3.8 TRANSPORTATION/TRAFFIC

This section describes the existing transportation and traffic setting for the project site and vicinity, as well as the various relevant regulations and policies that govern transportation in the area. The general and site-specific discussion contained herein provides the environmental baseline by which environmental impacts are identified and measured. Environmental impacts are discussed in Section 4.0.

3.8.1 REGULATORY SETTING

STATE

Caltrans

Caltrans manages interregional transportation, including the management and construction of the California highway system. In addition, Caltrans is responsible for the permitting and regulation of state roadways. The project area includes two roadways that fall under Caltrans’ jurisdiction, Interstate 580 (I-580) and 80 (I-80).

LOCAL REGULATORY SETTING

City of Richmond General Plan

The Circulation and Growth Management Elements of the City of Richmond’s (City) General Plan (1994) establishes policies and standards for traffic LOS. The LOS standards are defined in Section 3.8.2. Applicable goals and polices are as follows:

General Plan Update

The City is currently updating its General Plan and anticipates releasing the Draft General Plan to the public in December of 2008. It released a draft for public review in July 2009 (Velasco, 2007). The City has developed a working draft of the Transportation Element that includes guidelines for the development of the final version of the Transportation Element to be included in the General Plan Update (City of Richmond, 2007b).

General Plan (1994) Goals and Policies

Circulation and Growth Management Element

Goals

CIR-A Serve the existing and future arrangement of land uses with efficient, safe, convenient, and economic transportation systems for the movement of all people and goods.

CIR-B Provide a balanced, safe, attractive, and efficient transportation system for automobile/truck users, transit passengers, pedestrians and bicyclists.

CIR-C Develop and encourage the effective use of multi-modal circulation systems.
CIR-D Coordinate transportation system planning and related land use planning with other affected jurisdictions and agencies.

Policies
CIR-A.3 Apply consistent traffic control installation measures to mitigate traffic problems.
CIR-A.4 Establish standards for street improvements and new construction consistent with existing and anticipated transportation demands and land use characteristics while meeting safety considerations.
CIR-A.5 Promote access to the City’s recreational areas, shoreline area and community facilities.
CIR-B.3 Maintain a safe, effective and attractive bicycle and pedestrian circulation system, with particular emphasis on the San Francisco Bay and the Bay Area Ridge Trails and ensuring that new or existing developments are interconnected.
CIR-B.4 Facilitate ancillary multi-modal transportation improvements (e.g., bus stops, bus shelters, transportation hubs, ferry terminals, bike racks) as part of the City’s development process.
CIR-C.1 Balance the need for parking with the need to promote the use of alternative modes and transit.
CIR-C.2 Promote the use of alternatives to the single-occupant automobile to satisfy community transportation needs.
CIR-C.3 Provide a network of bicycle routes offering safe and easy access to all portions of the City.
CIR-C.4 Integrate bicycle facilities in new roadways.
CIR-D.1 Work with other affected agencies to ensure that transportation facilities are developed, and maintained, to the highest possible standard.
CIR-D.3 Maintain level of service standards which comply with requirements of County-wide Transportation Measure C.
CIR-D.4 Maintain level of service standards which comply with the West Contra Costa Transportation Committee’s Action Plan standards for regional routes.
CIR-D.5 Encourage any proposed BART extension to: 1) utilize the existing Richmond BART station; 2) minimize impacts on Richmond and surrounding communities; and 3) provide direct service to the Hilltop Mall retail facilities.
GM-C.2 Continue to require transportation-related mitigation attributable to a specific development as identified through required traffic analyses.
GM-D.6 Require an analysis of traffic impacts on all regional routes and signalized intersections of basic routes, for all development anticipated to generate over 100 peak-hour vehicle trips.
GM-D.8 Include capital projects in Richmond’s Capital Improvement Program which are necessary to maintain and improve traffic operations.
General Plan (1994) Area Specific Guidelines

West Shoreline Area Specific Guidelines are outlined for the shoreline in the City’s General Plan (1994), and are as follows:

No.1 Promote more effective movement of people to and within the shoreline areas by: (1) increased public transit service linked to BART; and (2) development of convenient bicycle and foot trails.

No.2 Promote circulation facilities in the shoreline areas that will assist inland residents in taking advantage of the shoreline. Stress that the design of these facilities should not block access to the waterfront.

No.3 Encourage development of a system of hike/bike trails throughout the shoreline area.

Countywide Comprehensive Transportation Plan

The 2009 Countywide Comprehensive Transportation Plan (CTP, 2009a) established the following goals for the Contra Costa County transportation system:

1. Enhance the movement of people and goods on highways and arterial roads,
2. Manage the impacts of growth to sustain Contra Costa’s economy and preserve its environment,
3. Expand safe, convenient and affordable alternatives to the single-occupant vehicle, and
4. Maintain the transportation system.

