Port of Los Angeles Port-wide Transportation Master Plan

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ABSTRACT

The Port of Los Angeles has embarked on a Port-wide Transportation Master Plan to address the transportation system of the Port of Los Angeles with an overview of the neighboring Port of Long Beach, as well as the surrounding community and the five-county Greater Los Angeles region. The Port recognizes the responsibility it has to look after the health and welfare of surrounding communities, while responding to the growing demands of international trade with its associated economic imperatives. The objectives of this planning study are to understand the implications of international goods movement as it relates to the port transportation system, and develop and evaluate transportation improvements to address those implications, while minimizing impacts on surrounding communities.

The Port utilizes a range of powerful tools and mechanisms in order to analyze, develop and evaluate various transportation improvements as part of this Transportation Master Plan. The tools and mechanisms used include:

- Long-term Macroeconomic Cargo Forecast
- MPC - Intermodal Rail Yard Capacity Model
- RTC - Rail Traffic Simulation Model
- QUICKTRIP - Port Truck Trip Generation Model
- TRANPLAN - Port Area Regional Travel Demand Model
- SYNCRO - Corridor Traffic Simulation
- Community Involvement Process

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1.0 INTRODUCTION

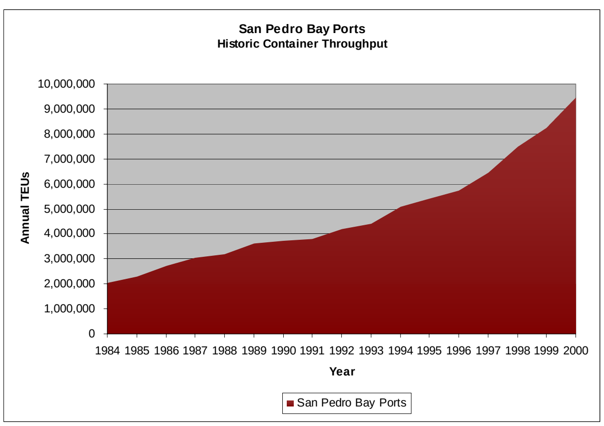
Everyday, consumers shop for and purchase needed items that have been made available thanks to an efficient goods movement system. The Ports of Los Angeles and Long Beach (San Pedro Bay Ports) serve as the country's primary gateway for international trade. Forty percent of all waterborne container freight imported to the U.S. flows through these two ports. In addition to supplying goods locally in the Southern California region, cargo is transported by truck and rail to supply goods throughout the United States. Of the cargo entering the San Pedro Bay Ports, approximately an equal split is transported by rail and by truck (50% rail/50% truck).

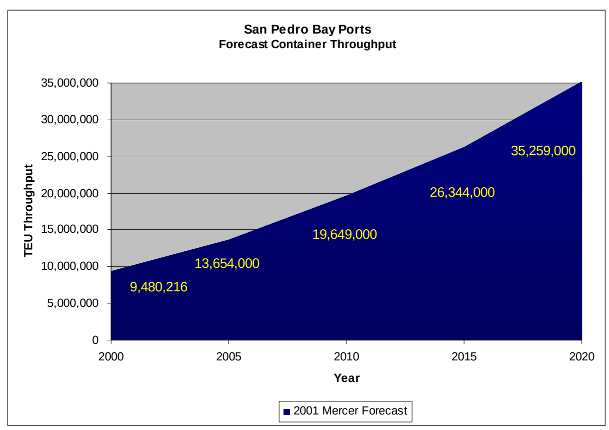
This system not only provides for the transport of goods; it is vital to the economic health of our region. The goods movement system that funnels through the San Pedro Bay Ports generates one of every 10 jobs in the region, with $30 billion in regional wages and salaries. The Ports are an economic powerhouse that directly affects the quality of life for residents in the neighboring communities, the region and throughout the country. The State of California's Goods Movement Action Plan *(Business, Transportation & Housing Agency/California Environmental Protection Agency, draft DEC 2005)* agrees, stating, *"the State's economy and quality of life depend upon the efficient, safe delivery of goods to and from our ports and borders. At the same time, the public health and environmental impacts from goods movement activities must be reduced to ensure protection of public health."*

The Port of Los Angeles is bounded by two communities, San Pedro and Wilmington, both of which are in close proximity to port operations. One of the challenges presented to the Ports is to provide an efficient goods movement system that minimizes environmental impacts and environmental injustices to local residents.

1.1 Purpose

The Port of Los Angeles Port-wide Transportation Master Plan has the primary purpose of planning for projected cargo growth so that the impacts of increasing cargo volumes are understood, and transportation improvements can be analyzed, developed and evaluated to address these impacts. The Transportation Master Plan analyzes the combined transportation system of the two San Pedro Bay Ports and the regional highway system and makes recommendations for system improvements focused on Port of Los Angeles facilities.





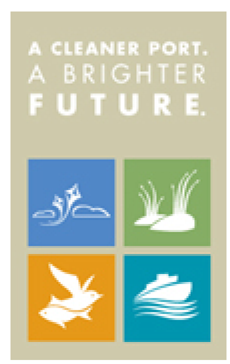
Cargo growth projections for San Pedro Bay have been prepared based on macroeconomic analyses that consider factors such as population growth and trends in global trade. The cargo forecast currently used by the Ports of Los Angeles and Long Beach is the San Pedro Bay Ports Long-Term Cargo Forecast *(Mercer Management Consulting, 2001).* This forecast anticipates cargo nearly tripling by the year 2020.

The market responds to demand, and the goal is to efficiently handle the growth while minimizing environmental impacts to the neighboring communities. This will require diligent planning and responsive action by the Port, industry and other governmental agencies.

1.2 Community Impacts

Goods movement currently relies heavily on diesel technology. Ships, trains, trucks and terminal equipment typically use diesel engines to handle the millions of containers that pass through every year. In 2005, over 13 million twenty foot equivalent units (TEUs), the equivalent of approximately 7½ million containers, passed through the Ports of Los Angeles and Long Beach. The California Air Resources Board has identified the San Pedro Bay Ports as a major source of pollution from diesel emissions, and estimates that nearly 25 percent of all diesel particulates and 10 percent of the oxides of nitrogen for the South Coast Air Quality Management District (SCAQMD) come from port operations.

Both the Port of Los Angeles (POLA) and the Port of Long Beach (POLB) have adopted wide-ranging policies, making environmental protection a top priority. Principles of these policies are summarized below:



- Protect the local community and environment
- Communicate with the community
- Promote sustainability in design, construction and operations

- Employ best practices and advanced technology solutions
- Take the lead in environmental stewardship

Specific environmental initiatives being implemented by the Port of Los Angeles include:

- **Vessel Speed Reduction and Vessel Fuel Improvement Program**. An incentive program within the Port to minimize the speed of incoming and outgoing vessels and encourage the use of vessels with cleaner fuel burning engines.
- **Channel Deepening**. Allows for larger vessels to enter the Port, reducing the number of vessel calls.
- **Alternative Maritime Power (AMP)**. Ships use electricity from shore (cold ironing) rather than burn bunker fuel to maintain operations while at berth. *POLA has taken the lead to initiate the use of this technology by retrofitting several of its berths to provide AMP receptacles for "ship to shore" connections.*
- **Truck Reduction.** Program to increase use of rail, reduce traffic congestion during commute hours, reduce truck trips through better dispatching and empty container management.
- **Yard Tractor Modernization & Alternative Fuel Program**. An incentive program to encourage the use of equipment with cleaner fuel burning engines.
- **Truck Trade-in Program.** Retire older trucks and replace with cleaner ones. More significant steps are being considered for project specific or a more general application.

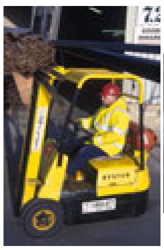
- **Locomotive Technologies Program**. Pacific Harbor Lines to immediately upgrade equipment to best available technology, and implement as feasible ultra-low emissions locomotives. Future terminal leases, involving the use of locomotives, are expected to adhere to this program.
- **Truck Idle Reduction Program.** Reduce truck idling at Port terminals.
- **Sustainable Design.** Promote sustainable design in Port developments.
- **Land Remediation**. Land contaminated by former owners or tenants.
- **Promote wildlife habitat protection** in the Harbor area (i.e. least tern nesting sites and eel grass planting)
- **PierPass Program.** Shifts some of the peak hour truck movements to off-peak time periods, thereby reducing congestion which reduces idling and emissions

Additional significant steps will be required to achieve the Ports' goal of efficiently handling the cargo demand, while minimizing environmental impacts to neighboring communities.

