2. The Goods Movement System

The goods movement system in the South Bay is a major component of Southern California's economic success. Its seaports, airports, roadways, railroads, intermodal facilities, and warehousing and distribution facilities are components of a large, complex system through which tons of freight, worth billions of dollars, are moved every day. The size and diversity of this system allows goods to easily switch to alternate methods, modes, and schedules to meet changing demands.

While individual shipments of goods are moved through the system in an efficient manner, the full spectrum of goods movement, and the interaction of individual components, is bewildering. It is difficult for decision makers to make infrastructure investment choices given the complexity of goods movement and its sensitivity to economic forces.

It is important to know the difference between commercial and passenger uses of the transportation system. Roadways serve two transportation systems simultaneously, one for passengers and one for goods movement. Despite this, decisions about major transportation improvements are generally based on passenger needs. Traditional methods of traffic impact analysis focuses on passenger trips, and cannot be used when studying goods movement because:

Goods movement uses the system in different ways

- The speed of trucks and freight rail is more limited than passenger equivalents
- Trucks are restricted to certain roadways and generally to the right two lanes of highways
- Trucks have different travel patterns than passenger trips, and in general do not have as high peak demands (morning and evening commute periods)
- Freight uses the transportation system for commercial reasons and require comparatively more reliability than passenger vehicles

Goods movement affects the system in different ways

- Trucks and freight trains are longer and slower than their passenger counterparts
- Trucks have a disproportionate impact on pavement deterioration

Goods Movement in the South Bay

Goods movement in the South Bay is conducted for local pickup and delivery services, domestic trade to other regions, and international trade through one of the South Bay's trade gateways.

The Commodity Flow Survey, compiled by the U.S. Bureau of Transportation Statistics, produces data on the movement of goods in the United States. It provides information on commodities shipped, their value, weight, and mode of transportation. The last survey for the Los Angeles–Long Beach–Riverside Consolidated Statistical Area was completed in 2002.

The Table 11 describes which mode of transportation is used to move the domestic and foreign goods within the Los Angeles region. The data is compiled for the Los Angeles-Long Beach-Riverside consolidated statistical area for 2002. Data is not available for all

air freight, however most air freight originating or destined for Southern California is trucked to/from Los Angeles International Airport and Ontario International Airport. As part of this study, Los Angeles World Airport staff members were interviewed to obtain the best available data for air cargo movements.

Table 11
Modes used for Goods Movement in the Los Angeles Region

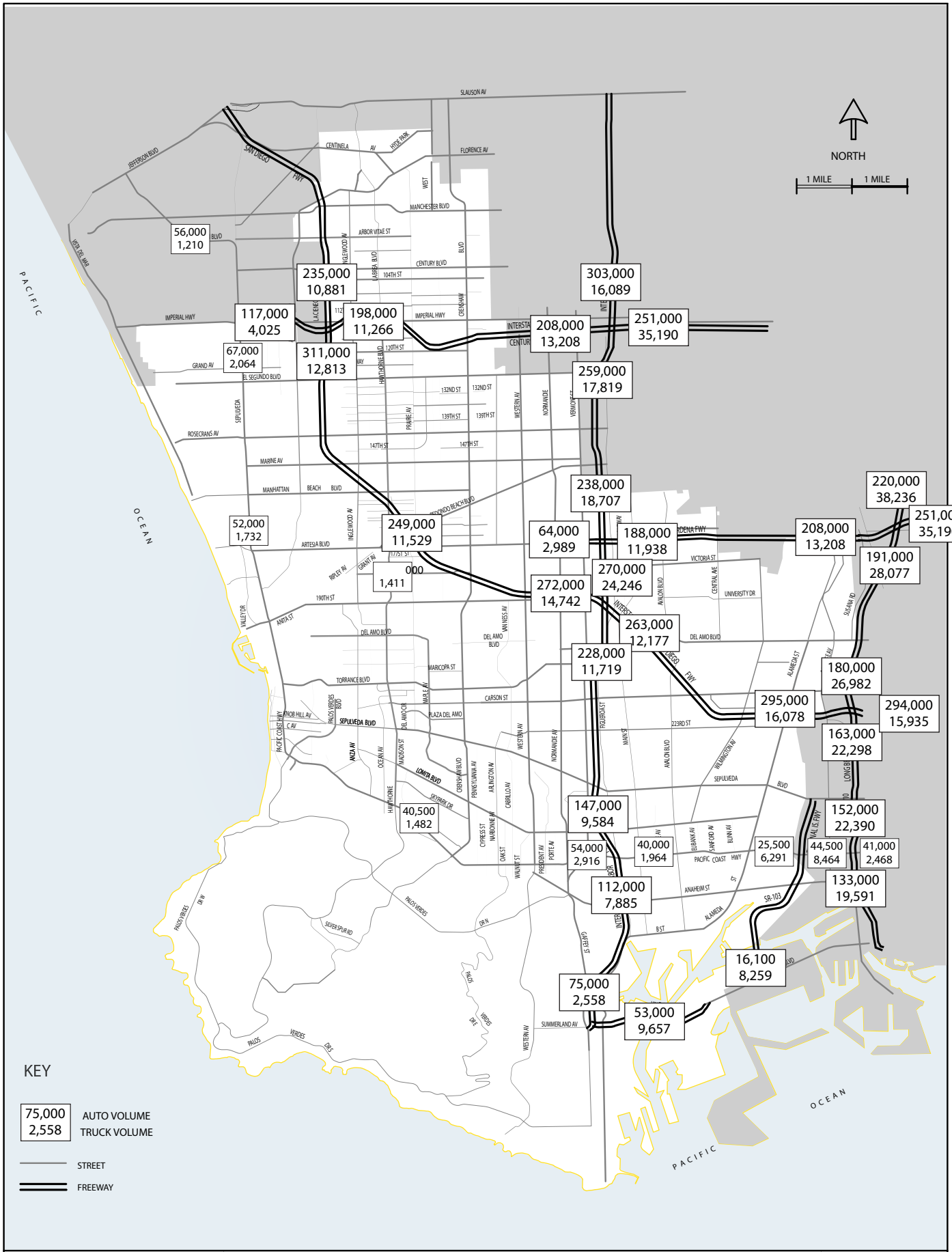
Mode	Total Tons	Percent of Total Tons
Air & Truck	483	0.1%
Other Intermodal	4,667	0.6%
Pipeline & Unknown	136,202	17.8%
Rail	37,910	5.0%
Truck	574,942	75.2%
Truck & Rail	5,082	0.7%
Water	5,064	0.7%

Nearly all of the freight in the Los Angeles Region is moved by pipeline and truck. Rail and intermodal freight serve the ports, with some bulk service as discussed in Section 2.2.2. Because this data was collected before the opening of the Alameda Corridor, it does not account for the shift of container traffic to/from the ports from truck to rail. However, because the ports account for only a portion of the truck trips in the region (13.5 percent according to the 2002 Commodity Flow Survey), trucks will continue to be the primary mode of goods movement in the South Bay.

The following narrative is intended to cast the transportation infrastructure of the South Bay in goods movement terms so that improvements to accommodate or mitigate goods movement can be inventoried and evaluated.

2.1 Roadways

The South Bay's roadway infrastructure is dominated by a grid arterial pattern, much like the rest of the Los Angeles Basin. Many north/south and east/west arterial roadways cross multiple cities and serve regional, as well as local traffic. Two major freeway facilities serve the majority of South Bay Cities: Interstate 110 (Harbor Freeway) and Interstate 405 (San Diego Freeway). Two other freeways, State Route 91(Gardena Freeway) and Interstate 105 (Century Freeway), originate in the South Bay. State Route 47 (Terminal Island Freeway) is located in Wilmington, and connects the POLA with Sepulveda Boulevard. While Interstate 710 (Long Beach Freeway) is not located within the South Bay, its close proximity, and importance to goods movement, make it an important freeway facility for the South Bay. Caltrans data on 2005 auto and truck average daily traffic volumes for the Interstate and state highways of the South Bay are shown in Figure 18.



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2005 Caltrans Average Daily Traffic
for Autos and Trucks

Figure
18

2.1.1 Freeways

For graphics illustrating auto and truck average daily traffic for each South Bay Freeway, refer to Appendix A.

