

Las Positas/Mission Circulation Options Traffic Analysis Report

Prepared for:

City of Santa Barbara



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In association with:

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1.0 Introduction

The City of Santa Barbara initiated the Las Positas/Mission Circulation Options study effort to identify traffic solutions for traffic operational deficiencies and vehicle access constraints near the Las Positas Road and Mission Street interchanges with US Highway 101. The study area has some of the highest levels of traffic congestion in the City of Santa Barbara. The Las Positas Road/Highway 101 and Mission Street/Highway 101 interchanges serve as the primary access routes between Highway 101 and nearby Cottage Hospital.

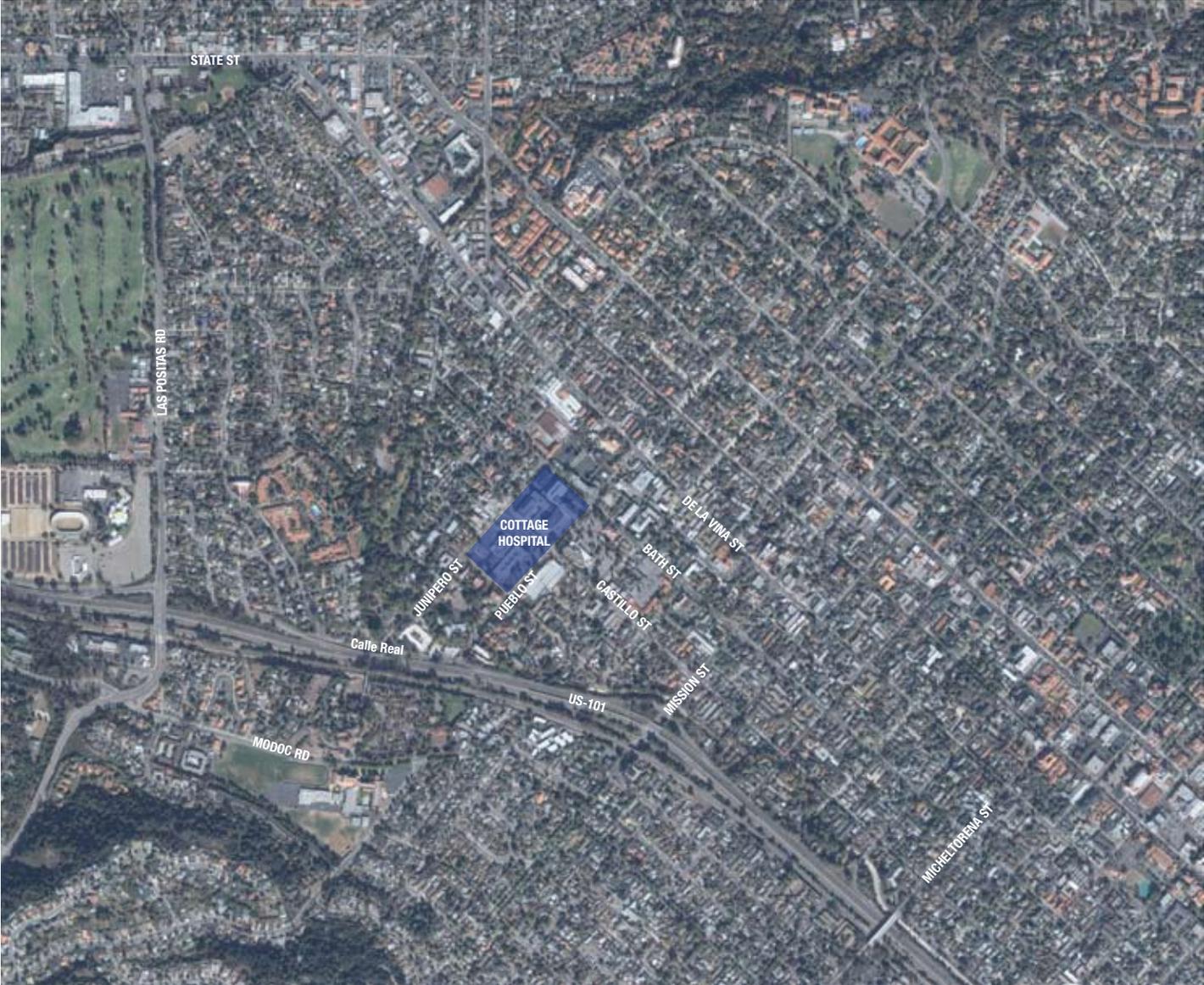
This report documents the analysis of selected options to improve access to and from Santa Barbara Cottage Hospital and the surrounding neighborhood. This effort incorporated extensive community outreach, including a series of public meetings. Feedback was received during various stages of the analysis through design charettes and comment cards. One of the products of this study is a list of preferred project alternatives to be carried forward into a Project Study Report (PSR) phase. The Project Study Report will be subject to review and approval by Caltrans, so the preferred project alternatives were chosen based on community consensus and input from Caltrans and other local stakeholders.

This report consists of the following sections:

- 1.0** Introduction
- 2.0** Analysis Methodology
- 3.0** Existing Conditions
- 4.0** Forecast Conditions – Year 2030 Baseline
- 5.0** Alternatives Analysis

Section 1, this section, provides an introduction to the report. Section 2 describes the methodology used for the various types of analysis presented in this study. Section 3 describes the existing study area land uses, intersection lane geometry, signal control, traffic volumes, and level of service. Section 4 presents the forecast year 2030 traffic volumes and level of service for the No Project (or baseline reference condition), which assumes ambient traffic growth through the forecast year. The assumed intersection lane geometry and control, forecast year 2030 traffic volumes, and level of service analysis results for each of the improvement projects selected for further analysis are summarized in Section 5. Section 6 presents a list of preferred project alternatives for a Project Study Report (PSR) and discusses the next steps for this study.

Figure 1.1 Project Location and Study Area



2.0 Analysis Methodology

The traffic analysis methodology used in this report conforms to City of Santa Barbara and California Department of Transportation (Caltrans) standards. The methodologies used for the analysis of signalized and unsignalized intersections are presented in this section.

2.1 SIGNALIZED INTERSECTION ANALYSIS

Intersection Capacity Utilization (ICU) methodology is the City of Santa Barbara's preferred methodology for the analysis of signalized intersections. All signalized study intersections are evaluated in this report using the ICU methodology. The California Department of Transportation (Caltrans) uses the year 2000 version of the Highway Capacity Manual (HCM) for intersection analysis. Given this condition, all signalized study intersections within Caltrans right-of-way are subjected to a second layer of analysis using the HCM methodology. The ICU and HCM methodologies are described in further detail in this section.

Intersection Capacity Utilization (ICU)

Consistent with City of Santa Barbara and County of Santa Barbara Congestion Management Program requirements, a saturation flow rate of 1,600 vehicles per hour (vph) and a clearance interval of 10 seconds (or a Loss Time of 10 seconds per 100 seconds of cycle length) are used in the analysis of signalized intersections. The clearance interval or Loss Time is equal to the total amount of Yellow and All-Red time during a single cycle.

The efficiency of traffic operations is measured by traffic engineers and planners with a grading system called Level of Service (LOS). Evaluation of roadways and intersections involves the assignment of grades from "A" to "F," with "A" representing the least congested operating conditions and "F" representing extremely congested and restricted operations. The ICU LOS level is determined by measuring the ratio of volume-to-capacity (V/C). Each letter grade corresponds to a range of V/C values, which are described in detail in Table 2-1.

The ICU level of service analysis is performed using the TRAFFIX computer software program. TRAFFIX is a network-based interactive computer program that enables calculation of levels of service at signalized and unsignalized intersections for multiple locations and scenarios.

Table 2-1: ICU Level of Service for Signalized Intersections

Level of Service	Description of Traffic Conditions	V/C Ratio
A	At level of service A there are no cycles that are fully loaded, and few are even close to loaded. No approach phase is utilized by traffic and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turning movements are easily made, and nearly all drivers find freedom of operation.	0.00 – 0.60
B	Level of service B represents stable operation. An occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel somewhat restricted within platoons of vehicles.	0.61 – 0.70
C	In level of service C stable operation continues. Full signal cycle loading is still intermittent, but more frequent. Occasionally drivers may have to wait through more than one red signal indication, and back-ups may develop behind turning vehicles.	0.71 – 0.80
D	Level of service D encompasses a zone of increasing restriction, approaching instability. Delay to approaching vehicles may be substantial during short peaks within the peak period, but enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive back-ups.	0.81 – 0.90
E	Level of service E represents the most vehicles that any particular intersection approach can accommodate. At capacity (V/C = 1.00) there may be long queues of vehicles waiting upstream of the intersection and delays may be great (up to several signal cycles).	0.91 – 1.00
F	Level of service F represents jammed conditions. Back-ups from locations downstream or on the cross street may restrict or prevent movement of vehicles out of the approach under consideration; hence, volumes carried are not predictable. V/C values are highly variable, because full utilization of the approach may be prevented by outside conditions.	>1.00

Source: Santa Barbara County Congestion Management Program, 2000

Highway Capacity Manual (HCM)

The Year 2000 edition of the Highway Capacity Manual (HCM) presents the methodology for analyzing traffic operations for streets and highways. Chapter 16 of the 2000 HCM contains the operations methodology for signalized intersections, which evaluates LOS based on controlled delay per vehicle. Controlled delay is defined as the portion of the total delay attributed to the traffic signal operation including deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The relationship between controlled delay per vehicle and LOS for signalized intersections is summarized in Table 2-2.

HCM is the methodology preferred by Caltrans, so all study intersections located within Caltrans right-of-way are analyzed with HCM in addition to the analysis completed using the ICU methodology. The HCM level of service analysis is performed using the TRAFFIX analysis software.

Table 2-2: Level of Service for Signalized Intersections

Level of Service	Description of Traffic Conditions	Controlled Delay (sec/veh)
A	Insignificant delays: no approach phase is fully utilized and no vehicle waits longer than one red indication.	≤ 10
B	Minimal delays: an occasional approach phase is fully utilized. Drivers begin to feel restricted.	> 10 – 20
C	Acceptable delays: major approach phase may become fully utilized. Most drivers feel somewhat restricted.	> 20 – 35
D	Tolerable delays: drivers may wait through more than one red indication. Queues may develop but dissipate rapidly, without excessive delays.	> 35 – 55
E	Significant delays: volumes approaching capacity. Vehicles may wait through several cycles and long vehicle queues form upstream.	> 55 – 80
F	Excessive delays: represents conditions at capacity, with extremely long delays. Queues may block upstream intersections.	> 80

Source: Highway Capacity Manual, Transportation Research Board, 2000.

2.2 UNSIGNALIZED INTERSECTION ANALYSIS

For unsignalized intersections, the methodology described in HCM 2000 Chapter 17 for unsignalized intersections is used. With this methodology, LOS is related to the controlled delay for each stop-controlled movement. The relationship between controlled delay per vehicle and LOS for unsignalized intersections is summarized in Table 2-3.

Table 2-3: Level of Service for Unsignalized Intersections

Level of Service	Description of Traffic Conditions	Controlled Delay (sec/veh)
A	No delay for stop-controlled approaches.	≤ 10
B	Operations with minor delay.	> 10 – 15
C	Operations with moderate delays.	> 15 – 25
D	Operations with some delays.	> 25 – 35
E	Operations with high delays and long queues.	> 35 – 50
F	Operation with extreme congestion, with very high delays and long queues unacceptable to most drivers.	> 50

Source: Highway Capacity Manual, Transportation Research Board, 2000.

2.3 THRESHOLD FOR MINIMUM ACCEPTABLE LEVEL OF SERVICE

Based on the City of Santa Barbara General Plan and the Caltrans Guide for the Preparation of Traffic Impact Studies, the minimum acceptable level of service for intersections is LOS “C.” As noted in this section, LOS “C” or better is equivalent to a volume-to-capacity ratio (v/c) of 0.80 or less and a control delay of 35 seconds per vehicle or less at signalized intersections. However, the City of Santa Barbara applies a v/c of 0.77 to define the threshold for minimum acceptable level of service for signalized intersections. If the intersection exceeds an ICU of 0.77 in the baseline condition and the project causes an increase in v/c of 0.01 or more, then mitigation measures are required to offset the project’s impact.

For unsignalized intersections, LOS “C” or better corresponds to an average control delay of 25 seconds or less per vehicle. Similar to signalized intersections, the City of Santa Barbara sets a delay threshold of 22 seconds to define the minimum acceptable level of service for unsignalized intersections. The City’s Environmental Impact Evaluation Guidelines do not define an increase in delay that constitutes a significant impact at unsignalized intersections. For the purpose of this analysis, an intersection is considered to experience a significant impact if the project causes an increase of one percent or more to the average delay and the resulting average delay is greater than 22 seconds per vehicle.

Based on the Santa Barbara County *Congestion Management Program (CMP)*, LOS E is the minimum acceptable level of service for CMP intersections, except where a segment or intersection has been designated deficient and a deficiency plan has been adopted. At CMP intersections, the project would be considered to have a significant effect on the level of service if it would:

- Decrease the LOS at an intersection operating at LOS A or B, two levels of service from project added traffic.
- Decrease the level of service from LOS C to LOS D.
- Add 20 or more peak-hour trips to an intersection operating at LOS D.
- Add 10 or more peak-hour trips to an intersection operating at LOS E or F.

2.4 ANALYSIS TIME PERIODS

The traffic study includes an assessment of AM peak hour and PM peak hour traffic conditions at 23 intersections during the following analysis timeframes:

- Existing: Year 2008
- Baseline (No Project): Year 2030
- Future With Project: Year 2030

The AM and PM peak hours typically occur during the morning and afternoon peak periods, generally defined as the time period between 7:00 – 9:00 AM and 4:00 – 6:00 PM.

2.5 EXISTING AND FUTURE FORECAST VOLUMES

Peak hour intersection count data collected in March 2008 was provided by the City of Santa Barbara. Arterial daily link volumes were obtained from the Traffic Impact Analysis prepared for the Santa Barbara Cottage Hospital Seismic Compliance and Modernization Plan¹. The year 2030 forecast roadway link volumes were obtained from the citywide traffic model developed as part of the Plan Santa Barbara Program Environmental Impact Report. The link volumes were post-processed to generate forecast intersection turning movement volumes based on existing count data.

¹ Santa Barbara Cottage Hospital Seismic Compliance and Modernization Plan Traffic Impact Analysis (March 2005)

3.0 Existing Conditions

This section includes descriptions of the project study area arterial roadway network, bicycle routes, major intersections and existing transit services operating in the study area. The peak period intersection level of service analysis results presents an understanding of existing traffic operations.

3.1 STUDY AREA

The study area is bordered by Las Positas Road to the north, Mission Street to the south, State and De la Vina Streets to the east, and Modoc Road to the west. The study area was illustrated previously in Figure 1.1. Major land uses in the study area include Santa Barbara Cottage Hospital, numerous medical offices located in the hospital vicinity, Oak Park, and residential neighborhoods. Highway 101 is the only freeway in Santa Barbara and serves as a primary route to downtown Santa Barbara, Goleta, and other destinations north and south of the study area.

3.2 STUDY AREA ROADWAYS

Within the study area, the alignment of northbound Highway 101 is technically from southeast to northwest. For the purpose of this study, Highway 101 and streets parallel to Highway 101 are considered to run north and south. Streets that are perpendicular to Highway 101 are considered east-west streets. The exception to this rule is Las Positas Road, which is oriented north-south. All road segments that intersect Las Positas Road are considered to be east-west.

Roadways analyzed in the study include:

- **Mission Street** is aligned perpendicular to Highway 101 and is considered to run east and west. Between De la Vina Street and Modoc Road, Mission Street is a four-lane undivided arterial with no dedicated left turn lanes. Left turn movements from Mission Street at signalized intersections operate with permitted phasing. Mission Street is located south of Cottage Hospital and is utilized by southbound Highway 101 vehicles destined for Cottage Hospital. The City of Santa Barbara recently completed improvements to Mission Street at Highway 101 that provide Class II (on-street, striped) bike lanes. On-street parking is not permitted between Highway 101 and De la Vina Street. The posted speed limit on Mission Street is 25 miles per hour.
- **Las Positas Road** is a four-lane undivided north-south arterial. There are on- and off-ramps between Las Positas Road and southbound Highway 101. The northbound Highway 101 access ramps at Las Positas Road connect to Calle Real, which is a frontage road located parallel to and north of Highway 101. South of Highway 101, Las Positas Road is designated as a state highway (State Route 225) and is under the jurisdiction of Caltrans. There are Class II (on-street, striped) bike lanes on either side of Las Positas Road between Modoc Road and State Street. The posted speed limit on Las Positas Road is 35 miles per hour.
- **De la Vina Street** is a two-lane collector that runs parallel to Highway 101. Between State Street and Constance Avenue, De la Vina has one lane in each direction with a center two-way left-turn lane. On-street parking and Class II bike lanes are provided on both sides of the street, except for the segment between Alamar Avenue and Constance Avenue where parking is not permitted along the east side of the street. South of Constance Avenue, De la Vina operates as a one-way street with two southbound lanes and parking permitted on both sides. Throughout the study area, De la Vina Street is primarily uncontrolled while intersecting side street approaches are stop-controlled. The posted speed limit on De la Vina Street is 30 miles per hour.
- **Modoc Road** is a two-lane street located parallel to and west of Highway 101. Class II bike lanes are striped on both sides of the street, and on-street parking is not permitted. The speed limit on Modoc Road between Las Positas Road and Mission Street is 35 miles per

hour, but there is a school zone in front of La Cumbre Junior High School with a 25 mile per hour speed limit when children are present.

- **Castillo Street** is a two-lane undivided collector street located parallel to and east of Highway 101. Between Pueblo Street and Mission Street there is one lane in each direction with parking permitted on both sides of the street. South of Mission Street, Castillo Street is a one-way roadway with a single southbound traffic lane, a Class II bike lane, and on-street parking along both sides of the street. Castillo Street is a main access route between Mission Street and the Pueblo Parking Structure, which serves Cottage Hospital. The segment of Castillo Street between Junipero Street and Pueblo Street was closed in 2008 as part of the Cottage Hospital expansion project. The speed limit on Castillo Street is 30 miles per hour.
- **Bath Street** is a two-lane undivided collector street located parallel to and east of Highway 101. North of Mission Street, there is one lane in each direction with parking permitted on both sides of the street. South of Mission Street, Bath Street is a one-way roadway with a single northbound traffic lane, a Class II bike lane, and on-street parking along both sides of the street. The speed limit on Bath Street is 30 miles per hour.
- **Pueblo Street** is a two-lane undivided roadway that runs perpendicular to Highway 101. It borders residential and medical land uses, including Cottage Hospital and the Pueblo Parking Structure. On-street parking is permitted along both sides. The prima facie speed limit on Pueblo Street is 25 miles per hour.
- **Junipero Street** is a two-lane undivided roadway that runs perpendicular to Highway 101. The roadway borders Oak Park, residential and medical land uses. The Cottage Hospital emergency entrance and Outpatient Surgery parking are located on Junipero Street. A pedestrian/bicycle bridge over Highway 101 currently provides access between Junipero Street and Modoc Road. The prima facie speed limit on Junipero Street is 25 miles per hour.
- **Calle Real** is a frontage road that is parallel to and east of Highway 101. Between Pueblo Street and Treasure Drive, Calle Real is a two-lane undivided roadway with parking permitted on the east side of the street. From Treasure Drive to Las Positas Road, Calle Real is a one-way street serving traffic in the westbound direction only. The single westbound lane merges with the northbound 101 off-ramp and diverges into four approach lanes at the intersection with Las Positas Road. The one-way segment of Calle Real eliminates vehicular and pedestrian access from Las Positas Road to Cottage Hospital on this street. There are no sidewalks, Class II bicycle lanes, or parking lanes provided along the one-way segment. West of Las Positas Road, Calle Real is a two-lane undivided roadway with Class II bike lanes in both directions. The speed limit on Calle Real east of Las Positas Road is 40 miles per hour. West of Las Positas Road the speed limit is 45 miles per hour.
- **Tallant Road** is a two-lane local street that travels through the Samarkand residential neighborhood. Despite the curved and winding alignment, this street experiences high cut-through traffic volumes generated by vehicles traveling from Las Positas Road to the Cottage Hospital area. This cut through traffic would be expected to divert to Calle Real if two-way operation was restored on Calle Real between Treasure Drive and Las Positas Road.

