Oakland Central Estuary Plan

Existing Conditions Report

Transportation

September 2009

Contents

1 Transportation Context and Setting

This report describes the transportation facilities serving the Central Estuary Plan Area ("Plan Area") within the City of Oakland. The analysis includes critical transportation facilities located outside the Plan Area that serve as a vital link to major regional destinations. The entire transportation analysis area, which includes the Plan Area and the surrounding communities and neighborhoods, is referred to as the transportation "study area".

This section discusses how the study area's transportation system fits into the overall context of the wider regional system, and presents many of the "big picture" issues related to how these facilities currently operate. An overview of the transportation analysis methodology is also presented in this section.

1.1 Regional and Local Transportation Components

The Plan Area and the surrounding regions of Oakland and Alameda are centrally located within a robust network of regional and local transportation infrastructure. Interstate 880 (I-880), critical local transportation corridors such as International Boulevard, major freight rail tracks, and a wide range of public transit options serve the study area and its environs.

The *Oakland General Plan – Transportation Diagram* (City of Oakland, 1998) segments the transportation system into two components:

- Facilities serving "Local Access" needs
  - Streets and roads ranging from the classic urban grid downtown to winding hilly roads
  - Pedestrian and bicycle facilities from the Oakland hills stairways to waterfront promenades
- Facilities serving "Regional Access" needs
  - Public transit centering on the AC Transit system hub and confluence of BART routes
  - Regional Bikeways System
  - Passenger ferry service to Alameda and San Francisco
  - Freeways providing access north via I-80, south via I-880, west to san Francisco and Peninsula via the Bay Bridge, and east via State Route 24 and I-580

Figure 1 presents the location of the study area and its relationship to the local and regional transportation network. These transportation facilities are summarized below:

- **Interstate 880**: I-880 is a critical component of the Bay Area freeway network that links the communities of the East Bay from Oakland to San Jose. Within the study area, I-880 is an eight-lane access controlled freeway with several closely spaced sub-standard interchanges and ramp junctions. I-880 provides access to downtown Oakland, the Port of Oakland, Oakland International Airport, and major industrial and distribution centers throughout the East Bay. The I-880 corridor traverses many densely populated residential areas and serves several large office and retail centers.

Figure 1: Transportation Context

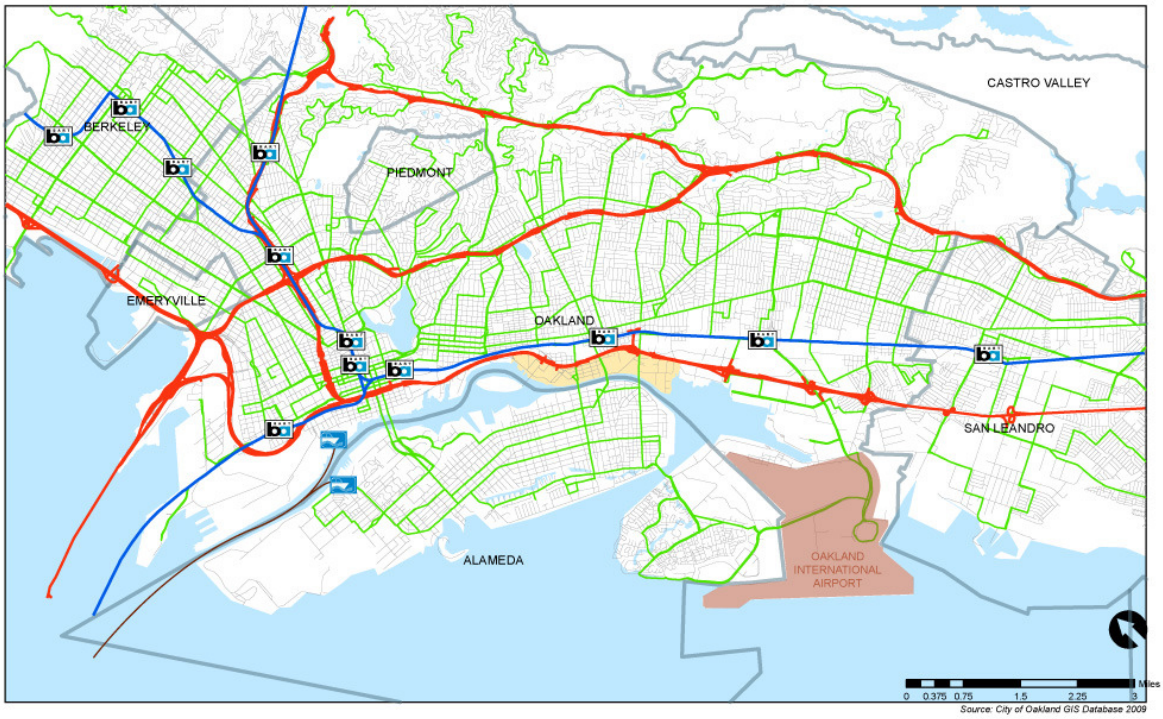


Figure 1: Regional Transportation Context **April 16, 2009**

Freeway
AC Transit
Local/Collector
BART
Ferry Route
City Limit Border
CEP Study Area
Oakland International Airport
BART Stop
Ferry Stop

- **International Boulevard**: International Boulevard is a four-lane arterial roadway that parallels I-880 and E 12th Street and stretches from E 14th Street in downtown Oakland to the City of Hayward. It is an important north-south connection that also serves many heavily used AC Transit bus routes, including the 1 Rapid bus line. International Boulevard is also an important commercial corridor for many neighborhoods in East Oakland.
- **East 12th Street**: East 12th Street (E 12th Street) is a four to six-lane arterial roadway that travels parallel to I-880 and International Boulevard from downtown Oakland to just west of the Coliseum. E 12th Street predominately serves industrial and warehouse land uses and has much less transit service and commercial activity than International Boulevard. For these reasons, E 12th Street is characterized by higher speeds and less pedestrian activity. E 12th Street's greater capacity, fewer pedestrians, and higher speeds results in traffic volumes (west of Fruitvale Avenue) that are approximately 5 to 10 percent higher than International Boulevard.
- **Fruitvale Avenue:** Fruitvale Avenue is a major east-west arterial that stretches from I-580 and MacArthur Boulevard in East Oakland to the Fruitvale Avenue bridge and Tilden Way in Alameda. Throughout most of the Plan Area, Fruitvale Avenue has two westbound lanes and one eastbound lane. Outside of the Plan Area, Fruitvale Avenue is a four-lane roadway. Fruitvale Avenue provides one of the three bridge crossings of the Oakland Estuary. Fruitvale Avenue has no direct freeway access to I-880 and very little transit service. Only two AC Transit bus routes serve Fruitvale Avenue within the Plan Area limits.
- **High Street:** High Street is a major four-lane east-west arterial roadway that runs from I-580 to Alameda and parallels Fruitvale Avenue. High Street traverses major industrial sections of the study area and therefore handles a large amount of trucks and other heavy vehicles. High Street provides access to I-880 via the 42nd Avenue ramps. High Street also provides another bridge connection across the Estuary.
- **16th, 23rd, and 29th Avenues**: These three roadways provide critical east-west connections from Oakland to Alameda through the Plan Area. All three of these facilities have bridges that span I-880 and the freight rail tracks just east of the freeway. Ramps to/from I-880 are provided at 23rd Avenue. At 29th Avenue, an indirect set of on and off-ramps provide access to I-880 through the residential neighborhoods east of the freeway. The 23rd and 29th Avenue bridges have sub-standard vertical clearances over the I-880 road surface. 23rd and 29th Avenues also make up part of the "Park Street Triangle", which is a complex one-way system of three intersections at the heart of the Plan Area. 23rd and 29th Avenues converge at the Park Street bridge, which provides another Estuary crossing.
- **42nd Avenue**: 42nd Avenue (State Route 77) is a very short four-lane access controlled highway that serves as a direct ramp connection from I-880 to International Boulevard and E 12th Street.
- **Public Transit**: BART's Fruitvale station is located approximately 1/4-mile from the edge of the Plan Area. International Boulevard, which is a major service corridor for several AC Transit bus routes, is less than 1/2-mile. The Plan Area itself is served directly by only a few bus routes (three local and one Transbay route).
- **Bay Trail**: The regional Bay Trail for bicycles and pedestrians follows an alignment along the Estuary shoreline through approximately half of the Plan Area.

1.2 Transportation Issues

Despite the close proximity of the Plan Area to these major transportation facilities, the access to these facilities and their overall quality of service is poor. In particular, I-880 and

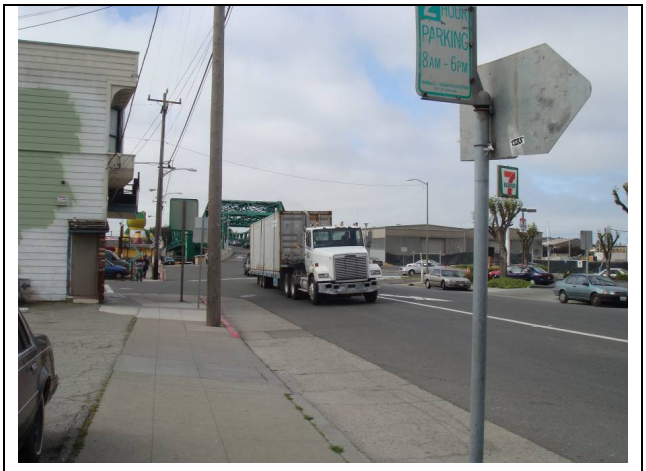
the freight rail tracks serve as a major physical barrier between the study area and adjacent neighborhoods, BART, the International Boulevard transit corridor, and the local Oakland street grid. The design and alignment of I-880 utilizes a system of local interchanges with confusing and inefficient ramps. The substandard nature of the interchange and ramp designs translates into an inefficient local street network.

The following list provides more detail on the existing transportation issues:

- On many segments of I-880, traffic volumes exceed the design capacity during peak hours of travel. This results in significant congestion and travel time delays along the entire corridor. In the AM peak hour, the major bottlenecks exist at the western approaches to the Bay Bridge. Bottlenecks also occur on northbound I-880 near the 23rd Avenue interchange and on southbound I-880 near the San Mateo Bridge. I-880 through many sections of Oakland is not built to current geometric standards, which results in lower capacity.
- I-880 within the study area has several closely spaced interchanges. Closely spaced ramps result in many potentially unsafe merging/diverging and weaving maneuvers as vehicles enter and exit the mainline traffic stream on I-880. In addition to safety, the closely spaced ramps also degrade freeway capacity. The on and off-ramps serving I-880 at 23rd Avenue, 29th Avenue, and 42nd Avenue/High Street also have very short acceleration/deceleration lanes. Short acceleration and deceleration lanes pose a safety issue for vehicles entering and exiting I-880.
- There are only five east-west connections through the Plan Area: 16th, 23rd, 29th, Fruitvale, and High Street. These five connections funnel traffic through the Plan Area and onto the three bridges that cross the Estuary. Closely spaced intersections with non-standard geometries and many driveway curb cuts reduce capacity and degrade traffic flow along these roadways. The substandard interchange configurations throughout the study area put additional pressure on the roadway network at locations where local streets provide access to the I-880 ramps.
- The local street grid is confusing and difficult to navigate. The Park Street Triangle is an excellent example of this. The Park Street Triangle consists of three closely spaced intersections that force traffic into a counter-clockwise one-way traffic flow. A traffic signal at the 23rd Avenue / Ford Street / Kennedy Street intersection helps to regulate traffic flow through the triangle. However, a number of uncontrolled “free” movements and the need to weave across one or two lanes of traffic to exit the Triangle, creates a confusing situation that can be difficult to navigate.
- The Plan Area lacks a continuous north-south roadway connection. All users trying to navigate the study area in a north-south direction must utilize an indirect route along several different streets.
- There is a lack of vehicular access to the Estuary waterfront. The lack of a continuous pedestrian, bicycle, and vehicle travel way abutting the Estuary shoreline is a major deficiency within the study area.
- The Bay Trail is an enormous asset for bicyclists and pedestrians throughout the Bay Area. However, the Bay Trail is discontinuous and difficult to access within the Plan Area. This forces Bay Trail users to follow an indirect route through the Plan Area on local streets.
- The overall pedestrian and bicycle environment throughout the study area is poor. Local streets and the bridges crossing the Estuary lack dedicated bike lanes and many street segments lack sidewalks. Several signalized intersections have prohibited pedestrian crossings, and many lack amenities such as striped pedestrian crosswalks with pedestrian signal heads and push buttons. The long

distances required to cross I-880 and the freight rail tracks, combined with the poor physical condition of the sidewalks and streets that traverse these barriers, contribute to the poor pedestrian and bicycle environment.

Roadway environment on Fruitvale Avenue as it passes under I-880



A Truck travels north through the Park Street Triangle

1.3 Existing Conditions Transportation Analysis Overview

The Existing Conditions transportation analysis discusses the local and regional components of the transportation system that serve the overall study area. The section discusses the local and regional components as they affect the various travel modes and users of the system. The transportation analysis includes the following:

- Traffic – Includes all motor vehicle users of the roadway network
- Transit – Includes all uses of public transit systems such as buses operated by the Alameda-Contra Costa Transit District (AC Transit) and commuter trains operated by the San Francisco Bay Area Rapid Transit District (BART)
- Bicycle/Pedestrian – Includes all bicyclists and pedestrians
- Freight – Includes a discussion of freight facilities that serve truck and rail users

An analysis of each mode is presented in the following sections.

2 Traffic Analysis

The Existing Conditions traffic analysis evaluates traffic flow and operations on the local street network and on regional freeway facilities.

The local street network evaluation includes an overview of the street grid, a peak hour operations analysis at thirty intersections, a vehicle collision analysis, and a discussion of local parking issues. The freeway analysis evaluates peak hour traffic conditions on I-880 in near the Plan Area and provides a general discussion of overall operations throughout the I-880 corridor. For both the local street network and freeway analysis, a discussion of the traffic operations methodologies is provided.

Figure 2 presents the roadway network within the study area. Figure 2 shows the street classifications (local / collector / arterial streets, transit corridors), and the I-880 mainline freeway and ramps. The following sections present the results of the local street and regional freeway analysis.

2.1 Traffic Analysis – Street Network

The City's General Plan classifies streets according to their function and design. The street classification system accounts for the existing character and land uses present on the street, and is consistent with the desired future goals of the City. These street classifications include:

- **Local Streets** are streets that primarily provide access to properties in residential neighborhoods and business districts. Local streets typically have two travel lanes, low posted speed limits, and sidewalks.
- **Collector Streets** move traffic between local streets and the arterial street system and between neighborhoods. Collector streets typically have two travel lanes, curb parking, bike lanes, and traffic signals and turning lanes at intersections with arterial streets.
- **Arterial Streets** serve as the basic network of through-traffic between different sections of the city, defining the form of residential, industrial, and commercial areas of the city. Arterial streets range from two to six lanes, with most having four travel lanes. Arterials provide access to freeway ramps. Arterials are streets designed to carry heavy traffic volumes at speeds lower than freeways, typically 30 to 45 miles per hour. Traffic signals with dedicated turn lanes are present at most major intersections.
- **Transit Streets** are arterial or collector streets that are designated as having transit priority. High frequency and reliable transit service is the goal along these corridors. Transit streets have preferential treatments based on their high levels of service, ridership, and the presence or plan for a supportive pattern of land uses.

Figure 3 presents the study area street network. The intersection study locations and ADT traffic volumes on major roadway segments are identified. The ADT traffic volumes were obtained from traffic counts conducted on March 7 – 13, 2009 and Caltrans. The ADT volumes provide an indication of the relative levels of traffic activity across the study area. Appendix A contains a copy of the traffic counts.

Figure 2: Central Estuary Plan Study Area Transportation Context

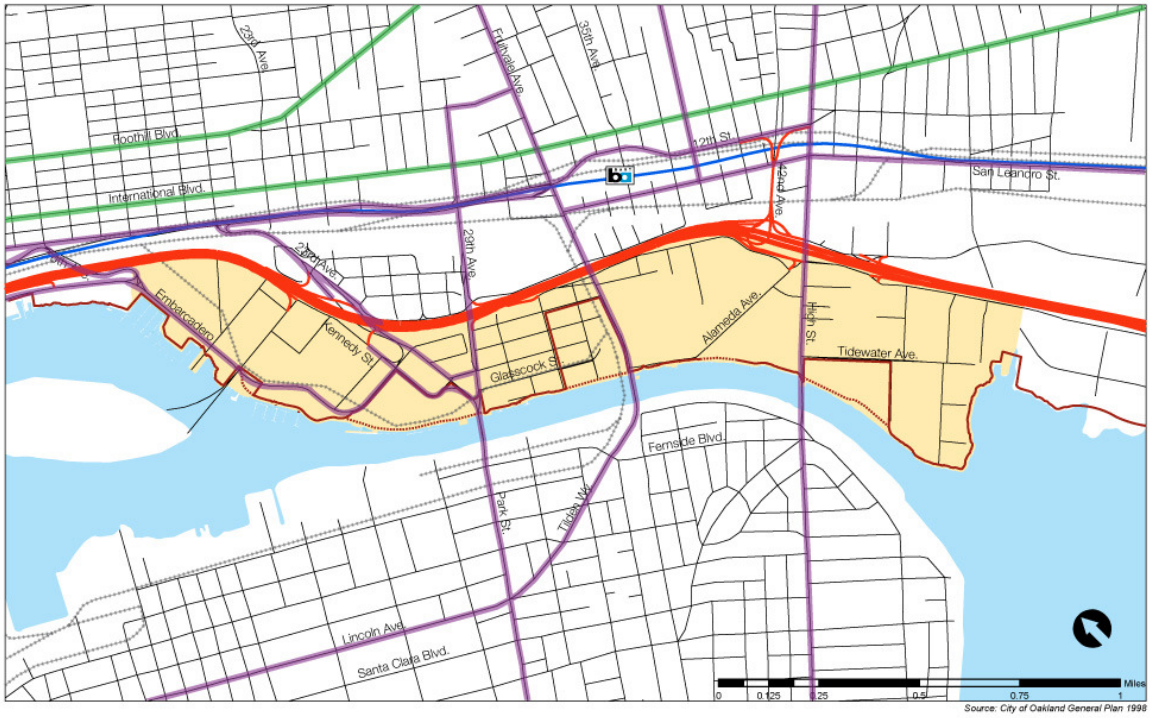


Figure 2: CEP Study Area Transportation Context **April 16, 2009**

Freeway
Freeway Ramps
BART
Local/Collector
Transit Streets
Arterial Streets
Railroad
Bay Trail (Existing)
Bay Trail (Under Construction/Proposed)
CEP Study Area