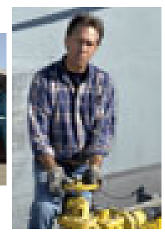
1.3 Economic Impacts

In addition to environmental impacts, economic impacts are an equal consideration for the quality of life of the surrounding communities. Indeed, these economic impacts affect not only the surrounding communities, but also the entire region and much of the country.

The combined Port of Los Angeles and Port of Long Beach complex is one of the world's largest trade gateways and the breadth of its economic contributions to the regional economy is far-reaching. The Port is connected, directly and indirectly, with tens of billions of dollars in industry sales each year in the Southern California region. Those sales translate into hundreds of thousands of local jobs and billions of dollars in wages, salaries, sales and national, state and local tax revenues.







Regional San Pedro Bay Port benefits include:

- 600,000 full-time and part-time jobs (one of every 10 jobs in Southern California)
- 2.8 million jobs nationwide
- $200 billion annually in industry sales
- $30 billion annually in regional wages and salaries
- $10 billion annually in tax revenues
- $7 billion annually in U.S. Customs revenues
- Approximately 70% of the regional direct, indirect and induced benefits connected to Port operations occur within Los Angeles County.

2.0 TRANSPORTATION SYSTEM ANALYSIS

The objective of the Transportation Master Plan is to analyze the Port transportation system in concert with projected traffic so that the implications of increasing cargo volumes are understood; and transportation improvements can be analyzed, developed and evaluated to address these implications. The Transportation Master Plan analysis considers cargo growth forecasts, predicts the flow and distribution of cargo traffic, identifies deficiencies in the transportation system and provides information to make recommendations for transportation improvements. The analytical tasks discussed include:

- Cargo Flow Analysis
- Rail System Analysis
- Roadway System Analysis

2.1 Cargo Flow Analysis

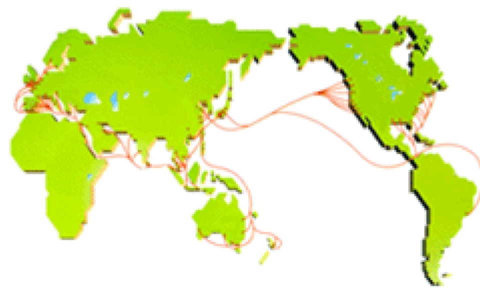
Cargo flow is analyzed to understand the volumes of trucks and trains at each of the marine terminals. Factors affecting the cargo flow include cargo volumes (Mercer 2001), and the various transport modes and processes used to move goods to and from the Port. Based on the results of the cargo flow analysis, rail yard plans can be developed, rail infrastructure needs determined, and roadway demand established.

Two perspectives are used to describe cargo flow—global trade and inland transportation modes.

Global Trade

Top U.S trading partners today are China, Hong Kong, Japan, Taiwan, and South Korea. Pacific Rim countries account for 70% of US imports and 60% of US exports. Southern California and the San Pedro Bay Ports provide a unique gateway for Pacific Rim cargo, thanks to the following features:

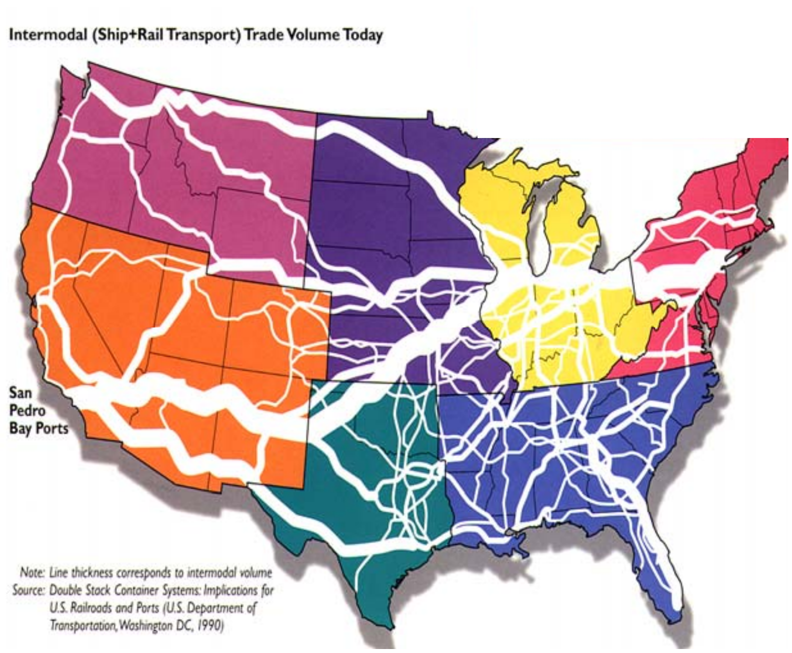
- Southern California has the second largest local consumer market in the country
- San Pedro Bay is a large natural harbor with shelter of man-made breakwaters



- San Pedro/Wilmington and the surrounding community have current logistics capabilities (labor, distribution center, freight forwarders, etc.) for international trade
- The San Pedro Bay Ports have a well-established transportation system, including rail connections to the rest of the country

Pacific Rim cargo is also handled through other U.S. west coast gateways--Seattle and Tacoma in the state of Washington, and Oakland, California. All are expanding in an effort to meet the demand for goods movement; however, they are physically constrained and cannot handle much of the projected growth. On an international level, Canada is working to provide capacity for U.S. intermodal cargo at the Port of Vancouver, Roberts Bank and Prince Rupert. Mexico is also planning port developments; however, extensive investment would be required to provide port facilities and transportation infrastructure (road and rail). Canada and Mexico will reap economic benefits from these investments, but increased port and intermodal capacity at the San Pedro Bay Ports will likely still be necessary to accommodate projected cargo growth.

An alternative to calling at West Coast ports would be to transport cargo by ship through the Panama Canal to U.S. ports along the Gulf of Mexico and the Atlantic Coast, known as the "*all water service to the east coast*". However, the Panama Canal currently constrains the size of vessels, requires additional sailing time and imposes transit fees. Shipping cargo to the U.S. West Coast and transporting by rail to hinterland destinations is currently, an economically superior option. There are also capacity constraints at the Panama Canal, and at the Gulf and Atlantic Coast ports.