Arterial Average Daily Traffic (ADT) Volumes

Twenty-four hour tube count volumes were collected in the vicinity of Cottage Hospital as part of the Modernization and Seismic Compliance Plan Traffic Impact Analysis. An annual growth factor of 1.0394 percent was applied to the 2004 data to estimate year 2008 volumes. This factor corresponds to a growth rate of 0.97 percent per year, and is consistent with rates used in the traffic analysis. Additional daily traffic volumes were obtained from the Plan Santa Barbara study effort. The year 2008 daily traffic volumes on selected arterials are presented in Table 3-1.

Table 3-1: Year 2008 Average Daily Traffic (ADT) Volumes

Street	Count Location	Daily Volume
Highway 101	Las Positas Rd to Mission St	133,000
Mission Street	Between State St and Highway 101	30,000
Las Positas Road	Between State St and Highway 101	21,100
	Between Highway 101 and Modoc Rd	17,600
De la Vina Street	Between State St and Alamar Ave	13,400
State Street	Between Alamar Ave and Pueblo St	17,300
Bath Street	Between Nogales Ave & Pueblo St	5,600
	Between Quinto St & Junipero St	4,500
	Between Pueblo St & Los Olivos St	4,900
Castillo Street	Between Quinto St & Junipero St	2,400
	Between Pueblo St & Los Olivos St	4,000
Fletcher Avenue	Between Quinto St & Junipero St	600
Oak Park Lane	Between Junipero St & Pueblo St	1,500
	Between Pueblo St & Los Olivos St	1,100
Junipero Street	Between Mission Creek & Oak Park	5,500
	Between Oak Park & Castillo St	4,000
	Between Castillo St & Bath St	3,200
Pueblo Street	Between Mission Creek & Oak Park Ln	5,700
	Between Oak Park Ln & Castillo St	6,000
	Between Castillo St & Bath St	5,600

Note: All street segments in this table are streets with two-way traffic.

3.3 STUDY AREA INTERSECTIONS

Twenty-two intersections have been selected for analysis. The locations of these intersections and the current lane geometry and signal control are illustrated in Figure 3.1. These intersections were selected based on observed and expected travel routes to access the employee and public parking structures, surface parking lots, on-street parking, and drop-off areas that serve Cottage Hospital.

1. Northbound 101 onramp & Calle Real
2. Las Positas Road & Tallant Road
3. Las Positas Road & Calle Real
4. Las Positas Road & Southbound 101 ramps
5. Las Positas Road & Modoc Road
6. Northbound 101 off-ramp (to Las Positas) & Calle Real
7. Bath Street & Junipero Street
8. Castillo Street & Junipero Street
9. Oak Park Lane & Junipero Street
10. Calle Real & Junipero Street
11. De la Vina Street & Nogales Avenue
12. De la Vina Street & Pueblo Street
13. Bath Street & Pueblo Street
14. Castillo Street & Pueblo Street
15. Oak Park Lane & Pueblo Street
16. Calle Real & Pueblo Street
17. De la Vina Street & Mission Street
18. Bath Street & Mission Street
19. Castillo Street & Mission Street
20. Northbound 101 ramps & Mission Street
21. Southbound 101 ramps & Mission Street
22. Modoc Road & Mission Street

Intersection Level of Service (LOS) Analysis

Year 2008 AM and PM peak hour intersection volumes for the 23 study intersections are presented in Figures 3.2 and 3.3. The results of the AM and PM peak hour intersection analysis for the existing condition are presented in Tables 4-5 and 4-6. As noted in the Analysis Methodology section of this report, all signalized intersections are evaluated using Intersection Capacity Utilization (ICU) methodology, and all unsignalized intersections are analyzed with Highway Capacity Manual (HCM) methodology based on City of Santa Barbara standards. All signalized intersections within Caltrans right-of-way were also analyzed using HCM methodology as required by Caltrans.

In the existing condition, there are nine intersections that operate at a deficient level of service during either or both the AM and PM peak hour time periods. In nearly all cases, the deficient intersections are located at or adjacent to the Highway 101 interchanges with Las Positas Road and Mission Street. This illustrates the impact that traffic volumes traveling to and from Highway 101 have on traffic operations in the study area. It also highlights the need for alternative route and/or freeway crossing locations for local traffic in order to avoid congestion caused by freeway-related traffic.

Figure 3.1 Study Intersection Lane Geometry

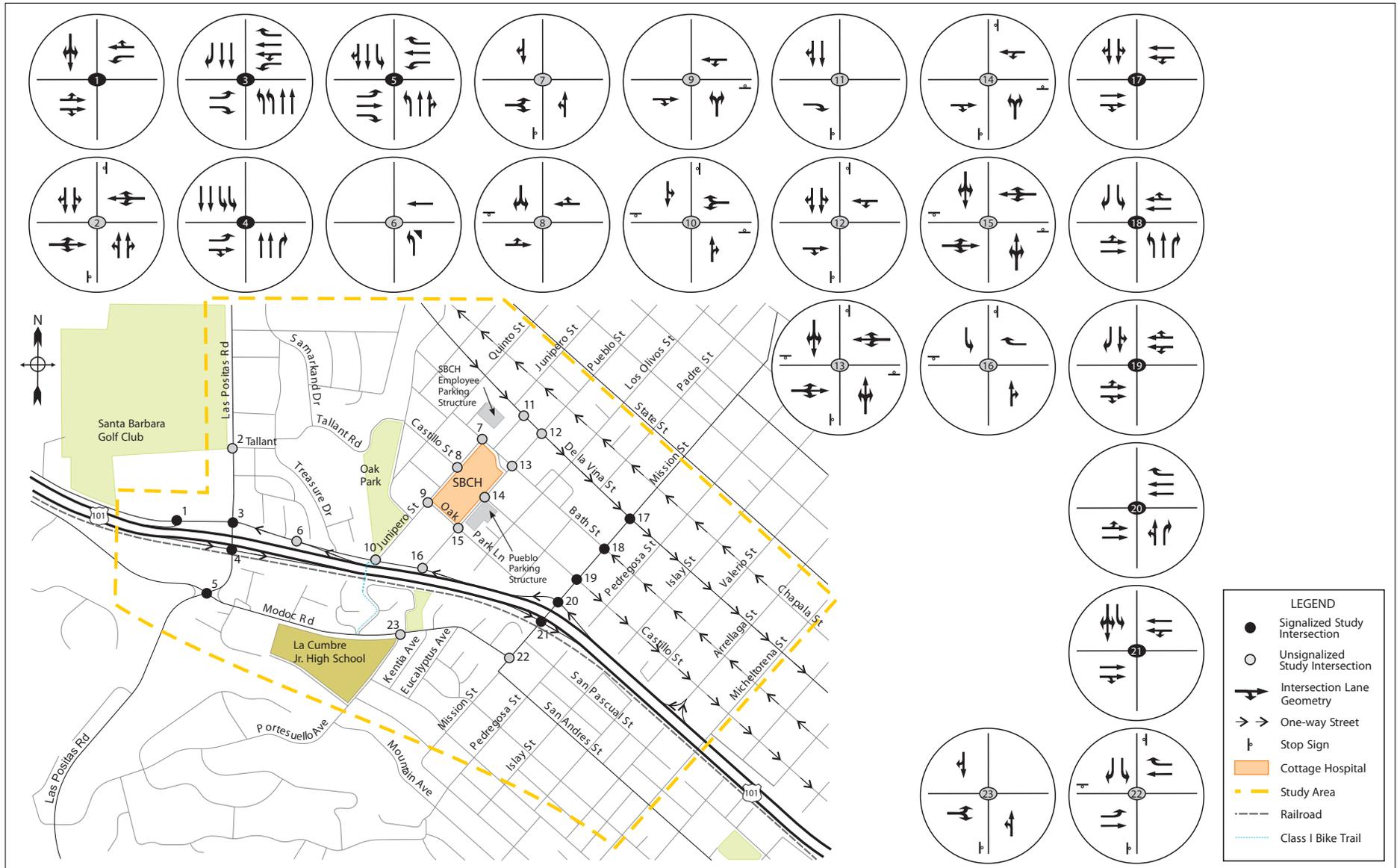


Figure 3.3 Study Intersection Existing Year 2008 Volumes: PM Peak

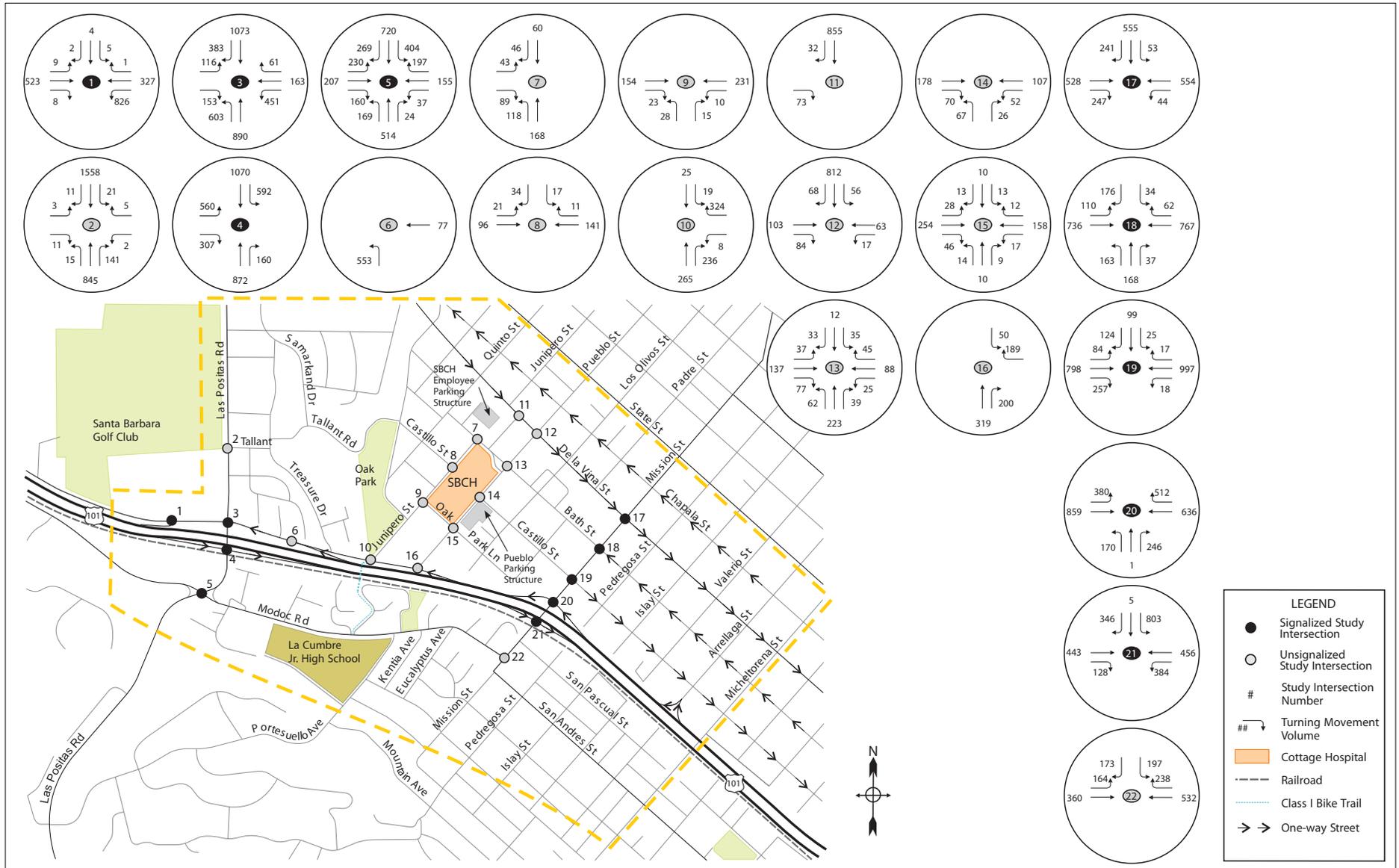


Table 3-2: Existing Condition Year 2008 Level of Service Analysis Results – AM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.82	D	X	14.1	B	
2	Las Positas Rd & Tallant Rd	EW Stop				27.2	D	X
3	Las Positas Rd & Calle Real	Signalized	0.72	C		28.3	C	
4	Las Positas Rd & SB 101 ramps	Signalized	0.95	E	X	45.1	D	X
5	Las Positas Rd & Modoc Rd	Signalized	0.70	B				
6	NB 101 off-ramp & Calle Real	Uncontrolled				13.1	B	
7	Bath St & Junipero St	EW Stop				10.1	B	
8	Castillo St & Junipero St	NS Stop				9.5	A	
9	Oak Park Ln & Junipero St	NS Stop				9.8	A	
10	Calle Real & Junipero St	All-way Stop				10.0	A	
11	De la Vina St & Nogales Av	EW Stop				10.7	B	
12	De la Vina St & Pueblo St	EW Stop				20.7	C	
13	Bath St & Pueblo St	All-way Stop				9.9	A	
14	Castillo St & Pueblo St	All-way Stop				9.2	A	
15	Oak Park Ln & Pueblo St	NS Stop				13.7	B	
16	Calle Real & Pueblo St	SW Stop				13.9	B	
17	De la Vina St & Mission St	Signalized	0.60	A				
18	Bath St & Mission St	Signalized	0.61	B				
19	Castillo St & Mission St	Signalized	0.51	A				
20	NB 101 ramps & Mission St	Signalized	0.86	D	X	19.1	B	
21	SB 101 ramps & Mission St	Signalized	0.87	D	X	23.5	C	
22	Modoc Rd & Mission St	All-way Stop				27.4	D	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C").
The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

Table 3-3: Existing Condition Year 2008 Level of Service Analysis Results – PM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.79	C	X	21.4	C	
2	Las Positas Rd & Tallant Rd	EW Stop				43.4	E	X
3	Las Positas Rd & Calle Real	Signalized	0.86	D	X	33.0	C	
4	Las Positas Rd & SB 101 ramps	Signalized	0.91	E	X	42.5	D	X
5	Las Positas Rd & Modoc Rd	Signalized	0.79	C	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				14.4	B	
7	Bath St & Junipero St	EW Stop				10.8	B	
8	Castillo St & Junipero St	NS Stop				9.6	A	
9	Oak Park Ln & Junipero St	NS Stop				10.7	A	
10	Calle Real & Junipero St	All-way Stop				12.7	A	
11	De la Vina St & Nogales Av	EW Stop				11.6	B	
12	De la Vina St & Pueblo St	EW Stop				28.7	D	X
13	Bath St & Pueblo St	All-way Stop				10.8	B	
14	Castillo St & Pueblo St	All-way Stop				8.6	A	
15	Oak Park Ln & Pueblo St	NS Stop				12.9	B	
16	Calle Real & Pueblo St	SW Stop				13.9	B	
17	De la Vina St & Mission St	Signalized	0.64	B				
18	Bath St & Mission St	Signalized	0.64	B				
19	Castillo St & Mission St	Signalized	0.55	A				
20	NB 101 ramps & Mission St	Signalized	0.81	D	X	17.1	B	
21	SB 101 ramps & Mission St	Signalized	0.88	D	X	45.5	D	X
22	Modoc Rd & Mission St	All-way Stop				28.5	D	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C"). The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

3.4 FREEWAY OFF-RAMP FACILITIES

There are five Highway 101 off-ramp facilities within the project study area. The number of ramp lanes, the ramp storage length, and the type of control at the ramp terminal intersection for each off-ramp are summarized in Table 3-4.

Table 3-4: Highway 101 Off-Ramp Facilities

Off-ramp To:	Number of Ramp Lanes	Ramp Length (feet)	Terminal Intersection Number	Approach Lanes at Intersection	Terminal Intersection Control
Southbound Off-ramps					
Las Positas Road	1	1,010	4	2	Signalized
Mission Street	1	990	21	2	Signalized
Northbound Off-ramps					
Mission Street	1	740	20	2	Signalized
Pueblo Street	1	450	16	1	Stop
Las Positas	1	1,580	3	4	Signalized

Freeway Ramp Queuing Analysis

The queuing analysis of Highway 101 off-ramp facilities within the project study area is based on the ramp storage capacity, the peak off-ramp volumes, and the control delay at the ramp terminal intersection. The results of a Synchro queuing analysis for the study area freeway off-ramps are summarized in Table 3-5. In the existing condition, the PM peak hour volumes on the Highway 101 southbound off-ramp to Mission Street exceed the capacity of the ramp, which can result in back-ups extending beyond the ramp and impacting the freeway mainline. Existing vehicle queues on the other ramps are not shown to spill back onto the freeway mainline in this analysis, but most are operating near capacity and an increase in volume due to ambient growth in the future may result in deficient operations on the freeway ramps.

Table 3-5: Freeway Off-ramp Synchro Queuing Analysis Results

Ramp	Ramp Length (feet)	Capacity (vph)	Peak Hour Volume	Spill-back?
NB 101 off-ramp to Mission Street	740	1,185	417	NO
NB 101 off-ramp to Pueblo Street	450	N/A	N/A	N/A
NB 101 off-ramp to Las Positas Road	1,580	916	681	NO
SB 101 off-ramp to Las Positas Road	1,010	1,044	876	NO
SB 101 off-ramp to Mission Street	990	1,146	1,154	YES

N/A: Synchro does not calculate 50th or 95th percentile queue lengths for unsignalized intersections.

3.5 STUDY AREA TRANSIT SERVICE

Transit service in and around the study area is provided by Santa Barbara Metropolitan Transit District (MTD). The base fare for bus rides in and through the study area is currently \$1.25. The senior and disabled fare is \$0.60. Free transfers are available for up to two more trips within an hour. The three main local colleges and universities all sponsor free rides with a valid student ID. Bus routes traveling in and around the study area are described in Table 3-6. Routes 5 and 8, which do not have stops within the study area, are included because they provide connections to communities on either side of the study area.