Interstate 110 (Harbor Freeway)
Interstate 110 originates at the west end of the port area in San Pedro, and terminates in Pasadena. It passes through the South Bay communities of San Pedro, Wilmington, West Carson, Harbor Gateway, and Carson. According to 2005 Caltrans data, average daily truck traffic is approximately 2,500 at its beginning at Interstate 110, about 12,000 south of Interstate 405, about 25,000 between Interstate 405 and State Route 91, and about 18,000 north of State Route 91. Interstate 110 is a eight-lane facility south of State Route 91, and a ten-lane facility north of State Route 91. The South Bay portion of Interstate 110 includes a significant truck volume proportion at the Interstate 405 interchange.

Interstate 405 (San Diego Freeway)
Interstate 405 bisects the South Bay from the northwest to southeast through Inglewood, Lennox, El Segundo, Hawthorne, Redondo Beach, Lawndale, Torrance, Harbor Gateway, and Carson. Because of its central location within the South Bay, it is how most South Bay travelers access the regional freeway system. According to 2005 Caltrans data, average daily truck traffic is about 12,000 to 15,000 on Interstate 405 as it passes through the South Bay. Interstate 405 is a twelve-lane facility for most of its length through the South Bay.

Interstate 710 (Long Beach Freeway)
Interstate 710 serves the largest portion of port-related truck trips due to its origin in the port area and connection to intermodal transfer facilities located in Los Angeles, Commerce, Industry, and Riverside and San Bernardino Counties. According to 2005 Caltrans data, the average daily truck traffic on Interstate 710 is about 20,000 near the ports, about 25,000 north of Interstate 405, and about 40,000 north of State Route 91. Port specific data indicates higher truck volumes near the port, closer to 30,000 trucks north of Ocean Boulevard. Interstate 710 is eight-lanes south of Interstate 405, ten-lanes south of State Route 91, and twelve-lanes south of Interstate 105.

Interstate 105 (Century Freeway)
Interstate 105 was the last major highway constructed in Southern California, opening in 1993. Interstate 105 provides an east-west route to serve Los Angeles International Airport and connects Interstate 405 near El Segundo with Interstate 605 in Norwalk. According to 2005 Caltrans data, average daily traffic on Interstate 105 is about 115,000 west of Interstate 405, 200,000 east of Interstate 405, and 250,000 east of Interstate 110. Interstate 105 is an eight-lane facility.

State Route 91 (Gardena Freeway)
State Route 91 originates as Artesia Boulevard in Gardena, and becomes a freeway east of Interstate 110. It is the major east/west freeway route to Riverside from South Los Angeles County. According to 2005 Caltrans data, its average daily truck traffic is about 64,000 west of Interstate 110, about 190,000 east of Interstate 110, and about

250,000 east of Interstate 710. State Route 91 is a ten-lane facility, east of the Interstate 110 ramps.

State Route 47/ 103 (Terminal Island Freeway)
State Route 47/103 begins at Interstate 110 in San Pedro as State Route 47, and ends at Sepulveda Boulevard in Wilmington as State Route 103. From Interstate 110, State Route 47 crosses the Vincent Thomas Bridge to Terminal Island, and connects to Ocean Boulevard. State Route 47 continues one mile east, where it intersects Ocean Boulevard and crosses over the Cerritos Channel on the Commodore Schuyler F. Heim Draw Bridge. At Henry Ford Avenue, State Route 47 becomes State Route 103 and has interchanges at I Street and Pacific Coast Highway before its termination at Sepulveda Boulevard The Intermodal Container Transfer Facility (ICTF) is located along Sepulveda Boulevard, adjacent to the terminus of State Route 103. According to 2005 Caltrans data, its average daily truck traffic is about 105,000 at Interstate 110, about 94,000 at Harbor Boulevard, and about 32,200 at the Heim Bridge. State Route 47 is a four-lane facility on the Vincent Thomas Bridge, a six-lane facility along Ocean Boulevard, and mostly a four-lane facility over the Heim Bridge to its terminus at Sepulveda Boulevard

2.1.2 Arterials

Arterial roadways serve every industrial area in the South Bay, and connect these areas to the freeways and ports. The major arterial roadways in the South Bay are:

North/South Routes

- Pacific Coast Highway/ Sepulveda Boulevard
- Aviation Boulevard
- Inglewood Avenue
- Hawthorne Boulevard
- Prairie Avenue
- Crenshaw Boulevard
- Western Avenue
- Normandie Avenue
- Vermont Avenue
- Figueroa Street
- Main Street
- Avalon Boulevard
- Wilmington Avenue
- Alameda Street
- Santa Fe Avenue

East/West Routes

- Centinela Avenue
- Manchester Boulevard
- Century Boulevard
- Imperial Highway
- Grand Avenue
- El Segundo Boulevard
- Rosecrans Avenue
- Marine Avenue
- Manhattan Beach Boulevard
- Redondo Beach Boulevard
- Artesia Boulevard
- Victoria Street
- 190th Street
- Del Amo Boulevard
- Torrance Boulevard
- Carson Street
- 223rd Street
- Sepulveda Boulevard
- Lomita Boulevard
- Pacific Coast Highway
- Anaheim Street

2.1.3 Truck Volumes in the South Bay

Truck Counts

As part of this study, traffic counts of autos and trucks were taken at fifteen locations in the South Bay on Thursday, April 12, 2007 for the midday (1:00 PM to 3:00 PM) and PM peak (4:00 PM TO 6:00 PM) periods. The truck count locations were chosen based on outreach to the South Bay Cities through surveys and meetings.

As the data shows in Table 11, within the South Bay, the midday peak period has more truck activity, both in absolute terms and as a percentage of total traffic, than the PM peak period. However, this is not true for all locations counted. Alameda Street in Carson and El Segundo Boulevard in Hawthorne had higher truck volumes in the PM peak hour, indicated that truck patterns vary depending on location, most likely due to varied operating practices of different industry segments.

Table 12
Midday and PM Peak Period Arterial Segment Counts

		Midday Peak 1PM - 3PM			PM Peak 4PM - 6PM		
City	Location	Truck	Total Vehicles	Percent	Truck	Total Vehicles	Percent
Carson	Alameda Street n/o Carson Street	623	1,905	32.7%	774	3,457	22.4%
Carson	Wilmington n/o Carson Street	550	2,717	20.2%	385	3,620	10.6%
Carson	Figueroa n/o 223rd Street	125	2,432	5.1%	83	2,846	2.9%
Carson	Avalon s/o University Drive	148	3,971	3.7%	96	5,589	1.7%
El Segundo	El Segundo Boulevard w/o Aviation	147	2,911	5.0%	89	3,917	2.3%
El Segundo	Sepulveda s/o Imperial Highway	347	8,436	4.1%	177	11,290	1.6%
Gardena	Rosecrans w/o Normandie	339	4,649	7.3%	232	5,903	3.9%
Gardena	Artesia Boulevard w/o Normandie	310	5,455	5.7%	213	7,249	2.9%
Hawthorne	El Segundo Blvd w/o Crenshaw Blvd	281	3,691	7.6%	416	5,121	8.1%
Los Angeles County	Sepulveda Boulevard w/o Vermont Ave.	230	5,806	4.0%	103	6,773	1.5%
Manhattan Beach	Sepulveda n/o Manhattan Beach Blvd.	137	6,735	2.0%	63	8,294	0.8%
Redondo Beach	Artesia Boulevard w/o Inglewood Avenue	145	4,477	3.2%	123	4,936	2.5%
Redondo Beach	Inglewood Ave. n/o Manhattan Beach Blvd.	180	6,595	2.7%	105	7,392	1.4%
Torrance	190th e/o Crenshaw Boulevard	173	4,377	4.0%	113	5,830	1.9%
Torrance	Torrance Boulevard w/o Hawthorne Blvd.	121	5,892	2.1%	63	6,164	1.0%
	Average	257	4,670	5.5%	202	5,892	3.4%

As shown, the average midday truck percentage (percent of total traffic that are trucks) is 5.5 percent, while the PM period truck percentage is 3.4 percent. Truck percentages up to approximately four percent are considered typical for an urban arterial roadway. During the midday period, eight locations had truck percentages of about four percent or less, five had from five percent to ten percent trucks, and two had more than twenty percent trucks. The two locations with very high truck counts are Alameda Street north of Carson Street (City of Carson) and Wilmington Avenue north of Carson Street (City of Carson). These two locations experience extremely high truck flows, consistent with their locations in a highly industrial/warehouse/distribution center district.

