

Permanent Impacts

Alternative 1: No-Build

No adverse impacts to community facilities serving minority or low-income populations would occur with these alternatives.

Alternative 2: Replace and Widen

No adverse impacts to community facilities serving minority or low-income populations would occur with these alternatives.

Alternative 5: Presidio Parkway

Under the Presidio Parkway Alternative – Diamond Option there would be no permanent displacement of Buildings 603, 1029, 1030, 1151 and 1152. Building 1151 (YMCA Pool) would, however, be permanently displaced with the Presidio Parkway Alternative - Circle Drive Option. However, because the use of this facility is not oriented towards serving minority and/or low-income populations, the displacement of this building would not disproportionately impact environmental justice populations. Access to all facilities, including ADA approved access to the Crissy Field Center, would be maintained during the long-term operation of Doyle Drive.

Avoidance, Minimization, and/or Mitigation Measures

Mitigation and avoidance measures would not be required because it is not anticipated that the project would disproportionately impact either minority or low-income populations.

3.2.8 Traffic and Transportation

This section presents a summary of existing and future traffic and transportation conditions, including pedestrian and bicycle facilities, within the Doyle Drive Project study area. Detailed information regarding methodology, traffic data, and projections can be found in the *South Access to the Golden Gate Bridge: Doyle Drive Project Revised Traffic and Transportation Study*, December 2004.

Methodology

An inventory of transportation facilities within the study area was conducted by the project team. Following this inventory, existing traffic and facility data were obtained from local, regional, and state agencies. Using these data, approved regional traffic models³ were used to project future travel conditions on the study area roadways for each alternative.

³This study used a version of the San Francisco Countywide Travel demand model which was enhanced for this project. This model is consistent with assumptions for the last adopted MTC Regional Transportation Plan Forecasts (2002).

All alternatives were tested using the San Francisco County Transportation Authority's traffic model. Each alternative assumes roadway and access changes anticipated through the redevelopment of the Presidio. In particular, adjustments were made to reflect the redevelopment of the Letterman Digital Arts Center as described in the *Letterman EIS and Letterman Redevelopment Richardson Avenue Access Traffic Operations Analysis*, March 2001.

Year 2000 data were used for the base year analysis. Economic conditions and employment destinations have resulted in variations in traffic volumes in the project study area since initial data were collected in April and May, 2000. Since that time, regularly assembled data for the Golden Gate Bridge have suggested that both daily and highest hourly traffic volumes have actually decreased for the same time periods between 2000 and 2003. Thus, conditions from 2000 are appropriate to designate as a base year.

The design year for a transportation project is generally targeted at twenty years from completion of the project. The current construction plan estimates completion in 2012, therefore the project design year is year 2032. Because population and employment are not projected to increase according to any existing data between 2030 and 2032, 2030 forecasts were assumed to be most appropriate using the design year methodology documented in this chapter.

Traffic performance related to congestion is defined as level of service (LOS). LOS is a measurement term used to describe operational conditions along a roadway. It generally describes travel speed and delay, freedom to maneuver, traffic interruptions and comfort and convenience. This measure is defined by the Transportation Research Board using published quantitative methods. There are six levels ranging from LOS A which represents the best operating conditions to LOS F where demand exceeds capacity. Different thresholds for LOS categories exist for intersections, highway segments, urban street segments and weaving. A summary of the LOS definitions is provided in **Exhibit 3-15** on the following page.

Affected Environment

Doyle Drive, the southern approach of US 101 to the Golden Gate Bridge, is 2.4 kilometers (1.5 miles) long with six traffic lanes. There are three San Francisco approach ramps which connect to Doyle Drive: one beginning at the intersection of Marina Boulevard and Lyon Street; one

**Exhibit 3-15
Level of Service Criteria**

CRITERIA	MEASUREMENT	LEVEL OF SERVICE	
		THRESHOLD	
Signalized Intersections	Average Delay (seconds per vehicle) All Approaches	A: Delay ≤ 10 B: 10 < Delay ≤ 20 C: 20 < Delay ≤ 35 D: 35 < Delay ≤ 55 E: 55 < Delay ≤ 80 F: Delay > 80	
All-Way Stop Controlled Intersections	Average Delay (seconds per vehicle) All Approaches	A: Delay ≤ 10 B: 10 < Delay ≤ 15 C: 15 < Delay ≤ 25 D: 25 < Delay ≤ 35 E: 35 < Delay ≤ 50 F: Delay > 50	
2-Way Stop Controlled Intersections	Average Delay (seconds per vehicle) Worst Approach	A: Delay ≤ 10 B: 10 < Delay ≤ 15 C: 15 < Delay ≤ 25 D: 25 < Delay ≤ 35 E: 35 < Delay ≤ 50 F: Delay > 50	
Highway Segment	Average Density (Vehicles per lane per mile)	A: Density ≤ 11 B: 11 < Density ≤ 18 C: 18 < Density ≤ 26 D: 26 < Density ≤ 35 E: 35 < Density ≤ 45 F: Density > 45 ¹	
Urban Street Segment – Class I	Average Travel Speed	A: Speed > 42 B: 34 < Speed ≤ 42 C: 27 < Speed ≤ 34 D: 21 < Speed ≤ 27 E: 16 < Speed ≤ 21 F: Speed ≤ 16	
Urban Street Segment – Class II	Average Travel Speed	A: Speed > 35 B: 28 < Speed ≤ 35 C: 22 < Speed ≤ 28 D: 17 < Speed ≤ 22 E: 13 < Speed ≤ 17 F: Speed ≤ 13	
Urban Street Segment – Class III	Average Travel Speed	A: Speed > 30 B: 24 < Speed ≤ 30 C: 18 < Speed ≤ 24 D: 14 < Speed ≤ 18 E: 10 < Speed ≤ 14 F: Speed ≤ 10	
Urban Street Segment – Class IV	Average Travel Speed	A: Speed > 25 B: 19 < Speed ≤ 25 C: 13 < Speed ≤ 19 D: 9 < Speed ≤ 13 E: 7 < Speed ≤ 9 F: Speed ≤ 7	
Weaving	The length of the weaving section, the total volume on the segment, and volume of weaving traffic all contribute to the LOS.		
Source: Highway Capacity Manual, 2000, Highway Design Manual, 2001			
Note: ¹ For a free-flow segment at 50 miles per hour the criteria is a density of 43 vehicles			

at the intersection of Richardson Avenue and Lyon Street; and one where Veterans Boulevard (State Route 1) merges into Doyle Drive (approximately 1.6 kilometers (one mile) west of the Marina Boulevard approach). Doyle Drive passes through the Presidio on an elevated concrete viaduct (low-viaduct) and transitions to a high steel truss viaduct (high-viaduct) as it approaches the Golden Gate Bridge Toll Plaza.

Currently, Doyle Drive has nonstandard design elements, including travel lanes from 2.9 to three meters (9.5 to ten feet) in width, no fixed median barrier, no shoulders, and exit ramps that have tight turning radii. Adjacent to the structure on the north side is an existing access sidewalk, which is fenced off from adjacent land uses and contains several stairwells that are not compliant with the *American with Disabilities Act* (ADA). Designated pedestrian and bicycle paths are located throughout the Presidio and include Bay Trail, Presidio Promenade, and the Golden Gate Promenade. These trails are designated as bicycle and pedestrian routes in the *Presidio Trails and Bikeways Master Plan*.

Because the number of lanes is restricted on the Golden Gate Bridge and on Doyle Drive, the direction of the two center lanes (on the bridge) is changed daily, depending upon traffic demands. During peak⁴ traffic hours, plastic pylons are manually moved to provide a median lane as well as to reverse the direction of traffic flow for center lanes. Further, the toll plaza contains more lanes than the bridge to allow for faster processing of toll collection, while maintaining adequate traffic flow and capacity on the Bridge. The number of lanes on Doyle Drive near the toll plaza varies in order to be consistent with the available lanes through the toll plaza in both directions. Further, the toll plaza contains more lanes than the bridge to allow for processing of toll collection while maintaining bridge traffic capacity.

Existing Traffic Conditions

Doyle Drive is classified as a multi-lane conventional highway with a posted speed of 45 miles per hour (mph) for its mainline section and 35 mph for its ramp and weaving sections.⁵ Generally, Doyle Drive operates as a transitional roadway: at the west terminus, near the Golden Gate Bridge (GGB), it operates like a free-flow highway, while at the east terminus it operates like an arterial roadway meeting local streets. During the weekday AM peak hour, the peak direction is southbound. The peak direction during the weekday PM peak hour is northbound.

⁴ Peak hours refer to the times generally from 7:45 am to 8:45 am and 5:00 pm to 6:00 pm on weekdays. The weekend peak hour is generally assumed to be 4:00 to 5:00 pm.)

⁵ In traffic analysis, weaving refers to the back and forth movement of vehicles between lanes primarily where vehicles are entering or leaving the highway.

