

Appendix G – Traffic Evaluation

MEMORANDUM

To: Michael Strahs
Kimco Westlake, L.P.

From: Mike Mowery, P.E.
Kimley-Horn and Associates, Inc.

Date: May 3, 2022

Subject: Westlake South Development - Traffic Evaluation

Kimley-Horn and Associates, Inc. (Kimley-Horn) was retained by Kimco Westlake, L.P. to conduct a traffic evaluation for the redevelopment of the existing Burlington store located in Daly City, California. The traffic evaluation consists of trip generation analysis, vehicle miles traveled (VMT) screening, intersection level of service (LOS) analysis, and evaluation of site access and circulation. This memorandum documents the methodology, assumptions, and results of the traffic evaluation.

BACKGROUND

The proposed project is located at the intersection of Lake Merced Boulevard with Southgate Avenue in the City of Daly City. The development entails the redevelopment of the existing 55,000 square foot Burlington store located at 99 Southgate Avenue to a new mixed-use project featuring approximately 214 market-rate apartment units over parking and approximately 10,800 square feet of commercial use. It should be noted the tenants for the commercial space have not been finalized, but it is anticipated that this area will resemble the same mix of commercial spaces represented in other areas of the Westlake Shopping Center. **Attachment A** shows the site plan.

TRIP GENERATION

The number of project trips for the proposed project was estimated using the industry standard Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition*. This reference estimates project trips based on survey data by land use category. For the existing development, the average rates for ITE Land Use 820, Shopping Center were used. For the proposed development, the average rates for ITE Land Use 820, Shopping Center and ITE Land Use 221, Multifamily Housing (Mid-Rise) were used.

Trip reductions were taken into account for internal capture (interaction between multiple land uses) and pass-by trip reductions (trips that were already on the road and would likely stop at commercial uses as they pass by the site). Internal capture for Land Use Code 820 (Shopping Center) from ITE *Trip Generation Handbook, 3rd Edition* was used, which indicates an average AM peak hour internal capture of 2 percent and an average PM peak hour internal capture rate of 36 percent. It should be noted that *Trip Generation Handbook* does not provide daily internal capture, therefore an average of the AM and PM peak hour percentages was used. For the weekend peak hour, no internal capture was conservatively assumed. Pass-by reduction for Land Use Code 820 (Shopping Center) was also

determined from ITE *Trip Generation Handbook*, 3rd Edition which indicates a daily pass-by rate of 34% and an average PM peak hour pass-by rate of 34 percent. For the weekend peak hour, no pass-by was conservatively assumed. **Table 1** presents the trip generation for the existing and proposed project.

As shown in **Table 1**, the existing development generates approximately 2,076 weekday trips, 52 trips in the AM peak hour, 210 trips in the PM peak hour, and 248 in the weekend peak hour. The total proposed project will generate approximately 1,185 weekday trips, 85 trips in the AM peak hour, 87 trips in the PM peak hour, and 143 weekend peak hour trips. The net new project trips were determined by removing the existing generated trips and adding the proposed generated trips. ***The net project trips on the road network as a result of this redevelopment is a decrease of 891 weekday trips, an increase of 33 AM peak hour trips, a decrease of 129 PM peak hour trips, and a decrease in 105 weekend peak hour trips.*** These results are below the County of San Mateo's threshold of 500 trips per day or over 100 trips during the peak hour to warrant a traffic impact analysis.

VEHICLE MILES TRAVELED

As of July 1, 2020, the state of California has fully adopted a change in the California Environmental Quality Act (CEQA) significant impact methodology for transportation impacts to use vehicle miles traveled (VMT) as opposed to level of service (LOS) via State Bill 743 (SB 743).

The City of Daly City has developed guidelines based on the state OPR and CEQA requirements; however, the City has not yet adopted specific VMT thresholds or screening criteria through a public review and approval process. Therefore, adopted recommended guidelines developed by the Governor's Office of Planning and Research (OPR) in the Technical Advisory on Evaluating Transportation Impacts in CEQA¹ (Technical Advisory) were used to determine VMT-related project impacts. The Technical Advisory provides screening thresholds that could be used to quickly identify when a project should be expected to cause a less-than-significant impact without conducting a detailed VMT study. These screening thresholds are based on project size, VMT characteristics of project location, land use type, and accessibility to transit.

For mixed-used developments, the OPR Technical Advisory recommends that each component of the project can be evaluated independently or consider the dominant use. This evaluation focused on the residential land-use since it is the dominant use and a less-than significant impact can be assumed for the retail use since it is proposed as small local-serving retail at less than 50,000 square feet. The VMT analysis found that a presumption of less-than significant impact can be made due to the fact that the projects satisfies VMT screening criteria of Proximity to High Quality Transit and Small Project.

¹ *Technical Advisory on Evaluating Transportation Impacts in CEQA*, Governor's Office of Planning and Research, State of California, December 2018.

Table 1: Trip Generation for Existing and Proposed Project

ITE Land Use Code		Land Use		Units	Weekday Daily	Weekday AM			Weekday PM			Weekend Peak		
						Rate	In%	Out%	Rate	In%	Out%	Rate	In%	Out%
221		Multifamily Housing (Mid-Rise)		Dwelling Unit(s)	5.44	0.36	26%	74%	0.44	61%	39%	0.44	49%	51%
820		Shopping Center		1,000 Sq Ft GLA	37.75	0.94	62%	38%	3.81	48%	52%	4.50	52%	48%
	ITE Land Use Code	Land Use	Size	Units	Weekday Daily	Weekday AM			Weekday PM			Weekend Peak		
						Total	In	Out	Total	In	Out	Total	In	Out
Existing	820	Shopping Center	55.000	1,000 Sq Ft GLA	2,076	52	32	20	210	101	109	248	129	119
Proposed	221	Multifamily Housing (Mid-Rise)	214	Dwelling Unit(s)	1,164	77	20	57	94	57	37	94	46	48
	820	Shopping Center	10.800	1,000 Sq Ft GLA	408	10	6	4	41	20	21	49	25	24
Subtotal					1,572	87	26	61	135	77	58	143	71	72
Internal Capture (Weekday Daily:19%, AM:2%, PM:36%, Weekend Peak: N/A) ¹					-296	-2	-1	-1	-48	-24	-24	-	-	-
Retail Pass-by Reduction (Weekday Daily:34%, PM:34%, Weekend Peak: N/A) ²					-91	-	-	-	-6	-5	-1	-	-	-
Proposed External Trips					1,185	85	25	60	81	48	33	143	71	72
Net New Project Trips					-891	33	-7	40	-129	-53	-76	-105	-58	-47

Source: ITE Trip Generation, 10th Edition; ITE Trip Generation Handbook, 3rd Edition

¹ Internal Capture calculated using ITE Trip Generation Handbook, 3rd Edition methodology. ITE methodology does not include calculation for daily trips, therefore the average percentage of the AM and PM peak hours were assumed for daily internal capture.

² Pass-by rates calculated using ITE Trip Generation Handbook, 3rd Edition methodology. ITE methodology does not include calculation for daily trips, therefore the PM peak hour was assumed for daily pass-by rate.

Proximity to High-Quality Transit

Based on OPR guidelines, presumption of less than significant impact could be concluded if the project is within 0.5 mile of an major transit stops or high-quality transit corridors are considered transit priority areas and projects located in this area may be exempt. OPR defines a major transit stop as an “existing rail transit station, ferry terminal served by either bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service internal of 15 minutes or less during the morning and afternoon peak commute periods.” A high-quality transit corridor is defined as “corridor with a fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.”

The project is approximately 200 feet from the Lake Merced Boulevard and Southgate Avenue bus stop, which serves SamTrans Routes 120 and 122. The frequency of service for this bus stop is 15 minutes or less during the peak periods. In addition, the project is located approximately 0.3 miles from John Daly Boulevard, which also meets the high-quality transit corridor criteria based on the fixed bus route service of Routes 120 and 122 with service intervals no longer than 15 minutes during peak commute hours.

In addition, the OPR Technical Advisory recommends that the following additional criteria be considered when presuming a less-than-significant impact near transit stations when the following additional criteria are met:

- The site must have a Floor Area Ratio (FAR) of more than 0.75.
 - o The proposed project has a FAR of 0.76, which is more than 0.75. Therefore, this requirement is met.
- The site may not include more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking).
 - o The proposed project is providing 341 parking spaces, which is less than the 390 spaces required. Therefore, this requirement is met.
- The site must be consistent with the applicable Sustainable Communities Strategy.
 - o The proposed project does not conflict with the Sustainable Communities Strategy. Therefore, this requirement is met.
- The site must not replace affordable residential units with a smaller number of moderate- or high-income residential units.
 - o The proposed project does not replace affordable residential units. Therefore, this requirement is met.

Based on the discussion above, the residential portion of the project satisfies the proximity to high-quality transit criteria.

Small Project

The shift from existing retail to residential use would result in the project generating less than 110 net new trips per day on the transportation network, which is a screening threshold for determining a less-than significant transportation impact. Therefore, both the proposed residential and retail land-uses can be screened out as having a less-than significant VMT impact.

Conclusion

The project meets all requirements to presume a less-than-significant impact due to the project's proximity to high-quality transit and the new trips threshold for small project. Therefore, ***both the proposed residential and retail land-uses can be screened out as having a less-than significant VMT impact.***

TRIP DISTRIBUTION AND ASSIGNMENT

Existing and proposed project trip distributions were developed based on existing traffic count information and general orientation of population centers to the site. Project trips were assigned to the network based on the assumed trip distribution as shown in **Attachment B**.

INTERSECTION LEVEL OF SERVICE

Intersection level of service analysis for the weekday AM (7:00 AM – 9:00 AM), weekday PM (4:00 PM – 6:00 PM), and weekend (11:00 AM – 1:00 PM) peak hour traffic was conducted for the following 11 intersections:

1. Lake Merced Boulevard/John Daly Boulevard
2. Park Plaza Drive/John Daly Boulevard
3. I-280 SB On-Ramp/SR-1 Off-Ramp/John Daly Boulevard
4. Junipero Serra Boulevard/John Daly Boulevard
5. Lake Merced Boulevard/Southgate Avenue
6. Palmcrest Drive/Westlake Center/Southgate Avenue
7. Park Plaza Drive/Southgate Avenue
8. Westlake Center/John Daly Boulevard
9. Lake Merced Boulevard/Belmar Avenue
10. Park Plaza Drive/Belmar Avenue
11. Sheffield Drive/Poncetta Dr/John Daly Boulevard

Traffic conditions were evaluated for the following traffic conditions:

- Existing Conditions – Based on traffic counts from the Westlake Shopping Center Traffic Impact Study² (Westlake Shopping Center TIS). A 1% annual growth factor was applied to adjust volumes to year 2021. Existing roadway geometry and traffic controls were used for this scenario.
- Existing Plus Project Conditions – Based on existing traffic volumes with traffic generated by the proposed project added and traffic generated by the existing development removed. Existing plus project roadway geometry and traffic controls were assumed for this scenario.
- Cumulative Conditions – Based on year 2035 traffic volumes from the Westlake Shopping Center TIS and the Cumulative plus project traffic volumes from the Duggans Carvana Traffic

² Westlake Shopping Center TIS, Fehr and Peers, October 2017.

- Impact Analysis³ (Duggans Carvana TIA). There are no Cumulative roadway improvements; therefore, existing roadway geometry and traffic controls were assumed.
- Cumulative Plus Project Conditions - Based on Cumulative traffic volumes with traffic generated by the proposed project added and traffic generated by the existing development removed. There are no Cumulative roadway improvements; therefore, existing plus project roadway geometry and traffic controls were assumed.

For plus project conditions, the Project would install a new traffic signal at the intersection of Lake Merced Boulevard and Southgate Avenue (Intersection #5).

Signalized intersection and unsignalized intersection LOS analysis was evaluated following the Highway Capacity Manual (HCM) 2000 methodology within the Synchro software, which follows standards and methodologies set forth by the San Mateo County Congestion Management Plan.

The LOS standard for a signalized intersection in the Circulation Element of the City of Daly City General Plan is LOS D.

Project deficiencies at signalized intersections would occur when the addition of the project traffic would result in the following conditions according to the City of Daly City General Plan:

A project deficiency would be identified if the addition of project traffic at a study intersection would result in the intersection Level of Service worsening from LOS D or better to LOS E or F, or if total intersection delay would worsen at an intersection already operating at LOS E or F.

As discussed previously, SB 743 changed the CEQA significant impact methodology for transportation to use VMT as opposed to LOS. Project-LOS deficiencies would not result in a CEQA impact.

EXISTING CONDITIONS

Weekday intersection turning movement volumes were based on the Westlake Shopping Center TIS which were collected in February 2017 with an added annual growth factor of 1%. Existing AM and PM peak hour turning movements volumes are shown in **Attachment C**. Existing weekend peak hour turning movements volumes are shown in **Attachment D**.

Results of the LOS analysis under the Existing Conditions are presented in **Table 2**. All study intersections function within acceptable LOS standards under Existing Conditions except for intersection #4 – Junipero Serra Boulevard/John Daly Boulevard in the AM, PM, and weekend peak hours. LOS analysis sheets are provided in **Attachment K**.

³ *Duggans Carvana TIA*, Kittelson and Associates, July 2019.

EXISTING PLUS PROJECT CONDITIONS

Traffic operations were evaluated at the study intersections under Existing Conditions plus Project conditions, and AM and PM peak hour volumes are shown in **Attachment E** and weekend peak hour volumes are shown in **Attachment F**. Results of the analysis are presented in **Table 2**. All study intersections function within acceptable LOS standards under Existing Plus Project Conditions except for Intersection #4 – Junipero Serra Boulevard/John Daly Boulevard in the AM, PM, and weekend peak hours.

The Project increases the average delay at Intersection #4 by 1.3 seconds during the AM peak hour and decreases delay during the PM and weekend peak hours. The City's General Plan recognizes this intersection operates unacceptably under 2008 Existing (LOS E) and 2035 Cumulative (LOS F) conditions and the City Council adopted a statement of overriding consideration noting the recommended improvement to address the deficiency would be infeasible. Therefore, the project would not result in a project deficiency at Intersection #4. LOS analysis sheets are provided in **Attachment K**.

CUMULATIVE CONDITIONS

Weekday intersection turning movement volumes were based on the Cumulative plus project volumes from the Duggans Carvana TIA and the Cumulative volumes from the Westlake Shopping Center TIS which were projected for year 2035. Cumulative AM and PM peak hour turning movement volumes are shown in **Attachment G**. Cumulative weekend peak hour turning movement volumes are shown in **Attachment H**.

Results of the LOS analysis under the Cumulative Conditions are presented in **Table 3**. All study intersections are expected to function within acceptable LOS standards except for Intersection #4 – Junipero Serra Boulevard/John Daly Boulevard in the AM, PM, and weekend peak hours and Intersection #11 – Sheffield Drive/Poncetta Drive/John Daly Boulevard in the PM peak hour.

LOS analysis sheets are provided in **Attachment K**.

CUMULATIVE PLUS PROJECT CONDITIONS

Traffic operations were evaluated at the study intersections under Cumulative conditions plus traffic generated by the project. Volumes are shown in **Attachment I** for AM and PM peak hour volumes and **Attachment J** for weekend peak hour volumes. Results of the analysis are presented in **Table 3**. All study intersections are expected to function within acceptable LOS standards under Cumulative Plus Project Conditions except for the following:

- Intersection #4 – Junipero Serra Boulevard/John Daly Boulevard in the AM, PM, and weekend peak hours.
- Intersection #11 – Sheffield Drive/Poncetta Drive/John Daly Boulevard in the PM peak hour.

The Project increases the average delay at Intersection #4 by 5.0 seconds during the AM peak hour, decreases delay by 5.9 seconds during the PM peak hour, and increases delay by 0.3 seconds during the weekend peak hour. The City's General Plan recognizes this intersection operates unacceptably under 2008 Existing (LOS E) and 2035 Cumulative (LOS F) conditions and the City Council adopted a statement of overriding consideration noting the recommended improvement to address the deficiency would be infeasible. Therefore, the project would not result in a project deficiency at Intersection #4. The Project decreases the average delay at Intersection #11 by 1.5 seconds during the PM peak hour; therefore, the project would not result in a project deficiency at Intersection #11.

LOS analysis sheets are provided in **Attachment K**.

Table 2: Existing and Existing Plus Project Intersection Level of Service Summary

#	Intersection	Control ¹	Existing									Existing + Project														
			AM Peak Hour			PM Peak Hour			Weekend Peak Hour			AM Peak Hour					PM Peak Hour					Weekend Peak Hour				
			LOS	Delay ² (sec)	v/c	LOS	Delay ² (sec)	v/c	LOS	Delay ² (sec)	v/c	LOS	Delay ² (sec)	Delay ² Var (sec)	v/c	v/c Var	LOS	Delay ² (sec)	Delay ² Var (sec)	v/c	v/c Var	LOS	Delay ² (sec)	Delay ² Var (sec)	v/c	v/c Var
1	Lake Merced Blvd/John Daly Blvd	Signal	C	27.8	0.60	C	31.1	0.59	C	33.7	0.55	C	28.1	0.3	0.60	0.00	C	31.4	0.3	0.58	-0.01	C	34.1	0.4	0.54	-0.01
2	Park Plaza Dr/John Daly Blvd	Signal	C	30.8	0.70	C	30.8	0.74	C	29.1	0.70	C	31.2	0.4	0.70	0.00	C	30.2	-0.6	0.73	-0.01	C	29.1	0.0	0.69	-0.01
3	I-280 SB On-Ramp/SR-1 Off-Ramp/ John Daly Blvd	Signal	B	13.8	0.51	B	12.7	0.59	B	11.9	0.53	B	13.8	0.0	0.52	0.01	B	12.8	0.1	0.58	-0.01	B	12.0	0.1	0.52	-0.01
4	Junipero Serra Blvd/John Daly Blvd	Signal	F	81.2	1.06	E	77.9	0.99	E	76.9	1.00	F	82.5	1.3	1.06	0.00	E	77.5	-0.4	0.98	-0.01	E	74.5	-2.4	0.99	-0.01
5	Lake Merced Blvd/Southgate Ave	AWSC/Signal ³	B	14.5	-	C	19.0	-	C	24.5	-	D	37.5	23.0	-	-	D	39.0	20.0	-	-	D	39.8	15.3	-	-
6	Palmcrest Dr/Westlake Ctr/Southgate Ave	AWSC	B	10.5	-	C	15.8	-	C	21.5	-	A	9.4	-1.1	-	-	B	13.3	-2.5	-	-	C	16.6	-4.9	-	-
7	Park Plaza/Southgate Ave	Signal	B	15.9	0.44	B	14.0	0.48	B	15.6	0.49	B	16.1	0.2	0.45	0.01	B	12.9	-1.1	0.44	-0.04	B	15.3	-0.3	0.45	-0.04
8	Westlake Center/John Daly Blvd	Signal	B	14.3	0.50	C	28.5	0.59	C	27.0	0.57	B	14.1	-0.2	0.50	0.00	C	28.4	-0.1	0.58	-0.01	C	26.1	-0.9	0.56	-0.01
9	Lake Merced Blvd/Belmar Ave	SSSC	B	14.3	0.22	C	15.3	0.14	C	24.8	0.28	B	14.6	0.2	0.37	0.15	C	15.4	0.1	0.14	0.00	D	25.8	1.0	0.29	0.01
10	Park Plaza Dr/Belmar Ave	SSSC	B	12.5	0.13	B	14.8	0.05	C	15.5	0.09	B	12.7	0.2	0.13	0.00	B	14.3	-0.5	0.04	-0.01	B	14.9	-0.6	0.17	0.08
11	Sheffield Dr/Poncetta Dr/John Daly Blvd	Signal	D	38.3	0.77	D	42.3	0.70	C	31.0	0.78	C	34.7	-3.6	0.78	0.01	D	42.0	-0.3	0.70	0.00	C	29.8	-1.2	0.77	-0.01

Note: Intersections that are operating below LOS D are shown in **BOLD**.
1 AWSC = All Way Street Stop Control, SSSC = Side Street Stop Control
2 The average control delay is reported for signalized and AWSC intersection. The delay for the worst movement is reported for SSSC intersections.
3 Intersection #5 is currently AWSC and will be signalized with the project.

Table 3: Cumulative and Cumulative Plus Project Intersection Level of Service Summary

#	Intersection	Control ¹	Cumulative									Cumulative Plus Project														
			AM Peak Hour			PM Peak Hour			Weekend Peak Hour			AM Peak Hour					PM Peak Hour					Weekend Peak Hour				
			LOS	Delay ² (sec)	v/c	LOS	Delay ² (sec)	v/c	LOS	Delay ² (sec)	v/c	LOS	Delay ² (sec)	Delay ² Var (sec)	v/c	v/c Var	LOS	Delay ² (sec)	Delay ² Var (sec)	v/c	v/c Var	LOS	Delay ² (sec)	Delay ² Var (sec)	v/c	v/c Var
1	Lake Merced Blvd/John Daly Blvd	Signal	C	30.2	0.65	C	33.3	0.64	D	35.1	0.62	C	30.4	0.2	0.65	0.00	C	33.4	0.2	0.64	0.00	D	35.4	0.3	0.64	0.02
2	Park Plaza Dr/John Daly Blvd	Signal	C	38.6	0.74	C	31.1	0.71	C	30.5	0.75	C	38.5	-0.1	0.74	0.00	C	30.7	-0.7	0.72	0.01	C	31.4	0.9	0.74	-0.01
3	I-280 SB On-Ramp/SR-1 Off-Ramp/ John Daly Blvd	Signal	B	13.7	0.57	B	13.5	0.62	B	15.4	0.60	B	13.7	0.0	0.55	-0.02	B	13.6	0.1	0.58	-0.04	B	15.5	0.1	0.60	0.00
4	Junipero Serra Blvd/John Daly Blvd	Signal	F	99.0	1.18	F	117.1	1.20	F	132.6	1.31	F	104.0	5.0	1.19	0.01	F	111.2	-5.9	1.09	-0.11	F	132.9	0.3	1.31	0.00
5	Lake Merced Blvd/Southgate Ave	AWSC/Signal ³	C	15.3	-	C	21.0	-	D	30.7	-	D	40.5	25.2	-	-	D	41.9	20.9	-	-	D	43.7	13.0	-	-
6	Palmcrest Dr/Westlake Ctr/Southgate Ave	AWSC	B	10.8	-	C	16.1	-	C	22.5	-	B	10.7	-0.1	-	-	B	13.6	-2.5	-	-	C	17.1	-5.4	-	-
7	Park Plaza/Southgate Ave	Signal	B	15.3	0.45	B	15.2	0.51	B	16.2	0.52	B	15.5	0.2	0.46	0.01	C	13.7	-1.5	0.47	-0.04	B	14.5	-1.7	0.47	-0.05
8	Westlake Center/John Daly Blvd	Signal	B	15.2	0.51	D	37.9	0.51	C	27.3	0.61	B	15.0	-0.2	0.51	0.00	D	36.4	-1.5	0.51	0.00	C	26.9	-0.4	0.60	-0.01
9	Lake Merced Blvd/Belmar Ave	SSSC	E	36.2	0.24	C	16.2	0.30	D	30.1	0.35	C	15.1	-21.1	0.25	0.01	C	17.7	1.5	0.31	0.01	D	31.7	1.6	0.37	0.02
10	Park Plaza Dr/Belmar Ave	SSSC	B	12.8	0.13	C	15.0	0.05	C	17.1	0.07	B	12.9	0.1	0.13	0.00	B	14.6	-0.4	0.04	-0.01	C	16.4	-0.7	0.07	0.00
11	Sheffield Dr/Poncetta Dr/John Daly Blvd	Signal	D	45.5	0.81	E	58.2	0.74	D	39.5	0.84	D	46.6	1.1	0.88	0.07	E	56.7	-1.5	0.73	-0.01	D	36.4	-3.1	0.82	-0.02

Note: Intersections that are operating below LOS D are shown in **BOLD**.
1 AWSC = All Way Street Stop Control, SSSC = Side Street Stop Control
2 The average control delay is reported for signalized and AWSC intersection. The delay for the worst movement is reported for SSSC intersections.
3 Intersection #5 is currently AWSC and will be signalized with the project.

ON-SITE CIRCULATION AND QUEUING

On-site vehicular circulation, queuing, and parking for the site were qualitatively reviewed for overall safety access and parking considerations.

ON-SITE CIRCULATION

As shown on the site plan, **Attachment A**, the project site will have one driveway on Lake Merced Boulevard into the parking structure. All vehicles will access the parking garage through that driveway. There is also limited on-street parking along the building on the north and east sides of the site.

The existing stop sign at the southeast corner of the new building, along the alleyway south of the building intersecting with Palmcrest Drive is proposed to be further shifted east to improve sight distance exiting the alleyway. A sight distance analysis was conducted to determine if vehicles would have adequate sight distance to observe traffic along Palmcrest Drive adjacent to the project site. Intersection sight distance was evaluated with the following methodology from the *Caltrans Highway Design Manual Chapter 400*. Sight distance was determined based the proposed project site plan and the following Intersection Design Standard:

$$\text{Intersection Sight Distance} = 1.47 \times V_m \times T_g$$

Where V_m is the design speed of the major road and T_g is the time gap for the vehicle to exit the project driveway and enter the major road. No spot speed study was conducted; posted speed limits and design speeds were used to determine sight distance.

The time gap for a vehicle to make a left-turn and right-turn onto Palmcrest is 7.5 seconds and 6.5 seconds, respectively. With a 10 mph posted speed limit along Palmcrest Drive, the sight distance criteria for passenger vehicles making a left-turn is 115 feet and making a right-turn is 100 feet. Based on the criteria summarized above and the relocated stop bar and stop sign, it is confirmed that the project design has no significant structures or other sight distance encumbrances, such as on-street parking, within the specified sight triangle, as illustrated in **Attachment O**.

PEDESTRIAN ACCESS AND CIRCULATION

There are proposed sidewalks along the north, east, and west sides of the building. Crosswalks are present at the northbound, southbound, eastbound, and westbound directions at the intersection of Lake Merced Boulevard/Southgate Avenue and connect to the northwest corner of the site. There are crosswalks that run northbound and southbound at the intersection of Palmcrest Drive/Southgate Avenue. This connects the Westlake Shopping Center parking lot to the northeast corner of the site. All project sidewalks, crosswalks, and other pedestrian facilities will meet ADA compliance requirements. Based on the provided site plan, pedestrian access and circulation will not be degraded as a result of the proposed Project.

Within the project site, residents and visitors may access the apartments through the residential office lobby entrance located adjacent to the intersection of Lake Merced Boulevard and Southgate Avenue or the stair lobby located along Palmcrest Drive near Coronado Drive. Entrances for the commercial uses are located along Southgate Avenue.

BICYCLE ACCESS AND CIRCULATION

Class III bicycle routes are present along Southgate Avenue in both the eastbound and westbound directions allowing for direct bicycle access to the Project site. In addition, a bicycle storage facility for the residents' use is planned adjacent to the lobby of the residential area and public bike racks will be installed adjacent to the roadway frontage.

ON-SITE QUEUING

The entrance to the parking garage will be located along Lake Merced Boulevard, approximately 100 feet south of Southgate Avenue. It is proposed that the garage entrance will be gated, therefore, the queue length for the southbound approach was also evaluated to determine if potential queuing due to vehicles making a southbound left from Lake Merced Boulevard into the parking garage could potentially block traffic along Southgate Avenue. A micro-simulation model within an Excel spreadsheet was used to determine the length of the garage entrance gate queue with a service time of approximately 10 to 12 seconds. Based on the highest southbound left demand of 59 vehicles per hour in the Cumulative Plus Project PM peak hour scenario, a queuing analysis was run with 1,000 iterations for the peak hour. Of the 1,000 iterations completed for the garage entrance gate, 95% of the iterations have a maximum queue of 4 vehicles or less. Assuming a vehicle length of 20 feet, the 95th percentile queue is 80 feet or less, therefore the project is not expected to cause any backups at the adjacent intersection. Queuing analysis sheet is provided in **Attachment L**.

PARKING ANALYSIS

The proposed project and the rest of the Westlake Shopping Center are part of Planned Development Zoning District PD-60A, which provides development standards related to parking. The parking analysis consisted of reviewing parking requirements, as well as conducting a shared parking analysis of the proposed project and the Westlake Shopping Center as a whole.

PARKING SCENARIO

The parking analysis consisted of two potential scenarios: 1) Interim and 2) Build-Out. The interim condition assumes existing conditions plus the construction of the proposed Project. Build-Out conditions assumes the construction of the proposed Project and changes associated with the 10 Park Plaza Drive mixed-used development (approved by the City Council in September 2018).

PROPOSED PARKING

The Project is proposing to provide a total of 341 spaces, which consist of spaces within and external to the proposed garage, as shown in **Table 4**. There will be 22 external parking spaces along the building which will consist of 21 angled and 1 parallel spaces. The parking garage would be gated for residential parking and would provide a total of 319 spaces, which consist of 278 regular spaces and 41 tandem spaces.

Table 4: Project Proposed Parking

Location	Parking Type	Parking Spaces
External	Angled	21
	Parallel	1
	Total	22
Parking Garage	Regular	278
	Tandem	41
	Total	319
TOTAL		341

Table 5 and **Attachment M** provide the updated parking inventory for the overall PD-60A development zone for Interim and Build-Out conditions. As shown in **Table 5**, in the Interim condition the PDA-60A will provide a total of 2,375 spaces, in which 2,056 spaces are for commercial uses and 319 for residential uses. In the Build-Out condition, the PD-60A will provide a total of 2,563 spaces, in which 1,984 spaces are for the commercial uses and 579 spaces are for residential uses.

Table 5: Updated Proposed PD-60A Parking Inventory

Type	Area	Interim Condition	Build Out Condition
Commercial	Southgate On-Street Parking	63	63
	Southwest Parking Lots	326	326
	Southeast Parking Lots	399	399
	Building W Garage	614	614
	Northeast Parking Lot	353	282
	Northwest Parking Lot	170	170
	Park Plaza On-Street Parking	11	6
	Building K Garage	120	120
	New Street On-Street Parking	-	4
	Commercial Parking Total	2,056	1,984
Residential	Building R Garage	-	260
	Building C Garage	319	319
	Residential Parking Total	319	579
GRAND TOTAL		2,375	2,563

SHARED PARKING ANALYSIS

There is potential for shared parking between the proposed mixed-use project and the remainder of the Westlake Shopping Center. For example, residents of the proposed project will most likely leave their vehicles parked within the residential garage and walk to the retail or restaurant uses within the Westlake Shopping Center rather than drive and park within the retail parking lots. Also, there is no restriction for the commercial parking, so retail customers may choose to park and walk to any uses within the PD-60A area.

The shared parking analysis utilized the Urban Land Institute (ULI) *Shared Parking Calculation Model*, which calculates shared parking demand based on the information and methodology in ULI's reference publication *Shared Parking, 3rd Edition*. This reference estimates shared parking results based on land uses, as well as collected data on parking fluctuation based on month and time of day for each land use. As a conservative approach, the analysis evaluated the land uses for the interim condition since the interim condition would provide a smaller surplus of required parking.

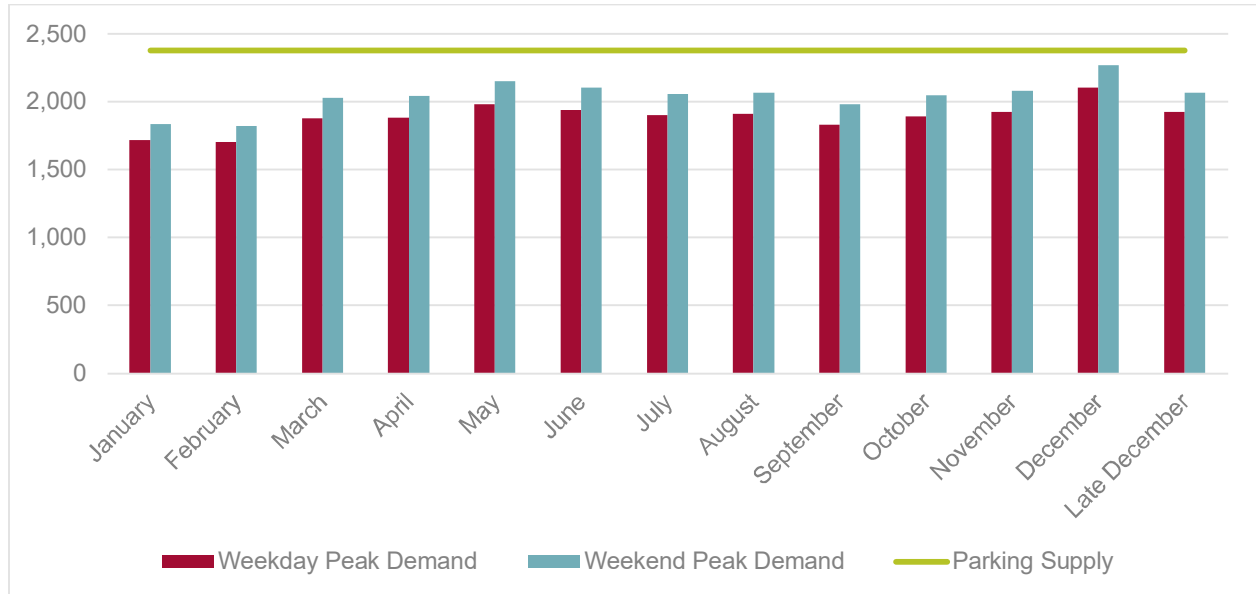
Overall, the site results in a 24-27% shared parking reduction for the site. **Table 6** presents the estimated monthly parking demand during the weekday and weekend AM (11 AM), PM (1 PM), and evening (6 PM) peak periods. **Figure 1** presents the estimated monthly parking demand during the peak period, which occurs during the PM peak. Throughout the year the predicted parking demand ranges from 1,511 to 2,267 spaces, which can be accommodated by the 2,375 spaces. Based on the shared parking analysis, parking within the PD-60A will be sufficient to accommodate the parking demand for the development zone. ULI Shared Parking outputs are provided in **Attachment N**.

Table 6: Monthly Weekday and Weekend Parking Demand

Month	Weekday Parking Demand			Weekend Parking Demand		
	AM Peak (11 AM)	PM Peak (1 PM)	Evening Peak (6 PM)	AM Peak (11 AM)	PM Peak (1 PM)	Evening Peak (6 PM)
January	1,521	1,703	1,718	1,660	1,832	1,657
February	1,511	1,691	1,704	1,649	1,822	1,653
March	1,670	1,877	1,869	1,820	2,027	1,816
April	1,683	1,883	1,863	1,833	2,042	1,822
May	1,764	1,978	1,947	1,921	2,148	1,903
June	1,727	1,936	1,910	1,886	2,102	1,866
July	1,687	1,898	1,874	1,842	2,056	1,823
August	1,694	1,694	1,885	1,851	2,065	1,831
September	1,637	1,831	1,821	1,787	1,982	1,771
October	1,687	1,891	1,876	1,837	2,044	1,824
November	1,710	1,921	1,904	1,872	2,080	1,847
December	1,844	2,101	2,078	2,004	2,267	1,945
Late December	1,647	1,922	1,835	1,733	2,064	1,837

PD-60A has a total of 2,375 spaces in the interim condition, which is greater than the highest parking demand during the weekday and weekend (bolded & shaded).

Figure 1: Monthly Weekday and Weekend Peak Parking Demand



There is a total of 2,375 spaces in the interim condition.

REQUIREMENTS

Parking Geometry

The parking spaces within the Project's parking structure will be 90-degree parking stalls and according to section 17.34.030 of the City Code, standard 90-degree parking stalls must be a minimum of 8.5 feet wide by 19 feet long, with an aisle width of 26 feet. The project proposes parking spaces that are 8.5 feet wide and 19-foot long stalls with 26-foot aisles and meets the City's requirements.

Parking Spaces

Table 7 summarizes the parking requirements for the Project. For residential, the PD-60A must provide a minimum of 1.25 parking spaces per unit, with a minimum of one space for each studio unit, 1.5 spaces for each one-bedroom unit, and two spaces for each two-bedroom unit or larger. For retail, PD-60A must provide 3.29 parking spaces per 1,000 square feet of leasable building area. Based on PD-60A's requirement, the total required parking spaces is 378.

The Applicant is proposing to amend the PD-60A requirements to allow a 20% reduction, which would reduce the total required parking to 319 spaces, which can be accommodated by the proposed 341 spaces. Section 17.34.010(E)(1) of the City's municipal code allows for up to a 20% reduction to the required spaces of off-street parking spaces for commercial office/multiple-family residential mixed-use developments under a single management. The Project meets the City's requirement because the proposed commercial/multi-family residential development will be under one management.

Table 7: Parking Requirements (Proposed Site)

Facility	Size	Unit	PD-60A Requirements	
			Requirement	Parking Spaces
Studio	26	Dwelling units	1 space per unit	26
1-Bedroom	97	Dwelling units	1.5 spaces per unit	146
2-Bedroom or larger	91	Dwelling units	2 spaces per unit	182
Shopping Center	10,800	Square feet	3.29 spaces per 1,000 square feet of leasable building area	36
Total Required Parking				390
Total Required Parking with 20% Reduction (Residential only)				319
Proposed Parking Spaces				341

In addition, the whole PD-60A must provide an overall parking ratio of 1.25 spaces per dwelling unit and 3.29 parking spaces per 1,000 square feet of leasable building area for residential and commercial uses, respectively.

Table 8 summarizes the parking ratios within PD-60A for the Interim condition. For residential uses, the proposed project will provide 1.50 spaces per dwelling unit, while the commercial uses will provide 3.50 spaces per 1,000 square feet. Both residential and commercial meet minimum PD-60A parking requirements.

Table 8: Interim Parking Requirements (PD-60A Area)

Land Use	Size/Unit	PD-60A Parking Ratio Requirement	Required Parking Spaces	Proposed Parking Ratio	Proposed Parking Spaces
Residential (Proposed Project)	214 DU	1.25 per DU	268	1.50 per DU	319
Commercial	587,212 SF	3.29 per 1,000 SF	1,932	3.50 per 1,000 SF	2,056

Table 9 summarizes the parking ratios within PD-60A for Build-Out condition. For residential uses, the proposed project will provide 1.50 spaces per dwelling unit, while 10 Park Plaza Drive will provide 1.45 spaces per dwelling unit. The commercial uses will provide 3.49 spaces per 1,000 square feet. Both residential and commercial meet minimum PD-60A parking requirements.

Table 9: Build-Out Parking Requirements (PD-60A Area)

Land Use	Size/Unit	PD-60A Parking Ratio Requirement	Required Parking Spaces	Proposed Parking Ratio	Proposed Parking Spaces
Residential (Proposed Project)	214 DU	1.25 per DU	268	1.50 per DU	319
Residential (10 Park Plaza Drive)	179 DU	1.25 per DU	224	1.45 per DU	260
Commercial	568,008 SF	3.29 per 1,000 SF	1,869	3.49 per 1,000 SF	1,984

CONCLUSION

Kimley-Horn conducted a traffic study to evaluate the potential effects of the redevelopment of the existing Burlington store into a mixed-use development consisting of residential and retail uses. The proposed project will generate a net decrease of 891 daily trips, an increase of 33 trips in the AM peak hour, a decrease of 129 trips in the PM peak hour, and a decrease of 105 trips in the weekend peak hour. Project trip generation is below the County of San Mateo's threshold of 500 daily trips or 100 peak-hour trips thus not requiring a full traffic impact analysis.

As the current City and County CEQA VMT guidelines are yet to be adopted, the existing state OPR guidance was used to inform the necessity of a VMT analysis. Due to the small local serving nature of the Project, in addition to the net decrease in daily trips, the Project is not required to perform a detailed VMT analysis according to State OPR prescreening criteria and is presumed to result in a less than significant impact.

The level of service analysis concludes that the Project's proposed redevelopment would not cause any operational deficiencies on the transportation network. On-site circulation was reviewed and determined that the site plan provides adequate space for vehicles entering and leaving the site, as well as minimal queuing due to vehicles entering or leaving the parking garage. A parking analysis concludes that the Project proposes a sufficient number of parking spaces. A shared parking evaluation was also conducted to analyze the Westlake Shopping Center parking as a whole. The shared parking evaluation found that combined spaces between the proposed project and Westlake Shopping Center would satisfy parking requirements for PD-60A.

ATTACHMENTS

Attachment A – Project Site Plan

Attachment B – Trip Distribution and Assignment

Attachment C – Existing AM and PM Peak Hour Turning Movements

Attachment D – Existing Weekend Peak Hour Turning Movements

Attachment E – Existing Plus Project AM and PM Peak Hour Turning Movements

Attachment F – Existing Plus Project Weekend Peak Hour Turning Movements

Attachment G – Cumulative AM and PM Peak Hour Turning Movements

Attachment H – Cumulative Weekend Peak Hour Turning Movements

Attachment I – Cumulative Plus Project AM and PM Peak Hour Turning Movements

Attachment J – Cumulative Plus Project Weekend Peak Hour Turning Movements

Attachment K – LOS Analysis Sheets

Attachment L – Queuing Analysis Sheet

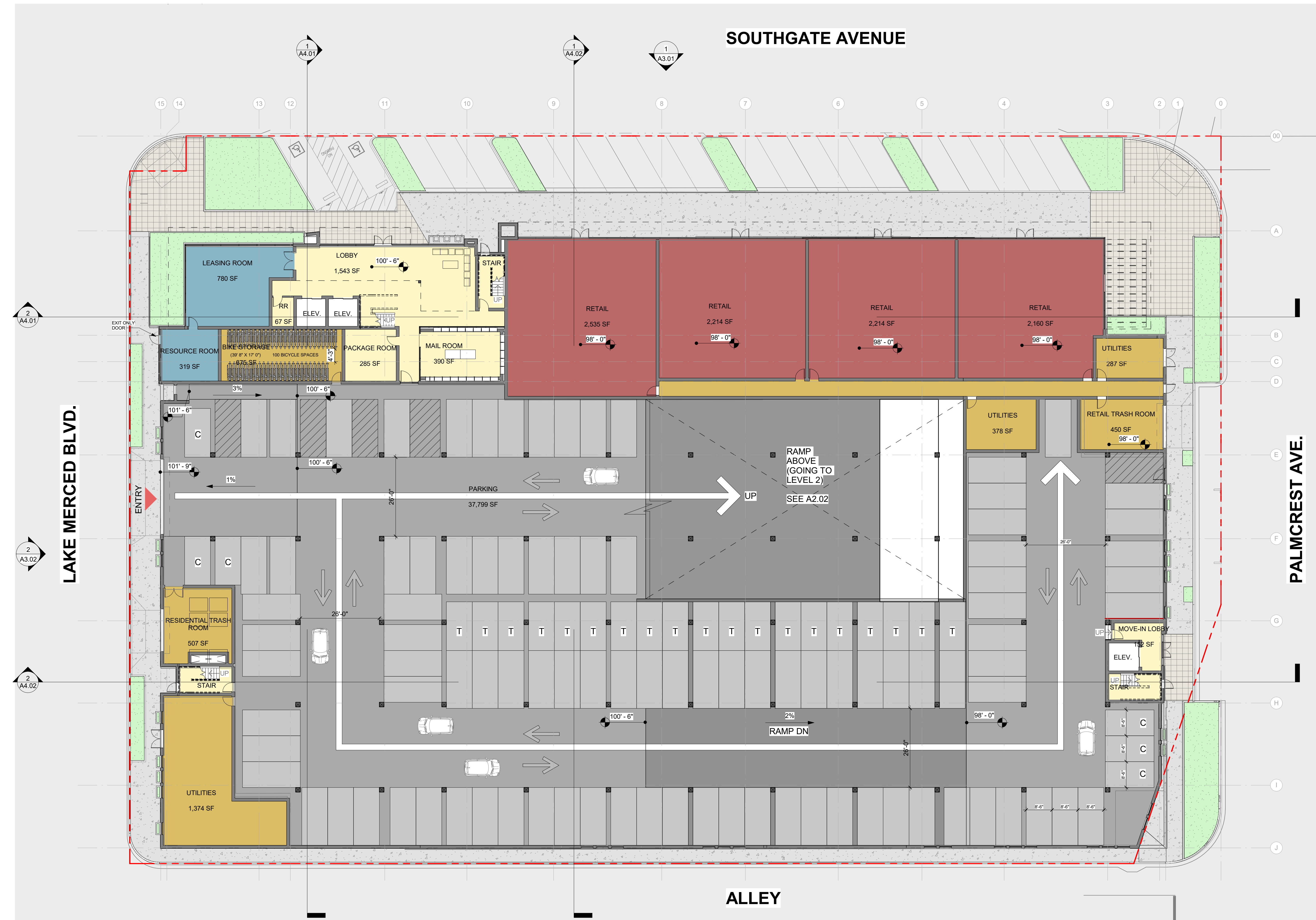
Attachment M – PD-60A Parking Counts

Attachment N – ULI Shared Parking Outputs

Attachment O – Sight Triangle



Attachment A – Project Site Plan



LEGEND

- RETAIL
- LEASING AND OFFICE
- PARKING
- UTILITIES
- AMENITY
- CIRCULATION

- T TANDEM PARKING SPACE
- C COMPACT PARKING SPACE

PARKING SUMMARY PER FLOOR

LEVEL 1:
TOTAL HEAD-IN PARKING STALLS = 101

TOTAL TANDEM PARKING STALLS = 19

TOTAL PARKING STALLS ON LEVEL = 120

LEVEL 2:
TOTAL HEAD-IN PARKING STALLS = 129

TOTAL TANDEM PARKING STALLS = 22

TOTAL PARKING STALLS ON LEVEL 2 = 151

LEVEL 2.5:
TOTAL HEAD-IN PARKING STALLS = 48

TOTAL TANDEM PARKING STALLS = 0

TOTAL PARKING STALLS ON LEVEL 2.5 = 48

GRAND TOTAL = 319 PARKING STALLS

PARKING RATIO:
319 TOTAL PARKING STALLS / 214 UNITS = 1.5

278 HEAD-IN STALLS / 214 UNITS = 1.30

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Client:

KIMCO REALTY

KIMCO REALTY CORP.