Table 3-6: Study Area Transit Service

Route No.	Destination/ Name	Description	Running Info Time Period/(Headways)	No. of Stops in Study Area
1	Westside	La Cumbre Jr. High • San Andres • Anapamu • SBHS • Milpas • Salinas	<u>Monday – Friday</u> 6:00 AM - 10:30 PM/(10-30 min) <u>Saturday</u> 6:15 AM - 10:15 PM/(15-45 min) <u>Sunday</u> 7:30 AM - 9:00 PM/(20-45 min)	5
3	Oak Park	Transit Center • Cottage Hospital • Samarkand • La Cumbre	<u>Monday – Friday</u> 6:00 AM - 9:15 PM/(20 min) <u>Saturday</u> 7:00 AM - 7:45 PM/(60 min) <u>Sunday</u> 8:30 AM - 6:45 PM/(60 min)	14
5	Mesa / La Cumbre	Transit Center • SBCC • Hidden Valley • La Cumbre	<u>Monday – Friday</u> 6:00 AM - 10:30 PM/(60 min) <u>Saturday</u> 7:00 AM - 8:45 PM/(60 min) <u>Sunday</u> 8:45 AM - 6:30 PM/(60 min)	0
6	State / Goleta	Transit Center • State • La Cumbre • Hollister • Downtown Goleta • Camino Real Marketplace	<u>Monday – Friday</u> 5:45 AM - 7:00 PM/(20-30 min) <u>Saturday</u> 6:15 AM - 7:15 PM/(30 min) <u>Sunday</u> 6:15 AM - 7:30 PM/(30 min)	12
8	Calle Real	Transit Center • La Cumbre • Sansum Clinic • County Health Care • Turnpike	<u>Monday – Friday</u> 6:00 AM - 7:45 PM/(30-60 min) <u>Saturday</u> 6:45 AM - 6:30 PM/(60 min) <u>Sunday</u> 8:00 AM - 6:30 PM/(60 min)	0
11	State / UCSB	Transit Center • State • La Cumbre • Hollister • Downtown Goleta • Airport • UCSB	<u>Monday – Friday</u> 5:45 AM - 7:00 PM/(20-30 min) <u>Saturday</u> 6:15 AM - 7:15 PM/(30 min) <u>Sunday</u> 6:15 AM - 7:30 PM/(30 min)	12
37	Crosstown	Mountain • Micheltoarena • Anacapa • Cota • Milpas • Franklin Center • Soledad • Cota • Chapala • Transit Center	<u>Monday – Friday</u> 7:00 AM - 6:30 PM/(15-25 min) <u>Saturday</u> No service on Saturday <u>Sunday</u> No service on Sunday	5

Route 1 begins at the Transit Station on De la Vina Street, turns south and proceeds under the freeway along Carrillo Street. The bus turns north onto San Andreas Street, continues onto Modoc Road, turns west onto Portesuello Avenue, and returns on Mission Street to San Andres Street to the Transit Station.

Route 3 runs west along Anapamu Street, turns north onto Bath Street, turns west onto Junipero Street and north onto Calle Real. The bus turns east onto Treasure Drive, heads north on Samarkand Drive, continues north on Las Positas Road, and turns west onto State Street. The bus then turns south onto Hitchcock Way, La Cumbre, and returns to the Transit Center on State Street and De la Vina Street.

Route 5 runs southeast on De la Vina Street and crosses Highway 101 on Castillo Street. Route 5 follows Cliff Drive and Veronica Springs Road about a mile south of the study area.

Route 6 runs along the northern boundary of the study area. The route runs northwest along Chapala Street, turns northeast along Sola Street. The bus then turns northwest onto State Street and continues on to downtown Goleta and the Camino Real Marketplace in Santa Felicia. Route 11 also runs along the northern boundary of the transit area. This route overlaps with Route 6 in the study area, running along State Street. However, west of the study area, the route continues on to the University of California, Santa Barbara (UCSB) campus.

Route 8 travels southwest on Carrillo Street, and then enters Highway 101. The route exits the freeway at Calle Real just outside the study area, and continues on La Cumbre to State Street and on to the County Health Care Services Center.

Route 37 is a daytime electric shuttle that runs through downtown Santa Barbara, operated in partnership with the City of Santa Barbara. The route runs around the southeastern border of the study area along Micheltorena Street between Anapamu Street and Mountain Avenue.

Transit Ridership

Average weekday transit ridership data for the years 2005 through 2008 was collected from the Santa Barbara Metropolitan Transit District (MTD) for routes that travel through and/or along the study area. The average weekday ridership volumes are summarized in Table 3-7.

Table 3-7: Santa Barbara Metropolitan Transit District Average Weekday Ridership Volumes

Year	Route 1 Westside	Route 3 Oak Park	Route 5 Mesa/La Cumbre	Route 6 State/Goleta	Route 8 Calle Real	Route 11 State/UCSB	Route 37 Crosstown
2005	1,512	952	937	2,202	1,108	2,730	654
2006	1,561	966	954	2,347	1,157	2,901	674
2007	1,675	1,126	781	2,444	1,239	3,005	641
2008	1,832	1,260	734	2,517	1,337	3,262	587

Source: Santa Barbara Metropolitan Transit District

The highest average weekday ridership volumes were observed on Routes 6 and 11, which run on State Street. Route 1, which serves the southern portion of the study area, also exhibits high daily ridership volumes. Route 8 passes through the study area on Highway 101, and has the potential to provide a connection between Cottage Hospital and the Goleta area if the route was modified. Most of the bus routes serving the study area show ridership increases over the past three to four years. The highest ridership increases between 2005 and 2008 are observed on Route 3 (32%) and Route 1 (21%).

3.6 BICYCLE ROUTES

Class I bikeways are off-street bike paths that are physically separated from automobile traffic. The only Class I bikeway within the study area begins near Oak Park at the bicycle/pedestrian bridge over Highway 101, travels through City right-of-way located between the Pilgrim Terrace Cooperative Homes and Vista Madera residential developments, and ends at La Cumbre Junior High School on Modoc Road.

Class II striped bike lanes are provided on the following roadway segments within the study area:

- Las Positas Road – State Street to Modoc Road
- Bath Street – Mission Street to Micheltorena Street
- Castillo Street – Mission Street to Micheltorena Street
- Modoc Road – Las Positas Road to Mission Street
- Mission Street – Modoc Road to Castillo Street

3.7 PEDESTRIAN FACILITIES

Pedestrian amenities such as sidewalks, crosswalks, and pedestrian overcrossings encourage people to walk for local trips and help to provide connections from off-site parking facilities and transit stops to nearby land uses. Sidewalks are provided along most streets throughout the study area, except for the following segments:

- Calle Real between Treasure Drive and Las Positas Road
- Las Positas Road – East side between Modoc Road and Union Pacific rail corridor
- Las Positas Road – between McCaw Avenue and State Street

There is a pedestrian and bicycle bridge across Highway 101 at Junipero Street that connects Oak Park on the east side of the freeway with La Cumbre Junior High School on the west side. The bridge access ramps exceed the Americans with Disabilities Act (ADA) maximum grade of five percent (5%).

4.0 Forecast Conditions – Year 2030 Baseline

As a point of comparison, conditions in the year 2030 with ambient traffic growth and no circulation improvements are called the No Project or Baseline case. For the year 2030 Baseline analysis, it is assumed that no modifications are made to the existing roadway link and intersection lane geometry. The forecast year 2030 AM and PM peak hour intersection turning movement volumes were forecast using the Santa Barbara Citywide traffic model, and are shown in Figures 4.1 and 4.2.

4.1 LEVEL OF SERVICE (LOS) ANALYSIS

The level of service analysis results for the year 2030 Baseline AM and PM peak hour conditions are summarized in Tables 4-1 and 4-2. The seven signalized study intersections that are adjacent to Highway 101 access ramps are forecast to operate at an unacceptable level of service during the AM and/or PM peak hour time periods based on City standards.

Table 4-1: Year 2030 Baseline Level of Service Analysis Results – AM Peak

Intersection		Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.91	E	X	26.3	C	
2	Las Positas Rd & Tallant Rd	EW Stop				209.8	F	X
3	Las Positas Rd & Calle Real	Signalized	0.81	D	X	36.0	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	0.81	D	X	29.7	C	
5	Las Positas Rd & Modoc Rd	Signalized	0.92	E	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				11.8	B	
8	Castillo St & Junipero St	NS Stop				10.5	B	
9	Oak Park Ln & Junipero St	NS Stop				11.2	B	
10	Calle Real & Junipero St	All-way Stop				9.0	A	
11	De la Vina St & Nogales Av	EW Stop				10.5	B	
12	De la Vina St & Pueblo St	EW Stop				18.6	C	
13	Bath St & Pueblo St	All-way Stop				8.8	A	
14	Castillo St & Pueblo St	All-way Stop				8.5	A	
15	Oak Park Ln & Pueblo St	NS Stop				17.1	C	
16	Calle Real & Pueblo St	SW Stop				12.4	B	
17	De la Vina St & Mission St	Signalized	0.59	A				
18	Bath St & Mission St	Signalized	0.56	A				
19	Castillo St & Mission St	Signalized	0.68	B				
20	NB 101 ramps & Mission St	Signalized	0.78	C	X	23.6	C	
21	SB 101 ramps & Mission St	Signalized	0.93	E	X	29.1	C	
22	Modoc Rd & Mission St	All-way Stop				18.0	C	
23	Modoc Rd & Portesuello Av	NS Stop				81.4	F	X

Notes: Def - the intersection does not meet the City standard for acceptable operations (LOS "C").
The HCM analysis of intersections #1, 3, 4, 16, 20, and 21 assumes a peak hour factor of 0.92 per Caltrans standards.

Figure 4.1 Forecast Year 2030 Volumes: Baseline - AM Peak



Figure 4.2 Forecast Year 2030 Volumes: Baseline - PM Peak



Table 4-2: Year 2030 Baseline Level of Service Analysis Results – PM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.75	C		19.7	B	
2	Las Positas Rd & Tallant Rd	EW Stop				55.3	F	X
3	Las Positas Rd & Calle Real	Signalized	0.95	E	X	52.3	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	0.80	C	X	30.0	C	
5	Las Positas Rd & Modoc Rd	Signalized	1.02	F	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				9.9	A	
8	Castillo St & Junipero St	NS Stop				11.4	B	
9	Oak Park Ln & Junipero St	NS Stop				13.8	B	
10	Calle Real & Junipero St	All-way Stop				15.8	C	
11	De la Vina St & Nogales Av	EW Stop				10.5	B	
12	De la Vina St & Pueblo St	EW Stop				20.2	C	
13	Bath St & Pueblo St	All-way Stop				9.7	A	
14	Castillo St & Pueblo St	All-way Stop				9.5	A	
15	Oak Park Ln & Pueblo St	NS Stop				14.0	B	
16	Calle Real & Pueblo St	SW Stop				13.3	B	
17	De la Vina St & Mission St	Signalized	0.61	B				
18	Bath St & Mission St	Signalized	0.66	B				
19	Castillo St & Mission St	Signalized	0.84	D	X			
20	NB 101 ramps & Mission St	Signalized	0.78	C	X	35.6	D	X
21	SB 101 ramps & Mission St	Signalized	1.06	F	X	98.0	F	X
22	Modoc Rd & Mission St	All-way Stop				15.5	C	
23	Modoc Rd & Portesuello Av	NS Stop				435.7	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C"). The HCM analysis of intersections #1, 3, 4, 16, 20, and 21 assumes a peak hour factor of 0.92 per Caltrans standards.

There are eight signalized study intersections that are forecast to operate with deficient LOS during the AM and/or PM peak hour time periods in the year 2030 Baseline condition:

- Las Positas Road & Tallant Road (#2)
- Las Positas Road & Calle Real (#3)
- Las Positas Road & SB 101 ramps (#4)
- Las Positas Road & Modoc Road (#5)
- Castillo Street & Mission Street (#19)
- Northbound 101 ramps & Mission Street (#20)
- Southbound 101 ramps & Mission Street (#21)
- Modoc Road & Portesuello Avenue (#23)

5.0 Alternatives Analysis

Based on the initial screening results, the projects selected for further consideration were grouped into three “packages” of alternatives for the purposes of traffic modeling. The three packages allow for a comparison of the benefits of an overpass option versus interchange improvements, and an assessment of these two types of improvements in a combined alternative. Selected local street improvements that would cause changes to traffic circulation patterns were also included in the traffic modeling effort so that the affects could be appropriately quantified.

Alternatives 2 and 3 have been subdivided into three sub-alternatives for the purposes of evaluating several interchange reconfiguration options for the Highway 101/Las Positas Road interchange. The alternatives discussed in this section are summarized as follows:

- Alternative 1: Pueblo Street Overcrossing – Implements a new freeway overpass at Pueblo Street over Highway 101, connecting to the intersection of Modoc Road and Portesuello Avenue west of Highway 101.
- Alternative 2A: Las Positas Northbound “Fly-Over” Off-Ramp – Replaces the existing northbound Las Positas Road off-ramp with a new off-ramp that would transition over the Highway 101 mainline and create a new off-set single-point intersection at the location of the existing Las Positas Road on and off-ramps with Highway 101.
- Alternative 2B: Las Positas “Hook” Northbound Off-Ramp - Replaces the existing northbound Las Positas Road off-ramp with a new off-ramp that would be located adjacent to the existing northbound on-ramp, west of the existing Las Positas Road overpass. The new on and off-ramp would be a “hook” ramp design similar to the existing northbound on and off-ramps at Highway 101 and Hope Street.
- Alternative 2C: Las Positas “Fly-Over” Southbound Ramp – Would maintain the existing northbound Las Positas Road off-ramp. However, minor relocation may be necessary. This alternative proposes a new single-lane bridge connecting the southbound Las Positas Road on and off-ramp intersection with Calle Real, west of Junipero Street. The new bridge would cross over the mainline traffic lanes of Highway 101 and have a similar alignment and profile to the bridge proposed in Alternative 2A. The objective of this alternative would be to provide for eastbound travel for vehicles between Las Positas Road and Junipero Street, effectively accomplishing the same goal as two-way traffic on Calle Real.
- Alternative 3A: Pueblo Street Overcrossing and Las Positas Northbound “Fly-Over” Off-Ramp – Combines the projects proposed in Alternative 1 and Alternative 2A.
- Alternative 3B: Pueblo Street Overcrossing and Las Positas “Hook” Northbound Off-Ramp – Combines the projects proposed in Alternative 1 and Alternative 2B.
- Alternative 3C: Pueblo Street Overcrossing and Las Positas “Fly-Over” Southbound Ramp – Combines the projects proposed in Alternative 1 and Alternative 2C.

Graphical examples of each of the alternatives are presented later in this section.

The following local street improvements are included in all Alternatives:

- Extend Castillo/Bath One-way Couplet
- Convert De La Vina to two-way operation between Constance and Pueblo Street

These local street improvements result in the following changes to study intersection lane geometry:

- De la Vina Street and Nogales Avenue (#11): from one southbound through lane and one southbound shared through-right lane on De la Vina Street and an eastbound right turn lane on Nogales Avenue to one southbound shared through-right lane and one northbound shared through-left lane and a shared left-right lane on Nogales Avenue.
- De la Vina Street and Pueblo Avenue (#12): from one southbound through-left lane and one southbound through-right lane on De la Vina Street and an eastbound through-right and one westbound through-left on Nogales Avenue to one shared left-through-right lane on the southbound, eastbound, and westbound approaches.
- Bath Street and Mission Street (#18): the southbound approach on Bath Street is removed, and Bath operates as a northbound one-way street.
- Castillo Street and Mission Street (#19): eastbound left turn and westbound right turn movements are no longer permitted as Castillo will operate as a southbound one-way street.

5.1 ALTERNATIVE 1: PUEBLO STREET OVERCROSSING

Alternative 1 includes a new overcrossing at Pueblo Street that would pass over the northbound 101 off-ramp to Calle Real, Highway 101, and the UP rail corridor and form a four-leg intersection with Modoc Road and Portesuello Avenue. This would require at least partial acquisition of park and garden land between Pilgrim Terrace Drive and Kentia Avenue. There would also be right-of-way impacts to property on the east side of Highway 101.

Conceptual engineering indicates that Modoc Road would need to be raised about two feet to meet the resulting grade of the Pueblo Street overpass. The northbound 101 off-ramp to Pueblo Street would need to be shifted west to fit under the overpass, and would connect to Junipero Street instead of Pueblo Street. These issues would be explored more extensively in subsequent analysis if this Alternative were carried into a Caltrans Project Study Report.

The locations of the improvements analyzed in this alternative are shown in Figure 5.1. Intersection lane geometry assumptions for Alternative 1 are illustrated in Figure 5.2. Intersection geometry for Alternative 1 is assumed to be the same as the Baseline condition, with the following exceptions:

- Calle Real and Pueblo Street (#16): the northbound 101 off-ramp would no longer intersect with Pueblo Street, but pass under the Pueblo Street overcrossing structure.
- Modoc Road and Portesuello Avenue (#23): the Pueblo Street overcrossing structure would connect to this intersection and add a southbound approach. This location is initially modeled as a four-way stop controlled intersection with one shared left-through-right lane on each approach.

Vehicles that utilize the Pueblo Street overcrossing could reduce their travel distance to Cottage Hospital by up to 0.5 miles compared to crossing Highway 101 on Mission Street. Northbound 101 vehicles that currently take the Pueblo Street exit and turn right onto Pueblo Street would continue north on Calle Real to Junipero Street and travel about 0.3 miles further with the new configuration.

Figure 5.3 illustrates the forecast changes in traffic flow between the Year 2030 Baseline and Alternative 1 along selected study area streets during the AM peak hour. The redistributed AM and PM peak hour intersection turning movement volumes associated with Alternative 1 are shown in Figures 5.4 and 5.5.