The 2.4 kilometer (1.5 miles) Doyle Drive roadway is composed of the following operational segments:

- Veterans Boulevard to south of Merchant Road. This segment includes seven traffic lanes that generally operate as four lanes in the peak direction and three lanes in the non-peak direction using reversible lanes. Much of this segment requires lane changes and weaving associated with the GGB toll plaza, Merchant Road ramps (to/from GGB viewing area), and Park Presidio ramps.
- Veterans Boulevard to Marina Boulevard Access Ramps. This segment includes six lanes of traffic that generally operate as three lanes in the peak direction, two lanes in the non-peak direction, and one lane unused as a buffer. In the morning peak, four lanes are provided in the peak (eastbound) direction, and two in the non-peak (westbound) direction.
- Richardson Avenue, Lyon Street to Marina Boulevard Access Ramps. This segment includes one roadway that transitions to an urban street with three lanes of traffic in each direction. The portion of this segment closer to Doyle Drive operates with two highway lanes in the northbound direction, and three highway lanes in the southbound direction. A new Richardson Avenue northbound slip ramp has recently been opened north of Lyon Street to connect to Mashall Street and Gorgas Avenue, providing new access into the Main Post and Letterman areas of the Presidio.
- Marina Boulevard Access Ramps to Lyon Street (Marina connector). This segment includes a single roadway with five traffic lanes. Plastic pylons are used to reverse, reduce, and divide the traffic varying the facility from two lanes near Lyon Street in each direction to one lane near the Richardson Avenue ramp connections. Other lanes are used as buffer zones when not used for traffic.

Intersection Level of Service

Exhibit 3-16 provides the existing morning (AM), evening (PM), and weekend Level of Service (LOS) and delay by intersection. The congested intersections on Marina Boulevard at Broderick and Divisadero (LOS F) are a result of the heavy volumes traveling through these unsignalized intersections.

Segment Level of Service

Exhibit 3-17 on the following pages, contains existing LOS and vehicle density for the highway segments within the project area. The peak direction of Doyle Drive traffic is near the preferred minimum performance standard of LOS D. **Exhibit 3-18** identifies the four urban street segments evaluated in the project area including the segment classification and existing LOS. Each of the urban street segments is

Exhibit 3-16
Intersection Level of Service for Existing Conditions

No.	INTERSECTION		AM PEAK HOUR		PM PEAK HOUR		WEEKEND PEAK HOUR	
	NORTH/SOUTH	EAST/WEST	LOS	DELAY ¹	LOS	DELAY ¹	LOS	DELAY ¹
Signalized Intersections								
1	Lyon	Marina	B	13	B	18	B	20
2	101 / Richardson	Francisco	C	34	B	10	B	11
12	101 / Richardson	Chestnut	B	13	B	15	B	12
13	101 / Richardson	Lombard	B	10	A	5	A	7
14	Broderick	Lombard	C	21	C	25	B	18
17	Park Presidio	Lake	B	17	C	21	B	15
Stop Controlled Intersections								
3	Lincoln (N)	GGB Viewing Area	B	12	B	12	B	11
4	Lincoln (S)	Merchant	A	10	B	11	A	5
5	Girard	Lincoln	A	<1	A	<1	A	<1
6	Halleck	Mason	A	6	A	6	A	6
10	Broderick	Marina	F	59	F	>100	F	>100
11	Divisadero	Marina	F	79	F	>100	F	>100
15	Lyon	Lombard Gate	D	29	C	18	B	13
16	Presidio	Pacific	C	16	C	19	C	19
18	Merchant	GGB Viewing Area	A	9	B	13	B	12
<p><i>Notes:</i></p> <ol style="list-style-type: none"> 1. Delay measured in seconds per vehicle 2. Intersections 7 through 9 do not exist today 3. Weekend peak hour congestion varies significantly depending on weather and events 4. Existing traffic conditions refer to post FasTrak installation at the Golden Gate Bridge toll plaza and post stop sign installation on Marina Boulevard. <p><i>Source:</i> DKS Associates, 2004 from HCM 2000 methodology</p>								

estimated to operate at acceptable levels of service (LOS D or better) during peak hours.

Segment Weaving

Exhibit 3-19 (on page 3-67) presents the LOS for highway weaving sections. Deficient service levels shown at locations 1 and 2 are due to close spacing of the Merchant Road and Veterans Boulevard Ramps combined with high traffic volumes on the Golden Gate Bridge.

Temporary Impacts

This section identifies the potential impacts that may occur during construction. Projected construction staging is detailed in Chapter 2, Section 2.7. Once a preferred alternative is selected, and during final design, a formal *Transportation Management Plan* will develop strategies to address construction equipment, signage, and general area-wide traffic reduction and management.

Exhibit 3-17
Peak Hour Highway Segment Level of Service for Existing Conditions

SEGMENT	AM		PM		WEEKEND	
	LOS	DENSITY ¹	LOS	DENSITY ¹	LOS	DENSITY ¹
1 US 101 Southbound between the Merchant Road Ramps and Park Presidio	D	31	B	16	C	23
2 US 101 Northbound between Park Presidio and the Merchant Road Ramps	C	20	D	28	C	23
3 US 101 Southbound between Park Presidio and Marina Blvd access ramps	D	26	D	26	C	24
4 US 101 Northbound between Marina Blvd access ramps and Park Presidio	B	14	D	31	B	18
9 Park Presidio Southbound between US 101 and the Park Presidio Tunnel	C	24	C	23	C	22
10 Park Presidio Northbound between the Park Presidio Tunnel and US 101	C	24	D	28	C	20
11 US 101 Southbound between Park Presidio off and on-ramps	D	28	B	13	C	19
12 US 101 Northbound between Park Presidio on and off-ramps	A	11	C	24	B	14
13 US 101 Southbound between Marin County and Merchant Road (Golden Gate Bridge)	D	29	C	20	D	28
14 US 101 Northbound between Merchant Road and Marin County (Golden Gate Bridge)	D	29	E	42	C	20

*Notes: 1. Density measured in vehicle per mile per lane
2. Segments 5 through 8 were analyzed as Urban Arterial Segments only (see Exhibit 3-17)*

Source: DKS Associates, 2004

Exhibit 3-18
Peak Hour Urban Street Segment Level of Service for Existing Condition

SEGMENT	URBAN STREET CLASS ²	AM		PM		WEEKEND	
		LOS	SPEED ¹	LOS	SPEED ¹	LOS	SPEED ¹
5 Richardson Southbound between proposed Marina Blvd access ramps and Lyon	III	C	19	B	26	B	26
6 Richardson Northbound between proposed Lyon and Marina Blvd access ramps	III	B	26	E	14	B	26
7 Marina Blvd Southbound between Lyon and Doyle Drive merger	III	B	26	B	27	B	27
8 Marina Blvd Northbound between Doyle Drive merger and Lyon	III	B	27	B	25	B	27

*Notes: 1. Speed calculated according to Highway Capacity Manual (HCM) methodology in miles per hour (mph). It is calculated as the average speed on the link. Delays at intersections are included in travel time analysis.
2. Urban Street Class II have a range of free flow speeds between 35 to 45 mph, while Urban Street Class III have a range of free flow speeds between 30 to 35 mph*

Source: DKS Associates, 2004

Exhibit 3-19
Weaving Segment Level of Service for Existing Condition

No.	LOCATION	LOS		
		AM	PM	WEEKEND
1	US 101 Southbound between the Merchant Road entrance ramp and Park Presidio exit ramp	C	C	E
2	US 101 Northbound between the Park Presidio entrance ramp and Merchant Road exit ramp	D	E	F
3	US 101 Southbound between the Park Presidio exit ramp and Richardson/Marina Access merge	C	A	C
4	US 101 Northbound between the Park Presidio exit ramp and Richardson/Marina Access merge	A	A	B

Note: Results interpolated from the Caltrans Design Manual Leisch method nomographs.

Source: DKS Associates, 2004

The construction period for all build alternatives is approximately four to five years. During this length of time, a series of construction phases would occur and construction vehicles, equipment and workers would be traversing the project area. Temporary impacts would result from:

- Construction vehicles;
- Area-wide traffic reduction; and
- Ramp/road closures (greater than one month).

A discussion of these potential temporary impacts follows. General impacts are discussed first, followed by specific impacts related to each Build Alternative.

Construction Vehicles

Construction will involve demolition; excavation; and installation of new tunnel, bridge, and roadway structures; as well as landscaping and signing. Vehicles involved in construction would include trucks hauling debris and delivering construction materials and supplies, commuter vehicles driven by construction workers, and vehicles used for constructions such as graders and heavy earthmoving and paving equipment. Travel volume would vary depending on the specific construction activity and scheduling.

Construction traffic is expected to access the project site from Veterans Boulevard and the Golden Gate Bridge as was required during construction of the Letterman Digital Arts Complex. This traffic would enter the Presidio from eastbound Richardson Avenue while exiting traffic would use Mason Street to westbound Doyle Drive. Depending on type of construction vehicle and time of arrival, vehicles may

occasionally use the local streets within the Presidio. During final design, the Presidio Trust, the National Park Service, and the Golden Gate Bridge Highway and Transportation District, as well as other affected agencies would be consulted to define specific construction procedures, routes and implementation of the *Transportation Management Plan*.