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GROUND FLOOR PLAN

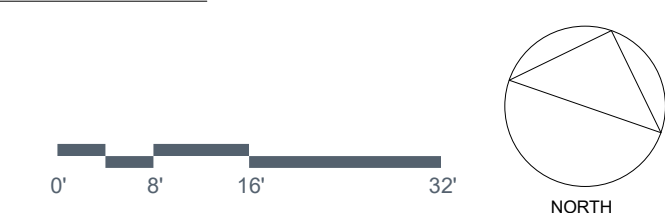
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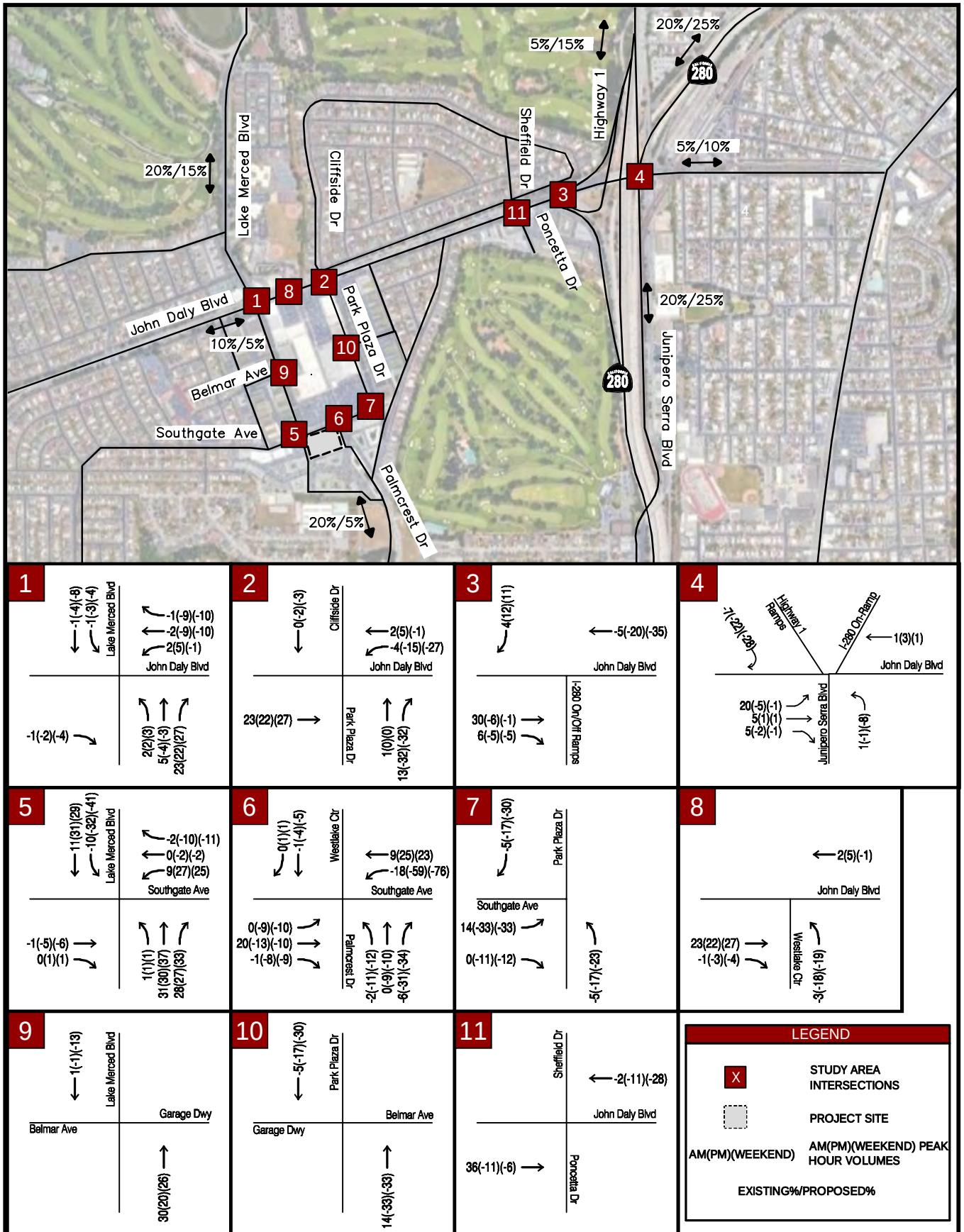
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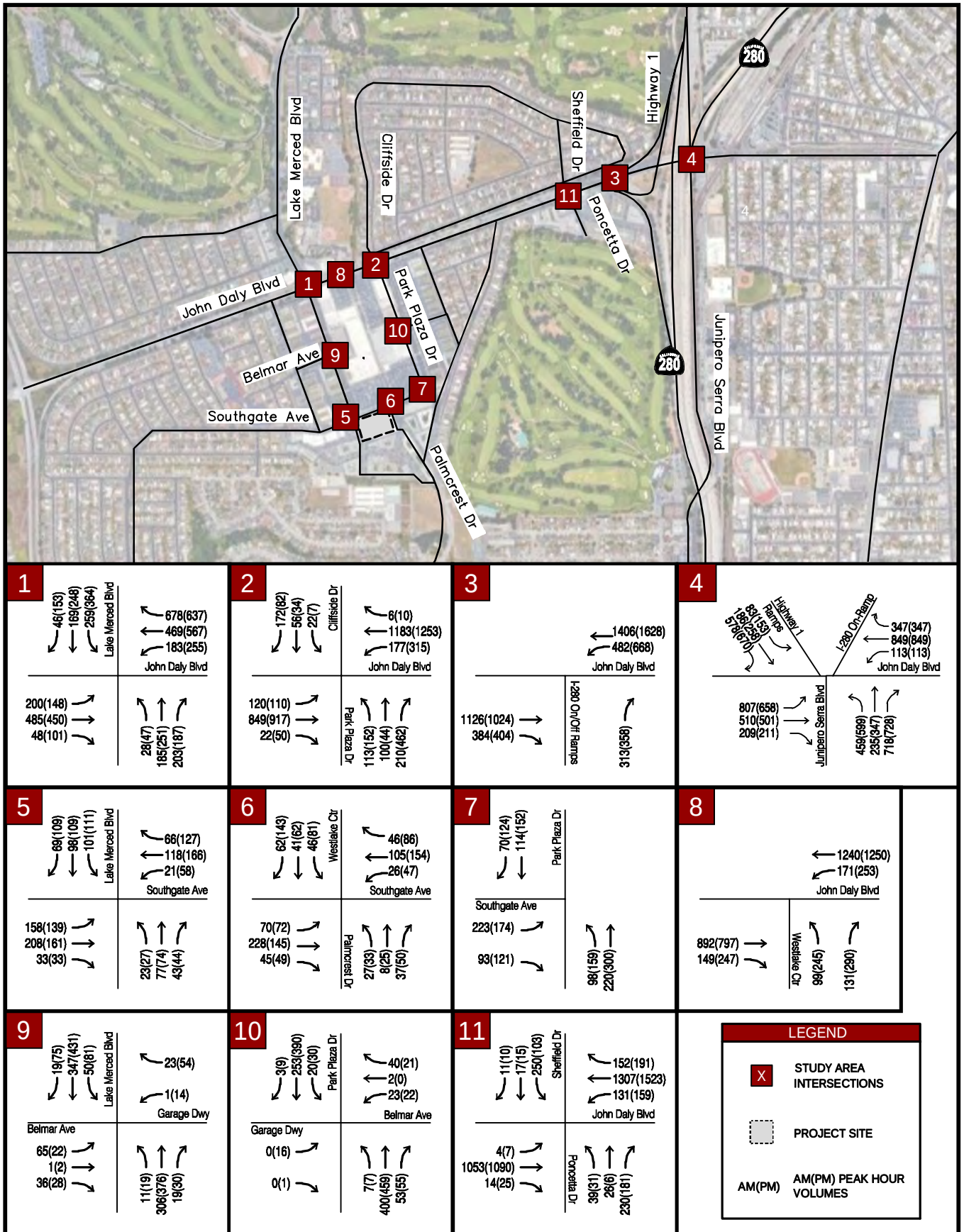
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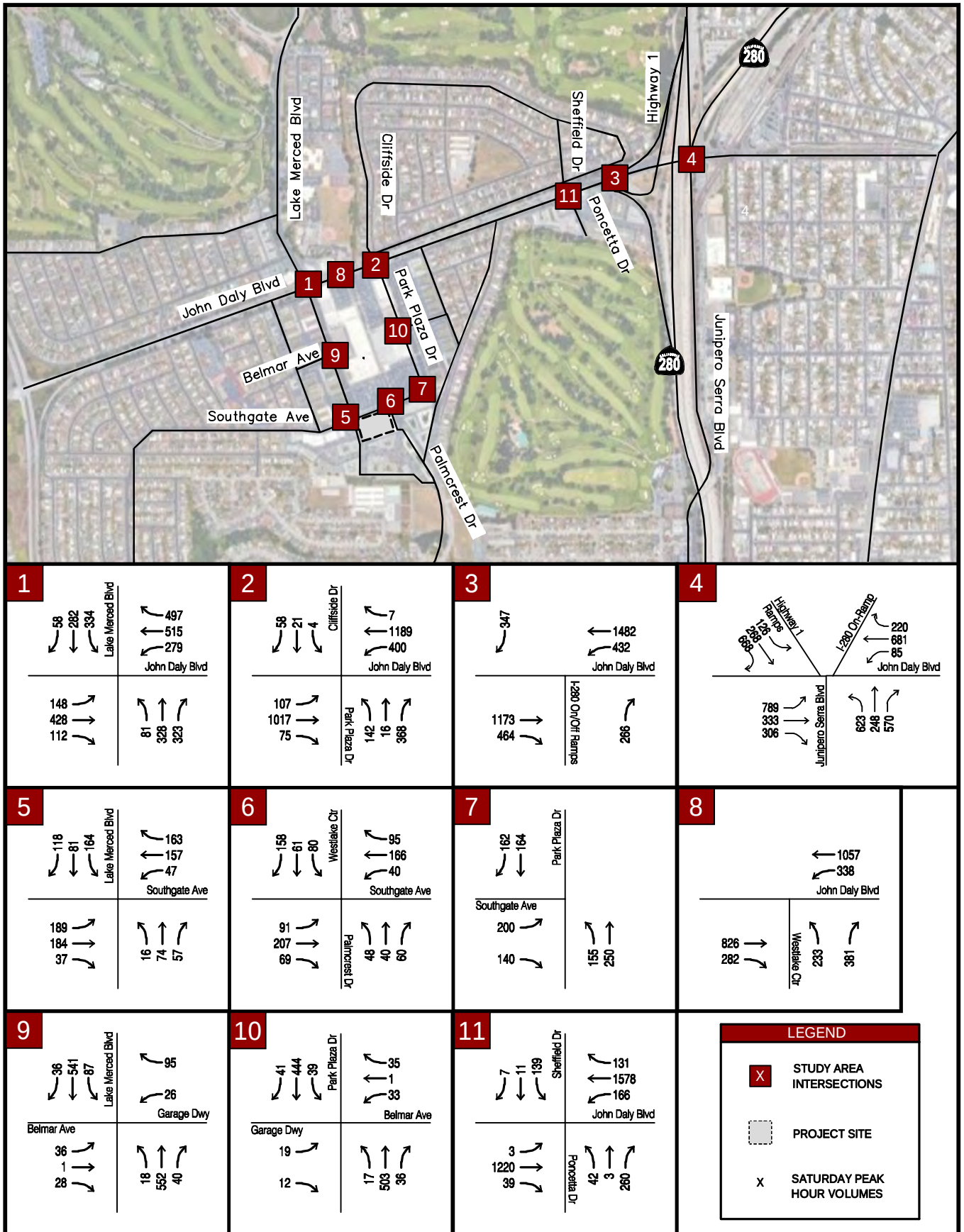
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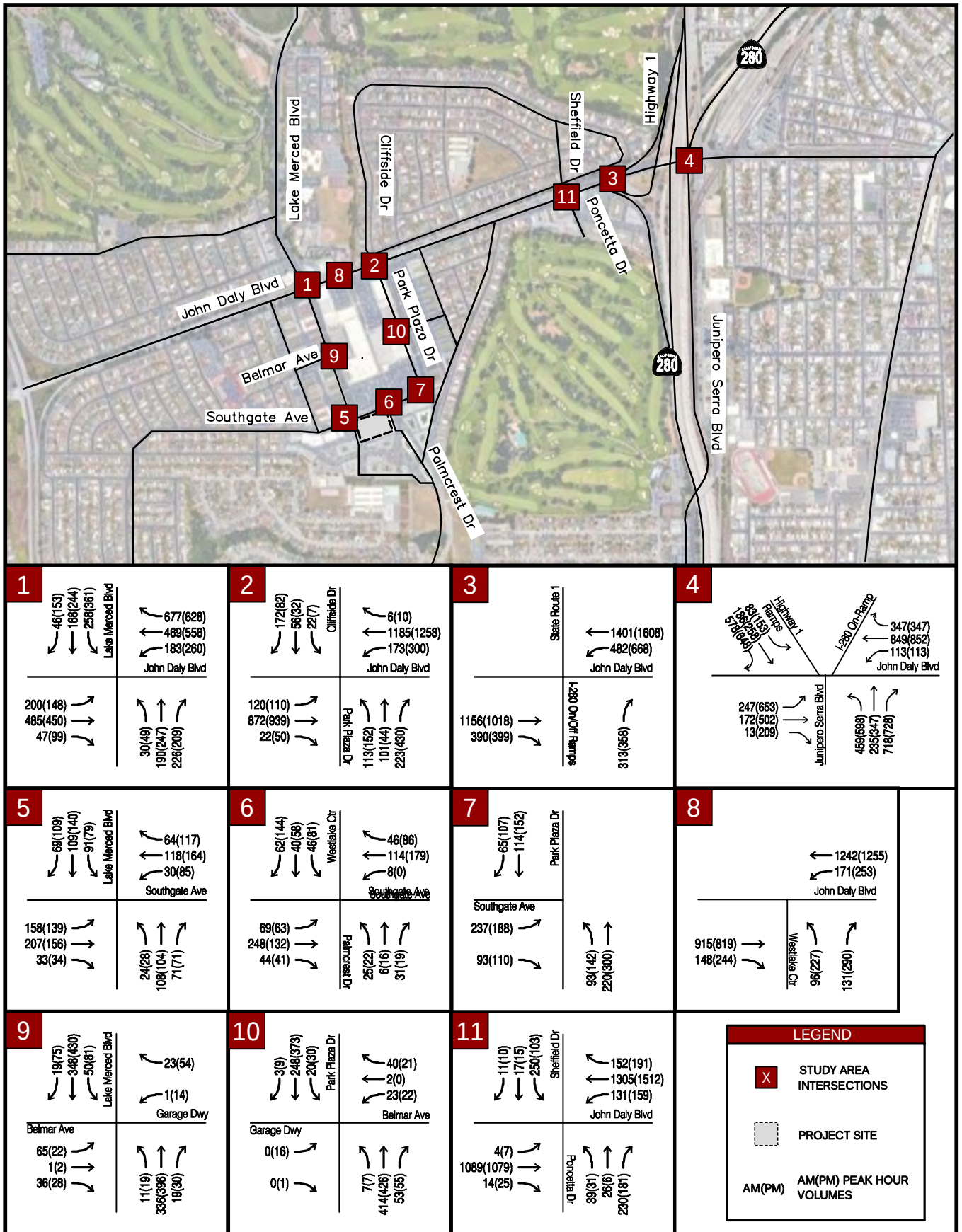
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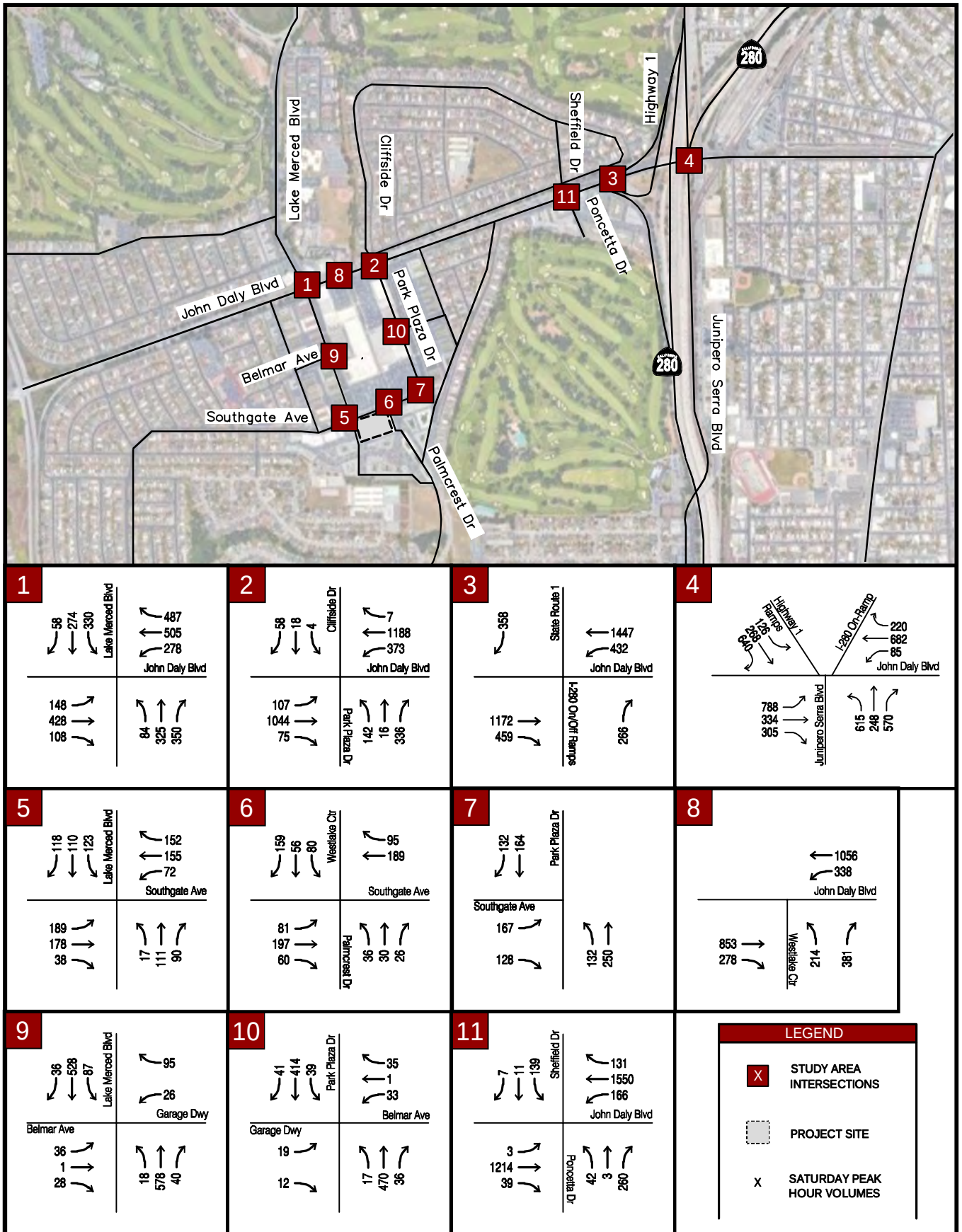


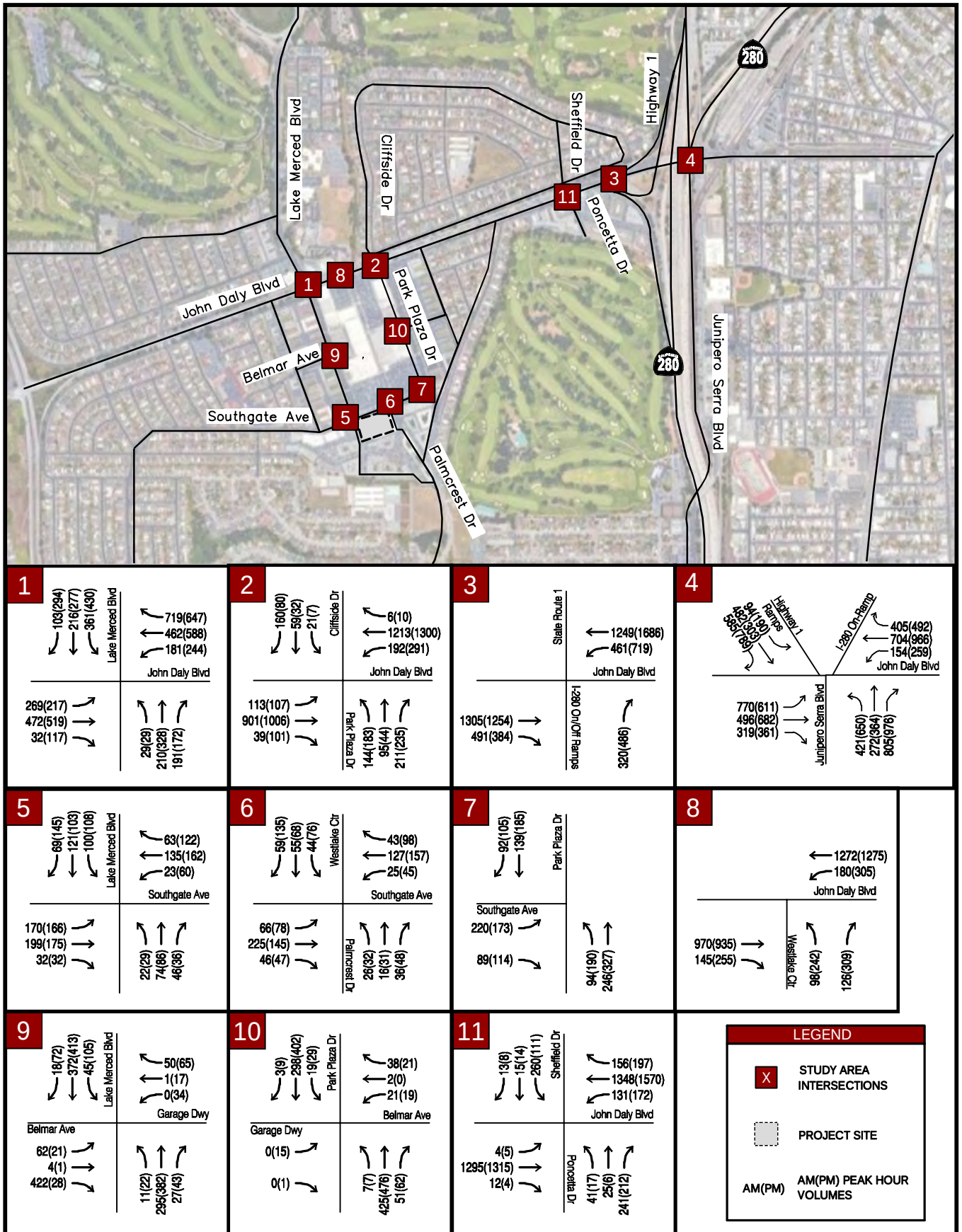


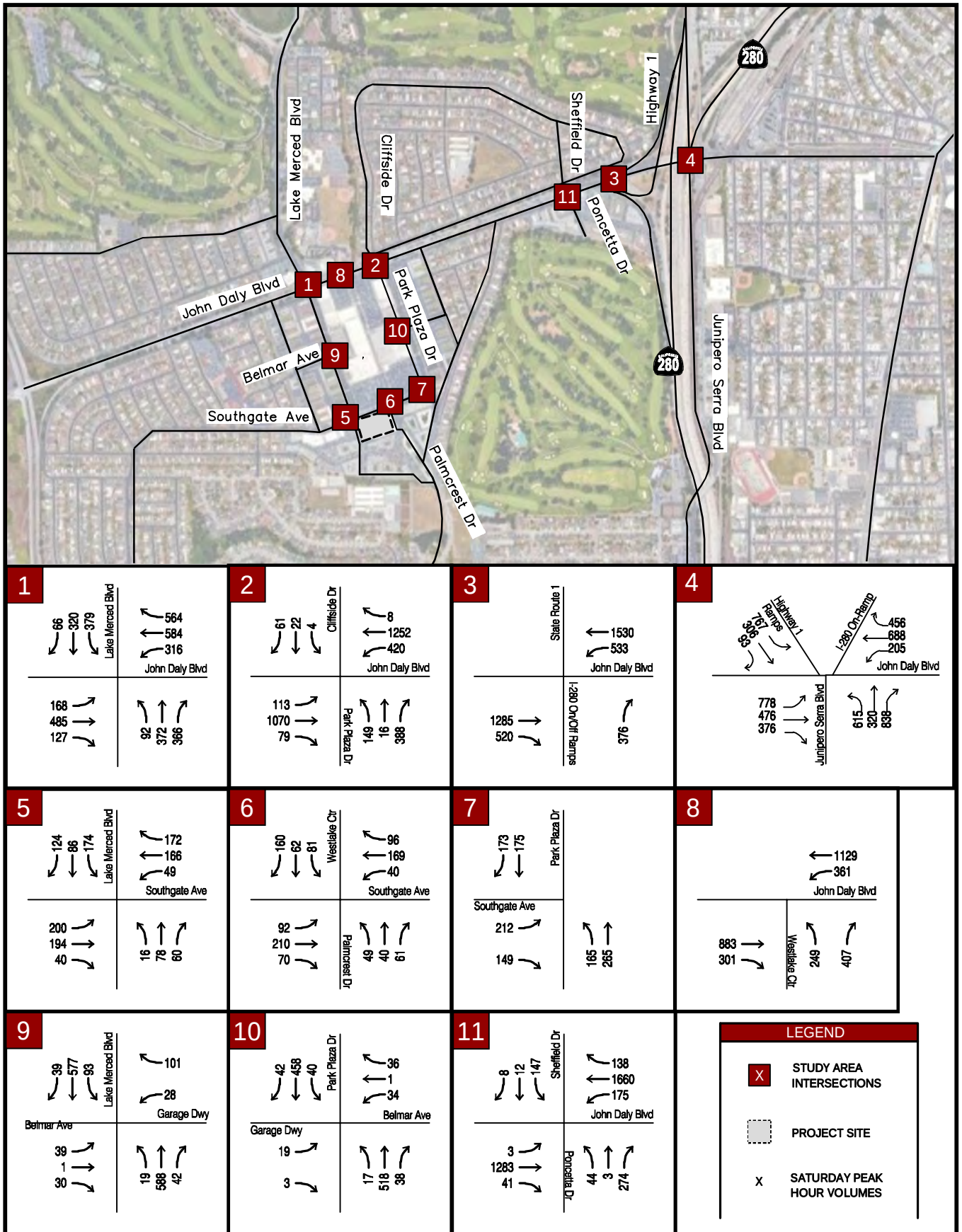


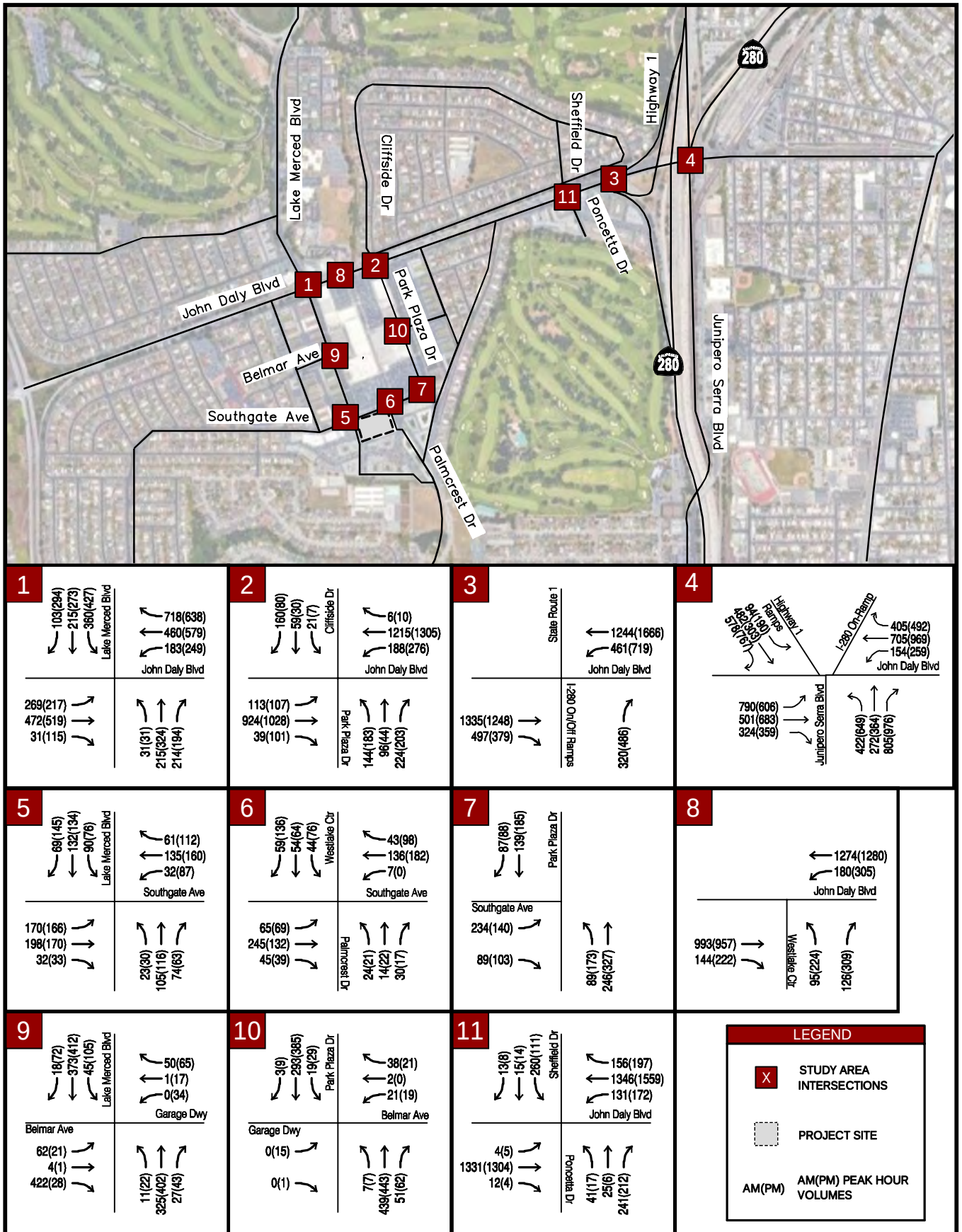


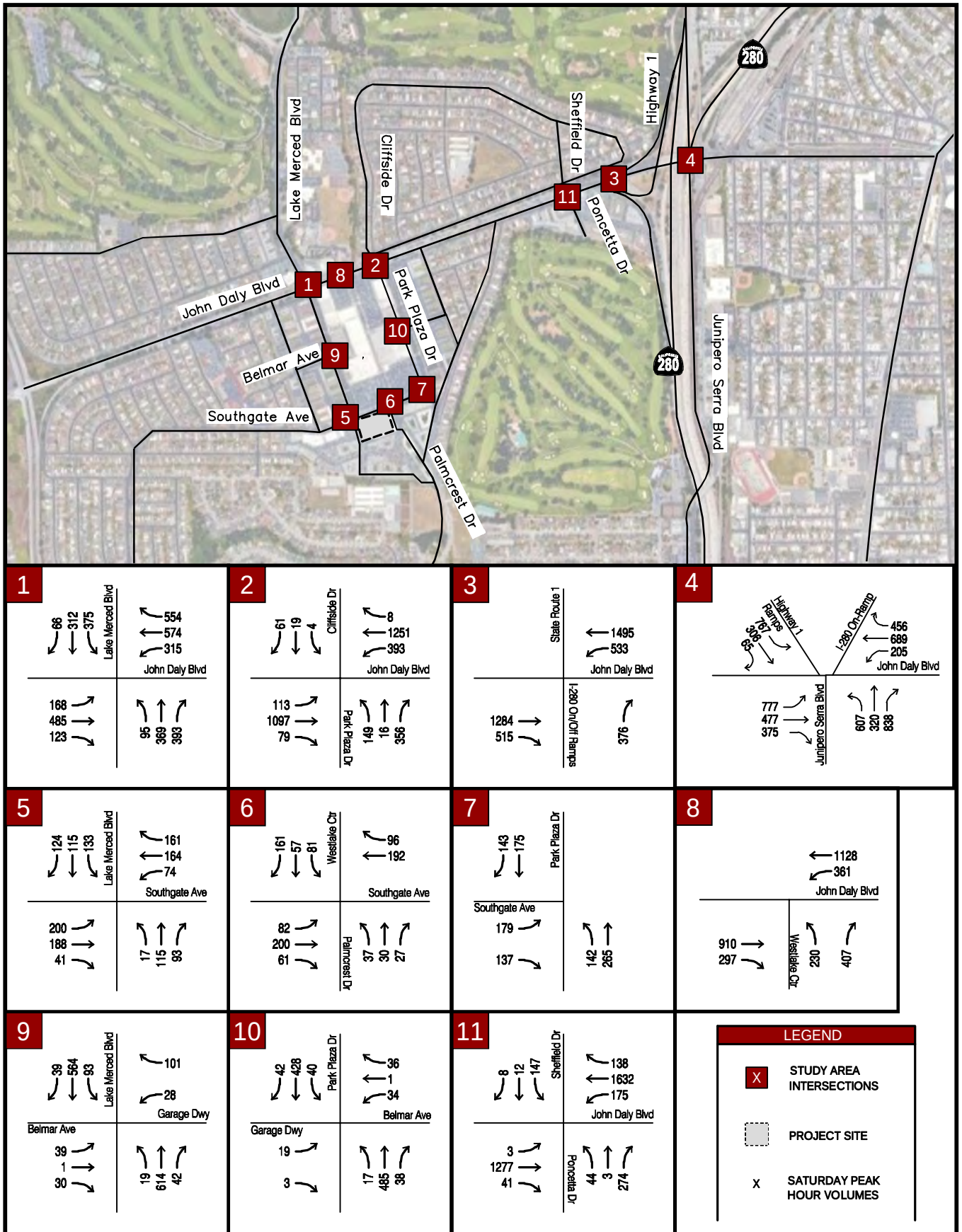














Attachment K – LOS Analysis Sheets

Queues

Existing Conditions AM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: AM

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	220	533	53	201	515	745	31	203	223	285	237
v/c Ratio	0.75	0.29	0.06	0.59	0.33	0.48	0.29	0.52	0.53	0.67	0.33
Control Delay	61.2	17.8	0.1	54.7	26.4	1.7	58.2	53.0	15.8	56.3	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	17.8	0.1	54.7	26.4	1.7	58.2	53.0	15.8	56.3	35.3
Queue Length 50th (ft)	158	115	0	77	157	19	23	76	51	106	71
Queue Length 95th (ft)	229	184	0	118	249	24	54	112	90	146	105
Internal Link Dist (ft)		569			362			724			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	326	1811	840	361	1575	1544	166	936	428	530	1122
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	51	0	0	0	0	0	0	1	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.30	0.06	0.56	0.33	0.48	0.19	0.22	0.52	0.54	0.21
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: Lake Merced Blvd & John Daly Blvd

Existing Conditions AM

Timing Plan: AM

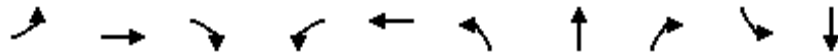
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	485	48	183	469	678	28	185	203	259	169	46
Future Volume (vph)	200	485	48	183	469	678	28	185	203	259	169	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9	4.0	4.0	4.0	4.0	4.0	4.2	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3379	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3379	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	220	533	53	201	515	745	31	203	223	285	186	51
RTOR Reduction (vph)	0	0	26	0	0	0	0	0	91	0	25	0
Lane Group Flow (vph)	220	533	27	201	515	745	31	203	132	285	212	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	19.5	58.3	58.3	11.7	50.5	116.0	4.9	13.0	24.7	16.1	24.0	
Effective Green, g (s)	19.5	58.3	58.3	11.7	50.5	116.0	4.9	13.0	24.7	16.1	24.0	
Actuated g/C Ratio	0.17	0.50	0.50	0.10	0.44	1.00	0.04	0.11	0.21	0.14	0.21	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	294	1761	759	342	1525	1544	74	392	329	471	699	
v/s Ratio Prot	c0.13	0.15		0.06	0.15		0.02	0.06	0.04	c0.08	0.06	
v/s Ratio Perm			0.02			c0.48			0.05			
v/c Ratio	0.75	0.30	0.04	0.59	0.34	0.48	0.42	0.52	0.40	0.61	0.30	
Uniform Delay, d1	45.9	16.9	14.6	49.8	21.7	0.0	54.2	48.5	39.3	47.0	38.9	
Progression Factor	1.00	1.00	1.00	0.97	1.14	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.5	0.4	0.1	1.9	0.5	1.0	2.8	1.5	0.6	1.9	0.3	
Delay (s)	55.4	17.4	14.7	50.4	25.2	1.0	56.9	50.1	39.9	48.8	39.3	
Level of Service	E	B	B	D	C	A	E	D	D	D	D	
Approach Delay (s)		27.6			16.3			45.6			44.5	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			27.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			17.1			
Intersection Capacity Utilization			68.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Conditions AM

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	130	923	24	192	1293	123	109	228	24	248
v/c Ratio	0.62	0.50	0.03	0.58	0.73	0.66	0.29	0.34	0.24	0.81
Control Delay	79.2	34.5	5.5	82.0	12.5	66.6	40.5	5.9	57.4	42.7
Queue Delay	0.0	1.8	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	79.2	36.3	5.5	82.0	12.5	66.7	40.5	5.9	57.4	42.8
Queue Length 50th (ft)	104	338	0	79	74	89	72	11	18	87
Queue Length 95th (ft)	169	427	m14	m93	#196	151	116	57	45	167
Internal Link Dist (ft)		253			2029		695			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	211	1854	818	391	1772	226	556	685	166	519
Starvation Cap Reductn	0	725	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	2	0	0	0	7
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.82	0.03	0.49	0.73	0.55	0.20	0.33	0.14	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Existing Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	849	22	177	1183	6	113	100	210	22	56	172
Future Volume (vph)	120	849	22	177	1183	6	113	100	210	22	56	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1472	3400	3501		1752	1845	1568	1752	1586	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1472	3400	3501		1752	1845	1568	1752	1586	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	923	24	192	1286	7	123	109	228	24	61	187
RTOR Reduction (vph)	0	0	12	0	0	0	0	0	138	0	113	0
Lane Group Flow (vph)	130	923	12	192	1293	0	123	109	90	24	135	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pt+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)	14.1	59.8	59.8	11.4	57.1		12.3	23.4	38.8	4.5	15.6	
Effective Green, g (s)	14.1	59.8	59.8	11.4	57.1		12.3	23.4	38.8	4.5	15.6	
Actuated g/C Ratio	0.12	0.52	0.52	0.10	0.49		0.11	0.20	0.33	0.04	0.13	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0		2.5	2.0	
Lane Grp Cap (vph)	212	1806	758	334	1723		185	372	524	67	213	
v/s Ratio Prot	c0.07	0.26		0.06	c0.37		c0.07	0.06	0.06	0.01	c0.09	
v/s Ratio Perm			0.01									
v/c Ratio	0.61	0.51	0.02	0.57	0.75		0.66	0.29	0.17	0.36	0.64	
Uniform Delay, d1	48.4	18.5	13.7	50.0	23.7		49.9	39.3	27.3	54.3	47.5	
Progression Factor	1.37	1.69	1.00	1.57	0.42		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.2	1.0	0.0	1.1	1.8		7.9	0.2	0.1	2.4	4.5	
Delay (s)	70.2	32.3	13.8	79.6	11.6		57.7	39.4	27.3	56.7	52.0	
Level of Service	E	C	B	E	B		E	D	C	E	D	
Approach Delay (s)		36.5			20.4			38.3			52.4	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			30.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			16.9			
Intersection Capacity Utilization			81.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: I-280/SR-1 ramps & John Daly Blvd

Existing Conditions AM

Timing Plan: AM



Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1557	497	1449	323
v/c Ratio	0.43	0.85	0.41	0.54
Control Delay	5.2	63.0	0.4	26.5
Queue Delay	0.4	0.0	0.0	0.0
Total Delay	5.7	63.0	0.4	26.5
Queue Length 50th (ft)	131	192	0	65
Queue Length 95th (ft)	154	#268	0	118
Internal Link Dist (ft)	411		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3583	609	3505	621
Starvation Cap Reductn	1355	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.70	0.82	0.41	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: I-280/SR-1 ramps & John Daly Blvd

Existing Conditions AM

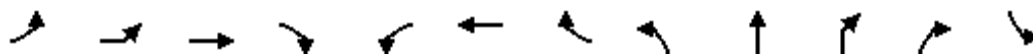
Timing Plan: AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↖↗	↑↑		↖↗
Traffic Volume (vph)	1126	384	482	1406	0	313
Future Volume (vph)	1126	384	482	1406	0	313
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6		3.5	3.6		3.5
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.96		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.96		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4650		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4650		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1161	396	497	1449	0	323
RTOR Reduction (vph)	6	0	0	0	0	128
Lane Group Flow (vph)	1551	0	497	1449	0	195
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	92.3		20.6	120.0		20.6
Effective Green, g (s)	92.3		20.6	120.0		20.6
Actuated g/C Ratio	0.77		0.17	1.00		0.17
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3576		583	3505		473
v/s Ratio Prot	c0.33		c0.15	0.41		0.07
v/s Ratio Perm						
v/c Ratio	0.43		0.85	0.41		0.41
Uniform Delay, d1	4.8		48.2	0.0		44.3
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.4		11.6	0.4		0.6
Delay (s)	5.2		59.8	0.4		44.9
Level of Service	A		E	A		D
Approach Delay (s)	5.2			15.5	44.9	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			13.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	7.1
Intersection Capacity Utilization			52.5%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Existing Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: AM



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	159	403	832	196	106	896	362	478	358	331	327	86
v/c Ratio	0.39	1.04	1.11	0.50	0.35	0.95	0.50	0.67	1.07	0.93	0.40	0.23
Control Delay	49.4	110.6	118.4	19.1	55.7	77.7	28.6	59.8	122.5	77.2	5.1	50.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	110.6	118.4	19.1	55.7	77.7	28.6	59.8	122.5	77.2	5.1	50.3
Queue Length 50th (ft)	141	~494	~574	46	104	339	219	223	~423	283	12	70
Queue Length 95th (ft)	221	#744	#733	138	176	#431	317	287	#648	#496	78	123
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	409	386	748	391	300	947	723	714	336	357	822	379
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	1.04	1.11	0.50	0.35	0.95	0.50	0.67	1.07	0.93	0.40	0.23