2.1.4 Truck Characteristics

The California container goods movement industry utilizes large, class 8 heavy-duty diesel-fueled vehicles,[4] with maximum capacities up to 80,000 pounds (truck and cargo). Trucks that operate at the ports for local or regional service are typically older models with high mileage,

[4] Class 8 vehicles are defined as having a gross vehicle weight of 33,001 lbs and over

and are generally much older than trucks used for long haul activities. After a vehicle accumulates 500,000 to 750,000 miles, it approaches the end of its useful life as a long-haul truck. Often, the truck is auctioned or sold to an owner that may utilize the vehicle for purposes other than long-haul activities, such as transporting containers.

Most port trucks are driven by owner/operators in an economically competitive business that generates low profit margins, with little ability to increase rates to cover the costs of complying with potential emission reduction strategies. Port truck owners arrange for business through dispatching companies, which in turn, contract with port terminals to transport containers or bulk cargo.

Considering annual operating costs such as fuel, maintenance, and mandated fees, truck drivers' annual pre-tax net earnings, which are essentially their wages, appear to average about $30,000. The low wages and difficult working conditions experienced by port truck owner/operators limits the supply of available port trucks to haul containers.

Truck Size and Vehicle Miles Traveled

In the past fifteen years, the average heavy-duty truck using the road system became longer and thereby carries more total weight. As shown in Table 12, vehicle miles traveled (VMT) for trucks in Los Angeles County with more than five axles increased by nearly 50 percent between 1989 and 2004, while VMT for all trucks increased by 23 percent.

Table 13
Daily Truck Total Vehicle Miles of Travel on the State Highway System of Los Angeles County

Year	2-Axle Trucks	3-Axle Trucks	4-Axle Trucks	5+ Axle Trucks	All Trucks	All Vehicles
1989	3,496,929	746,650	332,041	2,488,062	7,065,192	89,614,652
2004	2,661,488	765,912	262,726	3,714,537	7,405,381	109,767,690
Change	-23.9%	2.6%	-20.9%	49.3%	4.8%	22.5%

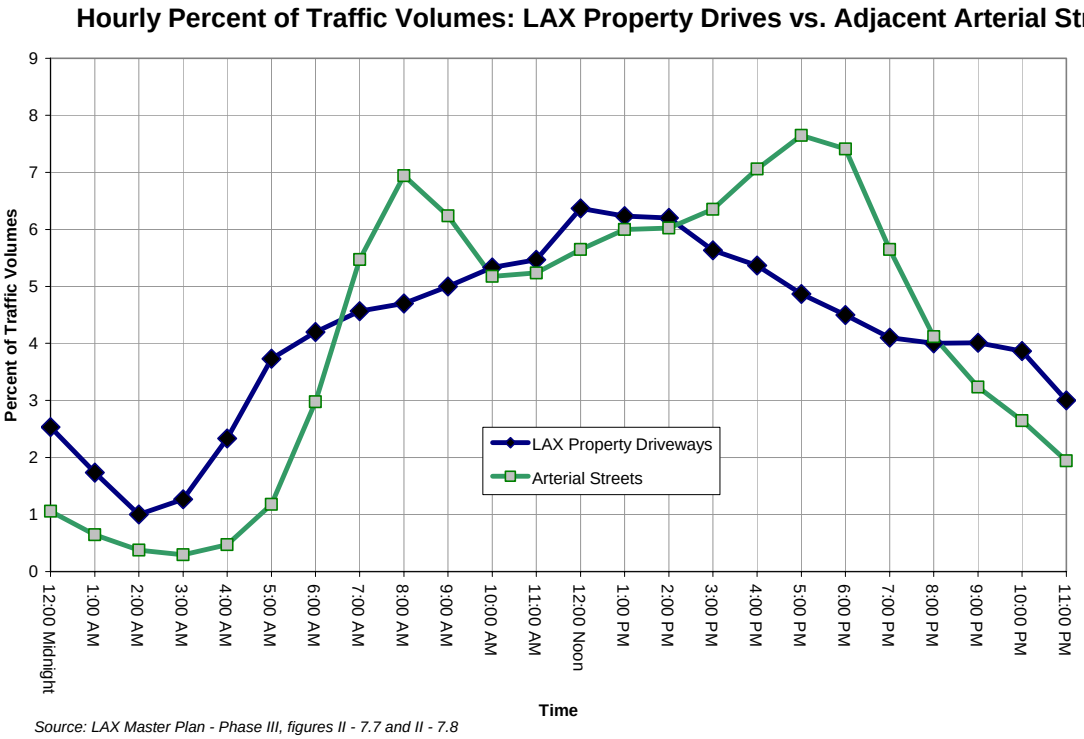
Source: Truck Miles of Travel, California State Highway System: 1989-2004
California Department of Transportation, Division of Transportation System Information, August 2006

The peak volume period for trucks is in the afternoon, however truck volumes are not as peaked as passenger trips, because truck travel and deliveries are spread throughout the workday as opposed to commute trips which are concentrated in windows of time.

Truck Travel Demand

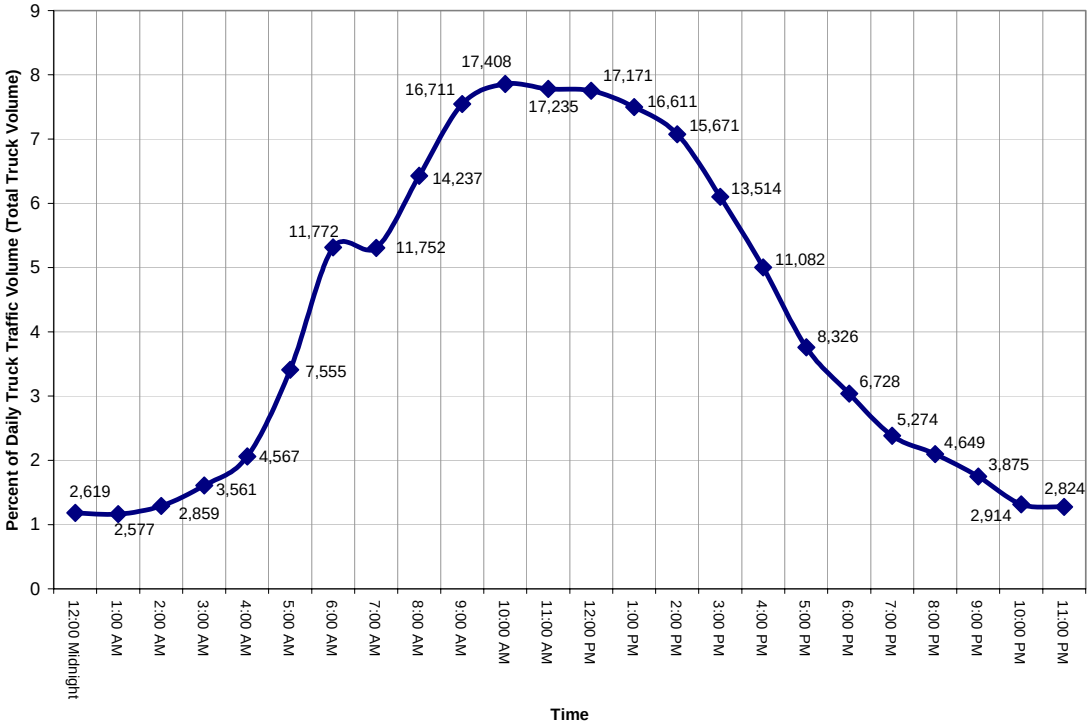
The travel demand of trucks on roadways has a different pattern as compared to passenger vehicles. While passenger cars have distinct AM and PM peak periods (the morning and evening commute times), heavy-duty trucks have more even travel demand over the course of the day with peak demand during the midday. Figure 18 demonstrates this with data from the LAX Master Plan comparing traffic volumes at LAX cargo-related driveways to traffic volumes on adjacent arterial streets. The SCAG Goods Movement Truck Count Study from 2002 indicates a similar pattern of truck travel demand as shown in Figure 19.