Figure 3: Central Estuary Plan Transportation Study Locations

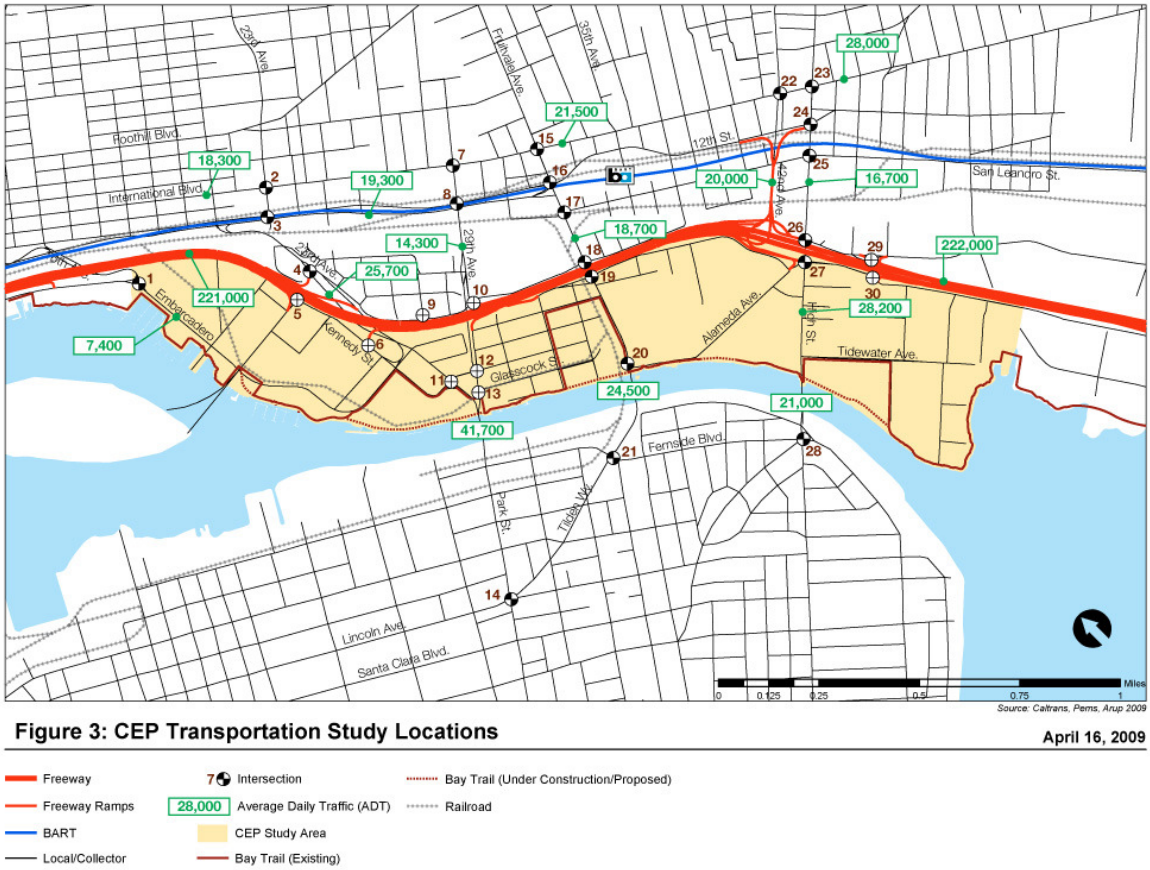
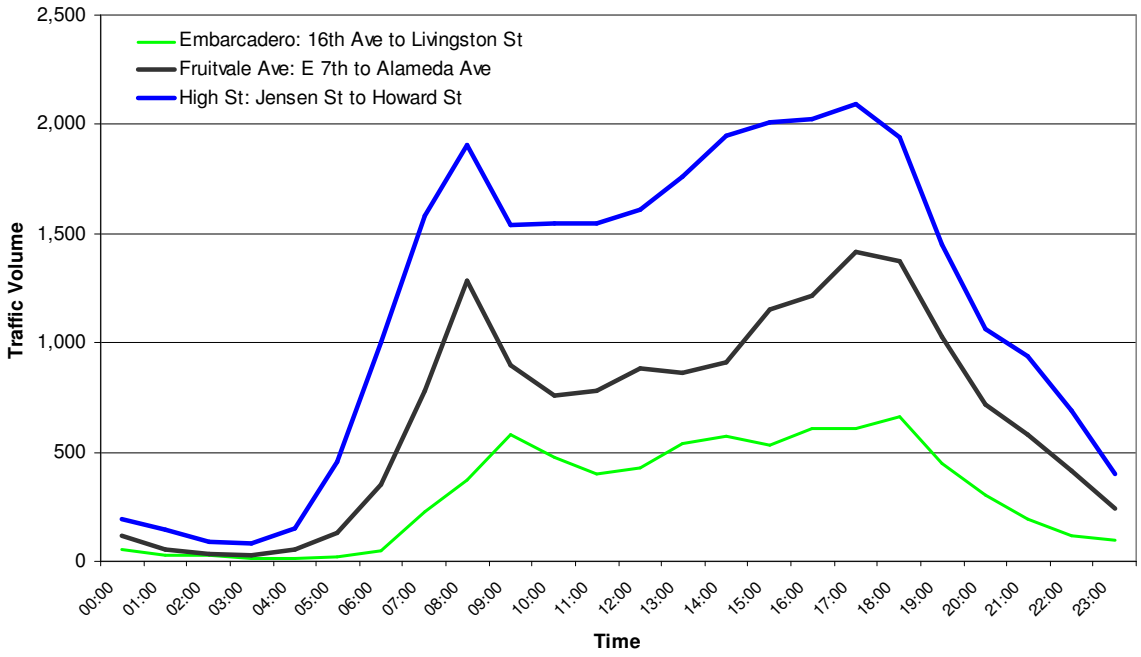


Figure 4 provides an hourly summary of traffic volumes collected at three locations within the Plan Area: Embarcadero from 16th Avenue to Livingston Street, Fruitvale Avenue from E 7th Street to Alameda Avenue, and High Street from Jensen Street to Howard Street.

Figure 4: Hourly Traffic Volumes



Source: Arup, 2009

The volumes plotted in Figure 4 show the fluctuations in traffic volumes throughout the day. The PM peak experiences the heaviest traffic flows. On average, traffic during the PM peak hour represents approximately 7 to 8 percent of the total ADT.

The street grid evaluation includes a detail operations analysis of intersection traffic operations and traffic safety. Intersection traffic operations are analyzed for the AM and PM peak hour, while traffic safety is analyzed using recent vehicle collision data. The parking section provides an inventory of existing on and off-street parking and presents a qualitative discussion of parking issues within the Plan Area.

2.1.1 Intersection Traffic Analysis Methodology

Traffic conditions on the street network are evaluated by analyzing intersection traffic operations and accident/collision data. Traffic operations at the study intersections were analyzed using methodologies contained in the *2000 Highway Capacity Manual (HCM)* (Transportation Research Board, 2000). The HCM provides analysis methods and equations that estimate the peak hour delay experienced by vehicles at signalized and unsignalized (i.e., stop-controlled) intersections. Inputs to the HCM intersection calculations include peak hour traffic volumes, intersection geometrics (number of lanes), traffic signal timing parameters, and other data such as pedestrian volumes and the percentage of trucks.

The HCM delay estimates are used to assign a qualitative level of service (LOS) rating, which describes overall intersection operating conditions. LOS ranges from LOS A, indicating free flow traffic conditions with little or no delay, to LOS F, representing over-

saturated conditions where traffic flows exceed design capacity. LOS F conditions typically result in excessive queuing and delays.

At signalized intersections, LOS is based on the weighted average delay (measured in seconds per vehicle) for all movements. At intersections with stop control on the minor side street approaches, LOS is based on the delay for the worst movement at the side street controlled approach. For all-way stop-controlled intersections, LOS is based on the weighted average delay of all movements.

Table 1 presents the HCM LOS delay thresholds for signalized and unsignalized intersections. The City of Oakland defines LOS D as the acceptable LOS for intersections. Intersections that exceed LOS D (i.e., E or F) are considered deficient from a traffic operations standpoint. However, traffic operations represent only one transportation planning goal, and must be weighed against other community values and goals.

Table 1 – Intersection Level of Service Thresholds

Level of Service	Signalized Intersection Delay (sec/veh)[1]	Unsignalized Intersection Delay (sec/veh)[1]	General Description
A	0 – 10.0	0 – 10.0	Free flow conditions
B	10.1 – 20.0	10.1 – 15.0	Limited congestion and short delays
C	20.1 – 35.0	15.1 – 25.0	Some congestion with average delays
D	35.1 – 55.0	25.1 – 35.0	Significant congestion and delays
E	55.1 – 80.0	35.1 – 50.0	Severe congestion and delays develop as intersection demand nears capacity.
F	> 80.0	> 50.0	Intersection capacity is exceeded. Extreme delays and queues result.

Notes:
(1) HCM delay estimates and LOS thresholds are expressed as the average control delay (seconds per vehicle). Control delay includes the delay at the intersection that is attributable to the traffic control (initial deceleration delay, queue move-up time, stopped delay, and acceleration delay).
Source: *2000 Highway Capacity Manual* (Transportation Research Board), Chapter 16 – Signalized Intersections and Chapter 17, Unsignalized Intersections

A traffic microsimulation analysis was performed for small portions of the study network to supplement the HCM-based calculations. HCM methods analyze intersections in isolation, which does not account for the effects of congestion and vehicle queuing at nearby intersections. SimTraffic simulates the interaction of individual drivers and vehicles as they move through the network of intersections. This allows the SimTraffic model to capture: (1) the interaction of vehicle queues between intersections; (2) the effect of turn-pocket overflows and queue spillbacks; (3) the effects of signal timing and coordination plans; (3) different distributions of driver behaviors (i.e. passive to aggressive drivers); (4) different distributions of vehicle types (e.g., higher percentages of heavy vehicles); and (5) various levels of pedestrian activity at intersections.

SimTraffic provides several measures of effectiveness (MOEs), such as percent demand served, average travel speed, and a more realistic assessment of vehicle queues. SimTraffic also provides delay by movement and for the intersection overall, which is generally consistent with the HCM. HCM methods only account for the delay associated with the traffic control device, while simulation takes into account total delay. Both delay measures are typically close, but total delay is always a bit more conservative.

The microsimulation analyis was performed on three portions of the study network:

1. The closely spaced intersections on Fruitvale Avenue (#18 and #19) and High Street (#26 and #27) under the I-880 bridge

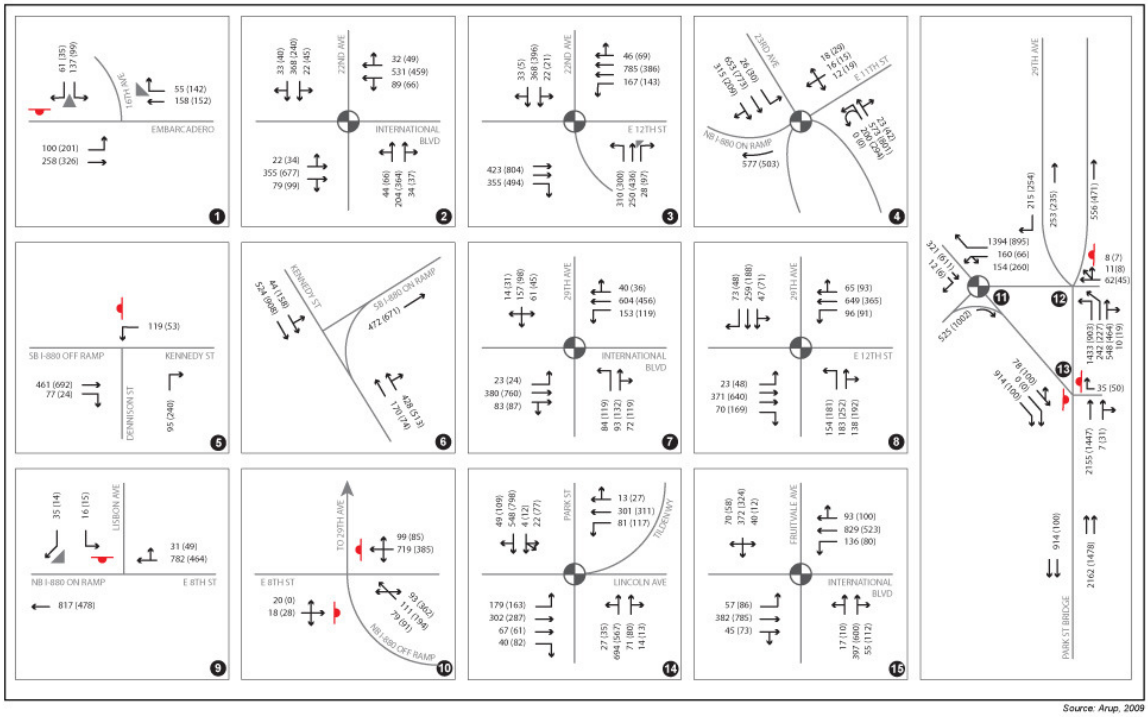
2. The unsignalized locations with non-standard intersection geometries (#5, #6, #29, and #30)
3. The Park Street triangle (#11, #12, #13). The Park Street Triangle is difficult to analyze using HCM methods because there are very few controlled movements. Also, the dominant one-way flow around the three intersection system produces very few conflicting movements.

2.1.2 Intersection Traffic Analysis Results

Morning (7:00 to 9:00 AM) and Evening (4:00 to 6:00 PM) peak period intersection turning movement counts were collected at the thirty study intersection on March 11 – 12, 2009. The systemwide AM peak hour was identified as 7:45 to 8:45, while the PM peak hour was identified as 4:45 to 5:45.

Figures 5A and 5B present the intersection turning movement counts, lane configurations, and traffic control for these peak hours. Signal timing plans were obtained from the Cities of Oakland and Alameda. The data from these timing plans were used in the HCM and SimTraffic analyses. Appendix B contains the technical calculation sheets for the traffic analysis.

Figure 5A: Intersection Traffic Volumes

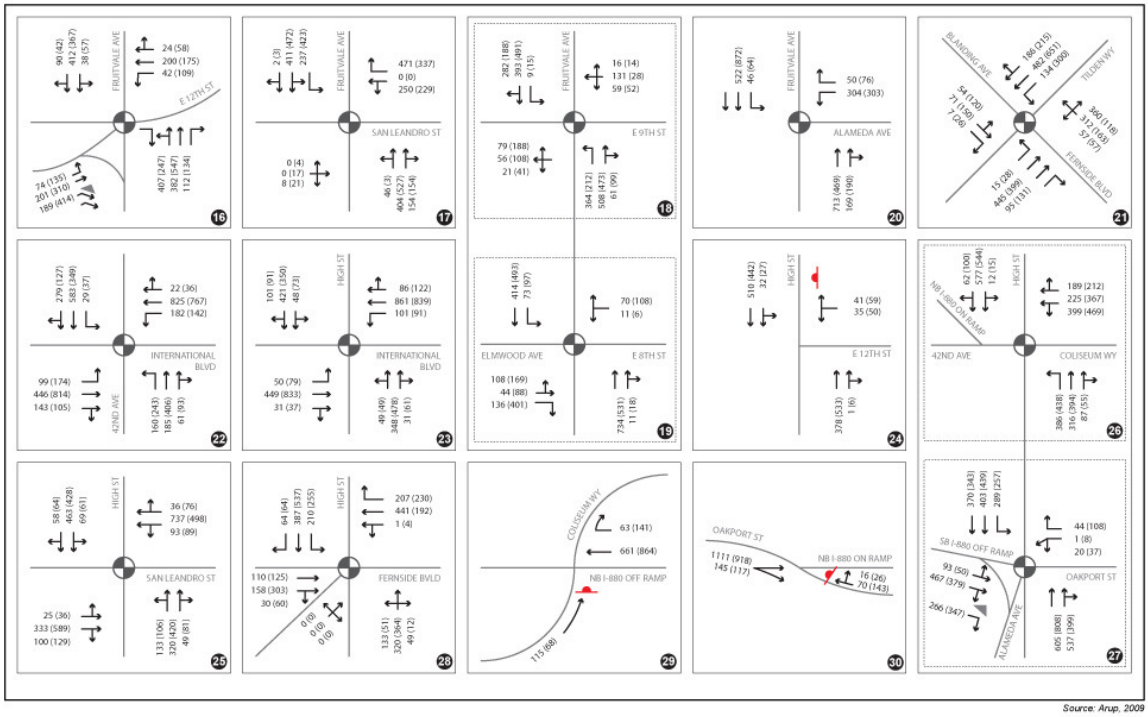


Source: Arup, 2009

Figure 5A: Intersection Traffic Volumes and Lane Configurations **April 16, 2009**

Traffic Signal
Stop Sign
Direction of Traffic
165 Traffic Volume AM Peak Hour
(165) Traffic Volume PM Peak Hour

Figure 5B: Intersection Traffic Volumes (Continued)



Source: Arup, 2009

Figure 5B: Intersection Traffic Volumes and Lane Configurations April 16, 2009

Traffic Signal
Stop Sign
Direction of Traffic
165 Traffic Volume AM Peak Hour
(165) Traffic Volume PM Peak Hour

Table 2 presents the results of the peak hour intersection analysis.

Table 2: Peak Hour Intersection Traffic Operations – Existing Conditions

Intersection	Traffic Control[1]	LOS / Delay (sec/veh)[2]	
		AM Peak Hour	PM Peak Hour
1. Embarcadero / 16th Ave	SSSC	C / 16	D / 26
2. International Blvd (E 14th St) / 22nd Ave	Signal	A / 8	A / 8
3. E 12th St / 22nd Ave / 23rd Ave	Signal	C / 28	C / 32
4. 23rd Ave / E 11th St	Signal	B / 16	C / 30
5. Dennison St / Kennedy St / SB 880 off-ramp	SSSC[3]	A / 8 (NBL)	A / 8 (NBL)
6. Kennedy St / SB 880 on-ramp	Uncontrolled[3]	A / 4 (SBL)	A / 6 (SBL)
7. 29th Ave / International Blvd	Signal	B / 16	B / 15
8. 29th Ave / E 12th St	Signal	B / 14	B / 18
9. E 8th St / Lisbon Ave / NB 880 on-ramp	SSSC	C / 16	B / 12
10. E 9th St / E 8th St / NB 880 off-ramp	AWSC	F / 80	F / 62
11. 23rd Ave / Ford St	Signal[3,4]	A / 8	B / 12
12. 29th Ave / Ford St	SSSC[3,4]	A / 7 (WBR)	B / 10 (WBR)
13. 29th Ave / 23rd Ave / Park St	SSSC[3,4]	A / 8 (EBL)	A / 8 (EBL)
14. Park St / Lincoln Ave / Tilden Way	Signal	B / 12	B / 15
15. Fruitvale Ave / International Blvd	Signal	B / 16	B / 19
16. Fruitvale Ave / E 12th St	Signal	C / 24	C / 27
17. Fruitvale Ave / San Leandro St / E 10th St	Signal	B / 19	C / 20
18. Fruitvale Ave / E 9th St	Signal[3]	C / 26	C / 24
19. Fruitvale Ave / E 8th St	Signal[3]	B / 18	B / 12
20. Fruitvale Ave / Alameda Ave	Signal	B / 15	B / 15
21. Tilden Way / Fernside Blvd / Blanding Ave	Signal	C / 21	C / 20
22. 42nd Ave / International Blvd	Signal	C / 34	C / 34
23. High St / International Blvd	Signal	B / 11	B / 11
24. High St / E 12th St	Signal	B / 13	C / 17
25. High St / San Leandro St	Signal	C / 23	C / 24
26. High St / Coliseum Wy	Signal[3]	C / 33	**F / 96**
27. High St / SB 880 off-ramp/Oakport St	Signal[3]	C / 26	**E / 69**
28. High St / Fernside Blvd	Signal	C / 34	C / 28
29. Coliseum Wy / NB 880 off-ramp	SSSC[3]	D / 25 (EBT)	D / 28 (EBT)
30. Oakport St / SB 880 on-ramp	SSSC[3]	D / 33 (NBT)	**E / 36 (NBT)**

Notes:

(1) Signal, SSSC = side-street stop control, AWSC = all-way stop control, Uncontrolled = no approach is controlled. The critical stop controlled movement with the worst delay is noted for all SSSC intersections.

(2) LOS / Delay (seconds per vehicle) based on HCM methodologies. **BOLD** results indicate that the LOS exceeds the City's LOS D operating standard.

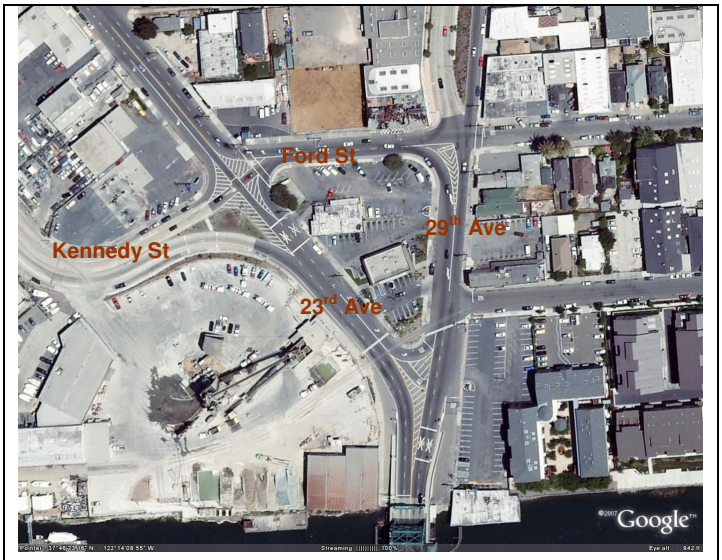
(3) Analyzed with the microsimulation program SimTraffic. The delay measured using simulation has been shown to be consistent with the HCM delay thresholds.

(4) Park Street Triangle intersections.