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



Lane Group	SBT	SBR
Lane Group Flow (vph)	411	385
v/c Ratio	1.09	0.50
Control Delay	122.7	24.5
Queue Delay	0.0	0.0
Total Delay	122.7	24.5
Queue Length 50th (ft)	~447	229
Queue Length 95th (ft)	#676	331
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	376	770
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.09	0.50

Intersection Summary

HCM Signalized Intersection Capacity Analysis

Existing Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: AM

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	170	637	510	209	113	849	208	139	459	235	217	501
Future Volume (vph)	170	637	510	209	113	849	208	139	459	235	217	501
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.1		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.78	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.95	0.85	0.85
Flt Protected	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2911	1118	1507	4756	1568		3400	1599	1427	1490
Flt Permitted	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2911	1118	1507	4756	1568		3400	1599	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	177	664	531	218	118	884	217	145	478	245	226	545
RTOR Reduction (vph)	0	0	1	105	0	0	24	0	0	0	58	171
Lane Group Flow (vph)	159	403	831	91	106	896	338	0	478	358	273	156
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pt+ov		Split	NA	Prot	pt+ov
Protected Phases	2	2	2		4	4	4 3		1	1	1	1 4
Permitted Phases				2								
Actuated Green, G (s)	38.5	38.5	38.5	38.5	29.9	29.9	66.5		31.5	31.5	31.5	65.9
Effective Green, g (s)	38.5	38.5	38.5	38.5	29.9	29.9	66.5		31.5	31.5	31.5	65.9
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.20	0.20	0.44		0.21	0.21	0.21	0.44
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1			4.5	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	409	386	747	286	300	948	695		714	335	299	654
v/s Ratio Prot	0.10	0.27	c0.29		0.07	c0.19	0.22		0.14	c0.22	0.19	0.10
v/s Ratio Perm				0.08								
v/c Ratio	0.39	1.04	1.11	0.32	0.35	0.95	0.49		0.67	1.07	0.91	0.24
Uniform Delay, d1	46.0	55.8	55.8	45.1	51.7	59.2	29.6		54.5	59.2	57.9	26.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	57.8	68.4	2.9	1.0	17.5	0.7		2.6	68.6	31.1	0.3
Delay (s)	48.8	113.5	124.1	48.1	52.7	76.8	30.3		57.1	127.8	89.0	26.6
Level of Service	D	F	F	D	D	E	C		E	F	F	C
Approach Delay (s)			104.5			62.6				74.4		
Approach LOS			F			E				E		
Intersection Summary												
HCM 2000 Control Delay			81.2									
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			97.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Existing Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: AM



Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	83	186	578
Future Volume (vph)	83	186	578
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	0.92	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1614	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1614	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	86	194	602
RTOR Reduction (vph)	0	27	20
Lane Group Flow (vph)	86	384	365
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pt+ov
Protected Phases	3	3	3 2
Permitted Phases			
Actuated Green, G (s)	32.5	32.5	75.5
Effective Green, g (s)	32.5	32.5	75.5
Actuated g/C Ratio	0.22	0.22	0.50
Clearance Time (s)	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	
Lane Grp Cap (vph)	379	349	749
v/s Ratio Prot	0.05	c0.24	0.24
v/s Ratio Perm			
v/c Ratio	0.23	1.10	0.49
Uniform Delay, d1	48.4	58.8	24.5
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.4	78.3	0.7
Delay (s)	48.8	137.0	25.2
Level of Service	D	F	C
Approach Delay (s)		79.6	
Approach LOS		E	
Intersection Summary			

HCM Unsignalized Intersection Capacity Analysis 5: Lake Merced Blvd & Southgate Ave

Existing Conditions AM
Timing Plan: AM

																	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
Lane Configurations																	
Sign Control	Stop			Stop				Stop			Stop						
Traffic Volume (vph)	158	208	33	21	118	66	23	77	43	101	98	69					
Future Volume (vph)	158	208	33	21	118	66	23	77	43	101	98	69					
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79					
Hourly flow rate (vph)	200	263	42	27	149	84	29	97	54	128	124	87					
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2										
Volume Total (vph)	200	305	27	233	180	128	211										
Volume Left (vph)	200	0	27	0	29	128	0										
Volume Right (vph)	0	42	0	84	54	0	87										
Hadj (s)	0.55	-0.05	0.55	-0.20	-0.10	0.55	-0.24										
Departure Headway (s)	7.3	6.7	7.7	7.0	7.2	7.7	6.9										
Degree Utilization, x	0.41	0.57	0.06	0.45	0.36	0.27	0.41										
Capacity (veh/h)	473	510	436	479	457	440	493										
Control Delay (s)	14.1	17.0	10.0	14.4	14.3	12.4	13.3										
Approach Delay (s)	15.9		13.9		14.3	13.0											
Approach LOS	C		B		B	B											
Intersection Summary																	
Delay			14.5														
Level of Service			B														
Intersection Capacity Utilization			49.6%		ICU Level of Service		A										
Analysis Period (min)			15														

HCM Unsignalized Intersection Capacity Analysis 6: Palmcrest Dr/Westlake Center & Southgate Ave

Existing Conditions AM
Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	70	228	45	26	105	46	27	8	37	46	41	62
Future Volume (vph)	70	228	45	26	105	46	27	8	37	46	41	62
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	88	285	56	33	131	58	34	10	46	58	51	78
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	231	199	222	90	187							
Volume Left (vph)	88	0	33	34	58							
Volume Right (vph)	0	56	58	46	78							
Hadj (s)	0.24	-0.15	-0.08	-0.18	-0.14							
Departure Headway (s)	5.8	5.4	5.3	5.7	5.5							
Degree Utilization, x	0.37	0.30	0.33	0.14	0.29							
Capacity (veh/h)	592	637	637	556	597							
Control Delay (s)	11.0	9.5	10.9	9.6	10.7							
Approach Delay (s)	10.4		10.9	9.6	10.7							
Approach LOS	B		B	A	B							
Intersection Summary												
Delay			10.5									
Level of Service			B									
Intersection Capacity Utilization			39.9%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues
7: Park Plaza Dr & Southgate Ave

Existing Conditions AM
Timing Plan: AM

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	279	116	123	275	143	88
v/c Ratio	0.66	0.25	0.49	0.25	0.19	0.13
Control Delay	26.7	5.3	29.5	6.9	14.6	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	5.3	29.5	6.9	14.6	4.7
Queue Length 50th (ft)	82	0	37	38	33	0
Queue Length 95th (ft)	125	23	75	74	66	20
Internal Link Dist (ft)	338			169	611	
Turn Bay Length (ft)						65
Base Capacity (vph)	572	590	281	1103	757	695
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.20	0.44	0.25	0.19	0.13
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

7: Park Plaza Dr & Southgate Ave

Existing Conditions AM

Timing Plan: AM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	223	93	98	220	114	70
Future Volume (vph)	223	93	98	220	114	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	279	116	122	275	142	88
RTOR Reduction (vph)	0	88	0	0	0	52
Lane Group Flow (vph)	279	28	123	275	143	36
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	13.8	13.8	7.0	34.8	23.3	23.3
Effective Green, g (s)	13.8	13.8	7.0	34.8	23.3	23.3
Actuated g/C Ratio	0.24	0.24	0.12	0.60	0.40	0.40
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	419	375	212	1114	746	634
v/s Ratio Prot	c0.16		c0.07	c0.15	0.08	
v/s Ratio Perm		0.02				0.02
v/c Ratio	0.67	0.07	0.58	0.25	0.19	0.06
Uniform Delay, d1	19.8	17.0	23.9	5.3	11.1	10.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	0.1	4.0	0.5	0.6	0.2
Delay (s)	23.8	17.0	27.9	5.8	11.6	10.6
Level of Service	C	B	C	A	B	B
Approach Delay (s)	21.8			12.7	11.3	
Approach LOS	C			B	B	

Intersection Summary

HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	57.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

8: Westlake Center & John Daly Blvd

Existing Conditions AM

Timing Plan: AM

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	970	162	186	1348	108	142
v/c Ratio	0.39	0.14	0.59	0.46	0.62	0.33
Control Delay	13.7	4.2	44.8	6.2	64.8	14.1
Queue Delay	1.3	0.0	0.0	0.7	0.0	0.1
Total Delay	15.0	4.2	44.8	6.9	64.8	14.1
Queue Length 50th (ft)	265	10	75	185	79	26
Queue Length 95th (ft)	350	27	m107	251	133	73
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2471	1154	503	2917	366	514
Starvation Cap Reductn	870	0	0	1095	0	0
Spillback Cap Reductn	1214	0	0	0	0	33
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.14	0.37	0.74	0.30	0.30

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

8: Westlake Center & John Daly Blvd

Existing Conditions AM

Timing Plan: AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘↙	↑↑	↘	↗
Traffic Volume (vph)	892	149	171	1240	99	131
Future Volume (vph)	892	149	171	1240	99	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	970	162	186	1348	108	142
RTOR Reduction (vph)	0	49	0	0	0	80
Lane Group Flow (vph)	970	113	186	1348	108	62
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	81.0	81.0	10.6	95.6	11.5	22.1
Effective Green, g (s)	81.0	81.0	10.6	95.6	11.5	22.1
Actuated g/C Ratio	0.70	0.70	0.09	0.82	0.10	0.19
Clearance Time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	2471	1105	313	2916	175	356
v/s Ratio Prot	0.27		c0.05	c0.38	c0.06	0.02
v/s Ratio Perm		0.07				0.02
v/c Ratio	0.39	0.10	0.59	0.46	0.62	0.17
Uniform Delay, d1	7.3	5.7	50.6	2.9	50.1	39.3
Progression Factor	1.65	3.13	0.78	1.81	1.00	1.00
Incremental Delay, d2	0.4	0.2	1.5	0.4	4.5	0.1
Delay (s)	12.4	18.0	40.9	5.6	54.6	39.4
Level of Service	B	B	D	A	D	D
Approach Delay (s)	13.2			9.9	46.0	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay			14.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.50			
Actuated Cycle Length (s)			116.0		Sum of lost time (s)	12.9
Intersection Capacity Utilization			47.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Existing Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	1	36	1	0	23	11	306	19	50	347	19
Future Volume (Veh/h)	65	1	36	1	0	23	11	306	19	50	347	19
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	1	39	1	0	25	12	333	21	54	377	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)											804	
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93					
vC, conflicting volume	888	874	388	902	874	344	398			354		
vC1, stage 1 conf vol	496	496		368	368							
vC2, stage 2 conf vol	392	378		535	506							
vCu, unblocked vol	840	825	301	856	825	344	312			354		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	100	94	100	100	96	99			95		
cM capacity (veh/h)	433	437	683	419	442	697	1153			1199		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	111	26	366	452								
Volume Left	71	1	12	54								
Volume Right	39	25	21	21								
cSH	497	680	1153	1199								
Volume to Capacity	0.22	0.04	0.01	0.05								
Queue Length 95th (ft)	21	3	1	4								
Control Delay (s)	14.3	10.5	0.4	1.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	14.3	10.5	0.4	1.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			61.2%	ICU Level of Service					B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Park Plaza Dr & Garage Dwy/Belmar Ave

Existing Conditions AM

Timing Plan: AM

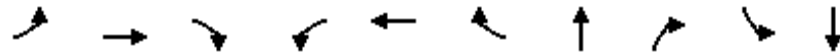
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	23	2	40	7	400	53	20	253	3
Future Volume (Veh/h)	0	0	0	23	2	40	7	400	53	20	253	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	25	2	43	8	435	58	22	275	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)								691			775	
pX, platoon unblocked												
vC, conflicting volume	844	830	276	800	802	464	278			493		
vC1, stage 1 conf vol	320	320		480	480							
vC2, stage 2 conf vol	524	509		320	322							
vCu, unblocked vol	844	830	276	800	802	464	278			493		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	95	100	93	99			98		
cM capacity (veh/h)	427	458	760	488	478	596	1279			1065		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	70	501	300								
Volume Left	0	25	8	22								
Volume Right	0	43	58	3								
cSH	1700	549	1279	1065								
Volume to Capacity	0.00	0.13	0.01	0.02								
Queue Length 95th (ft)	0	11	0	2								
Control Delay (s)	0.0	12.5	0.2	0.8								
Lane LOS	A	B	A	A								
Approach Delay (s)	0.0	12.5	0.2	0.8								
Approach LOS	A	B										
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			36.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

Existing Conditions AM

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	4	1145	15	142	1421	165	70	250	272	30
v/c Ratio	0.05	0.90	0.02	0.79	0.84	0.20	0.11	0.33	0.71	0.06
Control Delay	60.0	45.2	0.1	80.4	32.4	6.6	20.4	8.5	48.7	21.8
Queue Delay	0.0	0.0	0.0	0.0	34.6	0.0	0.0	0.0	0.0	0.0
Total Delay	60.0	45.2	0.1	80.4	67.0	6.6	20.4	8.5	48.7	21.8
Queue Length 50th (ft)	2	468	0	105	456	15	31	37	178	10
Queue Length 95th (ft)	m5	#582	m0	#230	#727	63	59	91	#328	35
Internal Link Dist (ft)		2029			411		195			206
Turn Bay Length (ft)										
Base Capacity (vph)	90	1271	646	180	1698	824	629	753	383	516
Starvation Cap Reductn	0	0	0	0	368	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.90	0.02	0.79	1.07	0.20	0.11	0.33	0.71	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Existing Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	4	1053	14	131	1307	152	39	26	230	250	17	11
Future Volume (vph)	4	1053	14	131	1307	152	39	26	230	250	17	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.9	4.9	4.0	4.9	4.9		4.5	4.5	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1791	1568	1752	1734	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.81	1.00	0.71	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1503	1568	1312	1734	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	1145	15	142	1421	165	42	28	250	272	18	12
RTOR Reduction (vph)	0	0	10	0	0	67	0	0	97	0	8	0
Lane Group Flow (vph)	4	1145	5	142	1421	98	0	70	153	272	22	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4		4	
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.1	42.0	42.0	12.0	53.4	53.4		49.1	49.1	34.0	34.0	
Effective Green, g (s)	1.1	42.0	42.0	12.0	53.4	53.4		49.1	49.1	34.0	34.0	
Actuated g/C Ratio	0.01	0.36	0.36	0.10	0.46	0.46		0.42	0.42	0.29	0.29	
Clearance Time (s)	3.5	4.9	4.9	4.0	4.9	4.9				4.0	4.0	
Vehicle Extension (s)	2.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	16	1269	567	181	1613	721		636	663	384	508	
v/s Ratio Prot	0.00	0.33		c0.08	c0.41				c0.10		0.01	
v/s Ratio Perm			0.00			0.06		0.05		c0.21		
v/c Ratio	0.25	0.90	0.01	0.78	0.88	0.14		0.11	0.23	0.71	0.04	
Uniform Delay, d1	57.0	35.1	23.7	50.7	28.4	18.0		20.2	21.4	36.6	29.3	
Progression Factor	1.11	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.7	9.7	0.0	19.6	7.3	0.4		0.1	0.2	5.9	0.0	
Delay (s)	65.9	44.6	23.7	70.4	35.7	18.4		20.3	21.6	42.5	29.4	
Level of Service	E	D	C	E	D	B		C	C	D	C	
Approach Delay (s)		44.4			36.9			21.3			41.2	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay	38.3			HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	116.0			Sum of lost time (s)			17.4					
Intersection Capacity Utilization	71.6%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

Queues

Existing Conditions PM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: PM

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	163	495	111	280	623	700	52	276	205	400	441
v/c Ratio	0.70	0.31	0.15	0.67	0.40	0.45	0.43	0.60	0.45	0.75	0.51
Control Delay	65.3	23.0	4.3	65.7	22.2	0.9	63.9	54.6	15.4	57.5	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.3	23.0	4.3	65.7	22.4	0.9	63.9	54.6	15.4	57.5	30.9
Queue Length 50th (ft)	122	124	0	118	102	0	39	107	54	154	116
Queue Length 95th (ft)	187	200	34	160	299	0	80	148	80	200	158
Internal Link Dist (ft)		569			362			714			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	266	1602	755	514	1565	1544	160	905	494	609	1200
Starvation Cap Reductn	0	0	0	0	353	0	0	0	0	0	0
Spillback Cap Reductn	0	80	0	0	0	0	0	0	1	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.33	0.15	0.54	0.51	0.45	0.33	0.30	0.42	0.66	0.37
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: Lake Merced Blvd & John Daly Blvd

Existing Conditions PM

Timing Plan: PM

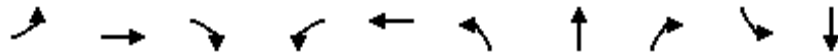
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	450	101	255	567	637	47	251	187	364	248	153
Future Volume (vph)	148	450	101	255	567	637	47	251	187	364	248	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	0.99	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	0.94
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	3505	1510	3400	3505	1544	1752	3505	1548	3400	3282	3282
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1752	3505	1510	3400	3505	1544	1752	3505	1548	3400	3282	3282
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	163	495	111	280	623	700	52	276	205	400	273	168
RTOR Reduction (vph)	0	0	61	0	0	0	0	0	60	0	92	0
Lane Group Flow (vph)	163	495	50	280	623	700	52	276	145	400	349	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	15.9	53.1	53.1	14.7	51.9	120.0	7.3	15.7	30.4	19.6	27.8	
Effective Green, g (s)	15.9	54.0	54.0	14.7	52.8	120.0	7.3	15.7	30.4	19.6	28.0	
Actuated g/C Ratio	0.13	0.45	0.45	0.12	0.44	1.00	0.06	0.13	0.25	0.16	0.23	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	232	1577	679	416	1542	1544	106	458	392	555	765	
v/s Ratio Prot	c0.09	0.14		0.08	0.18		0.03	c0.08	0.05	c0.12	0.11	
v/s Ratio Perm			0.03			c0.45			0.05			
v/c Ratio	0.70	0.31	0.07	0.67	0.40	0.45	0.49	0.60	0.37	0.72	0.46	
Uniform Delay, d1	49.8	21.1	18.8	50.4	22.9	0.0	54.5	49.2	36.9	47.6	39.5	
Progression Factor	1.00	1.00	1.00	1.17	0.87	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.6	0.5	0.2	3.2	0.6	0.8	2.6	2.6	0.4	4.3	0.6	
Delay (s)	58.4	21.7	19.0	62.3	20.7	0.8	57.1	51.8	37.3	51.9	40.1	
Level of Service	E	C	B	E	C	A	E	D	D	D	D	
Approach Delay (s)		29.1			19.3			46.8			45.7	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			31.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			69.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Conditions PM

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	120	997	54	342	1373	165	48	502	8	126
v/c Ratio	0.63	0.55	0.07	0.72	0.72	0.79	0.12	0.64	0.10	0.56
Control Delay	67.3	23.3	5.2	75.1	18.1	76.1	35.5	15.3	56.9	26.8
Queue Delay	0.0	1.8	0.0	0.0	0.1	96.6	0.0	0.0	0.0	0.0
Total Delay	67.3	25.1	5.2	75.1	18.2	172.6	35.5	15.3	56.9	26.9
Queue Length 50th (ft)	97	334	6	146	168	124	30	137	6	28
Queue Length 95th (ft)	#169	478	m31	m156	m#648	#220	58	213	23	78
Internal Link Dist (ft)		253			2035		684			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	189	1809	816	623	1918	233	553	841	160	479
Starvation Cap Reductn	0	609	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	48	187	0	0	0	15
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.83	0.07	0.55	0.73	3.59	0.09	0.60	0.05	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Existing Conditions PM

Timing Plan: PM

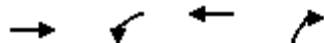
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	917	50	315	1253	10	152	44	462	7	34	82
Future Volume (vph)	110	917	50	315	1253	10	152	44	462	7	34	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1470	3400	3499		1752	1845	1568	1752	1601	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1470	3400	3499		1752	1845	1568	1752	1601	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	997	54	342	1362	11	165	48	502	8	37	89
RTOR Reduction (vph)	0	0	28	0	0	0	0	0	164	0	79	0
Lane Group Flow (vph)	120	997	26	342	1373	0	165	48	338	8	47	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pt+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)	13.0	57.8	57.8	16.8	61.6		14.5	27.1	47.9	1.4	14.0	
Effective Green, g (s)	13.0	58.7	58.7	16.8	62.5		14.5	27.1	47.9	1.4	14.0	
Actuated g/C Ratio	0.11	0.49	0.49	0.14	0.52		0.12	0.23	0.40	0.01	0.12	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0		2.5	2.0	
Lane Grp Cap (vph)	189	1714	719	476	1822		211	416	625	20	186	
v/s Ratio Prot	0.07	c0.28		0.10	c0.39		c0.09	0.03	c0.22	0.00	0.03	
v/s Ratio Perm			0.02									
v/c Ratio	0.63	0.58	0.04	0.72	0.75		0.78	0.12	0.54	0.40	0.25	
Uniform Delay, d1	51.2	21.9	15.9	49.3	22.7		51.2	36.9	27.6	58.9	48.3	
Progression Factor	1.03	1.00	1.00	1.45	0.75		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.4	1.3	0.1	2.3	1.4		16.5	0.0	0.5	9.3	0.3	
Delay (s)	58.3	23.1	16.0	73.6	18.4		67.7	37.0	28.1	68.2	48.5	
Level of Service	E	C	B	E	B		E	D	C	E	D	
Approach Delay (s)		26.4			29.4			37.9			49.7	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			30.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			75.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: I-280/SR-1 ramps & John Daly Blvd

Existing Conditions PM

Timing Plan: PM



Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1472	689	1678	369
v/c Ratio	0.46	0.83	0.48	0.49
Control Delay	2.6	52.3	0.5	28.9
Queue Delay	0.2	0.0	0.1	0.0
Total Delay	2.8	52.3	0.5	28.9
Queue Length 50th (ft)	45	261	0	98
Queue Length 95th (ft)	53	310	0	140
Internal Link Dist (ft)	406		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3199	1076	3505	946
Starvation Cap Reductn	788	0	0	0
Spillback Cap Reductn	0	0	362	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.61	0.64	0.53	0.39
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

3: I-280/SR-1 ramps & John Daly Blvd

Existing Conditions PM

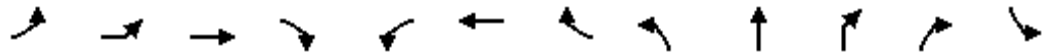
Timing Plan: PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↙↘	↑↑		↗↘
Traffic Volume (vph)	1024	404	668	1628	0	358
Future Volume (vph)	1024	404	668	1628	0	358
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.96		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.96		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4608		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4608		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1056	416	689	1678	0	369
RTOR Reduction (vph)	18	0	0	0	0	80
Lane Group Flow (vph)	1454	0	689	1678	0	289
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	83.2		29.7	120.0		29.7
Effective Green, g (s)	82.8		29.2	120.0		29.2
Actuated g/C Ratio	0.69		0.24	1.00		0.24
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3179		827	3505		671
v/s Ratio Prot	0.32		c0.20	c0.48		0.10
v/s Ratio Perm						
v/c Ratio	0.46		0.83	0.48		0.43
Uniform Delay, d1	8.4		43.1	0.0		38.4
Progression Factor	0.27		1.00	1.00		1.00
Incremental Delay, d2	0.3		7.2	0.5		0.4
Delay (s)	2.6		50.3	0.5		38.8
Level of Service	A		D	A		D
Approach Delay (s)	2.6			15.0	38.8	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			12.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			56.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Existing Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: PM



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	130	377	723	198	106	896	362	624	412	357	372	159
v/c Ratio	0.29	0.89	0.88	0.47	0.31	0.84	0.50	0.95	1.29	1.08	0.47	0.46
Control Delay	49.3	77.9	67.2	17.6	54.2	67.0	29.1	87.5	201.6	118.1	12.6	59.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.3	77.9	67.2	17.6	54.2	67.0	29.1	87.5	201.6	118.1	12.6	59.9
Queue Length 50th (ft)	119	450	454	40	108	347	230	336	~601	~387	96	147
Queue Length 95th (ft)	198	#748	#661	138	177	407	305	#455	#841	#621	191	214
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	450	425	825	419	348	1099	786	658	319	332	799	416
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.89	0.88	0.47	0.30	0.82	0.46	0.95	1.29	1.08	0.47	0.38

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



Lane Group	SBT	SBR
Lane Group Flow (vph)	269	698
v/c Ratio	0.78	0.90
Control Delay	75.7	50.9
Queue Delay	0.0	0.0
Total Delay	75.7	50.9
Queue Length 50th (ft)	281	668
Queue Length 95th (ft)	380	#965
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	416	772
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.65	0.90

Intersection Summary

HCM Signalized Intersection Capacity Analysis

Existing Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: PM

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	138	520	501	211	113	849	208	139	599	347	246	482
Future Volume (vph)	138	520	501	211	113	849	208	139	599	347	246	482
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.77	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.98	0.85	0.85
Flt Protected	0.95	0.95	0.99	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2918	1099	1507	4756	1568		3400	1647	1427	1490
Flt Permitted	0.95	0.95	0.99	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2918	1099	1507	4756	1568		3400	1647	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	144	542	522	220	118	884	217	145	624	361	256	524
RTOR Reduction (vph)	0	0	1	109	0	0	24	0	0	0	56	136
Lane Group Flow (vph)	130	377	722	89	106	896	338	0	624	412	301	236
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pm+ov		Split	NA	Perm	custom
Protected Phases	2	2	2		4	4	3		1	1		4
Permitted Phases				2			4				1	1 4
Actuated Green, G (s)	44.7	44.7	44.7	44.7	36.0	36.0	67.2		30.5	30.5	30.5	66.5
Effective Green, g (s)	45.2	45.2	45.2	45.2	36.1	36.1	68.2		31.0	31.0	31.0	66.7
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.23	0.23	0.43		0.19	0.19	0.19	0.42
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.5		4.5	4.5	4.5	4.1
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	450	425	824	310	340	1073	668		658	319	276	621
v/s Ratio Prot	0.08	0.25	0.25		0.07	c0.19	0.10		0.18	c0.25		0.09
v/s Ratio Perm				0.08			0.12				0.21	0.07
v/c Ratio	0.29	0.89	0.88	0.29	0.31	0.84	0.51		0.95	1.29	1.09	0.38
Uniform Delay, d1	44.8	55.0	54.7	44.8	51.6	59.1	33.6		63.7	64.5	64.5	32.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	22.9	12.6	2.3	0.7	6.0	0.8		23.1	152.7	80.9	0.5
Delay (s)	46.5	77.9	67.3	47.1	52.3	65.1	34.4		86.8	217.2	145.4	32.8
Level of Service	D	E	E	D	D	E	C		F	F	F	C
Approach Delay (s)			65.4			56.0				117.7		
Approach LOS			E			E				F		
Intersection Summary												
HCM 2000 Control Delay			77.9									E
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			160.0									16.0
Intersection Capacity Utilization			105.7%									G
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Existing Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: PM



Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	153	258	670
Future Volume (vph)	153	258	670
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1752	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1752	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	159	269	698
RTOR Reduction (vph)	0	0	20
Lane Group Flow (vph)	159	269	678
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pm+ov
Protected Phases	3	3	2
Permitted Phases			3
Actuated Green, G (s)	31.2	31.2	75.9
Effective Green, g (s)	31.7	31.7	76.9
Actuated g/C Ratio	0.20	0.20	0.48
Clearance Time (s)	4.5	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0
Lane Grp Cap (vph)	347	347	753
v/s Ratio Prot	0.09	0.15	c0.25
v/s Ratio Perm			0.20
v/c Ratio	0.46	0.78	0.90
Uniform Delay, d1	56.6	60.8	38.1
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	1.3	10.9	14.2
Delay (s)	57.9	71.7	52.2
Level of Service	E	E	D
Approach Delay (s)		57.7	
Approach LOS		E	
Intersection Summary			

HCM Unsignalized Intersection Capacity Analysis 5: Lake Merced Blvd & Southgate Ave

Existing Conditions PM
Timing Plan: PM

																	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
Lane Configurations																	
Sign Control	Stop			Stop				Stop			Stop						
Traffic Volume (vph)	139	161	33	58	166	127	27	74	44	111	109	109					
Future Volume (vph)	139	161	33	58	166	127	27	74	44	111	109	109					
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79					
Hourly flow rate (vph)	176	204	42	73	210	161	34	94	56	141	138	138					
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2										
Volume Total (vph)	176	246	73	371	184	141	276										
Volume Left (vph)	176	0	73	0	34	141	0										
Volume Right (vph)	0	42	0	161	56	0	138										
Hadj (s)	0.55	-0.07	0.55	-0.25	-0.09	0.55	-0.30										
Departure Headway (s)	8.1	7.5	8.1	7.3	7.9	8.2	7.4										
Degree Utilization, x	0.40	0.51	0.16	0.75	0.41	0.32	0.57										
Capacity (veh/h)	423	450	427	480	414	415	459										
Control Delay (s)	15.2	17.0	11.4	27.5	16.3	13.9	18.3										
Approach Delay (s)	16.2		24.9		16.3	16.8											
Approach LOS	C		C		C	C											
Intersection Summary																	
Delay			19.0														
Level of Service			C														
Intersection Capacity Utilization			58.0%		ICU Level of Service				B								
Analysis Period (min)			15														

HCM Unsignalized Intersection Capacity Analysis 6: Palmcrest Dr/Westlake Center & Southgate Ave

Existing Conditions PM
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	72	145	49	47	154	86	33	25	50	81	62	143
Future Volume (vph)	72	145	49	47	154	86	33	25	50	81	62	143
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	90	181	61	59	193	108	41	31	63	101	78	179
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	181	152	360	135	358							
Volume Left (vph)	90	0	59	41	101							
Volume Right (vph)	0	61	108	63	179							
Hadj (s)	0.30	-0.23	-0.10	-0.17	-0.19							
Departure Headway (s)	7.1	6.6	6.2	6.7	6.1							
Degree Utilization, x	0.36	0.28	0.62	0.25	0.60							
Capacity (veh/h)	471	508	542	455	555							
Control Delay (s)	12.8	10.8	18.6	11.9	17.9							
Approach Delay (s)	11.9		18.6	11.9	17.9							
Approach LOS	B		C	B	C							
Intersection Summary												
Delay			15.8									
Level of Service			C									
Intersection Capacity Utilization			54.9%			ICU Level of Service				A		
Analysis Period (min)			15									

Queues
7: Park Plaza Dr & Southgate Ave

Existing Conditions PM
Timing Plan: PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	218	151	199	375	190	155
v/c Ratio	0.54	0.32	0.65	0.33	0.28	0.23
Control Delay	23.3	5.5	34.2	6.5	14.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	5.5	34.2	6.5	14.4	4.0
Queue Length 50th (ft)	61	0	59	47	41	0
Queue Length 95th (ft)	98	25	#122	93	81	24
Internal Link Dist (ft)	338			169	622	
Turn Bay Length (ft)						65
Base Capacity (vph)	625	657	316	1144	684	679
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.23	0.63	0.33	0.28	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

7: Park Plaza Dr & Southgate Ave

Existing Conditions PM

Timing Plan: PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	174	121	159	300	152	124
Future Volume (vph)	174	121	159	300	152	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	218	151	199	375	190	155
RTOR Reduction (vph)	0	116	0	0	0	97
Lane Group Flow (vph)	218	35	199	375	190	58
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	11.7	11.7	8.8	32.6	19.3	19.3
Effective Green, g (s)	12.2	12.2	9.3	33.1	19.8	19.8
Actuated g/C Ratio	0.23	0.23	0.17	0.62	0.37	0.37
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	401	358	305	1145	685	582
v/s Ratio Prot	c0.12		c0.11	c0.20	0.10	
v/s Ratio Perm		0.02				0.04
v/c Ratio	0.54	0.10	0.65	0.33	0.28	0.10
Uniform Delay, d1	18.1	16.2	20.5	4.8	11.7	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.1	4.9	0.8	1.0	0.3
Delay (s)	19.6	16.3	25.4	5.6	12.7	11.3
Level of Service	B	B	C	A	B	B
Approach Delay (s)	18.3			12.5	12.1	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

8: Westlake Center & John Daly Blvd

Existing Conditions PM

Timing Plan: PM

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	866	268	275	1359	266	315
v/c Ratio	0.51	0.30	0.62	0.60	0.51	0.41
Control Delay	28.2	8.4	52.1	18.8	39.1	17.4
Queue Delay	6.3	0.0	0.0	2.2	0.0	0.0
Total Delay	34.5	8.4	52.1	21.0	39.1	17.4
Queue Length 50th (ft)	304	46	106	305	171	118
Queue Length 95th (ft)	391	76	148	379	257	178
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	1697	898	586	2270	523	824
Starvation Cap Reductn	483	0	0	733	0	0
Spillback Cap Reductn	769	0	0	0	0	32
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.30	0.47	0.88	0.51	0.40
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

8: Westlake Center & John Daly Blvd

Existing Conditions PM

Timing Plan: PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘↙	↑↑	↘	↗
Traffic Volume (vph)	797	247	253	1250	245	290
Future Volume (vph)	797	247	253	1250	245	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	3.5	4.0	3.5	3.5
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	866	268	275	1359	266	315
RTOR Reduction (vph)	0	139	0	0	0	45
Lane Group Flow (vph)	866	129	275	1359	266	270
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	57.1	57.1	15.0	76.5	35.0	50.0
Effective Green, g (s)	57.6	57.6	15.5	77.0	35.5	51.0
Actuated g/C Ratio	0.48	0.48	0.13	0.64	0.30	0.42
Clearance Time (s)	4.9	4.9	4.0	4.5	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	2.0	3.0
Lane Grp Cap (vph)	1698	759	443	2270	523	718
v/s Ratio Prot	0.24		0.08	c0.38	c0.15	0.05
v/s Ratio Perm		0.08				0.12
v/c Ratio	0.51	0.17	0.62	0.60	0.51	0.38
Uniform Delay, d1	21.5	17.7	49.5	12.5	35.0	23.6
Progression Factor	1.22	3.22	0.97	1.41	1.00	1.00
Incremental Delay, d2	1.0	0.4	2.0	0.8	3.5	0.3
Delay (s)	27.3	57.2	49.9	18.5	38.5	23.9
Level of Service	C	E	D	B	D	C
Approach Delay (s)	34.4			23.8	30.6	
Approach LOS	C			C	C	
Intersection Summary						
HCM 2000 Control Delay			28.5		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	11.4
Intersection Capacity Utilization			54.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Existing Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	2	28	14	0	54	19	376	30	81	431	75
Future Volume (Veh/h)	22	2	28	14	0	54	19	376	30	81	431	75
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	2	30	15	0	59	21	409	33	88	468	82
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)											794	
pX, platoon unblocked	0.88	0.88	0.88	0.88	0.88		0.88					
vC, conflicting volume	1212	1169	509	1184	1194	426	550			442		
vC1, stage 1 conf vol	685	685		468	468							
vC2, stage 2 conf vol	526	484		716	726							
vCu, unblocked vol	1172	1124	374	1140	1152	426	421			442		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	99	95	95	100	91	98			92		
cM capacity (veh/h)	298	330	590	310	325	627	997			1113		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	56	74	463	638								
Volume Left	24	15	21	88								
Volume Right	30	59	33	82								
cSH	407	519	997	1113								
Volume to Capacity	0.14	0.14	0.02	0.08								
Queue Length 95th (ft)	12	12	2	6								
Control Delay (s)	15.3	13.1	0.6	2.0								
Lane LOS	C	B	A	A								
Approach Delay (s)	15.3	13.1	0.6	2.0								
Approach LOS	C	B										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			70.1%	ICU Level of Service				C				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Park Plaza Dr & Garage Dwy/Belmar Ave

Existing Conditions PM

Timing Plan: PM

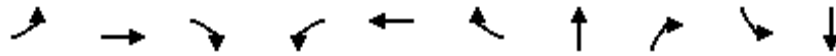
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	0	1	22	0	21	7	459	55	30	390	9
Future Volume (Veh/h)	16	0	1	22	0	21	7	459	55	30	390	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	0	1	24	0	23	8	499	60	33	424	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)								702			764	
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1063	1070	429	1041	1045	529	434			559		
vC1, stage 1 conf vol	495	495		545	545							
vC2, stage 2 conf vol	568	575		496	500							
vCu, unblocked vol	1047	1055	429	1025	1029	494	434			525		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	100	94	100	96	99			97		
cM capacity (veh/h)	376	387	624	406	405	553	1120			1001		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	47	567	467								
Volume Left	17	24	8	33								
Volume Right	1	23	60	10								
cSH	385	467	1120	1001								
Volume to Capacity	0.05	0.10	0.01	0.03								
Queue Length 95th (ft)	4	8	1	3								
Control Delay (s)	14.8	13.6	0.2	1.0								
Lane LOS	B	B	A	A								
Approach Delay (s)	14.8	13.6	0.2	1.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			49.1%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

Existing Conditions PM

11: Poncetta Dr/Sheffield Dr & John Daly Blvd

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	8	1185	27	173	1655	208	41	197	112	27
v/c Ratio	0.11	0.87	0.04	0.93	0.90	0.23	0.08	0.27	0.39	0.07
Control Delay	57.9	44.5	0.1	101.5	33.5	6.0	23.7	5.6	45.4	26.8
Queue Delay	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	44.5	0.1	101.5	36.5	6.0	23.7	5.6	45.4	26.8
Queue Length 50th (ft)	6	481	0	135	562	22	20	8	75	10
Queue Length 95th (ft)	m10	553	m0	#273	#856	72	45	56	133	36
Internal Link Dist (ft)		2035			406		211			198
Turn Bay Length (ft)										
Base Capacity (vph)	73	1364	687	186	1843	894	502	723	286	376
Starvation Cap Reductn	0	0	0	0	114	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.87	0.04	0.93	0.96	0.23	0.08	0.27	0.39	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

11: Poncetta Dr/Sheffield Dr & John Daly Blvd

Existing Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	7	1090	25	159	1523	191	31	6	181	103	15	10
Future Volume (vph)	7	1090	25	159	1523	191	31	6	181	103	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	3.5	3.5		4.5	4.5	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1771	1568	1752	1732	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.70	1.00	0.73	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1283	1568	1347	1732	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	1185	27	173	1655	208	34	7	197	112	16	11
RTOR Reduction (vph)	0	0	16	0	0	74	0	0	107	0	9	0
Lane Group Flow (vph)	8	1185	11	173	1655	134	0	41	90	112	18	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4			4
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.0	46.7	46.7	12.8	59.5	59.5		48.0	48.0	25.5	25.5	
Effective Green, g (s)	1.0	46.7	46.7	12.8	59.5	59.5		48.0	48.0	25.5	25.5	
Actuated g/C Ratio	0.01	0.39	0.39	0.11	0.50	0.50		0.40	0.40	0.21	0.21	
Clearance Time (s)	4.5	4.5	4.5	4.5	3.5	3.5				3.5	3.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	14	1364	610	186	1737	777		513	627	286	368	
v/s Ratio Prot	0.00	0.34		c0.10	c0.47				c0.06		0.01	
v/s Ratio Perm			0.01			0.09		0.03		c0.08		
v/c Ratio	0.57	0.87	0.02	0.93	0.95	0.17		0.08	0.14	0.39	0.05	
Uniform Delay, d1	59.3	33.8	22.5	53.2	28.9	16.7		22.3	22.9	40.6	37.6	
Progression Factor	0.99	1.11	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	39.4	6.6	0.0	44.4	12.4	0.5		0.3	0.5	4.0	0.3	
Delay (s)	98.3	44.0	22.6	97.5	41.3	17.1		22.6	23.4	44.6	37.9	
Level of Service	F	D	C	F	D	B		C	C	D	D	
Approach Delay (s)		43.9			43.6			23.3			43.3	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			42.3				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			69.1%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Plus Project Conditions AM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: AM

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	220	533	52	203	513	744	33	209	248	284	236
v/c Ratio	0.75	0.30	0.06	0.59	0.33	0.48	0.31	0.52	0.59	0.67	0.33
Control Delay	61.2	18.0	0.1	55.2	27.2	1.7	58.6	52.9	18.3	56.3	35.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	18.0	0.1	55.2	27.2	1.7	58.6	52.9	18.3	56.3	35.2
Queue Length 50th (ft)	158	115	0	78	158	19	24	78	63	106	71
Queue Length 95th (ft)	229	185	0	119	248	25	56	114	104	145	105
Internal Link Dist (ft)		569			362			724			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	326	1804	838	362	1570	1544	166	936	432	529	1122
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	61	0	0	0	0	0	0	2	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.31	0.06	0.56	0.33	0.48	0.20	0.22	0.58	0.54	0.21
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

Existing Plus Project Conditions AM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: AM

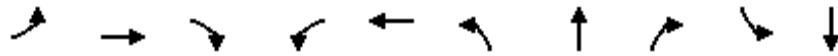
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	485	47	185	467	677	30	190	226	258	168	46
Future Volume (vph)	200	485	47	185	467	677	30	190	226	258	168	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9	4.0	4.0	4.0	4.0	4.0	4.2	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3378	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3378	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	220	533	52	203	513	744	33	209	248	284	185	51
RTOR Reduction (vph)	0	0	26	0	0	0	0	0	91	0	25	0
Lane Group Flow (vph)	220	533	26	203	513	744	33	209	157	284	211	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	19.5	58.1	58.1	11.7	50.3	116.0	5.0	13.2	24.9	16.1	24.1	
Effective Green, g (s)	19.5	58.1	58.1	11.7	50.3	116.0	5.0	13.2	24.9	16.1	24.1	
Actuated g/C Ratio	0.17	0.50	0.50	0.10	0.43	1.00	0.04	0.11	0.21	0.14	0.21	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	294	1755	756	342	1519	1544	75	398	332	471	701	
v/s Ratio Prot	c0.13	0.15		0.06	0.15		0.02	0.06	0.05	c0.08	0.06	
v/s Ratio Perm			0.02			c0.48			0.05			
v/c Ratio	0.75	0.30	0.03	0.59	0.34	0.48	0.44	0.53	0.47	0.60	0.30	
Uniform Delay, d1	45.9	17.0	14.7	49.9	21.8	0.0	54.1	48.4	39.8	46.9	38.8	
Progression Factor	1.00	1.00	1.00	0.98	1.16	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.5	0.4	0.1	2.1	0.5	1.0	3.0	1.6	0.8	1.8	0.3	
Delay (s)	55.4	17.5	14.8	51.0	25.9	1.0	57.1	50.1	40.6	48.8	39.2	
Level of Service	E	B	B	D	C	A	E	D	D	D	D	
Approach Delay (s)		27.7			16.7			45.7			44.4	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			28.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			17.1			
Intersection Capacity Utilization			68.3%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Plus Project Conditions AM

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	130	948	24	188	1295	123	110	242	24	248
v/c Ratio	0.62	0.51	0.03	0.57	0.73	0.66	0.30	0.37	0.24	0.81
Control Delay	78.7	34.4	5.2	81.2	14.0	66.6	40.5	6.9	57.4	42.7
Queue Delay	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.7	36.3	5.2	81.2	14.0	66.7	40.5	6.9	57.4	42.8
Queue Length 50th (ft)	104	343	0	77	90	89	73	20	18	87
Queue Length 95th (ft)	169	440	m13	m97	#226	151	116	68	45	167
Internal Link Dist (ft)		253			2029		695			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	211	1858	820	390	1772	226	556	684	166	519
Starvation Cap Reductn	0	718	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	1	0	0	0	8
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.83	0.03	0.48	0.73	0.55	0.20	0.35	0.14	0.49

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Existing Plus Project Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	872	22	173	1185	6	113	101	223	22	56	172
Future Volume (vph)	120	872	22	173	1185	6	113	101	223	22	56	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1472	3400	3501		1752	1845	1568	1752	1586	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1472	3400	3501		1752	1845	1568	1752	1586	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	948	24	188	1288	7	123	110	242	24	61	187
RTOR Reduction (vph)	0	0	12	0	0	0	0	0	137	0	113	0
Lane Group Flow (vph)	130	948	12	188	1295	0	123	110	105	24	135	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pt+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)	14.0	60.0	60.0	11.2	57.2		12.3	23.4	38.6	4.5	15.6	
Effective Green, g (s)	14.0	60.0	60.0	11.2	57.2		12.3	23.4	38.6	4.5	15.6	
Actuated g/C Ratio	0.12	0.52	0.52	0.10	0.49		0.11	0.20	0.33	0.04	0.13	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0		2.5	2.0	
Lane Grp Cap (vph)	211	1812	761	328	1726		185	372	521	67	213	
v/s Ratio Prot	c0.07	0.27		0.06	c0.37		c0.07	0.06	0.07	0.01	c0.09	
v/s Ratio Perm			0.01									
v/c Ratio	0.62	0.52	0.02	0.57	0.75		0.66	0.30	0.20	0.36	0.64	
Uniform Delay, d1	48.4	18.5	13.6	50.1	23.7		49.9	39.3	27.7	54.3	47.5	
Progression Factor	1.36	1.68	1.00	1.54	0.47		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.2	1.0	0.0	1.3	2.0		7.9	0.2	0.1	2.4	4.5	
Delay (s)	69.9	32.1	13.7	78.6	13.1		57.7	39.5	27.8	56.7	52.0	
Level of Service	E	C	B	E	B		E	D	C	E	D	
Approach Delay (s)		36.2			21.4			38.2			52.4	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			31.2			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			16.9			
Intersection Capacity Utilization			81.4%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Plus Project Conditions AM