Area-wide Traffic Reduction Strategies

Area roadways would continue to carry a high volume of traffic during construction. Although the roadways' current lanes would not be eliminated, some geometric restrictions (such as narrower lanes, alignment adjustments or more restrictive turning radii) and pavement conditions may create occasional awkward traffic movements or other situations where driver speeds will need to be reduced. Therefore, the *Transportation Management Plan* would include area-wide traffic reduction strategies aimed at reducing traffic in the construction area, and minimizing both Doyle Drive traffic and diversions to low-speed park roads during construction with detailed reduction needs and mitigation measures addressed during the specific traffic management situation. An over-arching strategy for construction zones begins with encouraging traffic to use alternate routes and reducing the area-wide traffic demand. In this situation, a reduction of five or ten percent in traffic could be achieved, and that would help to minimize additional traffic congestion.

Ramp/Road Closures and Operational Changes. During various construction stages, some ramps or roadways would be closed. Most closures are expected to last four to six months. In addition to closure, roadway lane capacity would be reduced in certain circumstances. The SF-TDM traffic model⁶ was used to assess the effects of such reductions. Using the travel model, a construction year (2010 as midpoint of construction) scenario was developed. Once completed, the effects from various closures were identified.

Because each closure affects traffic in a different corridor differently during the day, each projected traffic condition was examined individually. A discussion of each of the major ramp/road closures is provided below.

Alternative 2: Replace and Widen

The existing adjacent sidewalk along the north side of Doyle Drive, which is difficult to use and ADA non-compliant, will be closed during construction. Existing trails that parallel Doyle Drive on both sides would accommodate pedestrians. These include portions of the Bay Trail, Presidio Promenade and the Golden Gate Promenade, as

⁶ This study uses an enhanced version of the San Francisco Travel Demand model. The model used in this study was revalidated to local traffic counts for 2000.

designated in the *Presidio Trails and Bikeways Master Plan*. Bicycles will be routed to designated bicycle paths and routes on either side of the project area on routes described in the *Presidio Trails and Bikeways Master Plan*.

Park Presidio/Doyle Drive Ramp Closures. For both the Detour and No-Detour Option, ramp closures are required in the initial stages of the project. The two ramps proposed for closure are those that connect Park Presidio northbound to Doyle Drive southbound, and Doyle Drive northbound to Park Presidio southbound. It is anticipated that this closure could be as long as six months. While the Doyle Drive northbound to Park Presidio southbound ramp may be closed for a longer duration, this particular situation represents the early critical “worst case” traffic diversion scenario.

The Park Presidio northbound to Doyle Drive southbound ramp is projected to carry 930 vehicles in the AM peak hour and 730 vehicles in the PM peak hour. The Doyle Drive northbound to Park Presidio southbound ramp is projected to carry 430 vehicles in the AM peak hour and 910 in the PM peak hour. Closure of these ramps would entail a shifting of the estimated 1,360 vehicles in the AM peak hour and 1,640 in the PM peak hour to other routes or times.

The SF-TDM model indicates that these ramp closures would result in traffic moving to other ramps and streets. The general impact of this closure is projected to be that most drivers (over sixty percent in each time period) would not use either Park Presidio or Doyle Drive; these drivers would make their trips on other local streets through the Richmond District, Laurel Heights area, Presidio Heights area, the Cow Hollow District and the Marina District. These trips would generally disperse across the street network grid. The remaining forty percent (about 460 in the AM peak hour and 660 in the PM peak hour) would travel up Park Presidio and cut through the Toll Plaza Visitor’s area to continue their trip. These trips would distribute evenly; half (or twenty percent overall) would cut underneath the toll plaza, and the other half would use Lincoln Boulevard to cross underneath Doyle Drive to cross between one side to the other. This is forecasted to result in 350 AM peak hour vehicles and 100 PM peak hour vehicles traveling underneath the Toll Plaza in the peak direction, through this narrow roadway segment. Except for this localized increase in traffic in the toll plaza area, no other change in local Presidio traffic volumes is forecast to occur. Thus, other local roadways are not expected to have deterioration in traffic speeds, or resulting levels of service.

Lincoln Boulevard Closure. Local Presidio traffic would be rerouted for three months early in the construction period. During this time, Lincoln Boulevard near the National Cemetery and the northbound Park Presidio ramp to southbound Doyle Drive would also be closed. Traffic would

be diverted to Halleck, Mason and McDowell. The most critical time for this closure would be the PM, when 230 vehicles would be expected to use this diverted route westbound. Since traffic forecasts for detour roads show fewer than fifty vehicles at peak hours, the additional traffic would not result in any adverse congestion.

Marina/Richardson Merge and Diverge Relocation. Following completion of the construction scenarios, under the No-Detour Option, a westward relocation of the Marina and Richardson merge (northbound) and diverge (southbound) points would be required. This will result in an AM volume reduction of eighty vehicles northbound and 340 vehicles southbound on Doyle Drive PM volumes would drop by 160 vehicles northbound and 250 vehicles southbound. These vehicles would relocate to a variety of other streets, with none experiencing a more than 100 vehicle increase. The analysis suggests that typical traffic reduction strategy measures will be sufficient to accommodate this shift.

Modified Marina Access. During the final construction stage of the No-Detour Option, the replacement of Marina Boulevard access would temporarily reroute traffic originating south of the facility. This traffic would cross the northbound Richardson Avenue roadway at an at-grade signalized intersection.

In the AM condition, the northbound Doyle Drive volumes would drop by sixty vehicles and the southbound by 220 vehicles. In the PM condition, the roadway is projected to have a drop of 160 vehicles in the northbound direction, and less than ten vehicles in the southbound direction. The traffic is anticipated to disperse to a variety of other streets, with no other street showing traffic changes of more than 100 vehicles in any direction.

The new intersection created in this situation should operate satisfactorily, assuming that three outbound lanes are available on Richardson through this intersection, and that two left-turn travel lanes are available for traffic wishing to travel to Marina.

Assuming that all design constraints are met, no additional actions beyond the normal traffic reduction strategy for the project would be needed.

Alternative 5: Presidio Parkway

The existing adjacent sidewalk along the north side of Doyle Drive, which is difficult to use and ADA non-compliant, will be closed beginning at the commencement of construction. Existing trails that parallel Doyle Drive on both sides would accommodate pedestrians. These trails include portions of the Bay Trail, Presidio Promenade and

the Golden Gate Promenade, as designated in the *Presidio Trails and Bikeways Master Plan*.

Bicycles will be routed to already-designated bicycle paths and routes on either side of the project area on routes described in the *Presidio Trails and Bikeways Master Plan*.

Lincoln Boulevard Closure. Early in the construction phase, one traffic detour would involve rerouting internal Presidio traffic. A three-month closure of Lincoln Boulevard near the National Cemetery is proposed during the initial stages of construction. During this time, local traffic will be diverted to Halleck, Mason and McDowell, and pedestrians and bicyclists would need to follow these parallel routes. (Note: Halleck would be required to be opened when Lincoln would be closed.) The most critical time period for this closure would be the PM, when 290 vehicles would be expected to use this diverted route westbound. As the detour roads have fewer than fifty vehicles forecast on them at peak hour, the additional traffic should not result in any adverse congestion.

Halleck Street Closure. During construction, another traffic detour would be required when Halleck Street is closed for about a three year period. Halleck Street would attract less than 100 vehicles in each direction at peak hour, so that congestion impacts are not anticipated. Bicycle and pedestrian users would be affected, as the nearest detours would be at least 500 meters to the east (Lyon Street) or 1000 meters to the west (McDowell Avenue). To assure access between these areas, a replacement path should be provided across the roadway whenever possible.

Marina Boulevard Access without Doyle Drive to Park Presidio Ramp Closure. For the Parkway Alternative, the “worst case” scenario is the point in the construction staging where traffic to and from Marina Boulevard on the Girard Road extension would need to cross the temporary northbound Richardson Avenue ramp. Although traffic flow varies between the Diamond and the Circle Drive Options, there is no appreciable difference for purposes of this analysis.

In this scenario, the outbound traffic on Richardson was tested at two lanes. With two lanes, outbound Doyle Drive operated adequately in the AM peak hour, with less than 100 vehicles change on Doyle Drive. However, in the PM condition, the lack of three through lanes posed a substantial barrier to traffic. Over 1,000 vehicles shifted to other streets. About 250 vehicles would shift to Lincoln, another 250 vehicles would use Park Presidio to reach the bridge, and another 300 vehicles would choose other routes instead of using the Doyle Drive northbound to Park Presidio ramp.

For this reason, a full three lanes would be needed to carry the volumes coming from Richardson Avenue. With three lanes, the signalized

intersection created in this situation should operate satisfactorily and traffic diversion would not occur. Two lanes would be available on Girard Road for southbound Doyle Drive traffic wishing to travel to Marina Boulevard.

No substantial congestion is anticipated on roadways within the Presidio during this phase. All local roadways are forecast to have stable or slightly lower traffic volumes, even with the closure of Halleck Street. Once the extension of Girard Road to Marina Boulevard is opened, it will experience increased traffic, but this is expected as part of implementing Alternative 5.