3.8.2 ENVIRONMENTAL SETTING

ROADWAY TRANSPORTATION

Existing Circulation Network

The routes to and from the project site are described below. Figure 3.8-1 shows the project study area and study intersections locations.

Interstate 580 (I-580) - is situated in close proximity to the project site. This freeway begins in San Joaquin County at a junction with Interstate 5 (I-5) and passes through the San Francisco Bay Area (Bay Area), which includes the cities of Livermore, Pleasanton, and Oakland. I-580 connects with I-80 where it serves the southeast Bay Area, then continues north past the project site to connect with US-101 in Marin County. This freeway becomes the Richmond/San Rafael Bridge, west of the Western Drive off-ramp at the toll plaza. In the immediate vicinity of the project site, I-580 has a total of six lanes, three in each direction. Those traveling westbound on I-580 can exit at Western Drive to access the Project Site. Currently there is no direct access to Western Drive traveling east on I-580. If traveling east on I-580 access to the project site would be via the Castro Avenue exit.
**3.8 Transportation/Traffic**

**Interstate 80 (I-80)** - is a major east-west regional route that traverses in a north-south direction in the vicinity of the project site. Current access to the project site is by exiting I-80 at Richmond Parkway or I-580 westbound.

**United States 101 (U.S. 101)** - is currently six lanes in the vicinity of I-580, but is planned to be eight lanes (three lanes plus a high occupancy vehicle lane in each direction) with new auxiliary lanes. U.S. 101 is the major north-south freeway in Marin County extending into Sonoma County to the north and continuing south to San Francisco and points beyond.

**Richmond/San Rafael Bridge** - is a 5.5-mile-long bridge spanning the southern northern end of San Francisco Bay. The Bridge connects the City of Richmond with the City of San Rafael along I-580. There are two westbound lanes on the upper level bridge deck and one lower two eastbound lanes on the lower level bridge deck.

**Richmond/San Rafael Bridge Toll Plaza** - operates in the westbound direction and has a total of seven toll lanes/bookths. Five of the seven lanes/bookths are designated for auto cash/Fastrak. One lane operates as a designated carpool/Fastrak lane and the remaining lane operates as a Fastrak-only lane.

**Richmond Parkway** - extends from Castro Street and connects with I-80. This roadway is classified as an expressway, and varies in the number of lanes. In the vicinity of I-580, Richmond Parkway has two lanes in either direction, both of which merge with Castro Street. Castro Street connects with Western Drive.

**San Pablo Avenue** - provides parallel access to I-80 from Oakland to Hercules. San Pablo Avenue is a four-lane regional arterial, providing north-south access, designated by the County as a “Route of Regional Significance.” San Pablo Avenue provides an alternative access point from the north to the project site via Richmond Parkway.

**Canal Boulevard** - is a north-south roadway varying from four (south of Cutting Boulevard) to six lanes (north of Cutting Boulevard) and extends from the Richmond Parkway (south of I-580) to the Point Potrero area.

**Barrett Avenue** - is a cross-town arterial running east west through Richmond and varies from two to six lanes through Richmond and El Cerrito. Barrett Avenue passes through central Richmond, where it has six-lanes with Class II bike lanes.

**West Macdonald Avenue** - is located south of the Richmond Bay Area Rapid Transit (BART) station and has historically served as the City’s main street, which provides access to downtown and the civil
center complex. This four-lane arterial road parallels Barrett Avenue to the south, beginning at San Pablo Avenue in the east and terminating at Richmond Parkway/Gerrard Boulevard in the west.

**Cutting Boulevard** - extends from Arlington Boulevard in El Cerrito west to Garrard Avenue. This four-lane arterial road crosses I-580 once. Cutting Boulevard provides east-west route through the City.

**23rd Street** - is a major north-south route that runs through the City. South of Cutting Boulevard, 23rd Street becomes Marina Bay Parkway and outside of the City it becomes San Pablo Avenue. Between Bissell Avenue and Brooks Avenue, 23rd Street is a one-way road.

**Western Drive** - is the only road that directly accesses the project site. This road is two-lanes that varies between 20 to 30 feet in width, with no paved shoulders, curbs, gutters, sidewalks, or bicycle lanes. Western Drive does not currently meet the City’s design standards. Western Drive is the access road to the project site and also provides direct access to the Caltrans maintenance station and indirect access to the Chevron (Dutra Materials) Quarry and the Red Rock Cove site. To the north of the project site, Western Drive provides direct access to Chevron’s pistol and rifle range and the Point San Pablo Yacht Harbor, where the road terminates. The road provides indirect access to Chevron’s Rod and Gun Club (via Drowley Drive) and the Port of Richmond’s Terminal No. 4. Western Drive bisects the project site.