3: I-280/SR-1 ramps & John Daly Blvd

Timing Plan: AM



Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1594	497	1444	323
v/c Ratio	0.44	0.85	0.41	0.54
Control Delay	5.3	63.0	0.4	27.7
Queue Delay	0.5	0.0	0.0	0.0
Total Delay	5.8	63.0	0.4	27.7
Queue Length 50th (ft)	136	192	0	68
Queue Length 95th (ft)	160	#268	0	121
Internal Link Dist (ft)	411		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3584	609	3505	615
Starvation Cap Reductn	1341	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.71	0.82	0.41	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: I-280/SR-1 ramps & John Daly Blvd

Existing Plus Project Conditions AM

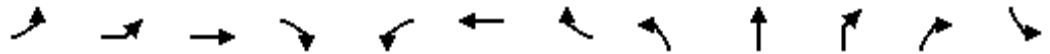
Timing Plan: AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↙↘	↑↑		↗↘
Traffic Volume (vph)	1156	390	482	1401	0	313
Future Volume (vph)	1156	390	482	1401	0	313
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6		3.5	3.6		3.5
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.96		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.96		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4653		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4653		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1192	402	497	1444	0	323
RTOR Reduction (vph)	6	0	0	0	0	122
Lane Group Flow (vph)	1588	0	497	1444	0	201
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	92.3		20.6	120.0		20.6
Effective Green, g (s)	92.3		20.6	120.0		20.6
Actuated g/C Ratio	0.77		0.17	1.00		0.17
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3578		583	3505		473
v/s Ratio Prot	c0.34		c0.15	0.41		0.07
v/s Ratio Perm						
v/c Ratio	0.44		0.85	0.41		0.43
Uniform Delay, d1	4.9		48.2	0.0		44.4
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.4		11.6	0.4		0.6
Delay (s)	5.3		59.8	0.4		45.0
Level of Service	A		E	A		D
Approach Delay (s)	5.3			15.6	45.0	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			13.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	7.1
Intersection Capacity Utilization			53.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Existing Plus Project Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: AM



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	163	412	844	201	106	897	362	479	357	331	328	86
v/c Ratio	0.40	1.07	1.13	0.51	0.35	0.95	0.50	0.67	1.06	0.93	0.40	0.23
Control Delay	49.7	116.7	124.3	19.6	55.7	77.9	28.6	59.8	121.7	77.2	5.1	50.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.7	116.7	124.3	19.6	55.7	77.9	28.6	59.8	121.7	77.2	5.1	50.3
Queue Length 50th (ft)	146	~515	~590	49	104	339	219	224	~420	283	13	70
Queue Length 95th (ft)	226	#765	#750	143	176	#432	317	287	#646	#496	78	123
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	409	386	747	393	300	947	723	714	336	357	822	379
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	1.07	1.13	0.51	0.35	0.95	0.50	0.67	1.06	0.93	0.40	0.23

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



Lane Group	SBT	SBR
Lane Group Flow (vph)	408	381
v/c Ratio	1.09	0.49
Control Delay	120.3	24.4
Queue Delay	0.0	0.0
Total Delay	120.3	24.4
Queue Length 50th (ft)	~441	226
Queue Length 95th (ft)	#670	326
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	376	770
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.09	0.49

Intersection Summary

HCM Signalized Intersection Capacity Analysis

Existing Plus Project Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: AM

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	174	653	515	214	113	850	208	139	460	235	215	503
Future Volume (vph)	174	653	515	214	113	850	208	139	460	235	215	503
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.1		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.78	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.95	0.85	0.85
Flt Protected	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2911	1118	1507	4756	1568		3400	1600	1427	1490
Flt Permitted	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2911	1118	1507	4756	1568		3400	1600	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	181	680	536	223	118	885	217	145	479	245	224	547
RTOR Reduction (vph)	0	0	1	106	0	0	24	0	0	0	58	171
Lane Group Flow (vph)	163	412	843	95	106	897	338	0	479	357	273	157
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pt+ov		Split	NA	Prot	pt+ov
Protected Phases	2	2	2		4	4	4 3		1	1	1	1 4
Permitted Phases				2								
Actuated Green, G (s)	38.5	38.5	38.5	38.5	29.9	29.9	66.5		31.5	31.5	31.5	65.9
Effective Green, g (s)	38.5	38.5	38.5	38.5	29.9	29.9	66.5		31.5	31.5	31.5	65.9
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.20	0.20	0.44		0.21	0.21	0.21	0.44
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1			4.5	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	409	386	747	286	300	948	695		714	336	299	654
v/s Ratio Prot	0.10	0.27	c0.29		0.07	c0.19	0.22		0.14	c0.22	0.19	0.11
v/s Ratio Perm				0.08								
v/c Ratio	0.40	1.07	1.13	0.33	0.35	0.95	0.49		0.67	1.06	0.91	0.24
Uniform Delay, d1	46.2	55.8	55.8	45.3	51.7	59.3	29.6		54.5	59.2	57.9	26.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	64.8	74.4	3.1	1.0	17.7	0.7		2.7	66.6	31.1	0.3
Delay (s)	49.0	120.6	130.2	48.4	52.7	76.9	30.3		57.2	125.8	89.0	26.6
Level of Service	D	F	F	D	D	E	C		E	F	F	C
Approach Delay (s)			109.4			62.7				73.9		
Approach LOS			F			E				E		
Intersection Summary												
HCM 2000 Control Delay			82.5									
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			97.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Existing Plus Project Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: AM



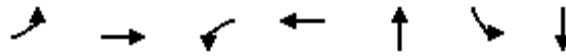
Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	83	186	571
Future Volume (vph)	83	186	571
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	0.92	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1615	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1615	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	86	194	595
RTOR Reduction (vph)	0	27	20
Lane Group Flow (vph)	86	381	361
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pt+ov
Protected Phases	3	3	3 2
Permitted Phases			
Actuated Green, G (s)	32.5	32.5	75.5
Effective Green, g (s)	32.5	32.5	75.5
Actuated g/C Ratio	0.22	0.22	0.50
Clearance Time (s)	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	
Lane Grp Cap (vph)	379	349	749
v/s Ratio Prot	0.05	c0.24	0.24
v/s Ratio Perm			
v/c Ratio	0.23	1.09	0.48
Uniform Delay, d1	48.4	58.8	24.4
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.4	75.4	0.7
Delay (s)	48.8	134.1	25.1
Level of Service	D	F	C
Approach Delay (s)		78.3	
Approach LOS		E	
Intersection Summary			

Queues

Existing Plus Project Conditions AM

5: Lake Merced Blvd & Southgate Ave

Timing Plan: AM



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	200	304	38	230	257	115	225
v/c Ratio	0.96	0.49	0.27	0.62	0.67	0.35	0.62
Control Delay	90.2	23.3	38.5	29.5	31.7	27.9	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.2	23.3	38.5	29.5	31.7	27.9	29.8
Queue Length 50th (ft)	81	83	15	72	82	40	68
Queue Length 95th (ft)	#210	180	42	131	149	80	127
Internal Link Dist (ft)		324		313	117		573
Turn Bay Length (ft)			130			100	
Base Capacity (vph)	208	636	142	536	522	501	523
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.48	0.27	0.43	0.49	0.23	0.43

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Lake Merced Blvd & Southgate Ave

Existing Plus Project Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	207	33	30	118	64	24	108	71	91	109	69
Future Volume (vph)	158	207	33	30	118	64	24	108	71	91	109	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95			0.95		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1752	1806		1752	1747			1747		1752	1738	
Flt Permitted	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (perm)	1752	1806		1752	1747			1747		1752	1738	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	200	262	42	38	149	81	30	137	90	115	138	87
RTOR Reduction (vph)	0	7	0	0	24	0	0	25	0	0	30	0
Lane Group Flow (vph)	200	297	0	38	206	0	0	232	0	115	195	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	7.8	22.2		1.7	16.1			13.4		12.4	12.4	
Effective Green, g (s)	7.8	22.2		1.7	16.1			13.4		12.4	12.4	
Actuated g/C Ratio	0.12	0.33		0.03	0.24			0.20		0.18	0.18	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	201	592		43	415			345		320	318	
v/s Ratio Prot	c0.11	c0.16		0.02	0.12			c0.13		0.07	c0.11	
v/s Ratio Perm												
v/c Ratio	1.00	0.50		0.88	0.50			0.67		0.36	0.61	
Uniform Delay, d1	29.9	18.3		32.9	22.3			25.1		24.2	25.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	61.7	0.7		92.7	0.9			5.1		0.7	3.5	
Delay (s)	91.6	19.0		125.6	23.2			30.2		24.9	28.9	
Level of Service	F	B		F	C			C		C	C	
Approach Delay (s)		47.8			37.7			30.2			27.5	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			37.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			67.7			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			55.2%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Palmcrest Dr/Westlake Center & Southgate Ave

Existing Plus Project Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	248	44	8	114	0	25	0	31	46	40	62
Future Volume (vph)	0	248	44	8	114	0	25	0	31	46	40	62
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	0	310	55	10	143	0	31	0	39	58	50	78
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	155	210	153	70	186							
Volume Left (vph)	0	0	10	31	58							
Volume Right (vph)	0	55	0	39	78							
Hadj (s)	0.05	-0.13	0.06	-0.19	-0.14							
Departure Headway (s)	5.4	5.2	5.2	5.2	5.1							
Degree Utilization, x	0.23	0.30	0.22	0.10	0.26							
Capacity (veh/h)	632	660	646	616	649							
Control Delay (s)	8.8	9.3	9.7	8.8	9.9							
Approach Delay (s)	9.1		9.7	8.8	9.9							
Approach LOS	A		A	A	A							
Intersection Summary												
Delay			9.4									
Level of Service			A									
Intersection Capacity Utilization			28.9%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues
7: Park Plaza Dr & Southgate Ave

Existing Plus Project Conditions AM
Timing Plan: AM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	296	116	116	275	143	81
v/c Ratio	0.68	0.24	0.47	0.25	0.19	0.12
Control Delay	27.3	5.2	29.3	7.1	14.8	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	5.2	29.3	7.1	14.8	4.8
Queue Length 50th (ft)	88	0	35	39	33	0
Queue Length 95th (ft)	133	23	71	74	66	20
Internal Link Dist (ft)	338			169	611	
Turn Bay Length (ft)						65
Base Capacity (vph)	570	589	280	1092	752	687
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.20	0.41	0.25	0.19	0.12
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

7: Park Plaza Dr & Southgate Ave

Existing Plus Project Conditions AM

Timing Plan: AM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	237	93	93	220	114	65
Future Volume (vph)	237	93	93	220	114	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	296	116	116	275	142	81
RTOR Reduction (vph)	0	88	0	0	0	48
Lane Group Flow (vph)	296	28	116	275	143	33
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	14.2	14.2	6.9	34.6	23.2	23.2
Effective Green, g (s)	14.2	14.2	6.9	34.6	23.2	23.2
Actuated g/C Ratio	0.25	0.25	0.12	0.60	0.40	0.40
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	430	385	209	1104	740	629
v/s Ratio Prot	c0.17		c0.07	c0.15	0.08	
v/s Ratio Perm		0.02				0.02
v/c Ratio	0.69	0.07	0.56	0.25	0.19	0.05
Uniform Delay, d1	19.8	16.7	24.0	5.5	11.2	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	0.1	3.2	0.5	0.6	0.2
Delay (s)	24.3	16.8	27.2	6.0	11.8	10.7
Level of Service	C	B	C	A	B	B
Approach Delay (s)	22.2			12.3	11.4	
Approach LOS	C			B	B	

Intersection Summary

HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	57.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		

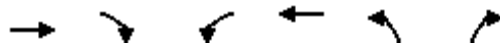
c Critical Lane Group

Queues

Existing Plus Project Conditions AM

8: Westlake Center & John Daly Blvd

Timing Plan: AM



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	995	161	186	1350	104	142
v/c Ratio	0.40	0.14	0.59	0.46	0.61	0.33
Control Delay	13.5	4.1	45.1	6.0	64.6	15.7
Queue Delay	1.7	0.0	0.0	0.7	0.0	0.1
Total Delay	15.2	4.1	45.1	6.7	64.6	15.7
Queue Length 50th (ft)	270	10	75	187	76	30
Queue Length 95th (ft)	354	26	m107	251	128	78
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2478	1156	503	2925	366	506
Starvation Cap Reductn	862	0	0	1103	0	0
Spillback Cap Reductn	1247	0	0	0	0	32
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.14	0.37	0.74	0.28	0.30

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

8: Westlake Center & John Daly Blvd

Existing Plus Project Conditions AM

Timing Plan: AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘↙	↑↑	↘	↑
Traffic Volume (vph)	915	148	171	1242	96	131
Future Volume (vph)	915	148	171	1242	96	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	995	161	186	1350	104	142
RTOR Reduction (vph)	0	48	0	0	0	75
Lane Group Flow (vph)	995	113	186	1350	104	67
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	81.3	81.3	10.6	95.9	11.2	21.8
Effective Green, g (s)	81.3	81.3	10.6	95.9	11.2	21.8
Actuated g/C Ratio	0.70	0.70	0.09	0.83	0.10	0.19
Clearance Time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	2480	1109	313	2925	170	352
v/s Ratio Prot	0.28		c0.05	c0.38	c0.06	0.02
v/s Ratio Perm		0.07				0.03
v/c Ratio	0.40	0.10	0.59	0.46	0.61	0.19
Uniform Delay, d1	7.2	5.6	50.6	2.8	50.3	39.7
Progression Factor	1.63	3.06	0.78	1.80	1.00	1.00
Incremental Delay, d2	0.5	0.2	1.4	0.4	4.5	0.1
Delay (s)	12.2	17.3	41.2	5.5	54.8	39.8
Level of Service	B	B	D	A	D	D
Approach Delay (s)	12.9			9.8	46.1	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay			14.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.50			
Actuated Cycle Length (s)			116.0		Sum of lost time (s)	12.9
Intersection Capacity Utilization			47.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Existing Plus Project Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	1	36	1	0	23	11	336	19	50	348	19
Future Volume (Veh/h)	65	1	36	1	0	23	11	336	19	50	348	19
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	1	39	1	0	25	12	365	21	54	378	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)											804	
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93					
vC, conflicting volume	921	906	388	936	906	376	399			386		
vC1, stage 1 conf vol	496	496		400	400							
vC2, stage 2 conf vol	424	410		536	507							
vCu, unblocked vol	876	861	303	892	861	376	314			386		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	100	94	100	100	96	99			95		
cM capacity (veh/h)	420	426	682	411	434	669	1152			1167		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	111	26	398	453								
Volume Left	71	1	12	54								
Volume Right	39	25	21	21								
cSH	486	653	1152	1167								
Volume to Capacity	0.23	0.04	0.01	0.05								
Queue Length 95th (ft)	22	3	1	4								
Control Delay (s)	14.6	10.7	0.4	1.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	14.6	10.7	0.4	1.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.7									
Intersection Capacity Utilization			62.2%		ICU Level of Service					B		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Park Plaza Dr & Garage Dwy/Belmar Ave

Existing Plus Project Conditions AM

Timing Plan: AM

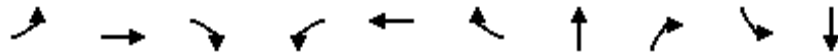
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	23	2	40	7	414	53	20	248	3
Future Volume (Veh/h)	0	0	0	23	2	40	7	414	53	20	248	3
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	25	2	43	8	450	58	22	270	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage (veh)							2			2		
Upstream signal (ft)							691			775		
pX, platoon unblocked												
vC, conflicting volume	854	840	272	810	812	479	273				508	
vC1, stage 1 conf vol	316	316		495	495							
vC2, stage 2 conf vol	539	524		316	317							
vCu, unblocked vol	854	840	272	810	812	479	273				508	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	95	100	93	99				98	
cM capacity (veh/h)	420	453	765	483	474	585	1284				1052	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	70	516	295								
Volume Left	0	25	8	22								
Volume Right	0	43	58	3								
cSH	1700	540	1284	1052								
Volume to Capacity	0.00	0.13	0.01	0.02								
Queue Length 95th (ft)	0	11	0	2								
Control Delay (s)	0.0	12.7	0.2	0.8								
Lane LOS	A	B	A	A								
Approach Delay (s)	0.0	12.7	0.2	0.8								
Approach LOS	A	B										
Intersection Summary												
Average Delay				1.4								
Intersection Capacity Utilization				37.3%	ICU Level of Service				A			
Analysis Period (min)				15								

Queues

Existing Plus Project Conditions AM

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	4	1184	15	142	1418	165	70	250	272	30
v/c Ratio	0.05	0.83	0.02	0.82	0.77	0.19	0.13	0.36	0.82	0.07
Control Delay	60.2	39.0	0.1	85.0	27.1	5.3	22.9	9.3	61.8	23.9
Queue Delay	0.0	0.0	0.0	0.0	11.3	0.0	0.0	0.0	0.0	0.0
Total Delay	60.2	39.0	0.1	85.0	38.4	5.3	22.9	9.3	61.8	23.9
Queue Length 50th (ft)	3	471	0	106	438	11	32	36	183	10
Queue Length 95th (ft)	m5	#568	m0	#222	#674	55	64	96	#368	36
Internal Link Dist (ft)		2029			411		195			206
Turn Bay Length (ft)										
Base Capacity (vph)	90	1420	707	175	1835	884	535	692	331	447
Starvation Cap Reductn	0	0	0	0	412	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.83	0.02	0.81	1.00	0.19	0.13	0.36	0.82	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Existing Plus Project Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	1089	14	131	1305	152	39	26	230	250	17	11
Future Volume (vph)	4	1089	14	131	1305	152	39	26	230	250	17	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.9	4.9	4.0	4.9	4.9		4.5	4.5	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1791	1568	1752	1734	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.78	1.00	0.71	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1435	1568	1312	1734	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	1184	15	142	1418	165	42	28	250	272	18	12
RTOR Reduction (vph)	0	0	9	0	0	67	0	0	105	0	9	0
Lane Group Flow (vph)	4	1184	6	142	1418	99	0	70	145	272	21	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4		4	
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.1	47.1	47.1	11.5	58.0	58.0		44.5	44.5	29.3	29.3	
Effective Green, g (s)	1.1	47.1	47.1	11.5	58.0	58.0		44.5	44.5	29.3	29.3	
Actuated g/C Ratio	0.01	0.41	0.41	0.10	0.50	0.50		0.38	0.38	0.25	0.25	
Clearance Time (s)	3.5	4.9	4.9	4.0	4.9	4.9				4.0	4.0	
Vehicle Extension (s)	2.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	16	1423	636	173	1752	784		550	601	331	437	
v/s Ratio Prot	0.00	0.34		c0.08	c0.40				c0.09		0.01	
v/s Ratio Perm			0.00			0.06		0.05		c0.21		
v/c Ratio	0.25	0.83	0.01	0.82	0.81	0.13		0.13	0.24	0.82	0.05	
Uniform Delay, d1	57.0	30.9	20.5	51.2	24.4	15.5		23.2	24.3	40.9	32.8	
Progression Factor	1.11	1.05	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.7	5.3	0.0	25.7	4.2	0.3		0.1	0.2	15.0	0.0	
Delay (s)	66.2	37.7	20.6	77.0	28.5	15.8		23.3	24.5	55.9	32.8	
Level of Service	E	D	C	E	C	B		C	C	E	C	
Approach Delay (s)		37.6			31.3			24.2			53.6	
Approach LOS		D			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			34.7				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			116.0				Sum of lost time (s)		17.4			
Intersection Capacity Utilization			71.5%				ICU Level of Service		C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 12: Lake Merced Blvd & Project Dwy

Existing Plus Project Conditions AM
Timing Plan: AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	61	0	0	20	0
Future Volume (Veh/h)	0	61	0	0	20	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	66	0	0	22	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	44	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	44	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			99	
cM capacity (veh/h)	951	1082			1617	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	66	0	22			
Volume Left	0	0	22			
Volume Right	66	0	0			
cSH	1082	1700	1617			
Volume to Capacity	0.06	0.00	0.01			
Queue Length 95th (ft)	5	0	1			
Control Delay (s)	8.5	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	8.5	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		8.2				
Intersection Capacity Utilization		13.8%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

Existing Plus Project Conditions PM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: PM

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	163	495	109	286	613	690	54	271	230	397	436
v/c Ratio	0.70	0.31	0.14	0.68	0.39	0.45	0.44	0.60	0.51	0.75	0.51
Control Delay	65.3	22.9	4.1	66.3	22.2	0.9	64.2	54.7	17.3	57.4	30.3
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.3	23.0	4.1	66.3	22.4	0.9	64.2	54.7	17.3	57.4	30.3
Queue Length 50th (ft)	122	124	0	121	97	0	41	105	65	153	112
Queue Length 95th (ft)	187	199	33	163	297	0	82	146	93	198	154
Internal Link Dist (ft)		569			362			714			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	266	1605	756	515	1573	1544	160	905	493	609	1203
Starvation Cap Reductn	0	0	0	0	360	0	0	0	0	0	0
Spillback Cap Reductn	0	86	0	0	0	0	0	0	2	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.33	0.14	0.56	0.51	0.45	0.34	0.30	0.47	0.65	0.36
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

Existing Plus Project Conditions PM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: PM

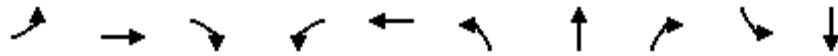
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	450	99	260	558	628	49	247	209	361	244	153
Future Volume (vph)	148	450	99	260	558	628	49	247	209	361	244	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	0.99	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	0.94
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	3505	1510	3400	3505	1544	1752	3505	1548	3400	3279	3279
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1752	3505	1510	3400	3505	1544	1752	3505	1548	3400	3279	3279
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	163	495	109	286	613	690	54	271	230	397	268	168
RTOR Reduction (vph)	0	0	60	0	0	0	0	0	61	0	97	0
Lane Group Flow (vph)	163	495	49	286	613	690	54	271	169	397	339	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	15.9	53.3	53.3	14.8	52.2	120.0	7.4	15.5	30.3	19.5	27.4	
Effective Green, g (s)	15.9	54.2	54.2	14.8	53.1	120.0	7.4	15.5	30.3	19.5	27.6	
Actuated g/C Ratio	0.13	0.45	0.45	0.12	0.44	1.00	0.06	0.13	0.25	0.16	0.23	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	232	1583	682	419	1550	1544	108	452	390	552	754	
v/s Ratio Prot	c0.09	0.14		0.08	0.17		0.03	c0.08	0.05	c0.12	0.10	
v/s Ratio Perm			0.03			c0.45			0.06			
v/c Ratio	0.70	0.31	0.07	0.68	0.40	0.45	0.50	0.60	0.43	0.72	0.45	
Uniform Delay, d1	49.8	21.0	18.6	50.4	22.6	0.0	54.5	49.3	37.7	47.7	39.7	
Progression Factor	1.00	1.00	1.00	1.19	0.89	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.6	0.5	0.2	3.4	0.6	0.8	2.6	2.5	0.6	4.2	0.6	
Delay (s)	58.4	21.5	18.9	63.1	20.7	0.8	57.1	51.8	38.2	51.8	40.3	
Level of Service	E	C	B	E	C	A	E	D	D	D	D	
Approach Delay (s)		29.0			19.7			46.7			45.8	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			31.4									
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			69.5%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Plus Project Conditions PM

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	120	1021	54	326	1378	165	48	467	8	124
v/c Ratio	0.63	0.55	0.07	0.71	0.71	0.79	0.12	0.60	0.10	0.57
Control Delay	66.9	22.2	4.6	75.9	17.4	76.1	36.4	13.9	56.9	27.5
Queue Delay	0.0	2.0	0.0	0.0	0.1	100.9	0.0	0.0	0.0	0.0
Total Delay	66.9	24.2	4.6	75.9	17.4	177.0	36.4	13.9	56.9	27.6
Queue Length 50th (ft)	97	343	5	139	165	124	30	112	6	27
Queue Length 95th (ft)	#170	474	m29	m158	294	#220	60	193	23	78
Internal Link Dist (ft)		253			2035		684			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	189	1842	828	623	1936	233	553	838	160	478
Starvation Cap Reductn	0	632	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	38	192	0	0	0	15
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.84	0.07	0.52	0.73	4.02	0.09	0.56	0.05	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Existing Plus Project Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	939	50	300	1258	10	152	44	430	7	32	82
Future Volume (vph)	110	939	50	300	1258	10	152	44	430	7	32	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1470	3400	3499		1752	1845	1568	1752	1597	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1470	3400	3499		1752	1845	1568	1752	1597	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	1021	54	326	1367	11	165	48	467	8	35	89
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	166	0	79	0
Lane Group Flow (vph)	120	1021	27	326	1378	0	165	48	301	8	45	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pt+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)	13.0	58.9	58.9	16.3	62.2		14.5	26.5	46.8	1.4	13.4	
Effective Green, g (s)	13.0	59.8	59.8	16.3	63.1		14.5	26.5	46.8	1.4	13.4	
Actuated g/C Ratio	0.11	0.50	0.50	0.14	0.53		0.12	0.22	0.39	0.01	0.11	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0		2.5	2.0	
Lane Grp Cap (vph)	189	1746	732	461	1839		211	407	611	20	178	
v/s Ratio Prot	0.07	c0.29		0.10	c0.39		c0.09	0.03	c0.19	0.00	0.03	
v/s Ratio Perm			0.02									
v/c Ratio	0.63	0.58	0.04	0.71	0.75		0.78	0.12	0.49	0.40	0.25	
Uniform Delay, d1	51.2	21.3	15.4	49.6	22.3		51.2	37.4	27.6	58.9	48.7	
Progression Factor	1.03	0.99	1.00	1.45	0.74		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	1.3	0.1	2.2	1.4		16.5	0.0	0.2	9.3	0.3	
Delay (s)	58.0	22.3	15.5	74.3	17.9		67.7	37.4	27.9	68.2	49.0	
Level of Service	E	C	B	E	B		E	D	C	E	D	
Approach Delay (s)		25.6			28.7			38.2			50.2	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			30.2			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			75.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Plus Project Conditions PM

3: I-280/SR-1 ramps & John Daly Blvd

Timing Plan: PM

	→	↙	←	↘
Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1460	689	1658	369
v/c Ratio	0.46	0.83	0.47	0.49
Control Delay	2.7	52.3	0.5	28.7
Queue Delay	0.2	0.0	0.1	0.0
Total Delay	2.9	52.3	0.5	28.7
Queue Length 50th (ft)	45	261	0	97
Queue Length 95th (ft)	53	310	0	140
Internal Link Dist (ft)	406		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3199	1076	3505	947
Starvation Cap Reductn	789	0	0	0
Spillback Cap Reductn	0	0	355	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.61	0.64	0.53	0.39
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

3: I-280/SR-1 ramps & John Daly Blvd

Existing Plus Project Conditions PM

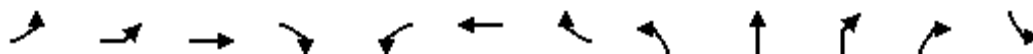
Timing Plan: PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↙↘	↑↑		↗↘
Traffic Volume (vph)	1018	399	668	1608	0	358
Future Volume (vph)	1018	399	668	1608	0	358
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.96		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.96		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4610		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4610		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1049	411	689	1658	0	369
RTOR Reduction (vph)	18	0	0	0	0	82
Lane Group Flow (vph)	1442	0	689	1658	0	287
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	83.2		29.7	120.0		29.7
Effective Green, g (s)	82.8		29.2	120.0		29.2
Actuated g/C Ratio	0.69		0.24	1.00		0.24
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3180		827	3505		671
v/s Ratio Prot	0.31		c0.20	c0.47		0.10
v/s Ratio Perm						
v/c Ratio	0.45		0.83	0.47		0.43
Uniform Delay, d1	8.4		43.1	0.0		38.3
Progression Factor	0.28		1.00	1.00		1.00
Incremental Delay, d2	0.3		7.2	0.5		0.4
Delay (s)	2.6		50.3	0.5		38.8
Level of Service	A		D	A		D
Approach Delay (s)	2.6			15.1	38.8	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			12.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			56.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Existing Plus Project Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: PM



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	129	374	723	196	106	900	362	623	413	357	371	159
v/c Ratio	0.29	0.88	0.88	0.47	0.31	0.84	0.50	0.95	1.29	1.08	0.47	0.46
Control Delay	49.2	77.1	67.4	17.7	54.2	67.1	29.1	87.3	202.8	118.1	12.6	59.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	77.1	67.4	17.7	54.2	67.1	29.1	87.3	202.8	118.1	12.6	59.9
Queue Length 50th (ft)	118	445	454	40	108	349	230	336	~603	~387	96	147
Queue Length 95th (ft)	197	#740	#661	138	177	409	305	#454	#846	#621	191	214
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	450	425	825	418	348	1099	786	658	319	332	798	416
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.88	0.88	0.47	0.30	0.82	0.46	0.95	1.29	1.08	0.46	0.38

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



Lane Group	SBT	SBR
Lane Group Flow (vph)	269	675
v/c Ratio	0.78	0.87
Control Delay	75.7	47.2
Queue Delay	0.0	0.0
Total Delay	75.7	47.2
Queue Length 50th (ft)	281	627
Queue Length 95th (ft)	380	#909
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	416	772
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.65	0.87

Intersection Summary

HCM Signalized Intersection Capacity Analysis

Existing Plus Project Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: PM

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	137	516	502	209	113	852	208	139	598	347	248	480
Future Volume (vph)	137	516	502	209	113	852	208	139	598	347	248	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.77	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.98	0.85	0.85
Flt Protected	0.95	0.95	0.99	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2918	1099	1507	4756	1568		3400	1647	1427	1490
Flt Permitted	0.95	0.95	0.99	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2918	1099	1507	4756	1568		3400	1647	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	143	538	523	218	118	888	217	145	623	361	258	522
RTOR Reduction (vph)	0	0	1	108	0	0	24	0	0	0	56	136
Lane Group Flow (vph)	129	374	722	88	106	900	338	0	623	413	301	235
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pm+ov		Split	NA	Perm	custom
Protected Phases	2	2	2		4	4	3		1	1		4
Permitted Phases				2			4				1	1 4
Actuated Green, G (s)	44.7	44.7	44.7	44.7	36.0	36.0	67.2		30.5	30.5	30.5	66.5
Effective Green, g (s)	45.2	45.2	45.2	45.2	36.1	36.1	68.2		31.0	31.0	31.0	66.7
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.23	0.23	0.43		0.19	0.19	0.19	0.42
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.5		4.5	4.5	4.5	4.1
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	450	425	824	310	340	1073	668		658	319	276	621
v/s Ratio Prot	0.08	0.25	0.25		0.07	c0.19	0.10		0.18	c0.25		0.09
v/s Ratio Perm				0.08			0.12				0.21	0.07
v/c Ratio	0.29	0.88	0.88	0.29	0.31	0.84	0.51		0.95	1.29	1.09	0.38
Uniform Delay, d1	44.8	54.8	54.7	44.8	51.6	59.2	33.6		63.7	64.5	64.5	32.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	22.1	12.6	2.3	0.7	6.1	0.8		22.8	154.0	80.9	0.5
Delay (s)	46.4	76.9	67.3	47.1	52.3	65.3	34.4		86.5	218.5	145.4	32.8
Level of Service	D	E	E	D	D	E	C		F	F	F	C
Approach Delay (s)			65.1			56.1				118.0		
Approach LOS			E			E				F		
Intersection Summary												
HCM 2000 Control Delay			77.5									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			160.0									Sum of lost time (s) 16.0
Intersection Capacity Utilization			105.3%									ICU Level of Service G
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Existing Plus Project Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: PM



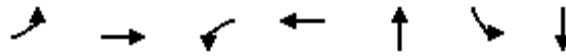
Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	153	258	648
Future Volume (vph)	153	258	648
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1752	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1752	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	159	269	675
RTOR Reduction (vph)	0	0	20
Lane Group Flow (vph)	159	269	655
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pm+ov
Protected Phases	3	3	2
Permitted Phases			3
Actuated Green, G (s)	31.2	31.2	75.9
Effective Green, g (s)	31.7	31.7	76.9
Actuated g/C Ratio	0.20	0.20	0.48
Clearance Time (s)	4.5	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0
Lane Grp Cap (vph)	347	347	753
v/s Ratio Prot	0.09	0.15	c0.25
v/s Ratio Perm			0.19
v/c Ratio	0.46	0.78	0.87
Uniform Delay, d1	56.6	60.8	37.1
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	1.3	10.9	11.0
Delay (s)	57.9	71.7	48.1
Level of Service	E	E	D
Approach Delay (s)		55.3	
Approach LOS		E	
Intersection Summary			

Queues

Existing Plus Project Conditions PM

5: Lake Merced Blvd & Southgate Ave

Timing Plan: PM



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	176	240	108	356	257	100	315
v/c Ratio	0.95	0.52	0.74	0.83	0.70	0.27	0.78
Control Delay	93.5	27.8	67.7	42.4	35.7	27.2	38.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.5	27.8	67.7	42.4	35.7	27.2	38.9
Queue Length 50th (ft)	~92	92	52	142	101	39	120
Queue Length 95th (ft)	#182	142	#118	#225	149	71	180
Internal Link Dist (ft)		324		313	133		583
Turn Bay Length (ft)			130			100	
Base Capacity (vph)	185	519	146	483	467	446	472
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.46	0.74	0.74	0.55	0.22	0.67

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Lake Merced Blvd & Southgate Ave

Existing Plus Project Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	156	34	85	164	117	28	104	71	79	140	109
Future Volume (vph)	139	156	34	85	164	117	28	104	71	79	140	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.94			0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1752	1795		1752	1730			1746		1752	1723	
Flt Permitted	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (perm)	1752	1795		1752	1730			1746		1752	1723	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	176	197	43	108	208	148	35	132	90	100	177	138
RTOR Reduction (vph)	0	10	0	0	32	0	0	25	0	0	35	0
Lane Group Flow (vph)	176	230	0	108	324	0	0	232	0	100	280	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	7.7	18.3		6.0	16.6			14.1		15.4	15.4	
Effective Green, g (s)	7.7	18.3		6.0	16.6			14.1		15.4	15.4	
Actuated g/C Ratio	0.11	0.25		0.08	0.23			0.20		0.21	0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	187	457		146	399			342		375	369	
v/s Ratio Prot	c0.10	0.13		0.06	c0.19			c0.13		0.06	c0.16	
v/s Ratio Perm												
v/c Ratio	0.94	0.50		0.74	0.81			0.68		0.27	0.76	
Uniform Delay, d1	31.8	22.9		32.1	26.1			26.7		23.5	26.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	48.9	0.9		17.7	11.8			5.3		0.4	8.6	
Delay (s)	80.7	23.7		49.9	38.0			32.0		23.9	35.1	
Level of Service	F	C		D	D			C		C	D	
Approach Delay (s)		47.9			40.7			32.0			32.4	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			39.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			71.8			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			63.9%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Palmcrest Dr/Westlake Center & Southgate Ave

Existing Plus Project Conditions PM
Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	63	132	41	0	179	86	22	16	19	81	58	144
Future Volume (vph)	63	132	41	0	179	86	22	16	19	81	58	144
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	79	165	51	0	224	108	28	20	24	101	73	180
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	162	134	332	72	354							
Volume Left (vph)	79	0	0	28	101							
Volume Right (vph)	0	51	108	24	180							
Hadj (s)	0.30	-0.22	-0.14	-0.07	-0.20							
Departure Headway (s)	6.6	6.1	5.6	6.3	5.6							
Degree Utilization, x	0.30	0.23	0.52	0.13	0.55							
Capacity (veh/h)	509	551	601	476	607							
Control Delay (s)	11.1	9.6	14.6	10.2	15.1							
Approach Delay (s)	10.5		14.6	10.2	15.1							
Approach LOS	B		B	B	C							
Intersection Summary												
Delay			13.3									
Level of Service			B									
Intersection Capacity Utilization			50.8%	ICU Level of Service		A						
Analysis Period (min)			15									

Queues
7: Park Plaza Dr & Southgate Ave

Existing Plus Project Conditions PM
Timing Plan: PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	176	138	178	375	190	134
v/c Ratio	0.48	0.32	0.59	0.32	0.26	0.19
Control Delay	22.7	6.0	29.6	5.8	13.4	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	6.0	29.6	5.8	13.4	3.8
Queue Length 50th (ft)	47	0	50	42	39	0
Queue Length 95th (ft)	81	25	95	84	76	22
Internal Link Dist (ft)	338			169	622	
Turn Bay Length (ft)						65
Base Capacity (vph)	632	653	319	1181	720	694
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.21	0.56	0.32	0.26	0.19
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

7: Park Plaza Dr & Southgate Ave

Existing Plus Project Conditions PM

Timing Plan: PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	141	110	142	300	152	107
Future Volume (vph)	141	110	142	300	152	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	176	138	178	375	190	134
RTOR Reduction (vph)	0	109	0	0	0	82
Lane Group Flow (vph)	176	29	178	375	190	52
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	10.5	10.5	8.7	33.3	20.1	20.1
Effective Green, g (s)	11.0	11.0	9.2	33.8	20.6	20.6
Actuated g/C Ratio	0.21	0.21	0.17	0.64	0.39	0.39
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	365	326	305	1181	719	611
v/s Ratio Prot	c0.10		c0.10	c0.20	0.10	
v/s Ratio Perm		0.02				0.03
v/c Ratio	0.48	0.09	0.58	0.32	0.26	0.09
Uniform Delay, d1	18.4	16.9	20.0	4.3	10.9	10.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.1	2.8	0.7	0.9	0.3
Delay (s)	19.4	17.0	22.9	5.0	11.8	10.4
Level of Service	B	B	C	A	B	B
Approach Delay (s)	18.3			10.8	11.3	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		

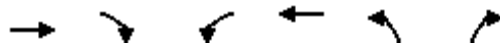
c Critical Lane Group

Queues

Existing Plus Project Conditions PM

8: Westlake Center & John Daly Blvd

Timing Plan: PM



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	890	265	275	1364	247	315
v/c Ratio	0.52	0.30	0.62	0.60	0.47	0.42
Control Delay	29.0	8.2	52.3	18.6	38.2	17.9
Queue Delay	7.5	0.0	0.0	2.0	0.0	0.0
Total Delay	36.5	8.2	52.3	20.5	38.2	17.9
Queue Length 50th (ft)	316	42	106	308	157	121
Queue Length 95th (ft)	403	73	148	366	238	181
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	1697	897	586	2270	523	821
Starvation Cap Reductn	476	0	0	710	0	0
Spillback Cap Reductn	758	0	0	0	0	16
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.30	0.47	0.87	0.47	0.39
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

8: Westlake Center & John Daly Blvd

Existing Plus Project Conditions PM

Timing Plan: PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘↙	↑↑	↘	↑
Traffic Volume (vph)	819	244	253	1255	227	290
Future Volume (vph)	819	244	253	1255	227	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	3.5	4.0	3.5	3.5
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	890	265	275	1364	247	315
RTOR Reduction (vph)	0	138	0	0	0	42
Lane Group Flow (vph)	890	127	275	1364	247	273
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	57.1	57.1	15.0	76.5	35.0	50.0
Effective Green, g (s)	57.6	57.6	15.5	77.0	35.5	51.0
Actuated g/C Ratio	0.48	0.48	0.13	0.64	0.30	0.42
Clearance Time (s)	4.9	4.9	4.0	4.5	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	2.0	3.0
Lane Grp Cap (vph)	1698	759	443	2270	523	718
v/s Ratio Prot	0.25		0.08	c0.39	c0.14	0.05
v/s Ratio Perm		0.08				0.12
v/c Ratio	0.52	0.17	0.62	0.60	0.47	0.38
Uniform Delay, d1	21.7	17.6	49.5	12.5	34.6	23.7
Progression Factor	1.25	3.10	0.97	1.39	1.00	1.00
Incremental Delay, d2	1.1	0.4	2.0	0.9	3.0	0.3
Delay (s)	28.1	55.1	50.1	18.3	37.6	24.0
Level of Service	C	E	D	B	D	C
Approach Delay (s)	34.3			23.6	30.0	
Approach LOS	C			C	C	
Intersection Summary						
HCM 2000 Control Delay			28.4		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	11.4
Intersection Capacity Utilization			53.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Existing Plus Project Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	2	28	14	0	54	19	396	30	81	430	75
Future Volume (Veh/h)	22	2	28	14	0	54	19	396	30	81	430	75
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	2	30	15	0	59	21	430	33	88	467	82
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)											794	
pX, platoon unblocked	0.88	0.88	0.88	0.88	0.88		0.88					
vC, conflicting volume	1232	1189	508	1204	1214	446	549			463		
vC1, stage 1 conf vol	684	684		488	488							
vC2, stage 2 conf vol	548	505		715	725							
vCu, unblocked vol	1196	1148	376	1164	1175	446	422			463		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	99	95	95	100	90	98			92		
cM capacity (veh/h)	291	326	590	307	323	610	999			1093		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	56	74	484	637								
Volume Left	24	15	21	88								
Volume Right	30	59	33	82								
cSH	401	508	999	1093								
Volume to Capacity	0.14	0.15	0.02	0.08								
Queue Length 95th (ft)	12	13	2	7								
Control Delay (s)	15.4	13.3	0.6	2.1								
Lane LOS	C	B	A	A								
Approach Delay (s)	15.4	13.3	0.6	2.1								
Approach LOS	C	B										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			71.1%	ICU Level of Service				C				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 10: Park Plaza Dr & Garage Dwy/Belmar Ave

Existing Plus Project Conditions PM

Timing Plan: PM

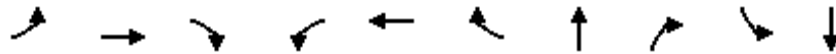
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	0	1	22	0	21	7	426	55	30	373	9
Future Volume (Veh/h)	16	0	1	22	0	21	7	426	55	30	373	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	0	1	24	0	23	8	463	60	33	405	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage veh)							2			2		
Upstream signal (ft)							702			764		
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1008	1015	410	986	990	493	415			523		
vC1, stage 1 conf vol	476	476		509	509							
vC2, stage 2 conf vol	532	539		477	481							
vCu, unblocked vol	995	1002	410	972	976	466	415			497		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	100	94	100	96	99			97		
cM capacity (veh/h)	395	404	639	424	421	579	1139			1034		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	47	531	448								
Volume Left	17	24	8	33								
Volume Right	1	23	60	10								
cSH	404	488	1139	1034								
Volume to Capacity	0.04	0.10	0.01	0.03								
Queue Length 95th (ft)	3	8	1	2								
Control Delay (s)	14.3	13.2	0.2	1.0								
Lane LOS	B	B	A	A								
Approach Delay (s)	14.3	13.2	0.2	1.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.4								
Intersection Capacity Utilization				47.9%	ICU Level of Service				A			
Analysis Period (min)				15								

Queues

Existing Plus Project Conditions PM

11: Poncetta Dr/Sheffield Dr & John Daly Blvd

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	8	1173	27	173	1643	208	41	197	112	27
v/c Ratio	0.11	0.86	0.04	0.93	0.89	0.23	0.08	0.27	0.39	0.07
Control Delay	55.3	45.0	0.2	101.6	33.0	5.9	23.7	5.5	45.4	26.8
Queue Delay	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	45.0	0.2	101.6	35.9	5.9	23.7	5.5	45.4	26.8
Queue Length 50th (ft)	6	487	0	135	554	21	20	8	75	10
Queue Length 95th (ft)	m10	545	m0	#273	#845	71	45	56	133	36
Internal Link Dist (ft)		2035			406		211			198
Turn Bay Length (ft)										
Base Capacity (vph)	73	1364	687	186	1843	894	502	723	286	376
Starvation Cap Reductn	0	0	0	0	121	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.86	0.04	0.93	0.95	0.23	0.08	0.27	0.39	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

