.6	1.5	1.0	2.6	1.5	1.2	1.9	1.0	1.2	1.9	1.0