**Study Intersections**

Intersections are the critical locations for increased traffic congestion and poor operations. The following 31 intersections, presented in Figure 3.8-1, were selected in consultation with the City, Caltrans, and neighboring jurisdictions, as likely to be impacted by the Proposed Project:

1. Richmond Parkway (Castro Street) and Redwood Way/WB I-580 On/Off
2. Marine Street and EB I580 On/Off Ramps
3. Garrard Boulevard/Canal Boulevard and WB I-580 On/Off
4. Garrard Boulevard/Canal Boulevard and EB O-580 On/Off
5. Cutting Boulevard and WB I580 On/Off Ramp
6. Cutting Boulevard and EB I-580 Off-Ramp/Hoffman Boulevard
7. Harbour Way and WB I-580 Off-Ramp
8. Cutting Boulevard and S. Harbour Way
9. Marina Bay Parkway and WB I-580 On/Off Ramps
10. Marina Bay Parkway and EB I-580 On/Off Ramps
11. Cutting Boulevard and Marina Bay Parkway/23rd Street
12. Erlandson Street and WB I-580 On/Off Ramps
13. Regatta Boulevard and EB I-580 On/Off Ramps/Meade Street
14. Carlson Boulevard and Cutting Boulevard
15. Cutting Boulevard and S. 49th Street
16. Cutting Boulevard and WB I-80 Off-Ramp
17. Macdonald Avenue and Harbour Way South
18. Richmond Parkway (Garrard Boulevard) and W. Macdonald Avenue
19. Richmond Parkway (Garrard Boulevard) and W. Barrett Avenue
20. Richmond Parkway (Castro Street) and Hensley Street
21. Richmond Parkway and Gertrude Avenue
22. Richmond Parkway and Parr Boulevard
23. Richmond Parkway and San Pablo Avenue
24. Richmond Parkway and Blume Drive/WB I-80 On/Off Ramps
25. Richmond Parkway/Fitzgerald Drive and NB I-80 On/Off Ramps
26. San Pablo Avenue and Appian Way/Pinole Avenue
27. Western Drive and Chevron Access
28. Sir Francis Drake Boulevard and Anderson Drive
29. Richmond Parkway and Pittsburg Avenue
30. Richmond Parkway and Goodrick Avenue
31. Richmond Parkway and I-80 Carpool On/Off-Ramps
32. Sir Francis Drake Boulevard and Larkspur Landing Circle (East)
33. Sir Francis Drake Boulevard and Larkspur Landing Circle (Ferry Terminal)
34. U.S. 101 Northbound On- and Off-Ramps at Sir Francis Drake Boulevard
35. U.S. 101 Southbound On- and Off-Ramps at Sir Francis Drake Boulevard

The traffic control and intersection lane configurations are presented in the Transportation Impact Analysis (TIA) provided in Appendix S. I-580 and US 101 Ramps are analyzed as freeway segments in Section 4.8 and are discussed in the Supplemental Traffic Impact Analysis (STIA) provided in Appendix S. Technical analysis for intersections 32 through 35 listed above is provided in the supplemental transportation memorandum provided in Appendix HH.

**Bicycle and Pedestrian Facilities**

Currently there are no bicycle or pedestrian facilities within the project site or along Western Drive. The nearest bicycle/pedestrian facility is a Class I bike path that begins northwest of the I-580/Western Drive interchange and passes under the Richmond/San Rafael Bridge. The bike path then traverses southwest. This bicycle/pedestrian path is part of the Bay Trail, which is proposed to ring the Bay with a combination of bicycle and pedestrian trails. **Figure 3.8-2** shows the Bay Trail as well as bicycle and pedestrian facilities in the project area.

**Transit**

Transit service in the region is currently provided by five private and public facilities, as described below. Currently no direct transit service is provided to the project site. Golden Gate Transit and AC Transit provide service on three routes near the project site.
Figure 3.8-2
Proposed Bay Trail
**Bus Services**

AC Transit operates local and express bus routes within the City. Only one AC Transit route provides service near the project site. Golden Gate Transit operates bus service within and between Marin, San Francisco, Sonoma, and Marin Contra Costa Counties. Golden Gate Transit buses operate service from the BART rail stations at El Cerrito Del Norte and Richmond to the vicinity of the project site. WestCAT provides bus service from the western County to the El Cerrito Del Norte and Richmond BART stations. BART operates bus terminals adjacent to the Richmond and El Cerrito Del Norte stations, which serves the City and County.

**Rail Services**

BART operates regional rail service that links the City to other cities in the Bay Area. Figure 3.8-3 shows the extent of service that is provided by BART. The Richmond BART station serves approximately 3,200 daily passengers daily, while the nearby El Cerrito Del Norte BART station serves approximately 7,000 daily passengers.