These strategies will be investigated as part of the *Transportation Management Plan*, and interactive traffic management, as appropriate, would be implemented to alleviate this upcoming bottleneck.

Marina Boulevard Access with Doyle Drive to Veterans Boulevard Ramp Closure. One possible variation of the previously-mentioned phase is for the Doyle Drive northbound to Veterans Boulevard southbound ramp to remain closed, rather than to have a temporary ramp for a portion of the construction period. In the case where this ramp is kept closed during construction, the traffic would divert to the toll plaza routing as discussed above in Alternative 2. The remaining vehicles would disperse to other local streets.

Similar to the previously-mentioned phase, a full three lanes would be needed to carry the anticipated volumes coming from Richardson Avenue. With three lanes, the signalized intersection created in this situation should operate satisfactorily and traffic diversion would not occur. Two lanes would be available on Girard Road for southbound Doyle Drive traffic wishing to travel to Marina Boulevard.

No substantial congestion is anticipated on roadways within the Presidio during this phase. Generally, all of these local roadways are forecast to have stable or slightly lower traffic volumes, even with the closure of Halleck Street. Once the extension of Girard Road to Marina Boulevard is opened, it will experience increased traffic, but this is expected as part of implementing Alternative 5.

These strategies will be investigated as part of the *Transportation Management Plan*, and interactive traffic management, as appropriate, would be implemented.

Summary of Temporary Impacts by Alternative

Alternative 1: No-Build

No adverse impacts.

Alternative 2: Replace and Widen

Construction vehicles would access the project site from Park Presidio Boulevard and the Golden Gate Bridge.

Additional congestion associated with occasional construction period roadway configuration changes would occur, which would be addressed through a *Transportation Management Plan*.

Local vehicular, pedestrian and bicycle traffic will need to be rerouted during the period where there is a Lincoln Boulevard closure.

Alternative 5: Presidio Parkway

Construction vehicles would access the project site from Park Presidio Boulevard and the Golden Gate Bridge.

Additional congestion associated with occasional construction period roadway configuration changes would occur, which would be addressed through a *Transportation Management Plan*.

Local vehicular, pedestrian and bicycle traffic will need to be rerouted during the period where there is a Lincoln Boulevard closure.

Local vehicular, pedestrian and bicycle traffic will need to be rerouted during the period where there is a Halleck Street closure.

Permanent Impacts

In the analysis of the permanent impacts, the Build Alternatives are compared to the No-Build Alternative in the design year. The following section presents the key traffic and transportation elements and provides a summary of potential permanent impacts and corrective measures for each alternative.

Intersection Level of Service. By the design year, the No-Build Alternative and Alternative 5, Presidio Parkway Alternative would have a new signalized intersection on Richardson Avenue at Gorgas Avenue/Lyon Street. New signals will also be installed at Lincoln and Merchant, Lyon and Lombard and Presidio and Pacific, as agreed in the *Presidio Trust Management Plan*. Timing plans for new signals were developed in accordance with existing signal timing progression used for downstream/upstream signals, and for fixed signal timing plans that would provide enough time for pedestrians to cross streets. Fixed signal timing plans for new signals on other roadways were optimized to provide the least amount of intersection delay. The AM Intersection LOS are shown in **Exhibit 3-20** and the PM

Intersection LOS in **Exhibit 3-21**. **Exhibit 3-22** contains the weekend condition.

The analysis shows that the intersections in the study area would continue to operate with acceptable level of service for all alternatives except the two unsignalized intersections along Marina (Marina at Divisadero and Marina at Broderick). Both of these intersections operate at LOS F during the existing conditions with extensive delays. With the exception of the Presidio Parkway Alternative during the AM and Weekend Peak periods, these intersections would continue to experience extensive delays. It should be noted that the delay in Presidio Parkway

Alternatives is much less than the delay under existing conditions and very similar to the forecast delay that would occur under the No-Build Alternative. Thus, the build alternatives would not create an adverse impact at these locations.

Exhibit 3-20
AM Peak Hour Intersection Level of Service Results By Alternative

INTERSECTION			CRITERIA	ALTERNATIVES				
#	NORTH/SOUTH	EAST/WEST		BASE YEAR	NO-BUILD	REPLACE AND WIDEN	PARKWAY: DIAMOND OPTION	PARKWAY: CIRCLE DRIVE OPTION
SIGNALIZED INTERSECTIONS								
1	Lyon	Marina	Delay ¹ LOS	13 B	10 A	10 A	15 B	15 B
2	101 / Richardson	Francisco	Delay LOS	34 C	35 C	35 C	38 D	39 D
4	Lincoln (S)	Merchant	Delay LOS	Stop Controlled	15 B	15 B	14 B	14 B
7	Richardson / 101	Gorgas / Lyon	Delay LOS	- -	17 B	16 B	16 B	16 B
8	Marina / Girard	Gorgas / 101 SB Ramps	Delay LOS	- -	- -	- -	14 B	10 A
9	Marina / Girard	101 NB Ramps	Delay LOS	- -	- -	- -	9 A	11 B
12	101 / Richardson	Chestnut	Delay LOS	12 B	14 B	14 B	14 B	14 B
13	101 / Richardson	Lombard	Delay LOS	10 ² B	9 ² A	9 ² A	3 A	3 A
14	101 / Lombard	Broderick	Delay LOS	21 C	21 C	21 C	13 B	13 B
15	Lyon	Lombard Gate	Delay LOS	Stop Controlled	26 C	27 C	18 B	16 B
16	Presidio	Pacific	Delay LOS	Stop Controlled	15 B	16 B	13 B	13 B
17	Park Presidio	Lake	Delay LOS	17 B	24 C	24 C	24 C	25 C
STOP CONTROLLED INTERSECTIONS³								
3	Lincoln (N)	GGB Viewing Area	Delay	13 ⁴	22	25	20	19
			LOS	B	C	C	C	C
4	Lincoln (S)	Merchant	Delay LOS	10 A	To be signalized in the future			
5	Girard	Lincoln	Delay LOS	<1 A ⁴	11 B ⁴	11 B ⁴	16 C	14 B
6	Halleck	Mason	Delay LOS	6 A	7 A	7 A	7 A	7 A

Exhibit 3-20 -- Continued
AM Peak Hour Intersection Level of Service Results by Alternative

INTERSECTION			CRITERIA	ALTERNATIVES				
#	NORTH/SOUTH	EAST/WEST		BASE YEAR	NO-BUILD	REPLACE AND WIDEN	PARKWAY: DIAMOND OPTION	PARKWAY: CIRCLE DRIVE OPTION
10	Broderick	Marina	Delay LOS	59 F	100 F	>100 F	35 E	33 D
11	Divisadero	Marina	Delay LOS	79 F	>100 F	>100 F	36 E	32 D
15	Lyon	Lombard Gate	Delay LOS	29 D	To be signalized in the future			
16	Presidio	Pacific	Delay LOS	16 C	To be signalized in the future			
18 ⁵	Merchant	GGB Viewing Area	Delay LOS	9 A	12 B	8 A	11 B	11 B

- Notes
1. Delay is measured in seconds per vehicle
 2. The intersection proximity between #13 Lombard and Richardson, and #14 Lombard and Broderick, results in spillback for left-turning vehicles at Lombard and Richardson, resulting in additional delay not demonstrated in this intersection level of service analysis.
 3. All stop controlled intersections have all way stop controlled approaches except as noted.
 4. For two-way stop controlled intersections, the delay and LOS for the worst movement is given
 5. The intersection of Merchant Road and GGB Viewing Area has a free northbound left turn and a free eastbound right turn. The delay has been calculated based on an all-way stop.

Source: DKS Associates, 2004

Exhibit 3-21
PM Peak Hour Intersection Level of Service Results by Alternative

INTERSECTION			CRITERIA	ALTERNATIVES				
#	NORTH/SOUTH	EAST/WEST		BASE YEAR	NO-BUILD	REPLACE AND WIDEN	PARKWAY: DIAMOND OPTION	PARKWAY: CIRCLE DRIVE OPTION
SIGNALIZED INTERSECTIONS								
1	Lyon	Marina	Delay ¹ LOS	18 B	9 A	25 C	14 B	14 B
2	Richardson	Francisco	Delay LOS	10 B	14 B	15 B	21 C	22 C
4	Lincoln (S)	Merchant	Delay LOS	Stop Controlled	17 B	18 B	15 B	16 B
7	Richardson / 101	Gorgas / Lyon	Delay LOS	- -	17 B	17 B	25 C	20 C
8	Marina / Girard	Gorgas / 101 SB Ramps	Delay LOS	- -	- -	- -	14 B	10 B

Exhibit 3-21 -- Continued
PM Peak Hour Intersection Level of Service Results by Alternative