Figure 5.1 Proposed Improvements: Alternative 1



Figure 5.2 Lane Geometry: Alternative 1

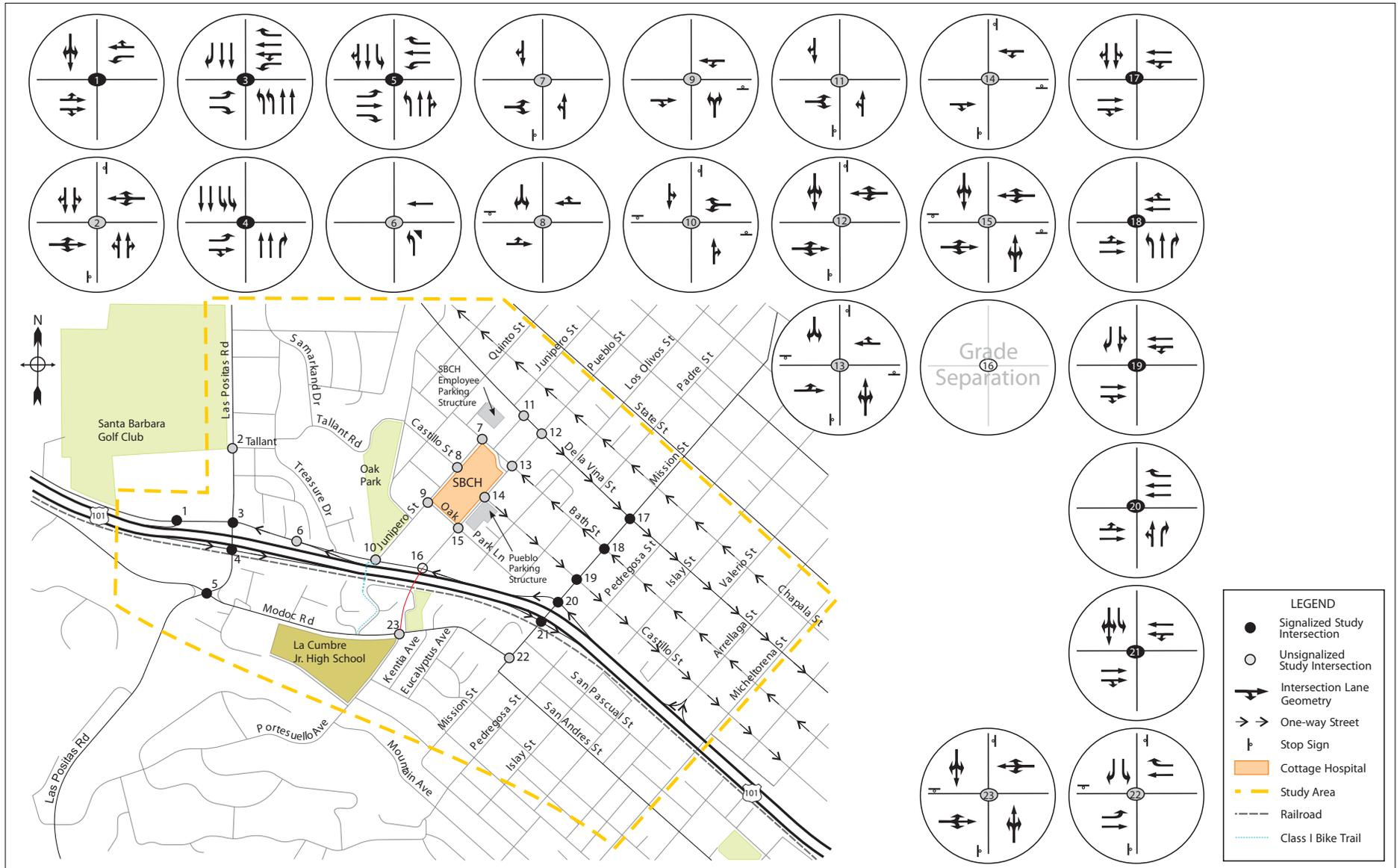


Figure 5.3 Forecast Year 2030 Volumes: Alternative 1 - AM Peak

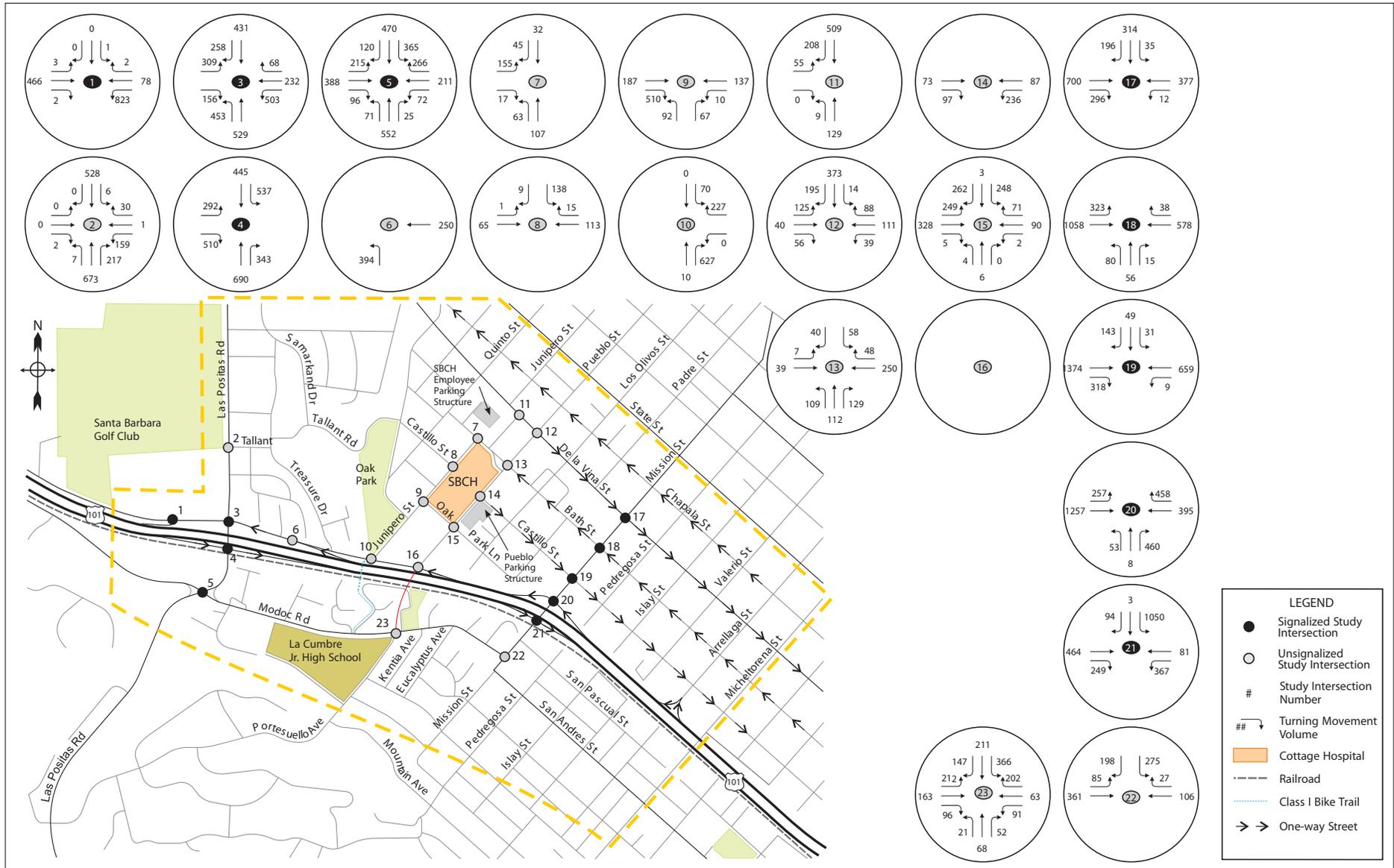


Figure 5.4 Forecast Year 2030 Volumes: Alternative 1 - PM Peak



Level of Service (LOS) Analysis

The initial level of service results for this alternative at the 23 study intersections are summarized in Tables 5-1 and 5-2.

Table 5-1: Alternative 1 Year 2030 Level of Service Analysis Results – AM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.76	C		20.7	C	
2	Las Positas Rd & Tallant Rd	EW Stop				105.7	F	X
3	Las Positas Rd & Calle Real	Signalized	0.72	C		33.8	C	
4	Las Positas Rd & SB 101 ramps	Signalized	0.76	C		31.3	C	
5	Las Positas Rd & Modoc Rd	Signalized	0.81	D	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				11.7	B	
8	Castillo St & Junipero St	NS Stop				10.4	B	
9	Oak Park Ln & Junipero St	NS Stop				15.0	C	
10	Calle Real & Junipero St	All-way Stop				13.6	B	
11	De la Vina St & Nogales Av	EW Stop				16.3	C	
12	De la Vina St & Pueblo St	EW Stop				26.3	D	X
13	Bath St & Pueblo St	All-way Stop				11.0	B	
14	Castillo St & Pueblo St	All-way Stop				9.0	A	
15	Oak Park Ln & Pueblo St	NS Stop				295.7	F	X
16	Calle Real & Pueblo St	SW Stop				0.0	N/A	
17	De la Vina St & Mission St	Signalized	0.55	A				
18	Bath St & Mission St	Signalized	0.54	A				
19	Castillo St & Mission St	Signalized	0.66	B				
20	NB 101 ramps & Mission St	Signalized	0.82	D	X	31.8	C	
21	SB 101 ramps & Mission St	Signalized	0.87	D	X	25.1	C	
22	Modoc Rd & Mission St	All-way Stop				14.1	B	
23	Modoc Rd & Portesuello Av	NS Stop				113.4	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C"). The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

Table 5-2: Alternative 1 Year 2030 Level of Service Analysis Results – PM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.69	B		19.1	B	
2	Las Positas Rd & Tallant Rd	EW Stop				43.6	E	X
3	Las Positas Rd & Calle Real	Signalized	0.82	D	X	39.2	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	0.85	D	X	34.6	C	
5	Las Positas Rd & Modoc Rd	Signalized	1.06	F	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				9.9	A	
8	Castillo St & Junipero St	NS Stop				10.5	B	
9	Oak Park Ln & Junipero St	NS Stop				42.9	E	X
10	Calle Real & Junipero St	All-way Stop				60.9	F	X
11	De la Vina St & Nogales Av	EW Stop				117.3	F	X
12	De la Vina St & Pueblo St	EW Stop				231.0	F	X
13	Bath St & Pueblo St	All-way Stop				12.6	B	
14	Castillo St & Pueblo St	All-way Stop				10.6	B	
15	Oak Park Ln & Pueblo St	NS Stop				409.0	F	X
16	Calle Real & Pueblo St	SW Stop				0.0	A	
17	De la Vina St & Mission St	Signalized	0.61	B				
18	Bath St & Mission St	Signalized	0.71	C				
19	Castillo St & Mission St	Signalized	0.65	B				
20	NB 101 ramps & Mission St	Signalized	0.90	D	X	20.9	C	
21	SB 101 ramps & Mission St	Signalized	1.03	F	X	85.7	F	X
22	Modoc Rd & Mission St	All-way Stop				13.4	B	
23	Modoc Rd & Portesuello Av	NS Stop				194.0	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C"). The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

In the Year 2030 Baseline condition there are four intersections along Las Positas that are forecast to operate at LOS D or worse during both peak periods. This condition improves with the Pueblo Street overcrossing, particularly during the AM peak hour. Unacceptable LOS still exists in the PM peak hour at all four intersections, but they do show improvement from the Year 2030 Baseline condition. The model forecasts do not show a major difference in volumes on Mission Street with the

overcrossing, which indicates that freeway traffic is not likely to use the Pueblo Street overcrossing as an alternative to Mission Street and limited changes to local traffic volumes on Mission Street are forecast to occur. The small forecast changes to traffic volumes on Mission Street may be influenced by the proposed changes to one-way traffic flow on Castillo Street and Bath Street, which may attract additional regional traffic to Mission Street as access between Cottage Hospital and Highway 101 becomes more efficient. This regional traffic increase would offset the local traffic reductions resulting from a new Pueblo Street overcrossing.

5.2 ALTERNATIVE 2A: NORTHBOUND 101 OFF-RAMP FLYOVER TO LAS POSITAS ROAD

In Alternative 2A, a flyover ramp structure would be constructed from northbound Highway 101 to a new westbound approach at the intersection of Las Positas Road and the southbound 101 ramps. The existing northbound 101 off-ramp to Las Positas Road would be removed, and two-way traffic would be restored on Calle Real between Treasure Drive and Las Positas Road. Vehicles would be able to exit southbound 101 at Las Positas Road and use Calle Real to access the Cottage Hospital area, which would shave about 0.5 miles from the travel distance compared to exiting at Mission Street and doubling back.

The southbound 101 on-ramp from Las Positas Road would need to be widened to provide room for the flyover approach. For the initial traffic analysis, it is assumed that the northbound off-ramp would have a single lane to serve both left and right turn movements.

The locations of the improvements analyzed in this alternative are shown in Figure 5.5. Intersection lane geometry assumptions for Alternative 2A are illustrated in Figure 5.6. Intersection geometry for Alternative 2A is assumed to be the same as the Baseline condition, with the following exceptions:

- Las Positas Road and Calle Real (#3): a southbound left turn lane would be striped within the existing right-of-way, and the northbound outside lane will operate as a shared through-right lane. On Calle Real, the eastbound right turn lane will serve both through and right turn movements. The westbound approach would be re-striped to provide two left turn lanes and a shared through-right lane.
- Las Positas Road and 101 ramps (#4): a westbound approach lane would be added to serve left and right turn movements.

The redistributed AM and PM peak hour intersection turning movement volumes associated with Alternative 2A are shown in Figures 5.7 and 5.8. Capacity enhancements at certain intersections would need to be included as part of Alternative 2A to provide acceptable level of service. Potential improvement options are included in this section.

Figure 5.5 Proposed Improvements: Alternative 2A



Extend two-way traffic on De La Vina Street

Extend one-way couplet on Castillo Street and Bath Street to Pueblo Street

- Legend**
- New freeway off-ramp
 - Convert street to 2-way traffic
 - Remove existing off-ramp
 - Convert street to 1-way traffic