11: Poncetta Dr/Sheffield Dr & John Daly Blvd

Existing Plus Project Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1079	25	159	1512	191	31	6	181	103	15	10
Future Volume (vph)	7	1079	25	159	1512	191	31	6	181	103	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	3.5	3.5		4.5	4.5	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1771	1568	1752	1732	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.70	1.00	0.73	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1283	1568	1347	1732	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	1173	27	173	1643	208	34	7	197	112	16	11
RTOR Reduction (vph)	0	0	16	0	0	75	0	0	108	0	9	0
Lane Group Flow (vph)	8	1173	11	173	1643	133	0	41	89	112	18	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4			4
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.0	46.7	46.7	12.8	59.5	59.5		48.0	48.0	25.5	25.5	
Effective Green, g (s)	1.0	46.7	46.7	12.8	59.5	59.5		48.0	48.0	25.5	25.5	
Actuated g/C Ratio	0.01	0.39	0.39	0.11	0.50	0.50		0.40	0.40	0.21	0.21	
Clearance Time (s)	4.5	4.5	4.5	4.5	3.5	3.5				3.5	3.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	14	1364	610	186	1737	777		513	627	286	368	
v/s Ratio Prot	0.00	0.33		c0.10	c0.47				c0.06		0.01	
v/s Ratio Perm			0.01			0.09		0.03		c0.08		
v/c Ratio	0.57	0.86	0.02	0.93	0.95	0.17		0.08	0.14	0.39	0.05	
Uniform Delay, d1	59.3	33.6	22.5	53.2	28.7	16.7		22.3	22.9	40.6	37.6	
Progression Factor	0.95	1.14	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	39.7	6.2	0.0	44.5	11.5	0.5		0.3	0.5	4.0	0.3	
Delay (s)	95.9	44.5	22.6	97.6	40.3	17.1		22.6	23.4	44.6	37.9	
Level of Service	F	D	C	F	D	B		C	C	D	D	
Approach Delay (s)		44.4			42.8			23.2			43.3	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			42.0				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			68.8%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 12: Lake Merced Blvd & Project Dwy

Existing Plus Project Conditions PM
Timing Plan: PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	58	0	0	59	0
Future Volume (Veh/h)	0	58	0	0	59	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	63	0	0	64	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	128	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	128	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			96	
cM capacity (veh/h)	830	1082			1617	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	63	0	64			
Volume Left	0	0	64			
Volume Right	63	0	0			
cSH	1082	1700	1617			
Volume to Capacity	0.06	0.00	0.04			
Queue Length 95th (ft)	5	0	3			
Control Delay (s)	8.5	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	8.5	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		7.9				
Intersection Capacity Utilization		13.6%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

Cumulative Conditions AM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: AM

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	296	519	35	199	508	790	32	231	210	397	350
v/c Ratio	0.74	0.31	0.04	0.59	0.42	0.51	0.30	0.55	0.50	0.74	0.40
Control Delay	52.9	20.8	0.1	56.3	35.9	1.9	58.5	52.7	15.2	55.2	30.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	20.8	0.1	56.3	35.9	1.9	58.5	52.7	15.2	55.2	30.1
Queue Length 50th (ft)	204	122	0	76	183	23	23	86	48	147	94
Queue Length 95th (ft)	301	194	0	119	258	33	55	124	79	192	132
Internal Link Dist (ft)		569			362			724			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	402	1671	785	360	1215	1544	166	936	427	570	1130
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	75	0	0	0	0	0	0	2	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.33	0.04	0.55	0.42	0.51	0.19	0.25	0.49	0.70	0.31
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

Cumulative Conditions AM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: AM

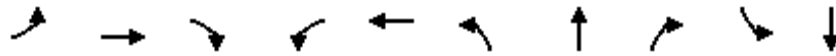
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	269	472	32	181	462	719	29	210	191	361	216	103
Future Volume (vph)	269	472	32	181	462	719	29	210	191	361	216	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9	4.0	4.0	4.0	4.0	4.0	4.2	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1511	3400	3505	1544	1752	3505	1547	3400	3316	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1511	3400	3505	1544	1752	3505	1547	3400	3316	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	296	519	35	199	508	790	32	231	210	397	237	113
RTOR Reduction (vph)	0	0	19	0	0	0	0	0	78	0	55	0
Lane Group Flow (vph)	296	519	16	199	508	790	32	231	132	397	295	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	26.7	53.7	53.7	11.6	38.6	116.0	4.9	13.9	25.5	19.9	28.7	
Effective Green, g (s)	26.7	53.7	53.7	11.6	38.6	116.0	4.9	13.9	25.5	19.9	28.7	
Actuated g/C Ratio	0.23	0.46	0.46	0.10	0.33	1.00	0.04	0.12	0.22	0.17	0.25	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	403	1622	699	340	1166	1544	74	419	340	583	820	
v/s Ratio Prot	c0.17	0.15		0.06	0.14		0.02	0.07	0.04	c0.12	0.09	
v/s Ratio Perm			0.01			c0.51			0.05			
v/c Ratio	0.73	0.32	0.02	0.59	0.44	0.51	0.43	0.55	0.39	0.68	0.36	
Uniform Delay, d1	41.4	19.6	16.9	49.9	30.2	0.0	54.2	48.1	38.6	45.1	36.1	
Progression Factor	1.00	1.00	1.00	1.00	1.13	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.4	0.5	0.1	1.9	1.1	1.1	2.9	1.9	0.5	3.0	0.4	
Delay (s)	47.8	20.2	17.0	52.1	35.2	1.1	57.1	50.0	39.1	48.1	36.4	
Level of Service	D	C	B	D	D	A	E	D	D	D	D	
Approach Delay (s)		29.7			19.4			45.7			42.6	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			30.2			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			17.1			
Intersection Capacity Utilization			75.4%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Conditions AM

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	123	979	42	209	1325	157	103	229	23	238
v/c Ratio	0.58	0.55	0.05	0.60	0.77	0.77	0.26	0.33	0.23	0.81
Control Delay	75.3	35.2	10.2	80.4	15.7	73.6	39.0	5.8	57.3	44.8
Queue Delay	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.3	37.7	10.2	80.4	15.7	73.6	39.0	5.8	57.3	44.8
Queue Length 50th (ft)	98	371	6	86	100	114	66	12	17	91
Queue Length 95th (ft)	162	455	32	m103	#612	#205	109	58	44	168
Internal Link Dist (ft)		253			2029		695			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	211	1796	796	396	1730	226	556	703	166	509
Starvation Cap Reductn	0	664	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.86	0.05	0.53	0.77	0.69	0.19	0.33	0.14	0.47

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Cumulative Conditions AM

Timing Plan: AM

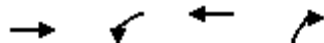
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 						 	
Traffic Volume (vph)	113	901	39	192	1213	6	144	95	211	21	59	160
Future Volume (vph)	113	901	39	192	1213	6	144	95	211	21	59	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1472	3400	3501		1752	1845	1568	1752	1594	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1472	3400	3501		1752	1845	1568	1752	1594	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	979	42	209	1318	7	157	103	229	23	64	174
RTOR Reduction (vph)	0	0	21	0	0	0	0	0	134	0	99	0
Lane Group Flow (vph)	123	979	21	209	1325	0	157	103	95	23	139	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pt+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)	14.0	57.8	57.8	11.9	55.7		13.6	24.9	40.8	4.5	15.8	
Effective Green, g (s)	14.0	57.8	57.8	11.9	55.7		13.6	24.9	40.8	4.5	15.8	
Actuated g/C Ratio	0.12	0.50	0.50	0.10	0.48		0.12	0.21	0.35	0.04	0.14	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0		2.5	2.0	
Lane Grp Cap (vph)	211	1746	733	348	1681		205	396	551	67	217	
v/s Ratio Prot	0.07	c0.28		0.06	c0.38		c0.09	0.06	0.06	0.01	c0.09	
v/s Ratio Perm			0.01									
v/c Ratio	0.58	0.56	0.03	0.60	0.79		0.77	0.26	0.17	0.34	0.64	
Uniform Delay, d1	48.2	20.3	14.8	49.8	25.2		49.7	37.9	26.0	54.3	47.4	
Progression Factor	1.32	1.59	34.34	1.54	0.50		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.1	1.2	0.1	1.5	2.3		15.0	0.1	0.1	2.2	4.5	
Delay (s)	67.0	33.5	508.6	78.0	15.0		64.6	38.0	26.0	56.5	51.9	
Level of Service	E	C	F	E	B		E	D	C	E	D	
Approach Delay (s)		54.5			23.6			40.9			52.3	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			38.6			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			16.9			
Intersection Capacity Utilization			83.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Conditions AM

3: I-280/SR-1 ramps & John Daly Blvd

Timing Plan: AM



Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1851	475	1288	330
v/c Ratio	0.52	0.83	0.37	0.59
Control Delay	5.8	61.3	0.3	34.7
Queue Delay	0.6	0.0	0.0	0.0
Total Delay	6.4	61.3	0.3	34.7
Queue Length 50th (ft)	173	182	0	88
Queue Length 95th (ft)	201	243	0	142
Internal Link Dist (ft)	411		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3576	609	3505	585
Starvation Cap Reductn	1201	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.78	0.78	0.37	0.56
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

3: I-280/SR-1 ramps & John Daly Blvd

Cumulative Conditions AM

Timing Plan: AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↙↘	↑↑		↗↘
Traffic Volume (vph)	1305	491	461	1249	0	320
Future Volume (vph)	1305	491	461	1249	0	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6		3.5	3.6		3.5
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.96		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.96		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4622		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4622		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1345	506	475	1288	0	330
RTOR Reduction (vph)	7	0	0	0	0	92
Lane Group Flow (vph)	1844	0	475	1288	0	238
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	92.7		20.2	120.0		20.2
Effective Green, g (s)	92.7		20.2	120.0		20.2
Actuated g/C Ratio	0.77		0.17	1.00		0.17
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3570		572	3505		464
v/s Ratio Prot	c0.40		c0.14	0.37		0.09
v/s Ratio Perm						
v/c Ratio	0.52		0.83	0.37		0.51
Uniform Delay, d1	5.2		48.2	0.0		45.4
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.5		9.9	0.3		1.0
Delay (s)	5.7		58.2	0.3		46.4
Level of Service	A		E	A		D
Approach Delay (s)	5.7			15.9	46.4	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			13.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	7.1
Intersection Capacity Utilization			57.9%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Cumulative Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: AM

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	120	401	831	299	144	749	422	439	405	368	371	98
v/c Ratio	0.27	0.96	1.04	0.63	0.69	1.13	0.60	0.64	1.25	1.06	0.49	0.21
Control Delay	44.5	89.0	93.4	18.6	79.1	133.4	33.2	59.5	181.7	108.8	7.0	44.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.5	89.0	93.4	18.6	79.1	133.4	33.2	59.5	181.7	108.8	7.0	44.7
Queue Length 50th (ft)	101	452	~537	62	158	~328	282	204	~539	~365	22	75
Queue Length 95th (ft)	165	#702	#697	185	#263	#425	400	264	#773	#598	106	128
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	441	416	802	473	209	662	703	691	325	348	764	461
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.96	1.04	0.63	0.69	1.13	0.60	0.64	1.25	1.06	0.49	0.21

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

		
Lane Group	SBT	SBR
Lane Group Flow (vph)	593	518
v/c Ratio	1.30	0.60
Control Delay	194.5	22.7
Queue Delay	0.0	0.0
Total Delay	194.5	22.7
Queue Length 50th (ft)	~778	309
Queue Length 95th (ft)	#1032	434
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	455	866
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.30	0.60

Intersection Summary

HCM Signalized Intersection Capacity Analysis

Cumulative Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: AM

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	128	642	496	319	154	704	241	164	421	272	324	481
Future Volume (vph)	128	642	496	319	154	704	241	164	421	272	324	481
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.1		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.78	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.99	0.85	1.00	1.00	0.85		1.00	0.95	0.85	0.85
Flt Protected	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2896	1118	1507	4754	1568		3400	1603	1427	1490
Flt Permitted	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2896	1118	1507	4754	1568		3400	1603	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	133	669	517	332	160	733	251	171	439	283	338	523
RTOR Reduction (vph)	0	0	1	164	0	0	25	0	0	0	58	212
Lane Group Flow (vph)	120	401	830	135	144	749	397	0	439	405	310	159
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pt+ov		Split	NA	Prot	pt+ov
Protected Phases	2	2	2		4	4	4 3		1	1	1	1 4
Permitted Phases				2								
Actuated Green, G (s)	41.5	41.5	41.5	41.5	20.9	20.9	64.5		30.5	30.5	30.5	55.9
Effective Green, g (s)	41.5	41.5	41.5	41.5	20.9	20.9	64.5		30.5	30.5	30.5	55.9
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.14	0.14	0.43		0.20	0.20	0.20	0.37
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1			4.5	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	441	416	801	309	209	662	674		691	325	290	555
v/s Ratio Prot	0.08	0.27	c0.29		0.10	c0.16	0.25		0.13	c0.25	0.22	0.11
v/s Ratio Perm				0.12								
v/c Ratio	0.27	0.96	1.04	0.44	0.69	1.13	0.59		0.64	1.25	1.07	0.29
Uniform Delay, d1	42.4	53.5	54.2	44.6	61.5	64.5	32.6		54.7	59.8	59.8	33.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	36.0	41.4	4.4	9.8	77.1	1.6		2.2	134.0	72.2	0.4
Delay (s)	44.0	89.5	95.6	49.1	71.3	141.6	34.2		56.8	193.7	131.9	33.4
Level of Service	D	F	F	D	E	F	C		E	F	F	C
Approach Delay (s)			81.9			99.5				103.8		
Approach LOS			F			F				F		
Intersection Summary												
HCM 2000 Control Delay			99.0									F
HCM 2000 Volume to Capacity ratio			1.18									
Actuated Cycle Length (s)			150.0									17.6
Intersection Capacity Utilization			109.2%									H
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Cumulative Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: AM



Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	94	482	585
Future Volume (vph)	94	482	585
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	0.98	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1712	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1712	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	98	502	609
RTOR Reduction (vph)	0	4	18
Lane Group Flow (vph)	98	589	500
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pt+ov
Protected Phases	3	3	3 2
Permitted Phases			
Actuated Green, G (s)	39.5	39.5	85.5
Effective Green, g (s)	39.5	39.5	85.5
Actuated g/C Ratio	0.26	0.26	0.57
Clearance Time (s)	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	
Lane Grp Cap (vph)	461	450	849
v/s Ratio Prot	0.06	c0.34	0.34
v/s Ratio Perm			
v/c Ratio	0.21	1.31	0.59
Uniform Delay, d1	43.1	55.2	20.9
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.3	153.9	1.2
Delay (s)	43.4	209.1	22.1
Level of Service	D	F	C
Approach Delay (s)		115.6	
Approach LOS		F	
Intersection Summary			

HCM Unsignalized Intersection Capacity Analysis 5: Lake Merced Blvd & Southgate Ave

Cumulative Conditions AM
Timing Plan: AM

																	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
Lane Configurations																	
Sign Control	Stop			Stop			Stop			Stop							
Traffic Volume (vph)	170	199	32	23	135	63	22	74	46	100	121	69					
Future Volume (vph)	170	199	32	23	135	63	22	74	46	100	121	69					
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79					
Hourly flow rate (vph)	215	252	41	29	171	80	28	94	58	127	153	87					
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2										
Volume Total (vph)	215	293	29	251	180	127	240										
Volume Left (vph)	215	0	29	0	28	127	0										
Volume Right (vph)	0	41	0	80	58	0	87										
Hadj (s)	0.55	-0.05	0.55	-0.17	-0.11	0.55	-0.20										
Departure Headway (s)	7.5	6.9	7.9	7.2	7.4	7.8	7.1										
Degree Utilization, x	0.45	0.56	0.06	0.50	0.37	0.28	0.47										
Capacity (veh/h)	462	497	429	470	446	435	475										
Control Delay (s)	15.3	17.2	10.2	15.9	14.7	12.6	15.0										
Approach Delay (s)	16.4		15.3		14.7	14.2											
Approach LOS	C		C		B	B											
Intersection Summary																	
Delay			15.3														
Level of Service			C														
Intersection Capacity Utilization			52.2%		ICU Level of Service		A										
Analysis Period (min)			15														

HCM Unsignalized Intersection Capacity Analysis 6: Palmcrest Dr/Westlake Center & Southgate Ave

Cumulative Conditions AM
Timing Plan: AM

																			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR							
Lane Configurations																			
Sign Control		Stop			Stop			Stop			Stop								
Traffic Volume (vph)	66	225	46	25	127	43	26	16	36	44	55	59							
Future Volume (vph)	66	225	46	25	127	43	26	16	36	44	55	59							
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80							
Hourly flow rate (vph)	83	281	58	31	159	54	33	20	45	55	69	74							
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1														
Volume Total (vph)	224	199	244	98	198														
Volume Left (vph)	83	0	31	33	55														
Volume Right (vph)	0	58	54	45	74														
Hadj (s)	0.24	-0.15	-0.06	-0.16	-0.12														
Departure Headway (s)	5.9	5.5	5.4	5.8	5.6														
Degree Utilization, x	0.37	0.31	0.37	0.16	0.31														
Capacity (veh/h)	580	623	626	541	585														
Control Delay (s)	11.2	9.8	11.5	9.9	11.1														
Approach Delay (s)	10.5		11.5	9.9	11.1														
Approach LOS	B		B	A	B														
Intersection Summary																			
Delay			10.8																
Level of Service			B																
Intersection Capacity Utilization			41.4%	ICU Level of Service					A										
Analysis Period (min)			15																

Queues
7: Park Plaza Dr & Southgate Ave

Cumulative Conditions AM
Timing Plan: AM

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	275	111	118	308	174	115
v/c Ratio	0.65	0.24	0.47	0.28	0.23	0.16
Control Delay	26.7	5.4	29.0	7.1	14.7	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	5.4	29.0	7.1	14.7	4.3
Queue Length 50th (ft)	81	0	35	43	40	0
Queue Length 95th (ft)	123	22	72	83	79	23
Internal Link Dist (ft)	338			169	611	
Turn Bay Length (ft)						65
Base Capacity (vph)	571	586	281	1108	763	716
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.19	0.42	0.28	0.23	0.16
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

7: Park Plaza Dr & Southgate Ave

Cumulative Conditions AM

Timing Plan: AM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	220	89	94	246	139	92
Future Volume (vph)	220	89	94	246	139	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	275	111	118	308	174	115
RTOR Reduction (vph)	0	85	0	0	0	68
Lane Group Flow (vph)	275	26	118	308	174	47
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	13.7	13.7	7.0	35.0	23.5	23.5
Effective Green, g (s)	13.7	13.7	7.0	35.0	23.5	23.5
Actuated g/C Ratio	0.24	0.24	0.12	0.61	0.41	0.41
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	415	372	212	1119	751	638
v/s Ratio Prot	c0.16		c0.07	c0.17	0.09	
v/s Ratio Perm		0.02				0.03
v/c Ratio	0.66	0.07	0.56	0.28	0.23	0.07
Uniform Delay, d1	19.9	17.1	23.9	5.4	11.2	10.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	0.1	3.1	0.6	0.7	0.2
Delay (s)	23.9	17.1	27.0	6.0	11.9	10.7
Level of Service	C	B	C	A	B	B
Approach Delay (s)	21.9			11.8	11.4	
Approach LOS	C			B	B	

Intersection Summary

HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

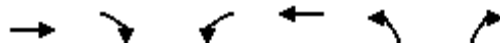
c Critical Lane Group

Queues

Cumulative Conditions AM

8: Westlake Center & John Daly Blvd

Timing Plan: AM



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1054	158	196	1383	107	137
v/c Ratio	0.43	0.14	0.60	0.47	0.62	0.32
Control Delay	16.0	5.4	46.9	5.8	64.9	16.0
Queue Delay	5.4	0.0	0.0	0.7	0.0	0.1
Total Delay	21.4	5.4	46.9	6.5	64.9	16.1
Queue Length 50th (ft)	305	15	80	181	78	31
Queue Length 95th (ft)	409	m38	m108	230	132	78
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2463	1150	473	2920	350	491
Starvation Cap Reductn	844	0	0	1090	0	0
Spillback Cap Reductn	1333	0	0	0	0	32
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.14	0.41	0.76	0.31	0.30

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

8: Westlake Center & John Daly Blvd

Cumulative Conditions AM
Timing Plan: AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘↙	↑↑	↘	↑
Traffic Volume (vph)	970	145	180	1272	98	126
Future Volume (vph)	970	145	180	1272	98	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1054	158	196	1383	107	137
RTOR Reduction (vph)	0	48	0	0	0	69
Lane Group Flow (vph)	1054	110	196	1383	107	68
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	80.7	80.7	11.0	95.7	11.4	22.4
Effective Green, g (s)	80.7	80.7	11.0	95.7	11.4	22.4
Actuated g/C Ratio	0.70	0.70	0.09	0.83	0.10	0.19
Clearance Time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	2462	1101	325	2919	173	360
v/s Ratio Prot	0.30		c0.06	c0.39	c0.06	0.02
v/s Ratio Perm		0.07				0.02
v/c Ratio	0.43	0.10	0.60	0.47	0.62	0.19
Uniform Delay, d1	7.6	5.8	50.4	2.9	50.2	39.2
Progression Factor	1.84	4.02	0.83	1.67	1.00	1.00
Incremental Delay, d2	0.5	0.2	1.5	0.4	4.6	0.1
Delay (s)	14.6	23.4	43.2	5.3	54.8	39.3
Level of Service	B	C	D	A	D	D
Approach Delay (s)	15.7			10.0	46.1	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay			15.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			116.0		Sum of lost time (s)	12.9
Intersection Capacity Utilization			48.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Cumulative Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	4	422	0	1	50	11	295	27	45	372	18
Future Volume (Veh/h)	62	4	422	0	1	50	11	295	27	45	372	18
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	4	459	0	1	54	12	321	29	49	404	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)											804	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	926	886	414	1332	882	336	424			350		
vC1, stage 1 conf vol	512	512		360	360							
vC2, stage 2 conf vol	414	374		973	522							
vCu, unblocked vol	864	820	297	1314	815	336	308			350		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	99	31	100	100	92	99			96		
cM capacity (veh/h)	411	435	668	73	440	704	1126			1203		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	530	55	362	473								
Volume Left	67	0	12	49								
Volume Right	459	54	29	20								
cSH	617	697	1126	1203								
Volume to Capacity	0.86	0.08	0.01	0.04								
Queue Length 95th (ft)	242	6	1	3								
Control Delay (s)	36.2	10.6	0.4	1.2								
Lane LOS	E	B	A	A								
Approach Delay (s)	36.2	10.6	0.4	1.2								
Approach LOS	E	B										
Intersection Summary												
Average Delay			14.4									
Intersection Capacity Utilization			83.7%		ICU Level of Service				E			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 10: Park Plaza Dr & Garage Dwy/Belmar Ave

Cumulative Conditions AM
Timing Plan: AM

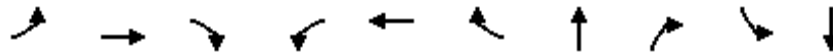
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	21	2	38	7	425	51	19	298	3
Future Volume (Veh/h)	0	0	0	21	2	38	7	425	51	19	298	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	23	2	41	8	462	55	21	324	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL		TWLTL		
Median storage veh								2		2		
Upstream signal (ft)								691		775		
pX, platoon unblocked												
vC, conflicting volume	915	900	326	873	874	490	327				517	
vC1, stage 1 conf vol	368	368		506	506							
vC2, stage 2 conf vol	548	533		368	369							
vCu, unblocked vol	915	900	326	873	874	490	327				517	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	95	100	93	99				98	
cM capacity (veh/h)	409	439	713	463	457	577	1227				1044	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	66	525	348								
Volume Left	0	23	8	21								
Volume Right	0	41	55	3								
cSH	1700	527	1227	1044								
Volume to Capacity	0.00	0.13	0.01	0.02								
Queue Length 95th (ft)	0	11	0	2								
Control Delay (s)	0.0	12.8	0.2	0.7								
Lane LOS	A	B	A	A								
Approach Delay (s)	0.0	12.8	0.2	0.7								
Approach LOS	A	B										
Intersection Summary												
Average Delay	1.3											
Intersection Capacity Utilization	37.8%			ICU Level of Service					A			
Analysis Period (min)	15											

Queues

Cumulative Conditions AM

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	4	1408	13	142	1465	170	72	262	283	30
v/c Ratio	0.05	1.00	0.02	0.90	0.82	0.20	0.13	0.37	0.84	0.07
Control Delay	63.2	60.3	0.1	101.8	29.7	5.4	22.9	12.4	64.7	23.2
Queue Delay	0.0	0.0	0.0	0.0	33.2	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	60.3	0.1	101.8	62.9	5.4	22.9	12.4	64.7	23.2
Queue Length 50th (ft)	3	~594	0	107	460	13	34	57	199	9
Queue Length 95th (ft)	m6	#734	m0	#234	#708	57	66	123	#395	36
Internal Link Dist (ft)		2029			411		195			206
Turn Bay Length (ft)										
Base Capacity (vph)	90	1401	700	158	1784	863	542	700	336	450
Starvation Cap Reductn	0	0	0	0	408	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	1.00	0.02	0.90	1.06	0.20	0.13	0.37	0.84	0.07

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Cumulative Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	4	1295	12	131	1348	156	41	25	241	260	15	13
Future Volume (vph)	4	1295	12	131	1348	156	41	25	241	260	15	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.9	4.9	4.0	4.9	4.9		4.5	4.5	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1789	1568	1752	1716	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.75	1.00	0.71	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1384	1568	1310	1716	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	1408	13	142	1465	170	45	27	262	283	16	14
RTOR Reduction (vph)	0	0	8	0	0	69	0	0	85	0	10	0
Lane Group Flow (vph)	4	1408	5	142	1465	101	0	72	177	283	20	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4		4	
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.1	46.3	46.3	10.5	56.2	56.2		46.3	46.3	29.8	29.8	
Effective Green, g (s)	1.1	46.3	46.3	10.5	56.2	56.2		46.3	46.3	29.8	29.8	
Actuated g/C Ratio	0.01	0.40	0.40	0.09	0.48	0.48		0.40	0.40	0.26	0.26	
Clearance Time (s)	3.5	4.9	4.9	4.0	4.9	4.9				4.0	4.0	
Vehicle Extension (s)	2.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	16	1398	625	158	1698	759		552	625	336	440	
v/s Ratio Prot	0.00	c0.40		c0.08	0.42				c0.11		0.01	
v/s Ratio Perm			0.00			0.06		0.05		c0.22		
v/c Ratio	0.25	1.01	0.01	0.90	0.86	0.13		0.13	0.28	0.84	0.04	
Uniform Delay, d1	57.0	34.9	21.0	52.2	26.5	16.5		22.1	23.6	40.9	32.4	
Progression Factor	1.17	1.03	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.7	24.8	0.0	42.9	6.1	0.4		0.1	0.2	17.1	0.0	
Delay (s)	69.4	60.7	21.0	95.1	32.6	16.8		22.2	23.9	58.0	32.4	
Level of Service	E	E	C	F	C	B		C	C	E	C	
Approach Delay (s)		60.3			36.1			23.5			55.6	
Approach LOS		E			D			C			E	
Intersection Summary												
HCM 2000 Control Delay	45.5			HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio	0.86											
Actuated Cycle Length (s)	116.0			Sum of lost time (s)			17.4					
Intersection Capacity Utilization	76.3%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

Queues

Cumulative Conditions PM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: PM

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	238	570	129	268	646	711	32	360	189	473	627
v/c Ratio	0.75	0.39	0.18	0.67	0.52	0.46	0.30	0.67	0.41	0.78	0.55
Control Delay	62.1	27.5	5.7	52.3	38.6	0.8	60.8	53.8	15.5	56.1	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.1	27.5	5.7	52.3	38.9	0.8	60.8	53.8	15.5	56.1	22.3
Queue Length 50th (ft)	173	160	0	108	230	0	24	140	53	181	134
Queue Length 95th (ft)	#315	251	45	m138	m312	m0	57	184	71	229	180
Internal Link Dist (ft)		569			362			714			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	317	1454	701	511	1234	1544	160	905	510	644	1256
Starvation Cap Reductn	0	0	0	0	168	0	0	0	0	0	0
Spillback Cap Reductn	0	18	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.40	0.18	0.52	0.61	0.46	0.20	0.40	0.37	0.73	0.50

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

Cumulative Conditions PM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: PM

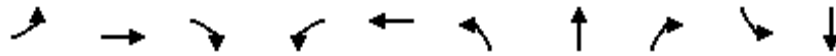
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	217	519	117	244	588	647	29	328	172	430	277	294
Future Volume (vph)	217	519	117	244	588	647	29	328	172	430	277	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1510	3400	3505	1544	1752	3505	1546	3400	3204	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1510	3400	3505	1544	1752	3505	1546	3400	3204	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	238	570	129	268	646	711	32	360	189	473	304	323
RTOR Reduction (vph)	0	0	77	0	0	0	0	0	40	0	170	0
Lane Group Flow (vph)	238	570	52	268	646	711	32	360	149	473	457	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	21.8	47.3	47.3	14.2	39.7	120.0	5.0	18.5	32.7	23.1	36.4	
Effective Green, g (s)	21.8	48.2	48.2	14.2	40.6	120.0	5.0	18.5	32.7	23.1	36.6	
Actuated g/C Ratio	0.18	0.40	0.40	0.12	0.34	1.00	0.04	0.15	0.27	0.19	0.31	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	318	1407	606	402	1185	1544	73	540	421	654	977	
v/s Ratio Prot	c0.14	0.16		0.08	c0.18		0.02	c0.10	0.04	c0.14	0.14	
v/s Ratio Perm			0.03			0.46			0.05			
v/c Ratio	0.75	0.41	0.09	0.67	0.55	0.46	0.44	0.67	0.35	0.72	0.47	
Uniform Delay, d1	46.5	25.7	22.2	50.6	32.2	0.0	56.1	47.8	35.1	45.5	33.8	
Progression Factor	1.00	1.00	1.00	0.90	1.14	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.8	0.9	0.3	3.1	1.5	0.8	3.0	3.4	0.4	3.7	0.5	
Delay (s)	55.3	26.5	22.5	48.8	38.1	0.8	59.2	51.3	35.5	49.2	34.3	
Level of Service	E	C	C	D	D	A	E	D	D	D	C	
Approach Delay (s)		33.3			23.6			46.6			40.7	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		33.3										
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		120.0							16.0			
Intersection Capacity Utilization		76.0%										
Analysis Period (min)		15										
c Critical Lane Group												

Queues

Cumulative Conditions PM

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	116	1093	110	316	1424	199	48	255	8	122
v/c Ratio	0.61	0.58	0.13	0.70	0.73	0.88	0.12	0.34	0.10	0.63
Control Delay	64.8	21.9	4.5	72.9	17.5	87.7	39.0	4.1	56.9	33.4
Queue Delay	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.8	22.3	4.5	72.9	17.5	87.7	39.0	4.1	56.9	33.4
Queue Length 50th (ft)	78	330	16	135	187	153	30	0	6	27
Queue Length 95th (ft)	m144	489	m53	m147	m291	#284	66	52	23	86
Internal Link Dist (ft)		253			2035		684			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	189	1874	840	623	1956	233	553	821	160	477
Starvation Cap Reductn	0	343	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.71	0.13	0.51	0.73	0.85	0.09	0.31	0.05	0.26

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Cumulative Conditions PM

Timing Plan: PM

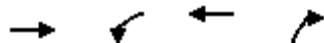
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	1006	101	291	1300	10	183	44	235	7	32	80
Future Volume (vph)	107	1006	101	291	1300	10	183	44	235	7	32	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1470	3400	3499		1752	1845	1568	1752	1598	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1470	3400	3499		1752	1845	1568	1752	1598	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	116	1093	110	316	1413	11	199	48	255	8	35	87
RTOR Reduction (vph)	0	0	54	0	0	0	0	0	158	0	79	0
Lane Group Flow (vph)	116	1093	56	316	1424	0	199	48	97	8	43	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pt+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)	13.0	60.0	60.0	15.9	62.9		15.5	25.8	45.7	1.4	11.7	
Effective Green, g (s)	13.0	60.9	60.9	15.9	63.8		15.5	25.8	45.7	1.4	11.7	
Actuated g/C Ratio	0.11	0.51	0.51	0.13	0.53		0.13	0.22	0.38	0.01	0.10	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0		2.5	2.0	
Lane Grp Cap (vph)	189	1778	746	450	1860		226	396	597	20	155	
v/s Ratio Prot	0.07	c0.31		0.09	c0.41		c0.11	0.03	0.06	0.00	c0.03	
v/s Ratio Perm			0.04									
v/c Ratio	0.61	0.61	0.07	0.70	0.77		0.88	0.12	0.16	0.40	0.28	
Uniform Delay, d1	51.1	21.2	15.1	49.8	22.2		51.3	38.0	24.5	58.9	50.2	
Progression Factor	1.01	1.02	1.46	1.40	0.80		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.4	1.4	0.2	1.9	1.2		30.2	0.1	0.0	9.3	0.4	
Delay (s)	55.9	23.0	22.3	71.8	19.0		81.6	38.0	24.6	68.2	50.6	
Level of Service	E	C	C	E	B		F	D	C	E	D	
Approach Delay (s)		25.8			28.6			48.4			51.7	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			31.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			77.1%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Conditions PM

3: I-280/SR-1 ramps & John Daly Blvd

Timing Plan: PM



Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1689	741	1738	501
v/c Ratio	0.53	0.85	0.50	0.66
Control Delay	2.6	51.8	0.5	38.7
Queue Delay	0.4	0.0	0.1	0.0
Total Delay	3.0	51.8	0.6	38.7
Queue Length 50th (ft)	51	281	0	173
Queue Length 95th (ft)	m51	329	0	222
Internal Link Dist (ft)	406		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3177	1076	3505	916
Starvation Cap Reductn	810	0	0	0
Spillback Cap Reductn	0	0	391	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.71	0.69	0.56	0.55

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: I-280/SR-1 ramps & John Daly Blvd

Cumulative Conditions PM

Timing Plan: PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↙↘	↑↑		↗↘
Traffic Volume (vph)	1254	384	719	1686	0	486
Future Volume (vph)	1254	384	719	1686	0	486
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.96		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.96		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4680		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4680		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1293	396	741	1738	0	501
RTOR Reduction (vph)	15	0	0	0	0	46
Lane Group Flow (vph)	1674	0	741	1738	0	455
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	81.5		31.4	120.0		31.4
Effective Green, g (s)	81.1		30.9	120.0		30.9
Actuated g/C Ratio	0.68		0.26	1.00		0.26
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3162		875	3505		710
v/s Ratio Prot	c0.36		c0.22	0.50		0.16
v/s Ratio Perm						
v/c Ratio	0.53		0.85	0.50		0.64
Uniform Delay, d1	9.8		42.3	0.0		39.6
Progression Factor	0.23		1.00	1.00		1.00
Incremental Delay, d2	0.3		7.6	0.5		2.0
Delay (s)	2.6		49.9	0.5		41.6
Level of Service	A		D	A		D
Approach Delay (s)	2.6			15.3	41.6	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			13.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			61.6%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Cumulative Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: PM

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	157	327	900	338	243	1033	512	677	502	445	477	198
v/c Ratio	0.38	0.85	1.20	0.77	0.70	0.94	0.66	1.03	1.60	1.34	0.62	0.52
Control Delay	53.6	77.2	151.6	33.3	68.3	76.2	31.8	104.3	325.4	211.9	23.3	59.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	77.2	151.6	33.3	68.3	76.2	31.8	104.3	325.4	211.9	23.3	59.7
Queue Length 50th (ft)	153	390	~741	147	274	415	342	~388	~823	~600	243	180
Queue Length 95th (ft)	238	#610	#905	#330	397	#509	474	#517	#1076	#850	374	265
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	409	386	750	439	348	1099	807	658	313	332	773	416
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.85	1.20	0.77	0.70	0.94	0.63	1.03	1.60	1.34	0.62	0.48

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

		
Lane Group	SBT	SBR
Lane Group Flow (vph)	316	822
v/c Ratio	0.83	1.08
Control Delay	77.6	91.4
Queue Delay	0.0	0.0
Total Delay	77.6	91.4
Queue Length 50th (ft)	327	~983
Queue Length 95th (ft)	453	#1257
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	416	764
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.76	1.08

Intersection Summary

HCM Signalized Intersection Capacity Analysis

Cumulative Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: PM

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	168	443	682	361	259	966	200	292	650	364	358	618
Future Volume (vph)	168	443	682	361	259	966	200	292	650	364	358	618
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.77	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.99	0.85	1.00	1.00	0.85		1.00	0.96	0.85	0.85
Flt Protected	0.95	0.95	0.99	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2916	1099	1507	4753	1568		3400	1617	1427	1490
Flt Permitted	0.95	0.95	0.99	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2916	1099	1507	4753	1568		3400	1617	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	175	461	710	376	270	1006	208	304	677	379	373	672
RTOR Reduction (vph)	0	0	1	158	0	0	36	0	0	0	56	108
Lane Group Flow (vph)	157	327	899	180	243	1033	476	0	677	502	389	369
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pm+ov		Split	NA	Perm	custom
Protected Phases	2	2	2		4	4	3		1	1		4
Permitted Phases				2			4				1	1 4
Actuated Green, G (s)	40.6	40.6	40.6	40.6	36.9	36.9	71.3		30.5	30.5	30.5	67.4
Effective Green, g (s)	41.1	41.1	41.1	41.1	37.0	37.0	72.3		31.0	31.0	31.0	67.6
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.23	0.23	0.45		0.19	0.19	0.19	0.42
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.5		4.5	4.5	4.5	4.1
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	409	387	749	282	348	1099	708		658	313	276	629
v/s Ratio Prot	0.10	0.22	c0.31		0.16	c0.22	0.15		0.20	c0.31		0.14
v/s Ratio Perm				0.16			0.16				0.27	0.11
v/c Ratio	0.38	0.84	1.20	0.64	0.70	0.94	0.67		1.03	1.60	1.41	0.59
Uniform Delay, d1	49.0	56.4	59.5	52.9	56.4	60.4	34.5		64.5	64.5	64.5	35.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	19.8	102.5	10.6	6.5	14.9	2.8		42.7	286.2	205.0	1.7
Delay (s)	51.7	76.2	161.9	63.5	62.8	75.3	37.3		107.2	350.7	269.5	37.1
Level of Service	D	E	F	E	E	E	D		F	F	F	D
Approach Delay (s)			116.3			62.7				183.9		
Approach LOS			F			E				F		
Intersection Summary												
HCM 2000 Control Delay			117.1									F
HCM 2000 Volume to Capacity ratio			1.20									
Actuated Cycle Length (s)			160.0									Sum of lost time (s)
Intersection Capacity Utilization			114.2%									ICU Level of Service
Analysis Period (min)			15									H
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Cumulative Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: PM



Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	190	303	789
Future Volume (vph)	190	303	789
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1752	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1752	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	198	316	822
RTOR Reduction (vph)	0	0	20
Lane Group Flow (vph)	198	316	802
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pm+ov
Protected Phases	3	3	2
Permitted Phases			3
Actuated Green, G (s)	34.4	34.4	75.0
Effective Green, g (s)	34.9	34.9	76.0
Actuated g/C Ratio	0.22	0.22	0.48
Clearance Time (s)	4.5	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0
Lane Grp Cap (vph)	382	382	745
v/s Ratio Prot	0.11	0.18	c0.28
v/s Ratio Perm			0.26
v/c Ratio	0.52	0.83	1.08
Uniform Delay, d1	55.1	59.7	42.0
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	1.6	14.3	55.5
Delay (s)	56.7	73.9	97.5
Level of Service	E	E	F
Approach Delay (s)		85.9	
Approach LOS		F	
Intersection Summary			

HCM Unsignalized Intersection Capacity Analysis 5: Lake Merced Blvd & Southgate Ave

Cumulative Conditions PM
Timing Plan: PM

																	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
Lane Configurations																	
Sign Control	Stop			Stop				Stop			Stop						
Traffic Volume (vph)	166	175	32	60	162	122	29	86	36	108	103	145					
Future Volume (vph)	166	175	32	60	162	122	29	86	36	108	103	145					
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79					
Hourly flow rate (vph)	210	222	41	76	205	154	37	109	46	137	130	184					
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2										
Volume Total (vph)	210	263	76	359	192	137	314										
Volume Left (vph)	210	0	76	0	37	137	0										
Volume Right (vph)	0	41	0	154	46	0	184										
Hadj (s)	0.55	-0.06	0.55	-0.25	-0.05	0.55	-0.36										
Departure Headway (s)	8.4	7.7	8.4	7.6	8.3	8.5	7.5										
Degree Utilization, x	0.49	0.57	0.18	0.76	0.44	0.32	0.66										
Capacity (veh/h)	404	440	410	458	401	407	455										
Control Delay (s)	17.9	19.2	12.0	29.2	17.6	14.2	22.6										
Approach Delay (s)	18.6		26.2		17.6	20.0											
Approach LOS	C		D		C	C											
Intersection Summary																	
Delay			21.0														
Level of Service			C														
Intersection Capacity Utilization			61.1%		ICU Level of Service		B										
Analysis Period (min)			15														

HCM Unsignalized Intersection Capacity Analysis 6: Palmcrest Dr/Westlake Center & Southgate Ave

Cumulative Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	78	145	47	45	157	98	32	31	48	76	68	135
Future Volume (vph)	78	145	47	45	157	98	32	31	48	76	68	135
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	98	181	59	56	196	122	40	39	60	95	85	169
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	189	150	374	139	349							
Volume Left (vph)	98	0	56	40	95							
Volume Right (vph)	0	59	122	60	169							
Hadj (s)	0.31	-0.23	-0.11	-0.15	-0.19							
Departure Headway (s)	7.1	6.6	6.2	6.8	6.2							
Degree Utilization, x	0.37	0.27	0.64	0.26	0.60							
Capacity (veh/h)	468	505	544	447	546							
Control Delay (s)	13.1	10.9	19.6	12.2	17.9							
Approach Delay (s)	12.1		19.6	12.2	17.9							
Approach LOS	B		C	B	C							
Intersection Summary												
Delay			16.1									
Level of Service			C									
Intersection Capacity Utilization			55.4%			ICU Level of Service			B			
Analysis Period (min)			15									

Queues
7: Park Plaza Dr & Southgate Ave

Cumulative Conditions PM
Timing Plan: PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	216	143	238	409	231	131
v/c Ratio	0.54	0.31	0.75	0.36	0.34	0.20
Control Delay	23.2	5.5	40.4	6.7	15.1	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	5.5	40.4	6.7	15.1	4.1
Queue Length 50th (ft)	60	0	72	52	51	0
Queue Length 95th (ft)	97	25	#156	102	96	22
Internal Link Dist (ft)	338			169	622	
Turn Bay Length (ft)						65
Base Capacity (vph)	626	652	316	1145	673	655
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.22	0.75	0.36	0.34	0.20

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

7: Park Plaza Dr & Southgate Ave

Cumulative Conditions PM

Timing Plan: PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	173	114	190	327	185	105
Future Volume (vph)	173	114	190	327	185	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	216	142	238	409	231	131
RTOR Reduction (vph)	0	110	0	0	0	83
Lane Group Flow (vph)	216	33	238	409	231	48
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	11.7	11.7	9.1	32.6	19.0	19.0
Effective Green, g (s)	12.2	12.2	9.6	33.1	19.5	19.5
Actuated g/C Ratio	0.23	0.23	0.18	0.62	0.37	0.37
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	401	358	315	1145	675	573
v/s Ratio Prot	c0.12		c0.14	c0.22	0.13	
v/s Ratio Perm		0.02				0.03
v/c Ratio	0.54	0.09	0.76	0.36	0.34	0.08
Uniform Delay, d1	18.1	16.2	20.7	4.9	12.3	11.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.1	9.9	0.9	1.4	0.3
Delay (s)	19.5	16.3	30.6	5.8	13.6	11.3
Level of Service	B	B	C	A	B	B
Approach Delay (s)	18.2			14.9	12.8	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