**Ferry Transportation**

Ferry service in San Pablo and San Francisco Bays are provided by both public and private entities, located in the cities of Vallejo, Oakland, Alameda (two terminals), Larkspur, Tiburon, Sausalito, and San Francisco (two terminals). Figure 3.8-4 illustrates the existing ferry service in the Bay Area. The Golden Gate Ferry District (Golden Gate) and the City of Vallejo provide public ferry service within the vicinity of the Point Molate pier, while the Blue and Gold Fleet and the Red and White Fleet are private service providers.

On weekdays, Golden Gate Transit owns and operates seven ferries with a capacity of 1,150 passengers. The ferries operate provides 20 roundtrips between Larkspur and San Francisco and Sausalito and San Francisco with two vessels. On weekends, one vessel (715 passenger capacity) completes four roundtrips, with an additional southbound trip in the morning. The Larkspur terminal has 1,600 parking spaces, typically used Monday through Friday. The City of Vallejo operates the Baylink ferry service between downtown Vallejo and the Ferry Building in San Francisco. The Blue and Gold Fleet and the Red and White Fleet provide service from Vallejo and Bay Farm Island to the San Francisco Ferry Building. The Blue and Gold fleet has ten ships with a total capacity of 1,090 passengers. The Blue and Gold Fleet has provided a letter, provided in Appendix S, of intent to provide ferry service to and from the project site.

The San Francisco Water Transportation Authority (WTA) had authority over ferry services in the Bay Area. However, the WTA ceased to exist in the year 2008 and the San Francisco Bay Area Water Emergency Transportation Authority (SFBAWETA) took its place. The SFBAWETA is tasked with expanding existing ferry services in the San Francisco Bay Area.
LEGEND

- BART
- AMTRAK Capitol Corridor/ San Joaquin
- Golden Gate Transit
- AC Transit
- Valley Transit Authority
- Westcat

SOURCE: DMJM Harris | AECOM, 12/2007; AES, 2008

Figure 3.8-3
Transit Systems
Figure 3.8-4
Existing Ferry Service

LEGEND

EXISTING FERRY ROUTES
1. Vallejo - San Francisco 50-60 min.
2. Alameda / Oakland - San Francisco 20-30 min.
3. Harbor Bay Isle - San Francisco 25 min.
4. Sausalito - San Francisco 25-30 min.
5. Tiburon - San Francisco 15-30 min.
6. Larkspur - San Francisco 30-35 min.
7. Angel Island - Tiburon 10-15 min.

10(15) = Round Trips Weekdays (Weekends)

SOURCE: DMJM Harris | AECOM, 12/2007; AES, 2008
**Toll Plaza**

The Richmond-San Rafael Bridge (Bridge) spans the San Francisco Bay from the City of Richmond to Marin County. Three lanes of westbound I-580 enter the toll plaza and two lanes exit the toll plaza on to the Bridge. The toll plaza is under the jurisdiction of Caltrans. The toll plaza currently has seven toll lanes; two FasTrak lanes, one carpool lane, and four manual payment/ FasTrak lanes (refer to STIA for lane definition, Appendix S).

**METHODOLOGY**

**Analysis Methodologies**

The existing traffic conditions for the project study area are presented in this section as provided in the TIA and the STIA (Appendix S). Peak traffic congestion in the region tends to occur during the commute periods between 7:00 and 9:00 AM and 4:00 and 6:00 PM. The peak hour is defined as the highest one hour period during each of the two hour time periods. Peak hour counts were collected in late May and early June (before school summer vacation period) 2007 by DMJM Harris/AECOM for 29 study intersections. The California Department of Transportation (Caltrans) provided 2007 average daily traffic (ADT) information for the US 101 freeway mainline and interchange ramps. The daily mainline volumes were calibrated with Caltrans peak hour volume data. Abrams and Associates preformed traffic counts at the Richmond/San Raphael Bridge Toll Booth Plaza in December 2008, at the intersection of Richmond Parkway/Gertrude Avenue in March 2009, and at the intersection of Richmond Parkway/I-80 On/Off Carpool Ramps in April 2009.

Existing conditions for the study intersections were analyzed using the Contra Costa County Transportation Authority (CCTA) LOS program. LOS is both a quantitative and qualitative grading system to characterize traffic flow conditions. Ranging from LOS A to F, with A representing the optimal operating conditions where roadways are uncongested and free flowing to F depicting the worst operating conditions where traffic exceeds capacity and has stop-and-go flow conditions. The CCTS LOS program was developed based on methodologies reported in the Transportation Research Board (TRB), Circular 212, Interim Materials on Highway Capacity, 1980. The TRB is a planning-level methodology that projects in CCTA jurisdiction use to develop LOS and delay parameters.