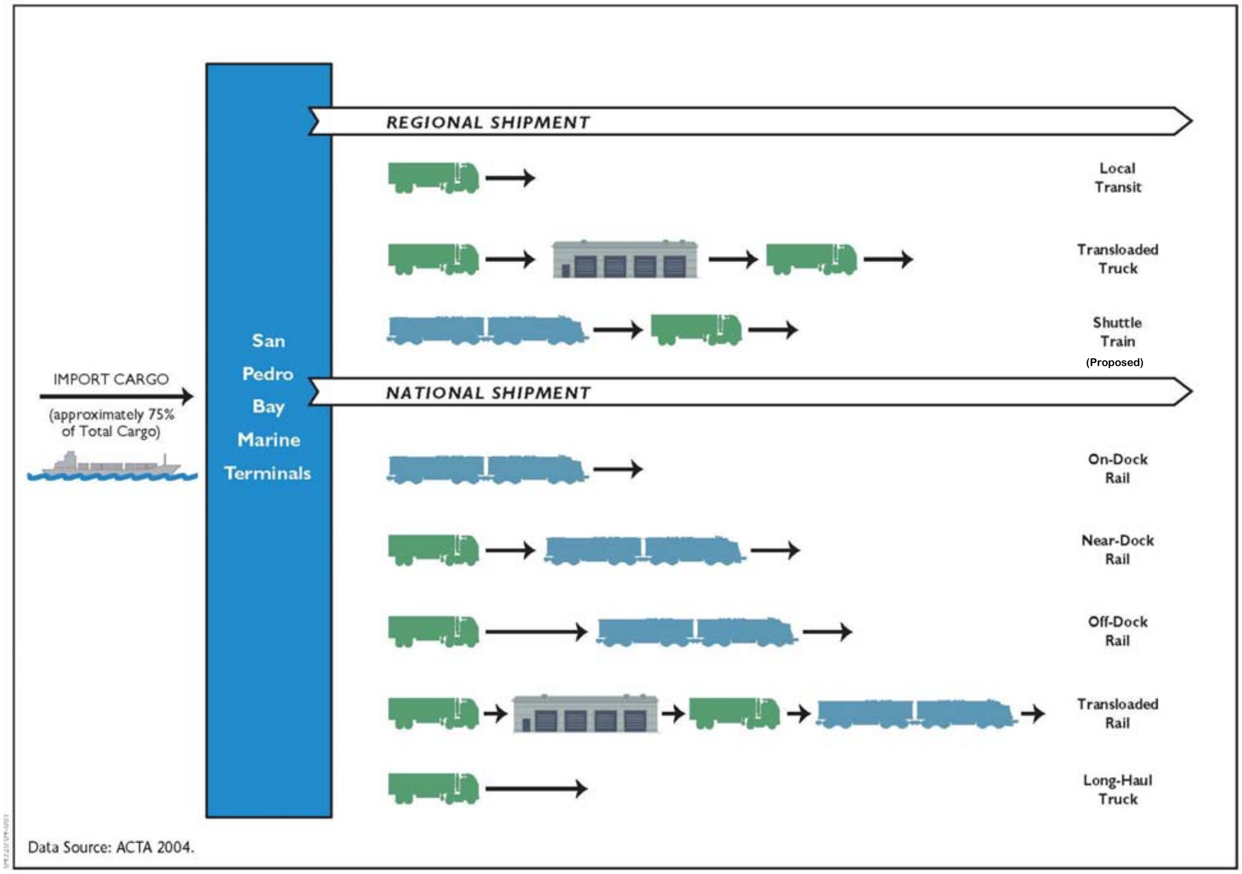
Another alternative to West Coast ports is to transport cargo by ship through the Suez Canal, directly to U.S. East Coast ports. Sailing time from Southeast Asia with this alternative nearly competes with trans-Pacific transit times; however, capacities at the Suez Canal and at East Coast ports are currently constrained.

The San Pedro Bay Port Complex remains the superior shipping route to alternative efficiently handle growing cargo flow, while addressing environmental impacts.

Inland Transportation Modes

Cargo is transported to and from the San Pedro Bay Ports by various modes and processes, as shown in *Figure 2.1*. For simplicity, note that *Figure 2.1* and the discussions herein describe import cargo. Export cargo and westbound empty containers have similar patterns, but in reverse. Transport modes include truck and rail and there are subcategory processes under each of these modes. Evaluating cargo flow and total cargo volumes is the basis for analyzing the volumes of rail and truck cargo to be considered in subsequent traffic analyses. Currently, trucks are required to transport containers from marine terminals for all cargo except "on-dock" rail cargo. It is the goal of POLA to maximize the use of on-dock rail, and to meet additional intermodal demand with near-dock rail yards, in lieu of off-dock rail yards.

Figure 2.1 – Cargo Flow



Cargo flow is divided into two types of shipments – regional and national. Cargo destined for the Southern California region and the region west of the Rocky Mountains is referred to as Regional Shipment.

Regional Shipment modes and processes are described as follows:

> ***Local Transport:*** Cargo is transported from the Port to its final destination by truck. This transport process serves the local Los Angeles region, as well as the region west of the Rocky Mountains (U.S. Western Region). This mode is

estimated to handle roughly 30% of the import cargo from the San Pedro Bay Ports.

Transloaded Truck: This transport process is similar to Local Transport, but cargo is transloaded at a warehouse or distribution center as part of the process. Transload cargo is removed (or unloaded) from international containers at a warehouse to be processed, repackaged, labeled, resorted and reloaded into larger domestic containers, and then trucked to its final destination. Approximately half the transload warehouses are located within 25 miles of the Ports. Other large warehouses are located in the Inland Empire area (Ontario to Riverside). This mode is estimated to handle roughly 20% of the import cargo from San Pedro Bay Ports.

Shuttle Train (proposed): This transport mode is currently being studied to supplement the previous two local delivery methods. This concept involves transporting cargo from the Ports by train to its final destination. It requires cargo to be directly loaded onto railcars at either on-dock or near-dock rail facilities (or rail yards). The trains are then pulled to an inland destination (e.g. Inland Empire) where the containers can be unloaded, staged, interchanged to trucks and transported to its final destination. The principle of this concept is to utilize rail through the most congested areas of the region and thereby alleviate some of the traffic demand. The shuttle train mode should target final locations in the

Inland Empire and beyond to minimize backhauling into congested areas. The shuttle train mode would allow containers to be quickly moved from the marine terminals and allow more time at an inland location for consignees to schedule truck transport for just-in-time delivery. Although the shuttle train concept is not currently in operation, a pilot program is being pursued.

National Shipment primarily involves cargo that is destined east of the Rocky Mountains, which is predominantly transported by rail and known as *intermodal cargo*. This cargo is also known as "landbridge" or "Inland Points Intermodal" (IPI).

National Shipment modes and processes are described as follows:

On-dock Rail: Intermodal cargo is directly loaded onto trains at a rail yard located within the marine terminal. This allows cargo to be loaded without any gate transaction and without being transported by truck on any local roadways. One disadvantage is that they can monopolize the container yard acreage of the marine terminal, reducing the throughput capacity of the terminal and the Ports, overall. However, with environmental benefits and careful planning to minimize capacity constraints the Ports are pursuing on-dock rail. The combined Ports have proposed planning expansions of at least ten on-dock rail yards to keep up with demand. Some limitations on the amount of cargo that can be moved on-dock will be presented in Section 2.2 of this document. On-dock usage has been steadily increasing in recent years, handling 16% of import cargo in 2003, and 21% in 2004.

Near-dock Rail: Near-dock rail yards are similar to on-dock rail, but are located

outside of the marine terminals and require a short truck trip (within 5 miles). Their advantage is the ability to combine cargo from various marine terminals and build trains that efficiently transport cargo to specific destinations throughout the country. The only existing near-dock rail yard, accommodating the San Pedro Bay Complex, is the Intermodal Container Transfer Facility *(ICTF)*. It is operated by Union Pacific Railroad on Port of Los Angeles property located north of Sepulveda Boulevard and east of Alameda Street. The Ports are contemplating other near-dock facilities to help meet the demand for efficient rail transport. Near-dock usage has remained relatively flat due to the availability of only one rail yard. Currently, ICTF handles approximately 8% to 9% of the total San Pedro Bay cargo.

Off-dock Rail: Currently, off-dock rail yards that handle containers from the San Pedro Bay Ports are located near downtown Los Angeles, approximately 25 miles away. Both the BNSF Railway and Union Pacific Railroad have off-dock facilities that handle Port containers. These rail yards contribute significant truck miles to some of the most congested roadways in the region. Off-dock rail yards handled approximately 14% of import cargo in 2003 and 2004.

Transload Rail: As with Transload Truck, cargo is trucked to a warehouse or distribution center, where it is removed from international containers; and processed, repackaged, labeled, resorted and reloaded into larger domestic containers. The transloaded cargo is then trucked to downtown rail yards and loaded onto trains for shipment to the hinterland. Some transloading occurs in the Inland Empire and is then loaded onto trains at BNSF's San Bernardino Intermodal Facility. A majority of the Transload Rail cargo is handled at warehouses that are located within 25 miles of the Port. This mode is estimated to handle roughly 10% of the import cargo from San Pedro Bay Ports.

Long Haul Truck: Cargo is transported by truck directly from the Ports to its final destination beyond the Rocky Mountains. Most Long Haul Truck cargo is likely to be transloaded at local warehouses; this will avoid backhaul of the international container and allow more efficient truck haul with a larger domestic container or truck. This transport mode is estimated to handle less than 1% of the import cargo from San Pedro Bay.