Figure 19



Source: LAX Master Plan - Phase III, figures II - 7.7 and II - 7.8

Figure 20
24 Hour Truck Volumes at Interstate 710 (Screenline #2) and Interstate 105 (Screenline #3) From the SCAG Goods Movement Truck Count Study (2002)



The traffic counts on selected South Bay arterials listed in section 2.1.3, reinforces the previous data collection of truck travel demand by demonstrating that truck trips were higher in the midday than the PM both in absolute terms (an average of 257 midday trucks vs. 202 PM trucks) and as a percentage of total traffic (5.5 percent of traffic in the midday and 3.4 percent of traffic

in the PM). While a significant amount of trucks are using roadways in peak commuter periods, these data indicate the truckers natural tendency to concentrate moves during off-peak hours when more trips can be made at higher speeds than during commute peak hours. To further encourage off-peak travel by trucks serving the ports, the Ports of Los Angeles (POLA) and Long Beach (POLB) began the PierPass OffPeak program. The previous data was collected prior to the start of the OffPeak program

Changes to Truck Travel Demand
PierPass is a program created by marine terminal operators to reduce congestion and improve air quality in and around the Ports of Los Angeles and Long Beach. This is accomplished by incentivizing shippers and receivers to have marine shipping containers picked up or dropped off during off-peak travel hours, including weekday evenings and weekends, and by funding the higher cost of evening and weekend terminal operations by charging a fee for container movement during peak travel hours.

The PierPASS OffPeak program uses a congestion pricing model that provides an incentive for cargo owners to move shipments at night and on weekends. Under the OffPeak program, all international container terminals at the Los Angeles and Long Beach ports implemented five new shifts per week -- Monday through Thursday from 3:00 AM to 6:00 PM, and 8:00 AM to 6:00 PM on Saturday. Cargo owners moving containers at the two ports during peak daytime hours are required to pay a Traffic Mitigation Fee, which helps fund the cost of operating five offpeak shifts per week at marine terminals. The fee is $50 per TEU (20-foot equivalent unit), or $100 for all containers larger than a 20-foot unit.

According to PierPass, its OffPeak program has diverted more than five million truck trips from peak daytime traffic since the program began in July 2005. In 2007 PierPASS estimates that up to 38 percent of all container truck trips to and from the ports will be diverted to OffPeak operation hours.[5] In comparison, the 2002 SCAG Truck Count Study screenline truck counts along Interstate 105 and Interstate 710 indicated that 18 percent of bobtails and 5+ axle trucks (the majority of trucks servicing the ports) were moved in the off-peak period.

2.1.5 Roadway Ordinances and Regulations

California Vehicle Code Sections Pertaining to Trucks
The California Vehicle Code (CVC) is the state level legislation that regulates trucks and the types of truck restrictions that can be implemented by local jurisdictions.

The CVC provisions provide for the following:

- Trucks are restricted to a 55 mile per hour speed limit
- Trucks are restricted to the two rightmost lanes unless otherwise designated
- Cities and counties may restrict the movement of vehicles over a maximum gross weight limit in residential districts, provided that appropriate signs are erected.
- Cities and Counties may not prohibit trucks from operating on any street when necessary for the purpose of making pickups or deliveries of goods.
- Counties may not restrict trucks on improved County highways unless to prohibit deterioration of such street (unless in a residential district).

For more detailed information about truck related California Vehicle Codes, see the Appendix.

[5] "PierPASS OffPeak Program Diverts 5 Million Trucks From Los Angeles Daytime Traffic," PierPASS, Inc. press release: May 7, 2007.

South Bay Cities Ordinances

South Bay Cities truck-related ordinances and regulations affecting trucks was gathered and compared. In the South Bay, there are a wide range of ordinances and regulations that pertain to trucks. A summary of the information that was gathered for South Bay Cities is shown in Table 14. As shown, most South Bay Cities identify truck routes for trucks over either 2,000 pounds or 6,000 pounds. Most South Bay Cities also have specified truck parking restrictions.

Table 14
Truck-Related Ordinance Information

City	Truck Related Ordinance Information
Carson	Truck Routes identified (over 6,000 lb)
	Parking restrictions identified (location and duration): conditional use permit required for loading and unloading within 100 ft of a residential zone; truck parking location and duration designated through signage
El Segundo	Truck Routes identified (over 2,000 lb)
	Parking restrictions not identified
Gardena	Truck Routes identified (over 2,000 lb)
	Parking restrictions identified (location and duration): truck parking for loading and unloading at yellow zone not exceeding twenty minutes
Hawthorne	Truck Routes and Zones identified (over 1,500 lb)
	Parking restrictions identified (location and duration): Trucking Intensive Overlay Zone (TIO) identified; truck parking for loading and unloading on any street and alley not exceeding one hour; permit required for loading and unloading at an angle to the curb
Hermosa Beach	Truck Routes identified (over 2,000 lb)
	Parking restrictions identified (location and duration): truck parking for loading and unloading not exceeding twenty minutes; truck parking on residential street not exceeding five hours
Inglewood	Truck Routes identified (over 2,000 lb)
	Parking restrictions identified (location and duration); truck parking for loading and unloading at loading zone not exceeding twenty minutes; truck parking on residential streets prohibited except for providing services to a property in the block where the vehicle is parked
Lawndale	Truck Routes identified (over 6,000 lb)
	Parking restrictions identified (location and duration): truck parking at residential zones not exceeding two hours with exceptions (necessary loading and unloading, performing services, construction, etc.)
Lomita	Truck Routes identified (over 6,000 lb)
	Parking restrictions identified (location and duration): truck parking at residential zones not exceeding two hours with exceptions (necessary loading and unloading, performing services, construction, etc.)
Los Angeles	Truck Routes identified (over 6,000 lb);
	Parking restrictions identified (location and duration): truck parking for loading and unloading at loading zone not exceeding fifteen and thirty minutes (depending on situation)
	Idling restrictions identified (location and duration): six tires, 10,000 lb restricted before 6:30am
Manhattan Beach	Truck Routes identified (over 2,000 lb)
	Parking restrictions identified (location and duration): truck parking for loading and unloading not exceeding twenty minutes
Palos Verdes Estates	Truck Routes identified (over 20,000 lb)
	Parking restrictions identified (location and duration): truck parking for loading and unloading not exceeding twenty minutes
Rancho Palos Verdes	Truck Routes identified (over 6,000 lb)
	Parking restrictions not identified
Redondo Beach	Truck Routes identified (over 6,000 lb and 10,000 lb)
	Parking restrictions identified (location and duration): truck parking for loading and unloading not exceeding twenty minutes
Rolling Hills	N/A
Rolling Hills Estates	Truck Routes identified (over 6,000 lb)
	Parking restrictions identified (location and duration): truck parking for loading and unloading not exceeding twenty minutes
Torrance	Truck Routes identified (over 8,000 lb)
	Parking restrictions identified (location and duration): citywide parking restrictions for trucks (one hour); truck parking for loading and unloading not exceeding twenty minutes; permit required for backing to the curb for loading and unloading

2.1.4 Truck Routes

In 1982, the federal government passed the Surface Transportation Assistance Act (STAA). This act required states to allow larger trucks on the 'National Network,' (NN) which is comprised of the Interstate system and the non-Interstate Federal-aid primary system. In 1983 and 1986, the California legislature passed bills that designated a 'California Legal' truck. California legal trucks have different dimensions than the trucks allowed on the National Network, and may use the designated California Legal network. In addition, each City in the South Bay also has designated truck routes.

South Bay roadways on the STAA and California Legal network include Interstate highways Interstate 110, Interstate 405, and Interstate 105, and state routes State Route 1 (Pacific Coast Highway and Sepulveda Boulevard), State Route 107 (Hawthorne Boulevard), State Route 213 (Western Avenue), State Route 47, and State Route 91.