Source: Arup, 2009

The key findings of the intersection traffic operations analysis are:

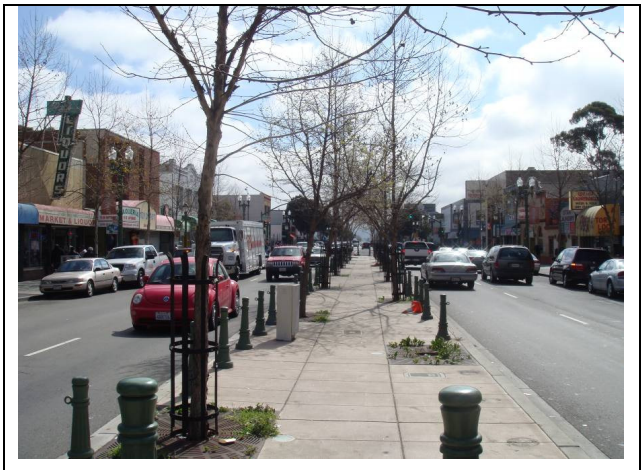
1. The majority of study intersections operate at LOS D or better during the AM and PM peak hours. Field visits indicate that most intersections experience some minimal queuing, but that traffic flows relatively well at most locations.
2. While most of the intersections operate within the City of Oakland's LOS D standard, congestion and vehicle queuing at High Street results in significant delays for vehicles traveling under I-880. This critical east-west corridor is a chokepoint in the system.
3. The simulation results reported in Table 3 for the two High Street (#26 and #27) intersections are more representative of actual traffic operations than LOS and delay from HCM-based equations. At these intersections, significant delays and congestion were observed during the field visits that are caused by the short intersection spacing and short back-to-back left-turn pockets. HCM-based estimates do not reflect this and reported traffic operations in the range of LOS C and D. The simulation more accurately captures the queuing and congestion at these intersections.
4. Major north-south arterials east of I-880 and outside the study area, such as International Boulevard and E 12th Street, are relatively uncongested.
5. Despite the Park Street Triangle's unusual design, it does operate reasonably well from a traffic operations standpoint. Most of the high volume turning movements have the right-of-way through the Triangle. These heavy movements are uncontrolled and do not have to stop, therefore, they incur very little delay. However, the considerable number of weaving maneuvers that occur within the Triangle's network of one-way streets has resulted in a number of vehicle, pedestrian, and bicycle collisions. The Triangle is primary route for traffic heading from Alameda to the I-880 / 23rd Avenue interchange.



Park Street Triangle

Vehicles queue on northbound Fruitvale Avenue approaching E 8th Street

Vehicles queue on northbound High Street between Coliseum Way and Oakport Street



International Boulevard Streetscape at 34th Avenue

2.1.3 Traffic Safety

Traffic safety was evaluated by analyzing five years of collision data obtained from the California Highway Patrol's (CHP) Statewide Integrated Traffic Records System (SWITRS). The SWITRS collision data contains a record of all motor vehicle collisions. For each record, information on the type of collision (vehicle / vehicle, vehicle / pedestrian, or vehicle / bicycle) is provided. The location of the collision is also provided. This allows for the data to be sorted by collision type and geocoded to a location on the roadway network. The geocoded collision data were used to develop a list of collision "hot-spots" throughout the study area. At these "hot spots", City staff can identify geometric and design deficiencies, which can eventually lead to safety improvement recommendations.

Figure 6 presents a five-year history (2002 to 2007) of all collisions (motor vehicles with other vehicles, pedestrians, and bicycles) that have occurred within the study area. The collision analysis indicates that several "hot spots" exist within the study area. The three areas with the highest motor vehicle collision rates are:

- High Street / International Boulevard (133 incidents over the last five years)
- E 12th Street / 23rd Avenue (123 incidents over the last five years)
- Within the Park Street Triangle, the 23rd Avenue / Ford Street / Kennedy Street intersection experienced 33 incidents and the 29th Avenue / Ford Street intersection experienced 21 incidents over the last five years.

2.1.4 Parking Analysis and Discussion

The parking analysis includes a summary of the on and off-street parking supply within the Central Estuary Plan Area. Overall, the available parking supply is adequate to satisfy parking demands across the sub-areas. Table 3 provides a qualitative summary of parking supply and demand for each of the Central Estuary Plan's four sub-areas.

Figure 6: All Vehicle Collisions

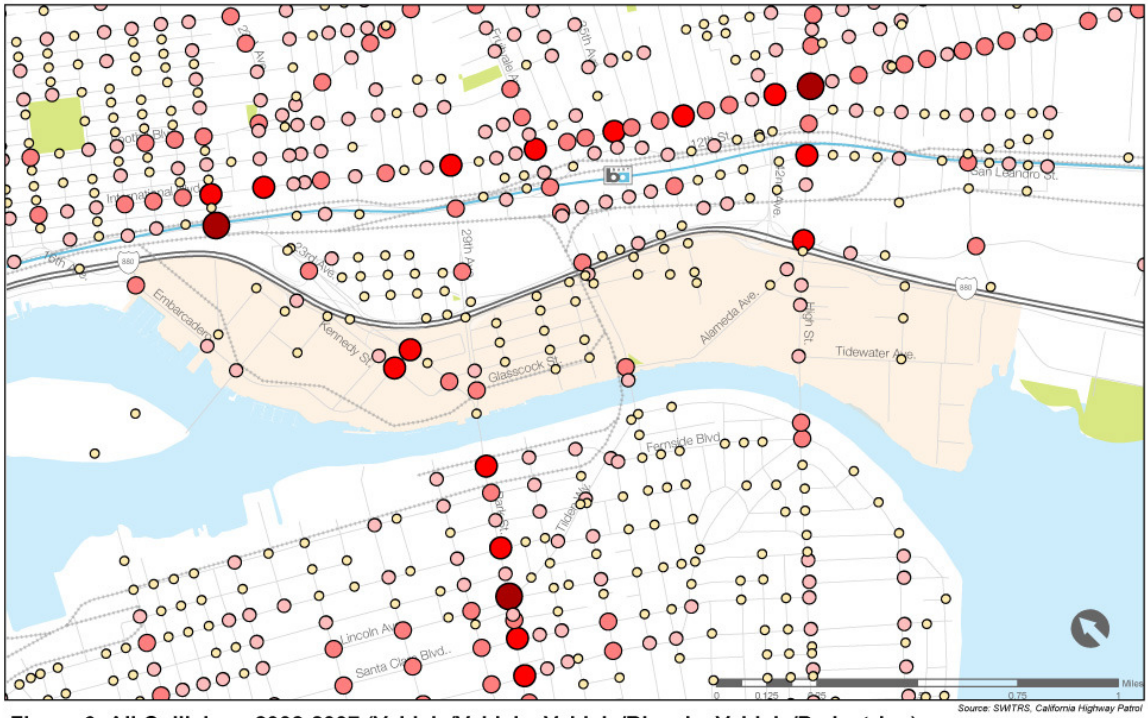


Figure 6: All Collisions 2002-2007 (Vehicle/Vehicle, Vehicle/Bicycle, Vehicle/Pedestrian)

April 16, 2009

NOTE: Does not include collisions on I-880

- 1 - 5 Collisions
- 5 - 20 Collisions
- 20 - 50 Collisions
- 50 - 100 Collisions
- 100+ Collisions
- Railroad

Table 3: Parking Supply and Demand by Sub-Area

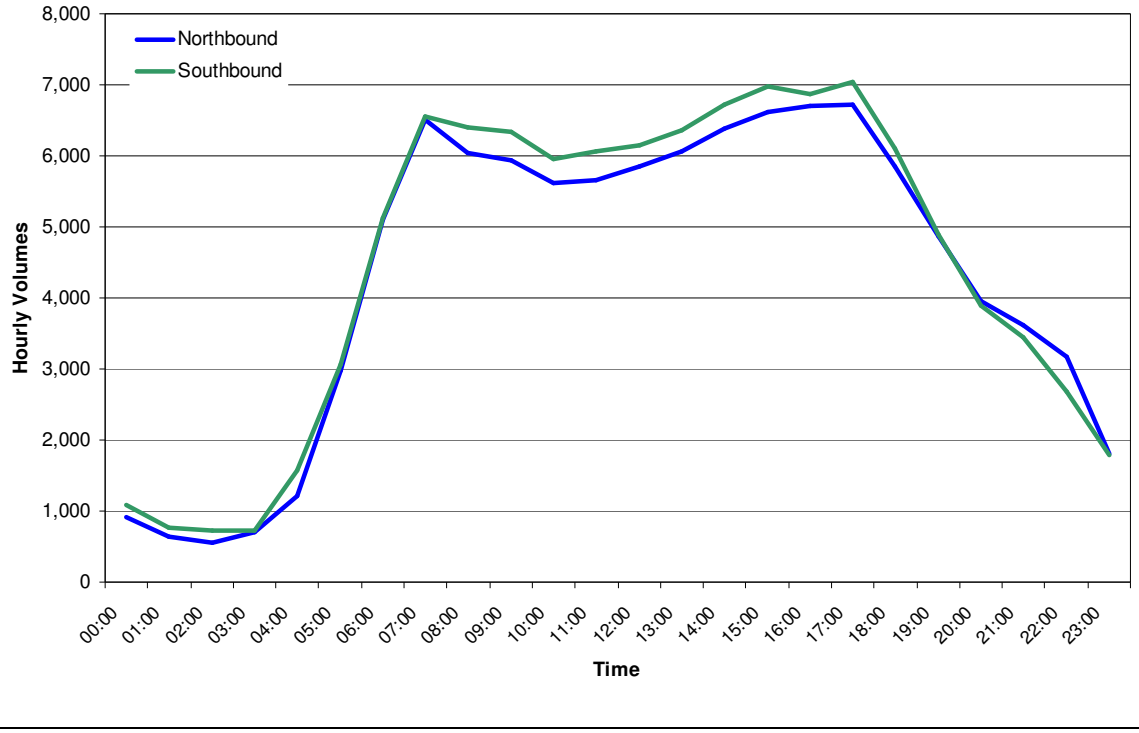
Central Estuary Plan Sub-Area	Parking Supply	Parking Demand
West	• 60 spaces of diagonal parking provided along the west side of Embarcadero (16th Ave to Livingston St) • 40 spaces of perpendicular parking provided on the south side of Denison St (Embarcadero to King St) • Union Point Park has 67 dedicated off-street spaces in a lot on the north end of the Park and 48 spaces in a lot at the south end • Office buildings in the Embarcadero Cove area have large off-street lots containing several hundred parking spaces • Parallel on-street parking spaces are provided along Embarcadero, Livingston St, Kennedy St, and 23rd Ave	• The existing supply appears adequate to meet parking demand on most streets.
Central-West	• The Jingletown area has on-street parking on all block faces. Approximately 40 perpendicular parking spaces are provided on Glasscock St (Derby Ave to Lancaster St), and 15 perpendicular spaces are provided on Derby Ave (Glasscock St to the Estuary) • The area is characterized by a mix of land uses including residential, light industrial, institutional (e.g., School of Mosaic Arts), and some retail	• The mix of land uses generates considerable parking demand • In some areas, the various parking demands and vehicle types (cars versus trucks) compete for the available on-street spaces • A lack of parking policy and restrictions can result in a somewhat chaotic parking situation
Central-East	• This area consists mostly by large industrial users and the Home Depot. The large industrial users have dedicated off-street parking. • The Home Depot has a large off-street lot with several hundred spaces. • The sub-area's small residential section has on-street parking along most block faces.	• The supply appears adequate to meet the parking demands at the industrial sites and at Home Depot.
East	• This area's industrial users have large off-street parking areas for employees and large trucks.	• The parking supply appears adequate to meet demand.
Source: Arup, 2009		

2.2 Traffic Analysis – Freeway Segments

I-880 is a critical component of the Bay Area freeway network that links the communities of the East and South Bays from Oakland to San Jose. Within the study area, I-880 is an eight-lane access controlled freeway with several closely spaced sub-standard interchanges and ramp junctions. The ADT on I-880 within the study area exceeds 200,000 vehicles per day with truck percentages exceeding 10 percent (truck percentages in the range of 5 to 6 percent are typically considered average for freeways). The high truck traffic is the result of I-880's role as a major trade corridor serving the Port of Oakland.

Figure 7 shows the hourly traffic variation on I-880 at 29th Avenue for the north and southbound travel lanes. The hourly traffic data presented in Figure 7 was collected by loop detectors on I-880 at 29th Avenue (postmile 28.65). The data was obtained form the Freeway Performance Measurement System (PeMS) at the University of Berkeley and represents average hourly directional volumes for mid-week days (Tuesday through Thursday) during the first three weeks in March 2009.

Figure 7: Hourly Traffic Volumes on I-880 at 29th Avenue



Source: PeMs, 2009

At 29th Avenue, traffic volumes peak in the morning between 7:00 and 8:00 AM, while volumes in the evening peak and remain relatively constant from 3:00 until 6:00 PM.

Drivers traveling along the I-880 corridor during peak periods regularly experience significant congestion and stop-and-go driving conditions. Congestion throughout the I-880 corridor is caused by a number of factors including high vehicle and truck demand, major regional bottlenecks at the Bay Bridge and the MacArthur Maze (the junction of I-80 / I-580 / and I-880), and the freeway's substandard geometric design and close interchange spacing.

With regards to interchange spacing, Caltrans' *Design Information Bulletin Number 77 – Interchange Spacing (DIB 77)* (Caltrans website www.dot.ca.gov/hq/oppd/dib/dib77.htm, January 1995) states the following:

> "The minimum spacing between interchanges shall be 1.5 km (one-mile) in urban areas."

The distance between the 23rd Avenue and the 29th Avenue interchanges is less than one-third of a mile. The distance between the 29th Avenue and the 42nd Avenue/High Street interchange is approximately 0.8 miles. The distance between the 42nd Avenue/High Street interchange and the 66th Avenue interchange (the next junction on I-880 to the south of the study area) is only 1.20 miles. The close spacing between these interchanges results in a number of merge/diverge and weaving maneuvers at the freeway ramps that can disrupt traffic flow. This is a major cause of congestion along this section of I-880.

Analyzing freeway traffic operations within the study area requires the following:

- An understanding of how traffic flows throughout the corridor
- How the system of interchanges and ramps near the study area affect the freeway's overall traffic flow

The most comprehensive source of existing traffic operations information on I-880 can be found in the Alameda County Congestion Management Agency's (ACCMA) *2008 LOS Monitoring Study* (ACCMA, September 2008). The 2008 LOS Monitoring Study reports LOS in terms of average speed for all freeways and routes of regional significance within the County. The ACCMA report measures the average speed across a roadway segment by conducting car-based travel time runs. The average speeds are compared to LOS thresholds contained in the 1985 HCM. Table 4 presents the 1985 HCM speed-based LOS thresholds for freeway facilities.

Table 4: Freeway Level of Service Thresholds

Level of Service	Average Travel Speed (mph)	Maximum Traffic Volume (veh/hr/ln)[1]
A	Greater than 60	700
B	55 to 59	1,000
C	49 to 54	1,500
D	41 to 48	1,800
E	30 to 40	2,000
F	Less than 30	-
Source: *1985 Highway Capacity Manual* (Transportation Research Board), ACCMA		

The 2008 ACCMA study indicates that major bottlenecks occurred at the following locations:

AM Peak Hour

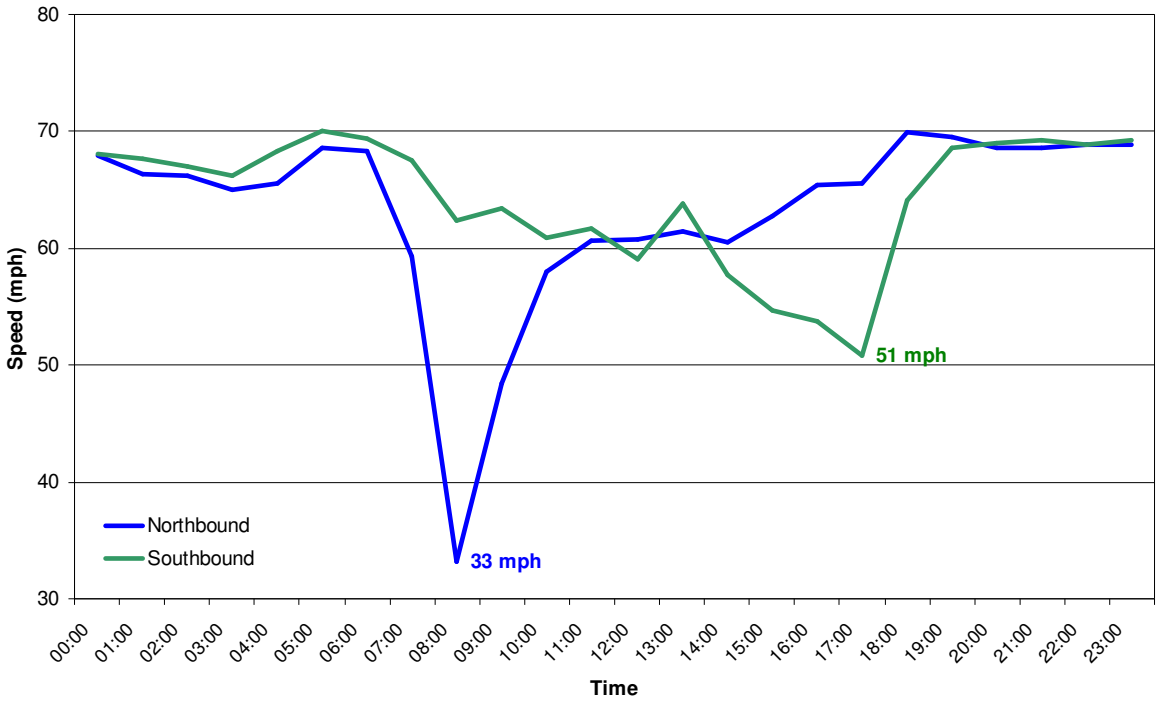
- The northbound section of I-880 from 42nd Avenue to 23rd Avenue experiences LOS E conditions (30 to 40 mph). Otherwise, LOS C (49 to 54 mph) and LOS D (41 to 48 mph) were observed on the other sections of I-880 within the study area.
- The major regional bottleneck north of the study area occurs at the toll plaza at the western approach to the Bay Bridge. LOS F conditions with speeds less than 10 mph are typically experienced on this section. However, this congestion is too far north to affect traffic flows through the study area.
- Major congestion does not occur in the southbound direction until just north of the San Mateo Bridge (SR 92). This is too far away to influence traffic flows within the study area.

PM Peak Hour

- Southbound I-880 experiences LOS E conditions (30 to 40 mph) between 42nd Avenue and Hegenberger Road and LOS F conditions (average speeds less than 30 mph) from Hegenberger Road to SR 112 and Davis Street. These queues degrade traffic flow within the study area.
- LOS B and C conditions were observed on northbound I-880 through the study area and on sections of southbound I-880 to the north of the congestion detailed above.
- In the PM peak hour, significant congestion and LOS E conditions occur on northbound I-880 from 35th Avenue to the MacArthur Maze and the Bay Bridge toll plaza.
- The high reported travel speeds in the southbound direction near the study area are likely due to the metering of traffic at the MacArthur Maze. The Maze restricts southbound traffic flow north of downtown Oakland, which results in relatively free-flow conditions on I-880 through the study area.

To further support the ACCMA results, PeMS speed data was analyzed at 29th Avenue. Figure 8 presents the average speeds on northbound and southbound I-880 at this location. The data represent the average speed by hour for the mid-week days during the period of March 1 through March 21, 2009.

Figure 8: Average Speeds on I-880 at 29th Avenue



Source: PeMs, 2009

Comparing the PeMS data to the 2008 ACCMA report yields:

- The findings from the two data sources are consistent. In the AM peak, the PeMS data reports average northbound speeds of approximately 35 mph at 29th Avenue. This is consistent with the LOS E (30 to 40 mph) result reported for this freeway segment in the 2008 ACCMA report.
- In the PM peak, speeds on southbound I-880 average approximately 50 mph. This is consistent with the LOS C (49 to 54) result reported for this freeway segment in the 2008 ACCMA report.

These results indicate that I-880 does experience congestion within the study area. In the AM, the congestion occurs in the northbound direction between 42nd Avenue and 23rd Avenue. In the PM, the congestion occurs in the southbound direction between 42nd Avenue and Davis Street in San Leandro.

This congestion does not appear to be caused by other regional bottlenecks. The close interchange spacing and substandard ramps within the study area appear to be the cause of the lower travel speeds and congestion.

3 Transit

Transit services located within the transportation study area include AC Transit bus, BART commuter train, as well as WETA ferry services. Paratransit services are also provided by East Bay Paratransit. The Existing Conditions transit assessment provided in this section describes the transit demand, frequency, and amenities of each service that operates in the within the study area. Other detailed quantitative service level measures such as on-time performance, transit productivity, or transit coverage are not included. This transit assessment is meant as an overview that establishes a baseline of existing demands and capacity.