2.2 Rail System Analysis

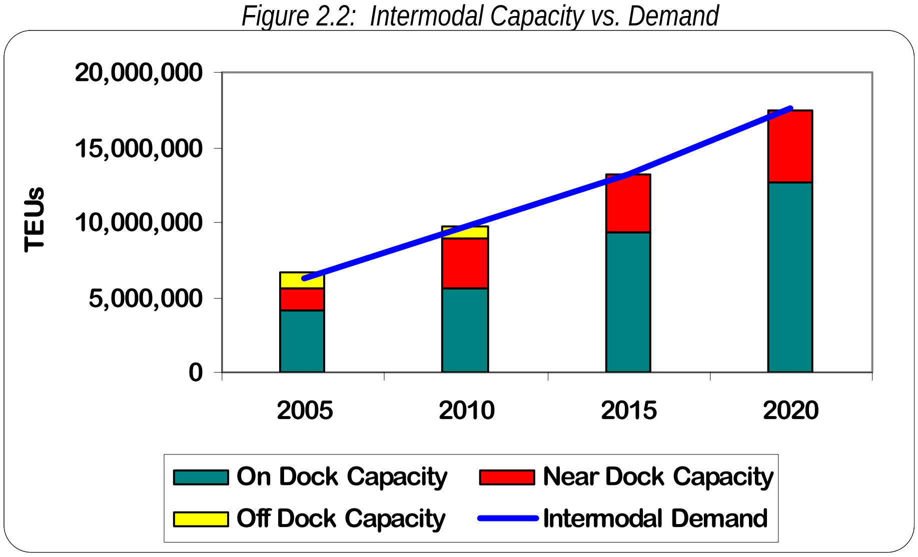
The rail system is complex with three major elements having the potential to constrain the system's throughput. The operations at the marine terminal, container handling at the rail yard, and train operations at both the rail yard and the rail track network all affect the efficiency of the overall rail system. Three major elements: rail yard demand, rail yard expansion plans and rail network improvement plans are presented below.

Rail Yard Demand Analysis

The San Pedro Bay Ports Long-term Cargo Forecast *(Mercer 2001)* estimates that half of the Port's cargo will be transported by train, referred to as *intermodal cargo*. The rail yards needed to serve this intermodal cargo demand fall into three classifications: on-dock, near-dock and off-dock rail facilities.

In recent years, several studies have been conducted to evaluate options for future cargo handling at the San Pedro Bay Ports. These studies include Transportation Master Planning Study *(POLB/POLA, 1999)*; Rail Master Plan *(POLB, 2002)*; Rail Capacity Analysis *(POLA, 2002)*; and Rail Market Study *(POLA, 2004)* These studies and this ongoing Transportation Master Plan describe intermodal demand and proposed rail yard capacities to handle that demand. *Figure 2.2* shows the planned rail yard capacities at on-dock, near-dock and off-dock rail yards for years 2005 through 2020. Also provided on the *figure* is the anticipated growth (demand) of intermodal container volumes (in TEUs) for the San Pedro Bay Ports.

Figure 2.2: Intermodal Capacity vs. Demand



On-dock Rail Yard Demand: The maximum on-dock rail yard throughput is determined based on two factors: operational issues and physical capacity constraints. Operational issues limit the percentage of intermodal cargo that can be handled by on-dock rail. Major operational issues include.

Full Destination Trains: Trains are loaded with intermodal cargo according to the hinterland destination (e.g. a train is loaded with containers destined for Chicago, another train for St Louis, etc.). If there are not enough containers to a given destination to build a full train, the containers are trucked to a near-dock or off-dock facility where containers from multiple port terminals can be combined.

Transload Cargo: Another issue that precludes intermodal cargo from using on-dock rail yards is transloading at local warehouses. Transload cargo is removed from international containers at warehouses where it can be processed, repackaged, labeled, resorted and reloaded into larger domestic containers. Transload cargo is trucked from the port to a warehouse and processed; trucked from the warehouse to the nearest rail yard; and then delivered by train to its hinterland destination. Transload cargo is estimated to comprise at least 10% of the total port volume. Fifty percent of the total forecasted Port cargo is intermodal. Therefore, the most that could be handled on-dock is 40%.

Demand for on-dock rail yards has been determined based on an analysis of intermodal volumes, freight origins and destinations, and transload volumes. The phased-in expansion of on-dock rail facilities has been planned by the Ports as dictated by this on-dock rail yard demand.

The second factor affecting on-dock rail yard throughput is capacity. In the long-term (beyond 2015) on-dock rail yards are planned to be built as large as possible within the available Port property. Any further expansion on existing port land would severely impact marine terminal throughput and the ability to serve demand for local and intermodal cargo.

The total on-dock capacity is planned to be maintained at 25% of total Port throughput through 2015, and then increase to 30% through 2030. During the period from 2005 through 2030, it is anticipated that on-dock rail yard capacity at the San Pedro Bay Ports will more than quadruple as a result of improved efficiencies and proposed expansions. The following table summarizes the existing and planned intermodal volumes at the Port of Los Angeles and Port of Long Beach.

Table 2.1: San Pedro Bay Ports On-dock Throughput Projections

Year	POLA	POLB	Total
2005	1.8	1.3	3.1
2010	3.1	1.9	5.0
2015	4.3	3.4	7.7
2020	6.3	5.5	11.7
2030	6.6	7.1	13.8
Throughput values expressed in millions of TEUs (rounded)			

Near-dock and Off-dock Rail Yard Demand: Even with on-dock rail yard expansion, the current rail yard capacity in Southern California will begin to fall short by 2010. The balance of intermodal cargo that can not be handled at on-dock facilities will need to be handled at near-dock or off-dock facilities. Therefore, near-dock and off-dock rail yards will need to be expanded to provide capacity to meet the total intermodal demand. The existing near-dock and off-dock rail yards are estimated to have an annual capacity of 4 million lifts (7.3 million TEUs). These facilities are listed in *Table 2.2* with their total maximum practical capacity (MPC).

The existing near-dock and off-dock capacity is split such that the near-dock UP ICTF rail yard can handle nearly 1.5 million TEU per year, and the rail yards in downtown Los Angeles can handle approximately 4.6 million TEU per year. The San Bernardino rail facility is much more remote, although it may handle some transload intermodal cargo. Compare this to the actual 2003 Port intermodal volumes totaling 5.9 million TEU; 2.2 million TEU moved through on-dock rail yards; therefore, 3.7 million TEU must have moved through near-dock and off-dock rail yards. The result is that Port intermodal volumes are utilizing 60 percent of the railroad capacity. The railroads have stated that domestic rail cargo will be growing and competing for the available off-dock intermodal capacity.

Table 2.2: Current Off-dock Rail Yard Capacities

Off-dock Facility	Total MPC (Lifts)	Total MPC (TEU)
UP ICTF	800,000	1,480,000
UP LATC	290,000	530,000
UP East LA	510,000	940,000
UP City of Industry	220,000	410,000
BNSF Hobart	1,330,000	2,450,000
BNSF Commerce	150,000	280,000
BNSF San Bernardino	660,000	1,210,000
TOTAL	3,960,000	7,300,000

The off-dock facilities must plan to absorb growth of domestic and transload cargo that also utilize these rail yards. A simple analysis of these cargos indicates growth of at least four percent annually, which will absorb all of the existing off-dock capacity by 2015 *(POLA 2004).*

The conclusion is that direct intermodal cargo (intermodal cargo that is not transloaded) will need to be handled at on-dock and near-dock facilities, since off-dock facilities will be fully utilized by domestic and transload cargo *(POLA 2004)*. The railroads will need all of the downtown/regional rail yards plus new construction to accommodate even a low growth in domestic and transload cargo.

Rail Yard Expansion Plans

The Port of Los Angeles and Port of Long Beach have well-developed conceptual plans for expansion and new development of rail yards. Rail yard plans were developed through the efforts of the Rail Master Planning Study *(POLB 2002),* Rail Capacity Analysis *(POLA 2003)* and Rail Market Study *(POLA 2004)*. These planning studies evaluated the potential for rail yard development and prepared concepts that fit port property constraints. The targeted configuration of these conceptual plans was as follows:

- Long tracks in yards (minimum one-third train length, preferred one-half train length)
- Storage track to working track ratio of 2:1 minimum, 3:1 preferred
- Adequate arrival/departure tracks to land or build a train without blocking the mainline
- Adequate number of leads to serve anticipated train traffic.

On-Dock Rail Yards

On-dock rail yard concepts were evaluated considering the marine terminal throughput which dictates intermodal demand. Rail yard concepts were analyzed to determine their capacity and a phased implementation plan was developed to match the rail yard capacity to the on-dock rail yard demand. An iterative process was performed to balance the marine terminal container yard acreage to the rail yard acreage. The container yard capacity analysis was performed by Moffatt & Nichol. The rail yard capacities were determined by Parsons.