Cumulative Conditions PM

8: Westlake Center & John Daly Blvd

Timing Plan: PM

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1016	245	332	1386	263	336
v/c Ratio	0.42	0.21	1.37	0.50	0.94	0.65
Control Delay	11.1	3.1	224.7	1.0	90.7	27.8
Queue Delay	0.6	0.0	0.0	0.2	0.0	0.5
Total Delay	11.7	3.1	224.7	1.3	90.7	28.3
Queue Length 50th (ft)	240	0	~178	16	204	128
Queue Length 95th (ft)	185	m42	m#268	14	#367	233
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2391	1149	243	2757	280	520
Starvation Cap Reductn	876	0	0	575	0	0
Spillback Cap Reductn	746	0	0	0	0	31
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.21	1.37	0.64	0.94	0.69

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

8: Westlake Center & John Daly Blvd

Cumulative Conditions PM

Timing Plan: PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘↙	↑↑	↘	↑
Traffic Volume (vph)	935	225	305	1275	242	309
Future Volume (vph)	935	225	305	1275	242	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	3.5	4.0	3.5	3.5
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1016	245	332	1386	263	336
RTOR Reduction (vph)	0	79	0	0	0	116
Lane Group Flow (vph)	1016	166	332	1386	263	220
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	80.6	80.6	8.0	93.0	18.5	26.5
Effective Green, g (s)	81.1	81.1	8.5	93.5	19.0	27.5
Actuated g/C Ratio	0.68	0.68	0.07	0.78	0.16	0.23
Clearance Time (s)	4.9	4.9	4.0	4.5	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	2.0	3.0
Lane Grp Cap (vph)	2391	1069	243	2757	280	408
v/s Ratio Prot	0.29		c0.10	c0.39	c0.15	0.04
v/s Ratio Perm		0.10				0.10
v/c Ratio	0.42	0.15	1.37	0.50	0.94	0.54
Uniform Delay, d1	8.8	7.0	55.8	4.8	49.9	40.7
Progression Factor	1.19	3.15	1.03	0.12	1.00	1.00
Incremental Delay, d2	0.5	0.3	182.1	0.5	40.2	1.4
Delay (s)	11.0	22.5	239.7	1.0	90.2	42.0
Level of Service	B	C	F	A	F	D
Approach Delay (s)	13.2			47.1	63.2	
Approach LOS	B			D	E	
Intersection Summary						
HCM 2000 Control Delay			37.9		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	11.4
Intersection Capacity Utilization			58.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Cumulative Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	1	28	34	17	65	22	382	43	105	413	72
Future Volume (Veh/h)	21	1	28	34	17	65	22	382	43	105	413	72
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	1	30	37	18	71	24	415	47	114	449	78
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)											794	
pX, platoon unblocked	0.87	0.87	0.87	0.87	0.87		0.87					
vC, conflicting volume	1282	1226	488	1233	1242	438	527			462		
vC1, stage 1 conf vol	716	716		486	486							
vC2, stage 2 conf vol	566	510		746	755							
vCu, unblocked vol	1249	1184	334	1192	1202	438	379			462		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	100	95	87	94	88	98			90		
cM capacity (veh/h)	252	303	612	288	303	616	1019			1094		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	54	126	486	641								
Volume Left	23	37	24	114								
Volume Right	30	71	47	78								
cSH	376	415	1019	1094								
Volume to Capacity	0.14	0.30	0.02	0.10								
Queue Length 95th (ft)	12	32	2	9								
Control Delay (s)	16.2	17.4	0.7	2.6								
Lane LOS	C	C	A	A								
Approach Delay (s)	16.2	17.4	0.7	2.6								
Approach LOS	C	C										
Intersection Summary												
Average Delay			3.9									
Intersection Capacity Utilization			73.7%		ICU Level of Service				D			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 10: Park Plaza Dr & Garage Dwy/Belmar Ave

Cumulative Conditions PM

Timing Plan: PM

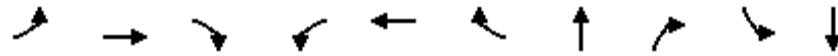
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	1	19	0	21	7	476	62	29	402	9
Future Volume (Veh/h)	15	0	1	19	0	21	7	476	62	29	402	9
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	0	1	21	0	23	8	517	67	32	437	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage (veh)							2			2		
Upstream signal (ft)							702			764		
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	1096	1106	442	1074	1078	550	447			584		
vC1, stage 1 conf vol	506	506		566	566							
vC2, stage 2 conf vol	590	600		507	511							
vCu, unblocked vol	1073	1084	442	1050	1054	498	447			533		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	100	95	100	96	99			97		
cM capacity (veh/h)	366	377	613	396	396	540	1108			975		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	17	44	592	479								
Volume Left	16	21	8	32								
Volume Right	1	23	67	10								
cSH	375	460	1108	975								
Volume to Capacity	0.05	0.10	0.01	0.03								
Queue Length 95th (ft)	4	8	1	3								
Control Delay (s)	15.0	13.7	0.2	1.0								
Lane LOS	C	B	A	A								
Approach Delay (s)	15.0	13.7	0.2	1.0								
Approach LOS	C	B										
Intersection Summary												
Average Delay				1.3								
Intersection Capacity Utilization				49.3%	ICU Level of Service				A			
Analysis Period (min)				15								

Queues

Cumulative Conditions PM

11: Poncetta Dr/Sheffield Dr & John Daly Blvd

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	1429	4	187	1707	214	25	230	121	24
v/c Ratio	0.07	1.04	0.01	1.03	0.93	0.24	0.04	0.32	0.42	0.06
Control Delay	51.4	75.5	0.0	124.5	36.1	6.3	22.9	9.0	46.0	27.8
Queue Delay	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	75.5	0.0	124.5	39.9	6.3	22.9	9.0	46.0	27.8
Queue Length 50th (ft)	4	~646	0	~154	596	24	12	32	82	9
Queue Length 95th (ft)	m7	#791	m0	#303	#899	76	31	89	142	33
Internal Link Dist (ft)		2035			406		211			198
Turn Bay Length (ft)										
Base Capacity (vph)	73	1372	691	182	1843	893	615	714	290	377
Starvation Cap Reductn	0	0	0	0	90	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	1.04	0.01	1.03	0.97	0.24	0.04	0.32	0.42	0.06

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

11: Poncetta Dr/Sheffield Dr & John Daly Blvd

Cumulative Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	5	1315	4	172	1570	197	17	6	212	111	14	8
Future Volume (vph)	5	1315	4	172	1570	197	17	6	212	111	14	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	3.5	3.5		4.5	4.5	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1781	1568	1752	1741	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.85	1.00	0.74	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1572	1568	1367	1741	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	1429	4	187	1707	214	18	7	230	121	15	9
RTOR Reduction (vph)	0	0	2	0	0	74	0	0	99	0	7	0
Lane Group Flow (vph)	5	1429	2	187	1707	140	0	25	131	121	17	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4		4	
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.0	47.0	47.0	12.5	59.5	59.5		48.0	48.0	25.5	25.5	
Effective Green, g (s)	1.0	47.0	47.0	12.5	59.5	59.5		48.0	48.0	25.5	25.5	
Actuated g/C Ratio	0.01	0.39	0.39	0.10	0.50	0.50		0.40	0.40	0.21	0.21	
Clearance Time (s)	4.5	4.5	4.5	4.5	3.5	3.5				3.5	3.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	14	1372	614	182	1737	777		628	627	290	369	
v/s Ratio Prot	0.00	0.41		c0.11	c0.49				c0.08		0.01	
v/s Ratio Perm			0.00			0.09		0.02		c0.09		
v/c Ratio	0.36	1.04	0.00	1.03	0.98	0.18		0.04	0.21	0.42	0.05	
Uniform Delay, d1	59.2	36.5	22.2	53.8	29.7	16.8		21.9	23.6	40.8	37.6	
Progression Factor	0.90	1.16	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.2	34.4	0.0	71.7	17.1	0.5		0.1	0.8	4.4	0.2	
Delay (s)	66.2	76.7	22.2	125.4	46.9	17.2		22.1	24.3	45.2	37.8	
Level of Service	E	E	C	F	D	B		C	C	D	D	
Approach Delay (s)		76.5			50.8			24.1			44.0	
Approach LOS		E			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			58.2				HCM 2000 Level of Service		E			
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)		17.0			
Intersection Capacity Utilization			70.8%				ICU Level of Service		C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Plus Project Conditions AM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: AM

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	296	519	34	201	505	789	34	236	235	396	349
v/c Ratio	0.74	0.31	0.04	0.59	0.42	0.51	0.31	0.56	0.56	0.74	0.40
Control Delay	53.0	21.0	0.1	57.0	35.7	1.9	58.5	52.8	17.6	55.1	30.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.0	21.0	0.1	57.0	35.7	1.9	58.5	52.8	17.6	55.1	30.1
Queue Length 50th (ft)	204	122	0	77	182	23	25	88	59	146	94
Queue Length 95th (ft)	302	195	0	0	257	34	57	126	93	191	132
Internal Link Dist (ft)		569			362			724			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	402	1664	782	361	1212	1544	166	936	429	570	1129
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	74	0	0	0	0	0	0	2	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.33	0.04	0.56	0.42	0.51	0.20	0.25	0.55	0.69	0.31
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

Cumulative Plus Project Conditions AM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: AM

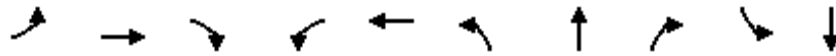
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	269	472	31	183	460	718	31	215	214	360	215	103
Future Volume (vph)	269	472	31	183	460	718	31	215	214	360	215	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9	4.0	4.0	4.0	4.0	4.0	4.2	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1511	3400	3505	1544	1752	3505	1547	3400	3315	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1511	3400	3505	1544	1752	3505	1547	3400	3315	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	296	519	34	201	505	789	34	236	235	396	236	113
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	78	0	55	0
Lane Group Flow (vph)	296	519	16	201	505	789	34	236	157	396	294	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	26.6	53.4	53.4	11.7	38.5	116.0	5.1	14.1	25.8	19.9	28.7	
Effective Green, g (s)	26.6	53.4	53.4	11.7	38.5	116.0	5.1	14.1	25.8	19.9	28.7	
Actuated g/C Ratio	0.23	0.46	0.46	0.10	0.33	1.00	0.04	0.12	0.22	0.17	0.25	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	401	1613	695	342	1163	1544	77	426	344	583	820	
v/s Ratio Prot	c0.17	0.15		0.06	0.14		0.02	0.07	0.05	c0.12	0.09	
v/s Ratio Perm			0.01			c0.51			0.06			
v/c Ratio	0.74	0.32	0.02	0.59	0.43	0.51	0.44	0.55	0.46	0.68	0.36	
Uniform Delay, d1	41.5	19.8	17.1	49.8	30.2	0.0	54.1	48.0	39.0	45.1	36.0	
Progression Factor	1.00	1.00	1.00	1.02	1.12	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.6	0.5	0.1	1.9	1.1	1.1	2.9	1.9	0.7	2.9	0.4	
Delay (s)	48.0	20.4	17.1	52.7	35.0	1.1	57.0	49.9	39.7	47.9	36.4	
Level of Service	D	C	B	D	C	A	E	D	D	D	D	
Approach Delay (s)		29.9			19.5			45.7			42.5	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			30.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			17.1			
Intersection Capacity Utilization			75.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Plus Project Conditions AM

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	123	1004	42	204	1328	157	104	243	23	238
v/c Ratio	0.58	0.56	0.05	0.59	0.77	0.77	0.26	0.36	0.23	0.81
Control Delay	75.0	35.1	9.9	79.9	16.5	73.6	39.1	6.8	57.3	44.8
Queue Delay	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.0	37.9	9.9	79.9	16.5	73.6	39.1	6.8	57.3	44.8
Queue Length 50th (ft)	98	382	6	84	108	114	67	20	17	91
Queue Length 95th (ft)	163	468	31	m103	#615	#205	110	68	44	168
Internal Link Dist (ft)		253			2029		695			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	211	1800	797	394	1730	226	556	701	166	509
Starvation Cap Reductn	0	657	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.88	0.05	0.52	0.77	0.69	0.19	0.35	0.14	0.47

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Cumulative Plus Project Conditions AM

Timing Plan: AM

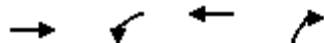
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	924	39	188	1215	6	144	96	224	21	59	160
Future Volume (vph)	113	924	39	188	1215	6	144	96	224	21	59	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1472	3400	3501		1752	1845	1568	1752	1594	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1472	3400	3501		1752	1845	1568	1752	1594	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	1004	42	204	1321	7	157	104	243	23	64	174
RTOR Reduction (vph)	0	0	21	0	0	0	0	0	132	0	99	0
Lane Group Flow (vph)	123	1004	21	204	1328	0	157	104	111	23	139	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pt+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)	14.0	57.9	57.9	11.8	55.7		13.6	24.9	40.7	4.5	15.8	
Effective Green, g (s)	14.0	57.9	57.9	11.8	55.7		13.6	24.9	40.7	4.5	15.8	
Actuated g/C Ratio	0.12	0.50	0.50	0.10	0.48		0.12	0.21	0.35	0.04	0.14	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0		2.5	2.0	
Lane Grp Cap (vph)	211	1749	734	345	1681		205	396	550	67	217	
v/s Ratio Prot	0.07	c0.29		0.06	c0.38		c0.09	0.06	0.07	0.01	c0.09	
v/s Ratio Perm			0.01									
v/c Ratio	0.58	0.57	0.03	0.59	0.79		0.77	0.26	0.20	0.34	0.64	
Uniform Delay, d1	48.2	20.4	14.8	49.8	25.3		49.7	37.9	26.3	54.3	47.4	
Progression Factor	1.32	1.58	33.42	1.53	0.53		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.1	1.3	0.1	1.4	2.3		15.0	0.1	0.1	2.2	4.5	
Delay (s)	66.7	33.5	493.4	77.4	15.7		64.6	38.0	26.4	56.5	51.9	
Level of Service	E	C	F	E	B		E	D	C	E	D	
Approach Delay (s)		53.5			24.0			40.7			52.3	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			38.5			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			16.9			
Intersection Capacity Utilization			83.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Plus Project Conditions AM

3: I-280/SR-1 ramps & John Daly Blvd

Timing Plan: AM



Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1888	475	1282	330
v/c Ratio	0.53	0.83	0.37	0.60
Control Delay	5.9	61.3	0.3	35.7
Queue Delay	0.7	0.0	0.0	0.0
Total Delay	6.6	61.3	0.3	35.7
Queue Length 50th (ft)	180	182	0	90
Queue Length 95th (ft)	207	243	0	144
Internal Link Dist (ft)	411		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3577	609	3505	580
Starvation Cap Reductn	1185	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.79	0.78	0.37	0.57
Intersection Summary				

HCM Signalized Intersection Capacity Analysis 3: I-280/SR-1 ramps & John Daly Blvd

Cumulative Plus Project Conditions AM

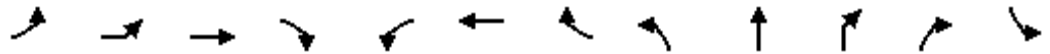
Timing Plan: AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↘↙	↑↑		↘↙
Traffic Volume (vph)	1335	497	461	1244	0	320
Future Volume (vph)	1335	497	461	1244	0	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6		3.5	3.6		3.5
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.96		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.96		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4625		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4625		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1376	512	475	1282	0	330
RTOR Reduction (vph)	7	0	0	0	0	87
Lane Group Flow (vph)	1881	0	475	1282	0	243
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	92.7		20.2	120.0		20.2
Effective Green, g (s)	92.7		20.2	120.0		20.2
Actuated g/C Ratio	0.77		0.17	1.00		0.17
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3572		572	3505		464
v/s Ratio Prot	c0.41		c0.14	0.37		0.09
v/s Ratio Perm						
v/c Ratio	0.53		0.83	0.37		0.52
Uniform Delay, d1	5.2		48.2	0.0		45.5
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.6		9.9	0.3		1.1
Delay (s)	5.8		58.2	0.3		46.6
Level of Service	A		E	A		D
Approach Delay (s)	5.8			15.9	46.6	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			13.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	7.1
Intersection Capacity Utilization			58.6%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Cumulative Plus Project Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: AM



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	156	400	823	304	144	750	422	440	406	368	373	98
v/c Ratio	0.38	1.04	1.10	0.67	0.49	0.80	0.58	0.62	1.21	1.03	0.46	0.26
Control Delay	49.2	108.7	115.9	20.9	59.7	64.9	31.5	58.1	167.2	101.2	8.8	50.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	108.7	115.9	20.9	59.7	64.9	31.5	58.1	167.2	101.2	8.8	50.8
Queue Length 50th (ft)	139	~487	~564	70	146	273	275	203	~529	~356	53	80
Queue Length 95th (ft)	217	#734	#724	201	233	329	389	263	#763	#589	143	136
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	409	386	745	456	300	947	719	714	336	357	811	384
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	1.04	1.10	0.67	0.48	0.79	0.59	0.62	1.21	1.03	0.46	0.26

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



Lane Group	SBT	SBR
Lane Group Flow (vph)	592	512
v/c Ratio	1.56	0.66
Control Delay	303.3	30.2
Queue Delay	0.0	0.0
Total Delay	303.3	30.2
Queue Length 50th (ft)	~866	356
Queue Length 95th (ft)	#1118	501
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	379	774
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.56	0.66

Intersection Summary

HCM Signalized Intersection Capacity Analysis

Cumulative Plus Project Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: AM

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	166	624	501	324	154	705	243	162	422	272	242	563
Future Volume (vph)	166	624	501	324	154	705	243	162	422	272	242	563
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.1		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.78	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.99	0.85	1.00	1.00	0.85		1.00	0.95	0.85	0.85
Flt Protected	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2896	1118	1507	4754	1568		3400	1602	1427	1490
Flt Permitted	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2896	1118	1507	4754	1568		3400	1602	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	173	650	522	338	160	734	253	169	440	283	252	612
RTOR Reduction (vph)	0	0	1	169	0	0	24	0	0	0	58	161
Lane Group Flow (vph)	156	400	822	135	144	750	398	0	440	406	310	212
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pt+ov		Split	NA	Prot	pt+ov
Protected Phases	2	2	2		4	4	4 3		1	1	1	1 4
Permitted Phases				2								
Actuated Green, G (s)	38.5	38.5	38.5	38.5	29.5	29.5	66.5		31.5	31.5	31.5	65.5
Effective Green, g (s)	38.5	38.5	38.5	38.5	29.5	29.5	66.5		31.5	31.5	31.5	65.5
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.20	0.20	0.44		0.21	0.21	0.21	0.44
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1			4.5	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	409	386	743	286	296	934	695		714	336	299	650
v/s Ratio Prot	0.10	0.27	c0.28		0.10	c0.16	0.25		0.13	c0.25	0.22	0.14
v/s Ratio Perm				0.12								
v/c Ratio	0.38	1.04	1.11	0.47	0.49	0.80	0.57		0.62	1.21	1.04	0.33
Uniform Delay, d1	45.9	55.8	55.8	47.1	53.5	57.5	31.1		53.8	59.2	59.2	27.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	55.5	65.9	5.5	1.7	5.3	1.4		1.8	118.4	62.2	0.4
Delay (s)	48.6	111.3	121.6	52.6	55.2	62.8	32.5		55.6	177.6	121.5	28.2
Level of Service	D	F	F	D	E	E	C		E	F	F	C
Approach Delay (s)			99.9			52.3				95.6		
Approach LOS			F			D				F		
Intersection Summary												
HCM 2000 Control Delay			104.0									
HCM 2000 Volume to Capacity ratio			1.18									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			109.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Cumulative Plus Project Conditions AM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: AM



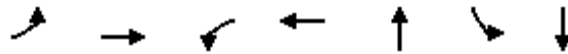
Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	94	482	578
Future Volume (vph)	94	482	578
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	0.98	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1712	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1712	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	98	502	602
RTOR Reduction (vph)	0	4	20
Lane Group Flow (vph)	98	588	492
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pt+ov
Protected Phases	3	3	3 2
Permitted Phases			
Actuated Green, G (s)	32.9	32.9	75.9
Effective Green, g (s)	32.9	32.9	75.9
Actuated g/C Ratio	0.22	0.22	0.51
Clearance Time (s)	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	
Lane Grp Cap (vph)	384	375	753
v/s Ratio Prot	0.06	0.34	0.33
v/s Ratio Perm			
v/c Ratio	0.26	1.57	0.65
Uniform Delay, d1	48.4	58.5	27.3
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.5	268.3	2.3
Delay (s)	48.9	326.9	29.6
Level of Service	D	F	C
Approach Delay (s)		177.6	
Approach LOS		F	
Intersection Summary			

Queues

Cumulative Plus Project Conditions AM

5: Lake Merced Blvd & Southgate Ave

Timing Plan: AM



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	215	292	41	248	256	114	254
v/c Ratio	1.06	0.51	0.30	0.66	0.68	0.32	0.67
Control Delay	116.9	25.7	39.9	32.3	32.4	27.3	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	116.9	25.7	39.9	32.3	32.4	27.3	32.6
Queue Length 50th (ft)	~104	105	17	84	85	40	85
Queue Length 95th (ft)	#228	172	44	145	147	80	148
Internal Link Dist (ft)		324		313	110		573
Turn Bay Length (ft)			130			100	
Base Capacity (vph)	203	603	137	521	509	487	508
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.06	0.48	0.30	0.48	0.50	0.23	0.50

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Lake Merced Blvd & Southgate Ave

Cumulative Plus Project Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	198	32	32	135	61	23	105	74	90	132	69
Future Volume (vph)	170	198	32	32	135	61	23	105	74	90	132	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95			0.95		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1752	1806		1752	1759			1743		1752	1750	
Flt Permitted	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (perm)	1752	1806		1752	1759			1743		1752	1750	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	215	251	41	41	171	77	29	133	94	114	167	87
RTOR Reduction (vph)	0	7	0	0	20	0	0	27	0	0	24	0
Lane Group Flow (vph)	215	285	0	41	228	0	0	229	0	114	230	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	7.8	20.8		2.7	15.7			13.5		13.5	13.5	
Effective Green, g (s)	7.8	20.8		2.7	15.7			13.5		13.5	13.5	
Actuated g/C Ratio	0.11	0.30		0.04	0.23			0.20		0.20	0.20	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	199	548		69	403			343		345	344	
v/s Ratio Prot	c0.12	c0.16		0.02	0.13			c0.13		0.07	c0.13	
v/s Ratio Perm												
v/c Ratio	1.08	0.52		0.59	0.57			0.67		0.33	0.67	
Uniform Delay, d1	30.4	19.7		32.4	23.4			25.4		23.6	25.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	86.8	0.9		13.0	1.8			4.8		0.6	4.9	
Delay (s)	117.2	20.6		45.3	25.2			30.3		24.2	30.3	
Level of Service	F	C		D	C			C		C	C	
Approach Delay (s)		61.6			28.1			30.3			28.4	
Approach LOS		E			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			40.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			68.5			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			57.7%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Palmcrest Dr/Westlake Center & Southgate Ave

Cumulative Plus Project Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	65	245	45	7	136	43	24	14	30	44	54	59
Future Volume (vph)	65	245	45	7	136	43	24	14	30	44	54	59
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	81	306	56	9	170	54	30	18	38	55	68	74
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	234	209	233	86	197							
Volume Left (vph)	81	0	9	30	55							
Volume Right (vph)	0	56	54	38	74							
Hadj (s)	0.22	-0.14	-0.08	-0.14	-0.12							
Departure Headway (s)	5.9	5.5	5.4	5.8	5.6							
Degree Utilization, x	0.38	0.32	0.35	0.14	0.31							
Capacity (veh/h)	589	630	632	540	589							
Control Delay (s)	11.2	9.8	11.2	9.7	11.0							
Approach Delay (s)	10.6		11.2	9.7	11.0							
Approach LOS	B		B	A	B							
Intersection Summary												
Delay			10.7									
Level of Service			B									
Intersection Capacity Utilization			41.1%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues
7: Park Plaza Dr & Southgate Ave

Cumulative Plus Project Conditions AM
Timing Plan: AM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	293	111	111	308	174	109
v/c Ratio	0.68	0.24	0.45	0.28	0.23	0.15
Control Delay	27.3	5.3	28.8	7.3	14.9	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	5.3	28.8	7.3	14.9	4.5
Queue Length 50th (ft)	87	0	34	44	41	0
Queue Length 95th (ft)	132	22	69	83	79	22
Internal Link Dist (ft)	338			169	611	
Turn Bay Length (ft)						65
Base Capacity (vph)	569	584	280	1095	756	707
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.19	0.40	0.28	0.23	0.15
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

7: Park Plaza Dr & Southgate Ave

Cumulative Plus Project Conditions AM

Timing Plan: AM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	234	89	89	246	139	87
Future Volume (vph)	234	89	89	246	139	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	292	111	111	308	174	109
RTOR Reduction (vph)	0	84	0	0	0	65
Lane Group Flow (vph)	293	27	111	308	174	44
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	14.1	14.1	6.9	34.8	23.4	23.4
Effective Green, g (s)	14.1	14.1	6.9	34.8	23.4	23.4
Actuated g/C Ratio	0.24	0.24	0.12	0.60	0.40	0.40
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	426	381	208	1108	745	633
v/s Ratio Prot	c0.17		c0.06	c0.17	0.09	
v/s Ratio Perm		0.02				0.03
v/c Ratio	0.69	0.07	0.53	0.28	0.23	0.07
Uniform Delay, d1	19.9	16.9	24.0	5.5	11.3	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1	2.6	0.6	0.7	0.2
Delay (s)	24.5	16.9	26.6	6.2	12.1	10.8
Level of Service	C	B	C	A	B	B
Approach Delay (s)	22.4			11.6	11.6	
Approach LOS	C			B	B	

Intersection Summary

HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	57.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
8: Westlake Center & John Daly Blvd

Cumulative Plus Project Conditions AM
Timing Plan: AM

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1079	157	196	1385	103	137
v/c Ratio	0.44	0.14	0.60	0.47	0.61	0.33
Control Delay	15.7	5.2	46.4	5.9	64.7	17.3
Queue Delay	7.1	0.0	0.0	0.8	0.0	0.1
Total Delay	22.9	5.2	46.4	6.7	64.7	17.4
Queue Length 50th (ft)	311	15	80	178	75	34
Queue Length 95th (ft)	413	m37	m108	230	128	81
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2471	1152	473	2927	350	484
Starvation Cap Reductn	839	0	0	1099	0	0
Spillback Cap Reductn	1340	0	0	0	0	30
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.14	0.41	0.76	0.29	0.30
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis 8: Westlake Center & John Daly Blvd

Cumulative Plus Project Conditions AM
Timing Plan: AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘↙	↑↑	↘	↑
Traffic Volume (vph)	993	144	180	1274	95	126
Future Volume (vph)	993	144	180	1274	95	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1079	157	196	1385	103	137
RTOR Reduction (vph)	0	47	0	0	0	66
Lane Group Flow (vph)	1079	110	196	1385	103	71
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	81.0	81.0	11.0	96.0	11.1	22.1
Effective Green, g (s)	81.0	81.0	11.0	96.0	11.1	22.1
Actuated g/C Ratio	0.70	0.70	0.09	0.83	0.10	0.19
Clearance Time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	2471	1105	325	2928	169	356
v/s Ratio Prot	0.30		c0.06	c0.39	c0.06	0.02
v/s Ratio Perm		0.07				0.03
v/c Ratio	0.44	0.10	0.60	0.47	0.61	0.20
Uniform Delay, d1	7.6	5.7	50.4	2.8	50.4	39.5
Progression Factor	1.81	3.96	0.82	1.76	1.00	1.00
Incremental Delay, d2	0.5	0.2	1.4	0.4	4.2	0.1
Delay (s)	14.3	22.7	42.7	5.4	54.6	39.6
Level of Service	B	C	D	A	D	D
Approach Delay (s)	15.4			10.0	46.0	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay			15.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			116.0		Sum of lost time (s)	12.9
Intersection Capacity Utilization			48.6%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis 9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Cumulative Plus Project Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	4	42	0	1	50	11	325	27	45	373	18
Future Volume (Veh/h)	62	4	42	0	1	50	11	325	27	45	373	18
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	4	46	0	1	54	12	353	29	49	405	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)											804	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	959	919	415	952	914	368	425			382		
vC1, stage 1 conf vol	513	513		392	392							
vC2, stage 2 conf vol	446	406		561	523							
vCu, unblocked vol	901	857	299	894	852	368	310			382		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	99	93	100	100	92	99			96		
cM capacity (veh/h)	398	425	667	399	432	676	1125			1171		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	117	55	394	474								
Volume Left	67	0	12	49								
Volume Right	46	54	29	20								
cSH	474	669	1125	1171								
Volume to Capacity	0.25	0.08	0.01	0.04								
Queue Length 95th (ft)	24	7	1	3								
Control Delay (s)	15.1	10.9	0.4	1.3								
Lane LOS	C	B	A	A								
Approach Delay (s)	15.1	10.9	0.4	1.3								
Approach LOS	C	B										
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			61.1%	ICU Level of Service					B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 10: Park Plaza Dr & Garage Dwy/Belmar Ave

Cumulative Plus Project Conditions AM
Timing Plan: AM

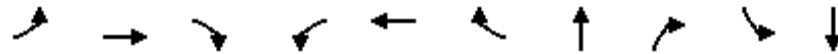
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	21	2	38	7	439	51	19	293	3
Future Volume (Veh/h)	0	0	0	21	2	38	7	439	51	19	293	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	23	2	41	8	477	55	21	318	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)								691			775	
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	924	910	320	882	884	504	321			532		
vC1, stage 1 conf vol	362	362		520	520							
vC2, stage 2 conf vol	562	548		362	363							
vCu, unblocked vol	923	909	320	881	883	503	321			530		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	95	100	93	99			98		
cM capacity (veh/h)	402	434	719	458	453	566	1233			1030		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	66	540	342								
Volume Left	0	23	8	21								
Volume Right	0	41	55	3								
cSH	1700	519	1233	1030								
Volume to Capacity	0.00	0.13	0.01	0.02								
Queue Length 95th (ft)	0	11	0	2								
Control Delay (s)	0.0	12.9	0.2	0.7								
Lane LOS	A	B	A	A								
Approach Delay (s)	0.0	12.9	0.2	0.7								
Approach LOS	A	B										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			38.5%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

Cumulative Plus Project Conditions AM

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	4	1447	13	142	1463	170	72	262	283	30
v/c Ratio	0.05	1.01	0.02	0.99	0.82	0.20	0.13	0.38	0.87	0.07
Control Delay	63.2	60.2	0.1	125.3	29.0	5.1	23.7	13.9	68.7	24.0
Queue Delay	0.0	0.0	0.0	0.0	36.4	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	60.2	0.1	125.3	65.4	5.1	23.7	13.9	68.7	24.0
Queue Length 50th (ft)	3	~596	0	108	448	12	34	64	204	9
Queue Length 95th (ft)	m6	#741	m0	#239	#692	54	67	133	#406	36
Internal Link Dist (ft)		2029			411		195			206
Turn Bay Length (ft)										
Base Capacity (vph)	90	1438	715	144	1794	869	529	688	327	439
Starvation Cap Reductn	0	0	0	0	430	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	1.01	0.02	0.99	1.07	0.20	0.14	0.38	0.87	0.07

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Cumulative Plus Project Conditions AM

Timing Plan: AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	4	1331	12	131	1346	156	41	25	241	260	15	13
Future Volume (vph)	4	1331	12	131	1346	156	41	25	241	260	15	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.9	4.9	4.0	4.9	4.9		4.5	4.5	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1789	1568	1752	1716	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00	0.71	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1365	1568	1310	1716	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	1447	13	142	1463	170	45	27	262	283	16	14
RTOR Reduction (vph)	0	0	8	0	0	70	0	0	79	0	11	0
Lane Group Flow (vph)	4	1447	5	142	1463	100	0	72	183	283	20	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4			4
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.1	47.6	47.6	9.6	56.6	56.6		45.9	45.9	29.0	29.0	
Effective Green, g (s)	1.1	47.6	47.6	9.6	56.6	56.6		45.9	45.9	29.0	29.0	
Actuated g/C Ratio	0.01	0.41	0.41	0.08	0.49	0.49		0.40	0.40	0.25	0.25	
Clearance Time (s)	3.5	4.9	4.9	4.0	4.9	4.9				4.0	4.0	
Vehicle Extension (s)	2.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	16	1438	643	144	1710	765		540	620	327	429	
v/s Ratio Prot	0.00	c0.41		c0.08	0.42				c0.12		0.01	
v/s Ratio Perm			0.00			0.06		0.05		c0.22		
v/c Ratio	0.25	1.01	0.01	0.99	0.86	0.13		0.13	0.29	0.87	0.05	
Uniform Delay, d1	57.0	34.2	20.2	53.1	26.1	16.2		22.4	24.0	41.6	33.0	
Progression Factor	1.17	1.05	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.7	24.2	0.0	70.2	5.7	0.4		0.1	0.3	20.5	0.0	
Delay (s)	69.2	60.1	20.3	123.4	31.8	16.6		22.5	24.2	62.2	33.0	
Level of Service	E	E	C	F	C	B		C	C	E	C	
Approach Delay (s)		59.8			37.7			23.9			59.4	
Approach LOS		E			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			46.6				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			116.0				Sum of lost time (s)			17.4		
Intersection Capacity Utilization			77.3%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 12: Lake Merced Blvd & Project Dwy

Cumulative Plus Project Conditions AM
Timing Plan: AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	61	0	0	20	0
Future Volume (Veh/h)	0	61	0	0	20	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	66	0	0	22	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	44	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	44	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			99	
cM capacity (veh/h)	951	1082			1617	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	66	0	22			
Volume Left	0	0	22			
Volume Right	66	0	0			
cSH	1082	1700	1617			
Volume to Capacity	0.06	0.00	0.01			
Queue Length 95th (ft)	5	0	1			
Control Delay (s)	8.5	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	8.5	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		8.2				
Intersection Capacity Utilization		13.8%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

Cumulative Plus Project Conditions PM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: PM

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	238	570	126	274	636	701	34	356	213	469	623
v/c Ratio	0.75	0.39	0.18	0.67	0.51	0.45	0.32	0.66	0.46	0.78	0.55
Control Delay	61.5	27.5	5.7	52.1	38.5	0.8	61.0	53.9	17.1	56.2	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.5	27.5	5.7	52.1	38.8	0.8	61.0	53.9	17.1	56.2	22.5
Queue Length 50th (ft)	173	160	0	110	225	0	26	138	63	180	133
Queue Length 95th (ft)	#311	250	44	m143	m310	m0	59	182	82	228	179
Internal Link Dist (ft)		569			362			714			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	319	1456	701	512	1238	1544	160	905	508	641	1254
Starvation Cap Reductn	0	0	0	0	171	0	0	0	0	0	0
Spillback Cap Reductn	0	20	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.40	0.18	0.54	0.60	0.45	0.21	0.39	0.42	0.73	0.50

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

Cumulative Plus Project Conditions PM

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: PM

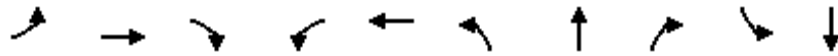
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	217	519	115	249	579	638	31	324	194	427	273	294
Future Volume (vph)	217	519	115	249	579	638	31	324	194	427	273	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	0.99	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92	0.92
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	3505	1510	3400	3505	1544	1752	3505	1546	3400	3202	3202
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1752	3505	1510	3400	3505	1544	1752	3505	1546	3400	3202	3202
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	238	570	126	274	636	701	34	356	213	469	300	323
RTOR Reduction (vph)	0	0	75	0	0	0	0	0	40	0	171	0
Lane Group Flow (vph)	238	570	51	274	636	701	34	356	173	469	452	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	NA
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	21.9	47.4	47.4	14.4	39.9	120.0	5.1	18.4	32.8	22.9	36.0	
Effective Green, g (s)	21.9	48.3	48.3	14.4	40.8	120.0	5.1	18.4	32.8	22.9	36.2	
Actuated g/C Ratio	0.18	0.40	0.40	0.12	0.34	1.00	0.04	0.15	0.27	0.19	0.30	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	319	1410	607	408	1191	1544	74	537	422	648	965	
v/s Ratio Prot	c0.14	0.16		0.08	c0.18		0.02	c0.10	0.05	c0.14	0.14	
v/s Ratio Perm			0.03			0.45			0.06			
v/c Ratio	0.75	0.40	0.08	0.67	0.53	0.45	0.46	0.66	0.41	0.72	0.47	
Uniform Delay, d1	46.4	25.6	22.2	50.5	31.9	0.0	56.1	47.9	35.7	45.6	34.1	
Progression Factor	1.00	1.00	1.00	0.90	1.14	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.7	0.9	0.3	3.3	1.4	0.8	3.3	3.4	0.5	3.8	0.5	
Delay (s)	55.1	26.4	22.4	48.7	37.9	0.8	59.4	51.3	36.2	49.3	34.6	
Level of Service	E	C	C	D	D	A	E	D	D	D	C	
Approach Delay (s)		33.2			23.6			46.4			40.9	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			33.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			75.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Plus Project Conditions PM

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	116	1117	110	300	1429	199	48	221	8	120
v/c Ratio	0.61	0.59	0.13	0.69	0.73	0.88	0.12	0.34	0.10	0.63
Control Delay	64.5	21.4	4.1	72.7	17.4	87.7	39.2	4.6	56.9	32.8
Queue Delay	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	21.8	4.1	72.7	17.4	87.7	39.2	4.6	56.9	32.8
Queue Length 50th (ft)	78	334	14	128	184	153	30	0	6	25
Queue Length 95th (ft)	m144	497	m49	m140	m294	#284	67	50	23	84
Internal Link Dist (ft)		253			2035		684			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	189	1893	848	623	1960	233	553	765	160	476
Starvation Cap Reductn	0	328	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.71	0.13	0.48	0.73	0.85	0.09	0.29	0.05	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Cumulative Plus Project Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	1028	101	276	1305	10	183	44	203	7	30	80
Future Volume (vph)	107	1028	101	276	1305	10	183	44	203	7	30	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	0.94	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1470	3400	3499		1752	1845	1480	1752	1594	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1470	3400	3499		1752	1845	1480	1752	1594	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	116	1117	110	300	1418	11	199	48	221	8	33	87
RTOR Reduction (vph)	0	0	54	0	0	0	0	0	145	0	79	0
Lane Group Flow (vph)	116	1117	56	300	1429	0	199	48	76	8	41	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2						8			
Actuated Green, G (s)	13.0	60.7	60.7	15.4	63.1		15.5	25.6	41.0	1.4	11.5	
Effective Green, g (s)	13.0	61.6	61.6	15.4	64.0		15.5	25.6	41.0	1.4	11.5	
Actuated g/C Ratio	0.11	0.51	0.51	0.13	0.53		0.13	0.21	0.34	0.01	0.10	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0	2.5	2.5	2.0	
Lane Grp Cap (vph)	189	1799	754	436	1866		226	393	555	20	152	
v/s Ratio Prot	0.07	c0.32		0.09	c0.41		c0.11	0.03	0.02	0.00	c0.03	
v/s Ratio Perm			0.04						0.03			
v/c Ratio	0.61	0.62	0.07	0.69	0.77		0.88	0.12	0.14	0.40	0.27	
Uniform Delay, d1	51.1	20.9	14.8	50.0	22.1		51.3	38.1	27.3	58.9	50.4	
Progression Factor	1.00	1.01	1.36	1.39	0.79		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.4	1.4	0.2	1.7	1.3		30.2	0.1	0.1	9.3	0.4	
Delay (s)	55.6	22.4	20.3	71.2	18.8		81.6	38.2	27.4	68.2	50.7	
Level of Service	E	C	C	E	B		F	D	C	E	D	
Approach Delay (s)		25.1			27.9			51.5			51.8	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			30.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			77.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Plus Project Conditions PM

3: I-280/SR-1 ramps & John Daly Blvd

Timing Plan: PM



Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1678	741	1718	501
v/c Ratio	0.53	0.85	0.49	0.66
Control Delay	2.7	51.8	0.5	38.7
Queue Delay	0.4	0.0	0.1	0.0
Total Delay	3.0	51.8	0.6	38.7
Queue Length 50th (ft)	51	281	0	173
Queue Length 95th (ft)	m51	329	0	222
Internal Link Dist (ft)	406		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3178	1076	3505	916
Starvation Cap Reductn	810	0	0	0
Spillback Cap Reductn	0	0	384	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.71	0.69	0.55	0.55

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis 3: I-280/SR-1 ramps & John Daly Blvd

Cumulative Plus Project Conditions PM

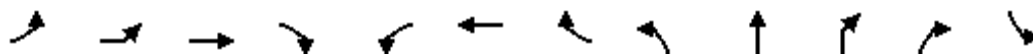
Timing Plan: PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↙↘	↑↑		↗↘
Traffic Volume (vph)	1248	379	719	1666	0	486
Future Volume (vph)	1248	379	719	1666	0	486
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.96		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.97		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4682		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4682		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1287	391	741	1718	0	501
RTOR Reduction (vph)	15	0	0	0	0	46
Lane Group Flow (vph)	1663	0	741	1718	0	455
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	81.5		31.4	120.0		31.4
Effective Green, g (s)	81.1		30.9	120.0		30.9
Actuated g/C Ratio	0.68		0.26	1.00		0.26
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3164		875	3505		710
v/s Ratio Prot	c0.36		c0.22	0.49		0.16
v/s Ratio Perm						
v/c Ratio	0.53		0.85	0.49		0.64
Uniform Delay, d1	9.8		42.3	0.0		39.6
Progression Factor	0.24		1.00	1.00		1.00
Incremental Delay, d2	0.3		7.6	0.5		2.0
Delay (s)	2.6		49.9	0.5		41.6
Level of Service	A		D	A		D
Approach Delay (s)	2.6			15.4	41.6	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			13.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.61			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			61.4%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Cumulative Plus Project Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: PM



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	119	347	913	337	243	1036	512	676	477	422	527	198
v/c Ratio	0.29	0.90	1.22	0.77	0.70	0.94	0.67	1.03	1.51	1.27	0.68	0.52
Control Delay	51.4	83.8	158.4	34.1	68.3	76.6	34.1	104.0	288.7	185.0	26.8	59.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	83.8	158.4	34.1	68.3	76.6	34.1	104.0	288.7	185.0	26.8	59.7
Queue Length 50th (ft)	114	422	~759	151	274	417	362	~387	~760	~543	302	180
Queue Length 95th (ft)	184	#665	#924	#336	397	#510	496	#515	#1010	#790	453	265
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	409	386	749	436	348	1099	794	658	315	332	773	416
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.90	1.22	0.77	0.70	0.94	0.64	1.03	1.51	1.27	0.68	0.48

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



Lane Group	SBT	SBR
Lane Group Flow (vph)	316	799
v/c Ratio	0.83	1.05
Control Delay	77.6	82.1
Queue Delay	0.0	0.0
Total Delay	77.6	82.1
Queue Length 50th (ft)	327	~930
Queue Length 95th (ft)	453	#1205
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	416	764
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.76	1.05

Intersection Summary

HCM Signalized Intersection Capacity Analysis

Cumulative Plus Project Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: PM

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	127	479	683	359	259	969	295	197	649	364	293	683
Future Volume (vph)	127	479	683	359	259	969	295	197	649	364	293	683
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.77	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.99	0.85	1.00	1.00	0.85		1.00	0.97	0.85	0.85
Flt Protected	0.95	0.95	0.99	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2916	1099	1507	4753	1568		3400	1627	1427	1490
Flt Permitted	0.95	0.95	0.99	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2916	1099	1507	4753	1568		3400	1627	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	132	499	711	374	270	1009	307	205	676	379	305	742
RTOR Reduction (vph)	0	0	1	155	0	0	22	0	0	0	56	108
Lane Group Flow (vph)	119	347	912	182	243	1036	490	0	676	477	366	419
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pm+ov		Split	NA	Perm	custom
Protected Phases	2	2	2		4	4	3		1	1		4
Permitted Phases				2			4				1	1 4
Actuated Green, G (s)	40.6	40.6	40.6	40.6	36.9	36.9	71.3		30.5	30.5	30.5	67.4
Effective Green, g (s)	41.1	41.1	41.1	41.1	37.0	37.0	72.3		31.0	31.0	31.0	67.6
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.23	0.23	0.45		0.19	0.19	0.19	0.42
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.5		4.5	4.5	4.5	4.1
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	409	387	749	282	348	1099	708		658	315	276	629
v/s Ratio Prot	0.07	0.23	c0.31		0.16	c0.22	0.15		0.20	c0.29		0.15
v/s Ratio Perm				0.17			0.16				0.26	0.13
v/c Ratio	0.29	0.90	1.22	0.65	0.70	0.94	0.69		1.03	1.51	1.33	0.67
Uniform Delay, d1	47.7	57.4	59.5	53.0	56.4	60.5	35.0		64.5	64.5	64.5	37.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	25.9	109.6	10.9	6.5	15.4	3.2		42.2	247.2	170.2	2.9
Delay (s)	49.5	83.3	169.1	63.9	62.8	75.9	38.1		106.7	311.7	234.7	40.1
Level of Service	D	F	F	E	E	E	D		F	F	F	D
Approach Delay (s)			122.8			63.3				162.2		
Approach LOS			F			E				F		
Intersection Summary												
HCM 2000 Control Delay			111.2									F
HCM 2000 Volume to Capacity ratio			1.18									
Actuated Cycle Length (s)			160.0									Sum of lost time (s) 16.0
Intersection Capacity Utilization			113.8%									ICU Level of Service H
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Cumulative Plus Project Conditions PM