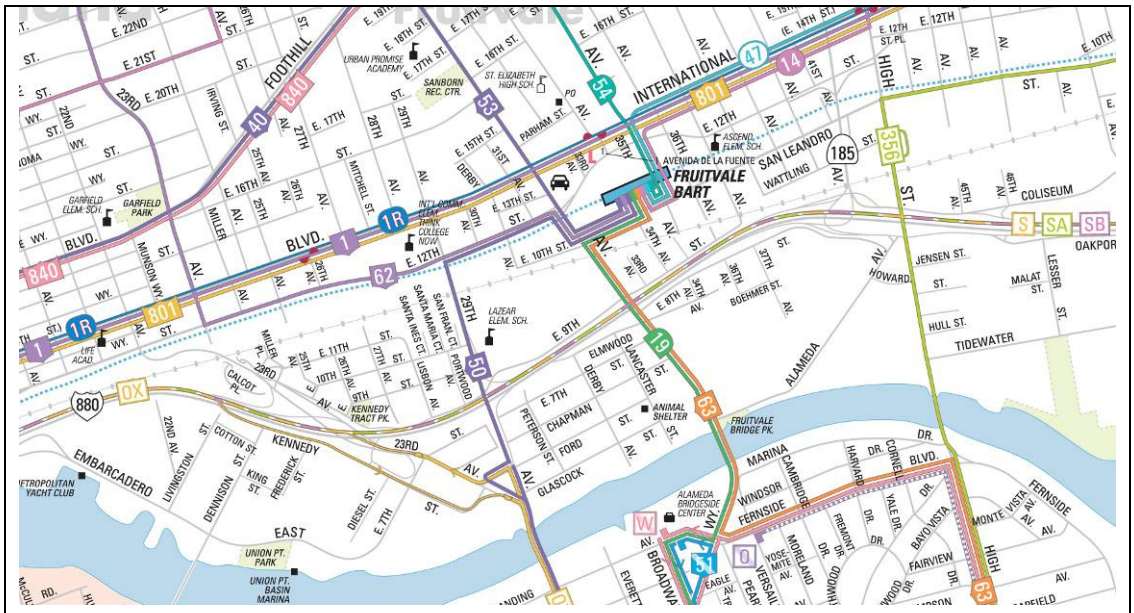
3.1 AC Transit

The Alameda-Contra Costa Transit District (AC Transit) serves 13 cities and adjacent unincorporated areas of Alameda and Contra Costa County. AC Transit service is heavily concentrated outside of the Plan Area along the International Boulevard Corridor where the majority of the demand and residential/commercial uses exist. Transit service is limited within the Plan Area, as demand is relatively sparse (approximately 60 combined daily boardings and alightings).

AC Transit bus entering Fruitvale BART Station from 35th Street

Within the study area, AC Transit operates local, Rapid, and Transbay Express routes along International Boulevard. The Fruitvale BART station and transit village serves as a major terminus and transfer station for several AC Transit bus lines. Only three local routes and one Transbay route directly serve the Plan Area. Figure 9 shows the AC Transit routes. These routes are described in detail below.

Figure 9: AC Transit Bus Routes Within the Transportation Study Area



Source: AC Transit Website (http://www.actransit.org)

3.1.1 Direct Routes Serving the Central Estuary Plan Area

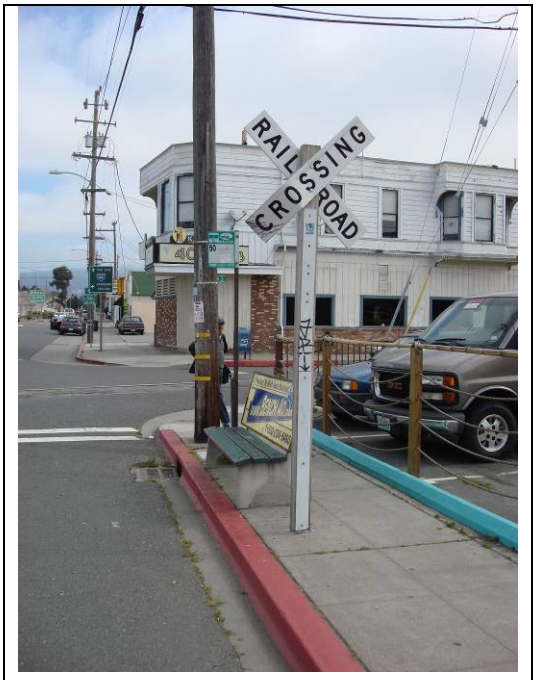
Four routes provide direct service to the Plan Area with three of these originating / terminating at the Fruitvale BART station. These routes include the Local 19, 50, and 63, as well as the Transbay OX. These routes call at a total of five stops within the study area (to be discussed below). Combined, service on these routes initiates at 4:45 AM and continues until 1:00AM, depending on the route. The four routes are described below and summarized in Table 5.

- **Local 19** – Provides service between the Fruitvale and the Downtown Berkeley BART stations. The Local 19 operates from 6:00 AM to 10:30 PM on weekdays with 30-minute headways throughout along the 15.4 mile route. Typically, alternating trips originate and terminate at the Berkeley or North Berkeley BART stations – the Local 19 does not serve both on a given trip. The Local 19 operates on Fruitvale Avenue with bi-directional stops at the intersection of Fruitvale and Alameda. This route uses 30' buses seating 25 people.
- **Local 50** – Provides the most service with 15-minute headways throughout the day and 30-minute headways in the evening. It also has the longest span of service from almost 5:00 AM to 1:00 AM. The Local 50 connects the Fruitvale and Bay Fair BART stations and operates along 29th Avenue into Alameda on the Park Street Bridge, a route length of about 24 miles. The northbound stop is at 23rd and Glascock, while the southbound one is at 23rd and 29th. This route uses 40' buses seating 32 people.

Table 5: AC Transit Bus Routes Serving the Estuary Study Area

Route #	Route Name	Service Type	Time Period[1]	Service Span		Service Frequency			
				Start	*End*	*AM Peak*	*Mid-day*	*PM Peak*	*Night*
19	Berkeley / North Berkeley BART – Fruitvale BART	Local	M-F	6:00AM	10:30PM	30	30	30	30
			Sat-Sun	6:00AM	10:15PM	30	30	30	30
50	Fruitvale BART – Bay Fair BART	Local	M-F	4:45AM	1:00AM	15	15	15	30
			Sat-Sun	6:00AM	1:00AM	30	30	30	30
63	Fruitvale BART – 11th/Martin Luther King Jr. (Alameda Ferry Terminal on Weekends)	Local	M-F	5:30AM	1:00AM	30	30	30	30
			Sat-Sun	5:30AM	12:30AM	30	30	30	30
OX	SF Transbay Terminal – Island Dr. Park & Ride	Trans-bay	M-F (EB)	4:00PM	8:30PM	-	-	10	30
			M-F (WB)	5:30AM	9:00AM	15	-	-	-
			Sat-Sun	No Weekend Service					

Notes:
(1) Schedules effective as of March 22, 2009 (www.actransit.org)
Source: AC Transit



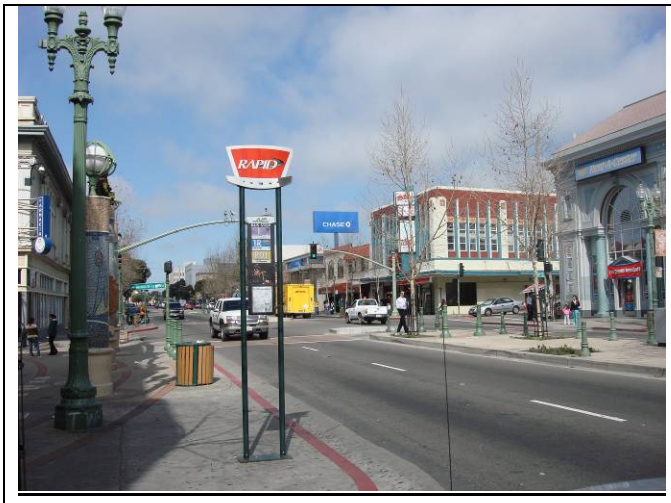
AC Transit Bus Stop at 29th and Glascock Street (Line 50)

- **Local 63** - Provides 30-minute all-day service from 5:30 AM to 1:00 AM from Fruitvale BART to 11th and Martin Luther King Jr. (on weekends the endpoint becomes the Alameda Ferry Terminal). The Local 63 follows the itinerary of the Local 19 through the study area, operating on Fruitvale Avenue, with stops at the intersection of Fruitvale and Alameda.
- **Transbay OX** – Operates as one of AC Transit's weekday-only Transbay Express routes, linking Island Drive Park & Ride to the Transbay Terminal. The OX operates in the westbound direction towards San Francisco from 5:30 AM to 9:00 AM at 15-

minute headways. In evening, the OX operates from 4:00 PM to 8:30 PM at 10-minute headways in the peak (with some runs at 30-minute headways toward the close of service). The OX calls at two stops in the study area: (i) 23rd Ave. and East. 7th Street (westbound); and (ii) 23rd Ave. and 29th Ave. (eastbound), shared with the Local 50. This route is about 18.5 miles long and uses 45' buses seating 57 people.

3.1.2 Routes Serving Areas Adjacent to the Central Estuary Plan Area

International Boulevard is one of the primary transit corridors in Oakland. The International Boulevard transit corridor and the Fruitvale BART station combine to provide areas directly west of the study area with a very high level of transit service and capacity. These routes operate outside of the limits of the Plan Area. The walk distance from the Plan Area boundary to International Boulevard is approximately one-third to one-half of a mile. This distance, the lack of direct pedestrian/bicycle routes, and the poor pedestrian environment limits the effectiveness of these routes to serve the Plan Area's existing population.



Rapid 1R Stop at Fruitvale Village

In total, seven daytime routes and a single night-time owl route operate along the International Boulevard corridor and/or within proximity of the Fruitvale BART station. Among these routes is the Rapid 1R, a Bus Rapid Transit (BRT)-type service operating with bus signal priority, longer stop spacing, and vehicle branding. The bus signal priority at intersections and greater stop spacing provide improved speed and schedule reliability. AC Transit is planning a BRT service along International Boulevard from the Bay Fair BART station to downtown Oakland. The BRT service will eventually replace the Rapid 1R. The International Boulevard BRT line is part of a larger East Bay BRT system that will extend into Berkeley. The BRT service will incorporate a dedicated median busway and enhanced rail-like stations with additional passenger amenities. The AC Transit East Bay BRT system is currently undergoing environmental assessment.

Table 6 provides a summary of these routes. The peak weekday service headways range from 12-20 minutes on these routes. Weekend headways are still fairly frequent, ranging from 15-30 minutes.

Table 6: AC Transit Bus Routes Serving the Adjacent International Blvd. and E 12th St Corridor

Route #	Route Name	Service Type	Time Period[1]	Service Span		Service Frequency			
				Start	*End*	*AM Peak*	*Mid-day*	*PM Peak*	*Night*
1	Bay Fair BART – Berkeley BART	Local	M-F	5:00AM	1:00AM	15	15-20	15	20
			Sat-Sun	5:00AM	1:15AM	20	20	20	20
1R	Bay Fair BART – Berkeley BART	Rapid	M-F	5:45AM	8:00PM	12	12	12	-
			Sat-Sun	7:30AM	7:00PM	15	15	15	-
14	MacArthur BART – Fruitvale BART	Local	M-F	5:00AM	8:45PM	15	30	15	-
			Sat-Sun	7:15AM	8:45PM	30	30	30	-
47	Fruitvale BART – 55th Ave. & MacArthur Blvd.	Local	M-F	6:00AM	7:30AM	30	30	30	-
			Sat-Sun	No Weekend Service					
53	Fruitvale BART – Lyman Rd. & Tiffin Rd./ Mountain Blvd. & Joaquin Miller Rd.	Local	M-F	5:00AM	12:45AM	15	15	15	-
			Sat-Sun	No Weekend Service					
54	Fruitvale BART – Merritt College	Local	M-F	6:00AM	10:30AM	10	15	15	60
			Sat-Sun	7:30AM	7:30PM	30	30	30	-
62	Fruitvale BART – West Oakland BART	Local	M-F	5:30AM	1:00AM	20	20	20	30
			Sat-Sun	5:30AM	1:00AM	30	30	30	30
801	Fremont BART – 14th St. & Broadway	Owl	M-F	11:30PM	5:30AM	-	-	-	60
			Sat	11:30PM	6:30AM	-	-	-	60
			Sun	11:30PM	8:15AM	-	-	-	60

Notes:
(1) Schedules effective as of March 22, 2009 (www.actransit.org)
Source: AC Transit

3.1.3 Routes That Pass Through, But Do Not Serve the Plan Area

In addition to the routes identified above, several routes pass through the Plan Area but do not stop. Three of these routes are Transbay Express routes that utilize I-880 and do not exit the freeway. The fourth route is the Local 356 which operates on one trip every Tuesday and Thursday, respectively, and connects areas in Western Alameda to areas southeast of the Oakland Coliseum. With increased development and density, these routes could be modified to directly serve the study area. Table 7 presents the service data for these routes.

Table 7: AC Transit Bus Routes That Pass Through, But Do Not Serve the Plan Area

Route #	Route Name	Service Type	Time Period[1]	Service Span		Service Frequency			
				Start	*End*	*AM Peak*	*Mid-day*	*PM Peak*	*Night*
356	Palo Vista Gardens / E.E. Cleveland Senior Center – Alameda Towne Centre (South Shore)	Local	Tue, Fri	One trip in each direction on Tuesday and Friday (10:00AM NB and 12:30PM SB)					
			Sat-Sun	No Weekend Service					
S	SF Transbay Terminal – Eden Shores Park	Trans-bay	M-F (EB)	4:00PM	7:15PM	-	-	30	-
			M-F (WB)	5:15AM	8:45AM	30	-	-	-
			Sat-Sun	No Weekend Service					
SA	SF Transbay Terminal – Paseo Grande & Paseo Largavista	Trans-bay	M-F (EB)	4:00PM	7:45PM	-	-	30	-
			M-F (WB)	5:30AM	8:45AM	30	-	-	-
			Sat-Sun	No Weekend Service					
SB	SF Transbay Terminal – Cedar & Stevenson Blvd.	Trans-bay	M-F (EB)	4:00PM	9:15PM	-	-	20	90
			M-F (WB)	5:15AM	9:00AM	20	-	-	-
			Sat-Sun	No Weekend Service					

Notes:
(1) Schedules effective as of March 22, 2009 (www.actransit.org)
Source: AC Transit

Figures 10A and 10B show the combined service headways for the AM and PM peak hours, respectively. These figures illustrate the overall transit frequency along major corridors within the study area.

Figure 10A: AM Combined Service Headways

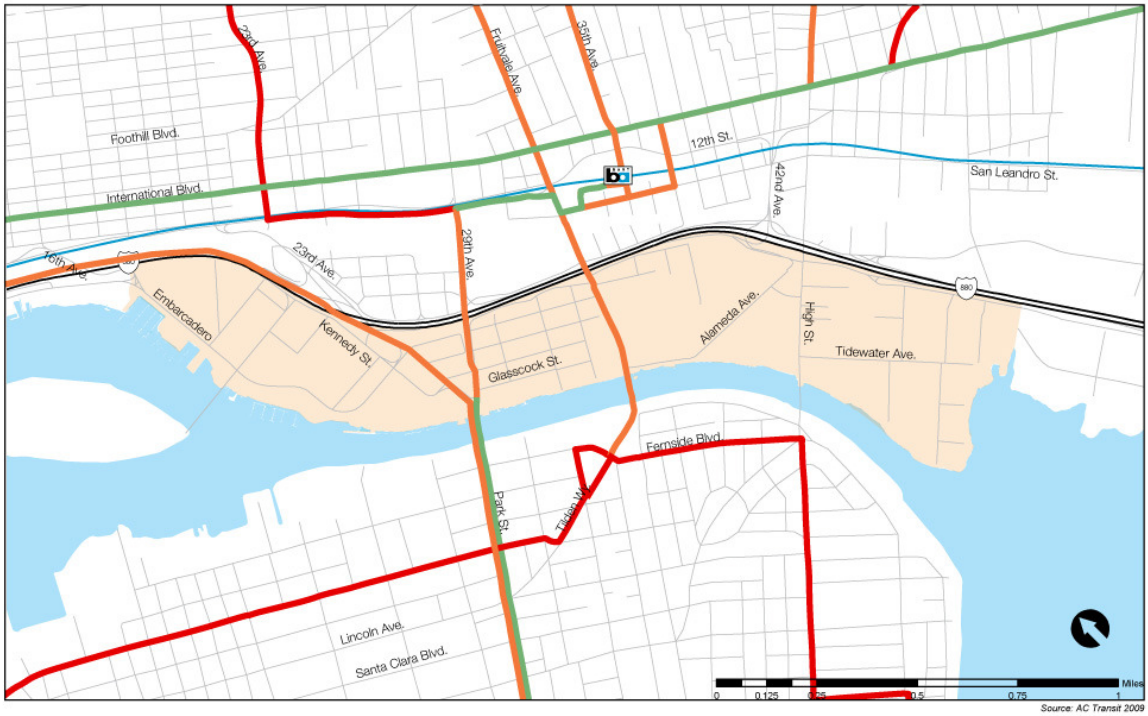


Figure 10A: Average Combined AC Transit Service Headways - AM Peak **April 16, 2009**

Average Combined Headway (<7.5 minutes)
Average Combined Headway (7.6 - 15.0 minutes)
Average Combined Headway (15 + minutes)

BART Stops — BART — Freeway — Project Boundary

Figure 10B: PM Combined Service Headways

Figure 10B: Average Combined AC Transit Service Headways - PM Peak **April 16, 2009**

Average Combined Headway (<7.5 minutes)
Average Combined Headway (7.6 - 15.0 minutes)
Average Combined Headway (15 + minutes)

BART Stops — BART — Freeway — Project Boundary

3.1.4 Transit Stops and Passenger Facilities

Transit facilities are limited within and around the study area and include curbside bus stops and bus bays at the Fruitvale BART station. Most stops consist of flagpoles and possess limited covered protection from the elements and/or benches. Stops also lack real-time arrival information and schedules. Opportunities exist to improve the bus stops to make them more amenable to transit users such as improved facilities and access.

AC Transit bus stop at Fruitvale and Alameda Avenues

Key passenger facility findings are summarized below:

- Five bus stops are located within the Plan Area – these are equipped with flagpoles at a minimum, with some having benches. Stops are located at both the near- and far-side of intersections. Stop locations include:
  - 23rd Avenue / East 7th Street (for the OX)
  - 23rd Avenue / 29th Avenue (for the OX and Local 50)
  - 29th Avenue / Glascock Street (for the Local 50)
  - Fruitvale Avenue / Alameda Avenue (two directional stops for the Local 19 and 63).
- Adjacent to the study area, bus stops are most numerous along International Boulevard, averaging one every three-four intersections or about every 0.20-0.25 miles. The level of amenities provided varies by location, with some bus stops consisting only of a flagpole, while others are more elaborate with benches and/or covered shelters. Bus stops are located at both near-/far-sides of the intersection.

AC Transit bus shelter at International Boulevard and 54th Avenue

- Bus stops exist along the E 12th Street Corridor for the Local 62, north of Fruitvale Station as well as on 29th and Fruitvale Avenue, just east of the study area.
- The Fruitvale BART station is a hub of transit activity just west of the International Blvd. Corridor. Several routes originate/terminate at the BART station including the Local 14, 19, 50, 53, 54, 62, and 63. The bus parking and maneuvering area is located at the west/south side of the station and includes five sawtooth bays to the north of the station and three along a center island. A bus loading area also exists in front of the station as well. Buses enter from 35th Avenue on the east side of the facility and exit via 33rd Avenue onto East 10th Street. Covered shelters exist at these locations for BART and AC Transit transfer passengers.

3.1.5 Ridership and Demand

Weekday Demand within Central Estuary Study Area

As noted, four routes with five stops directly serve the Plan Area. Demand is very limited in this area, with the four routes collectively serving an average 29 boardings and 34 alightings each weekday. Table 8 presents the daily boardings and alightings by route.

Table 8: Weekday Boardings/Alightings within Central Estuary Study Area

Route #	# of Stops[1]	Daily Boardings	Daily Alightings	Daily Activity
19	2	1	3	4
50	2	15	20	35
63	2	3	2	5
OX	2	10	9	19
Total	8	29	34	63

Notes:
(1) Some of these stops are shared. Only five signed bus stops are provided.
Source: AC Transit, March 2009.

Weekday Demand within Central Estuary Study Area and International Blvd Corridor

Transit demand is considerably higher along the International Boulevard corridor just east of the Plan Area. Overall, weekday demand within the corridor and the site area is estimated at around 7,400 boardings and 6,800 alightings per day at 50 shared stops. Table 9 presents the daily boardings and alightings for these routes. Of note within the study area and the International Boulevard Corridor:

- The Local 1, the Rapid 1R, and the Local 50 have the highest overall weekday demand with nearly 2,000, 1,600, and 850 weekday boardings.
- Collectively, these three routes account for over 60% of the total boardings in the area.
- The Local 53, 54, and 62 also see weekday boardings ranging from between 600-750 per day.