9	Marina / Girard	101 NB Ramps	Delay LOS	- -	- -	- -	6 A	8 A
12	Richardson	Chestnut	Delay LOS	15 B	17 B	16 B	17 B	16 B
13	Richardson	Lombard	Delay LOS	5 ² A	7 ² A	7 ² A	3 A	3 A
14	101 / Lombard	Broderick	Delay LOS	25 C	22 C	21 C	24 C	22 C
15	Lyon	Lombard Gate	Delay LOS	Stop Controlled	20 D	20 C	17 B	17 B
16	Presidio	Pacific	Delay LOS	Stop Controlled	16 B	17 B	14 B	14 B
17	Park Presidio	Lake	Delay LOS	21 C	38 D	41 D	40 D	39 D
STOP CONTROLLED INTERSECTIONS³								
3	Lincoln (N)	GGB Viewing Area	Delay LOS	12 ⁴ B	12 B	13 B	12 B	12 B
4	Lincoln (S)	Merchant	Delay LOS	11 B	To be signalized in the future			
5	Girard	Lincoln	Delay LOS	<1 ⁴ A	13 ⁴ B	13 ⁴ B	20 C	18 C
6	Halleck	Mason	Delay LOS	6 A	7 A	6 A	6 A	6 A
10	Broderick	Marina	Delay LOS	166 F	>100 F	>100 F	>100 F	>100 F
11	Divisadero	Marina	Delay LOS	182 F	>100 F	>100 F	>100 F	>100 F
15	Lyon	Lombard Gate	Delay LOS	18 C	To be signalized in the future			
16	Presidio	Pacific	Delay LOS	19 C	To be signalized in the future			
18 ⁵	Merchant	GGB Viewing Area	Delay LOS	13 B	11 B	11 B	10 B	10 B

- Notes
1. Delay is measured in seconds per vehicle
 2. The intersection proximity between #13 Lombard and Richardson, and #14 Lombard and Broderick, results in spillback for left-turning vehicles at Lombard and Richardson, resulting in additional delay not demonstrated in this intersection level of service analysis.
 3. All stop controlled intersections have all way stop controlled approaches except as noted.
 4. For two-way stop controlled intersections, the delay and LOS for the worst movement is given
 5. The intersection of Merchant Road and GGB Viewing Area has a free northbound left turn and a free eastbound right turn. The delay has been calculated based on an all-way stop.

Exhibit 3-22
Weekend Peak Hour Intersection Level of Service Results by Alternative

INTERSECTION			CRITERIA	ALTERNATIVES				
#	NORTH/SOUTH	EAST/WEST		BASE YEAR	NO-BUILD	REPLACE AND WIDEN	PARKWAY: DIAMOND OPTION	PARKWAY: CIRCLE DRIVE OPTION
SIGNALIZED INTERSECTIONS								
1	Lyon	Marina	Delay ¹ LOS	20 B	8 A	8 A	11 B	11 B
2	Richardson	Francisco	Delay LOS	11 B	14 B	14 B	16 B	16 B
4	Lincoln (S)	Merchant	Delay LOS	Stop Controlled	13 B	13 B	13 B	13 B
7	Richardson / 101	Gorgas / Lyon	Delay LOS	- -	14 B	14 B	14 B	14 B
8	Marina / Girard	Gorgas / 101 SB Ramps	Delay LOS	- -	- -	- -	12 B	10 A
9	Marina / Girard	101 NB Ramps	Delay LOS	- -	- -	- -	8 A	5 A
12	Richardson	Chestnut	Delay LOS	12 B	14 B	14 B	12 B	11 B
13	Richardson	Lombard	Delay LOS	7 ² A	6 ² A	7 ² A	2 A	2 A
14	101 / Lombard	Broderick	Delay LOS	18 B	19 B	19 B	12 B	11 B
15	Lyon	Lombard Gate	Delay LOS	Stop Controlled	32 C	37 D	15 B	15 B
16	Presidio	Pacific	Delay LOS	Stop Controlled	14 B	14 B	12 B	13 B
17	Park Presidio	Lake	Delay LOS	15 B	17 B	17 B	15 B	16 B
STOP CONTROLLED INTERSECTIONS³								
3	Lincoln (N)	GGB Viewing Area	Delay LOS	8 ⁴ A	8 A	7 A	8 A	8 A
4	Lincoln (S)	Merchant	Delay LOS	11 B	To be signalized in the future			
5	Girard	Lincoln	Delay LOS	<1 ⁴ A	9 ⁴ A	9 ⁴ A	15 B	15 B
6	Halleck	Mason	Delay LOS	6 A	6 A	6 A	6 A	6 A
10	Broderick	Marina	Delay LOS	46 E	>100 F	>100 F	14 B	13 B

Exhibit 3-22 -- Continued
Weekend Peak Hour Intersection Level of Service Results by Alternative

INTERSECTION			CRITERIA	ALTERNATIVES				
#	NORTH/SOUTH	EAST/WEST		BASE YEAR	NO-BUILD	REPLACE AND WIDEN	PARKWAY DIAMOND OPTION	PARKWAY CIRCLE DRIVE OPTION
11	Divisadero	Marina	Delay LOS	68 F	>100 F	>100 F	14 B	13 B
15	Lyon	Lombard Gate	Delay LOS	12 B	To be signalized in the future			
16	Presidio	Pacific	Delay LOS	19 C	To be signalized in the future			
18 ^s	Merchant	GGB Viewing Area	Delay LOS	12 B	10 A	10 A	10 B	10 A

- Notes*
1. Delay is measured in seconds per vehicle
 2. The intersection proximity between #13 Lombard and Richardson, and #14 Lombard and Broderick, results in spillback for left-turning vehicles at Lombard and Richardson, resulting in additional delay not demonstrated in this intersection level of service analysis.
 3. All stop controlled intersections have all way stop controlled approaches except as noted.
 4. For two-way stop controlled intersections, the delay and LOS for the worst movement is given
 5. The intersection of Merchant Road and GGB Viewing Area has a free northbound left turn and a free eastbound right turn. The delay has been calculated based on an all-way stop.

Source: DKS Associates, 2004

Segment Level of Service. The segment LOS was based on the density of vehicles and/or average travel speed, depending on whether it was a highway or urban street segment. The segment LOS results are provided for highway segments in **Exhibit 3-23** for AM conditions, **Exhibit 3-24** for PM conditions and **Exhibit 3-25** for weekend conditions. Urban street levels of service are shown in **Exhibit 3-26** for AM conditions, **Exhibit 3-27** for PM conditions and **Exhibit 3-28** for weekend conditions. Some transitional segments are listed in both tables for informational purposes. Operational studies have shown that traffic on the Golden Gate Bridge (Segments 13 and 14) in **Exhibits 3-23** through **3-25** and the northbound approach link to the Golden Gate Bridge (Segment 2) in **Exhibits 3-23** through **3-25** would operate at a deficient level of service during the AM peak hour, unless the bridge lanes are operated with three lanes in each direction. This would result in a Level of Service F for southbound Golden Gate Bridge. Traffic (Segment 13) in the AM peak hour, although operational studies project that this would result in much less congestion than if the four lane southbound/two lane northbound configuration were used in the design year. These exhibits show a large increase in traffic projected by 2030, as a result of increased traffic demand expected to occur in the non-peak direction (northbound for the AM and southbound for the PM peak hours).

**Exhibit 3-23
Highway Segment Level of Service -- AM Peak Hour**

No.	LOCATION	DIR	CRITERIA	Base Year	Design Year			
					NO-BUILD	REPLACE AND WIDEN	PARKWAY DIAMOND OPTION	PARKWAY CIRCLE OPTION
1	US 101 from the Merchant Drive Ramps to Park Presidio Blvd	SB	Hour Volume	6150	6441	6414	6550	6556
			Density / LOS	31 / D	33 / D	33 / D	33 / D	34 / D
2	US 101 from Park Presidio Blvd to the Merchant Drive Ramps	NB	Hour Volume	2994	5019	5013	5091	5096
			Density / LOS	20 / C	25 / C ¹	25 / C ¹	26 / C ¹	26 / C ¹
3	US 101 from Park Presidio to the Marina Blvd Access Ramps	SB	Hour Volume	5203	4981	4996	4951	4888
			Density / LOS	26 / D ⁵	25 / C	25 / C	25 / C	24 / C
4	US 101 from the Marina Blvd Access Ramps to Park Presidio	NB	Hour Volume	2049	2947	2979	2994	2948
			Density / LOS	14 / B	20 / C	20 / C	20 / C	20 / C
5	Richardson from the Marina Blvd Access Ramps to north of Lyon St	SB	Hour Volume	3717	3325	3320	3053	3063
			Density / LOS	39 / E	34 / D	34 / D	31 / D	31 / D
6	Richardson from North of Lyon St to the Marina Blvd Access Ramps	NB	Hour Volume	1443	2141	2208	2743	2636
			Density / LOS	14 / B	21 / C	22 / C	27 / D	26 / D ⁵
7	Marina Blvd from the Doyle Drive Merge to Lyon St	EB	Hour Volume	1486	1656	1676	N/A ⁴	N/A ⁴
			Density / LOS	21 / C	24 / C	24 / C	N/A ⁴	N/A ⁴
8	Marina Blvd from Lyon St to the Doyle Drive merge	WB	Hour Volume	606	806	770	N/A ⁴	N/A ⁴
			Density / LOS	9 / A	12 / B	11 / A	N/A ⁴	N/A ⁴
9	Park Presidio from US 101 Ramps to Park Presidio Tunnel	SB	Hour Volume	2380	2480	2485	2576	2592
			Density / LOS	24 / C	25 / C	25 / C	26 / C	26 / C
10	Park Presidio from Park Presidio Tunnel to the US 101 Ramps	NB	Hour Volume	2379	3092	3101	3073	3072
			Density / LOS	24 / C	31 / D	31 / D	31 / D	31 / D
11	US 101 between Park Presidio on and off-ramps	SB	Hour Volume	4217	4345	4314	4328	4295
			Density / LOS	28 / D	29 / D	29 / D	29 / D	29 / D
12	US 101 between Park Presidio off and on-ramps	NB	Hour Volume	1601	2564	2593	2641	2617
			Density / LOS	11 / A	17 / B	17 / B	18 / B	17 / B
13	US 101 between Marin County and Merchant Rd (Golden Gate Bridge)	SB	Hour Volume	5780	6098	6102	6105	6123
			Density / LOS	29 / D	44 / F ²	44 / F ²	44 / F ²	44 / F ²
14	US 101 between Merchant Rd and Marin County (Golden Gate Bridge)	NB	Hour Volume	2862	4990	4990	4991	4989
			Density / LOS	29 / D	34 / D ³	34 / D ³	34 / D ³	34 / D ³