Table 3.8-1 presents the CCTA LOS definitions for signalized intersections. Table 3.8-2 presents the 2000 Highway Capacity Manual (HCM) LOS definitions for unsignalized intersections. Table 3.8-3 presents the 2000 HCM LOS for basic freeway segments, merge and diverge areas, and weaving segments. The HCM is prepared by the TRB and provides a collection of state-of-the-art techniques for estimating the capacity and determination of the LOS for transportation facilities.
### TABLE 3.8-1
**CCTA SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS**

<table>
<thead>
<tr>
<th>LOS</th>
<th>Interpretation</th>
<th>V/C Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Uncongested operations; all queues clear in a single cycle.</td>
<td>Less than 0.60</td>
</tr>
<tr>
<td>B</td>
<td>Very light congestion; an occasional approach phase is fully utilized.</td>
<td>0.60 to 0.69</td>
</tr>
<tr>
<td>C</td>
<td>Light congestion; occasional backups on critical approaches.</td>
<td>0.70 to 0.79</td>
</tr>
<tr>
<td>D</td>
<td>Significant congestion on critical approaches, but intersection is functional.</td>
<td>0.80 to 0.89</td>
</tr>
<tr>
<td></td>
<td>Severe congestion with some long-standing queues on critical approaches.</td>
<td>0.90 to 0.99</td>
</tr>
<tr>
<td>E</td>
<td>Operations with long delays, and long queues.</td>
<td>1.00 and greater</td>
</tr>
</tbody>
</table>

Notes: V/C = volume to capacity.

### TABLE 3.8-2
**HCM UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS**

<table>
<thead>
<tr>
<th>LOS</th>
<th>Definition of Traffic conditions</th>
<th>Average Delay (seconds/vehicle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Little or no delay for stop-controlled approaches.</td>
<td>&lt;10.0</td>
</tr>
<tr>
<td>B</td>
<td>Operations with minor delay.</td>
<td>10 to 15</td>
</tr>
<tr>
<td>C</td>
<td>Operations with moderate delays.</td>
<td>15 to 25</td>
</tr>
<tr>
<td>D</td>
<td>Operations with increasing delays.</td>
<td>25 to 35</td>
</tr>
<tr>
<td>E</td>
<td>Operations with high delays, and long queues.</td>
<td>35 to 45</td>
</tr>
<tr>
<td>F</td>
<td>Operations with extreme congestion, with very high delays</td>
<td>&gt;50</td>
</tr>
</tbody>
</table>


### TABLE 3.8-3
**HCM FREEWAY LEVEL OF SERVICE**

<table>
<thead>
<tr>
<th>LOS</th>
<th>Freeway Segment Density Range (pc/mi/IN)</th>
<th>Merge and Diverge Areas Density Range (pc/mi/IN)</th>
<th>Weaving Segments Density Range (pc/mi/IN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0 to 11</td>
<td>0 to 10</td>
<td>0 to 10</td>
</tr>
<tr>
<td>B</td>
<td>&gt;11 to 18</td>
<td>&gt;10 to 20</td>
<td>&gt;10 to 20</td>
</tr>
<tr>
<td>C</td>
<td>&gt;18 to 26</td>
<td>&gt;20 to 28</td>
<td>&gt;20 to 28</td>
</tr>
<tr>
<td>D</td>
<td>&gt;26 to 35</td>
<td>&gt;28 to 35</td>
<td>&gt;28 to 35</td>
</tr>
<tr>
<td>E</td>
<td>&gt;35 to 45</td>
<td>&gt;35</td>
<td>&gt;35 to 43</td>
</tr>
<tr>
<td>F</td>
<td>&gt;45</td>
<td>Demand Exceed Capacity</td>
<td>&gt;43</td>
</tr>
</tbody>
</table>

Toll Plaza

The existing condition at the toll plaza was determined using traffic counts conducted at the toll plaza in December 2008. Background conditions were determined using the traffic from reasonably foreseeable projects, which are provided in the STIA (Appendix S).

Intersection Operations

Traffic operations at the study intersections were analyzed and the results are presented in Table 3.8-4. The following intersections are shown to have poor LOS in the existing traffic environment:

- Sir Francis Drake Boulevard and Anderson Drive
- Sir Francis Drake Boulevard and Larkspur Landing Circle (Ferry Terminal)
- U.S. 101 On- and Off-Ramps and Sir Francis Drake Boulevard

Traffic volumes for the study intersections during the weekday AM and PM and Saturday PM peak hour are presented in the TIA, Appendix S. The intersections at Sir Francis Drake Boulevard and Larkspur Landing Circle (Ferry Terminal) and Sir Francis Drake Boulevard and U.S. 101 Northbound On- and Off-Ramps would operate at LOS E and F, respectively. Analysis of intersections under existing conditions in the City of Larkspur along Sir Francis Drake Boulevard is provided in Appendix III.