Table 9: Weekday Boardings/Alightings Activity for Routes Operating around Study Area

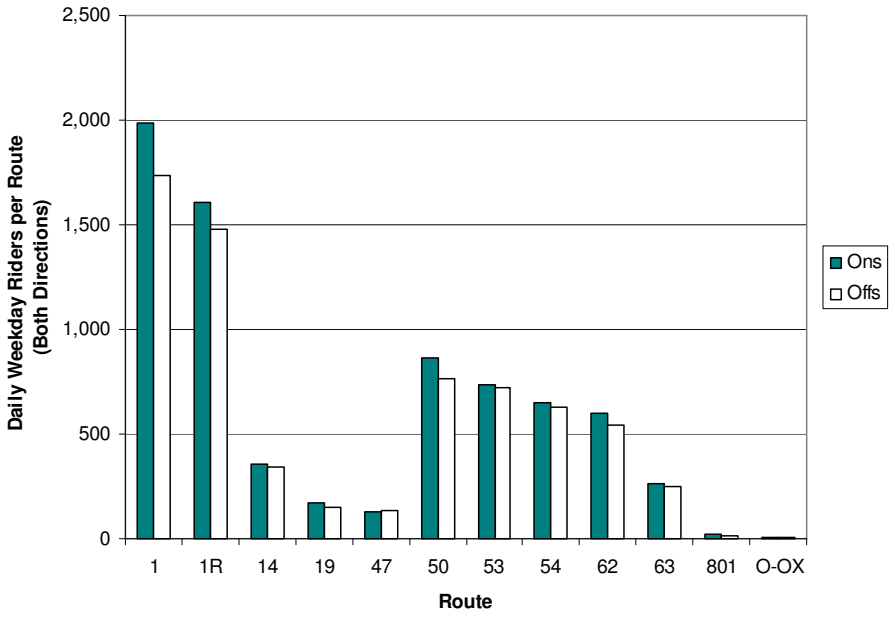
Route #	Entire Route				Within Study Area and Int. Blvd. Corridor			
	# of Stops	Daily Boardings	Daily Alightings	Daily Activity	# of Stops	Daily Boardings	Daily Alightings	Daily Activity
1	213	10,970	10,969	21,939	29	1,985	1,739	3,724
1R	76	11,332	11,291	22,623	6	1,605	1,480	3,085
14	166	3,316	3,293	6,609	9	360	343	703
19	171	1,745	1,745	3,490	6	172	153	325
47	54	308	309	617	10	128	138	266
50	189	8,209	8,211	16,420	9	866	764	1,630
53	62	2,297	2,373	4,670	4	736	721	1,457
54	57	1,977	1,975	3,952	5	648	626	1,274
62	98	3,357	3,378	6,735	11	598	540	1,138
63	118	1,937	1,940	3,877	6	264	251	515
801	255	185	185	370	29	19	15	34
O-OX	110	2,270	2,266	4,536	2	10	9	19
Total around Study Area						**7,391**	**6,779**	**14,170**

Source: AC Transit, March 2009

Highest Usage Stops within Central Estuary Study Area and International Blvd. Corridor

Fifty-five bus stops are served by AC Transit routes within the study area and the International Blvd. Corridor. Figure 11 presents the average weekday ridership demand for the entire route (in both directions).

Figure 11: Average Weekday Demand by Route (Both Directions)



Source: AC Transit, March 2009

On these routes:

- All of the busiest stops are located outside of the Plan Area boundary.
- The Fruitvale BART station is the busiest boarding and alighting location for AC Transit services. While it is assumed that the majority of these passengers transfer to/from BART lines, it is possible some proportion of these is between AC Transit routes including the 1R.
- International Boulevard & 34th Street is the second busiest bus stop in the area – it is served by the Local 1 and the Rapid 1R. This stop connects directly to the Fruitvale BART station via the 34th Street pedestrian mall through the Fruitvale Transit Village.

Figure 12 presents the daily boardings for all of the bus stops within the study area. Table 10 presents the top 10 of these bus stops as measured by daily boardings and alightings.

Figure 12: Daily Boardings at All Bus Stops in the Central Estuary Study Area

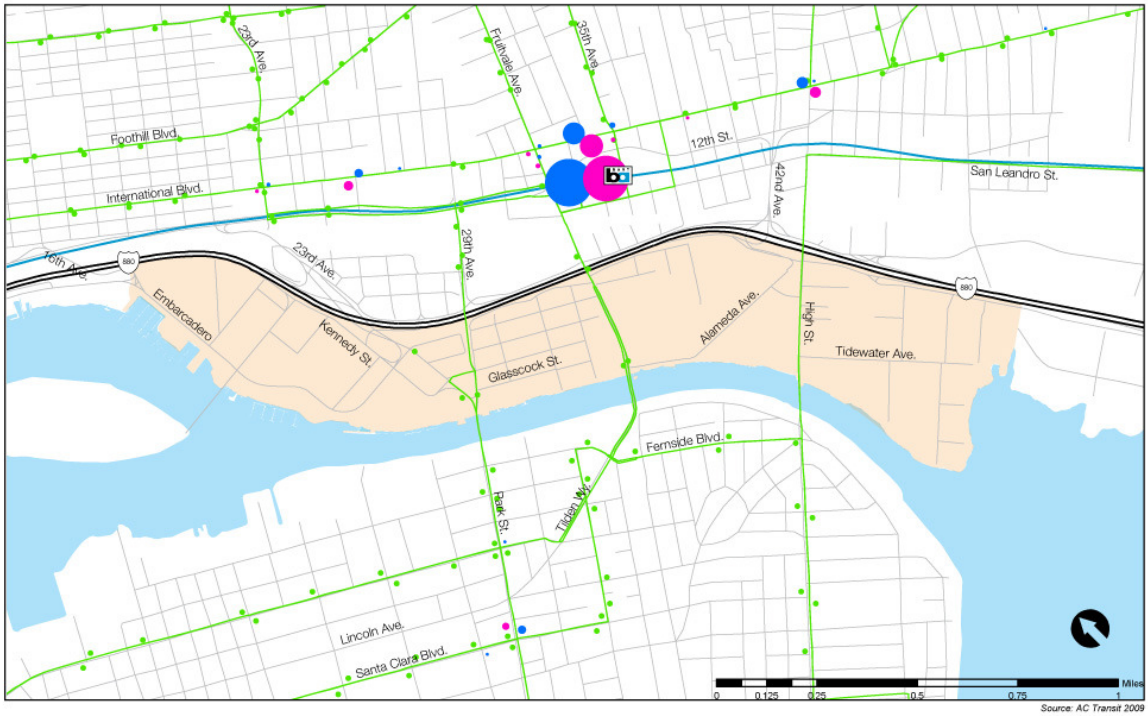


Figure 12: Most Active Bus Stops **April 16, 2009**

NOTE: Ridership data on two AC Transit Routes serving only Alameda , 51 and W, were not included in these totals.

- AC Transit Stops (under 100 Daily Boardings + Alightings)
- ACTransit Routes
- BART Stops
- BART

Higher Activity AC Transit Bus Stops

- 100 Boardings + Alightings Daily (Southbound)
- 500 Boardings + Alightings Daily (Southbound)
- 1,000 Boardings + Alightings Daily (Southbound)
- 100 Boardings + Alightings Daily (Northbound)
- 500 Boardings + Alightings Daily (Northbound)
- 1,000 Boardings + Alightings Daily (Northbound)

Table 10: Top 10 Bus Stops by Daily Boardings Within the Study Area

#	Stop Location	Daily Boardings	Daily Alightings	Stop Location	Daily Boardings	Daily Alightings
1	Fruitvale BART Station	2,055	885	Fruitvale BART Station	974	1,815
2	International Blvd & 34th	540	749	International Blvd & 34th	832	540
3	International Blvd & High	327	301	International Blvd & High	362	258
4	International Blvd & 26th	259	185	International Blvd & 26th	266	238
5	Fruitvale Av & E 14th St	169	6	35th Av & E 14th St	192	5
6	International Blvd & Fruitvale	85	65	International Blvd & Fruitvale	103	93
7	International Blvd & 23rd	84	75	International Blvd & 23rd	88	63
8	International Blvd & 54th	67	38	International Blvd & 38th	84	46
9	International Blvd & 29th	62	49	High St & E 14th St	81	10
10	International Blvd & 46th	46	39	International Blvd & 29th	42	56

Source: AC Transit, March 2009

3.2 BART

The Bay Area Regional Transit District (BART) provides regional commuter rail transit service in the Bay Area. BART operates along a corridor that runs parallel to I-880 and E 12th Street, just to the east of the Plan Area. The Fruitvale BART station is the closest to the CEP study area. Figure 13 shows the location of the Fruitvale BART station in relation to the entire BART system.

Figure 13: BART System (as of March 2009)

Source: BART Website (http://www.bart.gov)

Two other BART stations are located within two miles of the Plan Area: the Lake Merritt station is approximately two miles north and the Coliseum station is approximately one mile south. This section focuses on the Fruitvale station because of its close proximity to the CEP study area.

While the Plan Area boundary is located less than one-quarter mile from the Fruitvale station, the pedestrian connectivity between the Plan Area and the station is quite poor. Figure 14 presents a pedestrian "walkshed" analysis of the BART station. A walkshed is defined as the area that is walkable around a particular point of interest.

The walkshed analysis presented in Figure 14 identifies a one-quarter and one-half mile buffer around the Fruitvale BART station. Along with these distance buffers, the actual one-quarter and one-mile walking distances on the existing sidewalk network are also identified. Figure 14 clearly shows that the physical barrier formed by I-880 and the railroad tracks results in a lack of direct pedestrian routes from the BART station to the Plan Area.

Figure 14: Fruitvale BART Station Walkshed

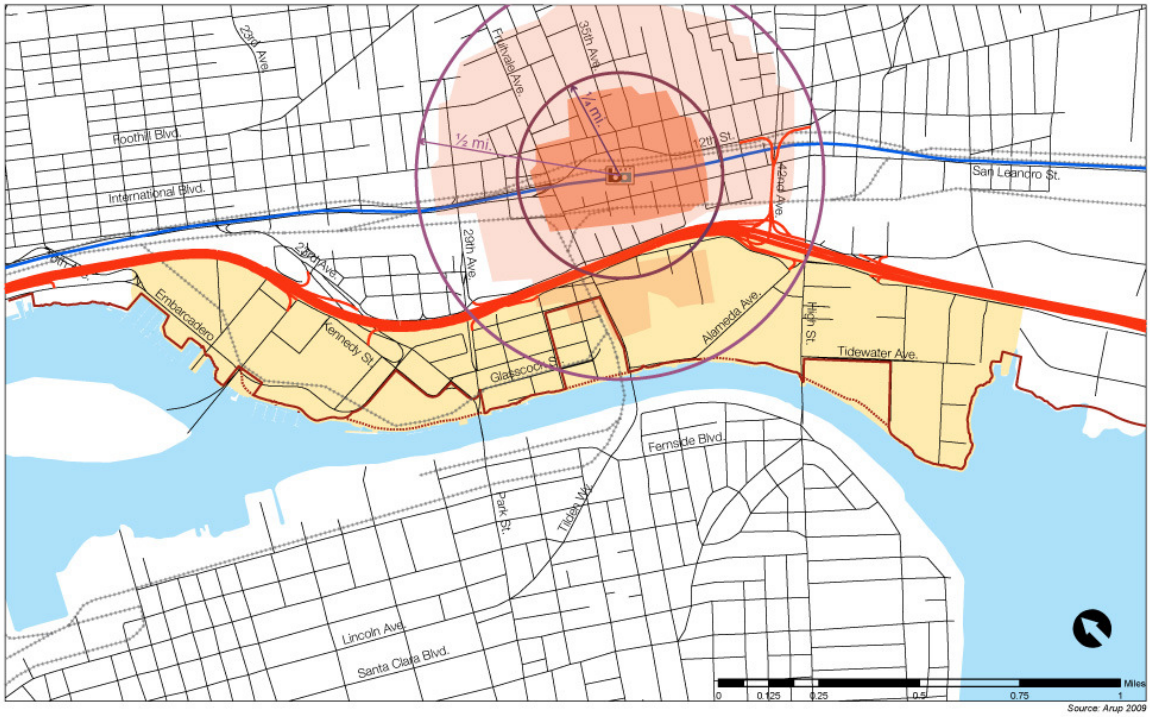


Figure 14: Fruitvale BART Station Walkshed **April 16, 2009**

Freeway
Freeway Ramps
BART
Local/Collector
Railroad
½ Mile Walk-shed
¼ Mile Walk-shed
CEP Study Area
Bay Trail (Existing)
Bay Trail (Under Construction/Proposed)

3.2.1 Service Characteristics

The Fruitvale BART station currently serves three BART lines: the Green Line between San Francisco and Fremont; the Orange line between Richmond and Fremont; and the Blue line between San Francisco and Dublin / Pleasanton. Service on BART is directional with more frequent service in the peak direction of travel (towards Downtown Oakland and San Francisco in the morning and south towards Fremont in the afternoon). Headways on each line vary from 15-20 minutes depending on the time of day and day of the week. During the weekday, the combined service headway is five minutes in the peak direction. BART operates seven days a week with weekday peak service being the heaviest and Sunday/Holiday service being the lightest.

Fruitvale BART Station

Table 11 presents the service data for the three lines serving Fruitvale station.

Table 11: BART Lines Serving Fruitvale Station

Line	Direction	Time Period	Service Span		Service Frequency			
			Start	***End***	***AM Peak***	***Mid-day***	***PM Peak***	***Night***
Richmond - Fremont	Towards Richmond	M-F	4:00AM	1:00AM	15	15	15	15
		Sat	5:45AM	1:00AM	20	20	20	15
		Sun	7:45AM	1:00AM	15	15	15	15
	Towards Fremont	M-F	4:15AM	1:30AM	15	15	15	15
		Sat	6:00AM	1:30AM	20	20	20	15
		Sun	8:00AM	1:30AM	15	15	15	15
Dublin/Pleasanton – Daly City/Millbrae	Towards Dublin	M-F	4:15AM	1:30AM	15	15	15	15
		Sat	6:00AM	1:30AM	20	20	20	15
		Sun	7:45AM	1:30AM	15	15	15	15
	Towards Daly City	M-F	4:15AM	1:00AM	15	15	15	15
		Sat	6:00AM	1:00AM	20	20	20	15
		Sun	7:45AM	1:00AM	15	15	15	15
Fremont – Daly City	Towards Daly City	M-F	5:00AM	7:00PM	15	15	15	-
		Sat	8:45AM	7:00PM	20	20	20	-
		Sun	No Sunday Service					
	Towards Fremont	M-F	6:15AM	8:00PM	15	15	15	15
		Sat	10:00AM	8:00PM	20	20	20	-
		Sun	No Sunday Service					

Source: BART Website (http://www.bart.gov)

3.2.2 Transit Passenger Facilities

The Fruitvale BART station is located to the east of the site area along E 12th Street between Fruitvale Avenue and 35th Street. The station itself has an aerial side platform configuration. The station concourse is located on the ground level and connects to the Fruitvale Transit Village to the north of the station and to the bus and parking lot/garage to the south of the station. Other features of this station include:

- A large bus loading, maneuvering, and storage area, which accommodates eight sawtooth bus bays. Seven routes originate/terminate at the station - the Local 14, 19, 50, 53, 54, 62, and 63. Buses enter from 35th Avenue on the east side of the facility and exit via 33rd Avenue onto East 10th Street. Covered shelters exist at these locations for BART and AC Transit transfer passengers.

Bus Loading Area at Fruitvale BART Station

- Direct pedestrian connections exit via the 34th Avenue pedestrian mall to International Boulevard and the concentration of transit services on this corridor – including the Local 1 and Rapid 1R.

34th Ave Pedestrian Mall to International Blvd

- Short-term parking is available for pickups south of the bus loading area (about 20 spaces).
- BART patron parking is available in a five-story garage at the corner of E 12th Street and Fruitvale Avenue. Approximately 500 spaces are available in the garage.

Additional overflow parking exists across Fruitvale Avenue (approximately 250 spaces). At present, the daily parking charge is $1.00, with additional payment options including Monthly Reserved, Extended Weekend, Carpool, Single Day Reserved, and Airport/Long-Term Parking. According to BART, the lots fill by 7:00AM. Additional paid parking exists to the southeast of the station – areas normally used for the Fruitvale Development.

- Secure bike storage is available at the Fruitvale Village (attended from 6:00AM-8:00PM), featuring nearly 230 spaces. Bike racks are also available at the station.
- Two dozen keyed lockers are also available at the station

3.2.3 Ridership and Demand

The Fruitvale BART station averaged approximately 7,000 weekday boardings and alightings from January to March 2009. Ridership at Fruitvale during the same three month period in 2008 was approximately 7,230. This represents a year-over-year decrease of 3 percent. Systemwide, average weekday BART ridership declined 1 percent over the same period. In terms of ridership, the Fruitvale station is the 18th busiest of BART's 43 stations.

Detailed time-of-day ridership data from April 2008 was analyzed to understand peak period activity at the Fruitvale station. During BART's systemwide AM peak hour (7:45 AM to 8:45 AM), approximately 16 percent of Fruitvale boardings and 4 percent of Fruitvale alightings occur. Demand at the Fruitvale BART station is reversed during the systemwide PM peak hour (5:15 to 6:15 PM), as approximately 15 percent of alightings and 5 percent of boardings occur. About half of total activity at Fruitvale Station occurs during the AM and PM commute periods. As defined by BART, the AM commute period occurs from 7:00 to 10:00 AM and the PM commute period occurs from 4:00 to 7:00 PM.

Table 12 presents the five stations in the BART system that experience the most activity to/from Fruitvale. The percentage of total daily riders to/from Fruitvale is provided for each station. The Embarcadero and Montgomery BART stations receive 12 and 11 percent of total daily riders from Fruitvale, respectively.

Table 12: Fruitvale BART Station Ridership

Station	Daily Ridership to/from Fruitvale BART (%)
Embarcadero	12%
Montgomery	11%
Powell	8%
Civic Center	8%
Berkeley	5%
Source: BART, 2009	

Data on how riders travel to the Fruitvale BART station is provided in the report *2008 BART Station Profile Study* (BART, 2008). Table 13 presents the percentages for each travel mode to/from the Fruitvale BART station. The Fruitvale BART station's 10 percent bike mode share is tied for the second highest in the system – Ashby with 12 percent and Berkeley with 10 percent are the other two station's with comparable bicycle mode shares.

Table 13: Travel Mode to/From Fruitvale BART Station

Travel Mode	Daily Ridership to/from Fruitvale BART (%)
Walk (only)	17%
Bus/Transit	19%
Drive Alone	38%
Car Pool	4%
Dropped Off	11%
Bicycle	10%
Source: *2008 BART Station Profile Study* (BART, 2008)	

3.3 Water Emergency Transportation Authority (WETA)

The Water Emergency Transportation Authority (WETA) was established by SB 976 and replaces the WTA (Water Transit Authority), which was a regional agency authorized by the State to operate a comprehensive San Francisco Bay Area public water transit system. Primary ferry routes link San Francisco with Vallejo, Sausalito, Larkspur, Tiburon, Oakland/Alameda, and Harbor Bay (Alameda).

Within the site area, there is no direct ferry service. The closest ferry service to the Plan Area (approximately 2.5 miles to the north) is the daily Oakland/Alameda service that operates between Alameda (Alameda Ferry Dock at 2990 Main Street), Oakland (Jack London Square – 530 Water Street), the San Francisco Ferry Building, and Pier 41. Seasonal services to AT&T Park for Giants baseball games and Angel Island also operate. Figure 15 shows the WETA ferry system and Alameda/Oakland ferry service.

Figure 15: Alameda/Oakland to San Francisco Ferry Route

Source: WETA, 2009

During the morning and afternoon peak periods, departures are about every hour, whereas in the mid-day this is reduced to a single departure every two hours. Each weekday sees 13 departures to San Francisco and 12 departures to Oakland/ Alameda. Each trip serves both Oakland and Alameda, however, some trips may originate or terminate at Oakland, while others may do so at Alameda. Weekend service operates every 90-150 minutes with six daily departures. Fares are $6.25 per one-way trip from Alameda/Oakland to San Francisco.

Tables 14 and 15 present the weekday timetable for the Oakland/Alameda service:

Table 14: Weekday Oakland/Alameda to San Francisco Ferry Schedule

#	Depart Oakland[1]	Depart Alameda	Arrive at SF Ferry Building	Arrive at Pier 41
1	6:00AM	6:10AM	6:30AM	
2	7:05AM	7:15AM	7:35AM	
3	8:10AM	8:20AM	8:40AM	
4	9:15AM	9:25AM	9:45AM	10:00AM
5	11:00AM	10:50AM	11:30AM	11:45AM
6	12:45PM	12:35PM	1:15PM	1:30PM
7	2:30PM	2:20PM	3:00PM	3:10PM
8	4:40PM	4:30PM	5:10PM	
9	5:50PM	5:40PM	6:15PM	
10	6:20PM	6:10PM		7:00PM
11	6:55PM	6:45PM	7:20PM	
12	7:55PM	7:45PM	8:20PM	
13	8:55PM	8:45PM		9:25PM

Note:
(1) Some departures start in Oakland first, while others start in Alameda first.
Source: Alameda/Oakland Ferry (http://www.eastbayferry.com)

Table 15: Weekday San Francisco to Oakland/Alameda Ferry Schedule

#	Depart Pier 41	Depart SF Ferry Building	Arrive at Alameda[1]	Arrive at Oakland
1		6:30AM	7:15AM	7:05AM
2		7:35AM	8:20AM	8:10AM
3		8:40AM	9:25AM	9:15AM
4	10:15AM	10:30AM	10:50AM	11:00AM
5	12:00PM	12:15PM	12:35PM	12:45PM
6	1:45PM	2:00PM	2:20PM	2:30PM
7	3:45PM	4:10PM	4:30PM	4:40PM
8		5:20PM	5:40PM	5:50PM
9	5:20PM	5:45PM	6:10PM	6:20PM
10		6:25PM	6:45PM	6:55PM
11		7:25PM	7:45PM	7:55PM
12		8:25PM	8:45PM	8:55PM

Note:
(1) Some trips arrive in Alameda first, while others arrive in Oakland first.
Source: Alameda/Oakland Ferry (http://www.eastbayferry.com)

According to the Alameda/Oakland Ferry Service, annual demand for the Alameda/Oakland to San Francisco reached nearly 467,000 riders in FY2007/08. During commute periods, 65% of the ridership originates in Alameda and 35% in Oakland, respectively. Overall weekday patronage is split between Oakland and Alameda, while weekend demand is largely from Oakland (nearly 60-70% of the total). Winter months have the lowest demand, while summer periods have the highest (from June to October). Highest average weekday demand occurs in the spring and summer with flows of up to 1,400-1,500 daily riders (with winter demand dipping to nearly 600 daily riders).