¹If Golden Gate Bridge northbound configuration remains at the current two lanes, this segment would operate at D for all future design year scenarios.

²If Golden Gate Bridge southbound configuration remains at the current four lanes, this segment would operate at D for all future design year scenarios. However, the analysis also shows that queuing would be extensive on Doyle Drive if this configuration is used, and that queuing on the bridge would be minimal in this configuration.

³If Golden Gate Bridge northbound configuration remains at the current two lanes, this segment would operate at F for all future design year scenarios.

⁴This segment is analyzed as an Urban Street Segment under the two Presidio Parkway Alternative options.

⁵Reported Level of Service for this segment is one classification greater than Thresholds identified in Exhibit 3-11 as density measurement is slightly above the rounded threshold.

Source: DKS Associates, 2004

**Exhibit 3-24
Highway Segment Level of Service -- PM Peak Hour**

No.	Location	Dir	Criteria	Base Year	Design Year			
					No-Build	Replace and Widen	Parkway Diamond Option	Parkway Circle Option
1	US 101 from the Merchant Drive Ramps to Park Presidio Blvd	SB	Hour Volume	3120	5074	5437	5612	5572
			Density / LOS	21 / C	25 / C	27 / D	28 / D	28 / D
2	US 101 from Park Presidio Blvd to the Merchant Drive Ramps	NB	Hour Volume	5649	6219	6263	6448	6431
			Density / LOS	28 / D	32 / D	32 / D	33 / D	33 / D
3	US 101 from Park Presidio to the Marina Blvd Access Ramps	SB	Hour Volume	2608	3590	3838	3785	3752
			Density / LOS	26 / D ³	18 / B	19 / C	19 / C	19 / C
4	US 101 from the Marina Blvd Access Ramps to Park Presidio	NB	Hour Volume	4619	4806	4795	4924	4902
			Density / LOS	31 / D	33 / D	33 / D	34 / D	33 / D
5	Richardson from Marina Blvd Access Ramps to north Lyon St	SB	Hour Volume	1734	2543	2660	2398	2431
			Density / LOS	17 / B	25 / C	27 / D	24 / C	24 / C
6	Richardson from North of Lyon St to Marina Blvd Access Ramps	NB	Hour Volume	2802	2931	3008	3355	3291
			Density / LOS	28 / D	29 / D	30 / D	34 / D	34 / D
7	Marina Blvd from the Doyle Drive Merge to Lyon St	EB	Hour Volume	873	1047	1178	N/A ²	N/A ²
			Density / LOS	13 / B	15 / B	17 / B	N/A ²	N/A ²
8	Marina Blvd from Lyon St to the Doyle Drive merge	WB	Hour Volume	1817	1875	1787	N/A ²	N/A ²
			Density / LOS	26 / C	27 / D	26 / C	N/A ²	N/A ²
9	Park Presidio from US 101 Ramps to Park Presidio Tunnel	SB	Hour Volume	2251	2935	2984	3094	3080
			Density / LOS	23 / C	30 / D	30 / D	31 / D	31 / D
10	Park Presidio from Park Presidio Tunnel to US 101 Ramps	NB	Hour Volume	2768	2864	2853	2792	2790
			Density / LOS	28 / D	29 / D	29 / D	28 / D	28 / D
11	US 101 between Park Presidio on and off-ramps	SB	Hour Volume	1884	2929	3180	3190	3163
			Density / LOS	13 / B	20 / C	21 / C	21 / C	21 / C
12	US 101 between Park Presidio off and on-ramps	NB	Hour Volume	3605	4016	4068	4252	4230
			Density / LOS	24 / C	27 / D	27 / D	28 / D	28 / D
13	US 101 between Marin County and Merchant Rd (Golden Gate Bridge)	SB	Hour Volume	2987	5275	5732	5734	5723
			Density / LOS	20 / C	37 / E ¹	41 / E ¹	41 / E ¹	40 / E ¹
14	US 101 between Merchant Road and Marin County (Golden Gate Bridge)	NB	Hour Volume	5890	6450	6491	6500	6492
			Density / LOS	42 / E	47 / F ¹	48 / F ¹	48 / F ¹	48 / F ¹

¹Golden Gate Bridge segments are projected to operate at a deficient level of service in all scenarios in the design year in both directions.

²This segment is analyzed as an Urban Street Segment under the two Presidio Parkway Alternative options.

³Reported Level of Service for this segment is one classification greater than Thresholds identified in Exhibit 3-11 as density measurement is slightly above the rounded threshold.

Source: DKS Associates, 2004

Exhibit 3-25
Highway Segment Level of Service -- Weekend Peak Hour

No.	Location	Dir	Criteria	Base Year	Design Year			
					No-Build	Replace and Widen	Parkway Diamond Option	Parkway Circle Option
1	US 101 from the Merchant Drive Ramps to Park Presidio Blvd	SB	Hour Volume Density / LOS	4583 23 / C	5430 27 / D	5446 27 / D	5471 27 / D	5466 27 / D
2	US 101 from Park Presidio Blvd to the Merchant Drive Ramps	NB	Hour Volume Density / LOS	3377 23 / C	5277 26 / D ³	5271 26 / D ³	5304 27 / D	5299 27 / D
3	US 101 from Park Presidio to the Marina Blvd Access Ramps	SB	Hour Volume Density / LOS	3596 24 / C	3493 18 / B	3501 18 / B	3397 17 / B	3389 17 / B
4	US 101 from the Marina Blvd Access Ramps to Park Presidio	NB	Hour Volume Density / LOS	2624 18 / B	3550 24 / C	3533 24 / C	3633 24 / C	3612 24 / C
5	Richardson from the Marina Blvd Access Ramps to north of Lyon St	SB	Hour Volume Density / LOS	2520 25 / C	2532 25 / C	2516 25 / C	2272 23 / C	2306 23 / C
6	Richardson from north of Lyon St to the Marina Blvd Access Ramps	NB	Hour Volume Density / LOS	1683 17 / B	2407 24 / C	2455 25 / C	2960 30 / D	2907 29 / D
7	Marina Blvd from the Doyle Drive Merge to Lyon St	EB	Hour Volume Density / LOS	1076 15 / B	960 14 / B	986 14 / B	N/A ² N/A ²	N/A ² N/A ²
8	Marina Blvd from Lyon St to the Doyle Drive merge	WB	Hour Volume Density / LOS	941 13 / B	1142 16 / B	1078 15 / B	N/A ² N/A ²	N/A ² N/A ²
9	Park Presidio from the US 101 Ramps to the Park Presidio Tunnel	SB	Hour Volume Density / LOS	2213 22 / C	2165 22 / C	2182 22 / C	2278 23 / C	2283 23 / C
10	Park Presidio from Park Presidio Tunnel to the US 101 Ramps	NB	Hour Volume Density / LOS	1980 20 / C	1955 20 / C	1975 20 / C	1875 19 / C	1892 19 / C
11	US 101 between Park Presidio on and off-ramps	SB	Hour Volume Density / LOS	2892 19 / C	3376 23 / C	3376 23 / C	3292 22 / C	3285 22 / C
12	US 101 between Park Presidio off and on-ramps	NB	Hour Volume Density / LOS	2102 14 / B	3439 23 / C	3421 23 / C	3535 24 / C	3510 23 / C
13	US 101 between Marin County and Merchant Rd (Golden Gate Bridge)	SB	Hour Volume Density / LOS	4153 28 / D	5556 39 / E ¹	5559 39 / E ¹	5561 39 / E ¹	5560 39 / E ¹
14	US 101 between Merchant Rd and Marin County (Golden Gate Bridge)	NB	Hour Volume	3000	5226	5219	5230	5226
			Density / LOS	20 / C	36 / E ¹	36 / E ¹	36 / E ¹	36 / E ¹

¹Golden Gate Bridge segments are projected to operate at a deficient level of service in all scenarios in the design year in both directions.