Freeway Operations

Traffic operations on freeway sections, on/off ramps, and weave segments were analyzed and the results are presented in Table 3.8-5. The following freeway sections are shown to have poor LOS in the existing traffic environment.

- SB U.S. 101 Off-Ramp to EB I-580 (AM peak hour).
- WB I-580 On-Ramp to NB U.S. 101 (PM peak hour).

The SB U.S. 101 Off-Ramp to EB I-580 and WB I-580 On-Ramp to NB U.S. 101 currently operate at LOS F and are anticipated to continue operating at LOS F after ramp improvements due to high traffic volumes on mainline U.S. 101 (STIA, Appendix S).

Toll Booth Operations

Under the current configuration of the toll plaza (54 percent FasTrak vehicles) the capacity is 4,225 vehicles per lane per hour (vph). Table 9 of the STIA (provided in Appendix S) shows the current westbound traffic volume at the toll plaza is 3,768 vehicles in the AM peak hour and 3,828 vehicles in the PM peak hour. Table 10 of the STIA shows the existing LOS westbound through the toll plaza. Under the existing conditions the toll plaza operates at an acceptable LOS.
### TABLE 3.8-4
PEAK HOUR INTERSECTION OPERATIONS - EXISTING CONDITIONS

<table>
<thead>
<tr>
<th>No</th>
<th>Intersections</th>
<th>Weekday AM</th>
<th></th>
<th>Weekday PM</th>
<th></th>
<th>Saturday PM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LOS</td>
<td>Critical V/C</td>
<td>LOS</td>
<td>Critical V/C</td>
<td>LOS</td>
<td>Critical V/C</td>
</tr>
<tr>
<td>1</td>
<td>Richmond Parkway (Castro Street)/ Redwood Way/WB I-580 On/Off</td>
<td>A</td>
<td>0.37</td>
<td>B</td>
<td>0.64</td>
<td>A</td>
<td>0.42</td>
</tr>
<tr>
<td>2</td>
<td>Marine Street/EB I-580 On/Off Ramps</td>
<td>A</td>
<td>0.23</td>
<td>B</td>
<td>0.69</td>
<td>A</td>
<td>0.38</td>
</tr>
<tr>
<td>3</td>
<td>Garrard Boulevard/Canal Boulevard/ WB I-580 On/Off</td>
<td>A</td>
<td>0.44</td>
<td>A</td>
<td>0.37</td>
<td>A</td>
<td>0.17</td>
</tr>
<tr>
<td>4</td>
<td>Garrard Boulevard/Canal Boulevard/EB I-580 On/Off</td>
<td>A</td>
<td>0.45</td>
<td>A</td>
<td>0.36</td>
<td>A</td>
<td>0.19</td>
</tr>
<tr>
<td>5</td>
<td>Cutting Boulevard/WB I-580 On/Off Ramp</td>
<td>A</td>
<td>0.46</td>
<td>A</td>
<td>0.17</td>
<td>A</td>
<td>0.06</td>
</tr>
<tr>
<td>6</td>
<td>Cutting Boulevard/EB I-580 Off-Ramp/Hoffman Boulevard</td>
<td>A</td>
<td>0.23</td>
<td>A</td>
<td>0.20</td>
<td>A</td>
<td>0.09</td>
</tr>
<tr>
<td>7</td>
<td>Harbour Way/WB I-580 Off-Ramp</td>
<td>B</td>
<td>10.4</td>
<td>B</td>
<td>10.9</td>
<td>A</td>
<td>9.0</td>
</tr>
<tr>
<td>8</td>
<td>Cutting Boulevard/S. Harbor Way</td>
<td>A</td>
<td>0.45</td>
<td>A</td>
<td>0.45</td>
<td>A</td>
<td>0.26</td>
</tr>
<tr>
<td>9</td>
<td>Marina Bay Parkway/WB I-580 On/Off Ramps</td>
<td>A</td>
<td>0.35</td>
<td>A</td>
<td>0.37</td>
<td>A</td>
<td>0.18</td>
</tr>
<tr>
<td>10</td>
<td>Marina Bay Parkway/EB I-580 On/Off Ramps</td>
<td>A</td>
<td>0.23</td>
<td>A</td>
<td>0.32</td>
<td>A</td>
<td>0.16</td>
</tr>
<tr>
<td>11</td>
<td>Cutting Boulevard/Marina Bay Parkway/23rd Street</td>
<td>A</td>
<td>0.52</td>
<td>A</td>
<td>0.50</td>
<td>A</td>
<td>0.33</td>
</tr>
<tr>
<td>12</td>
<td>Erlandson Street and WB I-580 On/Off Ramps</td>
<td>B</td>
<td>10.0</td>
<td>B</td>
<td>10.7</td>