One of the key tools used was the Parsons' MPC Model for intermodal yards. Maximum Practical Capacity (MPC) is estimated by this simulation model. It considers the operation of rail yards, including the following: train arrival and switching, container loading and unloading, preparation for train departure, train departure and yard downtime. The model does not consider constraints due to vessel or container yard operations, or any impacts due to mainline rail limitations. The calculated throughput capacity is an estimate of the maximum that could be attained by the rail facility. Actual operations may be maintained below this level in order to contain operating costs and increase reliability. The model has been repeatedly validated against railroad facilities that operate at a sustainable or constrained level of throughput. Adjustments have been made to the model to account for longshore labor rules and work practices, however, no on-dock rail yards are currently operating at their full capacity. Thus, actual validation is not possible.

The San Pedro Bay Ports have led the industry in on-dock intermodal facility development. The on-dock concept was initiated less than twenty years ago and has taken hold and grown rapidly in that relatively short time. To help accommodate anticipated growth, the Ports plan to maximize their on-dock operations with expansion of on-dock rail yards and improved efficiencies of work shifts and labor rules.

The planned on-dock rail yard expansions in the Port of Los Angeles include phased growth of existing facilities, as well as proposed construction of two new rail yards *(POLA, 2002)* as shown on *Figure 2.4*. The Port of Long Beach has planned a similar program of on-dock rail yard expansions *(POLB, 2002)*.

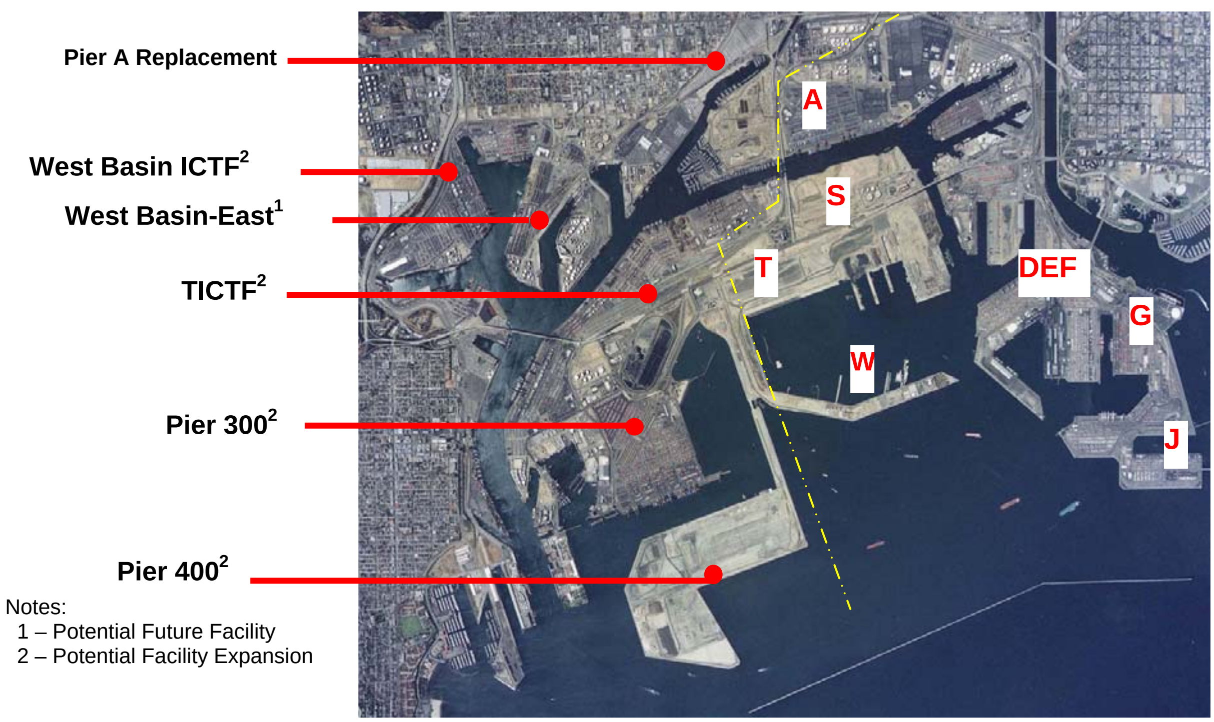


Figure 2.4: Existing and Proposed On-dock Rail Yards

Near-dock/Off-Dock Rail Yards

The only existing “near-dock” facility, Union Pacific Railroad’s (UPRR) ICTF, currently operates at 1.2 million TEUs annually, though its operator has recently expressed an interest in expanding operations to allow for a maximum of 2.2 million TEUs of annual throughput Any plans to expand this facility are speculative at this time, the rail capacity calculations shown in *Figure 2.2* assume an average volume of 1.5 million TEUs at the UPRR’s ICTF facility through 2015, and 2.2 million TEUs from 2015 through 2020.

Near-dock intermodal facility plans have been pursued recently to address the urgent demand for this type of facility. Port of Los Angeles has developed concepts for a near-dock facility, located on their property, immediately south of the existing UP ICTF. This facility, proposed to be operated by BNSF Railway, would be known as BNSF’s Southern California International Gateway (SCIG). The facility is conceptualized to have a capacity of approximately one million lifts (1,850,000 TEUs). An EIR for this facility is currently being prepared.

Although off-dock rail yard expansions may be required, they would be located outside the Port’s jurisdiction and would be pursued by other parties.

Rail Network Improvement Plans

The San Pedro Bay Ports and the Alameda Corridor Transportation Authority (ACTA), have analyzed the port rail network and the Alameda Corridor to identify deficiencies in the system and recommend improvements to remove bottlenecks and blockages. The primary tool used to perform this analysis is Berkeley Simulation Software’s Rail Traffic

Controller (RTC) simulation program. The input to this program includes characteristics of all rail infrastructure and train traffic data. The characteristics of the rail infrastructure were provided by Parsons who have developed a detailed inventory of the system including track, signal extents and speed limits. The train traffic was also provided by Parsons based on the results of their MPC model, which estimates train volumes for each rail yard.

Rail Traffic Controller (RTC) is a sophisticated computer program designed to dynamically simulate rail operations in either a planning environment or an online control center. RTC contains a sophisticated train performance calculator that considers locomotive horsepower and trailing tonnage of the train. Train control decisions are driven by least-cost solutions that are operationally feasible. The direct operating costs algorithms are user defined. Conflicts between trains are generally resolved by giving preference to higher cost trains. RTC dynamically varies operating costs for trains as they traverse their routes. For example, trains with crews that are approaching their hours-of-service limit, and trains running behind schedule are favored by virtue of escalating delay costs. Conversely, trains that are ahead of schedule receive less preference, even if they are traditional “high priority” trains. RTC determines that trains are ahead of schedule either through user-defined arrival times or by internally computed arrival times. Departure times and dwell times were randomized in order to test the robustness of the rail system to handle trains without excessive delays.

The result of using this sophisticated model is that the rail network could by tested by imposing increasing train volumes projected for future years. The rail network was tested with train volumes and rail yard configurations projected for 2005, 2010, 2015, 2020 and 2030. RTC delays trains as needed to achieve a solution where all trains eventually make their trips from origin to destination. If there were an excessive number of trains, then RTC will delay trains at terminals until line capacity becomes available. Delays also result as conflicts occur on the mainline and trains must slow or stop to wait for clear track. The total delay incurred by each train is logged by the simulation model. The model results include total delay of all trains, delay ratio (delay time divided by unimpeded running time) of all trains and maximum delay of individual trains. The model also provides data on blockage times at roadway crossings, which is used in the truck traffic analysis.

The train delay results are used to calculate a Level of Service for the rail network under a given train traffic volume. Level of Service is graded LOS A through LOS F, analogous to the Highway Capacity Manual (A is free flow, F is gridlock). If the rail network has an unacceptable LOS, then the model results are evaluate and animations observed to determine where bottlenecks exist or identify other causes of train delay.