Figure 5.6 Lane Geometry: Alternative 2A

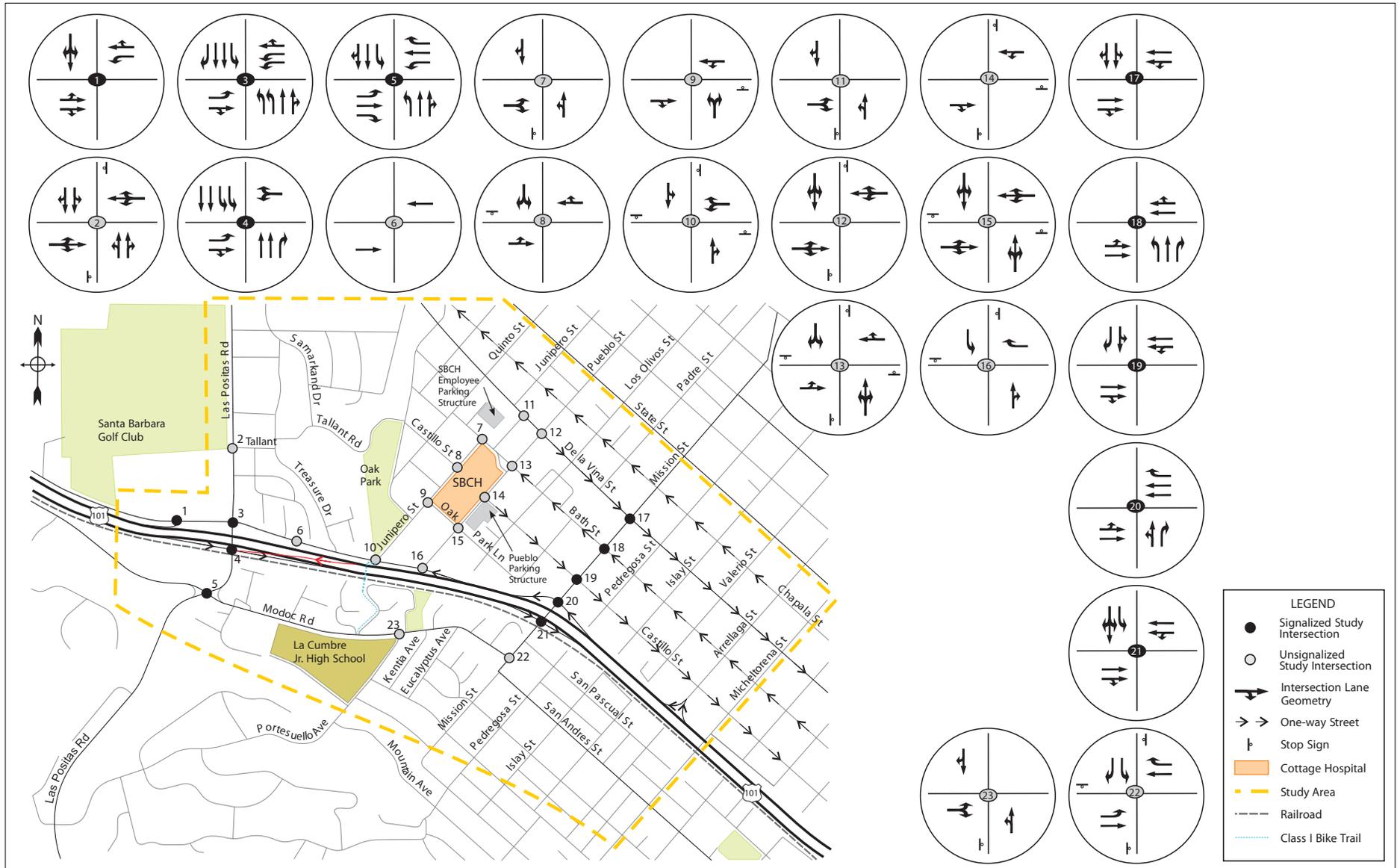


Figure 5.7 Forecast Year 2030 Volumes: Alternative 2A - AM Peak

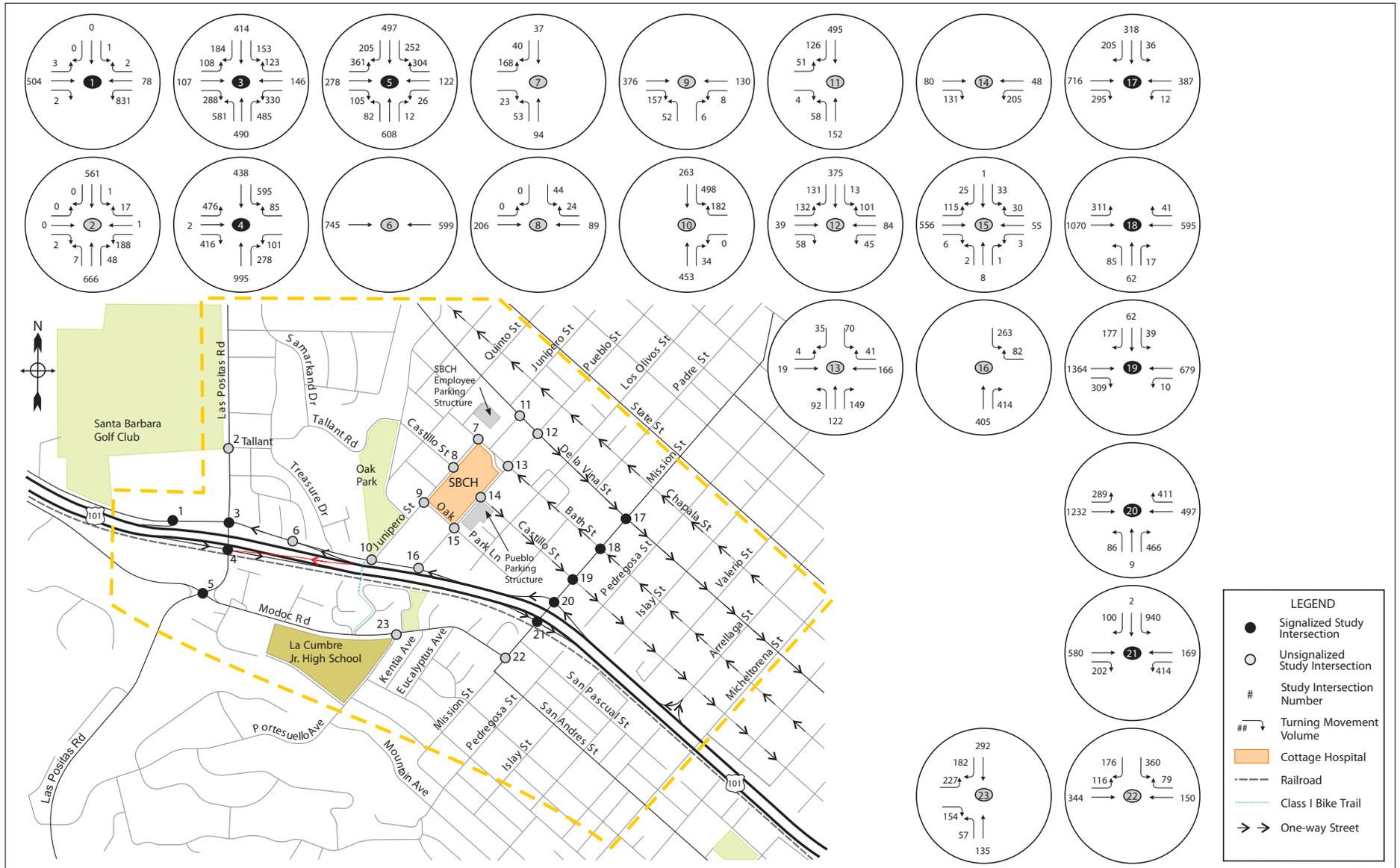
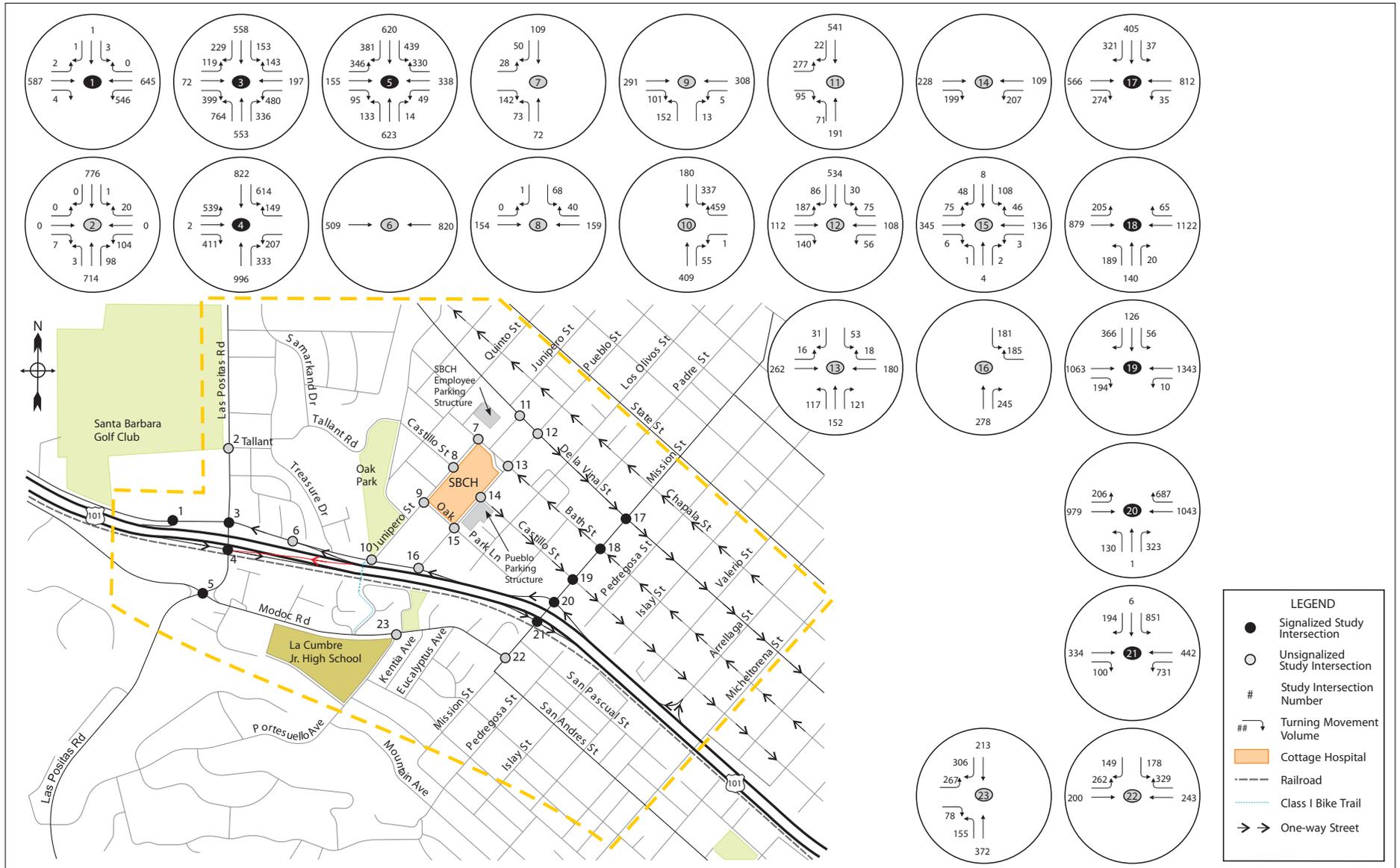


Figure 5.8 Forecast Year 2030 Volumes: Alternative 2A - PM Peak



Level of Service (LOS) Analysis

The level of service results for this alternative at the 23 study intersections are summarized in Tables 5-3 and 5-4.

Table 5-3: Alternative 2A Year 2030 Level of Service Analysis Results – AM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.78	C	X	21.7	C	
2	Las Positas Rd & Tallant Rd	EW Stop				97.9	F	X
3	Las Positas Rd & Calle Real	Signalized	0.85	D	X	40.4	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	0.97	E	X	38.9	D	X
5	Las Positas Rd & Modoc Rd	Signalized	0.87	D	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				11.5	B	
8	Castillo St & Junipero St	NS Stop				10.6	B	
9	Oak Park Ln & Junipero St	NS Stop				13.6	B	
10	Calle Real & Junipero St	All-way Stop				54.6	F	X
11	De la Vina St & Nogales Av	EW Stop				17.7	C	
12	De la Vina St & Pueblo St	EW Stop				23.0	C	
13	Bath St & Pueblo St	All-way Stop				10.1	B	
14	Castillo St & Pueblo St	All-way Stop				8.5	A	
15	Oak Park Ln & Pueblo St	NS Stop				18.7	C	
16	Calle Real & Pueblo St	SW Stop				14.6	B	
17	De la Vina St & Mission St	Signalized	0.56	A				
18	Bath St & Mission St	Signalized	0.55	A				
19	Castillo St & Mission St	Signalized	0.70	B				
20	NB 101 ramps & Mission St	Signalized	0.83	D	X	40.2	D	X
21	SB 101 ramps & Mission St	Signalized	0.89	D	X	25.5	C	
22	Modoc Rd & Mission St	All-way Stop				16.7	C	
23	Modoc Rd & Portesuello Av	NS Stop				31.4	D	

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C").
The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

Table 5-4: Alternative 2A Year 2030 Level of Service Analysis Results – PM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.69	B		19.5	B	
2	Las Positas Rd & Tallant Rd	EW Stop				67.0	F	X
3	Las Positas Rd & Calle Real	Signalized	0.96	E	X	53.8	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	1.03	F	X	95.2	F	X
5	Las Positas Rd & Modoc Rd	Signalized	1.00	E	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				10.3	B	
8	Castillo St & Junipero St	NS Stop				11.0	B	
9	Oak Park Ln & Junipero St	NS Stop				17.8	C	
10	Calle Real & Junipero St	All-way Stop				31.0	D	X
11	De la Vina St & Nogales Av	EW Stop				113.8	F	X
12	De la Vina St & Pueblo St	EW Stop				192.3	F	X
13	Bath St & Pueblo St	All-way Stop				12.7	B	
14	Castillo St & Pueblo St	All-way Stop				10.2	B	
15	Oak Park Ln & Pueblo St	NS Stop				18.4	C	
16	Calle Real & Pueblo St	SW Stop				13.5	B	
17	De la Vina St & Mission St	Signalized	0.58	A				
18	Bath St & Mission St	Signalized	0.68	B				
19	Castillo St & Mission St	Signalized	0.71	C				
20	NB 101 ramps & Mission St	Signalized	0.82	D	X	18.9	B	
21	SB 101 ramps & Mission St	Signalized	0.98	E	X	72.3	E	X
22	Modoc Rd & Mission St	All-way Stop				13.4	B	
23	Modoc Rd & Portesuello Av	NS Stop				202.3	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C"). The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

5.3 ALTERNATIVE 2B: NORTHBOUND 101 "HOOK" OFF-RAMP TO LAS POSITAS ROAD

Alternative 2B proposes to construct a "hook" off-ramp from northbound Highway 101 to Calle Real on the west side of Las Positas Road. In order to avoid impacts to the Las Positas bridge structure, the new off-ramp would need to diverge from the freeway mainline on the west side of the bridge.

According to Caltrans minimum ramp length requirements, the off-ramp intersection with Calle Real would need to be about 700 feet west of Las Positas Road. The existing hook on-ramp to northbound 101 and the entrance to the Earl Warren Showgrounds property would be relocated to coincide with the new hook off-ramp. Calle Real would also be realigned to the north in order to accommodate the ramp geometry, which would result in right-of-way impacts to the Showgrounds property.

As part of this Alternative, the existing northbound 101 off-ramp to Las Positas Road would be removed, and Calle Real would be reconfigured to provide two-way traffic between Las Positas Road and Pueblo Street. This would allow vehicles traveling southbound on Highway 101 to exit at Las Positas Road and use Calle Real to access the Cottage Hospital area. This route is about 0.5 miles shorter than exiting at Mission Street and using Castillo Street or the northbound exit to Pueblo Street to get to the hospital.

Alternative 2B includes modification to these intersections in addition to the local street improvements:

- Northbound 101 ramps and Calle Real (#1): the existing northbound 101 on-ramp intersection with Calle Real at the entrance to the Earl Warren Showgrounds would be relocated to the west to provide adequate length for the northbound 101 off-ramp. The off-ramp approach is assumed to have one left-through lane and one right turn lane. It is also assumed that the northbound right turn lane would have overlap phasing, and be coordinated with the intersection of Las Positas Road and Calle Real (#3).
- Las Positas Road and Calle Real (#3): a southbound left turn lane would be striped within the existing right-of-way, and the northbound outside lane will operate as a shared through-right lane. On Calle Real, the eastbound right turn lane will serve both through and right turn movements. The westbound approach would be restriped to provide two left turn lanes and a shared through-right lane.

The locations of the improvements analyzed in this alternative are shown in Figure 5.9. Intersection lane geometry assumptions for Alternative 2B are illustrated in Figure 5.10. The AM and PM peak hour intersection turning movement volumes are shown in Figures 5.11 and 5.12.

Figure 5.9 Proposed Improvements: Alternative 2B



Extend two-way traffic on De La Vina Street

Extend one-way couplet on Castillo Street and Bath Street to Pueblo Street

Legend

- New freeway off-ramp
- Convert street to 2-way traffic
- Remove existing off-ramp
- Convert street to 1-way traffic

Figure 5.10 Lane Geometry: Alternative 2B

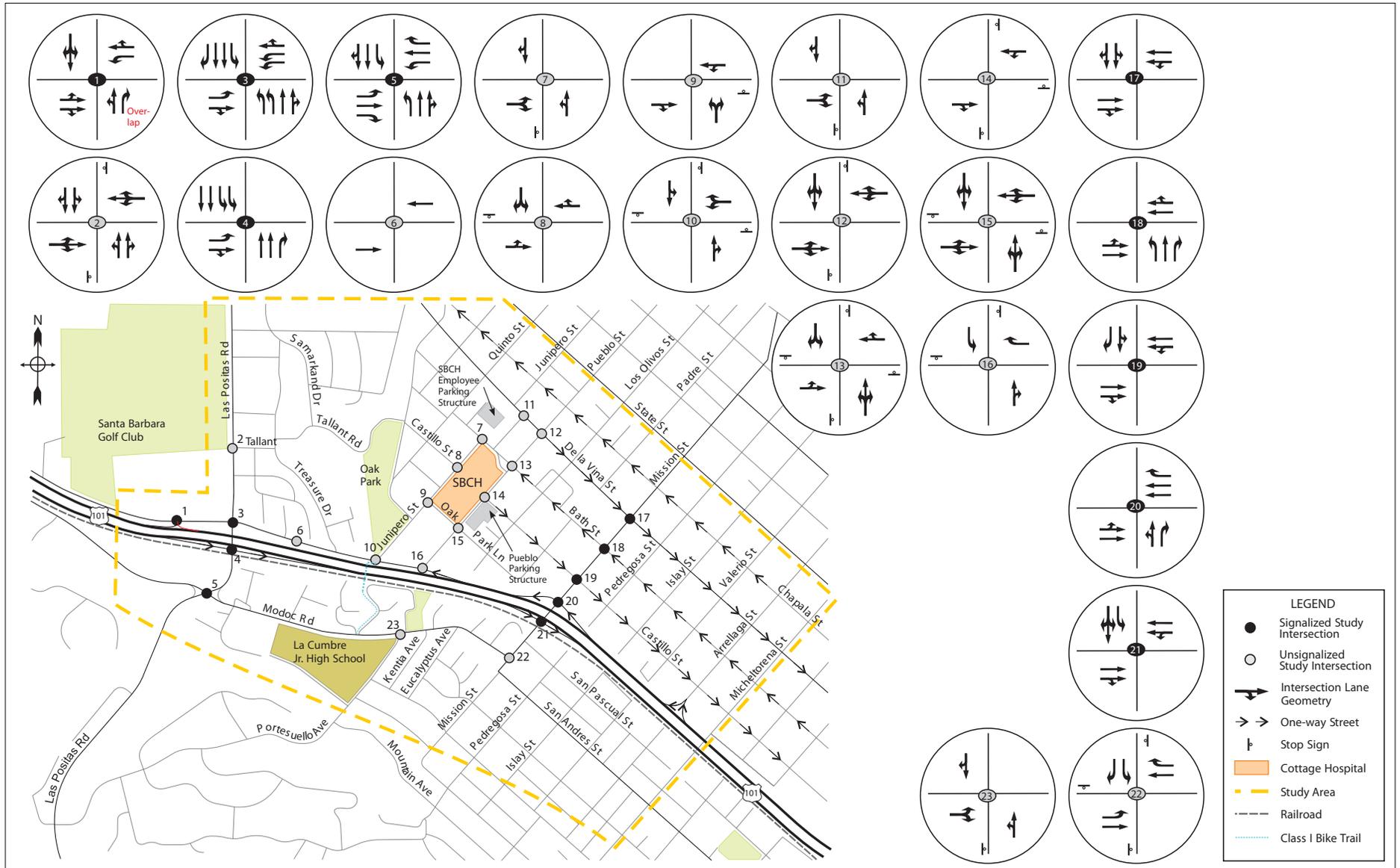


Figure 5.11 Forecast Year 2030 Volumes: Alternative 2B - AM Peak



Figure 5.12 Forecast Year 2030 Volumes: Alternative 2B - PM Peak



Level of Service (LOS) Analysis

The level of service results for this alternative at the 23 study intersections are summarized in Tables 5-5 and 5-6.

Table 5-5: Alternative 2B Year 2030 Level of Service Analysis Results – AM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.80	C	X	23.2	C	
2	Las Positas Rd & Tallant Rd	EW Stop				97.9	F	X
3	Las Positas Rd & Calle Real	Signalized	0.91	E	X	47.2	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	0.85	D	X	33.5	C	
5	Las Positas Rd & Modoc Rd	Signalized	0.87	D	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				11.5	B	
8	Castillo St & Junipero St	NS Stop				10.6	B	
9	Oak Park Ln & Junipero St	NS Stop				13.6	B	
10	Calle Real & Junipero St	All-way Stop				54.6	F	X
11	De la Vina St & Nogales Av	EW Stop				17.7	C	
12	De la Vina St & Pueblo St	EW Stop				23.0	C	
13	Bath St & Pueblo St	All-way Stop				10.1	B	
14	Castillo St & Pueblo St	All-way Stop				8.5	A	
15	Oak Park Ln & Pueblo St	NS Stop				18.7	C	
16	Calle Real & Pueblo St	SW Stop				14.6	B	
17	De la Vina St & Mission St	Signalized	0.56	A				
18	Bath St & Mission St	Signalized	0.55	A				
19	Castillo St & Mission St	Signalized	0.70	B				
20	NB 101 ramps & Mission St	Signalized	0.83	D	X	40.2	D	X
21	SB 101 ramps & Mission St	Signalized	0.89	D	X	25.5	C	
22	Modoc Rd & Mission St	All-way Stop				16.7	C	
23	Modoc Rd & Portesuello Av	NS Stop				31.4	D	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C").
The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

Table 5-6: Alternative 2B Year 2030 Level of Service Analysis Results – PM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.69	B		22.2	C	
2	Las Positas Rd & Tallant Rd	EW Stop				67.0	F	X
3	Las Positas Rd & Calle Real	Signalized	1.08	F	X	86.4	F	X
4	Las Positas Rd & SB 101 ramps	Signalized	0.89	D	X	34.5	C	
5	Las Positas Rd & Modoc Rd	Signalized	1.00	E	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				10.3	B	
8	Castillo St & Junipero St	NS Stop				11.0	B	
9	Oak Park Ln & Junipero St	NS Stop				17.8	C	
10	Calle Real & Junipero St	All-way Stop				31.0	D	X
11	De la Vina St & Nogales Av	EW Stop				113.8	F	X
12	De la Vina St & Pueblo St	EW Stop				192.3	F	X
13	Bath St & Pueblo St	All-way Stop				12.7	B	
14	Castillo St & Pueblo St	All-way Stop				10.2	B	
15	Oak Park Ln & Pueblo St	NS Stop				18.4	C	
16	Calle Real & Pueblo St	SW Stop				13.5	B	
17	De la Vina St & Mission St	Signalized	0.58	A				
18	Bath St & Mission St	Signalized	0.68	B				
19	Castillo St & Mission St	Signalized	0.71	C				
20	NB 101 ramps & Mission St	Signalized	0.82	D	X	18.9	B	
21	SB 101 ramps & Mission St	Signalized	0.98	E	X	72.3	E	X
22	Modoc Rd & Mission St	All-way Stop				13.4	B	
23	Modoc Rd & Portesuello Av	NS Stop				202.3	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C"). The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

5.4 ALTERNATIVE 2C: SOUTHBOUND 101 OFF-RAMP FLYOVER TO LAS POSITAS ROAD

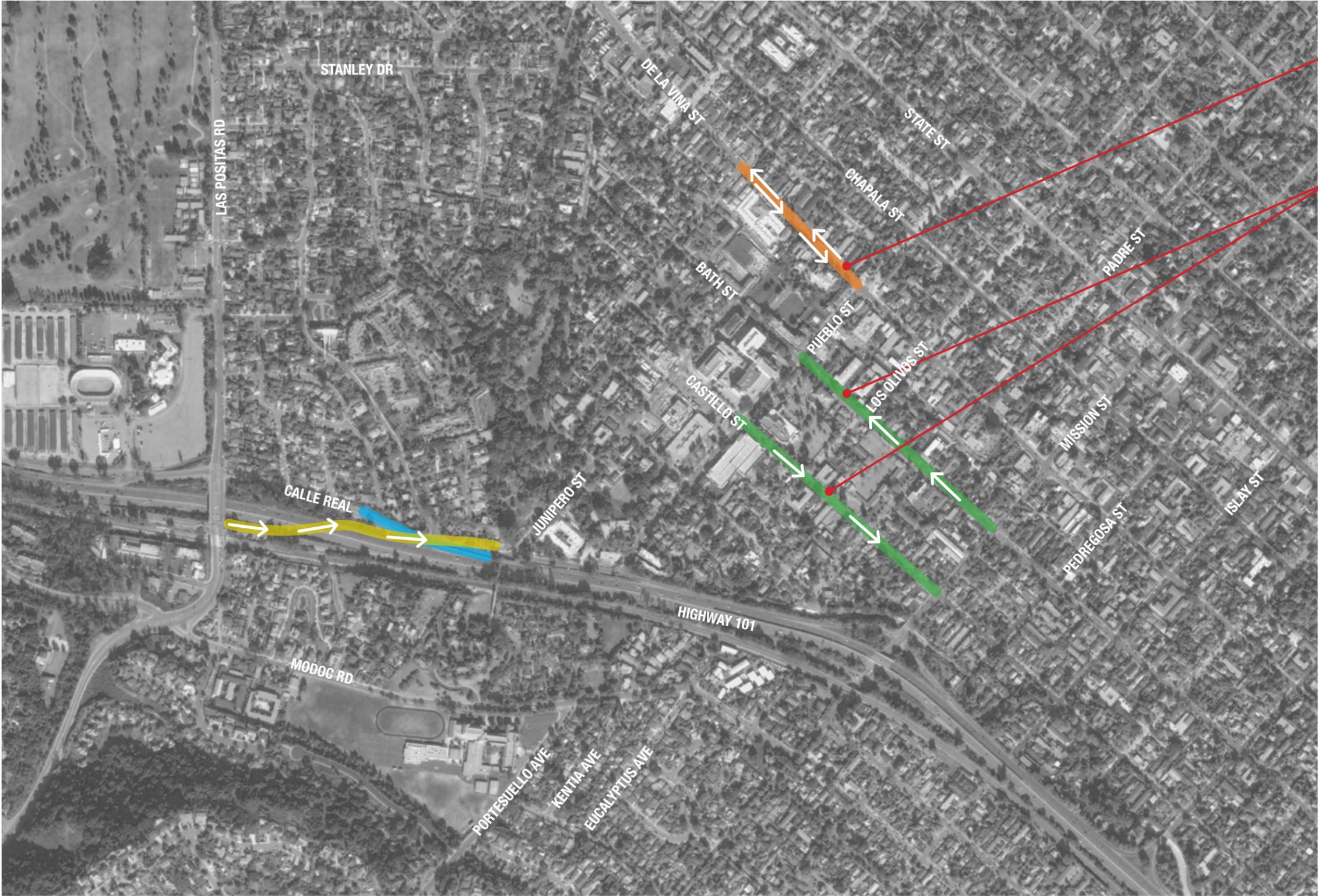
Alternative 2C involves the construction of an aerial structure that originates at the intersection of Las Positas Road and the southbound 101 ramps, travels across the 101 freeway, and merges with Calle Real just north of Junipero Street. The flyover ramp would provide an alternative route for vehicles that wish to travel eastbound on Calle Real. Vehicles would be able to exit southbound 101 at Las Positas Road and continue straight through the intersection to the flyover ramp.