<td>A</td>
<td>9.1</td>
</tr>
<tr>
<td>13</td>
<td>Regatta Boulevard/EB I-580 On/Off Ramps/Meade Street</td>
<td>A</td>
<td>0.22</td>
<td>A</td>
<td>0.15</td>
<td>A</td>
<td>0.07</td>
</tr>
<tr>
<td>14</td>
<td>Carlson Boulevard /Cutting Boulevard</td>
<td>A</td>
<td>0.39</td>
<td>A</td>
<td>0.36</td>
<td>A</td>
<td>0.27</td>
</tr>
<tr>
<td>15</td>
<td>Cutting Boulevard/S. 49th Street</td>
<td>A</td>
<td>0.30</td>
<td>A</td>
<td>0.30</td>
<td>A</td>
<td>0.23</td>
</tr>
<tr>
<td>16</td>
<td>Cutting Boulevard/WB I-80 Off-Ramp</td>
<td>A</td>
<td>0.45</td>
<td>A</td>
<td>0.45</td>
<td>A</td>
<td>0.30</td>
</tr>
<tr>
<td>17</td>
<td>MacDonald Avenue/S. Harbor Way</td>
<td>A</td>
<td>0.36</td>
<td>A</td>
<td>0.39</td>
<td>A</td>
<td>0.23</td>
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<tr>
<td>18</td>
<td>Richmond Parkway/Garrard Boulevard/W. MacDonald Avenue</td>
<td>A</td>
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<td>A</td>
<td>0.35</td>
<td>A</td>
<td>0.17</td>
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<tr>
<td>19</td>
<td>Richmond Parkway/Gareard Boulevard/W. Barrett Avenue</td>
<td>A</td>
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<td>A</td>
<td>0.38</td>
<td>A</td>
<td>0.19</td>
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<tr>
<td>20</td>
<td>Richmond Parkway/Castro Street/Hensley Street</td>
<td>A</td>
<td>0.32</td>
<td>A</td>
<td>0.59</td>
<td>A</td>
<td>0.12</td>
</tr>
<tr>
<td>21</td>
<td>Richmond Parkway/Gertrude Avenue</td>
<td>C</td>
<td>0.71</td>
<td>C</td>
<td>0.76</td>
<td>A</td>
<td>0.41</td>
</tr>
<tr>
<td>22</td>
<td>Richmond Parkway/Parr Boulevard</td>
<td>B</td>
<td>0.70</td>
<td>B</td>
<td>0.67</td>
<td>A</td>
<td>0.27</td>
</tr>
<tr>
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<td>Richmond Parkway/San Pablo Avenue</td>
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<td>C</td>
<td>0.71</td>
<td>A</td>
<td>0.47</td>
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<tr>
<td>24</td>
<td>Richmond Parkway/Blume Drive/WB I-80 On/Off Ramps</td>
<td>B</td>
<td>0.67</td>
<td>D</td>
<td>0.88</td>
<td>D</td>
<td>0.82</td>
</tr>
<tr>
<td>25</td>
<td>Richmond Parkway/Fitzgerald Drive/NB I-80 On/Off Ramps</td>
<td>A</td>
<td>0.19</td>
<td>A</td>
<td>0.58</td>
<td>A</td>
<td>0.60</td>
</tr>
<tr>
<td>26</td>
<td>San Pablo Avenue/Appian Way/Pinole Avenue</td>
<td>B</td>
<td>0.65</td>
<td>C</td>
<td>0.71</td>
<td>A</td>
<td>0.43</td>
</tr>
<tr>
<td>27</td>
<td>Western Drive/Chevron Access</td>
<td>-</td>
<td>N/A</td>
<td>-</td>
<td>N/A</td>
<td>-</td>
<td>N/A</td>
</tr>
<tr>
<td>28</td>
<td>Sir Francis Drake Blvd./Anderson Drive</td>
<td>E</td>
<td>45.5</td>
<td>F</td>
<td>545.3</td>
<td>E</td>
<td>45.2</td>
</tr>
<tr>
<td>29</td>
<td>Richmond Parkway/Pittsburg Avenue</td>
<td>A</td>
<td>0.56</td>
<td>C</td>
<td>0.76</td>
<td>A</td>
<td>0.40</td>
</tr>
<tr>
<td>30</td>
<td>Richmond Parkway/Goodrick Avenue</td>
<td>A</td>
<td>0.53</td>
<td>C</td>
<td>0.71</td>
<td>A</td>
<td>0.36</td>
</tr>
<tr>
<td>31</td>
<td>I-80Carpool On-Ramp/Richmond Parkway</td>
<td>A</td>
<td>0.24</td>
<td>A</td>
<td>0.58</td>
<td>A</td>
<td>0.33</td>
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</tbody>
</table>