RTC model results for 2005 and 2010 have been presented to the Ports, ACTA and the railroads for their review. These results include recommended improvements to the rail network (e.g. double tracking various legs of the network). The process of modeling 2015, 2020 and 2030 conditions is underway. To date, it is anticipated that required rail network improvements will include adding one track to the rail yards on Terminal Island, adding another rail bridge onto Terminal Island, and double tracking access to POLA West Basin. The 2030 results are expected to test the capacity of Alameda Corridor itself. The limits of the modeled rail network extend from the lines feeding the north end of the Alameda Corridor, through the Corridor and all tracks in the Port. The current modeling effort is not intended to analyze the capacity of the mainline north and east of the Alameda Corridor, but this is an important exercise that should be conducted by the railroads or a governmental agency.

2.3 Roadway System Analysis

The remaining 50% of cargo (not transported by rail) must be transported by truck on local and regional roadways. The Transportation Master Plan provides an analysis of the San Pedro Bay Ports roadway system as well as surrounding regional roadways and highways. The efficient movement of goods on the roadway system is directly affected by cargo growth, terminal operations, truck traffic distribution, roadway capacities and other roadway users.

The roadway system analysis is accomplished through application of a truck trip generation model (Quicktrip), a regional travel demand model (TRANPLAN), traffic engineering capacity analyses at the link and intersection levels of detail, and corridor simulation modeling to provide programmatic analysis of combined roadway elements (Synchro). The goal of the analysis is to predict the distribution of traffic onto the highway system and to identify elements in the system that is deficient to accommodate the predicted traffic. The subsequent discussion of the roadway analysis covers the following topics:

- Trip Generation
- Trip Distribution (Route) Choice
- Level of Service (LOS) Analysis

Trip Generation

The truck trip generation analysis considers cargo growth, rail/truck transportation mode split, terminal operations, and truck dispatch operations. The Cargo growth forecast and mode split analysis that were described in Section 2.1 apply to the trip generation analysis. An overview of the terminal and truck dispatch operations is presented below.

Trucks are generated by marine terminals that import containers (leaving the terminal) and export containers (arriving to the terminal). The marine terminal operating characteristics have a significant impact on truck traffic generations. These operational parameters include gate hours of operation per day of week, truck appointment system, volume of dual moves (trucker brings a container and also hauls a container away), empty container management (utilization of “virtual container yard” or “inland empty depots”). The marine terminal operating characteristics are analyzed using a model, QuickTrip. Quicktrip was used to evaluate a range of truck reduction strategies and the resulting truck generation functions are used as input to other transportation modeling efforts.

QuickTrip is a spreadsheet model that estimates truck trips generated by port container terminals. *Model inputs* include annual throughput; the split of imports, exports, empties and on-dock intermodal rail containers; and terminal operating procedures. The model provides for a selection of arrival and departure curves to represent truck arrival/departure patterns every fifteen minutes of the day for week days and weekends. The QuickTrip model is used as a tool in this Transportation Master Plan to calculate truck trip generation associated with the forecast throughput and to test strategies to reduce peak traffic volumes. Strategies that would reduce truck trips include:

1. Increasing the intermodal rail transportation.

2. Improving trucker dispatching to link drop-off and pick-up for dual-moves that reduce the number of bobtail trips.

3. Developing an inland empties depot so that import containers that are delivered locally in areas such as the Inland Empire can be marshaled and either provided to a local exporter for use as an export load container, or returned to the port via rail.

4. Developing a virtual container yard to register exporters needing empty containers and put them in touch with importers who have emptied their containers; thereby, avoiding trips to the marine terminal.

Other strategies can be used to reallocate truck trips to hours when regional roads are used less intensively (non-peak traffic times of day). Strategies that would reallocate truck trips to off-peak hours of the day include:

1. Extending gate hours to include night and hoot shifts.

2. Providing weekend hours for freight pick-up and delivery.

3. Providing and managing an appointment system, which would help to spread traffic out over the day and to avoid peak periods of highway congestion, and avoid random peaking of truck arrivals.

Efficient transportation requires that truckers be resourcefully dispatched through utilization of marine terminal appointment systems, planning to increase dual-moves, and use of empty container management systems.

Trip Distribution (Route) Choice

Trip distribution and specific route choices affect where trucks travel on the roadway system. The origins and destinations of port cargo are a primary factor in the analysis of trip distribution. Origins and destinations are determined from cargo data, trucking company data and truck driver surveys. Truck driver surveys are also valuable in obtaining route choice information. The primary method of determining trip distribution is application of a travel demand model to select the optimum distribution of traffic onto the roadway system. This model considers volumes of traffic generated by port terminals, inland origins and destinations, physical characteristics of the roadway network, specific route choices and background traffic. An overview of the travel demand model development and application is presented below.

Port Area Travel Demand Model Development and Application: The roadway facilities in and around the Port area are assessed using a fully dynamic travel demand-forecasting (TDF) model that is generally based on the Southern California Association of Governments' (SCAG) Regional Travel Demand Forecasting Model. Elements of the SCAG Heavy Duty Truck (HDT) model were used, as well as input data from the City of

Long Beach model and the City of Los Angeles Transportation Improvement Mitigation Program (TIMP) models for Wilmington and San Pedro. TRANPLAN is the software platform used for modeling.

The purpose of the Port area model is to forecast distribution of truck and automobile trips in and around the Port area, based on growth projections in Port throughput combined with regional growth projections. The model produces forecasts on the highway network (both freeways and surface arterial streets) for several vehicle types including port autos (auto trips with an origin or destination in the Port such as employees or visitors), non-port autos, bobtail trucks, container trucks, trucks with chassis, flatbed trucks and other vehicles.

The SCAG Regional Model is the basis and “parent” of most sub-regional models in the southern California five-county region, comprised of Ventura, Los Angeles, Orange, San Bernardino, and Riverside counties. At the regional level, this model has the most comprehensive and up to date regional data –for both existing and future conditions- on housing, population, employment, and other socio-economic input variables used to develop regional travel demand forecasts. The current horizon year for the regional model is 2030. For purposes of sub-regional transportation analysis, the SCAG model provides the most comprehensive and dynamic tool to forecast the magnitude of trips and distribution of travel patterns anywhere in the region. However, by virtue of its design and function, the Regional Model is not (and cannot be) very detailed and precise in any specific area of the region, such as Port Los Angeles focus study area. Therefore, the regional model was comprehensively updated and detailed in the Port focus area. The Port model focus area is generally bounded by State Route 91 to the north, the Pacific Ocean to the west and the Los Angeles/Orange County line to the east.

The following major refinements were made to the regional model to provide accurate local area traffic forecasting capabilities for the San Pedro Bay Ports:

- Roadway network refinements to the local roadway system and the freeway system in the focus area. Every roadway, including all local roads in the Port area, were added to the model.
- Traffic model zone system refinement in the focus area to develop much smaller and more discrete zones and loading points. Every container terminal was coded as a traffic zone, as well as many of the larger non-container terminals.
- Trip generation refinements to provide more accurate assignment of special generator trips such as those in downtown Long Beach and San Pedro.
- Development of highly detailed port network and zone system to provide localized accuracy in the port focus area.
- Several network modifications are implemented including: link capacity enhancements, truck prohibitions, and incorporation of truck PCE factors.

Coding of Highway Grades and Reduced Capacities. Locations of steep uphill and downhill grades, including the Gerald Desmond and Vincent Thomas Bridges were accounted for and coded to the network.

Daily trip tables from all different types of trips were divided by SCAG's AM, PM, midday and off-peak periods. Daily to period conversion factors were derived from the SCAG model to develop peak period to peak hour conversion factors. These factors were developed and modified to achieve the best model validation results. The model resulted in unique hourly trip tables for the AM (8 to 9 AM), mid-day (2 to 3 PM) and PM (4 to 5 PM) peak hours. This port area travel demand model is a tool of the roadway system analysis that provides necessary information on trip distribution and specific route choices within the study area.

Level of Service (LOS) Analyses

Level of service is the third component to the roadway system analysis. Two mechanisms used to determine level of service are TRANPLAN, a modeling program and Synchro, corridor simulation software.

> ***TRANPLAN:*** TRANPLAN, the same model, used in the previous section to generate travel demand, also generates a series of analyses including intersection level of service, link-based level of service, freeway weaving section and ramp conditions, and other elements to determine future operating conditions in the Port and surrounding area. The results of the level of service analyses are used to determine roadway deficiency locations and to test potential improvements to accommodate both Port and regional traffic growth.
>
> ***Corridor Simulation***: In addition to traditional traffic engineering LOS analyses, the Transportation Master Plan has employed corridor simulation to analyze areas with complicated interaction between elements of the roadway network.