The southbound 101 on-ramp from Las Positas Road would need to be widened to provide room for the flyover departure lane. The new bridge would provide capacity for a single lane of traffic on the flyover bridge. The locations of the improvements analyzed in this alternative are shown in Figure 5.13. Intersection lane geometry assumptions for Alternative 2C are illustrated in Figure 5.14. Intersection geometry for Alternative 2C is assumed to be the same as the Baseline condition, with the following exceptions:

- Las Positas Road and Calle Real (#3): a southbound left turn lane would be striped within the existing right-of-way, and the northbound outside lane will operate as a shared through-right lane. On Calle Real, the eastbound right turn lane will serve both through and right turn movements. The westbound approach would be restriped to provide two left turn lanes and a shared through-right lane.
- Las Positas Road and 101 ramps (#4): an eastbound departure lane would be added, which would branch off from the southbound 101 on-ramp and fly over the freeway to merge with Calle Real north of Junipero Street.

The redistributed AM and PM peak hour intersection turning movement volumes associated with Alternative 2C are shown in Figures 5.15 and 5.16. Capacity enhancements at certain intersections would need to be included as part of Alternative 2C to provide acceptable level of service. Potential improvement options are included in this section.

Figure 5.13 Proposed Improvements: Alternative 2C



Extend two-way traffic on De La Vina Street

Extend one-way couplet on Castillo Street and Bath Street to Pueblo Street

Legend

- New freeway off-ramp
- Convert street to 2-way traffic
- Realign existing off-ramp
- Convert street to 1-way traffic

Figure 5.14 Lane Geometry: Alternative 2C

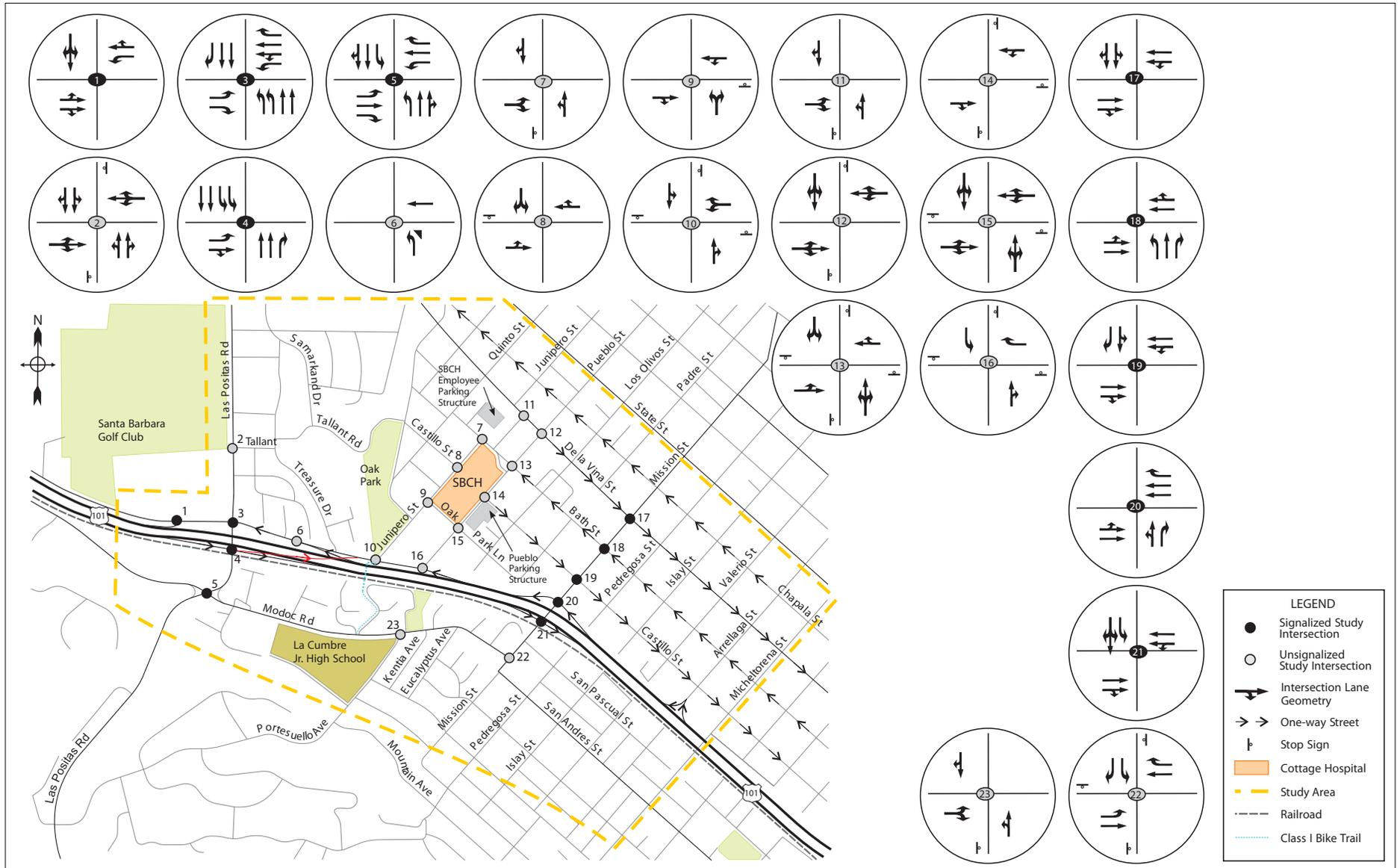


Figure 5.15 Forecast Year 2030 Volumes: Alternative 2C - AM Peak



Figure 5.16 Forecast Year 2030 Volumes: Alternative 2C - PM Peak



Level of Service (LOS) Analysis

The level of service results for this alternative at the 23 study intersections are summarized in Tables 5-7 and 5-8.

Table 5-7: Alternative 2C Year 2030 Level of Service Analysis Results – AM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.78	C	X	21.7	C	
2	Las Positas Rd & Tallant Rd	EW Stop				97.9	F	X
3	Las Positas Rd & Calle Real	Signalized	0.83	D	X	39.9	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	1.07	F	X	68.5	E	X
5	Las Positas Rd & Modoc Rd	Signalized	0.87	D	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				11.5	B	
8	Castillo St & Junipero St	NS Stop				10.6	B	
9	Oak Park Ln & Junipero St	NS Stop				13.6	B	
10	Calle Real & Junipero St	All-way Stop				54.6	F	X
11	De la Vina St & Nogales Av	EW Stop				17.7	C	
12	De la Vina St & Pueblo St	EW Stop				23.0	C	
13	Bath St & Pueblo St	All-way Stop				10.1	B	
14	Castillo St & Pueblo St	All-way Stop				8.5	A	
15	Oak Park Ln & Pueblo St	NS Stop				18.7	C	
16	Calle Real & Pueblo St	SW Stop				14.6	B	
17	De la Vina St & Mission St	Signalized	0.56	A				
18	Bath St & Mission St	Signalized	0.55	A				
19	Castillo St & Mission St	Signalized	0.70	B				
20	NB 101 ramps & Mission St	Signalized	0.83	D	X	40.2	D	X
21	SB 101 ramps & Mission St	Signalized	0.89	D	X	25.5	C	
22	Modoc Rd & Mission St	All-way Stop				16.7	C	
23	Modoc Rd & Portesuello Av	NS Stop				31.4	D	

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C").
The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

Table 5-8: Alternative 2C Year 2030 Level of Service Analysis Results – PM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.69	B		19.5	B	
2	Las Positas Rd & Tallant Rd	EW Stop				67.0	F	X
3	Las Positas Rd & Calle Real	Signalized	1.03	F	X	67.9	E	X
4	Las Positas Rd & SB 101 ramps	Signalized	0.98	E	X	47.0	D	X
5	Las Positas Rd & Modoc Rd	Signalized	1.00	E	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				10.3	B	
8	Castillo St & Junipero St	NS Stop				11.0	B	
9	Oak Park Ln & Junipero St	NS Stop				17.8	C	
10	Calle Real & Junipero St	All-way Stop				31.0	D	X
11	De la Vina St & Nogales Av	EW Stop				113.8	F	X
12	De la Vina St & Pueblo St	EW Stop				192.3	F	X
13	Bath St & Pueblo St	All-way Stop				12.7	B	
14	Castillo St & Pueblo St	All-way Stop				10.2	B	
15	Oak Park Ln & Pueblo St	NS Stop				18.4	C	
16	Calle Real & Pueblo St	SW Stop				13.5	B	
17	De la Vina St & Mission St	Signalized	0.58	A				
18	Bath St & Mission St	Signalized	0.68	B				
19	Castillo St & Mission St	Signalized	0.71	C				
20	NB 101 ramps & Mission St	Signalized	0.82	D	X	18.9	B	
21	SB 101 ramps & Mission St	Signalized	0.98	E	X	72.3	E	X
22	Modoc Rd & Mission St	All-way Stop				13.4	B	
23	Modoc Rd & Portesuello Av	NS Stop				202.3	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C"). The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

5.5 ALTERNATIVE 3A: PUEBLO OVERCROSSING AND NB 101 FLYOVER TO LAS POSITAS

Alternative 3A incorporates the combined improvements of a Pueblo Street overcrossing and a northbound 101 flyover off-ramp to Las Positas Road, along with local street circulation modifications. The Pueblo Street overcrossing would connect Pueblo Street on the east side of Highway 101 with the intersection of Modoc Road and Portesuello Avenue. The flyover ramp structure would be constructed from northbound Highway 101 to a new westbound approach at the intersection of Las Positas Road and the southbound 101 ramps. The existing northbound 101 off-ramp to Las Positas Road would be removed, and two-way traffic would be restored on Calle Real between Treasure Drive and Las Positas Road.

Preliminary engineering indicates that Modoc Road would need to be raised about two feet to meet the grade of the Pueblo Street overpass. The northbound 101 off-ramp to Pueblo Street would need to be shifted west to fit under the overpass, and would connect to Junipero Street instead of Pueblo Street. This would require at least partial acquisition of park and garden land between Pilgrim Terrace Drive and Kentia Avenue. There would also be right-of-way impacts to property on the east side of Highway 101.

The southbound 101 on-ramp from Las Positas Road would need to be widened to provide room for the flyover approach. For the initial traffic analysis, it is assumed that the northbound off-ramp would have a single lane to serve both left and right turn movements.

Improvements proposed as part of this alternative are shown in Figure 5.17. Intersection lane geometry assumptions for Alternative 3A are illustrated in Figure 5.18. Intersection geometry for Alternative 3A is assumed to be the same as the Baseline condition, with the following exceptions:

- Las Positas Road and Calle Real (#3): a southbound left turn lane would be striped within the existing right-of-way, and the northbound outside lane will operate as a shared through-right lane. On Calle Real, the eastbound right turn lane will serve both through and right turn movements. The westbound approach would be restriped to provide two left turn lanes and a shared through-right lane.
- Las Positas Road and 101 ramps (#4): a westbound approach lane would be added to serve left and right turn movements.
- Calle Real and Pueblo Street (#16): the northbound 101 off-ramp would no longer intersect with Pueblo Street, but pass under the Pueblo Street overcrossing structure.
- Modoc Road and Portesuello Avenue (#23): the Pueblo Street overcrossing structure would connect to this intersection and add a southbound approach. This location is initially modeled as a four-way stop controlled intersection with one shared left-through-right lane on each approach.

Vehicles that utilize the Pueblo Street overcrossing would reduce their travel distance by 0.5 miles compared to crossing Highway 101 on Mission Street. Northbound 101 vehicles that currently take the Pueblo Street exit and turn right onto Pueblo Street would continue north on Calle Real to Junipero Street and travel about 0.3 miles further with the new configuration. Vehicles that exit southbound 101 at Las Positas Road and use Calle Real to access the Cottage Hospital area would reduce their trip lengths by about 0.5 miles. The redistributed AM and PM peak hour intersection turning movement volumes associated with Alternative 3A are shown in Figures 5.19 and 5.20.

Figure 5.17 Proposed Improvements: Alternative 3A



Figure 5.18 Lane Geometry: Alternative 3A

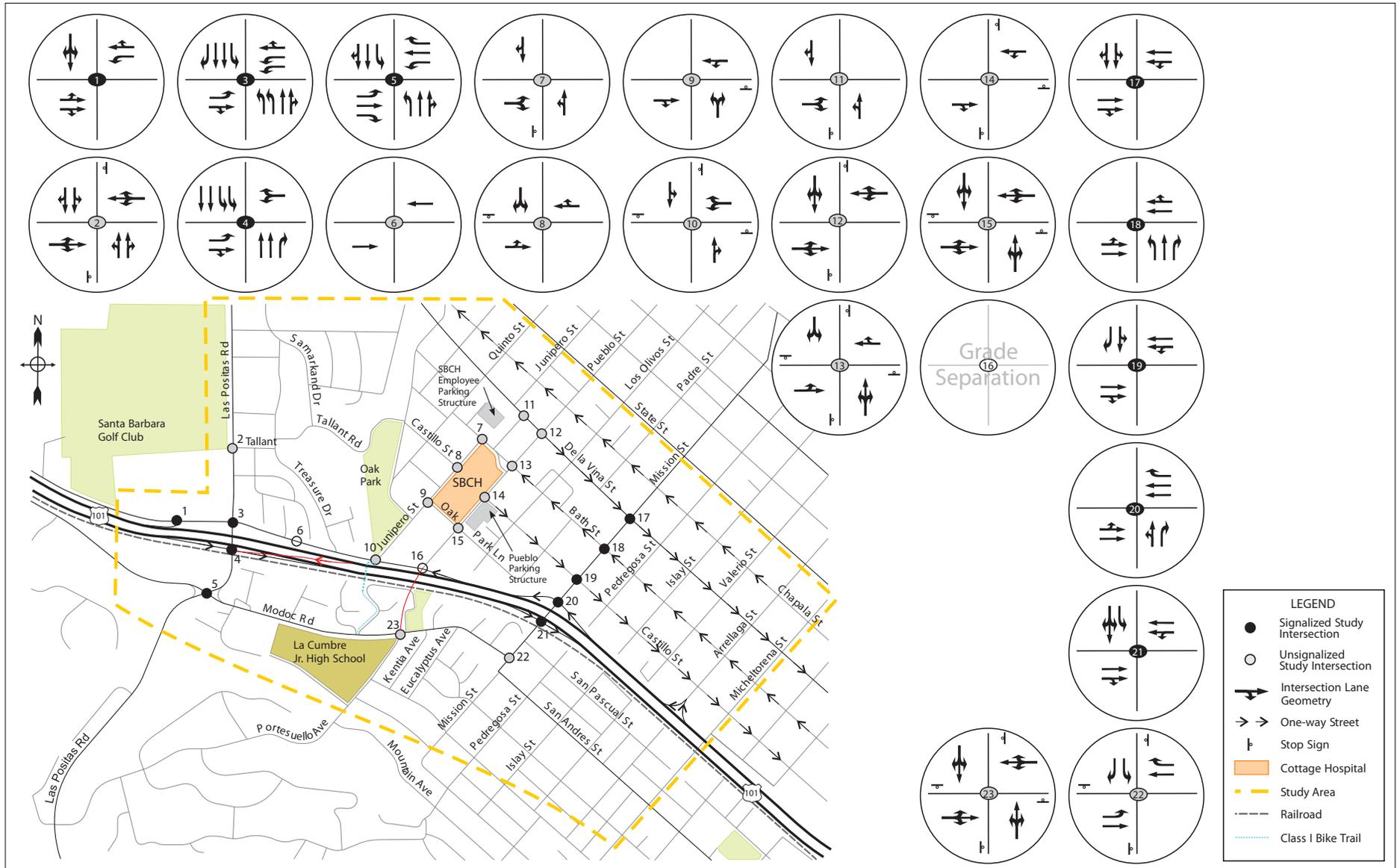
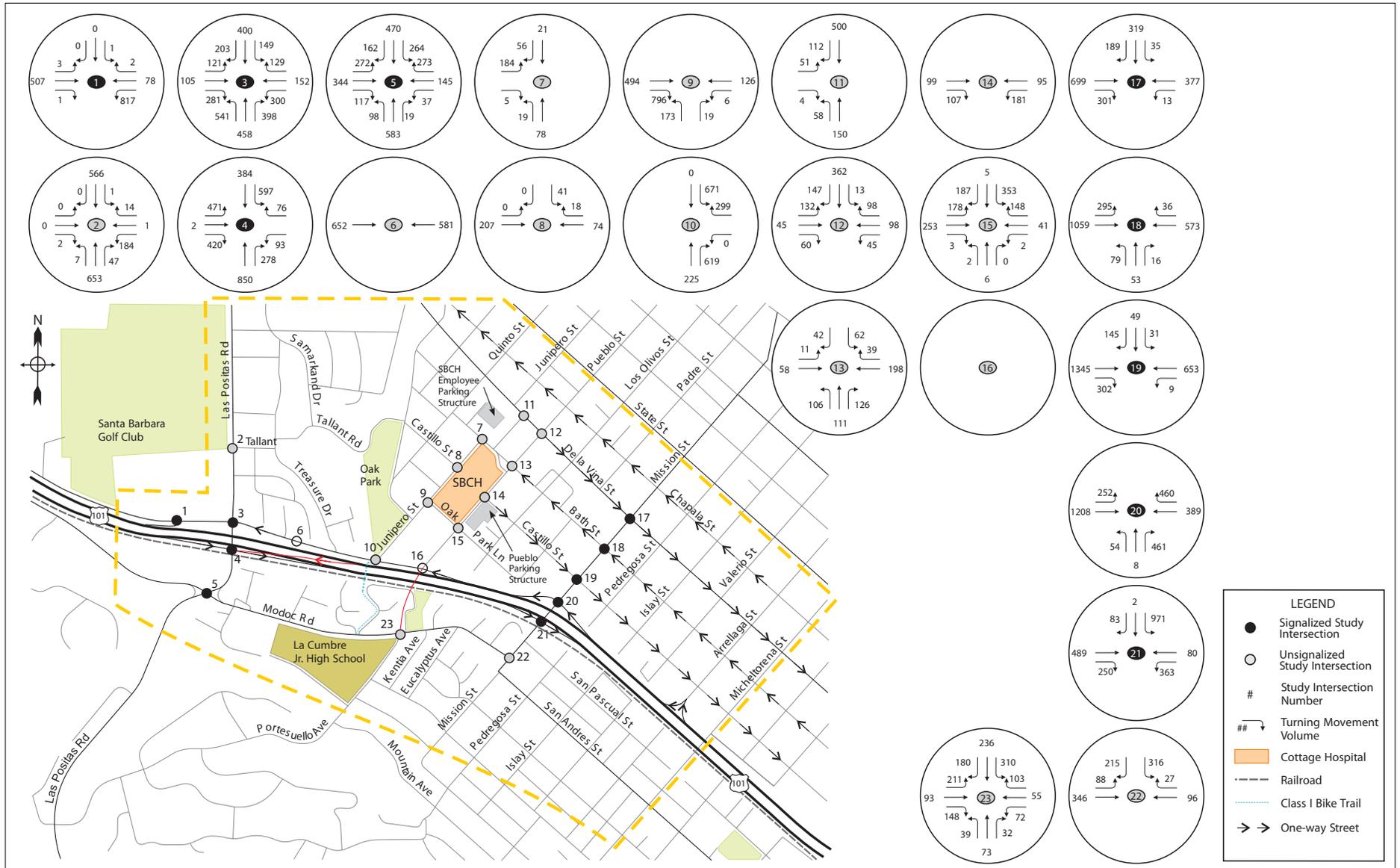


Figure 5.19 Forecast Year 2030 Volumes: Alternative 3A - AM Peak



Level of Service (LOS) Analysis

The level of service results for this alternative at the 23 study intersections are summarized in Tables 5-9 and 5-10.