Source: Alameda/Oakland Ferry Service

Alameda/Oakland Ferry

Ferry service also links the Alameda Harbor Bay with San Francisco, although Harbor Bay is considered to be outside of the site area. Six daily roundtrip departures are provided each day (three during the morning and three during the evening peak, respectively, at one hour intervals).

Future plans calls for a new route linking Oakland (Jack London Square) to South San Francisco and Oyster Point, the location of numerous biotechnology related companies. Travel time would be approximately 30-35 minutes. The service is predicted to carry upwards of 900 daily passengers by 2025.

3.4 East Bay Paratransit

For those riders that have a disability or a health condition preventing them from using AC Transit buses or BART trains, East Bay Paratransit fills this gap providing dial-a-ride service within the site area. East Bay Paratransit was established by AC Transit and BART to meet the requirements of the Americans with Disabilities Act, using sedan or lift-equipped vans. Potential users must fill out an application and be certified as eligible prior to being able to use the service. Once deemed eligible, riders can make a trip reservation anytime between 7:00 AM-7:00 PM any day of the week (up to seven days in advance).

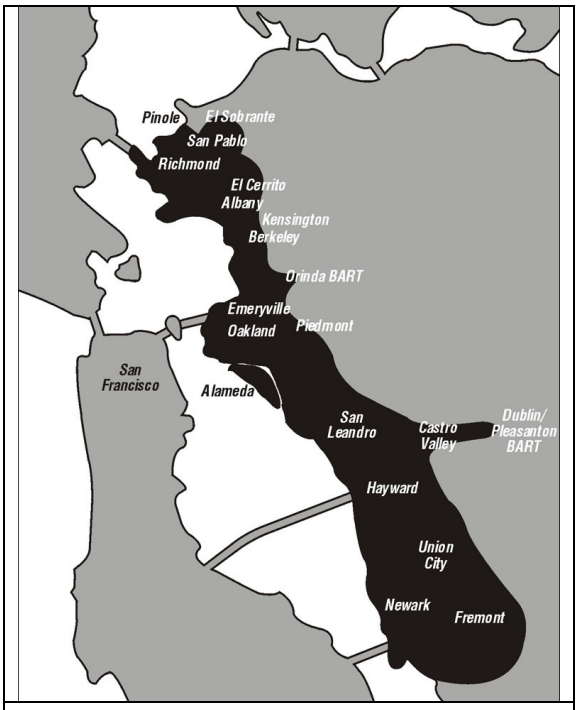
Source: East Bay Paratransit (http://www.eastbayparatransit.org)

East Bay Paratransit Vehicle

East Bay Paratransit acts as a door-to-door service for eligible riders. It operates across the same service territory as AC Transit – from Richmond/Pinole in the north, to Fremont in the south, to Castro Valley in east, and to San Francisco in the west. Transfers to other

paratransit services are also available. Costs within the East Bay range from $3.00-$6.00 depending on the length of the trip. Trips between the East Bay and San Francisco cost between $6.00-$7.00. Figure 16 presents the East Bay Paratransit service area.

Figure 16: East Bay Paratransit Service Area



Source: East Bay Paratransit (http://www.eastbayparatransit.org)

4 Bicycle/Pedestrian

The study area's overall bicycle and pedestrian environment is quite poor for several reasons:

- Bay Trail segments along the Estuary shoreline are incomplete, which results in a discontinuous route through the Plan Area (Note: a number of proposals exist to complete a contiguous routing along the water)
- A lack of dedicated bicycle facilities on local streets and bridges crossing the Estuary
- Missing sidewalk segments
- Prohibited pedestrian crossings at major intersections
- A lack of crosswalks, pedestrian signal heads, and pedestrian push buttons at major signalized intersections
- Indirect north-south connections through the Plan Area result in pedestrians and bicyclists having to cross major east-west streets (e.g., Fruitvale Avenue, 29th Avenue) at locations with heavy traffic volumes
- A lack of safe, attractive, and direct pedestrian and bicycle connections from the Plan Area to the Fruitvale BART, E 12th Street, and International Boulevard east of I-880 and the freight rail tracks.

This section of the report provides an overview and inventory of the existing pedestrian and bicycle environment within the study area.

4.1 Bicycle and Pedestrian Analysis Methodologies

The pedestrian and bicycle evaluation presented in this section includes the following:

1. The results of the AM and PM peak hour pedestrian and bicycle counts at the thirty study intersections.
2. An inventory of the existing pedestrian and bicycle facilities within the Plan Area site and throughout the overall transportation study area. The inventory identifies the width of sidewalks, the class and width of bike lanes, and other features including crosswalks at intersections, the availability of mid-block crossings, pedestrian refuges, etc. The assessment identifies where there are gaps or discontinuities in the existing pedestrian and bicycle network. Regions within the study area that lack adequate facilities for pedestrians or bicyclists are identified.
3. An analysis of pedestrian and bicycle collisions throughout the study area using the same CHP SWITRS accident/collision data used in the traffic analysis section. The location and total number of pedestrian and bicycle collisions are mapped and normalized to the relative AM/PM peak hour passenger car, bike, and pedestrian volumes observed at each intersection. These plots are used to identify "hot spots" that pose a danger to pedestrians and bicyclists.

There are several promising emerging methodologies within the planning profession that are attempting to better quantify the pedestrian and bicycle environment. Two of these methods include:

- **Multimodal Level of Service:** *NCHRP Report 616: Multimodal Level of Service Analysis for Urban Streets* (Transportation Research Board, 2008). The Multimodal LOS analysis methodology is comprehensive assessment of all users of the urban street network: auto drivers, transit riders, bicyclists, and pedestrians. Separate LOS models were developed for each mode using video laboratory surveys and

field data. The model has built-in dependencies; i.e., each model affects all of the others. For example, better Auto or Transit LOS could result in inputs that negatively impact Bicycle and Pedestrian LOS. The Multimodal LOS analysis will be incorporated into the 2010 update of the HCM.

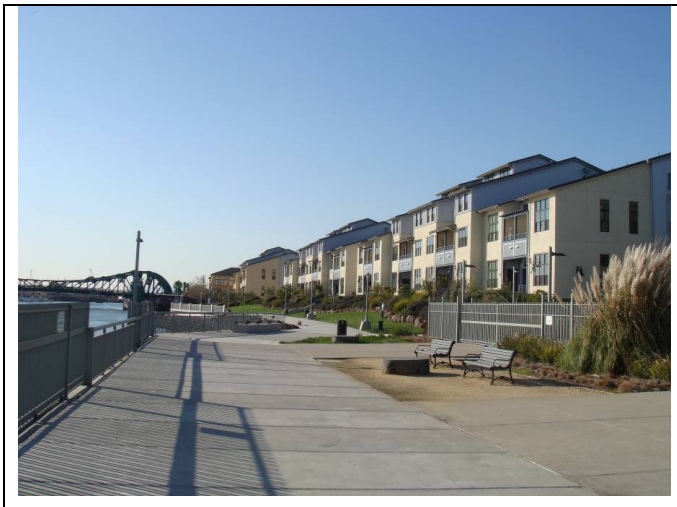
- **Pedestrian Environmental Quality Index (PEQI) and Bicycle Environmental Quality Index (BEQI):** *Healthy Development Measurement Tool* (San Francisco Department of Public Health, 2006). The PEQI and BEQI metrics assess the quality of the pedestrian and bicycle environments by scoring a series of indicators that affect the quality of the pedestrian and bicycle experience. These indicators are developed using visual assessments of street segments and intersections. Each indicator is scored based on a survey of national experts. These scores are aggregated into the PEQI and BEQI metrics.

Both the Multimodal LOS and PEQI/BEQI metrics provide a more rigorous analysis of pedestrian and bicycle conditions. However, these metrics require additional data collection and analysis techniques that are relatively new. Some of the data required for these analysis methods is summarized below in the pedestrian and bicycle assessments. Additional data gathering and discussions are needed before these methods can be pursued further.

4.2 Bay Trail

The Bay Trail is an important element of the Bay Area's overall pedestrian and bicycle network. The ultimate goal of the Bay Trail is to provide a continuous 400-mile corridor around the entire Bay Area that connects communities and provides recreation and transportation opportunities. Various alignment options and strategies for the entire Bay Trail are identified in the report *Oakland Waterfront Trail, Bay Trail Feasibility & Design Guidelines* (City of Oakland and EDAW, 2006).

Within the Plan Area the Bay Trail follows an indirect on-street alignment along Embarcadero, E 7th Street, Fruitvale Avenue, Alameda Avenue, and High Street. The Bay Trail has several segments that follow an Estuary shoreline alignment. While these segments are located along roughly half of the Plan Area waterfront shoreline, most of the segments are not linked. At the northern end of the Plan Area, the Bay Trail is an on-street Class 2 facility that follows an alignment along Embarcadero. At the southern end of the Plan Area, the Bay Trail is an off-street Class 1 facility that traverses the Martin Luther King Jr. Regional Park.



Bay Trail West of Glasscock Street

Many of the gaps in the shoreline alignment exist where individual parcels have water access. Easements and pier-supported structures will be required to span many of these sections. Other gaps exist at the three bridges that span the Estuary. Agreements with the Army Corps of Engineers will be required to provide access under the bridge structures.

The City of Oakland is currently working to close these gaps through various programs, most notably its Measure DD bond measure. Ongoing efforts to close the gaps in the Bay Trail shoreline alignment include:

- Cryer Site: A two-acre site located at the southwest corner of the Embarcadero / Dennison Street intersection. The parcel borders the northern end of Union Point Park. The Bay Trail is planned to follow an alignment through the parcel that would connect Embarcadero to the northern end of the park. The City is currently working on obtaining the parcel and completing an environmental assessment.
- The Derby Avenue to Lancaster Street section is currently under construction.
- Trail easements were obtained from two private owners (US Audio and NEU) for a short segment along the shoreline south of Fruitvale Avenue and just west of Alameda Avenue. This new segment will connect Alameda Avenue to the Bay Trail and High Street further south. This section is currently in design.
- The feasibility of closing the remaining gaps along the shoreline north of the Park Street Bridge and south of the High Street Bridge are being evaluated. Easements with existing property owners are required to complete these sections. These sections include the Livingston Pier site (at the western end of Livingston St) and properties in the vicinity of the Park Street Triangle.
- The three bridges at Park Street, Fruitvale Avenue, and High Street are a major obstacle to providing a continuous shoreline alignment. The Fruitvale Avenue bridge is the first priority because shoreline sections of the Bay Trail terminate on either side of the bridge. The Park Street bridge currently has no segments on either side, while High Street has a segment on the north side only. A preferred option for crossing Fruitvale Avenue would occur under the bridge, although an at-grade crossing at the Fruitvale Avenue / Alameda Avenue intersection is another alternative. All bridge crossings require an extensive analysis and approval by the Army Corps of Engineers.

4.3 Bicycle Facilities

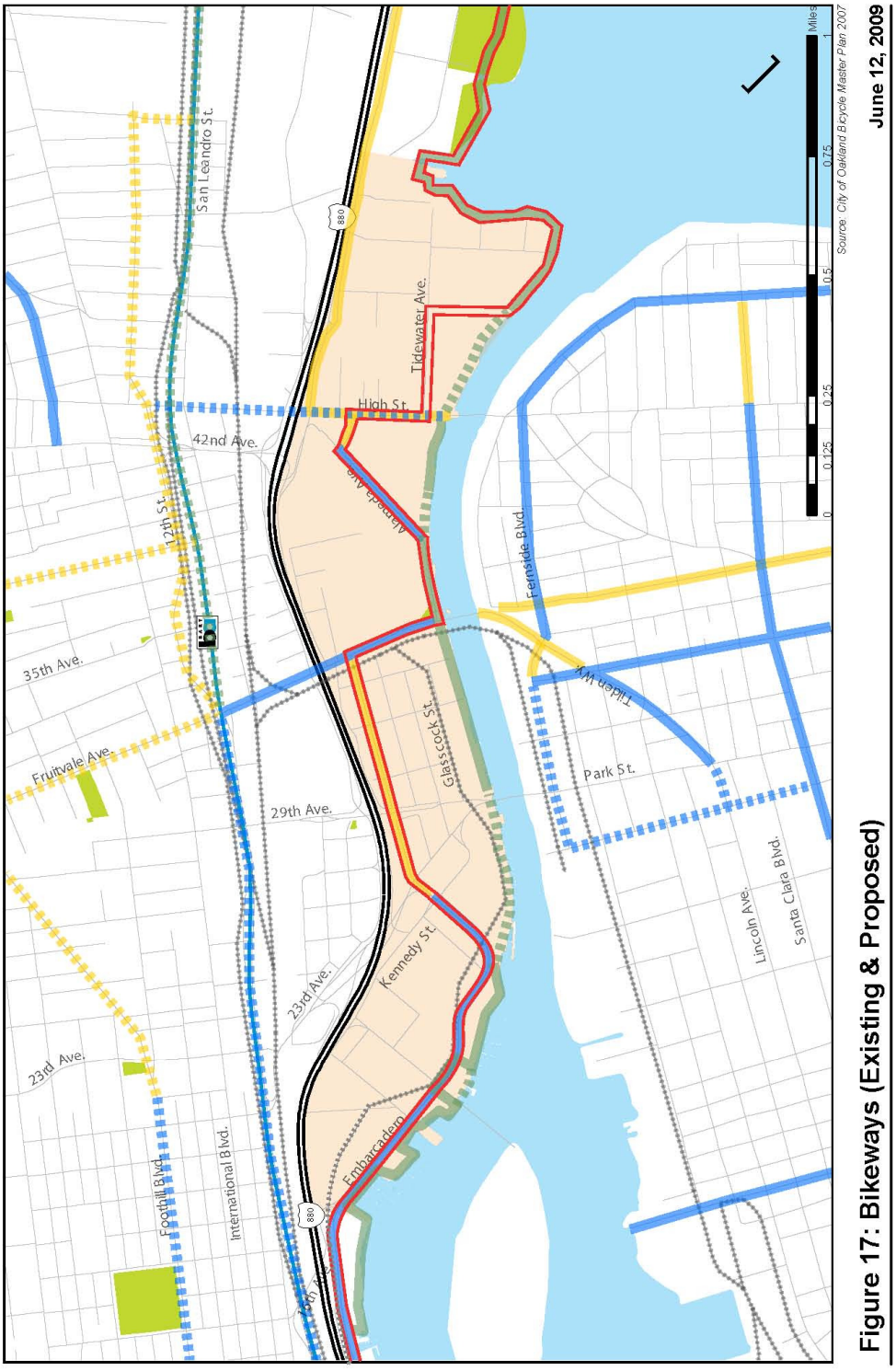
Bicycle facilities include any dedicated off-street paths where bicycles are permitted and all local streets and public rights-of-way. There are three primary classes of bicycle infrastructure in Oakland defined in the *City of Oakland Bike Master Plan* (City of Oakland, December 2007):

- Bicycle Paths (Class 1) are off-street paths that are available for use by cyclists. They are typically shared with pedestrians and often called mixed-use paths. They are often located in parks, along waterways, former railways and freeways.
- Bicycle Lanes (Class 2) are on-street lanes, designated for exclusive use by cyclists. Bicycle lanes are often installed on arterial and collector roads that have relatively high vehicle volumes and speeds.
- Bicycle Routes (Class 3) are streets that provide signage, but no dedicated space for cyclists. Instead, cyclists share a mixed use lane with other traffic. Streets with Class 3 bicycle routes usually have relatively low levels of auto traffic and may be provided with traffic calming or other physical measures to support bicycle travel.

Two types of Class 3 bike lanes used in Oakland that incorporate enhanced bicycle amenities include:

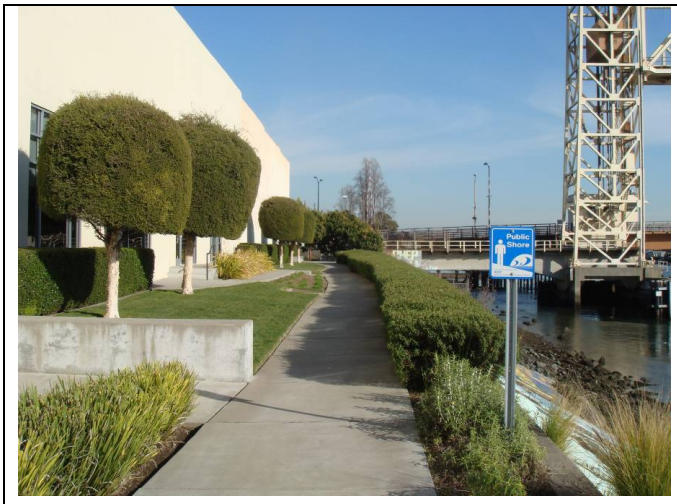
- *Arterial Bicycle Routes* (Class 3A): Bicycle routes may be used on some arterial streets where bicycle lanes are not feasible and parallel streets do not provide adequate connectivity. These streets should promote shared use with lower posted speed limits (preferably 25mph), shared lane bicycle stencils, wide curb lanes, and signage.
- *Bicycle Boulevards (Class 3B): Bicycle boulevards are bicycle routes on residential streets that prioritize through trips for bicyclists. The route should appeal to cyclists of varied skill levels by providing direct connections on streets with low traffic volumes. The route should reduce delay to bicyclists by assigning right-of-way to travel on the route. Traffic calming should be introduced as needed to discourage drivers from using the boulevard as a through route. Intersections with major streets should be controlled by traffic signals with bicycle actuation.*

Figure 17 presents the location and type of the existing and proposed bikeways within the study area. The Bay Trail is a Class 1 bike path through roughly half of the site. However, the large number of gaps in the trail causes riders to divert often to local streets. This makes for a very indirect route for bicyclists trying to utilize as many shoreline segments as possible.


San Leandro St.
Tidewater Ave.
High St.
42nd Ave.
12th St.
Alameda Ave.
Fernside Blvd.
Tilden Way
35th Ave.
Fruitvale Ave.
29th Ave.
Glascock St.
Park St.
23rd Ave.
Kennedy St.
Lincoln Ave.
Santa Clara Blvd.
Embarcadero
International Blvd.
Foothill Blvd.
880
Miles
0
0.125
0.25
0.5
0.75
1
Source: City of Oakland Bicycle Master Plan 2007
June 12, 2009
Figure 17: Bikeways (Existing & Proposed)
Project Boundary
Parks
Freeway
Freight Rail
BART Stops
BART
PROPOSED
Bike Path (Class 1)
Bike Lane (Class 2)
Bike Route (Class 3)
Current Bay Trail Alignment
EXISTING

The major diversions occur at three locations:

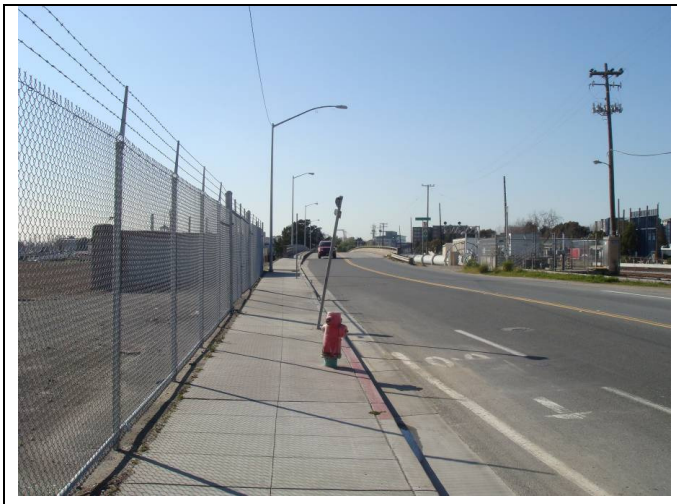
- **Between Union Point Park and 29th Avenue:** This diversion to E 7th Street and Kennedy Street requires bicyclists to cross the difficult Park Street Triangle series of intersections. The Bay Trail shoreline alignment is accessed south of 29th Avenue through a parking lot on Glascock Street.
- **North of Fruitvale Avenue Bridge:** The second major diversion occurs where the Bay Trail dead-ends just north of the Fruitvale Avenue bridge. This requires riders to divert north to E 7th Street where they can access Class 2 bike lanes on Fruitvale Avenue. These lanes travel south and reconnect to the Bay Trail at Alameda Avenue.