²This segment is analyzed as an Urban Street Segment under the two Presidio Parkway Alternative options.

³Reported Level of Service for this segment is one classification greater than Thresholds identified in Exhibit 3-11 as density measurement is slightly above the rounded threshold.

Source: DKS Associates, 2004

**Exhibit 3-26
Urban Street Segment Level of Service -- AM Peak Hour**

No.	Location	Dir	Criteria	Base Year	Design Year			
					No-Build	Replace and Widen	Parkway Diamond Option	Parkway Circle Option
5	Richardson from north of Lyon Street to Francisco	SB	Hour Volume	3717	3094	3087	3130	3138
			Calc. Speed / LOS	19 / C	23 / C	23 / C	23 / C	23 / C
6	Richardson from Francisco to north of Lyon Street	NB	Hour Volume	1443	2259	2161	2817	2851
			Calc. Speed / LOS	26 / B	22 / C	23 / C	18 / D	17 / D
7	Marina Blvd from the Doyle Drive Merge to Lyon Street	EB	Hour Volume	1486	1656	1676	1271	1203
			Calc. Speed / LOS	26 / B	26 / B	26 / B	16 / C ¹	16 / C ¹
8	Marina Blvd from Lyon Street to the Doyle Drive Merge	WB	Hour Volume	606	806	770	230	196
			Calc. Speed / LOS	27 / B	27 / B	27 / B	23 / B ¹	23 / B ¹

¹Marina Boulevard has a different urban street classification under the two Presidio Parkway Alternative options. Under Base Year, No-Build and Replace and Widen Alternatives, Marina Boulevard has an Urban Street Classification of III and in the Presidio Parkway Alternative options the Classification is IV. Urban Street Classification IV has a FFS range of 25 to 35 mph.

Source: DKS Associates, 2004

**Exhibit 3-27
Urban Street Segment Level of Service -- PM Peak Hour**

No.	Location	Dir	Criteria	Base Year	Design Year			
					No-Build	Replace and Widen	Parkway Diamond Option	Parkway Circle Option
5	Richardson from north of Lyon Street to Francisco	SB	Hour Volume	1734	2439	2560	2633	2665
			Calc. Speed / LOS	26 / B	26 / B	26 / B	25 / B	25 / B
6	Richardson from Francisco to north of Lyon Street	NB	Hour Volume	2776	2772	2784	3402	3418
			Calc. Speed / LOS	14 / E	13 / E	13 / E	11 / E	10 / E
7	Marina Blvd from the Doyle Drive Merge to Lyon Street	EB	Hour Volume	873	1047	1178	887	820
			Calc. Speed / LOS	27 / B	27 / B	27 / B	24 / B ¹	22 / B ¹
8	Marina Blvd from Lyon Street to the Doyle Drive Merge	WB	Hour Volume	1817	1875	1787	1276	1233
			Calc. Speed / LOS	25 / B	25 / B	26 / B	28 / A ¹	29 / A ¹

¹Marina Boulevard has a different urban street classification under the two Presidio Parkway Alternative options. Under Base Year, No-Build and Replace and Widen Alternatives, Marina Boulevard has an Urban Street Classification of III and in the Presidio Parkway Alternative options the Classification is IV. Urban Street Classification IV has a FFS range of 25 to 35 mph.

Source: DKS Associates, 2004

Exhibit 3-28
Urban Street Segment Level of Service -- Weekend Peak Hour

No.	Location	Dir	Criteria	Base Year	Design Year			
					No-Build	Replace and Widen	Parkway Diamond Option	Parkway Circle Option
5	Richardson from north of Lyon Street to Francisco	SB	Hour Volume	2520	2441	2434	2361	2388
			Calc. Speed / LOS	26 / B	26 / B	26 / B	27 / B	27 / B
6	Richardson from Francisco to north of Lyon Street	NB	Hour Volume	1683	2363	2373	2978	2979
			Calc. Speed / LOS	26 / B	21 / C	20 / C	16 / D	16 / D
7	Marina Blvd from the Doyle Drive Merge to Lyon Street	EB	Hour Volume	1076	960	986	589	525
			Calc. Speed / LOS	27 / B	27 / B	27 / B	26 / A ¹	29 / A ¹
8	Marina Blvd from Lyon Street to Doyle Drive Merge	WB	Hour Volume	941	1142	1078	514	498
			Calc. Speed / LOS	27 / B	27 / B	27 / B	28 / A ¹	29 / A ¹

¹Marina Boulevard has a different urban street classification under the two Presidio Parkway Alternative options. Under Base Year, No-Build and Replace and Widen Alternatives, Marina Boulevard has an Urban Street Classification of III and in the Presidio Parkway Alternative options the Classification is IV. Urban Street Classification IV has a FFS range of 25 to 35 mph.

Source: DKS Associates, 2004

Overall, an acceptable LOS D⁷ was achieved for all highway segments except for the Golden Gate Bridge operations, particularly during the PM Peak period for all future design year alternatives. It should be noted that the bridge is forecasted to operate with LOS F under the No-Build Alternative; No-Build alternative is forecast to have any further impacts on the Golden Gate Bridge operations.

PM Peak hour speeds on Richardson Avenue in the northbound direction are anticipated to fall to LOS E conditions in the design year in all alternatives. This estimated design deficiency is indicated for the segment level analysis, although any upstream intersections are projected to operate at a sufficient level of service.

As no new deficiencies would result beyond the No-Build Alternative, no mitigation is required.

Segment Weaving. The LOS for the weaving areas were calculated. The results are shown in **Exhibit 3-29**. A less than adequate weave condition (Level of Service E) was identified on northbound US 101 between the Park Presidio on-ramp and Merchant Road exit-ramp in the base year and in all future alternatives because the Park Presidio on-ramp requires

⁷ Visual interpretation of results show that performance is at a D/E, showing barely adequate suitability.

two lanes – which exiting traffic must then cross. To eliminate this potential problem, a Merchant Road slip ramp option is carried forth.

The findings also identified a southbound weaving section between the Merchant Road on-ramp and the Park Presidio off-ramp in the AM and PM peak hour (Level of Service E) in the Alternative 1, No-Build and Alternative 2, Replace and Widen Alternatives. The southbound weave condition at this location was improved by adding a second lane to the exit ramp at Park Presidio in Alternative 5, Presidio Parkway Alternative.

The PM peak hour traffic forecasts also indicate that the northbound segment of Doyle Drive between merge point from Richardson Avenue and Marina Boulevard to the off-ramp at Park Presidio is projected to deteriorate to Level of Service E during the Design Year in all alternatives. Traffic increases are the primary reason for the level of service deterioration. Therefore, no additional impacts are associated with design alternatives and options.

There are no impacts identified in the segment weaving analysis, since the No-Build Alternative is anticipated to operate at unacceptable levels of service for three of the four segments during at least one time period.

Design Option Weaving Analysis. It is noted that design options found in various alternatives eliminate projected weaving deficiencies for northbound Doyle Drive between Park Presidio and Merchant Road ramps.

As identified above, Doyle Drive under existing conditions, has a continued weaving deficiency for northbound traffic between the Park Presidio on-ramp and Merchant Road off-ramp. This weaving deficiency is a daily occurrence and often will impact mainline traffic circulation on Doyle Drive. This can be eliminated by the Merchant Road Slip Ramp Option which proposes to eliminate this severe weaving problem by providing a slip ramp to Merchant Road. This design option allows Merchant Road off-ramp traffic to access the toll plaza and Merchant Road from Doyle Drive without weaving through on-ramp traffic from Park Presidio, thus eliminating the weaving deficiency.