Table 5-9: Alternative 3A Year 2030 Level of Service Analysis Results – AM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.77	C		21.6	C	
2	Las Positas Rd & Tallant Rd	EW Stop				87.8	F	X
3	Las Positas Rd & Calle Real	Signalized	0.80	C	X	38.1	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	0.91	E	X	35.5	D	X
5	Las Positas Rd & Modoc Rd	Signalized	0.79	C	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				10.6	B	
8	Castillo St & Junipero St	NS Stop				10.4	B	
9	Oak Park Ln & Junipero St	NS Stop				47.5	E	X
10	Calle Real & Junipero St	All-way Stop				106.0	F	X
11	De la Vina St & Nogales Av	EW Stop				17.6	C	
12	De la Vina St & Pueblo St	EW Stop				24.2	C	
13	Bath St & Pueblo St	All-way Stop				10.4	B	
14	Castillo St & Pueblo St	All-way Stop				8.7	A	
15	Oak Park Ln & Pueblo St	NS Stop				223.7	F	X
16	Calle Real & Pueblo St	SW Stop				0.0	N/A	
17	De la Vina St & Mission St	Signalized	0.55	A				
18	Bath St & Mission St	Signalized	0.53	A				
19	Castillo St & Mission St	Signalized	0.67	B				
20	NB 101 ramps & Mission St	Signalized	0.80	C	X	28.8	C	
21	SB 101 ramps & Mission St	Signalized	0.85	D	X	23.6	C	
22	Modoc Rd & Mission St	All-way Stop				14.6	B	
23	Modoc Rd & Portesuello Av	All-way Stop				89.5	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C"). The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

Table 5-10: Alternative 3A Year 2030 Level of Service Analysis Results – PM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.69	B		19.5	B	
2	Las Positas Rd & Tallant Rd	EW Stop				62.0	F	X
3	Las Positas Rd & Calle Real	Signalized	0.89	D	X	45.7	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	0.98	E	X	53.0	D	X
5	Las Positas Rd & Modoc Rd	Signalized	0.99	E	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				10.1	B	
8	Castillo St & Junipero St	NS Stop				10.7	B	
9	Oak Park Ln & Junipero St	NS Stop				229.4	F	X
10	Calle Real & Junipero St	All-way Stop				100.9	F	X
11	De la Vina St & Nogales Av	EW Stop				84.8	F	X
12	De la Vina St & Pueblo St	EW Stop				189.4	F	X
13	Bath St & Pueblo St	All-way Stop				12.3	B	
14	Castillo St & Pueblo St	All-way Stop				10.5	B	
15	Oak Park Ln & Pueblo St	NS Stop				203.3	F	X
16	Calle Real & Pueblo St	SW Stop				0.0	N/A	
17	De la Vina St & Mission St	Signalized	0.57	A				
18	Bath St & Mission St	Signalized	0.67	B				
19	Castillo St & Mission St	Signalized	0.66	B				
20	NB 101 ramps & Mission St	Signalized	0.87	D	X	16.3	B	
21	SB 101 ramps & Mission St	Signalized	0.96	E	X	66.8	E	X
22	Modoc Rd & Mission St	All-way Stop				13.1	B	
23	Modoc Rd & Portesuello Av	All-way Stop				156.8	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C"). The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

5.6 ALTERNATIVE 3B: PUEBLO OVERCROSSING AND NB 101 “HOOK” OFF-RAMP TO LAS POSITAS

Alternative 3B incorporates the combined improvements of a Pueblo Street overcrossing and a “hook” off-ramp from northbound Highway 101 to Calle Real on the west side of Las Positas Road, along with local street circulation modifications. The Pueblo Street overcrossing would connect Pueblo Street on the east side of Highway 101 with the intersection of Modoc Road and Portesuello Avenue. Preliminary engineering indicates that Modoc Road would need to be raised about two feet to meet the grade of the Pueblo Street overpass. The northbound 101 off-ramp to Pueblo Street would need to be shifted west to fit under the overpass, and would connect to Junipero Street instead of Pueblo Street. This would require at least partial acquisition of park and garden land between Pilgrim Terrace Drive and Kentia Avenue. There would also be right-of-way impacts to property on the east side of Highway 101.

The new northbound 101 hook off-ramp intersection with Calle Real would need to be about 700 feet west of Las Positas Road. The existing hook on-ramp to northbound 101 and the entrance to the Earl Warren Showgrounds property would be relocated to coincide with the new hook off-ramp. Calle Real would also be realigned to the north in order to accommodate the ramp geometry, which would result in right-of-way impacts to the Showgrounds property.

As part of this Alternative, the existing northbound 101 off-ramp to Las Positas Road would be removed, and Calle Real would be reconfigured to provide two-way traffic between Las Positas Road and Pueblo Street. This would allow vehicles traveling southbound on Highway 101 to exit at Las Positas Road and use Calle Real to access the Cottage Hospital area.

Improvements proposed as part of this alternative are shown in Figure 5.21. Intersection lane geometry assumptions for Alternative 3B are illustrated in Figure 5.22. Intersection geometry for Alternative 3B is assumed to be the same as the Baseline condition, with the following exceptions:

- Northbound 101 ramps and Calle Real (#1): the existing northbound 101 on-ramp intersection with Calle Real at the entrance to the Earl Warren Showgrounds would be relocated to the west to provide adequate length for the northbound 101 off-ramp. The off-ramp approach is assumed to have one left-through lane and one right turn lane. It is also assumed that the northbound right turn lane would have overlap phasing, and be coordinated with the intersection of Las Positas Road and Calle Real (#3).
- Las Positas Road and Calle Real (#3): a southbound left turn lane would be striped within the existing right-of-way, and the northbound outside lane will operate as a shared through-right lane. On Calle Real, the eastbound right turn lane will serve both through and right turn movements. The westbound approach would be restriped to provide two left turn lanes and a shared through-right lane.
- Calle Real and Pueblo Street (#16): the northbound 101 off-ramp would no longer intersect with Pueblo Street, but pass under the Pueblo Street overcrossing structure.
- Modoc Road and Portesuello Avenue (#23): the Pueblo Street overcrossing structure would connect to this intersection and add a southbound approach. This location is initially modeled as a four-way stop controlled intersection with one shared left-through-right lane on each approach.

Vehicles that utilize the Pueblo Street overcrossing would reduce their travel distance by 0.5 miles compared to crossing Highway 101 on Mission Street. Northbound 101 vehicles that currently take the Pueblo Street exit and turn right onto Pueblo Street would continue north on Calle Real to Junipero Street and travel about 0.3 miles further with the new configuration. Vehicles that exit

southbound 101 at Las Positas Road and use Calle Real to access the Cottage Hospital area would reduce their trip lengths by about 0.5 miles.

The redistributed AM and PM peak hour intersection turning movement volumes associated with Alternative 3B are shown in Figures 5.23 and 5.24.

Figure 5.21 Proposed Improvements: Alternative 3B



Figure 5.22 Lane Geometry: Alternative 3B

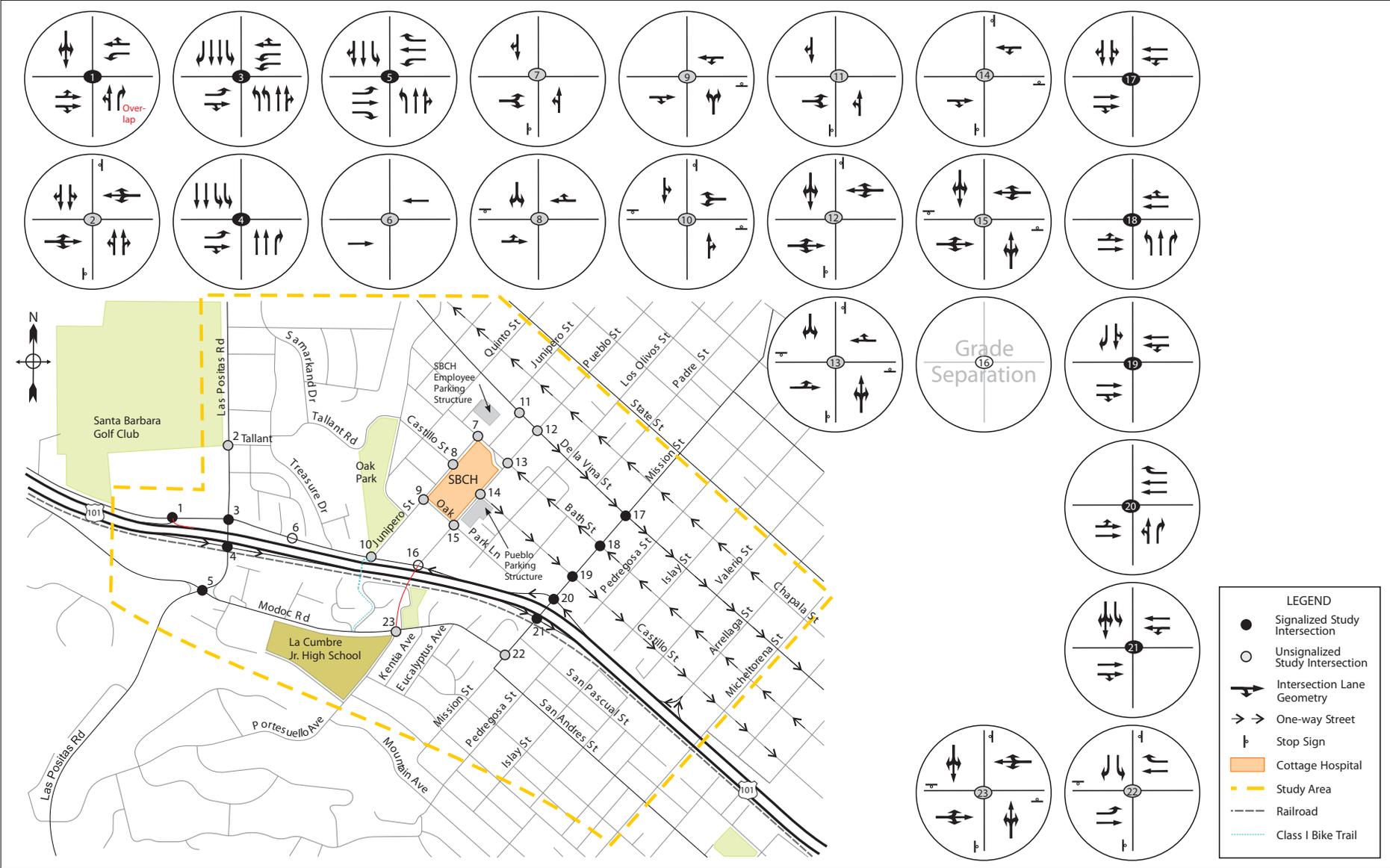
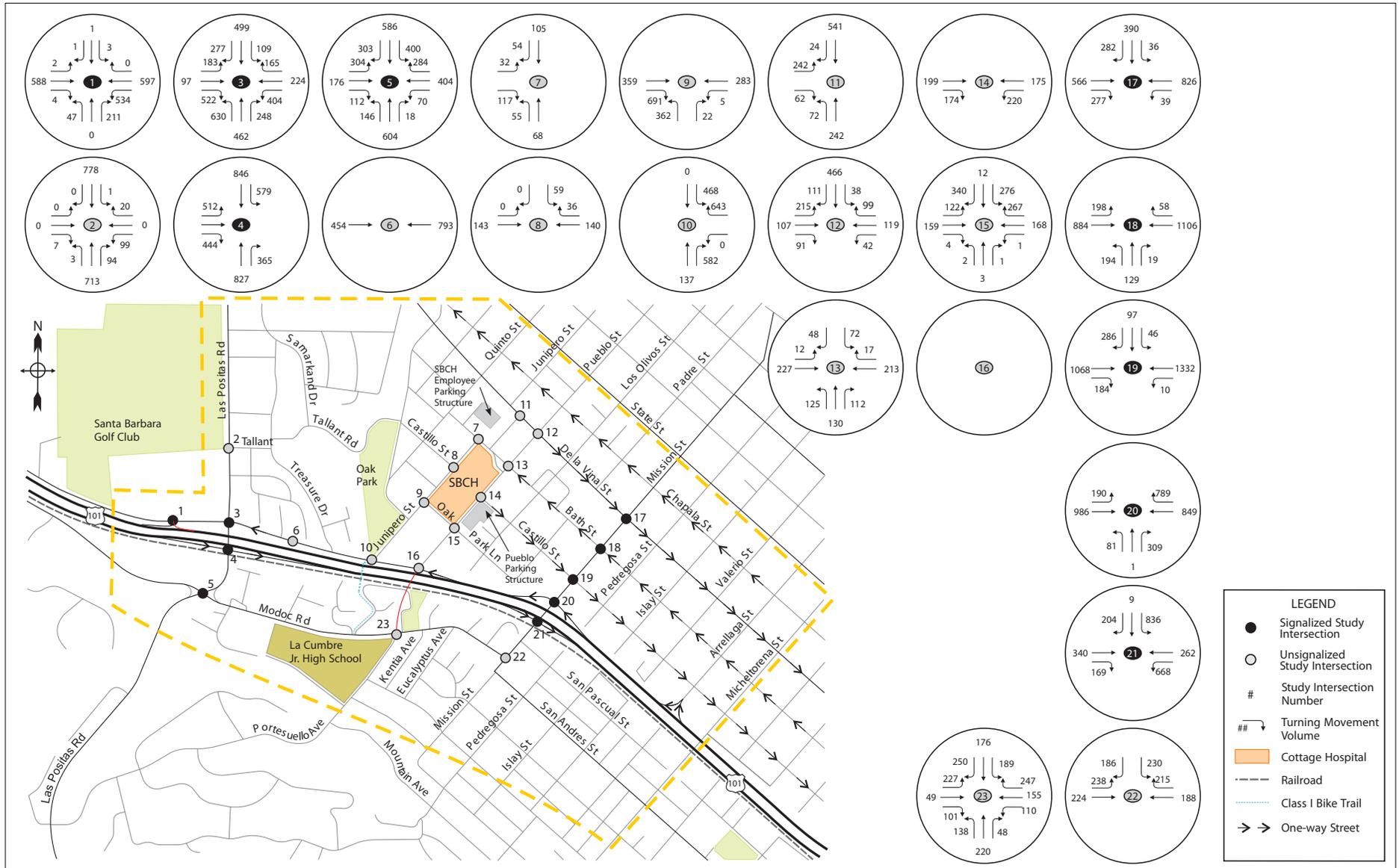


Figure 5.23 Forecast Year 2030 Volumes: Alternative 3B - AM Peak



Figure 5.24 Forecast Year 2030 Volumes: Alternative 3B - PM Peak



Level of Service (LOS) Analysis

The level of service results for this alternative at the 23 study intersections are summarized in Tables 5-11 and 5-12.

Table 5-11: Alternative 3B Year 2030 Level of Service Analysis Results – AM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.79	C	X	23.0	C	
2	Las Positas Rd & Tallant Rd	EW Stop				87.8	F	X
3	Las Positas Rd & Calle Real	Signalized	0.85	D	X	42.3	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	0.85	D	X	34.7	C	
5	Las Positas Rd & Modoc Rd	Signalized	0.79	C	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				10.6	B	
8	Castillo St & Junipero St	NS Stop				10.4	B	
9	Oak Park Ln & Junipero St	NS Stop				47.5	E	X
10	Calle Real & Junipero St	All-way Stop				106.0	F	X
11	De la Vina St & Nogales Av	EW Stop				17.6	C	
12	De la Vina St & Pueblo St	EW Stop				24.2	C	
13	Bath St & Pueblo St	All-way Stop				10.4	B	
14	Castillo St & Pueblo St	All-way Stop				8.7	A	
15	Oak Park Ln & Pueblo St	NS Stop				223.7	F	X
16	Calle Real & Pueblo St	SW Stop				0.0	N/A	
17	De la Vina St & Mission St	Signalized	0.55	A				
18	Bath St & Mission St	Signalized	0.53	A				
19	Castillo St & Mission St	Signalized	0.67	B				
20	NB 101 ramps & Mission St	Signalized	0.80	C	X	28.8	C	
21	SB 101 ramps & Mission St	Signalized	0.85	D	X	23.6	C	
22	Modoc Rd & Mission St	All-way Stop				14.6	B	
23	Modoc Rd & Portesuello Av	All-way Stop				89.5	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C").
The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

Table 5-12: Alternative 3B Year 2030 Level of Service Analysis Results – PM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.69	B		21.2	C	
2	Las Positas Rd & Tallant Rd	EW Stop				62.0	F	X
3	Las Positas Rd & Calle Real	Signalized	0.98	E	X	60.6	E	X
4	Las Positas Rd & SB 101 ramps	Signalized	0.86	D	X	35.4	D	X
5	Las Positas Rd & Modoc Rd	Signalized	0.99	E	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				10.1	B	
8	Castillo St & Junipero St	NS Stop				10.7	B	
9	Oak Park Ln & Junipero St	NS Stop				229.4	F	X
10	Calle Real & Junipero St	All-way Stop				100.9	F	X
11	De la Vina St & Nogales Av	EW Stop				84.8	F	X
12	De la Vina St & Pueblo St	EW Stop				189.4	F	X
13	Bath St & Pueblo St	All-way Stop				12.3	B	
14	Castillo St & Pueblo St	All-way Stop				10.5	B	
15	Oak Park Ln & Pueblo St	NS Stop				203.3	F	X
16	Calle Real & Pueblo St	SW Stop				0.0	N/A	
17	De la Vina St & Mission St	Signalized	0.57	A				
18	Bath St & Mission St	Signalized	0.67	B				
19	Castillo St & Mission St	Signalized	0.66	B				
20	NB 101 ramps & Mission St	Signalized	0.87	D	X	16.3	B	
21	SB 101 ramps & Mission St	Signalized	0.96	E	X	66.8	E	X
22	Modoc Rd & Mission St	All-way Stop				13.1	B	
23	Modoc Rd & Portesuello Av	All-way Stop				156.8	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C"). The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

5.7 ALTERNATIVE 3C: PUEBLO OVERCROSSING AND SB 101 FLYOVER TO JUNIPERO

Alternative 3C incorporates the combined improvements of a Pueblo Street overcrossing and a southbound 101 flyover ramp from Las Positas Road to Junipero Street, along with local street circulation modifications. The Pueblo Street overcrossing would connect Pueblo Street on the east side of Highway 101 with the intersection of Modoc Road and Portesuello Avenue. The flyover ramp would provide an alternative route for vehicles that wish to travel eastbound on Calle Real. Vehicles would be able to exit southbound 101 at Las Positas Road and continue straight through the intersection to the flyover ramp.