Specific corridors with multiple infrastructure elements can be modeled and analyzed using the Synchro software package. The model was developed to accurately portray a corridor for purposes of simulating current traffic flows as well as identifying potential intersection and roadway operational conditions due to growth at the Port container terminals, changes to gate operations and regional growth. Synchro enables detailed analysis and on-screen visual simulation of traffic flow at intersections and on roadway segments. Key input parameters such as roadway geometric information (number of lanes, length of turn bays, distance between intersections and speed limits) and traffic data (entry volumes, truck percentages, origin-destination patterns, signal timing and phasing) are input into the Synchro software to accurately simulate corridor traffic conditions. The model explicitly accounts for the impacts of trucks in the traffic stream by applying a Passenger Car Equivalent (PCE) factor that estimates the capacity used by large trucks as opposed to autos. The traffic conditions that are used in the simulation model are derived from the Port of Los Angeles travel demand model (TRANPLAN).

As part of this work, the West Basin Corridor area was modeled for existing and future traffic operations. Several alternatives were developed for proposed roadway and intersection improvements. The simulation provided a graphical representation of the potential traffic flows and truck queues as a result of the improvements. The model results were analyzed to include average queue lengths, computed traffic delay and intersection delays along streets in the West Basin corridor. These results were translated into level of service (LOS) grades based on the Highway Capacity Manual

(HCM) methodology. Resulting outputs were used to evaluate and recommend a set of ramp, roadway and intersection improvements that would best eliminate deficiencies and provide good service levels.

In Summary, the transportation system analysis includes planning for projected cargo growth, predicting the flow and distribution of cargo traffic, and analyzing, developing and evaluating transportation improvements. In support of that, we analyzed three main components of the transportation system: cargo flow (global trade and inland transportation modes), rail system (including demand, capacity and expansion) and roadway system (trip generation, trip distribution, level of service). The analytical results identify deficiencies in the system and provide the necessary information to make informed recommendations for transportation improvements.

3.0 TRANSPORTATION DEVELOPMENT PROCESS

The Port-wide Transportation Master Plan requires analysis of the rail and roadway systems as described in Section 2.0 of this paper. However, the results of that effort would have little value if there were not a follow-on process. After performing the transportation analysis, the critical elements of the process include:

- Develop transportation improvement concepts
- Conduct community/stakeholders outreach process
- Evaluate improvement concepts
- Implement improvement concepts

This process has already been applied to selected transportation improvement concepts that demonstrated a clear and present need. The steps of this process are iterative, whereby concepts are developed and modified based on input from the community, stakeholders or reviewing agencies. The concepts are also modified based on findings of the evaluation process, environmental permitting process and design process. As concepts evolve, continued community outreach, stakeholder involvement and agency coordination is important to the success of the implementation.

3.1 Develop Transportation Improvement Concepts

As deficiencies are identified during the analysis of the rail and roadway systems, concepts to alleviate those deficiencies must be developed. These concepts are developed with consideration for impacts on adjacent communities, land opportunities and constraints, and regulations of agencies such as Caltrans (for roadways) and California Public Utilities Commission/Federal Railway Administration (for rail).

Concepts have been developed for twenty rail yard expansion projects and another twenty rail access infrastructure projects, which are specifically designed to improve train performance and reduce train delays. These concepts are currently being tested with the RTC simulation model to verify their benefits and make adjustments as necessary. The conceptual designs meet all applicable agency requirements and are intended to minimize community impacts.

Roadway concepts are in the process of being developed to address deficiencies identified by the analysis of local roadways. The concepts are evaluated using standard traffic engineering techniques as described in the Highway Capacity Manual, as well as through application of corridor simulation that allows analysis of multiple concepts and their interactive performance. As these concepts are developed, the Port of Los Angeles has been proactive in meeting with Caltrans to review the proposed projects, since most have at least a peripheral affect on facilities under Caltrans' jurisdiction. The conceptual designs meet all applicable agency requirements, although some elements will require design exceptions to standard policy; but, these are supported by Caltrans at the district level. The concepts are intended to minimize community impacts. Extensive community involvement has taken place to ensure this fact, as described in the following section.

3.2 Community/Stakeholder Outreach Process

The Port of Los Angeles Port-wide Transportation Master Plan has implemented a highly beneficial community process that incorporates existing community outreach programs with project specific outreach, resulting in a transparent master plan development process.

The first element of community outreach is interaction with the Port Community Advisory Committee (PCAC). The Port has worked closely with the PCAC Traffic Subcommittee and Wilmington Waterfront Development Subcommittees. Through these groups, PCAC receives regular status reports on the activities of the Transportation Master Plan and contributes comments and suggestions.

Hosting public workshops on transportation is an essential element of the Transportation Master Plan outreach program. Initial workshops were conducted to discuss general transportation issues and garner public input on the development of the Transportation Master Plan. Subsequent project specific workshops have been conducted to present conceptual transportation improvements and garner comments. The workshops have received spirited input from the community and have been highly productive in guiding the Transportation Master Plan concept development. The Port has received widespread appreciation from the community for this workshop program.

The Transportation Master Plan has also initiated a Transportation Website to assist with informing the public and providing an additional avenue for contributing comments. The website automatically generates email to registered users when an update is made to the contents, including new notice of upcoming events, new Transportation Master Plan status information or new concepts posted on the website.

Presentations to the surrounding communities, neighborhood councils and meetings with project stakeholders including community leaders, port tenants, railroads, and other cargo users are also conducted to share information and obtain feedback on the development of the Transportation Master Plan.

3.3 Evaluation/Metrics

Conceptual plans that are developed in response to deficiencies identified in the transportation system must be evaluated to determine their programmatic benefits to Port operations, neighboring communities and the public at-large. Evaluation metrics are applied to the conceptual plans with the goal of selecting transportation improvements that achieve the Port's objective of efficiently handling cargo throughput while minimizing environmental impacts. Evaluation metrics are divided into two categories, Feasibility and Environmental Impacts, as described below.

Evaluation Metrics

Feasibility Metrics:

- Transportation system capacity
- Community/stakeholder concensus
- Constructability/Sustainability
- Financial feasibility

Environmental Impact Metrics:

- Truck miles and hours traveled
- Truck queuing
- Terminal operations
- Equipment emissions characteristics
- Other environmental impacts

Feasibility Metrics:

- Transportation system capacity – e.g. transportation system's ability to efficiently handle the projected cargo volumes
- Constructability – e.g. engineering issues in constructing infrastructure, property acquisition, phasing requirements to accommodate existing operations and construction access
- Sustainability – e.g. compatibility with adjacent land uses, preservation of open land, conservation of resources and protection of habitat
- Financial feasibility – e.g. capital costs, operating costs, funding sources, revenue and rate of return on investment
- Community and stakeholder concensus – e.g. concept is aligned with current concensus

Environmental Impact Metrics:

- Truck miles and hours traveled – reduction of this metric will reduce traffic congestion and air emissions
- Truck queuing – has potential to improve trucker's quality of life, improve terminal operations, reduce operating costs, reduce traffic congestion and reduce air emissions
- Terminal operations – efficiency will benefit cargo throughput, reduce operating costs and reduce traffic congestion
- Truck and terminal equipment emissions characteristics – fuel type and engine features can have a significant affect on air emissions
- Other environmental impacts – e.g. noise, aesthetics, geology/soils, water quality, biological resources, cultural resources, recreational resources.

Conceptual plans that rank highly based on these evaluation metrics will have the best opportunity to provide a balance of efficient cargo transport with reduced community impacts. The concepts should be responsive to community input since these neighbors have a personal understanding of the traffic conditions and local impacts that may occur.

3.4 Implementation

The Port of Los Angeles needs to remain focused on planning efficient transportation systems and implementing improvements through a process including agency coordination, regulatory compliance and sustainable design. Many projects have become critical due to extended environmental permitting processes and the actions of environmental activists. Quality of life issues must be rationally analyzed to balance economic and environmental impacts. Financial analysis of the project costs and funding mechanisms need to ensure the Port is acting with fiduciary responsibility. Implementation of proposed improvements should proceed in order to ensure environmental and economic benefits. Inaction is likely to cause significant negative impacts.