South Bay truck routes on roads other than Federal and State routes are designated by local governments. If STAA trucks are allowed on local roads, they are posted with the Caltrans Terminal Access (TA) sign. Otherwise, the trucks must follow the regulations set by the local government. Information regarding truck routes was gathered for the South Bay Cities. Of these 16 jurisdictions, 15 have designated truck routes. One jurisdiction (City of Rolling Hills) has no public roadways. Figure 19 illustrates the adopted truck routes by all jurisdictions in the South Bay.

Truck routes are established by local jurisdictions as a method of limiting truck traffic to select routes that are better suited for handling large vehicles. These routes, in general, have wider lanes and curb radii, and serve major industrial and commercial areas. Trucks are usually prohibited from non-truck routes unless they are entering or exiting a property for business purposes or storage by the most direct route.

City-designated truck routes in the South Bay combine to form an extensive truck route network. The South Bay Cities were incorporated at a time when most cities adopted truck routes as part of their General Plan. Thus, the South Bay truck route system is much more comprehensive then, for example, truck route systems in newer communities such as in the Inland Empire.

As part of the focus group conducted for this study in Section 3.1.2, deficient signage was indicated as an issue in the South Bay. South Bay Cities should investigate inconsistencies or deficiencies in truck route signage. At a minimum, all truck routes should be signed at the intersection of other truck routes.

Where gaps in the truck route system occur within individual Cities, it is often intentional (a roadway enters a residential area or the City does not want trucks on a route for other reasons). However, there are a few gaps in the truck route network at the border of jurisdictions. South Bay cities should work with the jurisdictions on their borders to validate and make reasonable truck routes across jurisdictions. This includes working with the County of Los Angeles and adjacent cities outside of the South Bay Cities Council of Governments. In addition, South Bay Cities should analyze the areas surrounding truck routes for compatibility of adjacent land uses, site access, sound walls, and aesthetics. Figure 20 illustrates truck route gaps and they are listed on the following page:

Manhattan Beach

- Rosecrans Avenue to Highland Avenue (Rosecrans Avenue is a truck route in El Segundo): while the completion of this truck route would provide alternative access that Grand Avenue in El Segundo currently provides, the character of this section of Rosecrans Avenue is residential.
- Highland Avenue, from 45th Street (Vista Del Mar is a truck route in El Segundo, Vista Del Mar becomes Highland Avenue at the Manhattan Beach city line): this section of Highland Avenue is residential in character.

Redondo Beach

- Palos Verdes Boulevard, from Susana Avenue to Pacific Coast Highway (Palos Verdes Boulevard east of Susana Avenue is a truck route in Torrance): this section of Palos Verdes Boulevard is residential in character.
- Camino Real, west of Sepulveda Boulevard (Sepulveda Boulevard is a truck route in Torrance): this section of Camino Real is residential in character.
- Del Amo Street/Prospect Avenue (Del Amo Boulevard is a truck route in Torrance that ends at Prospect Avenue in Redondo Beach): this section of Del Amo Street/Prospect Avenue is residential in character.

Rolling Hills Estates

- Narbonne Boulevard/Palos Verdes Drive East, south of the Lomita/Rolling Hills Estates border (Narbonne Boulevard is a truck route in Lomita): this section of Palos Verdes Drive East serves Chandler quarry. While it is not a truck route, trucks are permitted to use this route to serve the quarry.
- Crenshaw Boulevard, south of Rolling Hills Road (Crenshaw Boulevard is a truck route in Torrance) the continuation of this truck route would formalize truck access to the Peninsula Center.

Harbor Gateway (City of Los Angeles) and West Carson (County of Los Angeles)

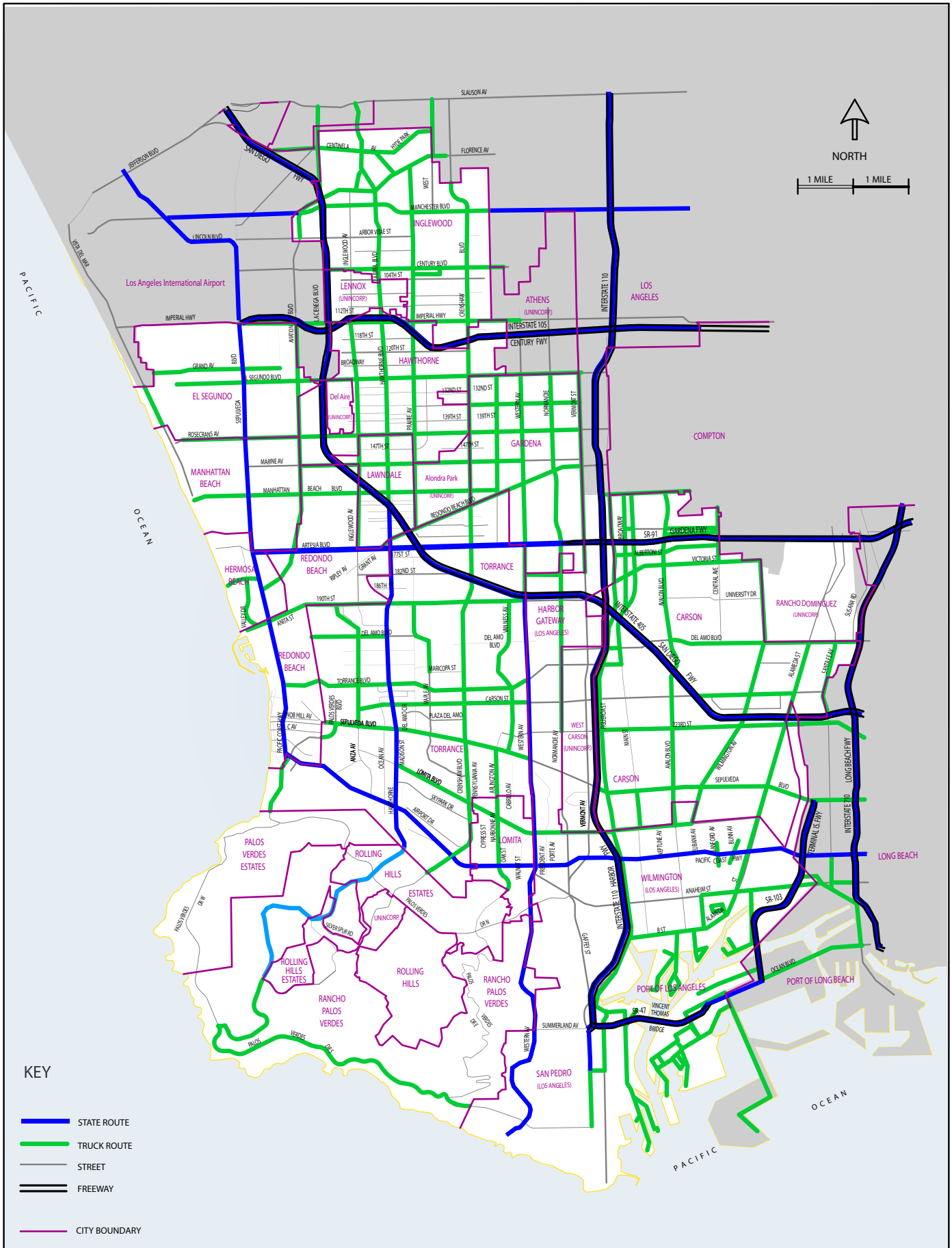
- Torrance Boulevard, Carson Street and Sepulveda Boulevard, east of Western Avenue and west of Figueroa Street (All three roadways are truck routes in both Torrance and Carson)

Harbor Gateway (City of Los Angeles)

- 190th Street, from Western Avenue to Figueroa Street (190th Street is a truck route in Torrance and Carson)

San Pedro (City of Los Angeles)

- 25th Street (Palos Verdes Drive South is a truck route in Rancho Palos Verdes, which become 25th Street at the Los Angeles City line): this section of 25th Street is residential in character.