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: PM



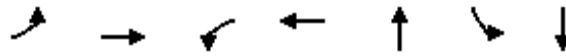
Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	190	303	767
Future Volume (vph)	190	303	767
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1752	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1752	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	198	316	799
RTOR Reduction (vph)	0	0	20
Lane Group Flow (vph)	198	316	779
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pm+ov
Protected Phases	3	3	2
Permitted Phases			3
Actuated Green, G (s)	34.4	34.4	75.0
Effective Green, g (s)	34.9	34.9	76.0
Actuated g/C Ratio	0.22	0.22	0.48
Clearance Time (s)	4.5	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0
Lane Grp Cap (vph)	382	382	745
v/s Ratio Prot	0.11	0.18	c0.27
v/s Ratio Perm			0.25
v/c Ratio	0.52	0.83	1.05
Uniform Delay, d1	55.1	59.7	42.0
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	1.6	14.3	45.5
Delay (s)	56.7	73.9	87.5
Level of Service	E	E	F
Approach Delay (s)		79.6	
Approach LOS		E	
Intersection Summary			

Queues

Cumulative Plus Project Conditions PM

5: Lake Merced Blvd & Southgate Ave

Timing Plan: PM



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	210	257	110	345	265	96	354
v/c Ratio	0.78	0.45	0.61	0.82	0.77	0.26	0.88
Control Delay	57.0	27.1	53.6	45.0	46.2	31.8	52.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.0	27.1	53.6	45.0	46.2	31.8	52.9
Queue Length 50th (ft)	117	114	61	164	130	46	169
Queue Length 95th (ft)	#184	159	100	220	182	78	#260
Internal Link Dist (ft)		324		313	101		583
Turn Bay Length (ft)			130			100	
Base Capacity (vph)	289	589	195	492	404	396	426
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.44	0.56	0.70	0.66	0.24	0.83

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Lake Merced Blvd & Southgate Ave

Cumulative Plus Project Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	166	170	33	87	160	112	30	116	63	76	134	145
Future Volume (vph)	166	170	33	87	160	112	30	116	63	76	134	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.94			0.96		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1752	1799		1752	1731			1757		1752	1701	
Flt Permitted	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (perm)	1752	1799		1752	1731			1757		1752	1701	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	210	215	42	110	203	142	38	147	80	96	170	184
RTOR Reduction (vph)	0	8	0	0	28	0	0	18	0	0	43	0
Lane Group Flow (vph)	210	249	0	110	317	0	0	247	0	96	311	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	12.8	26.0		6.9	20.1			15.5		17.6	17.6	
Effective Green, g (s)	12.8	26.0		6.9	20.1			15.5		17.6	17.6	
Actuated g/C Ratio	0.15	0.31		0.08	0.24			0.18		0.21	0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	266	556		143	414			324		367	356	
v/s Ratio Prot	c0.12	0.14		0.06	c0.18			c0.14		0.05	c0.18	
v/s Ratio Perm												
v/c Ratio	0.79	0.45		0.77	0.77			0.76		0.26	0.87	
Uniform Delay, d1	34.3	23.3		37.8	29.8			32.5		27.8	32.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	14.4	0.6		21.7	8.2			10.2		0.4	20.5	
Delay (s)	48.7	23.8		59.4	38.0			42.7		28.1	52.6	
Level of Service	D	C		E	D			D		C	D	
Approach Delay (s)		35.0			43.2			42.7			47.4	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			41.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			84.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			67.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Palmcrest Dr/Westlake Center & Southgate Ave

Cumulative Plus Project Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	69	132	39	0	182	98	21	22	17	76	64	136
Future Volume (vph)	69	132	39	0	182	98	21	22	17	76	64	136
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	86	165	49	0	228	122	26	28	21	95	80	170
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	169	132	350	75	345							
Volume Left (vph)	86	0	0	26	95							
Volume Right (vph)	0	49	122	21	170							
Hadj (s)	0.31	-0.21	-0.16	-0.05	-0.19							
Departure Headway (s)	6.6	6.1	5.6	6.4	5.6							
Degree Utilization, x	0.31	0.22	0.55	0.13	0.54							
Capacity (veh/h)	506	548	604	468	596							
Control Delay (s)	11.4	9.6	15.3	10.4	15.1							
Approach Delay (s)	10.6		15.3	10.4	15.1							
Approach LOS	B		C	B	C							
Intersection Summary												
Delay			13.6									
Level of Service			B									
Intersection Capacity Utilization			51.8%			ICU Level of Service			A			
Analysis Period (min)			15									

Queues
7: Park Plaza Dr & Southgate Ave

Cumulative Plus Project Conditions PM

Timing Plan: PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	175	129	216	409	231	110
v/c Ratio	0.48	0.30	0.68	0.35	0.33	0.17
Control Delay	22.5	6.0	34.8	6.0	14.1	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	6.0	34.8	6.0	14.1	4.0
Queue Length 50th (ft)	47	0	62	47	49	0
Queue Length 95th (ft)	81	24	#129	92	91	20
Internal Link Dist (ft)	338			169	622	
Turn Bay Length (ft)						65
Base Capacity (vph)	638	653	322	1176	702	665
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.20	0.67	0.35	0.33	0.17

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

7: Park Plaza Dr & Southgate Ave

Cumulative Plus Project Conditions PM

Timing Plan: PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	140	103	173	327	185	88
Future Volume (vph)	140	103	173	327	185	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	175	129	216	409	231	110
RTOR Reduction (vph)	0	102	0	0	0	68
Lane Group Flow (vph)	175	27	216	409	231	42
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	10.4	10.4	8.9	32.8	19.4	19.4
Effective Green, g (s)	10.9	10.9	9.4	33.3	19.9	19.9
Actuated g/C Ratio	0.21	0.21	0.18	0.64	0.38	0.38
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	365	327	315	1176	703	597
v/s Ratio Prot	c0.10		c0.12	c0.22	0.13	
v/s Ratio Perm		0.02				0.03
v/c Ratio	0.48	0.08	0.69	0.35	0.33	0.07
Uniform Delay, d1	18.2	16.6	20.0	4.4	11.4	10.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.1	6.1	0.8	1.2	0.2
Delay (s)	19.2	16.7	26.1	5.2	12.7	10.5
Level of Service	B	B	C	A	B	B
Approach Delay (s)	18.1			12.4	12.0	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

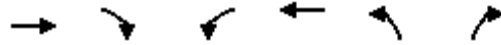
c Critical Lane Group

Queues

Cumulative Plus Project Conditions PM

8: Westlake Center & John Daly Blvd

Timing Plan: PM



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1040	241	332	1391	243	336
v/c Ratio	0.43	0.21	1.37	0.50	0.87	0.65
Control Delay	11.0	2.9	224.6	1.0	78.5	28.9
Queue Delay	0.5	0.0	0.0	0.2	0.0	0.5
Total Delay	11.6	2.9	224.6	1.3	78.5	29.4
Queue Length 50th (ft)	242	0	~178	16	186	133
Queue Length 95th (ft)	195	m39	m#268	14	#330	239
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2391	1147	243	2757	280	515
Starvation Cap Reductn	848	0	0	568	0	0
Spillback Cap Reductn	731	0	0	0	0	29
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.21	1.37	0.64	0.87	0.69

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis 8: Westlake Center & John Daly Blvd

Cumulative Plus Project Conditions PM
Timing Plan: PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘↙	↑↑	↘	↑
Traffic Volume (vph)	957	222	305	1280	224	309
Future Volume (vph)	957	222	305	1280	224	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	3.5	4.0	3.5	3.5
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1040	241	332	1391	243	336
RTOR Reduction (vph)	0	78	0	0	0	111
Lane Group Flow (vph)	1040	163	332	1391	243	225
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	80.6	80.6	8.0	93.0	18.5	26.5
Effective Green, g (s)	81.1	81.1	8.5	93.5	19.0	27.5
Actuated g/C Ratio	0.68	0.68	0.07	0.78	0.16	0.23
Clearance Time (s)	4.9	4.9	4.0	4.5	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	2.0	3.0
Lane Grp Cap (vph)	2391	1069	243	2757	280	408
v/s Ratio Prot	0.29		c0.10	c0.39	c0.14	0.04
v/s Ratio Perm		0.10				0.10
v/c Ratio	0.43	0.15	1.37	0.50	0.87	0.55
Uniform Delay, d1	8.9	7.0	55.8	4.8	49.3	40.8
Progression Factor	1.17	2.94	1.03	0.12	1.00	1.00
Incremental Delay, d2	0.5	0.3	182.0	0.5	28.5	1.6
Delay (s)	10.9	20.9	239.6	1.0	77.8	42.4
Level of Service	B	C	F	A	E	D
Approach Delay (s)	12.8			47.0	57.3	
Approach LOS	B			D	E	
Intersection Summary						
HCM 2000 Control Delay			36.4		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	11.4
Intersection Capacity Utilization			57.9%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis 9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Cumulative Plus Project Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	1	28	34	17	65	22	402	43	105	412	72
Future Volume (Veh/h)	21	1	28	34	17	65	22	402	43	105	412	72
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	1	30	37	18	71	24	437	47	114	448	78
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)								663			794	
pX, platoon unblocked	0.87	0.87	0.87	0.87	0.87		0.87					
vC, conflicting volume	1304	1247	487	1254	1262	460	526			484		
vC1, stage 1 conf vol	715	715		508	508							
vC2, stage 2 conf vol	588	532		746	754							
vCu, unblocked vol	1274	1209	335	1217	1227	460	380			484		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	100	95	87	94	88	98			89		
cM capacity (veh/h)	244	298	613	285	301	599	1020			1074		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	54	126	508	640								
Volume Left	23	37	24	114								
Volume Right	30	71	47	78								
cSH	369	409	1020	1074								
Volume to Capacity	0.15	0.31	0.02	0.11								
Queue Length 95th (ft)	13	32	2	9								
Control Delay (s)	16.4	17.7	0.7	2.7								
Lane LOS	C	C	A	A								
Approach Delay (s)	16.4	17.7	0.7	2.7								
Approach LOS	C	C										
Intersection Summary												
Average Delay			3.9									
Intersection Capacity Utilization			74.7%		ICU Level of Service					D		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Park Plaza Dr & Garage Dwy/Belmar Ave

Cumulative Plus Project Conditions PM

Timing Plan: PM

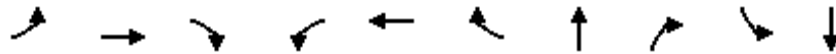
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	1	19	0	21	7	443	62	29	385	9
Future Volume (Veh/h)	15	0	1	19	0	21	7	443	62	29	385	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	0	1	21	0	23	8	482	67	32	418	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)								702			764	
pX, platoon unblocked	0.96	0.96		0.96	0.96	0.96				0.96		
vC, conflicting volume	1042	1052	423	1020	1024	516	428			549		
vC1, stage 1 conf vol	487	487		532	532							
vC2, stage 2 conf vol	554	565		488	492							
vCu, unblocked vol	1021	1032	423	998	1002	471	428			506		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	100	95	100	96	99			97		
cM capacity (veh/h)	385	393	629	413	411	565	1126			1008		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	17	44	557	460								
Volume Left	16	21	8	32								
Volume Right	1	23	67	10								
cSH	394	481	1126	1008								
Volume to Capacity	0.04	0.09	0.01	0.03								
Queue Length 95th (ft)	3	8	1	2								
Control Delay (s)	14.6	13.2	0.2	0.9								
Lane LOS	B	B	A	A								
Approach Delay (s)	14.6	13.2	0.2	0.9								
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			48.1%	ICU Level of Service					A			
Analysis Period (min)			15									

Queues

Cumulative Plus Project Conditions PM

11: Poncetta Dr/Sheffield Dr & John Daly Blvd

Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	1417	4	187	1695	214	25	230	121	24
v/c Ratio	0.07	1.03	0.01	1.03	0.92	0.24	0.04	0.32	0.42	0.06
Control Delay	50.0	73.3	0.0	124.6	35.4	6.2	22.9	9.0	46.0	27.8
Queue Delay	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	73.3	0.0	124.6	39.1	6.2	22.9	9.0	46.0	27.8
Queue Length 50th (ft)	4	~636	0	~154	588	24	12	32	82	9
Queue Length 95th (ft)	m8	#779	m0	#303	#889	76	31	89	142	33
Internal Link Dist (ft)		2035			406		211			198
Turn Bay Length (ft)										
Base Capacity (vph)	73	1372	691	182	1843	894	615	714	290	377
Starvation Cap Reductn	0	0	0	0	97	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	1.03	0.01	1.03	0.97	0.24	0.04	0.32	0.42	0.06

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

11: Poncetta Dr/Sheffield Dr & John Daly Blvd

Cumulative Plus Project Conditions PM

Timing Plan: PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	5	1304	4	172	1559	197	17	6	212	111	14	8
Future Volume (vph)	5	1304	4	172	1559	197	17	6	212	111	14	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	3.5	3.5		4.5	4.5	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1781	1568	1752	1741	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.85	1.00	0.74	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1572	1568	1367	1741	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	1417	4	187	1695	214	18	7	230	121	15	9
RTOR Reduction (vph)	0	0	2	0	0	74	0	0	99	0	7	0
Lane Group Flow (vph)	5	1417	2	187	1695	140	0	25	131	121	17	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4		4	
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.0	47.0	47.0	12.5	59.5	59.5		48.0	48.0	25.5	25.5	
Effective Green, g (s)	1.0	47.0	47.0	12.5	59.5	59.5		48.0	48.0	25.5	25.5	
Actuated g/C Ratio	0.01	0.39	0.39	0.10	0.50	0.50		0.40	0.40	0.21	0.21	
Clearance Time (s)	4.5	4.5	4.5	4.5	3.5	3.5				3.5	3.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	14	1372	614	182	1737	777		628	627	290	369	
v/s Ratio Prot	0.00	0.40		c0.11	c0.48				c0.08		0.01	
v/s Ratio Perm			0.00			0.09		0.02		c0.09		
v/c Ratio	0.36	1.03	0.00	1.03	0.98	0.18		0.04	0.21	0.42	0.05	
Uniform Delay, d1	59.2	36.5	22.2	53.8	29.5	16.7		21.9	23.6	40.8	37.6	
Progression Factor	0.87	1.17	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.1	31.6	0.0	71.8	15.9	0.5		0.1	0.8	4.4	0.2	
Delay (s)	64.7	74.3	22.2	125.5	45.4	17.2		22.1	24.3	45.2	37.8	
Level of Service	E	E	C	F	D	B		C	C	D	D	
Approach Delay (s)		74.1			49.7			24.1			44.0	
Approach LOS		E			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			56.7				HCM 2000 Level of Service		E			
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)		17.0			
Intersection Capacity Utilization			70.5%				ICU Level of Service		C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 12: Lake Merced Blvd & Project Dwy

Cumulative Plus Project Conditions PM
Timing Plan: PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	58	0	0	59	0
Future Volume (Veh/h)	0	58	0	0	59	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	63	0	0	64	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						181
pX, platoon unblocked						
vC, conflicting volume	128	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	128	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			96	
cM capacity (veh/h)	830	1082			1617	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	63	0	64			
Volume Left	0	0	64			
Volume Right	63	0	0			
cSH	1082	1700	1617			
Volume to Capacity	0.06	0.00	0.04			
Queue Length 95th (ft)	5	0	3			
Control Delay (s)	8.5	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	8.5	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		7.9				
Intersection Capacity Utilization		13.6%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

Existing Conditions Weekend

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: Weekend

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	163	470	123	307	566	546	89	360	355	367	374
v/c Ratio	0.70	0.32	0.18	0.66	0.39	0.35	0.61	0.66	0.66	0.73	0.45
Control Delay	62.9	25.4	5.2	54.3	32.3	0.6	69.4	51.8	18.8	55.6	37.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.9	25.4	5.2	54.3	32.3	0.6	69.4	51.8	18.8	55.6	37.2
Queue Length 50th (ft)	118	125	0	111	199	0	65	134	97	136	123
Queue Length 95th (ft)	181	188	41	167	287	0	119	178	140	180	155
Internal Link Dist (ft)		569			362			724			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	306	1447	696	465	1457	1544	166	936	540	555	1123
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	51	0	0	0	0	0	0	1	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.34	0.18	0.66	0.39	0.35	0.54	0.38	0.66	0.66	0.33
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

Existing Conditions Weekend

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	428	112	279	515	497	81	328	323	334	282	58
Future Volume (vph)	148	428	112	279	515	497	81	328	323	334	282	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9	4.0	4.0	4.0	4.0	4.0	4.2	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3404	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3404	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	163	470	123	307	566	546	89	360	355	367	310	64
RTOR Reduction (vph)	0	0	73	0	0	0	0	0	87	0	17	0
Lane Group Flow (vph)	163	470	50	307	566	546	89	360	268	367	357	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	15.6	47.1	47.1	15.9	47.4	116.0	8.3	18.1	34.0	18.0	27.6	
Effective Green, g (s)	15.6	47.1	47.1	15.9	47.4	116.0	8.3	18.1	34.0	18.0	27.6	
Actuated g/C Ratio	0.13	0.41	0.41	0.14	0.41	1.00	0.07	0.16	0.29	0.16	0.24	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	235	1423	613	466	1432	1544	125	546	453	527	809	
v/s Ratio Prot	c0.09	0.13		0.09	c0.16		0.05	c0.10	0.08	c0.11	0.10	
v/s Ratio Perm			0.03			c0.35			0.09			
v/c Ratio	0.69	0.33	0.08	0.66	0.40	0.35	0.71	0.66	0.59	0.70	0.44	
Uniform Delay, d1	47.9	23.6	21.2	47.5	24.2	0.0	52.7	46.0	35.1	46.4	37.6	
Progression Factor	1.00	1.00	1.00	1.00	1.21	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.9	0.6	0.3	2.7	0.7	0.6	16.3	3.2	1.7	3.7	0.5	
Delay (s)	55.8	24.3	21.4	50.4	30.0	0.6	69.0	49.2	36.8	50.1	38.2	
Level of Service	E	C	C	D	C	A	E	D	D	D	D	
Approach Delay (s)		30.6			23.1			45.9			44.1	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			33.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			17.1			
Intersection Capacity Utilization			71.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Conditions Weekend

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: Weekend

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	116	1105	82	435	1300	154	17	400	4	86
v/c Ratio	0.55	0.66	0.11	0.62	0.66	0.76	0.05	0.49	0.05	0.51
Control Delay	61.5	30.5	9.5	58.0	10.8	72.7	36.8	9.7	53.8	29.0
Queue Delay	0.0	13.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.5	43.9	9.5	58.0	10.8	72.7	36.8	9.7	53.8	29.0
Queue Length 50th (ft)	83	358	18	128	72	111	10	64	3	17
Queue Length 95th (ft)	m143	478	m46	m209	184	#199	31	150	15	64
Internal Link Dist (ft)		253			2029		695			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	211	1675	747	704	1976	226	556	816	166	471
Starvation Cap Reductn	0	566	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	1.00	0.11	0.62	0.66	0.68	0.03	0.49	0.02	0.18

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Existing Conditions Weekend

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	1017	75	400	1189	7	142	16	368	4	21	58
Future Volume (vph)	107	1017	75	400	1189	7	142	16	368	4	21	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1472	3400	3500		1752	1845	1568	1752	1593	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1472	3400	3500		1752	1845	1568	1752	1593	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	116	1105	82	435	1292	8	154	17	400	4	23	63
RTOR Reduction (vph)	0	0	45	0	0	0	0	0	146	0	58	0
Lane Group Flow (vph)	116	1105	37	435	1300	0	154	17	254	4	28	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pt+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)	14.0	52.3	52.3	24.0	62.3		13.5	21.6	49.6	1.2	9.3	
Effective Green, g (s)	14.0	52.3	52.3	24.0	62.3		13.5	21.6	49.6	1.2	9.3	
Actuated g/C Ratio	0.12	0.45	0.45	0.21	0.54		0.12	0.19	0.43	0.01	0.08	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0		2.5	2.0	
Lane Grp Cap (vph)	211	1580	663	703	1879		203	343	670	18	127	
v/s Ratio Prot	0.07	c0.32		0.13	c0.37		c0.09	0.01	c0.16	0.00	0.02	
v/s Ratio Perm			0.03									
v/c Ratio	0.55	0.70	0.06	0.62	0.69		0.76	0.05	0.38	0.22	0.22	
Uniform Delay, d1	48.0	25.5	17.9	41.8	19.8		49.7	38.8	22.7	56.9	50.0	
Progression Factor	1.08	1.16	2.14	1.31	0.51		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	2.3	0.1	0.8	1.2		14.3	0.0	0.1	4.5	0.3	
Delay (s)	54.0	31.9	38.5	55.7	11.2		64.0	38.8	22.8	61.5	50.3	
Level of Service	D	C	D	E	B		E	D	C	E	D	
Approach Delay (s)		34.3			22.4			34.4			50.8	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			29.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			16.9			
Intersection Capacity Utilization			74.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Conditions Weekend

3: I-280/SR-1 ramps & John Daly Blvd

Timing Plan: Weekend

	→	↙	←	↘
Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1687	445	1528	274
v/c Ratio	0.47	0.80	0.44	0.48
Control Delay	5.2	59.7	0.4	24.1
Queue Delay	0.5	0.0	0.0	0.0
Total Delay	5.7	59.7	0.4	24.1
Queue Length 50th (ft)	144	170	0	51
Queue Length 95th (ft)	173	227	0	97
Internal Link Dist (ft)	411		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3587	609	3505	611
Starvation Cap Reductn	1279	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.73	0.73	0.44	0.45
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

3: I-280/SR-1 ramps & John Daly Blvd

Existing Conditions Weekend

Timing Plan: Weekend

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↘↙	↑↑		↘↙
Traffic Volume (vph)	1173	464	432	1482	0	266
Future Volume (vph)	1173	464	432	1482	0	266
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6		3.5	3.6		3.5
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.96		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.96		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4607		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4607		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1209	478	445	1528	0	274
RTOR Reduction (vph)	8	0	0	0	0	119
Lane Group Flow (vph)	1679	0	445	1528	0	155
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	93.3		19.6	120.0		19.6
Effective Green, g (s)	93.3		19.6	120.0		19.6
Actuated g/C Ratio	0.78		0.16	1.00		0.16
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3581		555	3505		450
v/s Ratio Prot	c0.36		c0.13	0.44		0.06
v/s Ratio Perm						
v/c Ratio	0.47		0.80	0.44		0.34
Uniform Delay, d1	4.7		48.3	0.0		44.5
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.4		8.2	0.4		0.5
Delay (s)	5.1		56.5	0.4		45.0
Level of Service	A		E	A		D
Approach Delay (s)	5.1			13.1	45.0	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			11.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	7.1
Intersection Capacity Utilization			54.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Existing Conditions Weekend

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: Weekend

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	155	342	704	287	80	718	230	649	313	276	279	131
v/c Ratio	0.38	0.89	0.95	0.60	0.28	0.78	0.32	0.91	0.91	0.77	0.36	0.34
Control Delay	49.2	78.3	77.7	13.9	54.0	64.3	22.8	75.4	88.4	56.2	6.0	52.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	78.3	77.7	13.9	54.0	64.3	22.8	75.4	88.4	56.2	6.0	52.3
Queue Length 50th (ft)	138	376	419	28	77	259	115	323	331	212	21	110
Queue Length 95th (ft)	216	#586	#571	140	138	313	181	#430	#530	#358	84	176
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	409	386	739	475	300	947	715	714	343	357	788	390
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.89	0.95	0.60	0.27	0.76	0.32	0.91	0.91	0.77	0.35	0.34

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

		
Lane Group	SBT	SBR
Lane Group Flow (vph)	509	466
v/c Ratio	1.33	0.60
Control Delay	206.6	27.6
Queue Delay	0.0	0.0
Total Delay	206.6	27.6
Queue Length 50th (ft)	~670	307
Queue Length 95th (ft)	#914	433
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	383	779
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.33	0.60

Intersection Summary

HCM Signalized Intersection Capacity Analysis

Existing Conditions Weekend

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: Weekend

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	165	624	333	306	85	681	132	88	623	248	228	342
Future Volume (vph)	165	624	333	306	85	681	132	88	623	248	228	342
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.1		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.78	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.99	0.85	1.00	1.00	0.85		1.00	0.97	0.85	0.85
Flt Protected	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2872	1118	1507	4756	1568		3400	1634	1427	1490
Flt Permitted	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2872	1118	1507	4756	1568		3400	1634	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	172	650	347	319	89	709	138	92	649	258	238	372
RTOR Reduction (vph)	0	0	2	188	0	0	24	0	0	0	58	138
Lane Group Flow (vph)	155	342	702	99	80	718	206	0	649	313	218	141
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pt+ov		Split	NA	Prot	pt+ov
Protected Phases	2	2	2		4	4	4 3		1	1	1	1 4
Permitted Phases				2								
Actuated Green, G (s)	38.5	38.5	38.5	38.5	28.9	28.9	66.5		31.5	31.5	31.5	64.9
Effective Green, g (s)	38.5	38.5	38.5	38.5	28.9	28.9	66.5		31.5	31.5	31.5	64.9
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.19	0.19	0.44		0.21	0.21	0.21	0.43
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1			4.5	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	409	386	737	286	290	916	695		714	343	299	644
v/s Ratio Prot	0.10	0.23	c0.24		0.05	c0.15	0.13		0.19	c0.19	0.15	0.09
v/s Ratio Perm				0.09								
v/c Ratio	0.38	0.89	0.95	0.35	0.28	0.78	0.30		0.91	0.91	0.73	0.22
Uniform Delay, d1	45.9	53.6	54.8	45.5	51.6	57.6	26.7		57.9	57.9	55.3	26.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	24.5	23.3	3.3	0.7	4.7	0.3		15.7	28.0	9.4	0.2
Delay (s)	48.6	78.2	78.2	48.8	52.3	62.3	27.1		73.5	85.9	64.7	26.9
Level of Service	D	E	E	D	D	E	C		E	F	E	C
Approach Delay (s)			69.4			53.6				65.9		
Approach LOS			E			D				E		
Intersection Summary												
HCM 2000 Control Delay			76.9									E
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			150.0									17.6
Intersection Capacity Utilization			105.0%									G
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Existing Conditions Weekend

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: Weekend



Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	126	268	668
Future Volume (vph)	126	268	668
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	0.93	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1634	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1634	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	131	279	696
RTOR Reduction (vph)	0	19	20
Lane Group Flow (vph)	131	490	446
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pt+ov
Protected Phases	3	3	3 2
Permitted Phases			
Actuated Green, G (s)	33.5	33.5	76.5
Effective Green, g (s)	33.5	33.5	76.5
Actuated g/C Ratio	0.22	0.22	0.51
Clearance Time (s)	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	
Lane Grp Cap (vph)	391	364	759
v/s Ratio Prot	0.07	c0.30	0.30
v/s Ratio Perm			
v/c Ratio	0.34	1.35	0.59
Uniform Delay, d1	48.9	58.2	25.7
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.7	172.6	1.4
Delay (s)	49.6	230.8	27.1
Level of Service	D	F	C
Approach Delay (s)		123.5	
Approach LOS		F	
Intersection Summary			

HCM Unsignalized Intersection Capacity Analysis 5: Lake Merced Blvd & Southgate Ave

Existing Conditions Weekend

Timing Plan: Weekend

																	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
Lane Configurations																	
Sign Control	Stop			Stop				Stop			Stop						
Traffic Volume (vph)	189	184	37	47	157	163	16	74	57	164	81	118					
Future Volume (vph)	189	184	37	47	157	163	16	74	57	164	81	118					
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79					
Hourly flow rate (vph)	239	233	47	59	199	206	20	94	72	208	103	149					
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2										
Volume Total (vph)	239	280	59	405	186	208	252										
Volume Left (vph)	239	0	59	0	20	208	0										
Volume Right (vph)	0	47	0	206	72	0	149										
Hadj (s)	0.55	-0.07	0.55	-0.31	-0.16	0.55	-0.36										
Departure Headway (s)	8.5	7.9	8.5	7.6	8.4	8.7	7.7										
Degree Utilization, x	0.56	0.61	0.14	0.86	0.44	0.50	0.54										
Capacity (veh/h)	401	438	406	460	393	397	438										
Control Delay (s)	20.7	21.2	11.7	40.8	17.8	18.9	18.3										
Approach Delay (s)	21.0		37.1		17.8	18.6											
Approach LOS	C		E		C	C											
Intersection Summary																	
Delay			24.5														
Level of Service			C														
Intersection Capacity Utilization			61.8%		ICU Level of Service		B										
Analysis Period (min)			15														

HCM Unsignalized Intersection Capacity Analysis 6: Palmcrest Dr/Westlake Center & Southgate Ave

Existing Conditions Weekend
Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	91	207	69	40	166	95	48	40	60	80	61	158
Future Volume (vph)	91	207	69	40	166	95	48	40	60	80	61	158
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	114	259	86	50	208	119	60	50	75	100	76	198
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	244	216	377	185	374							
Volume Left (vph)	114	0	50	60	100							
Volume Right (vph)	0	86	119	75	198							
Hadj (s)	0.29	-0.23	-0.11	-0.13	-0.21							
Departure Headway (s)	7.8	7.3	7.0	7.6	6.9							
Degree Utilization, x	0.53	0.43	0.73	0.39	0.72							
Capacity (veh/h)	430	460	487	400	487							
Control Delay (s)	17.9	14.5	26.9	15.5	25.4							
Approach Delay (s)	16.3		26.9	15.5	25.4							
Approach LOS	C		D	C	D							
Intersection Summary												
Delay			21.5									
Level of Service			C									
Intersection Capacity Utilization			58.8%	ICU Level of Service				B				
Analysis Period (min)			15									

Queues
7: Park Plaza Dr & Southgate Ave

Existing Conditions Weekend
Timing Plan: Weekend



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	250	175	194	313	205	203
v/c Ratio	0.61	0.35	0.69	0.28	0.31	0.30
Control Delay	25.1	5.3	38.1	6.9	15.8	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	5.3	38.1	6.9	15.8	4.1
Queue Length 50th (ft)	72	0	60	41	47	0
Queue Length 95th (ft)	112	26	#128	84	91	28
Internal Link Dist (ft)	338			169	611	
Turn Bay Length (ft)						65
Base Capacity (vph)	597	649	293	1105	654	687
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.27	0.66	0.28	0.31	0.30

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

7: Park Plaza Dr & Southgate Ave

Existing Conditions Weekend

Timing Plan: Weekend



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	200	140	155	250	164	162
Future Volume (vph)	200	140	155	250	164	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	250	175	194	312	205	202
RTOR Reduction (vph)	0	134	0	0	0	131
Lane Group Flow (vph)	250	41	194	313	205	72
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	12.8	12.8	8.8	32.6	19.3	19.3
Effective Green, g (s)	12.8	12.8	8.8	32.6	19.3	19.3
Actuated g/C Ratio	0.24	0.24	0.16	0.60	0.35	0.35
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	412	368	283	1105	654	556
v/s Ratio Prot	c0.14		c0.11	c0.17	0.11	
v/s Ratio Perm		0.03				0.05
v/c Ratio	0.61	0.11	0.69	0.28	0.31	0.13
Uniform Delay, d1	18.6	16.3	21.5	5.3	12.7	11.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.1	6.7	0.6	1.3	0.5
Delay (s)	21.1	16.5	28.2	5.9	14.0	12.4
Level of Service	C	B	C	A	B	B
Approach Delay (s)	19.2			14.4	13.2	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

Existing Conditions Weekend

8: Westlake Center & John Daly Blvd

Timing Plan: Weekend

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	898	307	367	1149	253	414
v/c Ratio	0.44	0.29	0.80	0.43	0.83	0.67
Control Delay	21.4	6.6	63.4	7.1	68.2	27.7
Queue Delay	16.5	0.4	0.0	0.5	0.0	0.4
Total Delay	38.0	7.0	63.4	7.6	68.2	28.2
Queue Length 50th (ft)	281	39	149	110	183	183
Queue Length 95th (ft)	350	68	196	207	269	281
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2059	1049	504	2656	366	636
Starvation Cap Reductn	700	351	0	926	0	0
Spillback Cap Reductn	1162	0	0	0	0	39
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.44	0.73	0.66	0.69	0.69
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

8: Westlake Center & John Daly Blvd

Existing Conditions Weekend

Timing Plan: Weekend

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘↙	↑↑	↘	↑
Traffic Volume (vph)	826	282	338	1057	233	381
Future Volume (vph)	826	282	338	1057	233	381
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	898	307	367	1149	253	414
RTOR Reduction (vph)	0	128	0	0	0	82
Lane Group Flow (vph)	898	179	367	1149	253	332
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	67.5	67.5	15.6	87.1	20.0	35.6
Effective Green, g (s)	67.5	67.5	15.6	87.1	20.0	35.6
Actuated g/C Ratio	0.58	0.58	0.13	0.75	0.17	0.31
Clearance Time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	2059	921	461	2657	305	540
v/s Ratio Prot	0.25		c0.11	c0.32	c0.14	0.08
v/s Ratio Perm		0.11				0.13
v/c Ratio	0.44	0.19	0.80	0.43	0.83	0.61
Uniform Delay, d1	13.6	11.4	48.7	5.3	46.4	34.3
Progression Factor	1.43	3.81	1.09	1.15	1.00	1.00
Incremental Delay, d2	0.6	0.4	6.8	0.4	16.1	1.5
Delay (s)	20.0	44.0	59.6	6.5	62.4	35.8
Level of Service	C	D	E	A	E	D
Approach Delay (s)	26.1			19.4	45.9	
Approach LOS	C			B	D	
Intersection Summary						
HCM 2000 Control Delay			27.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.57			
Actuated Cycle Length (s)			116.0		Sum of lost time (s)	12.9
Intersection Capacity Utilization			56.1%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Existing Conditions Weekend

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	1	28	26	0	95	18	552	40	87	541	36
Future Volume (Veh/h)	36	1	28	26	0	95	18	552	40	87	541	36
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	1	30	28	0	103	20	600	43	95	588	39
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)											804	
pX, platoon unblocked	0.88	0.88	0.88	0.88	0.88		0.88					
vC, conflicting volume	1562	1480	608	1490	1478	622	627			643		
vC1, stage 1 conf vol	798	798		662	662							
vC2, stage 2 conf vol	764	683		828	817							
vCu, unblocked vol	1571	1478	480	1488	1475	622	503			643		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	100	94	88	100	79	98			90		
cM capacity (veh/h)	180	256	511	242	269	485	925			937		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	70	131	663	722								
Volume Left	39	28	20	95								
Volume Right	30	103	43	39								
cSH	251	399	925	937								
Volume to Capacity	0.28	0.33	0.02	0.10								
Queue Length 95th (ft)	28	35	2	8								
Control Delay (s)	24.8	18.4	0.6	2.5								
Lane LOS	C	C	A	A								
Approach Delay (s)	24.8	18.4	0.6	2.5								
Approach LOS	C	C										
Intersection Summary												
Average Delay			4.0									
Intersection Capacity Utilization			86.3%	ICU Level of Service					E			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Park Plaza Dr & Garage Dwy/Belmar Ave

Existing Conditions Weekend

Timing Plan: Weekend

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	19	0	12	33	1	35	17	503	36	39	444	41	
Future Volume (Veh/h)	19	0	12	33	1	35	17	503	36	39	444	41	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	21	0	13	36	1	38	18	547	39	42	483	45	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								TWLTL					TWLTL
Median storage veh)								2					2
Upstream signal (ft)								691					775
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98			
vC, conflicting volume	1230	1212	506	1205	1214	566	528				586		
vC1, stage 1 conf vol	590	590		602	602								
vC2, stage 2 conf vol	641	622		602	612								
vCu, unblocked vol	1224	1205	506	1198	1208	545	528				565		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5								
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2		
p0 queue free %	93	100	98	90	100	93	98				96		
cM capacity (veh/h)	314	346	565	344	354	524	1034				979		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	34	75	604	570									
Volume Left	21	36	18	42									
Volume Right	13	38	39	45									
cSH	378	416	1034	979									
Volume to Capacity	0.09	0.18	0.02	0.04									
Queue Length 95th (ft)	7	16	1	3									
Control Delay (s)	15.5	15.5	0.5	1.2									
Lane LOS	C	C	A	A									
Approach Delay (s)	15.5	15.5	0.5	1.2									
Approach LOS	C	C											
Intersection Summary													
Average Delay			2.1										
Intersection Capacity Utilization			54.6%	ICU Level of Service				A					
Analysis Period (min)			15										

Queues

Existing Conditions Weekend

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Timing Plan: Weekend

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	1326	42	180	1715	142	49	283	151	20
v/c Ratio	0.04	0.92	0.06	0.62	0.82	0.15	0.15	0.48	0.70	0.07
Control Delay	72.0	36.7	0.8	57.0	25.6	7.1	25.7	14.0	61.4	27.1
Queue Delay	0.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.0	36.7	0.8	57.0	50.6	7.1	25.7	14.0	61.4	27.1
Queue Length 50th (ft)	2	519	0	124	487	15	26	67	107	8
Queue Length 95th (ft)	m4	#737	m2	#303	#968	66	46	117	167	28
Internal Link Dist (ft)		2029			411		195			206
Turn Bay Length (ft)										
Base Capacity (vph)	90	1441	716	288	2085	969	376	652	271	358
Starvation Cap Reductn	0	0	0	0	444	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.92	0.06	0.63	1.05	0.15	0.13	0.43	0.56	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Existing Conditions Weekend

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	3	1220	39	166	1578	131	42	3	260	139	11	7
Future Volume (vph)	3	1220	39	166	1578	131	42	3	260	139	11	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.9	4.9	4.0	4.9	4.9		4.5	4.5	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1762	1568	1752	1734	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.59	1.00	0.73	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1080	1568	1337	1734	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	1326	42	180	1715	142	46	3	283	151	12	8
RTOR Reduction (vph)	0	0	25	0	0	38	0	0	111	0	7	0
Lane Group Flow (vph)	3	1326	17	180	1715	104	0	49	172	151	13	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4			4
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.1	47.7	47.7	19.1	66.2	66.2		36.3	36.3	18.9	18.9	
Effective Green, g (s)	1.1	47.7	47.7	19.1	66.2	66.2		36.3	36.3	18.9	18.9	
Actuated g/C Ratio	0.01	0.41	0.41	0.16	0.57	0.57		0.31	0.31	0.16	0.16	
Clearance Time (s)	3.5	4.9	4.9	4.0	4.9	4.9				4.0	4.0	
Vehicle Extension (s)	2.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	16	1441	644	288	2000	894		337	490	217	282	
v/s Ratio Prot	0.00	c0.38		c0.10	c0.49				c0.11		0.01	
v/s Ratio Perm			0.01			0.07		0.05		c0.11		
v/c Ratio	0.19	0.92	0.03	0.62	0.86	0.12		0.15	0.35	0.70	0.05	
Uniform Delay, d1	57.0	32.3	20.3	45.1	20.9	11.4		28.7	30.8	45.8	41.0	
Progression Factor	1.34	0.78	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.6	9.1	0.1	4.2	5.0	0.3		0.2	0.4	9.3	0.1	
Delay (s)	78.0	34.4	20.4	49.3	26.0	11.7		28.9	31.2	55.1	41.0	
Level of Service	E	C	C	D	C	B		C	C	E	D	
Approach Delay (s)		34.0			27.0			30.8			53.5	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			31.0				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			116.0				Sum of lost time (s)			17.4		
Intersection Capacity Utilization			72.9%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Conditions Weekend

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: Weekend

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	185	533	140	347	642	620	101	409	402	416	425
v/c Ratio	0.74	0.41	0.22	0.68	0.49	0.40	0.67	0.69	0.72	0.75	0.50
Control Delay	65.1	29.2	5.4	56.1	36.7	0.7	73.4	51.2	22.7	54.6	36.8
Queue Delay	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.1	29.3	5.4	56.1	36.9	0.7	73.4	51.2	22.7	54.6	36.8
Queue Length 50th (ft)	134	157	0	131	241	0	74	152	121	154	138
Queue Length 95th (ft)	205	215	43	#236	325	0	#142	197	194	200	169
Internal Link Dist (ft)		569			362			724			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	305	1294	646	513	1323	1544	166	936	561	584	1123
Starvation Cap Reductn	0	0	0	0	185	0	0	0	0	0	0
Spillback Cap Reductn	0	79	0	0	0	0	0	0	2	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.44	0.22	0.68	0.56	0.40	0.61	0.44	0.72	0.71	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

Cumulative Conditions Weekend

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: Weekend

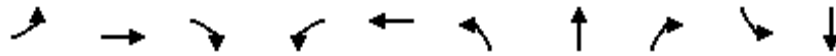
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	485	127	316	584	564	92	372	366	379	320	66
Future Volume (vph)	168	485	127	316	584	564	92	372	366	379	320	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9	4.0	4.0	4.0	4.0	4.0	4.2	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3404	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3404	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	185	533	140	347	642	620	101	409	402	416	352	73
RTOR Reduction (vph)	0	0	88	0	0	0	0	0	65	0	17	0
Lane Group Flow (vph)	185	533	52	347	642	620	101	409	337	416	408	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	16.5	42.9	42.9	17.5	43.9	116.0	9.9	19.7	37.2	19.0	28.6	
Effective Green, g (s)	16.5	42.9	42.9	17.5	43.9	116.0	9.9	19.7	37.2	19.0	28.6	
Actuated g/C Ratio	0.14	0.37	0.37	0.15	0.38	1.00	0.09	0.17	0.32	0.16	0.25	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	249	1296	558	512	1326	1544	149	595	496	556	839	
v/s Ratio Prot	c0.11	0.15		0.10	c0.18		0.06	c0.12	0.10	c0.12	0.12	
v/s Ratio Perm			0.03			c0.40			0.12			
v/c Ratio	0.74	0.41	0.09	0.68	0.48	0.40	0.68	0.69	0.68	0.75	0.49	
Uniform Delay, d1	47.7	27.2	23.9	46.6	27.4	0.0	51.5	45.3	34.2	46.2	37.4	
Progression Factor	1.00	1.00	1.00	1.05	1.18	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.8	1.0	0.3	2.9	1.1	0.7	10.6	3.6	3.5	5.2	0.6	
Delay (s)	58.5	28.1	24.2	51.8	33.6	0.7	62.1	48.8	37.7	51.4	38.0	
Level of Service	E	C	C	D	C	A	E	D	D	D	D	
Approach Delay (s)		34.0			24.8			45.4			44.6	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			35.1			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			17.1			
Intersection Capacity Utilization			74.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Conditions Weekend

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: Weekend



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	123	1163	86	457	1370	162	17	422	4	90
v/c Ratio	0.58	0.72	0.12	0.61	0.70	0.79	0.05	0.50	0.05	0.51
Control Delay	62.2	33.1	9.7	56.5	12.3	75.1	36.3	10.3	53.8	28.4
Queue Delay	0.0	44.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.2	77.2	9.7	56.5	12.3	75.1	36.3	10.3	53.8	28.4
Queue Length 50th (ft)	87	387	20	139	76	118	10	77	3	18
Queue Length 95th (ft)	m149	#530	m48	m195	214	#214	31	164	15	65
Internal Link Dist (ft)		253			2029		695			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	211	1608	721	754	1960	226	556	840	166	474
Starvation Cap Reductn	0	539	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	1.09	0.12	0.61	0.70	0.72	0.03	0.50	0.02	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Cumulative Conditions Weekend