Dead-End Section of Bay Trail Approaching the Fruitvale Bridge from the West

- **Martin Luther King Jr. Shoreline to High Street:** At the southern end of the study area, Bay Trail riders have to divert to Tidewater Avenue to access High Street. Tidewater Avenue is an industrial street serving a high number of trucks and other heavy vehicles.

Class 2 bike lanes are located along the Embarcadero, Fruitvale Avenue and Alameda Avenue. Class 3 bike routes are located on East 7th Street, High Street and Oakport Street.



Class 2 Bike Lane Along Embarcadero

Key changes proposed for the bicycle network within the study area by the *Bicycle Master Plan* are:

- Expansion of the Bay Trail, completing existing gaps on this Class 1 bike path
- A Class 1 bike path along the BART alignment southeast of Fruitvale Avenue
- Class 2 bike lanes on E 12th Street (west of Fruitvale Avenue)
- Class 3A on Fruitvale Avenue (north of E 12th Street)
- Class 3A arterial bike route on E 12th Street (east of Fruitvale Avenue)
- A Class 3B Bike Boulevard on East 7th Street (currently a Class 3 bike route)
- Removal of bikeways Oakport Street

Within the study area, the impediments to bicycle travel include:

- Lack of bicycle connections across I-880 and the railroad tracks
- Lack of continuous dedicated bicycle facilities (Class 1 or 2) on major corridors such as High Street, International Boulevard, and E 12 Street
- No overall strategy for promoting bicycle commuting to downtown Oakland
- Lack of east-west access to the waterfront shoreline
- Lack of continuity in the Bay Trail along the Oakland Estuary waterfront shoreline, including access under the Park Street, Fruitvale Avenue, and High Street bridges
- Lack of an adequate Estuary crossing at either of the three bridges

4.3.1 Cyclist Safety

Pedestrian safety was assessed by performing an analysis of pedestrian / vehicle collisions within the study area. Figure 18 presents the location and counts of pedestrian / vehicle collisions. The map indicates the various pedestrian collision “hot spots” across the study area. The Bicycle Master Plan notes that cyclist collision data often under-reports actual collisions, as non-injury incidents are rarely reported to the SWITRS.

Figure 18: Bike Collisions

Figure 18: Bicycle Collisions 2002-2007 (Vehicle/Bicycle)

April 16, 2009

NOTE: Does not include collisions on I-880

- 1 - 2 Collisions
- 2 - 5 Collisions
- 5 - 10 Collisions
- 10 - 15 Collisions
- 15+ Collisions

- Bay Trail (Existing)
- Bay Trail (Under Construction/Proposed)
- Railroad

The 2003 report "Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling", *Injury Prevention* (Peter Lyndon Jacobson, 2003) found that Oakland ranked as the fourth safest bicycle city in California with a population over 60,000. Bicycle safety is measured as the number of collisions per bicyclist. The *Injury Prevention* article converts the bicycle collision data into a risk index that is then compared across major California cities. Oakland's risk index of 2.50 follows Berkeley (2.17), Huntington Park (2.33), and San Francisco (2.34).

The location with the greatest number of reported cyclist collisions per mile of road was at Fruitvale Ave and Foothill Blvd, which had six collisions during the five-year period. Other locations with high levels of collisions were further outside of the study area.

4.3.2 Bicycle to Transit Access

According to BART's 1998 and 2008 station access surveys, the Fruitvale BART station saw the greatest gain in bicycle access mode share during this period and tied for the highest increase in absolute numbers. The Fruitvale station experienced an increase of 307 riders accessing the station by bicycle between 1998 and 2008 (143% gain), increasing the station's bicycle access mode share from 4 to 10 percent. The establishment of the Fruitvale Transit Village in 2004, a pedestrian friendly transit-oriented mixed-use development, helped contribute to these gains in bicycle mode share. The Transit Village created a more pedestrian-friendly environment and provided a new bicycle station that offers free secure bicycle parking to commuters. The station provides 230 parking spaces for bicycles.

The City's Bike Master Plan identified the Fruitvale BART station as having a high growth potential for bicycle travel. This was determined by an analysis of topography and major barriers, nearby population and car ownership levels, existing bicycle mode share and total station ridership. Bicycles are generally permitted on BART trains, except during the peak direction at peak hours. Cyclists are also able to make dual-mode trips on the AC Transit network by using the bike racks fitted to each AC Transit bus. While bicycle usage at the Fruitvale station is amongst the highest in the BART system, the poor connectivity to the station from the Plan Area and Alameda have likely constrained growth in bicycle mode share. Improving access across I-880 and the Estuary should provide a further boost to bike usage at the Fruitvale BART station.

4.4 Pedestrian Facilities

Pedestrian facilities include the network of sidewalks and crosswalks that parallel the local street system. Pedestrian facilities also include any off-street pathways accessible to pedestrians, such as the Bay Trail.

The City of Oakland's *Pedestrian Master Plan* (City of Oakland, 2002) designated certain pedestrian routes of significance at the citywide level. The plan identifies International Boulevard as the primary pedestrian corridor in the study area, along with a section of Fruitvale Avenue and Foothill Boulevard. Other designated routes include High Street, San Leandro Street, and adjacent sections of Foothill Boulevard and Fruitvale Avenue. District level routes of relevance include Park Street-29th Avenue and E 12th Street. The Bay Trail is also identified as a regional pedestrian facility.

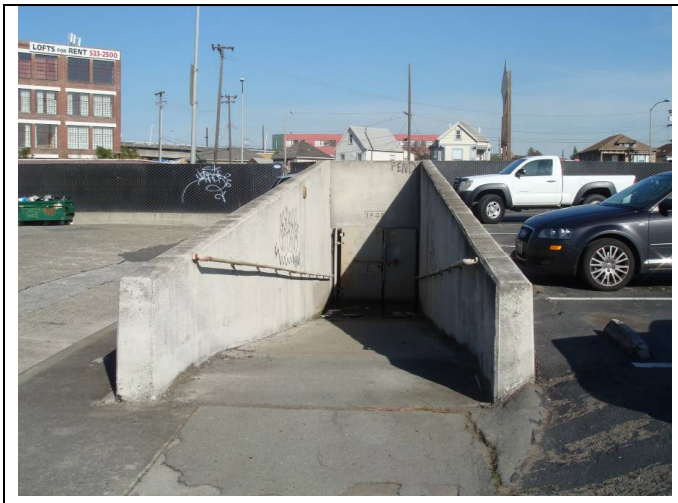
Overall, the pedestrian environment throughout the overall study area is generally quite poor. The lack of adequate connections and long exposed walking distances from the Plan Area to the rest of Oakland reduces the area's overall "walkability".

The factors that have contributed to the poor pedestrian environment include:

- Freeway ramps and other locations with uncontrolled right turns, including the Park Street Triangle
- Missing sidewalks

- Large block sizes, which can increase walking distances
- Wide roads designed to accommodate heavy vehicles and maximize traffic flow
- Few marked crosswalks and several prohibited pedestrian crossings at busy intersections
- A lack of activity generators, particularly outside of employment hours
- Insufficient street trees and other amenities
- Movement barriers created by I-880, Union Pacific / Capital Corridor railroad, BART and the Oakland Estuary

The photographs below show two examples of pedestrian paths under I-880. The first pedestrian facility is a closed undercrossing (tunnel) connecting Livingston Street to Calcot Place. This undercrossing is currently closed because of security issues. Also, the connection is not very direct and still forces pedestrians to use the 23rd Avenue rail overcrossing to access E 12th Street and International Boulevard.



Closed I-880 pedestrian undercrossing at Livingston Street

Closed I-880 pedestrian undercrossing at Calcot Place

The photograph below shows another example of pedestrian path under I-880. This pathway is open and located on E 8th Street at 34th Avenue. Similar to the Livingston Street crossing shown above, this crossing does not provide any real connection. Pedestrians still have to use Fruitvale Avenue to cross the freight rail tracks east of I-880.

Pedestrian path under I-880 on E 8th Street at 34th Avenue

These facilities and the Fruitvale station walkshed presented in Figure 14 highlight the poor pedestrian connectivity that is the result of physical barrier formed by I-880 and the railroad tracks. The lack of crossings results in indirect and circuitous walking routes from the Plan Area to destinations such as the BART station and the International Boulevard transit corridor.

4.4.1 Pedestrian Safety

Pedestrian safety was assessed by performing an analysis of pedestrian / vehicle collisions within the study area. Figure 19 presents the location and counts of pedestrian / vehicle collisions. The map indicates the various pedestrian collision “hot spots” across the study area. Most pedestrian collisions occur along International Boulevard where the most pedestrian/vehicle volumes are present.

4.5 Summary of Bicycle and Pedestrian Circulation Issues

A summary of the bicycle and pedestrian circulation issues within the study area are presented below.

- **Lack of bicycle facilities on major north-south streets:** Major north-south arterial streets such as International Boulevard and E 12th Street lack designated bike lanes. This makes bike commuting to downtown Oakland from the Plan Area difficult.
- **Lack of pedestrian crossings under I-880:** The two pedestrian facilities discussed in section 4.4 above are indicative of the lack of quality pedestrian connections from the Plan Area to areas east of I-880 and the freight rail tracks.

Figure 19: Pedestrian Collisions

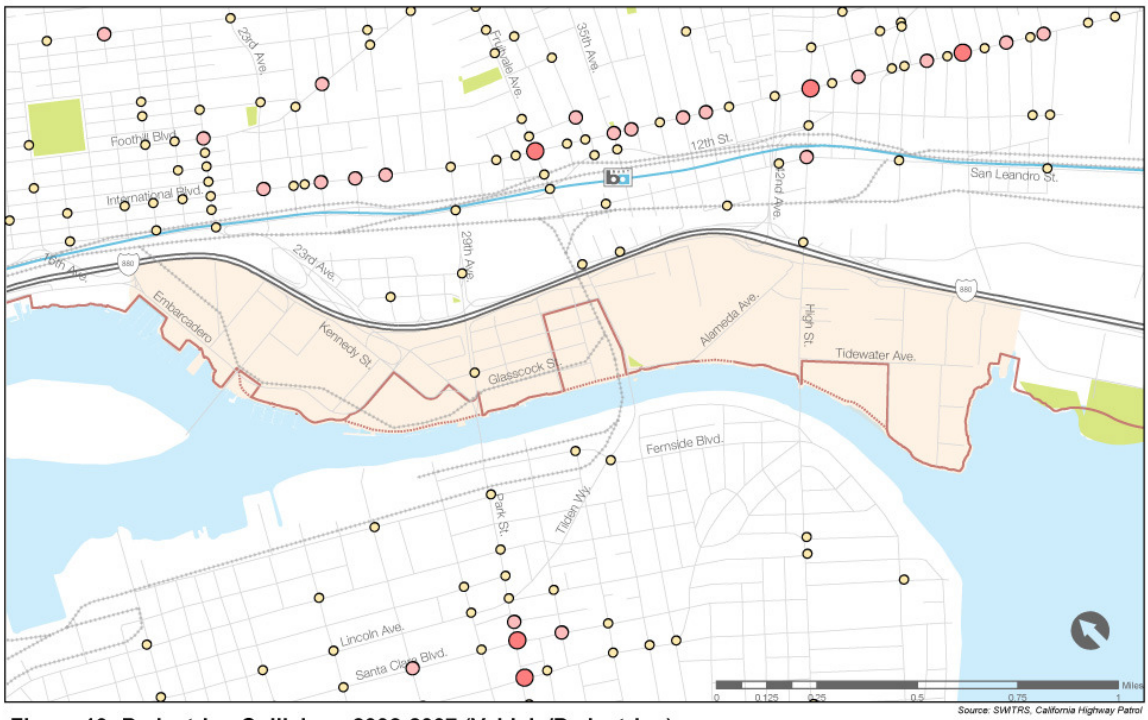


Figure 19: Pedestrian Collisions 2002-2007 (Vehicle/Pedestrian)

April 16, 2009

NOTE: Does not include collisions on I-880

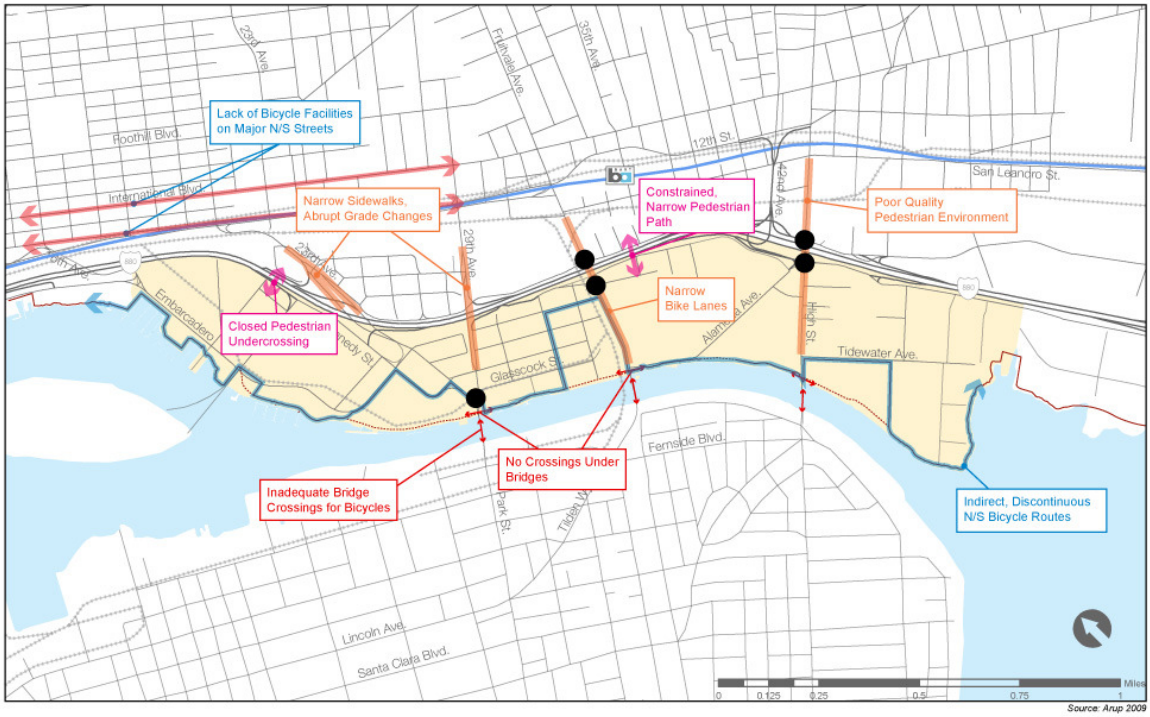
- 1 - 2 Collisions
- 2 - 5 Collisions
- 5 - 10 Collisions
- 10 - 15 Collisions
- 15+ Collisions

- Bay Trail (Existing)
- Bay Trail (Under Construction/Proposed)
- Railroad

- **The 23rd and 29th Avenue overcrossings lack adequate sidewalks, have poor street-level access, and have abrupt grade changes:** The two bridge structures spanning I-880 at 23rd Avenue and the single bridge structure at 29th Avenue only have narrow sidewalks on one side. Pedestrian access from the street level to the bridge sidewalks occurs at the base of each bridge and via stairways. These stairways are not compliant with the Americans with Disabilities Act (ADA). Also, the overcrossings have steep grades and abrupt grade changes as they rise to clear I-880. Steeper grades make it more difficult for pedestrians to cross using these sidewalks.
- **Inadequate crossings for bicycles on the three bridges spanning the Oakland Estuary:** All three bridges crossing the Oakland Estuary (Park Street, Fruitvale Avenue, and High Street) lack bicycle lanes. Bicyclists currently use the mixed-flow travel lanes and the narrow pedestrian paths on the sides of the bridges to cross from Alameda to Oakland.
- **No north-south shoreline crossings under the three bridges spanning the Oakland Estuary:** Three of the most significant gaps in the shoreline alignment of the Bay Trail occur at the three Estuary bridges. There is currently no access under the bridges and no marked or protected at-grade crossings.
- **The lack of a continuous Bay Trail through the Plan Area results in an indirect north-south bicycle/pedestrian route along the shoreline:** The existing gaps in the Bay Trail result in an indirect north-south route through the study area. This route forces bicyclists and pedestrians onto streets with high truck traffic. This routing also forces crossings at busy intersections without well-marked crosswalks.
- **High Street has a poor quality pedestrian environment:** High Street has an overall poor quality pedestrian environment. A large number of industrial uses, narrow sidewalks, a lack of bike lanes and shoulders, prohibited pedestrian crossings at some intersections, and a lack of pedestrian amenities such as street trees create an overall poor walking experience. At the I-880 / High Street interchange, a sidewalk does not exist on the north side of High Street under I-880. Therefore, pedestrian crossings are prohibited at the north leg of both the High Street / Coliseum Way and the High St / SB I-880 Off-Ramp / Oakport Street intersections. This requires pedestrians to cross several legs in order to traverse the interchange.
- **Narrow bike lanes on Fruitvale Avenue:** The Class 2 bike lanes on Fruitvale Avenue are narrow. Also, no sidewalk exists on the north side of Fruitvale Avenue from Elmwood Avenue (near I-880) to Alameda Avenue (near the Fruitvale Avenue bridge).
- **Several intersections have bicycle/pedestrian crossing issues and high collision rates:** The intersections at the Park Street Triangle and on Fruitvale Avenue and High Street near I-880 have difficult unprotected crossings for bicyclists and pedestrians. These intersections have a higher rate of bicycle and pedestrian accidents.

Figure 20 summarizes the bicycle and pedestrian circulation issues within the study area.

Figure 20: Summary of Bicycle/Pedestrian Issues



Source: Arup 2009

Figure 20: Summary of Bicycle/Pedestrian Circulation Issues **April 16, 2009**

- Freeway
- Freeway Ramps
- BART
- Local/Collector
- Railroad
- Bay Trail (Existing)
- Bay Trail (Under Construction/Proposed)
- CEP Study Area
- Intersection with Bicycle/Pedestrian Crossing Issues and High Collision Rates

5 Freight

This section briefly assesses existing freight and truck corridors within the transportation study area. Industrial land uses exist throughout the Plan Area, particularly in the East Planning Area south of High Street and the West Planning Area north of the Park Street Bridge and 23rd Avenue. Freight, goods, and materials are hauled to and from these industrial sites by trucks and rail.

A recent study completed by the Metropolitan Transportation Commission (MTC), *Goods Movement/Land Use Project for the San Francisco Bay Area, Final Summary Report* (Hausrath Economics Group, December 2008), provides a synopsis of goods movement and related land use issues in the Bay Area. The report identifies the cumulative implications of local land use decisions on the efficiency and cost of regional goods movement, and addresses trends in land use patterns among goods movement businesses. The report estimates the impacts that logistics activities have on traffic congestion and Greenhouse Gas Emissions (GHGs).

The Plan Area's strategic location between the port and the airport, coupled with its access to I-880 and the freight rail tracks, provides an opportunity for the area to serve as a major freight and logistics hub. Assessing the Plan Area's freight and logistics infrastructure is important in identifying the suitability of the area for these types of activities.

5.1 Trucks

The primary truck corridor around the site is north-south I-880, which connects Oakland, San Francisco, San Jose, and other areas around the Bay Area. On a more local level, the Port of Oakland lies to the northwest of the site, connected by both I-880 and Embarcadero, while Oakland Airport lies to the south, connected to the site by I-880 and Oakport Street. Freight traffic to/from Alameda accesses I-880 via 23rd Avenue and High Street.

Based on a review of two recent studies, *Fruitvale Alive! Master Transportation Plan* (CHS Consulting Group, June 2005) and the City of Oakland's *Industrial District Strategy Support, Public Infrastructure Assessment and Recommendations* (BKF Consulting, October 2008), key freight corridors were identified. Table 16 summarizes these truck routes.