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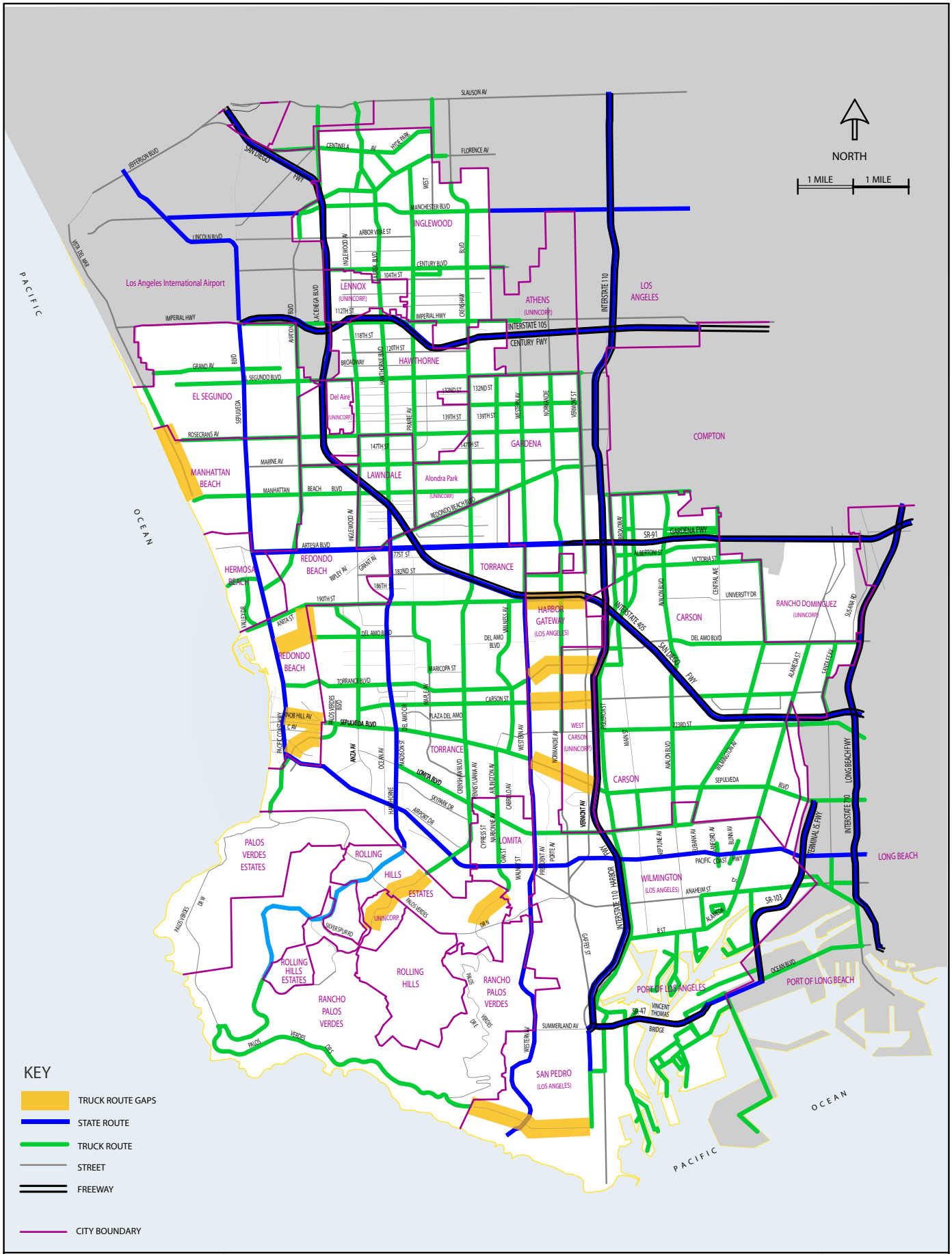
South Bay Truck Routes

Figure 21



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South Bay Truck Route Gaps

Figure 22

2.1.5 Truck Parking

Parking of oversize vehicles such as trucks is typically regulated by the local jurisdictions. Within the South Bay there is a wide mix of parking regulations. See Table 11 for a summary of truck parking regulations in the South Bay Cites.

Truck Stops

There is one truck stop located in the South Bay: Wilmington Truck Stop on D Street in Wilmington. The 2.5 acre facility provides diesel fuel, propane, a truck scale, truck lubrication services, and monthly parking for 100 trucks. In contrast, there are two truck stops in the City of Ontario with 780 spaces, and 305 spaces at two truck stops in the City of Fontana. Given the high volume of trucks in the South Bay, and the restricted access to port terminals, there may be an opportunity to reduce unnecessary idling and uncontrolled parking on streets with the construction of a conveniently located truck stop.

2.1.6 Truck Idling

The California Air Resources Board (ARB), a department of the California Environmental Protection Agency, enacted new regulations for truck idling in 2005. The regulation states that a diesel-fueled commercial vehicle shall not idle for greater than five (5) minutes at any location, and may not idle a diesel-fueled auxiliary power system (APS) for more than five (5) minutes to power a heater, air conditioner, or ancillary equipment if the vehicle is located within 100 feet of a home or school. Idling of the main engine is permitted during sleeping or resting in a sleeper berth beyond 100 feet from any house or school. Review of the South Bay ordinances, as well as city codes, shows that in addition to state regulations, the only city that regulates truck idling is the City of Los Angeles.

The truck idling regulations are primarily enforced by ARB diesel truck inspectors, who inspect smoking trucks and buses for tampering and mal-maintenance to engines that can increase emissions. However, local law enforcement agencies and the California Highway Patrol can also issue citations.

Truck Stop Electrification

Because federal law mandates that truckers rest for ten hours after driving for 11 hours, truckers may park at truck stops or along industrial streets for several hours. Truckers often idle their engines during this rest time to provide their sleeper compartments with air conditioning or heating, or to run electrical appliances such as refrigerators or televisions. Truck stop electrification allows truckers to "plug in" vehicles to operate necessary systems without idling the engine. In some cases, a stand-alone system can provide heating, ventilation, and air conditioning directly to the sleeper compartment.

Options for truck stop electrification include stand-alone systems that are owned and operated by the truck stop, and combined systems that require both on-board and off-board equipment. There is currently a pilot project underway in Sacramento where power is supplied to trucks for free, and extension cords and equipment are available on site.

2.2 Rail Infrastructure

The rail infrastructure of the South Bay is focused on both moving freight north from the port area to major intermodal centers, and serving the industrial land uses in the South Bay.

2.2.1 Inter-Subregional Rail Infrastructure

The Alameda Corridor

The grade separated Alameda Corridor is the primary freight rail facility in the South Bay. During 2006, 4.9 million TEUs were moved in the 19,924 trains along the corridor, an increase of 31.8 percent over 2005. An average of 55 trains a day operated on the Alameda Corridor in 2006.

According to the Alameda Corridor Transportation Authority (ACTA), the Alameda Corridor has a practical capacity of over 150 daily train movements.

ACTA charges a fee of $18.04 for a full container and $4.57 for an empty container to use the facility. These use fees will be eliminated once the debt for the in-place infrastructure is paid off. Full containers trucked around the Alameda Corridor to the rail yards served by the corridor also pay the use fee. In 2006, 1.24 million containers were trucked around the corridor—0.7 percent fewer than in 2005. Containers are trucked around the corridor to go to intermediate consolidators (crossdocking or transloading) before being loaded onto rail at an intermodal transfer facility. This is done for manifest verification, labeling, palletizing, shrink wrapping, pick and pack activities, distribution center bypass, merging of loads. In addition, retailers often receive waterborne cargo with an unspecified destination upon entry, the final destination is determined at a transloading facility. More details about consolidation activity can be found in the 2004 study "Consolidation Activity in the Southern California Area" commissioned by the Alameda Corridor Transportation Authority.

The completion of the Alameda Corridor allows trains to move from the POLA and POLB to downtown Los Angeles in 45 minutes. Previously the trip would take two to six hours. This increased efficiency produces a regional air quality benefit. Air quality benefits are realized by four means: consolidation of pre-existing rail lines with longer routes into a more direct route to downtown, allowing trains to operate at faster speeds; elimination of vehicular wait times and emission reductions at grade crossings; and increased rail capacity on a consolidated corridor which allows more cargo to be transported by rail rather than truck.

The main market emphasis for the railroads using the Alameda Corridor is intermodal freight, mostly involving container traffic through the seaports. The railroads wholesale their intermodal train capacity directly to the marine lines or rely on third party intermodal marketers for the domestic and transload business segments. The railroads concentrate on managing their intermodal yards and the long-haul lines they operate. The drayage aspect (pick-up and delivery of containers or trailers to and from the port terminal) is typically arranged by the intermodal marketing companies or ocean carriers.