**Exhibit 3-29
Weaving Analysis**

Location		Level of Service		
		AM	PM	Weekend
Base Year				
1	US 101 Southbound between the Merchant Road entrance ramp and Park Presidio exit ramp	C	C	N/A
2	US 101 Northbound between the Park Presidio entrance ramp and Merchant Road exit ramp	D	E ²	N/A
3	US 101 Southbound between the Park Presidio merge and Richardson/Marina Access exit ramp	C	A	N/A
4	US 101 Northbound between Richardson/Marina Access merge and the Park Presidio exit ramp	A	A	N/A
Design Year – No-Build Alternative				
1	US 101 Southbound between the Merchant Road entrance ramp and Park Presidio exit ramp	E ²	E ²	D
2	US 101 Northbound between the Park Presidio entrance ramp and Merchant Road exit ramp	D	E ¹	D
3	US 101 Southbound between the Park Presidio merge and Richardson/Marina Access exit ramp	D	C	C
4	US 101 Northbound between Richardson/Marina Access merge and the Park Presidio exit ramp	B	E ²	C
Design Year – Replace and Widen Alternative				
1	US 101 Southbound between the Merchant Road entrance ramp and Park Presidio exit ramp	E ²	E ²	D
2	US 101 Northbound between the Park Presidio entrance ramp and Merchant Road exit ramp	D	E ²	D
3	US 101 Southbound between the Park Presidio merge and Richardson/Marina Access exit ramp	D	B	B
4	US 101 Northbound between Richardson/Marina Access merge and the Park Presidio exit ramp	C	E ²	C
Design Year – Presidio Parkway Alternative: Diamond Option				
1	US 101 Southbound between the Merchant Road entrance ramp and Park Presidio exit ramp	D/E	D	D
2	US 101 Northbound between the Park Presidio entrance ramp and Merchant Road exit ramp	B	E ²	D
3	US 101 Southbound between the Park Presidio merge and Richardson/Marina Access exit ramp	C	B	B
4	US 101 Northbound between Richardson/Marina Access merge and the Park Presidio exit ramp	B	E ²	C
Design Year -- Presidio Parkway Alternative: Circle Drive Option				
1	US 101 Southbound between the Merchant Road entrance ramp and Park Presidio exit ramp	D/E	D	C
2	US 101 Northbound between the Park Presidio entrance ramp and Merchant Road exit ramp	B	E ²	C
3	US 101 Southbound between the Park Presidio merge and Richardson/Marina Access exit ramp	C	B	B
4	US 101 Northbound between Richardson/Marina Access merge and the Park Presidio exit ramp	B	E ²	C

¹Deficient weaving remedied with new northbound slip ramp.

²Design year level of service deficiencies are projected in No-Build Alternative, therefore no additional impacts would occur.

Source: DKS Associates, 2004

In testing this option in the San Francisco County travel model, the effect of this alternative is less than fifty vehicles on any link. The result of adding the slip ramp would not drastically affect other traffic volumes in the area. The expected traffic demand is distributed to specific ramps that eliminate the weaving activity and mainline traffic impacts. The one segment with a reduction in volumes would be the mainline segment between Park Presidio and the Merchant Road on-ramp, as the off-ramp traffic would no longer be traveling on this segment. Otherwise, the traffic volumes would change by less than fifty vehicles or 1.1 percent for surrounding segments. This variation is well within the margin of error of a travel model assignment process so that a separate analysis for the slip ramp option would yield no major operational changes beyond the elimination of the weaving.

The loop ramp configuration carried forth in Alternative 5, Presidio Parkway Alternative was designed to maximize the distance from the ramp to the cavalry stables buildings. The ramp can be shortened to a hook ramp configuration for cost savings and a reduction in the roadway footprint.

While the ramp change to a hook ramp would not introduce any additional traffic movements, the slightly shorter distance would result in slight increases to ramp traffic on this segment. It would also create minor changes to traffic on surrounding streets, but these changes are less than seventy-five vehicles or 1.7 percent of the mainline Doyle Drive traffic. This would not create any adverse traffic impacts.

Pedestrian and Bicycle Operations. Both Alternatives 2 and 5 remove the existing adjacent sidewalk along the north side of Doyle Drive which is difficult to use and ADA non-compliant. New trails that parallel Doyle Drive are in place or planned on both sides of the facility that should accommodate pedestrians including portions of the Bay Trail, Presidio Promenade and the Golden Gate Promenade, as designated in the *Presidio Trails and Bikeways Master Plan*; these trails that parallel Doyle Drive are in place or planned on both sides of the facility. In Alternative 5, the tunnel design will allow for easier access for pedestrians to cross Doyle Drive west of the main post atop the tunnels. Also in Alternative 5, the new access underneath Richardson Avenue will allow for more direct pedestrian movements between the Main Post area and the Palace of Fine Arts. Bicyclists and pedestrians will lose north-south access because of the Marshall Street closure in Alternative 5 options, however, Halleck Street will be available to pedestrians and cyclists about 120m to the west.

Alternative routes that are more attractive for pedestrians and bicyclists are available. Therefore, pedestrians and bicyclists will be prohibited on Doyle Drive and hence in the tunnels.

Bicycle activity in the Doyle Drive corridor is accommodated by already-designated bicycle paths and routes on either side of the Project area on routes described in the *Presidio Trails and Bikeways Master Plan*.

No adverse impacts are identified to bicycles with any alternative.

Summary of Permanent Impacts by Alternative

Alternative 1: No-Build

Intersection operations on Marina Boulevard at Broderick Street and Divisadero Street would continue to operate at Level of Service F.

Golden Gate Bridge operations would deteriorate to Level of Service deficiencies in both directions during weekday peak hours (Level of Service F in the AM peak hour southbound and PM peak hour northbound; Level of Service E in the PM peak hour southbound), and during the weekend peak hour (Level of Service E in both directions). The bridge configuration is anticipated to become three lanes in each direction for all peak hours, as the percent of peak direction traffic on the bridge lowers by the horizon year.

The Richardson Avenue northbound urban street segment would deteriorate to Level of Service E during the PM peak hour by the horizon year.

Weaving deficiencies are anticipated for three segments by the horizon year:

- US 101 Southbound between the Merchant Road entrance ramp and Park Presidio exit ramp (Level of Service E at AM and PM peak hours)
- US 101 Northbound between the Park Presidio entrance ramp and Merchant Road exit ramp (Level of Service E at PM peak hour)
- US 101 Northbound between Richardson/Marina Access merge and the Park Presidio exit ramp (Level of Service E at PM peak hour)

Alternative 2: Replace and Widen

Intersection operations would not worsen beyond a No Build condition, however additional spillback from westbound Lombard Street at Richardson Avenue eastward beyond Broderick Street would occur unless the Richardson northbound slip ramp to Marshall Street is maintained.

No additional segment level of service deficiencies are anticipated beyond those identified the No Build condition.

No additional weaving deficiencies are anticipated for segments beyond the No Build condition. The weaving deficiency for US 101 Southbound between the Merchant Road entrance ramp and Park Presidio exit ramp would be improved by a second lane on the exit ramp.

A pedestrian sidewalk adjacent to Doyle Drive through a north side pedestrian sidewalk would be removed, but parallel trails provide a more suitable pedestrian environment.

No adverse impacts are identified to bicycles with any alternative.

Alternative 5: Presidio Parkway

Intersection operations would not worsen beyond a No Build condition.

No additional segment level of service deficiencies are anticipated beyond those identified the No Build condition.

No additional weaving deficiencies are anticipated for segments beyond the No Build condition. The weaving deficiency for US 101 Southbound between the Merchant Road entrance ramp and Park Presidio exit ramp would be improved by a second lane on the exit ramp.

The weaving deficiency for US 101 Northbound between the Park Presidio entrance ramp and Merchant Road exit ramp would be eliminated by the introduction of the Merchant Road northbound slip ramp.

A pedestrian sidewalk adjacent to Doyle Drive through a north side pedestrian sidewalk would be removed, but parallel trails provide a more suitable pedestrian environment.

No adverse impacts are identified to bicycles with any alternative.

Avoidance, Minimization and/or Mitigation

No permanent impacts are anticipated therefore no mitigation would be required.

A *Transportation Management Plan* will be developed to minimize traffic impacts during construction. During construction, the implementation of traffic reduction and management strategies by the project proponent would minimize potential pedestrian, bicycle, and traffic impacts. Measures which will be included in this Plan would include, but not be limited to:

- encouraging alternatives, such as use of local San Francisco arterial streets (for local San Francisco traffic), shifting travel to other time periods, or use of transit;
- coordinating an overall trip reduction strategy;
- interactive traffic monitoring, as appropriate, would be implemented to determine the best strategies for alleviating possible bottlenecks.

3.2.9 Transit

The Doyle Drive project study area is currently served by the San Francisco Municipal Railway (MUNI) and the Golden Gate Bridge, Highway and Transit District (Golden Gate Transit, or GGT). The Presidio Trust also operates transit service within and through the project area. Doyle Drive carries MUNI and GGT transit service.

Regulatory Setting

Although no specific regulations exist which require analysis of impacts to transit service, both the *National Environmental Policy Act* (NEPA) and the *California Environmental Quality Act* (CEQA) require the review and analysis of potential impacts to community services, as well as transportation systems.

Affected Environment

MUNI, Golden Gate Transit, and Presidio Trust buses operate transit service within and through the study area. MUNI Route 28 is an important cross-town route that connects areas on the western side of San Francisco with the Presidio and Fort Mason.

Golden Gate Transit buses that operate on Doyle Drive provide public transit service between San Francisco and Marin and Sonoma counties. This service falls into two general categories: “Basic” service, which operates on a 24-hour/7-days per week basis, and “Commute” service, which operates on a peak period/peak direction weekday basis. In addition, the Presidio Shuttle operates in the study area, although it does not use Doyle Drive.

The following bus routes⁸ have some, or part, of their route on Doyle Drive:

- MUNI Bus Routes: 28 and 76; and
- Golden Gate Transit Bus Routes: 2, 4, 8, 10, 18, 20, 24, 26, 28, 30, 32, 34, 38, 44, 48, 50, 54, 56, 60, 70, 72, 74, 76, 78, 80, 90, 93.

⁸ GGT routes are based on year 2000 service structures.