Notes: 1 2000 Highway Capacity Manual, Unsignalized Intersection Methodology, worst-case delay per vehicle reported. Refer to Appendix HH for the existing conditions for intersections 32 – 35. V/C = volume to capacity; **Bold text** = poor LOS. Source: DMJM Harris/AECOM, TIA, 2008; Abrams and Associates, STIA, 2009 (Appendix S).
### Table 3.8-5

EXISTING CONDITIONS FREEWAY LEVEL OF SERVICE (REVISED)

<table>
<thead>
<tr>
<th>Segment</th>
<th>Dir.</th>
<th>No of Lns</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-580 at Marine Street Off-Ramp&lt;sup&gt;2&lt;/sup&gt;</td>
<td>EB</td>
<td>2</td>
<td>2,611</td>
<td>3,688</td>
</tr>
<tr>
<td>I-580 Western Drive to Castro Street&lt;sup&gt;1&lt;/sup&gt;</td>
<td>EB</td>
<td>3</td>
<td>2,251</td>
<td>2,657</td>
</tr>
<tr>
<td>I-580 Weave Between Castro Street and Canal Blvd.&lt;sup&gt;3&lt;/sup&gt;</td>
<td>EB</td>
<td>3</td>
<td>2,075</td>
<td>2,305</td>
</tr>
<tr>
<td>I-580 Canal Blvd. to Cutting Blvd.&lt;sup&gt;1&lt;/sup&gt;</td>
<td>EB</td>
<td>3</td>
<td>2,499</td>
<td>2,497</td>
</tr>
<tr>
<td>I-580 Canal Blvd. to Castro Street&lt;sup&gt;1&lt;/sup&gt;</td>
<td>WB</td>
<td>3</td>
<td>2,917</td>
<td>3,232</td>
</tr>
<tr>
<td>I-580 at Castro Street On-Ramp&lt;sup&gt;2&lt;/sup&gt;</td>
<td>WB</td>
<td>3</td>
<td>2,917</td>
<td>3,232</td>
</tr>
<tr>
<td>I-580 Castro Street to Western Drive&lt;sup&gt;1&lt;/sup&gt;</td>
<td>WB</td>
<td>3</td>
<td>3,768</td>
<td>3,828</td>
</tr>
<tr>
<td>I-580 Western Drive Off-Ramp&lt;sup&gt;2&lt;/sup&gt;</td>
<td>WB</td>
<td>3</td>
<td>3,768</td>
<td>3,828</td>
</tr>
<tr>
<td>I-80 at Richmond Parkway On-Ramp&lt;sup&gt;2&lt;/sup&gt;</td>
<td>EB</td>
<td>4</td>
<td>3,099</td>
<td>5,565</td>
</tr>
<tr>
<td>I-80 at Richmond Parkway Off-Ramp&lt;sup&gt;2&lt;/sup&gt;</td>
<td>WB</td>
<td>4</td>
<td>6,661</td>
<td>4,953</td>
</tr>
<tr>
<td>SB U.S. 101 Off-Ramp to EB I-580&lt;sup&gt;2,#&lt;/sup&gt;</td>
<td>SB</td>
<td>2</td>
<td>1,722</td>
<td>1,917</td>
</tr>
<tr>
<td>WB I-580 On-Ramp to NB U.S. 101&lt;sup&gt;2,#&lt;/sup&gt;</td>
<td>WB</td>
<td>1</td>
<td>1,828</td>
<td>1,668</td>
</tr>
<tr>
<td>WB I-580 Richmond/San Rafael Bridge</td>
<td>WB</td>
<td>2</td>
<td>3,768</td>
<td>3,828</td>
</tr>
<tr>
<td>EB I-580 Richmond/San Rafael Bridge</td>
<td>EB</td>
<td>2</td>
<td>2,251</td>
<td>2,657</td>
</tr>
<tr>
<td>SR-4 at I-80 EB Off-Ramp</td>
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<td>1,696</td>
<td>2,079</td>
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<tr>
<td>SR-4 at Willow Avenue</td>
<td>EB</td>
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<td>1,696</td>
<td>2,079</td>
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<td>SR-4 at Sycamore Avenue</td>
<td>WB</td>
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<td>2,454</td>
</tr>
<tr>
<td>SR-4 at Willow Avenue</td>
<td>WB</td>
<td>4</td>
<td>1,209</td>
<td>1,424</td>
</tr>
</tbody>
</table>

Note: **Bold text** = poor LOS.

- <sup>1</sup> Freeway Section
- <sup>2</sup> On/Off Ramp
- <sup>3</sup> Weave Segment
- <sup>4</sup> pc/mi/ln = passenger cars per miles per lanes.
- * Density not reported for level of service F
- # Provided in the Supplemental TIA.