Intermodal Facilities
There are three major types of intermodal facilities: on-dock, near-dock, and off-dock.

On-Dock Intermodal
On-dock rail yards are rail yards located within marine terminals. They receive imported cargo discharged from marine vessels, as well as export cargo from trains. These facilities usually consist of rail tracks for loading and unloading trains and temporary storage of rail equipment and cargo, and a staging area for stockpiling containers. Marine terminals operate on-dock rail yards for the benefit of the carriers using the facility. Individual marine terminals may or may not have facilities for handling cargo via on-dock rail.

The POLA and POLB have on-dock rail serving most of their container terminals to reduce transfer time and costs. These facilities allow containers to be placed on railcars in marine containers, and then transported along the Alameda Corridor and out of California. Approximately 21 percent of containers moving through the ports of Los Angeles and Long Beach were transferred to and from trains at on-dock rail yards in 2005.

Near-Dock Intermodal
Near-dock rail yards are rail yards located near ports and are dedicated to handling port cargo. Unlike on-dock rail yards, they serve more than one marine terminal and thus tend to be much larger than their on-dock counterpart. Trucks are used to move the containers between these facilities and the marine terminals (this move is called a “dray”). The close proximity to port operations usually eliminates the need to truck containers on regional highways. These yards are operated by railroads for the benefit of their customers (marine carriers and/or logistics companies). As with off-dock rail yards, the sorting and grouping of cargo needed to build trains is done within a near-dock rail yard.

Of the intermodal transfer terminals in the Los Angeles Basin, only one is in the South Bay subregion: the Intermodal Container Transfer Facility (ICTF). All other intermodal freight going to off-dock intermodal terminals must be trucked from the port area to Los Angeles, Commerce, Industry, and San Bernardino rail yards. The Union Pacific’s ICTF is located approximately five miles from the Ports of Los Angeles and Long Beach at the end of the Terminal Island Freeway (State Route 103), and is the only near-dock intermodal transfer facility in the South Bay. There, containers are lifted on and off of trucks which connect the facility to the seaports. This facility has the capacity of 800,000 lifts per year. BNSF has been selected to build a second intermodal transfer facility to the south of ITCF, the Southern California International Gateway. That project is undergoing environmental review at this time.

Off-Dock Intermodal
Off-dock rail yards are rail yards located within the region served by a port, and handle port cargo as well as domestic cargo from other local sources. Cargo must be trucked from the marine terminals or local transload facilities to these yards, which are operated by the transcontinental railroads serving the local area. The major off-dock rail yards are located near downtown Los Angeles and to the east of Los Angeles, therefore port cargo trucked to and from these facilities is moved primarily on Interstate 710. Cargo is sorted and grouped by final destination in these facilities.

There are several off-dock rail yards near the Ports of Los Angeles and Long Beach. Containers or trailers are drayed to these facilities by truck, and transferred to trains at the yards. The Burlington Northern Santa Fe Railway (BNSF) has two off-dock terminals in the area, located in

Los Angeles and San Bernardino. Annually the Hobart (Los Angeles) terminal handles over 1.3 million units, and it has one of the highest throughput densities at 5,500 units per acre. The Union Pacific Railroad operates three off-dock terminals: City of Industry, City of Commerce, and the Los Angeles Transportation Center in Los Angeles (a total of approximately one million lifts per year capacity).

There are also a small number of terminals in the area that transfer freight between conventional, non-intermodal railcars (e.g. boxcars) and trucks.

2.2.2 Intra-Subregional Rail Infrastructure

Creation of the Alameda Corridor concentrated the port intermodal container trains on one line. Previously, the Harbor Subdivision was Santa Fe's primary route to and from the ports, carrying substantial volumes of intermodal container traffic. The Southern Pacific routed its intermodal port trains over the Alameda Street line. The Union Pacific used its own line east of Alameda Street for its intermodal trains; that right of way was used for the Alameda Corridor, and traffic on the other lines declined substantially. The branch lines in the South Bay Cities subregion are now used to serve conventional carload rail customers on the branches, and to move cars to and from connections with PHL at the ports. These lines are also available as detours or relievers for the Alameda Corridor.

Operations on these lines are almost entirely low-speed local service, picking up and delivering freight cars at a small number of on-line industrial customers. Grade crossings are frequent, and many former light-duty roads that the railroads crossed in industrial or undeveloped areas are now busy arterials. Branch line trains travel slowly, and may block streets for extended periods while they switch local customers. These factors often bring the legacy rail system into conflict with thriving new development.

The traditional movement of merchandise in railroad boxcars has all but disappeared. The remaining rail customers in the area are almost entirely shippers or receivers of bulk commodities, such as liquid chemicals in tank cars, lumber on specialized flatcars, or grain in large covered hopper cars. These commodities require specialized loading and unloading equipment such as pipeline connections and pumps, large forklifts, or conveyor belts. Even the smallest customer must be able to handle 70-100 tons per carload, and most tend to ship and receive in multiple carload lots. While the South Bay Cities retain a diverse commercial and industrial base, including many freight intermediaries and distribution centers, only the largest plants are typical active rail carload customers.

The outlook for rail business on these lines is more a function of the individual customer outlook than a function of the Southern California economy as a whole. For example, the Chevron and Conoco-Phillips refineries are likely to remain active indefinitely, but the nature and volume of rail carload traffic they generate depends on their use of specific additives and output of specific petrochemical products. Changes in technology, regulations, or policy can significantly alter these rail movements in ways that cannot be predicted from the regional need for gasoline. The increase in ethanol movements, for instance, is due to the regulatory elimination of MTBE as a fuel additive.

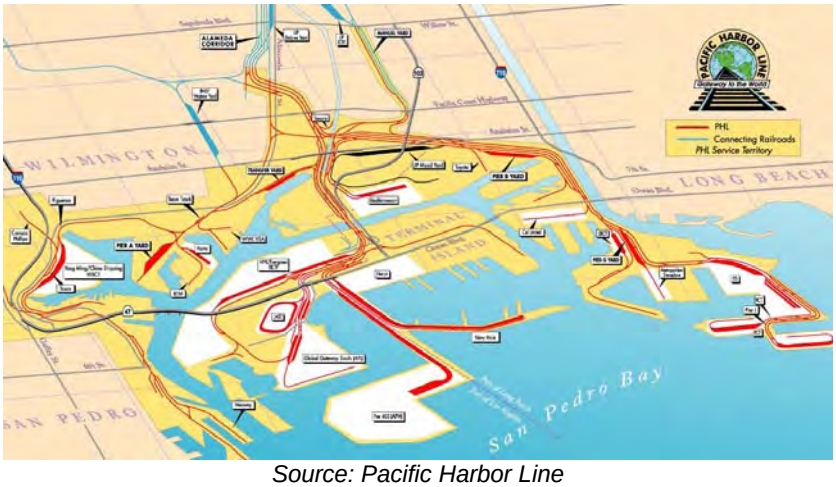
To take another example, the Vought Aircraft plant in Hawthorne ships 747 fuselage components to Boeing. Should 747 orders and production cease, the future of rail shipments from Vought would depend on whether the Hawthorne plant remained open and what it produced.

One likely source of additional rail traffic from existing or new customers is the growth of the "green" industries, including recycling and alternative fuels. As noted above, tank car shipments to the refineries have increased to handle the requirements for ethanol blending. Pacific Harbor Line includes multiple recycling companies among its customers. The development of regional infrastructure to supply LNG, hydrogen, biodiesel, or other alternative fuels will likely result in increased rail traffic as well.

Pacific Harbor Line

The Pacific Harbor Line (PHL) operates roughly 59 miles of track spread over an 18-mile network serving the ports and nearby facilities. While PHL's best known function is serving the numerous on-dock intermodal terminals the line also handles roughly 40,000 carloads of conventional freight for industrial customers and non-container marine terminals.

Figure 23
The Pacific Harbor Line Network



Source: Pacific Harbor Line

PHL is an operating unit of Anacostia & Pacific, which owns and operates several shortline railroads. It connects with UP and BNSF's Harbor Subdivision at West Thenard, and with UP at Manuel Yard. West Thenard is also PHL's connection to the Alameda Corridor. It is primarily a switching railroad, and its operations are restricted to 15–25 mph. As of early 2007, PHL had about 145 employees and 23 locomotives. PHL serves all of the nine on-dock rail transfer facilities at the Ports of Los Angeles and Long Beach.