The flyover would consist of an aerial structure that originates at the intersection of Las Positas Road and the southbound 101 ramps, travels across the 101 freeway, and merges with southbound Calle Real just north of Junipero Street. The southbound 101 on-ramp from Las Positas Road would need to be widened to provide room for the flyover departure lane. For the initial traffic analysis, it is assumed that the northbound off-ramp would have a single lane to serve both left and right turn movements.

Improvements proposed as part of this alternative are shown in Figure 5.25. Intersection lane geometry assumptions for Alternative 3C are illustrated in Figure 5.26. Intersection geometry for Alternative 3C is assumed to be the same as the Baseline condition, with the following exceptions:

- Las Positas Road and Calle Real (#3): a southbound left turn lane would be striped within the existing right-of-way, and the northbound outside lane will operate as a shared through-right lane. On Calle Real, the eastbound right turn lane will serve both through and right turn movements. The westbound approach would be restriped to provide two left turn lanes and a shared through-right lane.
- Las Positas Road and 101 ramps (#4): an eastbound departure lane would be added, which would branch off from the southbound 101 on-ramp and fly over the freeway to merge with Calle Real north of Junipero Street.
- Calle Real and Pueblo Street (#16): the northbound 101 off-ramp would no longer intersect with Pueblo Street, but pass under the Pueblo Street overcrossing structure.
- Modoc Road and Portesuello Avenue (#23): the Pueblo Street overcrossing structure would connect to this intersection and add a southbound approach. This location is initially modeled as a four-way stop controlled intersection with one shared left-through-right lane on each approach.

Vehicles that utilize the Pueblo Street overcrossing could reduce their travel distance to Cottage Hospital by up to 0.5 miles compared to crossing Highway 101 at Mission Street. Northbound Highway 101 vehicles that currently take the Pueblo Street exit and turn right onto Pueblo Street would continue north on Calle Real to Junipero Street and travel about 0.3 miles further with the new configuration. Vehicles that exit southbound 101 at Las Positas Road and use the southbound flyover to access the Cottage Hospital area could reduce their trip lengths by about 0.5 miles.

The redistributed AM and PM peak hour intersection turning movement volumes associated with Alternative 3C are shown in Figures 5.27 and 5.28.

Figure 5.25 Proposed Improvements: Alternative 3C



Figure 5.26 Lane Geometry: Alternative 3C

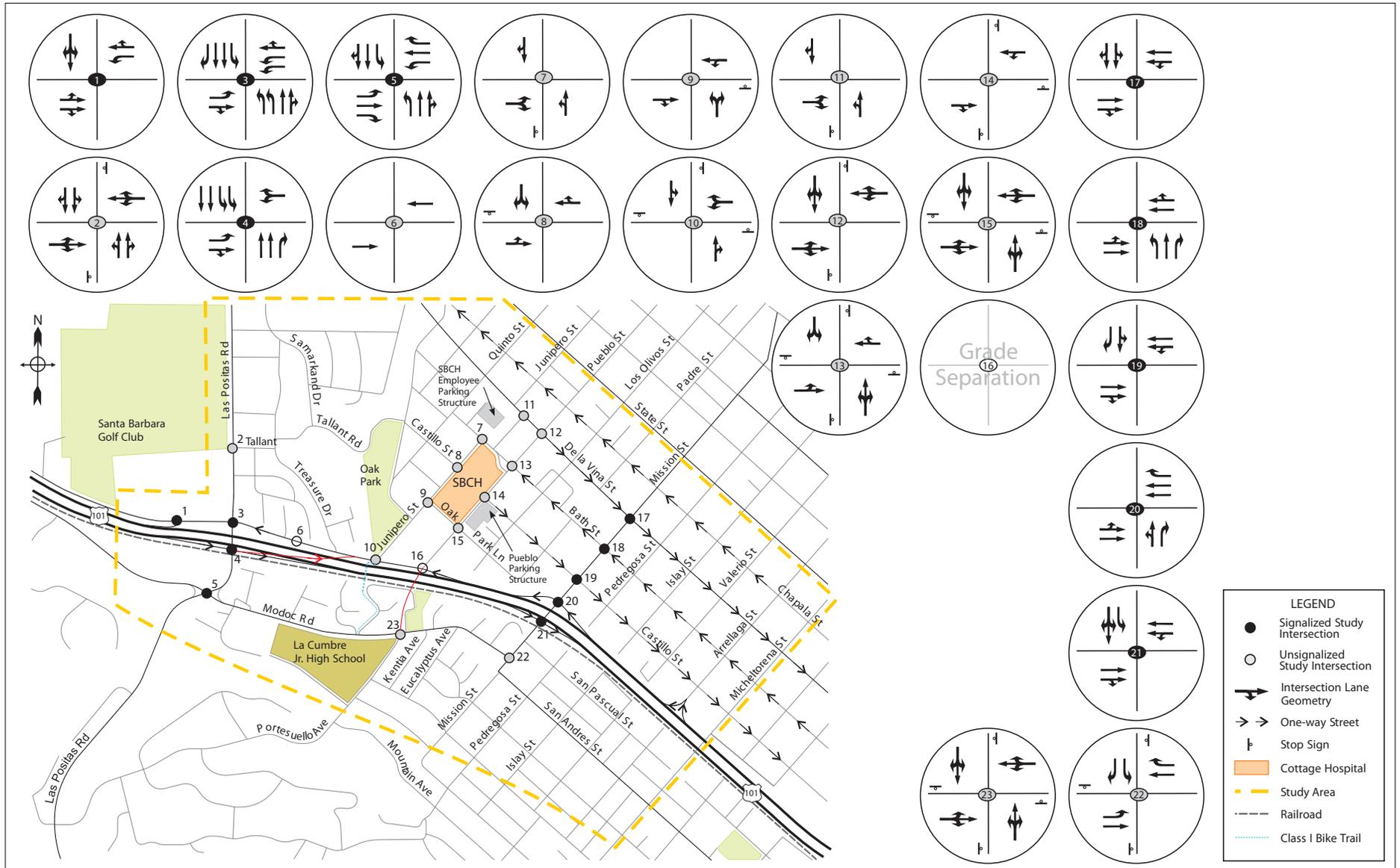


Figure 5.27 Forecast Year 2030 Volumes: Alternative 3C - AM Peak

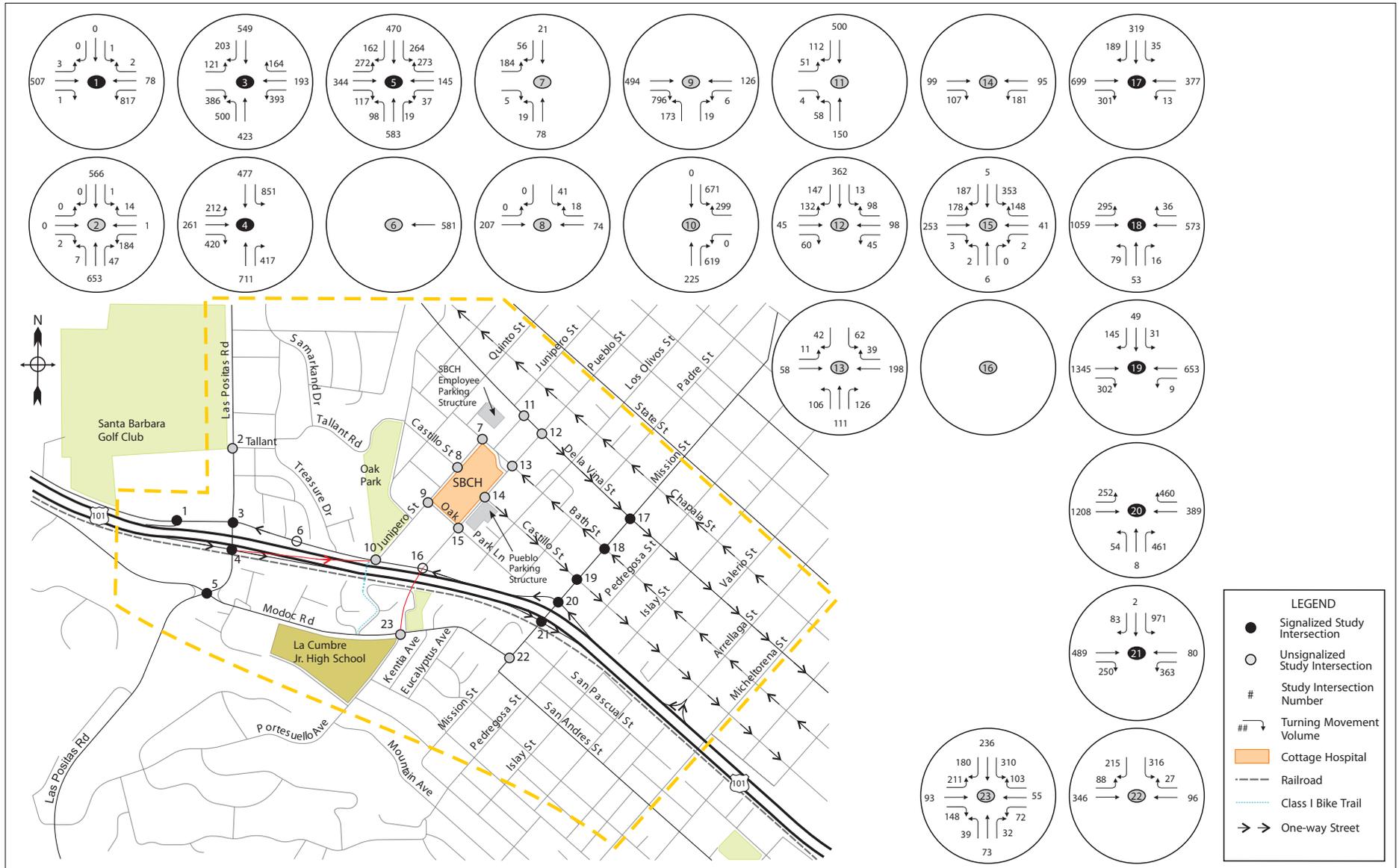
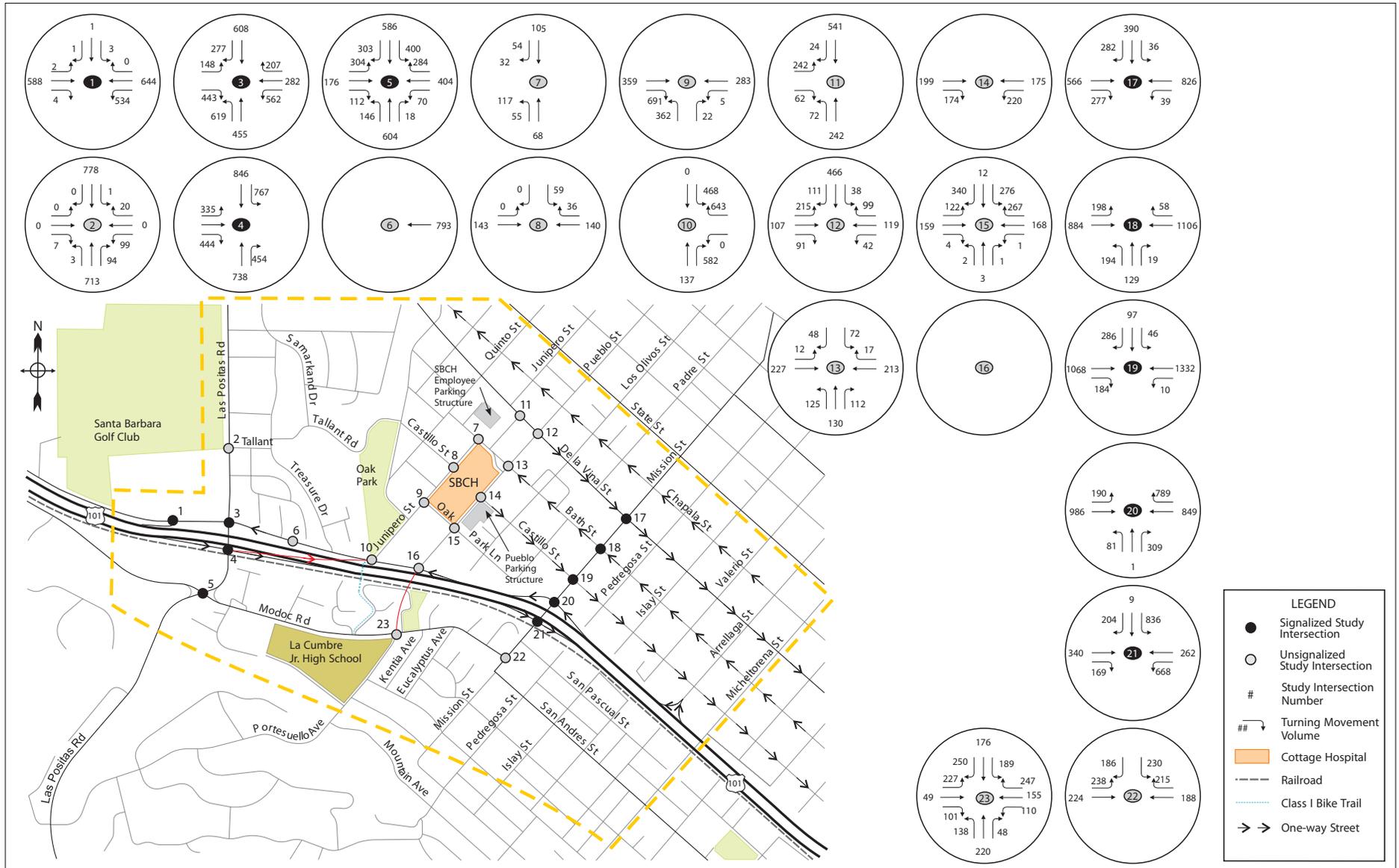


Figure 5.28 Forecast Year 2030 Volumes: Alternative 3C - PM Peak



Level of Service (LOS) Analysis

The level of service results for this alternative at the 23 study intersections are summarized in Tables 5-13 and 5-14.

Table 5-13: Alternative 3C Year 2030 Level of Service Analysis Results – AM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.77	C		21.6	C	
2	Las Positas Rd & Tallant Rd	EW Stop				87.8	F	X
3	Las Positas Rd & Calle Real	Signalized	0.79	C	X	37.6	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	1.05	F	X	67.1	E	X
5	Las Positas Rd & Modoc Rd	Signalized	0.79	C	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				10.6	B	
8	Castillo St & Junipero St	NS Stop				10.4	B	
9	Oak Park Ln & Junipero St	NS Stop				47.5	E	X
10	Calle Real & Junipero St	All-way Stop				106.0	F	X
11	De la Vina St & Nogales Av	EW Stop				17.6	C	
12	De la Vina St & Pueblo St	EW Stop				24.2	C	
13	Bath St & Pueblo St	All-way Stop				10.4	B	
14	Castillo St & Pueblo St	All-way Stop				8.7	A	
15	Oak Park Ln & Pueblo St	NS Stop				223.7	F	X
16	Calle Real & Pueblo St	SW Stop				0.0	N/A	
17	De la Vina St & Mission St	Signalized	0.55	A				
18	Bath St & Mission St	Signalized	0.53	A				
19	Castillo St & Mission St	Signalized	0.67	B				
20	NB 101 ramps & Mission St	Signalized	0.80	C	X	28.8	C	
21	SB 101 ramps & Mission St	Signalized	0.85	D	X	23.6	C	
22	Modoc Rd & Mission St	All-way Stop				14.6	B	
23	Modoc Rd & Portesuello Av	All-way Stop				89.5	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C").
The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.

Table 5-14: Alternative 3C Year 2030 Level of Service Analysis Results – PM Peak

	Intersection	Control	ICU			HCM		
			V/C	LOS	Def	Delay (sec)	LOS	Def
1	NB 101 on-ramp & Calle Real	Signalized	0.69	B		19.5	B	
2	Las Positas Rd & Tallant Rd	EW Stop				62.0	F	X
3	Las Positas Rd & Calle Real	Signalized	0.94	E	X	53.6	D	X
4	Las Positas Rd & SB 101 ramps	Signalized	1.01	F	X	53.9	D	X
5	Las Positas Rd & Modoc Rd	Signalized	0.99	E	X			
6	NB 101 off-ramp & Calle Real	Uncontrolled				0.0	N/A	
7	Bath St & Junipero St	EW Stop				10.1	B	
8	Castillo St & Junipero St	NS Stop				10.7	B	
9	Oak Park Ln & Junipero St	NS Stop				229.4	F	X
10	Calle Real & Junipero St	All-way Stop				100.9	F	X
11	De la Vina St & Nogales Av	EW Stop				84.8	F	X
12	De la Vina St & Pueblo St	EW Stop				189.4	F	X
13	Bath St & Pueblo St	All-way Stop				12.3	B	
14	Castillo St & Pueblo St	All-way Stop				10.5	B	
15	Oak Park Ln & Pueblo St	NS Stop				203.3	F	X
16	Calle Real & Pueblo St	SW Stop				0.0	N/A	
17	De la Vina St & Mission St	Signalized	0.57	A				
18	Bath St & Mission St	Signalized	0.67	B				
19	Castillo St & Mission St	Signalized	0.66	B				
20	NB 101 ramps & Mission St	Signalized	0.87	D	X	16.3	B	
21	SB 101 ramps & Mission St	Signalized	0.96	E	X	66.8	E	X
22	Modoc Rd & Mission St	All-way Stop				13.1	B	
23	Modoc Rd & Portesuello Av	All-way Stop				156.8	F	X

Notes:

Def - A mark in this column indicates that the intersection does not meet the City standard for acceptable operations (LOS "C"). The HCM analysis of intersections (#1, 3, 4, 16, 20, and 21) assumes a peak hour factor of 0.92 per Caltrans standards.