Table 16: Key Truck Routes within Oakland Estuary Area

Key Freight Routes	Role
23rd Avenue	Links to northbound I-880 (with a direct on-ramp) and to Park Street Bridge to Alameda
29th Avenue	Links to southbound I-880 (with a direct on-ramp) and to Park Street Bridge to Alameda
Embarcadero	Provides access to site from southbound I-880 and to Port of Oakland
Alameda Avenue	Provides access to site for both directions of I-880, links to I-880, and to Alameda (via Fruitvale Ave. Bridge)
High Street	Provides access to site for both directions of I-880, links to I-880, and to Alameda (via Fruitvale Ave. Bridge)
Oakport Street	Links to southbound I-880 (with a direct on-ramp) for High Street and Alameda Avenue traffic and to Oakland Airport (frontage road alongside southbound I-880)
Source: *Fruitvale Alive! Transportation Master Plan* and City of Oakland *Industrial District Strategy Support*	

More localized freight routes include Tidewater Avenue and Lesser Street. The City's *Industrial District Strategy* report recommended the following improvements for truck traffic:

- **Tidewater Upgrade** – At present, Tidewater Avenue is a 50 foot private street in poor condition. Recommendations call for upgrading this street for improved truck operations and also to make it more amenable to multiple users including pedestrians and bicyclists. Various scenarios call for widening of the street with provisions for wider through lanes in each direction as well as curbside parking.
- **Reconfiguration of Tidewater and High Street Intersection** – At the corner of Tidewater and High Street, the eastbound High Street movement is problematic due to the short curb radius – this forces trucks to wait until the westbound High Street direction is clear before making the turn. This in turn congests traffic behind the waiting truck on Tidewater as well as mainline traffic on High Street in both directions. Proposals call for improving this intersection and the curb such that trucks could make this turn without entering the westbound High Street lanes. This could also reduce truck volumes on Lesser and Oakport streets.

5.2 Rail

Several Union Pacific Railroad (UPRR) freight tracks provide access to industrial users within the Plan Area and Alameda. Currently, most service is provided via the 5th Avenue spur that parallels Embarcadero and enters the Plan Area from the north. Most of the shipments are bound for the ConAgra flour mill located on E 7th Street and the Veronica Foods plant on Dennison Street. ConAgra receives shipments three times a week. Two of the shipments occur between 1:00 and 4:00 AM, while the third occurs between noon and 4:00 PM. Veronica Foods receives shipments twice a week, between 5:00 and 6:00 AM.

Until recently, the Glasscock spur, which accesses the Plan Area via a connection from Fruitvale Avenue, was used periodically by ConAgra for deliveries. Use of the Glasscock spur has waned over the last few years as residential units have been constructed in that area of Jingletown.

However, the Glasscock Street spur has recently been identified as the primary route to serve industrial users within the Plan Area as Caltrans closes the 5th Avenue spur in order to complete a seismic retrofit to the elevated section of I-880. The new bridge columns that will be constructed at 5th Avenue will make this spur unusable. In April 2009, the City of Oakland came to a settlement agreement with UPRR and Caltrans on continued but extremely limited use of the Glasscock spur within the residential section of the Plan Area.

6 Pending/Proposed Projects

There are several pending and proposed transportation projects planned within the study area. These projects have the potential to affect the study area's roadway capacity, local circulation, transit service, and pedestrian/bicycle facilities. It is important to understand the details of these projects so that the Central Estuary Plan can:

1. Incorporate the physical design and transportation/circulation benefits of these improvements
2. Propose additional improvements that integrate and compliment these pending/proposed projects

Table 17 presents the pending and proposed projects. For each project, the lead public agency is identified, along with a few brief details of the project, the likely estimated completion date (if possible), the cost (if known), and the current stage of the planning process. Many of these projects will likely have benefits and costs that will spillover to other projects. Figure 21 presents the location of several of the critical projects within the study area.

Table 17: Pending/Proposed Projects

Project Name, Agency, and Estimated Completion Date	Project Description	Potential Affects on the Central Estuary Plan
1. I-80 Operational and Safety Improvements at the 29th and 23rd Ave Overcrossings ACCMA, Caltrans Est. Completion: 2012 Funding: Fully funded	Remove and reconstruct the overcrossing structures at 23rd and 29th Avenues, reconfigure several on/off ramps, and extend the NB aux lane.	The project will improve access to and from NB I-880 by combining and closing ramps at both 23rd and 29th Avenues. Local circulation is improved by simplifying some intersections and providing interim improvements at the base of the 29th Avenue bridge where it intersects the Park Street Triangle.
2. Park Street Triangle Improvements City of Oakland Est. Completion: n/a Funding: No funding	Reconstruct the three intersections in the Park Street Triangle on 23rd Avenue, 29th Avenue, and Ford Street.	Several alternatives described in *Park Street Triangle Traffic Study* (Dowling Associates, December 2005), are being considered. However, the overcrossing improvements at 29th Avenue described in #1 will include some interim improvements to the Triangle. Ultimately, the Triangle will be reconfigured, which should improve local circulation and access through this portion of the CEP area.
3. High Street Overhead Seismic Retrofit Project Caltrans Est. Completion: 2012/2013 Funding: Fully funded	Replace the overhead structures on I-880 from Fruitvale Avenue to south of High Street and reconfigure the I-880 / SR 77 / 42nd Avenue interchange.	The project will reconfigure the ramps at 42nd Avenue to create two at-grade intersections on 42nd Avenue that serve the NB 880 on-ramp and SB 880 off-ramp. The E 8th Street frontage road will terminate south of 37th Avenue to accommodate the retrofit.
4. 42nd Avenue/High Street Access Improvements City of Oakland Est. Completion: 2015+ Funding: Partially funded	This project will follow on the heals of #2 and includes extending 42nd Avenue west from 880 to intersect Jensen Street and widening High Street under 880.	This project, when combined with the 42nd Avenue interchange improvements included as part of #2, will improve the overall east-west street connectivity across I-880. These changes will result in 42nd Avenue serving as an parallel route to High Street that connects to Alameda Avenue. The bridge work in #2 will allow High Street to be widened to eight lanes under 880. This will allow for two full left-turn lanes in both directions and two through travel lanes.
5. Citywide Intelligent Transportation System Program City of Oakland Est. Completion: 2009 – 2012 Funding: Fully funded	Install cameras and detectors to monitor and manage traffic and transit on major corridors throughout the city.	The cameras and detectors are planned for segments of High Street and Fruitvale Avenue within the study area.
6. Telegraph Avenue Corridor Bus Rapid Transit (BRT) AC Transit Est. Completion: 2012 Funding: Fully funded	BRT service would be introduced along the Telegraph, Broadway, International, and E 14th Street corridor. The project includes new stations, vehicles, bus signal priority, and dedicated bus-only lanes.	BRT would not directly serve the CEP area, but could travel along International Boulevard less than one-half mile from the CEP boundary. The enhanced frequency, speed, and quality of the BRT service could make transit a much more attractive mode to reach destinations in downtown Oakland and areas to the south. There is the potential that one travel lane along International Boulevard in each direction could be dedicated to BRT service. This would have a potentially negative affect on auto traffic circulation. This trade-off is being evaluated in the process of selecting a preferred alternative to study in the EIR.
7. Bay Trail/Waterfront Trail Projects City of Oakland, ABAG Est Completion: Ongoing Funding: Partially funded	There are a series of pedestrian and bicycle trail projects within the CEP area that are funded by the City of Oakland's Measure DD bond measure.	Projects where easement agreements have been reached and design is ongoing include the Cryer Site (SW corner of Embarcadero/Dennison St), and the US Audio / NEU site (south of Alameda Ave). Additional sites to complete the shoreline alignment have been studied, but no agreements have been reached.
8. Seismic Retrofit of the Three Estuary Bridges Alameda County Est Completion: 2010 Funding: "No Collapse" fully funded; "Lifeline" partially funded	Phase 1: "No Collapse" retrofits of the Fruitvale Ave, Park St, and High St bridges crossing the Estuary. Phase 2: "Lifeline" retrofit of the Fruitvale Ave bridge.	The "No Collapse" retrofits are funded and currently in design. A "No Collapse" retrofit ensures that the bridge will not collapse. However, it may not be functional for a long time. A "Lifeline" retrofit ensures that a bridge will sustain only minimal damage and it may be functional with a short time. The retrofits do not provide any additional capacity for autos, bicycles, or pedestrians.

Table 17: (Continued): Pending/Proposed Projects

Project Name, Agency, and Estimated Completion Date	Project Description	Potential Affects on the Central Estuary Plan
9. Estuary Crossing Study City of Alameda Est. Completion: n/a Funding: No funding	Develop estuary crossing alternatives to the existing Posey Tube. The boundaries of the study area are outside the CEP area.	While the Estuary Crossing study area is outside the CEP area, the report documents the lack of acceptable crossings for pedestrians and bicyclists. Improving these connections across the three bridges is a key goal of the plan.
10. Fruitvale Alive! Master Transportation Plan City of Oakland Est. Completion: n/a Funding: No funding	The Fruitvale Alive! plan was funded by a Caltrans Environmental Justice Grant. The plan identifies pedestrian, bicycle, traffic, transit, and parking improvements in the Dimond and Fruitvale Districts in Oakland.	The Fruitvale Alive! study area extends along Fruitvale Avenue to the edge of the Plan Area at E 9th Street. The recommendations include a number of corridor-wide pedestrian crosswalk enhancements, bulbouts, improved signal coordination, and focused improvements at several intersections. Most of these improvements would fall outside the Plan Area and are not currently funded.
11. Measure DD Projects City of Oakland Est. Completion: ongoing Funding: Partially funded	The City's Measure DD program financed the Union Point Park project and is working to fill in the Bay Trail gaps through the Plan Area.	Measure DD funding will support completion of Bay Trail gaps.
12. E 12th St Bikeway City of Oakland Est. Completion: 2011 Funding: Fully funded	Add bike lanes on E 12th Street from 2nd Avenue to Fruitvale Avenue.	The new bike lanes along E 12th Street will improve north-south connectivity from the Plan Area to downtown Oakland.
Source: As noted in the table. Compiled by Arup.		

Figure 21: Pending/Proposed Projects

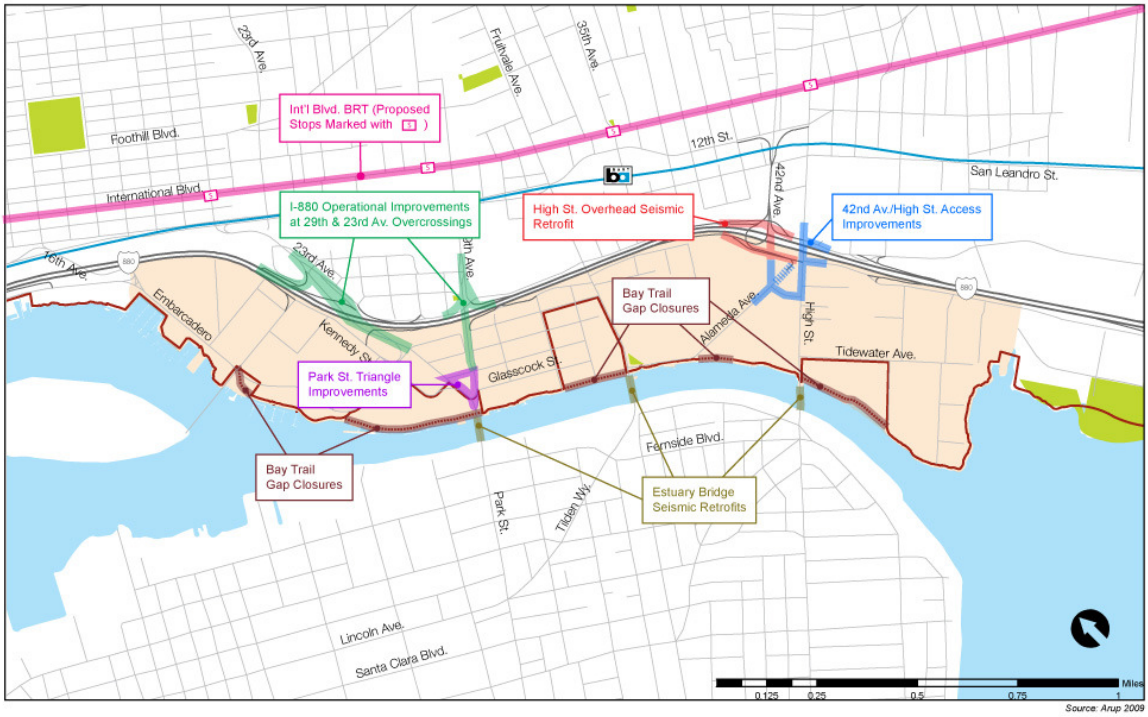


Figure 21: Pending/Proposed Projects **April 16, 2009**

Bay Trail (Existing)

BART Stops

BART

7 Issues, Opportunities, and Constraints

This section summarizes the transportation issues, opportunities, and constraints within the study area. Table 18 lists the issues by mode and includes traffic (which includes automobile circulation), transit, bicycle / pedestrian, and freight (which includes truck and rail users).

Table 18: Transportation Issues, Constraints, and Opportunities

Traffic (Auto)		
Issue	**Constraints**	**Opportunities**
High Street Congestion: High traffic volumes (including a large number of trucks) and closely-spaced intersections on High St from I-880 to the Oakland Estuary results in traffic congestion and queuing along this segment of the street network.	Existing land uses, right-of-way (ROW) limitations, and Caltrans control of much of the ROW limits the options for widening or improving High St.	Take advantage of Caltrans' pending High Street Overhead Retrofit project and the City's High Street Access Improvements project to improve circulation.
Freeway and Freight Tracks as a Barrier: I-880 and the freight rail tracks east of the freeway are a significant physical barrier that limits east-west connectivity.	Caltrans and Union Pacific Railroad (UPRR) controlled ROW limit the options for spanning these barriers. Also, the need to attain sufficient vertical clearance over or under these facilities results in significant cost.	Take advantage of pending projects at High Street and 29th/23rd Avenue to improve east-west connectivity for all travel modes. Look for additional opportunities to improve existing crossing points.
Freeway Access: The access to and from I-880 is confusing. The ramp locations and configurations are sub-standard, which affects freeway traffic flow and local circulation. Also, ramps connect directly to local streets.	Caltrans controlled ROW, the existing alignment of I-880, and the adjacent communities all limit the options for providing additional freeway ramps.	The pending projects at High Street and 29th/23rd Avenue will provide improved freeway access that is safer and limits the impacts on local streets. Potential to improve ramp terminal intersections.
Lack of North-South Connectivity: There is no direct north-south connection through the study area. All of the east-west streets create barriers that are difficult to cross.	Existing land uses, the complex street network, and the high traffic volumes on the existing east-west streets (23rd/29th, Fruitvale, and High) are a constraint to providing more north-south connections.	Look for an opportunity to extend Embarcadero south to the Park Street Triangle. An additional north-south connection could exist at E 7th St under the 29th Ave overcrossing.
Confusing Street Network: The existing street grid is complex and difficult to navigate. Many travel paths take motorists through residential neighborhoods to access I-880.	Existing uses, I-880, the freight rail tracks, and the Estuary all limit the ability to rationalize the street grid.	Take advantage of the various freeway projects and any redevelopment to add new street segments and connections.
Intersection Safety: Within the study area, collisions are an issue at the Park Street Triangle, Fruitvale Ave, and High St.	Limited ROW constrains the options for making intersection geometric upgrades.	Develop street standards that address vehicle access, sight distance, and intersection traffic control. The Park Street Triangle will be studied as part of the 29th/23rd Avenue project.
Through Traffic From Alameda: The three Oakland Estuary bridges within the study area carry a considerable amount of Alameda traffic through the site.	Competing users with different objectives: Alameda motorists want fast reliable access to I-880; study area residents want safe streets; industrial users want adequate access to their businesses	The projects at High Street and 29th/23rd will provide opportunities to improve circulation for all users. Additional street improvements at the Park Street Triangle and High Street would better serve all users.
Parking Discipline and Conflicts: The mix of users within the study area can create parking issues, particularly in the mixed residential/light industrial Jingletown area.	Existing uses and a lack of consistent street designs and standards results in parking conflicts and a lack of on-street parking in the Jingletown area.	Ensure that street design standards for the CEP study area include options for accommodating residential and light industrial parking needs. Develop a parking management strategy that addresses all activities.

Table 18 (Continued): Transportation Issues, Constraints, and Opportunities

Transit		
Issue	**Constraint**	**Opportunity**
Lack of Transit Service: The overall quality of the transit service is poor. Only a few bus routes serve the study area directly. The entire study area only has five bus stops, and the bus stop amenities are lacking. Also, there is no direct late-night route that serves the study area.	Lack of existing ridership and development densities within the study area reduces the likelihood of additional service.	Increase densities and transit supportive uses. Locate new residential and commercial developments close to the existing transit routes to maximize ridership.
Transit Operations and Reliability: The freeway and street grid issues discussed in the Traffic section degrades transit operations and reliability.	The large number of closely spaced signalized intersections within the study area makes signal coordination and bus signal priority difficult.	The planned BRT service on International Blvd
No Direct North-South Service: Most bus service through the study area connects to the Fruitvale BART station or follows a circuitous route through Alameda. The existing north-south routes all run along International Blvd.	Lack of existing ridership and development densities within the study area reduces the likelihood of additional service.	If justified by future land uses, use Embarcadero for a new north-south bus route that connects the CEP study area to the Oak to Ninth development and Jack London Square. Locate new uses near Embarcadero to maximize transit ridership on this potential route.
Poor Pedestrian Environment: The overall poor pedestrian environment and lack of direct routes makes walking to transit less attractive.	The industrial character of the area and the I-880/freight rail tracks create a significant deterrent to walking.	Take advantage of the High St and 29th/23rd Ave projects to improve pedestrian access across I-880 to BART and the International Blvd transit corridor. Improve other existing freeway crossing points.
Bicycle/Pedestrian		
Issue	**Constraint**	**Opportunity**
Poor Bicycle and Pedestrian Environment: Narrow sidewalks, gaps in the sidewalk network, lack of crosswalks, prohibited pedestrian crossings at some intersections, and many curb cuts produce an overall environment that is not friendly for bikes and pedestrians.	Existing land uses, ROW limitations, and competition from auto and truck users limits the options for improving the overall pedestrian and bicycle environment.	Establish street design guidelines and standards that promote bicycle and pedestrian users. Take advantage of the High St and 29th/23rd Ave projects to improve pedestrian connectivity.
Access Across the I-880/Freight Rail Tracks: The existing east-west connections are not bicycle and pedestrian-friendly. The grades on the I-880 overcrossings at 23rd and 29th Aves are steep. The Fruitvale Ave and High St crossings lack adequate bike lanes and sidewalks.	Existing land uses, ROW limitations, and the Caltrans and UPRR control of the ROW limits the ability to provide additional bike and pedestrian-friendly crossings.	Use the 29th/23rd Avenue and the Fruitvale Ave and High St seismic retrofits to provide better east-west bike and pedestrian connectivity. Improve other existing freeway crossing points.
Bay Trail Gaps: Several gaps exist in the Bay Trail shoreline alignment at existing land uses and the three Estuary bridges.	Many of the businesses in the study area require direct access to the water. Accommodating water and trail users will be difficult. Constructing trail segments under the Park, Fruitvale, and High St bridges will require permission from the Army Corps of Engineers. The vertical clearance under the bridges is also a constraint.	Continue to negotiate with the interested parties along the shoreline to obtain permission to route the Bay Trail through their properties. The seismic retrofitting of the three bridges provides an opportunity to evaluate options for continuing the Bay Trail under the structures.
Access Across the Estuary: The three bridges have narrow pathways for bicyclists and pedestrians. No dedicated bike lanes are provided along the street ROW.	There are no plans to redesign the pedestrian sidewalks or restripe the bridge decks to better accommodate bicyclists and pedestrians.	The pending bridge seismic retrofits provide an opportunity to stripe bike lanes, particularly on the Fruitvale Ave bridge.

Table 18 (Continued): Transportation Issues, Constraints, and Opportunities

Park Street Triangle Bike and Pedestrian Access: The Park Street Triangle provides a formidable obstacle for bicyclists and pedestrians traveling north and south through the study area.	The Park Street Triangle's design, the lack of traffic control at two of the Triangle's three intersections, and the free-flow nature of traffic all limit the ability to provide better bike and pedestrian access.	Improvements to the intersections on Ford St, which include a traffic signal at 29th Ave / Ford St, provide an opportunity to locate better north-south crosswalks. The Park Street Triangle will be studied as part of the 29th/23rd project.
Freight		
Issue	**Constraint**	**Opportunity**
Truck Routes are Poorly Designed: The defined truck routes within the study area, most notably High St from I-880 to the Estuary, are not designed to handle the high volume of trucks.	Existing land uses, ROW limitations, and competition from other users (autos, bike, and pedestrians) limit the ability to provide facilities that better serve trucks and rail.	Street design guidelines and standards that clearly define the needs of trucks (e.g., wider turning radius, areas for trucks to queue) will help accommodate the study area's industrial users.
Freight Rail Conflicts: Provide direct rail connections to existing and future industrial users within the study area that does not disrupt other land uses.	The existing rail ROW and the limited number of rail connections to the major lines east of I-880. The closing of the 5th Ave spur is a major constraint.	Use the CEP to set design guidelines for at-grade rail crossings and to establish policy guidance on delivery and operations activities.
Source: Arup, 2009		