Agency Coordination/Regulatory Compliance

Successful planning and implementation of transportation projects requires agency coordination and regulatory compliance at all stages of the project. Appropriate agencies should be included early in the conceptual development, and coordination must continue throughout the environmental process, design and construction.

Public funding requests need to be coordinated with the proper agencies through early communication, applications and meetings.

Sustainability

The Transportation Master Plan improvement concepts incorporate sustainable design practices. Sustainable design, construction, and operational practices should include: efficient transportation programs; LEED® building standards; recovery and on-site reuse of construction waste; storm water quality management; air quality management; use of locally available green materials, supplies and energy sources; waste reduction; and energy and water conservation. Sustainable design also includes the principles of Smart Growth, as described below.

Smart Growth: The urban location of port facilities makes new goods movement development challenging since new and expanded corridors and facilities will come into conflict with adjacent land uses. The problem posed by this conflict can be addressed by the principles of smart growth and green corridor design. Such principles are defined in the resolutions adopted by the California Senate and Assembly (HR-23 and SR-12, 1999):

1. Plan for the Future: Preserve and enhance California's quality of life, ensure the wise and efficient use of our natural and financial resources…

2. Promote Prosperous and Livable Communities: Make existing communities vital and healthy places for all residents to live, work, obtain a quality education and raise a family.

3. Provide Better Housing and Transportation Opportunities: Provide efficient transportation alternatives and a range of housing choices…

4. Conserve Open Space, Natural Resources and the Environment: Focus new development in existing communities and areas appropriately planned for growth, while protecting air and water quality, conserving wildlife habitat, natural landscapes, floodplains and water recharge areas. Provide green space for recreation and other amenities.

5. Protect California's Agricultural and Forest Landscapes: Protect California's farm, range and forest lands from sprawl and the pressure to convert land for development.

Green Freight Corridor Design at the Port of Los Angeles emphasizes buffer zones between goods movement infrastucture and adjacent community land uses. The Green Corridor should also connect communities to regional bike paths, trails, parks and public spaces.

The Port of Los Angeles is working to incorporate each of these sustainability practices into all aspects of Port development and operations. An excellent example of these sustainable practices (including Smart Growth and Green Freight Corridor Design) can be found in the Trapac Terminal Expansion and Harry Bridges Boulevard project. This project has evolved, through extensive community involvement and application of sustainable design, to have the following characteristics:

- Large buffer zone along entire length of Harry Bridges Boulevard, which serves to separate both terminal operations and truck traffic on Harry Bridges Boulevard from the adjacent Wilmington community.

Wilmington Waterfront Conceptual Development – depicting green space buffer zones, pathways and trails

- The buffer zone along Harry Bridges Boulevard provides open space and access to regional bike paths, trails, parks and public spaces.

- Truck access to Trapac and other port facilities in the vicinity are made efficient with improved traffic flow, through the Fries Avenue Grade Separation and by reconfiguration of the Trapac truck gate. This improves the existing traffic flow through closely spaced intersections and avoids impacts of at-grade rail crossings.

- The project is closely coordinated with community plans to develop a commercial waterfront development. Public access to the waterfront development is protected.

- Design is conforming to sustainability criteria.

4.0 CONCLUSIONS

4.1 Purpose and Need

The Port of Los Angeles Port-wide Transportation Master Plan is meeting a critical need. The San Pedro Bay Ports not only serve as the nation's primary gateway for international cargo, but they are an economic powerhouse that directly affects the quality of life for residents in the neighboring communities, the region and throughout the country.

Goods movement in an urban environment will cause environmental and quality of life impacts due primarily to traffic congestion and diesel emissions. These transportation issues along with the need to provide an efficient goods movement system are addressed by the Transportation Master Plan. The challenge is to provide a system that will efficiently handle the forecast cargo flow, which generates substantial economic benefits, while minimizing environmental impacts.

Environmental impacts must be evaluated from a regional perspective, as well as a local perspective. A concept that benefits the region, but causes significant impacts to a local community may be guilty of environmental injustice. Such a concept should be modified to reduce impacts to the local community.

The cargo growth forecast for San Pedro Bay presents a challenge due to the significant increase in container throughput that would be accommodated by the transportation system. The Transportation Master Plan is analyzing impacts of the future cargo volumes and recommending improvements to the transportation system that will be required to accommodate the cargo. These improvements include expanded rail yards, improvements to the rail network infrastructure, roadway infrastructure improvements and operational improvements.

4.2 Transportation System Analysis

The Transportation Master Plan provides analysis of the cargo flow to determine the volume of cargo and the mode of transportation. The volume of intermodal cargo dictates the required capacity of intermodal yards and rail network infrastructure. The remaining cargo is transported by trucks, which set the roadway demand. The objectives of this planning study are to understand the implications of international goods movement as it relates to the port transportation system, and develop and evaluate transportation improvements to address those implications, while minimizing impacts on surrounding communities. The Port of Los Angeles has a powerful set of tools available to develop transportation improvements, including:

- Long-term Cargo Forecast
- MPC - Intermodal Rail Yard Capacity Model
- RTC - Rail Traffic Simulation Model
- QUICKTRIP - Port Truck Generating Model
- TRANPLAN - Regional Travel Demand Model
- SYNCRO - Corridor Simulation Model

These tools have been described herein and provide all the necessary analytical capability to plan transportation improvements that provide an efficient goods movement system while minimizing environmental impacts.

4.3 Transportation Development Process

After an in-depth analysis of cargo volume and the Port's transportation system, the process towards developing an efficient transportation system proceeds. The following summarizes the effort required to continue the Transportation Development process:

- Develop transportation improvement concepts
- Conduct community and stakeholder outreach and respond with concept refinements
- Evaluate concepts using metrics aimed at efficiency and reduced environmental impacts
- Develop financial analysis and funding mechanisms
- Implement improvements through a process including agency coordination, regulatory compliance and sustainable design.

4.4 Transportation Master Plan Status

Currently, the Port of Los Angeles' Transportation Master Plan has made significant progress with both the transportation system analysis and development process.

Transportation System Analysis Status

- Cargo flow analysis of intermodal and local goods movement
- Rail yard capacity and throughput projections for incremental years through 2030
- Rail network infrastructure capabilities for incremental years through 2030
- Determination of the truck/rail mode split in 2030

- Existing and future roadway capacities determined through the use of trip generation, distribution (route choice), and Level of Service analyses.

Transportation Development Process Status

- Conceptual design of selected infrastructure improvements
- Community outreach for general transportation plan and selected infrastructure improvement projects
- Corridor analysis of infrastructure improvements in the SR-47/I-110 corridor
- Caltrans/LA DOT coordination to review initial concepts for the SR-47/I-110 corridor
- Funding strategies and applications for selected infrastructure improvement projects
- Environmental process (CEQA/NEPA) for selected infrastructure improvement projects
- Sustainable/Smart Growth/Green Corridor Design principles applied to Trapac/Harry Bridges Boulevard project.

4.5 Next Steps

In summary, the Transportation Master Plan's primary purpose is to plan for projected cargo growth, predict the flow and distribution of cargo traffic, analyze, develop and evaluate transportation improvements. The Port is continuously reviewing and analyzing cargo flow and volumes in order to understand the implications of international goods movement as it relates to the port transportation system. The Port uses this understanding to develop and evaluate transportation improvements to provide efficient cargo flow, while minimizing impacts on surrounding communities.

The next step is to integrate this planning effort with the Port's Strategic Plan, Facilities Plan and Master Plan. The Transportation Master Plan is an important element that takes a comprehensive proactive approach to addressing the environmental and economic impacts of continuing cargo growth on the quality of life for the surrounding communities, the region and the nation.

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Acknowledgements

The authors would like to acknowledge the valuable contributions to the Transportation Master Plan by the following individuals:

Stacey Jones, PE, Port of Los Angeles

David Walsh, PE, Port of Los Angeles

Michael DiBernardo, Port of Los Angeles

Merilee Hatfield, Project Control Consulting, Inc. (PCCi)

Michael Christensen, PE, Parsons Transportation Group

Larry Weseman, PE, Parsons Transportation Group

Tony Velasquez, PE, Parsons Transportation Group

Larry Nye, PE, Moffatt Nichol

Carlo Luzzi, PE, Port of Long Beach

Kerry Cartwright, PE, Port of Long Beach

Gill Hicks, Gill V. Hicks & Associates