PHL's less-known carload operations are a critical factor in minimizing truck trips and truck impacts in the South Bay Cities subregion. The boxcars, flat cars, tank cars, hoppers, and other conventional railcars moved to and from industrial customers, typically each carry 50 to 100 tons of freight, or the equivalent of two to four truckloads. PHL's 40,000 annual carloads thus equate to 80,000–160,000 annual round trips by heavy duty trucks on regional highways and surface streets.

UP South Bay Freight Operations

The Union Pacific Railroad has three rail lines in the study area used to handle local freight traffic: the El Segundo Industrial Lead, the Torrance Industrial Lead, and the Wilmington Subdivision. However, the Alameda Corridor is used to move local freight to and from industry tracks located near the southern end of the Wilmington Subdivision.

Table 15
UP South Bay Freight Lines

Line Name	Start	End	Length (miles)
Wilmington Subdivision	West Redondo	Alameda	11.7
El Segundo Industrial Lead	Watts	El Segundo	10.8
Torrance Industrial Lead	South L.A.	Torrance	9.9
Alameda Corridor	East Redondo	West Thenard	16.1

Wilmington Subdivision
The Wilmington Subdivision starts at West Redondo Junction (E 24th Street between Long Beach Avenue & South Alameda Street) and ends at Alameda Junction (south of East Victoria Street and South Alameda Street), a distance of 11.7 miles. The El Segundo Industrial Lead diverges from the Wilmington Subdivision at approximately East 103 Street and Grandee Avenue. The right of way for the Wilmington Subdivision is shared with the Metro Blue Line from West Redondo Junction past the junction with the Alameda Corridor. The trackage south of Watts is not used for freight operation, except to stage empty double stack intermodal cars on the sidings at Carson mile post 7.3 and Nadeau mile post 2.0 for delivery to either the ICTF or on-dock intermodal terminals. Any carload freight for points south of Watts is sent via Alameda Corridor to Delores Yard.

El Segundo Industrial Lead
The El Segundo Industrial lead originates at Watts, mile post 5.7 on the Wilmington Subdivision, and ends at the Chevron Manhattan Beach Refinery.

The three largest customers on this line are Interplastic Corporation, Vought Aircraft Industries, and Chevron. There is also a team track[6] used to transfer lumber from railcars to trucks for local delivery. While there are other receivers on the line, they have very infrequent freight, and the three customers identified, along with the team track, account for the vast majority of traffic on the line.

El Segundo Industrial Lead Line
The BNSF mainline and the UP El Segundo industrial lead line cross just east of Douglas Street at Utah Avenue. Leading into the junction before Sepulveda Boulevard, the two railroad lines parallel one another for approximately 0.75 miles before they cross at Douglas Street. BNSF joins the UP line to enter the refinery just east of Sepulveda Boulevard, and a single line crosses Sepulveda Boulevard at grade into the refinery approximately 300 yards north of Rosecrans Avenue. The track is owned by UP and open to BNSF service.

North of the track and east of Sepulveda Boulevard, a new retail shopping center, Plaza El Segundo, is under construction. An important improvement to the local circulation network is the proposed extension of Park Place between Allied way and Nash Street to relieve congestion on Rosecrans Avenue by providing an alternate route. Given the location of the two lines and the retail activity in the area, the potential for congestion and rail/highway conflicts will increase. A grade-separation at Sepulveda Boulevard is not feasible given physical constraints, and would be of only marginal utility given that the limited train movements in and out of the Chevron refinery which occur only at night. However, consolidation of the two rail lines east of Sepulveda would be desirable to facilitate the completion of the Park Place extension.

[6] A team track is a spur line accessible to trucks and used for periodic rail-truck transfer.

Torrance Industrial Lead

The Torrance Industrial Lead is a 9.9 mile north–south rail line that diverges from the El Segundo Industrial Lead at mile post 493 at the UP South Los Angeles Station. The station is two miles west from the point where the El Segundo Industrial Lead branches off from the Wilmington Subdivision. There is one local train per day, Monday through Friday working the Torrance Industrial Lead. The local train originates at UP's 4th Street Yard, as does the El Segundo local, but the Torrance crew starts work at 5:00 a.m. rather than 8:00 a.m. On a typical day, the local has 16 to 18 loaded cars when it leaves 4th Street Yard; most of the outbound cars from the line are empties. Annual carload volume on the line is slightly less than that of the El Segundo Industrial, with approximately 9,000 loaded and empty cars.

Conoco Phillips is the largest customer on the lead, receiving ten tank cars of ethanol each day for blending into gasoline for local delivery. Jones Chemical and Crenshaw Lumber each receive three to four railcars per day. Jones Chemical receives chemicals to produce industrial bleach and bisulfite products for water and wastewater treatment.

BNSF Local Freight Operations

BNSF has one line in the South Bay Study area, the Harbor Subdivision Main Line (Harbor Line), with several industry lead tracks. The route was clearly chosen to serve the El Segundo refinery, the seaports, and industrial customers in between.

The Harbor Line starts at Harbor Junction in Los Angeles near Washington Boulevard and the Los Angeles River and runs generally south toward the port area for 27.6 miles, before ending at West Thenard on the Alameda Corridor.

From its origin, the Harbor line heads south to approximately 56th St, then runs west paralleling Slauson Avenue to approximately Western Avenue, where it turns southwest, adjacent to Florence Avenue. The line turns south at the eastern edge of LAX, and runs parallel to Aviation Boulevard, crossing Imperial Highway, at grade, to El Segundo Boulevard. The grade crossing at Imperial Highway and Aviation Boulevard has been identified by communities as a source of delay or congestion.

After crossing El Segundo Boulevard, the Harbor Line heads southwest, crossing the UP El Segundo Industrial Lead at approximately Douglas Street, where the BNSF industry lead to the Chevron Refinery branches of the main track. The Douglas Street/Utah Avenue grade crossing has also been identified a causing significant motorist delay.

The BNSF Harbor Subdivision joins again with the UP El Segundo line, east of Sepulveda Boulevard before the UP line enters the refinery. See the description of the UP local rail services for a description of this location.

The Harbor Line turns southeast at the point where the industry lead to Chevron joins with the main line crossing Rosecrans Avenue at Aviation Boulevard. The line continues southeast, parallel to Interstate 405, to Manhattan Beach Boulevard, where it turns south paralleling Condon Avenue one block east of Inglewood Avenue to approximately 182nd Street. BNSF crosses both Inglewood Boulevard and Manhattan Beach Boulevard diagonally, making it possible for a train to block both streets at once.

The line turns southeast crossing Hawthorne Boulevard at 190th Street. Both road crossings are at grade as the line enters the Honeywell/ExxonMobil/Union Carbide/Dow Chemical industrial complex, south of 190th Street, between Hawthorne Boulevard and Western Avenue. Much of the BNSF line right-of-way is through residential neighborhoods.

The BNSF line, through Torrance and Carson, has six grade crossings cited as causing significant vehicle delays or other problems. These grade crossings typically involve multiple traffic lanes and several are approached at oblique angles that may obscure sightlines.

As noted earlier, the Harbor Subdivision formerly carried all Santa Fe traffic to and from the Ports of Los Angeles and Long Beach, where it was interchanged with the former Harbor Belt Line, now PNL. After the opening of the Alameda Corridor, all the port container traffic, and some other types of traffic as well, shifted to the Alameda Corridor and off the Harbor Subdivision. The Harbor Subdivision is now used exclusively for non-container traffic in conventional railroad freight cars.

Summary

The goods-movement system in the South Bay cities consists of several freeway corridors, the arterial street network, a freight rail system, the seaports of Los Angeles and Long Beach, Los Angeles International Airport, and a number of supporting land uses. As domestic and international trade increases, the pressures on these facilities will also increase. Inadequate facilities will become bottlenecks for the expansion of trade, while impacts on communities and passenger users of the system will be amplified. The current and future goods movement issues facing the South Bay Cities are examined in the next section.