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1070	79	420	1252	8	149	16	388	4	22	61
Future Volume (vph)	113	1070	79	420	1252	8	149	16	388	4	22	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1472	3400	3500		1752	1845	1568	1752	1593	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1472	3400	3500		1752	1845	1568	1752	1593	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	1163	86	457	1361	9	162	17	422	4	24	66
RTOR Reduction (vph)	0	0	48	0	0	0	0	0	140	0	61	0
Lane Group Flow (vph)	123	1163	38	457	1370	0	162	17	282	4	29	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pt+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)	14.0	50.1	50.1	25.7	61.8		13.7	22.1	51.8	1.2	9.6	
Effective Green, g (s)	14.0	50.1	50.1	25.7	61.8		13.7	22.1	51.8	1.2	9.6	
Actuated g/C Ratio	0.12	0.43	0.43	0.22	0.53		0.12	0.19	0.45	0.01	0.08	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0		2.5	2.0	
Lane Grp Cap (vph)	211	1513	635	753	1864		206	351	700	18	131	
v/s Ratio Prot	0.07	c0.33		0.13	c0.39		c0.09	0.01	c0.18	0.00	0.02	
v/s Ratio Perm			0.03									
v/c Ratio	0.58	0.77	0.06	0.61	0.73		0.79	0.05	0.40	0.22	0.22	
Uniform Delay, d1	48.2	28.0	19.2	40.6	20.8		49.7	38.4	21.7	56.9	49.7	
Progression Factor	1.08	1.14	1.93	1.32	0.56		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.9	3.3	0.2	0.6	1.3		17.1	0.0	0.1	4.5	0.3	
Delay (s)	54.7	35.1	37.1	54.3	12.8		66.9	38.4	21.8	61.5	50.0	
Level of Service	D	D	D	D	B		E	D	C	E	D	
Approach Delay (s)		37.0			23.2			34.4			50.5	
Approach LOS		D			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			30.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			16.9			
Intersection Capacity Utilization			77.0%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Conditions Weekend

3: I-280/SR-1 ramps & John Daly Blvd

Timing Plan: Weekend



Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1861	549	1577	388
v/c Ratio	0.53	0.92	0.45	0.67
Control Delay	6.2	69.5	0.4	38.3
Queue Delay	0.7	0.0	0.0	0.0
Total Delay	6.9	69.5	0.4	38.3
Queue Length 50th (ft)	178	217	0	112
Queue Length 95th (ft)	206	#315	0	173
Internal Link Dist (ft)	411		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3519	609	3505	588
Starvation Cap Reductn	1182	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.80	0.90	0.45	0.66

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: I-280/SR-1 ramps & John Daly Blvd

Cumulative Conditions Weekend

Timing Plan: Weekend

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↘↙	↑↑		↘↙
Traffic Volume (vph)	1285	520	533	1530	0	376
Future Volume (vph)	1285	520	533	1530	0	376
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6		3.5	3.6		3.5
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.95		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.96		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4600		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4600		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1325	536	549	1577	0	388
RTOR Reduction (vph)	4	0	0	0	0	95
Lane Group Flow (vph)	1857	0	549	1577	0	293
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	91.7		21.2	120.0		21.2
Effective Green, g (s)	91.7		21.2	120.0		21.2
Actuated g/C Ratio	0.76		0.18	1.00		0.18
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3515		600	3505		487
v/s Ratio Prot	c0.40		c0.16	0.45		0.11
v/s Ratio Perm						
v/c Ratio	0.53		0.92	0.45		0.60
Uniform Delay, d1	5.6		48.5	0.0		45.5
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.6		18.6	0.4		2.1
Delay (s)	6.2		67.1	0.4		47.6
Level of Service	A		E	A		D
Approach Delay (s)	6.2			17.6	47.6	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			15.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	7.1
Intersection Capacity Utilization			60.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Cumulative Conditions Weekend

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: Weekend

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	192	386	780	341	193	738	475	641	438	396	392	799
v/c Ratio	0.45	0.95	1.00	0.67	0.92	1.11	0.65	0.96	1.38	1.17	0.69	1.65
Control Delay	49.4	87.3	86.6	16.0	108.0	128.0	33.0	85.4	232.1	144.5	43.1	336.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	87.3	86.6	16.0	108.0	128.0	33.0	85.4	232.1	144.5	43.1	336.2
Queue Length 50th (ft)	172	433	~474	45	219	~319	316	323	~621	~439	306	~1129
Queue Length 95th (ft)	261	#675	#646	180	#401	#416	447	#445	#862	#673	442	#1383
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	430	406	778	511	209	662	732	668	318	339	569	484
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.95	1.00	0.67	0.92	1.11	0.65	0.96	1.38	1.17	0.69	1.65

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

		
Lane Group	SBT	SBR
Lane Group Flow (vph)	329	87
v/c Ratio	0.68	0.10
Control Delay	56.5	8.1
Queue Delay	0.0	0.0
Total Delay	56.5	8.1
Queue Length 50th (ft)	303	20
Queue Length 95th (ft)	424	47
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	483	876
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.68	0.10

Intersection Summary

HCM Signalized Intersection Capacity Analysis

Cumulative Conditions Weekend

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: Weekend

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	204	574	476	376	205	688	155	301	615	320	404	434
Future Volume (vph)	204	574	476	376	205	688	155	301	615	320	404	434
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.1		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.78	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.99	0.85	1.00	1.00	0.85		1.00	0.96	0.85	0.85
Flt Protected	0.95	0.95	0.99	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2874	1118	1507	4752	1568		3400	1618	1427	1490
Flt Permitted	0.95	0.95	0.99	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2874	1118	1507	4752	1568		3400	1618	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	212	598	496	392	214	717	161	314	641	333	421	472
RTOR Reduction (vph)	0	0	3	210	0	0	33	0	0	0	59	28
Lane Group Flow (vph)	192	386	777	131	193	738	442	0	641	438	337	364
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pt+ov		Split	NA	Prot	pt+ov
Protected Phases	2	2	2		4	4	4 3		1	1	1	1 4
Permitted Phases				2								
Actuated Green, G (s)	40.5	40.5	40.5	40.5	20.9	20.9	66.5		29.5	29.5	29.5	54.9
Effective Green, g (s)	40.5	40.5	40.5	40.5	20.9	20.9	66.5		29.5	29.5	29.5	54.9
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.14	0.14	0.44		0.20	0.20	0.20	0.37
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1			4.5	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	430	406	775	301	209	662	695		668	318	280	545
v/s Ratio Prot	0.12	0.26	c0.27		0.13	c0.16	0.28		0.19	c0.27	0.24	0.24
v/s Ratio Perm				0.12								
v/c Ratio	0.45	0.95	1.00	0.44	0.92	1.11	0.64		0.96	1.38	1.20	0.67
Uniform Delay, d1	45.4	53.8	54.8	45.3	63.8	64.5	32.4		59.7	60.2	60.2	39.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	33.9	33.0	4.6	41.7	70.9	2.2		25.0	188.4	121.0	3.4
Delay (s)	48.8	87.6	87.7	49.9	105.5	135.5	34.5		84.7	248.7	181.2	43.3
Level of Service	D	F	F	D	F	F	C		F	F	F	D
Approach Delay (s)			75.7			97.2				135.0		
Approach LOS			E			F				F		
Intersection Summary												
HCM 2000 Control Delay			132.6									F
HCM 2000 Volume to Capacity ratio			1.31									
Actuated Cycle Length (s)			150.0									17.6
Intersection Capacity Utilization			130.1%									H
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Cumulative Conditions Weekend

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: Weekend



Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	767	306	93
Future Volume (vph)	767	306	93
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1744	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1744	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	799	319	97
RTOR Reduction (vph)	0	1	17
Lane Group Flow (vph)	799	328	70
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pt+ov
Protected Phases	3	3	3 2
Permitted Phases			
Actuated Green, G (s)	41.5	41.5	86.5
Effective Green, g (s)	41.5	41.5	86.5
Actuated g/C Ratio	0.28	0.28	0.58
Clearance Time (s)	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	
Lane Grp Cap (vph)	484	482	859
v/s Ratio Prot	c0.46	0.19	0.05
v/s Ratio Perm			
v/c Ratio	1.65	0.68	0.08
Uniform Delay, d1	54.2	48.4	14.1
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	302.0	4.3	0.1
Delay (s)	356.3	52.6	14.2
Level of Service	F	D	B
Approach Delay (s)		249.6	
Approach LOS		F	
Intersection Summary			

HCM Unsignalized Intersection Capacity Analysis 5: Lake Merced Blvd & Southgate Ave

Cumulative Conditions Weekend
Timing Plan: Weekend

																	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
Lane Configurations																	
Sign Control	Stop			Stop				Stop			Stop						
Traffic Volume (vph)	200	194	40	49	166	172	16	78	60	174	86	124					
Future Volume (vph)	200	194	40	49	166	172	16	78	60	174	86	124					
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79					
Hourly flow rate (vph)	253	246	51	62	210	218	20	99	76	220	109	157					
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2										
Volume Total (vph)	253	297	62	428	195	220	266										
Volume Left (vph)	253	0	62	0	20	220	0										
Volume Right (vph)	0	51	0	218	76	0	157										
Hadj (s)	0.55	-0.07	0.55	-0.31	-0.16	0.55	-0.36										
Departure Headway (s)	8.8	8.2	8.8	8.0	8.8	9.0	8.1										
Degree Utilization, x	0.62	0.68	0.15	0.95	0.48	0.55	0.60										
Capacity (veh/h)	391	425	396	440	390	394	440										
Control Delay (s)	24.0	25.4	12.2	56.9	19.5	21.2	21.0										
Approach Delay (s)	24.7		51.3		19.5	21.1											
Approach LOS	C		F		C	C											
Intersection Summary																	
Delay			30.7														
Level of Service			D														
Intersection Capacity Utilization			64.5%		ICU Level of Service		C										
Analysis Period (min)			15														

HCM Unsignalized Intersection Capacity Analysis 6: Palmcrest Dr/Westlake Center & Southgate Ave

Cumulative Conditions Weekend
Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	92	210	70	40	169	96	49	40	61	81	62	160
Future Volume (vph)	92	210	70	40	169	96	49	40	61	81	62	160
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	115	263	88	50	211	120	61	50	76	101	78	200
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	247	220	381	187	379							
Volume Left (vph)	115	0	50	61	101							
Volume Right (vph)	0	88	120	76	200							
Hadj (s)	0.28	-0.23	-0.11	-0.13	-0.21							
Departure Headway (s)	7.9	7.3	7.1	7.7	7.0							
Degree Utilization, x	0.54	0.45	0.75	0.40	0.73							
Capacity (veh/h)	426	456	483	396	483							
Control Delay (s)	18.4	14.9	28.4	15.8	26.8							
Approach Delay (s)	16.8		28.4	15.8	26.8							
Approach LOS	C		D	C	D							
Intersection Summary												
Delay			22.5									
Level of Service			C									
Intersection Capacity Utilization			59.3%	ICU Level of Service				B				
Analysis Period (min)			15									

Queues

Cumulative Conditions Weekend

7: Park Plaza Dr & Southgate Ave

Timing Plan: Weekend



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	265	186	206	331	219	216
v/c Ratio	0.63	0.36	0.73	0.30	0.34	0.31
Control Delay	25.6	5.3	40.8	7.2	16.2	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	5.3	40.8	7.2	16.2	4.1
Queue Length 50th (ft)	77	0	64	46	52	0
Queue Length 95th (ft)	119	27	#139	89	97	28
Internal Link Dist (ft)	338			169	611	
Turn Bay Length (ft)						65
Base Capacity (vph)	593	654	291	1097	645	689
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.28	0.71	0.30	0.34	0.31

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

7: Park Plaza Dr & Southgate Ave

Cumulative Conditions Weekend

Timing Plan: Weekend



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	212	149	165	265	175	173
Future Volume (vph)	212	149	165	265	175	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	265	186	206	331	219	216
RTOR Reduction (vph)	0	141	0	0	0	140
Lane Group Flow (vph)	265	45	206	331	219	76
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	13.2	13.2	8.9	32.6	19.2	19.2
Effective Green, g (s)	13.2	13.2	8.9	32.6	19.2	19.2
Actuated g/C Ratio	0.24	0.24	0.16	0.59	0.35	0.35
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	422	377	284	1097	646	549
v/s Ratio Prot	c0.15		c0.12	c0.18	0.12	
v/s Ratio Perm		0.03				0.05
v/c Ratio	0.63	0.12	0.73	0.30	0.34	0.14
Uniform Delay, d1	18.6	16.3	21.8	5.5	13.1	12.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	0.1	8.9	0.7	1.4	0.5
Delay (s)	21.5	16.4	30.7	6.2	14.5	12.7
Level of Service	C	B	C	A	B	B
Approach Delay (s)	19.4			15.6	13.6	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

Cumulative Conditions Weekend

8: Westlake Center & John Daly Blvd

Timing Plan: Weekend

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	960	327	392	1227	271	442
v/c Ratio	0.48	0.31	0.82	0.47	0.85	0.71
Control Delay	21.3	5.7	64.1	7.4	69.8	30.8
Queue Delay	50.9	0.4	0.0	0.6	0.0	0.5
Total Delay	72.1	6.2	64.1	8.0	69.8	31.3
Queue Length 50th (ft)	310	41	156	145	195	211
Queue Length 95th (ft)	385	67	#214	211	#306	327
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2016	1042	507	2630	366	637
Starvation Cap Reductn	655	337	0	906	0	0
Spillback Cap Reductn	1162	0	0	0	0	32
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.12	0.46	0.77	0.71	0.74	0.73

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

8: Westlake Center & John Daly Blvd

Cumulative Conditions Weekend

Timing Plan: Weekend

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘↙	↑↑	↘	↑
Traffic Volume (vph)	883	301	361	1129	249	407
Future Volume (vph)	883	301	361	1129	249	407
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	960	327	392	1227	271	442
RTOR Reduction (vph)	0	141	0	0	0	69
Lane Group Flow (vph)	960	186	392	1227	271	373
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	66.1	66.1	16.1	86.2	20.9	37.0
Effective Green, g (s)	66.1	66.1	16.1	86.2	20.9	37.0
Actuated g/C Ratio	0.57	0.57	0.14	0.74	0.18	0.32
Clearance Time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	2016	902	476	2629	318	559
v/s Ratio Prot	0.27		c0.11	c0.35	c0.15	0.09
v/s Ratio Perm		0.12				0.14
v/c Ratio	0.48	0.21	0.82	0.47	0.85	0.67
Uniform Delay, d1	14.7	12.2	48.6	5.9	46.1	34.2
Progression Factor	1.32	3.35	1.09	1.12	1.00	1.00
Incremental Delay, d2	0.7	0.4	8.0	0.4	18.6	2.3
Delay (s)	20.1	41.1	60.8	7.0	64.7	36.5
Level of Service	C	D	E	A	E	D
Approach Delay (s)	25.5			20.0	47.2	
Approach LOS	C			C	D	
Intersection Summary						
HCM 2000 Control Delay			27.3		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.61			
Actuated Cycle Length (s)			116.0		Sum of lost time (s)	12.9
Intersection Capacity Utilization			59.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Cumulative Conditions Weekend

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	1	30	28	0	101	19	588	42	93	577	39
Future Volume (Veh/h)	39	1	30	28	0	101	19	588	42	93	577	39
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	1	33	30	0	110	21	639	46	101	627	42
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)											804	
pX, platoon unblocked	0.86	0.86	0.86	0.86	0.86		0.86					
vC, conflicting volume	1664	1577	648	1588	1575	662	669			685		
vC1, stage 1 conf vol	850	850		704	704							
vC2, stage 2 conf vol	814	727		884	871							
vCu, unblocked vol	1690	1589	514	1601	1587	662	538			685		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	72	100	93	86	100	76	98			89		
cM capacity (veh/h)	152	234	483	217	246	460	886			904		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	76	140	706	770								
Volume Left	42	30	21	101								
Volume Right	33	110	46	42								
cSH	218	371	886	904								
Volume to Capacity	0.35	0.38	0.02	0.11								
Queue Length 95th (ft)	37	43	2	9								
Control Delay (s)	30.1	20.5	0.6	2.8								
Lane LOS	D	C	A	A								
Approach Delay (s)	30.1	20.5	0.6	2.8								
Approach LOS	D	C										
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization			91.4%		ICU Level of Service				F			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Park Plaza Dr & Garage Dwy/Belmar Ave

Cumulative Conditions Weekend

Timing Plan: Weekend

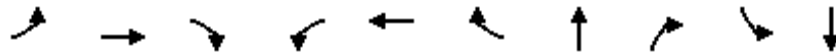
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	0	3	34	1	36	17	518	38	40	458	42
Future Volume (Veh/h)	19	0	3	34	1	36	17	518	38	40	458	42
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	0	3	37	1	39	18	563	41	43	498	46
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage (veh)							2			2		
Upstream signal (ft)							691			775		
pX, platoon unblocked	0.96	0.96		0.96	0.96	0.96				0.96		
vC, conflicting volume	1266	1247	521	1230	1250	584	544				604	
vC1, stage 1 conf vol	607	607		620	620							
vC2, stage 2 conf vol	659	640		610	630							
vCu, unblocked vol	1257	1238	521	1219	1240	549	544				570	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	93	100	99	89	100	92	98				96	
cM capacity (veh/h)	303	336	553	341	344	514	1020				961	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	77	622	587								
Volume Left	21	37	18	43								
Volume Right	3	39	41	46								
cSH	321	411	1020	961								
Volume to Capacity	0.07	0.19	0.02	0.04								
Queue Length 95th (ft)	6	17	1	4								
Control Delay (s)	17.1	15.8	0.5	1.2								
Lane LOS	C	C	A	A								
Approach Delay (s)	17.1	15.8	0.5	1.2								
Approach LOS	C	C										
Intersection Summary												
Average Delay				2.0								
Intersection Capacity Utilization				55.5%	ICU Level of Service				B			
Analysis Period (min)				15								

Queues

Cumulative Conditions Weekend

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Timing Plan: Weekend



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	1395	45	190	1804	150	51	298	160	22
v/c Ratio	0.04	1.01	0.07	0.64	0.88	0.16	0.15	0.49	0.72	0.07
Control Delay	74.0	53.4	0.8	57.2	29.8	7.7	24.9	14.8	62.7	26.8
Queue Delay	0.0	0.0	0.0	0.0	46.4	0.0	0.0	0.0	0.0	0.0
Total Delay	74.0	53.4	0.8	57.2	76.2	7.7	24.9	14.8	62.7	26.8
Queue Length 50th (ft)	2	~619	0	130	562	18	27	76	114	8
Queue Length 95th (ft)	m4	#796	m2	#320	#1040	72	47	129	178	30
Internal Link Dist (ft)		2029			411		195			206
Turn Bay Length (ft)										
Base Capacity (vph)	90	1375	689	299	2040	950	375	660	270	357
Starvation Cap Reductn	0	0	0	0	403	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	1.01	0.07	0.64	1.10	0.16	0.14	0.45	0.59	0.06

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Cumulative Conditions Weekend

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	3	1283	41	175	1660	138	44	3	274	147	12	8
Future Volume (vph)	3	1283	41	175	1660	138	44	3	274	147	12	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.9	4.9	4.0	4.9	4.9		4.5	4.5	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1762	1568	1752	1731	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.57	1.00	0.72	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1060	1568	1335	1731	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	1395	45	190	1804	150	48	3	298	160	13	9
RTOR Reduction (vph)	0	0	27	0	0	39	0	0	109	0	7	0
Lane Group Flow (vph)	3	1395	18	190	1804	111	0	51	189	160	15	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4			4
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.1	45.5	45.5	19.8	64.7	64.7		37.8	37.8	19.4	19.4	
Effective Green, g (s)	1.1	45.5	45.5	19.8	64.7	64.7		37.8	37.8	19.4	19.4	
Actuated g/C Ratio	0.01	0.39	0.39	0.17	0.56	0.56		0.33	0.33	0.17	0.17	
Clearance Time (s)	3.5	4.9	4.9	4.0	4.9	4.9				4.0	4.0	
Vehicle Extension (s)	2.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	16	1374	615	299	1954	874		345	510	223	289	
v/s Ratio Prot	0.00	c0.40		c0.11	c0.51				c0.12		0.01	
v/s Ratio Perm			0.01			0.07		0.05		c0.12		
v/c Ratio	0.19	1.02	0.03	0.64	0.92	0.13		0.15	0.37	0.72	0.05	
Uniform Delay, d1	57.0	35.2	21.7	44.7	23.4	12.2		27.7	30.0	45.7	40.6	
Progression Factor	1.38	0.75	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	24.8	0.1	4.4	8.8	0.3		0.2	0.5	10.5	0.1	
Delay (s)	80.0	51.4	21.7	49.1	32.2	12.5		27.9	30.4	56.2	40.6	
Level of Service	E	D	C	D	C	B		C	C	E	D	
Approach Delay (s)		50.5			32.3			30.1			54.3	
Approach LOS		D			C			C			D	
Intersection Summary												
HCM 2000 Control Delay	39.5			HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	116.0			Sum of lost time (s)			17.4					
Intersection Capacity Utilization	75.6%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

Queues

Existing Plus Project Conditions Weekend

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: Weekend

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	163	470	119	305	555	535	92	357	385	363	365
v/c Ratio	0.70	0.32	0.17	0.66	0.38	0.35	0.63	0.66	0.71	0.73	0.48
Control Delay	62.9	25.2	4.9	55.0	32.4	0.6	70.3	51.8	21.5	55.8	38.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.9	25.2	4.9	55.0	32.4	0.6	70.3	51.8	21.5	55.8	38.6
Queue Length 50th (ft)	118	124	0	111	196	0	67	133	114	135	120
Queue Length 95th (ft)	181	188	38	168	281	0	123	176	159	178	152
Internal Link Dist (ft)		569			362			724			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	306	1457	700	463	1464	1544	166	936	539	553	1124
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	76	0	0	0	0	0	0	2	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.34	0.17	0.66	0.38	0.35	0.55	0.38	0.72	0.66	0.32
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: Lake Merced Blvd & John Daly Blvd

Existing Plus Project Conditions Weekend

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 			 		 	 	
Traffic Volume (vph)	148	428	108	278	505	487	84	325	350	330	274	58
Future Volume (vph)	148	428	108	278	505	487	84	325	350	330	274	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9	4.0	4.0	4.0	4.0	4.0	4.2	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3402	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3402	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	163	470	119	305	555	535	92	357	385	363	301	64
RTOR Reduction (vph)	0	0	70	0	0	0	0	0	88	0	18	0
Lane Group Flow (vph)	163	470	49	305	555	535	92	357	297	363	347	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	15.6	48.2	48.2	15.8	48.4	116.0	9.7	18.0	33.8	17.1	25.2	
Effective Green, g (s)	15.6	48.2	48.2	15.8	48.4	116.0	9.7	18.0	33.8	17.1	25.2	
Actuated g/C Ratio	0.13	0.42	0.42	0.14	0.42	1.00	0.08	0.16	0.29	0.15	0.22	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	235	1456	627	463	1462	1544	146	543	451	501	739	
v/s Ratio Prot	c0.09	0.13		0.09	0.16		0.05	0.10	c0.09	c0.11	0.10	
v/s Ratio Perm			0.03			c0.35			0.10			
v/c Ratio	0.69	0.32	0.08	0.66	0.38	0.35	0.63	0.66	0.66	0.72	0.47	
Uniform Delay, d1	47.9	22.9	20.5	47.5	23.4	0.0	51.4	46.1	36.0	47.2	39.6	
Progression Factor	1.00	1.00	1.00	1.02	1.23	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.9	0.6	0.2	2.7	0.7	0.6	7.5	3.2	3.1	4.8	0.6	
Delay (s)	55.8	23.5	20.7	51.2	29.4	0.6	58.9	49.3	39.1	52.0	40.2	
Level of Service	E	C	C	D	C	A	E	D	D	D	D	
Approach Delay (s)		30.1			23.1			45.7			46.1	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			34.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			17.1			
Intersection Capacity Utilization			71.4%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Plus Project Conditions Weekend

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: Weekend

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	116	1135	82	405	1299	154	17	365	4	83
v/c Ratio	0.55	0.64	0.10	0.64	0.65	0.76	0.05	0.47	0.05	0.52
Control Delay	61.3	28.2	8.5	64.3	11.0	72.7	38.1	9.1	53.8	30.1
Queue Delay	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.3	34.8	8.5	64.3	11.0	72.7	38.1	9.1	53.8	30.1
Queue Length 50th (ft)	82	353	18	134	88	111	10	50	3	15
Queue Length 95th (ft)	m142	472	m46	m210	206	#199	32	131	15	62
Internal Link Dist (ft)		253			2029		695			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	211	1765	783	637	1996	226	556	782	166	469
Starvation Cap Reductn	0	577	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.96	0.10	0.64	0.65	0.68	0.03	0.47	0.02	0.18

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Existing Plus Project Conditions Weekend

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	1044	75	373	1188	7	142	16	336	4	18	58
Future Volume (vph)	107	1044	75	373	1188	7	142	16	336	4	18	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1472	3400	3500		1752	1845	1568	1752	1584	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1472	3400	3500		1752	1845	1568	1752	1584	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	116	1135	82	405	1291	8	154	17	365	4	20	63
RTOR Reduction (vph)	0	0	43	0	0	0	0	0	152	0	58	0
Lane Group Flow (vph)	116	1135	39	405	1299	0	154	17	213	4	25	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pt+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)	14.0	55.3	55.3	21.7	63.0		13.5	20.9	46.6	1.2	8.6	
Effective Green, g (s)	14.0	55.3	55.3	21.7	63.0		13.5	20.9	46.6	1.2	8.6	
Actuated g/C Ratio	0.12	0.48	0.48	0.19	0.54		0.12	0.18	0.40	0.01	0.07	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0		2.5	2.0	
Lane Grp Cap (vph)	211	1670	701	636	1900		203	332	629	18	117	
v/s Ratio Prot	0.07	c0.32		0.12	c0.37		c0.09	0.01	c0.14	0.00	0.02	
v/s Ratio Perm			0.03									
v/c Ratio	0.55	0.68	0.06	0.64	0.68		0.76	0.05	0.34	0.22	0.21	
Uniform Delay, d1	48.0	23.5	16.3	43.5	19.3		49.7	39.3	24.0	56.9	50.5	
Progression Factor	1.08	1.17	2.11	1.40	0.54		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	2.0	0.1	1.1	1.2		14.3	0.0	0.1	4.5	0.3	
Delay (s)	53.9	29.3	34.6	62.1	11.6		64.0	39.4	24.1	61.5	50.8	
Level of Service	D	C	C	E	B		E	D	C	E	D	
Approach Delay (s)		31.8			23.6			36.1			51.3	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			29.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			16.9			
Intersection Capacity Utilization			74.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Plus Project Conditions Weekend

3: I-280/SR-1 ramps & John Daly Blvd

Timing Plan: Weekend

	→	↙	←	↘
Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1681	445	1492	274
v/c Ratio	0.47	0.80	0.43	0.48
Control Delay	5.2	59.7	0.4	23.9
Queue Delay	0.5	0.0	0.0	0.0
Total Delay	5.7	59.7	0.4	23.9
Queue Length 50th (ft)	143	170	0	50
Queue Length 95th (ft)	172	227	0	97
Internal Link Dist (ft)	411		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3592	609	3505	611
Starvation Cap Reductn	1284	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.73	0.73	0.43	0.45
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

3: I-280/SR-1 ramps & John Daly Blvd

Existing Plus Project Conditions Weekend

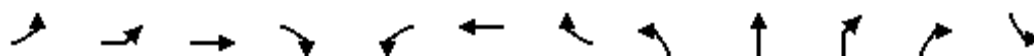
Timing Plan: Weekend

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↙↘	↑↑		↗↘
Traffic Volume (vph)	1172	459	432	1447	0	266
Future Volume (vph)	1172	459	432	1447	0	266
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6		3.5	3.6		3.5
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.96		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.96		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4610		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4610		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1208	473	445	1492	0	274
RTOR Reduction (vph)	8	0	0	0	0	120
Lane Group Flow (vph)	1673	0	445	1492	0	154
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	93.3		19.6	120.0		19.6
Effective Green, g (s)	93.3		19.6	120.0		19.6
Actuated g/C Ratio	0.78		0.16	1.00		0.16
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3584		555	3505		450
v/s Ratio Prot	c0.36		c0.13	0.43		0.06
v/s Ratio Perm						
v/c Ratio	0.47		0.80	0.43		0.34
Uniform Delay, d1	4.7		48.3	0.0		44.5
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.4		8.2	0.4		0.5
Delay (s)	5.1		56.5	0.4		45.0
Level of Service	A		E	A		D
Approach Delay (s)	5.1			13.3	45.0	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			12.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	7.1
Intersection Capacity Utilization			53.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Existing Plus Project Conditions Weekend

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: Weekend



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	155	341	705	286	80	719	230	641	313	276	279	131
v/c Ratio	0.38	0.88	0.95	0.60	0.27	0.78	0.32	0.90	0.91	0.77	0.36	0.34
Control Delay	49.2	78.0	77.9	13.9	54.0	64.3	22.8	74.0	88.4	56.2	6.0	52.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	78.0	77.9	13.9	54.0	64.3	22.8	74.0	88.4	56.2	6.0	52.3
Queue Length 50th (ft)	138	375	420	28	77	260	115	318	331	212	21	110
Queue Length 95th (ft)	216	#583	#572	138	138	314	181	#422	#530	#358	84	176
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	409	386	739	474	300	947	723	714	343	357	788	390
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.88	0.95	0.60	0.27	0.76	0.32	0.90	0.91	0.77	0.35	0.34

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



Lane Group	SBT	SBR
Lane Group Flow (vph)	492	454
v/c Ratio	1.28	0.58
Control Delay	189.9	27.0
Queue Delay	0.0	0.0
Total Delay	189.9	27.0
Queue Length 50th (ft)	~635	294
Queue Length 95th (ft)	#877	417
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	383	779
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.28	0.58

Intersection Summary

HCM Signalized Intersection Capacity Analysis Existing Plus Project Conditions Weekend 4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: Weekend

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	165	623	334	305	85	682	132	88	615	248	228	342
Future Volume (vph)	165	623	334	305	85	682	132	88	615	248	228	342
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.1		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.78	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.99	0.85	1.00	1.00	0.85		1.00	0.97	0.85	0.85
Flt Protected	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2873	1118	1507	4756	1568		3400	1634	1427	1490
Flt Permitted	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2873	1118	1507	4756	1568		3400	1634	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	172	649	348	318	89	710	138	92	641	258	238	372
RTOR Reduction (vph)	0	0	2	187	0	0	24	0	0	0	58	138
Lane Group Flow (vph)	155	341	703	99	80	719	206	0	641	313	218	141
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pt+ov		Split	NA	Prot	pt+ov
Protected Phases	2	2	2		4	4	4 3		1	1	1	1 4
Permitted Phases				2								
Actuated Green, G (s)	38.5	38.5	38.5	38.5	29.0	29.0	66.5		31.5	31.5	31.5	65.0
Effective Green, g (s)	38.5	38.5	38.5	38.5	29.0	29.0	66.5		31.5	31.5	31.5	65.0
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.19	0.19	0.44		0.21	0.21	0.21	0.43
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1			4.5	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	409	386	737	286	291	919	695		714	343	299	645
v/s Ratio Prot	0.10	0.23	c0.24		0.05	c0.15	0.13		0.19	c0.19	0.15	0.09
v/s Ratio Perm				0.09								
v/c Ratio	0.38	0.88	0.95	0.35	0.27	0.78	0.30		0.90	0.91	0.73	0.22
Uniform Delay, d1	45.9	53.6	54.9	45.5	51.5	57.5	26.7		57.7	57.9	55.3	26.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	24.2	23.6	3.3	0.7	4.7	0.3		14.3	28.0	9.4	0.2
Delay (s)	48.6	77.8	78.4	48.7	52.2	62.2	27.1		72.0	85.9	64.7	26.8
Level of Service	D	E	E	D	D	E	C		E	F	E	C
Approach Delay (s)			69.5			53.5				65.2		
Approach LOS			E			D				E		
Intersection Summary												
HCM 2000 Control Delay			74.5			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			17.6			
Intersection Capacity Utilization			104.2%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis Existing Plus Project Conditions Weekend 4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: Weekend



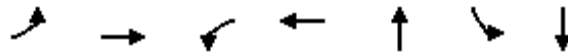
Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	126	268	640
Future Volume (vph)	126	268	640
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	0.94	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1639	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1639	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	131	279	667
RTOR Reduction (vph)	0	18	20
Lane Group Flow (vph)	131	474	434
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pt+ov
Protected Phases	3	3	3 2
Permitted Phases			
Actuated Green, G (s)	33.4	33.4	76.4
Effective Green, g (s)	33.4	33.4	76.4
Actuated g/C Ratio	0.22	0.22	0.51
Clearance Time (s)	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	
Lane Grp Cap (vph)	390	364	758
v/s Ratio Prot	0.07	0.29	0.29
v/s Ratio Perm			
v/c Ratio	0.34	1.30	0.57
Uniform Delay, d1	49.0	58.3	25.5
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	0.7	154.9	1.3
Delay (s)	49.7	213.2	26.7
Level of Service	D	F	C
Approach Delay (s)		114.7	
Approach LOS		F	
Intersection Summary			

Queues

Existing Plus Project Conditions Weekend

5: Lake Merced Blvd & Southgate Ave

Timing Plan: Weekend



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	239	273	91	388	277	156	288
v/c Ratio	0.82	0.45	0.49	0.87	0.78	0.48	0.80
Control Delay	58.8	26.9	46.7	49.3	45.9	36.8	44.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.8	26.9	46.7	49.3	45.9	36.8	44.6
Queue Length 50th (ft)	134	123	49	187	130	78	127
Queue Length 95th (ft)	#209	171	84	#269	183	119	180
Internal Link Dist (ft)		324		313	117		573
Turn Bay Length (ft)			130			100	
Base Capacity (vph)	311	603	220	487	409	386	417
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.45	0.41	0.80	0.68	0.40	0.69

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Lake Merced Blvd & Southgate Ave

Existing Plus Project Conditions Weekend

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	189	178	38	72	155	152	17	111	90	123	110	118
Future Volume (vph)	189	178	38	72	155	152	17	111	90	123	110	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.93			0.94		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1752	1796		1752	1708			1735		1752	1702	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (perm)	1752	1796		1752	1708			1735		1752	1702	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	239	225	48	91	196	192	22	141	114	156	139	149
RTOR Reduction (vph)	0	8	0	0	38	0	0	29	0	0	44	0
Lane Group Flow (vph)	239	265	0	91	350	0	0	249	0	156	244	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	13.9	27.6		7.3	21.0			15.6		15.5	15.5	
Effective Green, g (s)	13.9	27.6		7.3	21.0			15.6		15.5	15.5	
Actuated g/C Ratio	0.17	0.33		0.09	0.25			0.19		0.18	0.18	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	289	590		152	427			322		323	314	
v/s Ratio Prot	c0.14	0.15		0.05	c0.20			c0.14		0.09	c0.14	
v/s Ratio Perm												
v/c Ratio	0.83	0.45		0.60	0.82			0.77		0.48	0.78	
Uniform Delay, d1	33.9	22.2		36.9	29.7			32.5		30.7	32.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	17.3	0.5		6.2	11.6			10.9		1.1	11.4	
Delay (s)	51.2	22.8		43.2	41.3			43.4		31.8	44.0	
Level of Service	D	C		D	D			D		C	D	
Approach Delay (s)		36.0			41.7			43.4			39.7	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			39.8			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			84.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			68.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis Existing Plus Project Conditions Weekend 6: Palmcrest Dr/Westlake Center & Southgate Ave

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	81	197	60	0	189	95	36	30	26	80	56	159
Future Volume (vph)	81	197	60	0	189	95	36	30	26	80	56	159
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	101	246	75	0	236	119	45	38	33	100	70	199
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	224	198	355	116	369							
Volume Left (vph)	101	0	0	45	100							
Volume Right (vph)	0	75	119	33	199							
Hadj (s)	0.28	-0.21	-0.15	-0.04	-0.22							
Departure Headway (s)	7.1	6.6	6.3	7.1	6.2							
Degree Utilization, x	0.44	0.36	0.62	0.23	0.64							
Capacity (veh/h)	478	513	533	419	545							
Control Delay (s)	14.4	12.1	19.0	12.2	19.5							
Approach Delay (s)	13.3		19.0	12.2	19.5							
Approach LOS	B		C	B	C							
Intersection Summary												
Delay			16.6									
Level of Service			C									
Intersection Capacity Utilization			55.4%			ICU Level of Service			B			
Analysis Period (min)			15									

Queues
7: Park Plaza Dr & Southgate Ave

Existing Plus Project Conditions Weekend

Timing Plan: Weekend



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	209	160	165	313	205	165
v/c Ratio	0.56	0.35	0.60	0.27	0.26	0.22
Control Delay	24.7	5.8	32.2	6.2	14.1	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	5.8	32.2	6.2	14.1	3.8
Queue Length 50th (ft)	59	0	48	38	45	0
Queue Length 95th (ft)	95	26	93	77	87	25
Internal Link Dist (ft)	338			169	611	
Turn Bay Length (ft)						65
Base Capacity (vph)	594	637	292	1147	779	757
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.25	0.57	0.27	0.26	0.22
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

7: Park Plaza Dr & Southgate Ave

Existing Plus Project Conditions Weekend

Timing Plan: Weekend



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	167	128	132	250	164	132
Future Volume (vph)	167	128	132	250	164	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	209	160	165	312	205	165
RTOR Reduction (vph)	0	127	0	0	0	96
Lane Group Flow (vph)	209	33	165	313	205	69
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	11.6	11.6	7.3	34.9	23.1	23.1
Effective Green, g (s)	11.6	11.6	7.3	34.9	23.1	23.1
Actuated g/C Ratio	0.21	0.21	0.13	0.63	0.42	0.42
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	366	327	230	1160	767	652
v/s Ratio Prot	c0.12		c0.09	c0.17	0.11	
v/s Ratio Perm		0.02				0.04
v/c Ratio	0.57	0.10	0.72	0.27	0.27	0.11
Uniform Delay, d1	19.7	17.7	23.1	4.6	10.6	9.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.1	10.2	0.6	0.9	0.3
Delay (s)	21.9	17.9	33.3	5.2	11.5	10.2
Level of Service	C	B	C	A	B	B
Approach Delay (s)	20.1			14.9	10.9	
Approach LOS	C			B	B	

Intersection Summary

HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	55.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

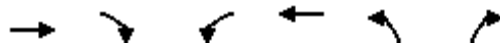
c Critical Lane Group

Queues

Existing Plus Project Conditions Weekend

8: Westlake Center & John Daly Blvd

Timing Plan: Weekend



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	927	302	367	1148	233	414
v/c Ratio	0.45	0.29	0.78	0.43	0.80	0.69
Control Delay	21.1	6.2	61.9	7.0	66.7	29.5
Queue Delay	8.0	0.4	0.0	0.4	0.0	0.4
Total Delay	29.1	6.6	61.9	7.4	66.7	29.9
Queue Length 50th (ft)	284	36	152	118	169	193
Queue Length 95th (ft)	362	64	195	205	248	288
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2081	1055	512	2686	366	622
Starvation Cap Reductn	709	362	0	917	0	0
Spillback Cap Reductn	1109	0	0	0	0	34
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.44	0.72	0.65	0.64	0.70
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

8: Westlake Center & John Daly Blvd

Existing Plus Project Conditions Weekend

Timing Plan: Weekend

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘↙	↑↑	↘	↑
Traffic Volume (vph)	853	278	338	1056	214	381
Future Volume (vph)	853	278	338	1056	214	381
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	927	302	367	1148	233	414
RTOR Reduction (vph)	0	124	0	0	0	77
Lane Group Flow (vph)	927	178	367	1148	233	337
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	68.3	68.3	15.8	88.1	19.0	34.8
Effective Green, g (s)	68.3	68.3	15.8	88.1	19.0	34.8
Actuated g/C Ratio	0.59	0.59	0.14	0.76	0.16	0.30
Clearance Time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	2083	932	467	2687	289	529
v/s Ratio Prot	c0.26		c0.11	0.32	c0.13	0.09
v/s Ratio Perm		0.11				0.13
v/c Ratio	0.45	0.19	0.79	0.43	0.81	0.64
Uniform Delay, d1	13.3	11.0	48.5	5.0	46.7	35.1
Progression Factor	1.43	3.59	1.08	1.20	1.00	1.00
Incremental Delay, d2	0.6	0.4	6.2	0.4	14.3	1.9
Delay (s)	19.6	40.0	58.4	6.4	61.0	37.0
Level of Service	B	D	E	A	E	D
Approach Delay (s)	24.6			19.0	45.6	
Approach LOS	C			B	D	
Intersection Summary						
HCM 2000 Control Delay			26.1		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.56			
Actuated Cycle Length (s)			116.0		Sum of lost time (s)	12.9
Intersection Capacity Utilization			55.8%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis Existing Plus Project Conditions Weekend

9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	1	28	26	0	95	18	578	40	87	528	36
Future Volume (Veh/h)	36	1	28	26	0	95	18	578	40	87	528	36
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	1	30	28	0	103	20	628	43	95	574	39
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)											804	
pX, platoon unblocked	0.88	0.88	0.88	0.88	0.88		0.88					
vC, conflicting volume	1576	1494	594	1504	1492	650	613			671		
vC1, stage 1 conf vol	784	784		690	690							
vC2, stage 2 conf vol	792	711		814	803							
vCu, unblocked vol	1587	1494	465	1504	1491	650	487			671		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	77	100	94	88	100	78	98			90		
cM capacity (veh/h)	172	252	521	243	268	468	938			915		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	70	131	691	708								
Volume Left	39	28	20	95								
Volume Right	30	103	43	39								
cSH	243	390	938	915								
Volume to Capacity	0.29	0.34	0.02	0.10								
Queue Length 95th (ft)	29	36	2	9								
Control Delay (s)	25.8	18.8	0.6	2.6								
Lane LOS	D	C	A	A								
Approach Delay (s)	25.8	18.8	0.6	2.6								
Approach LOS	D	C										
Intersection Summary												
Average Delay			4.1									
Intersection Capacity Utilization			86.9%		ICU Level of Service				E			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis Existing Plus Project Conditions Weekend

10: Park Plaza Dr & Garage Dwy/Belmar Ave

Timing Plan: Weekend

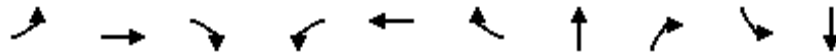
													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	19	0	12	33	1	35	17	470	36	39	414	41	
Future Volume (Veh/h)	19	0	12	33	1	35	17	470	36	39	414	41	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	21	0	13	36	1	38	18	511	39	42	450	45	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								TWLTL					TWLTL
Median storage (veh)								2					2
Upstream signal (ft)								691					775
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99			
vC, conflicting volume	1162	1142	472	1136	1146	530	495				550		
vC1, stage 1 conf vol	556	556		566	566								
vC2, stage 2 conf vol	605	586		570	579								
vCu, unblocked vol	1157	1138	472	1131	1141	518	495				538		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5								
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2		
p0 queue free %	94	100	98	90	100	93	98				96		
cM capacity (veh/h)	333	363	590	363	371	549	1064				1012		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	34	75	568	537									
Volume Left	21	36	18	42									
Volume Right	13	38	39	45									
cSH	400	438	1064	1012									
Volume to Capacity	0.09	0.17	0.02	0.04									
Queue Length 95th (ft)	7	15	1	3									
Control Delay (s)	14.8	14.9	0.5	1.2									
Lane LOS	B	B	A	A									
Approach Delay (s)	14.8	14.9	0.5	1.2									
Approach LOS	B	B											
Intersection Summary													
Average Delay			2.1										
Intersection Capacity Utilization			52.6%	ICU Level of Service				A					
Analysis Period (min)			15										

Queues

Existing Plus Project Conditions Weekend

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Timing Plan: Weekend



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	1320	42	180	1685	142	49	283	151	20
v/c Ratio	0.04	0.88	0.06	0.67	0.80	0.14	0.15	0.48	0.71	0.07
Control Delay	67.0	34.5	1.1	61.0	24.0	6.1	26.8	14.3	63.4	27.8
Queue Delay	0.0	0.0	0.0	0.0	18.8	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	34.5	1.1	61.0	42.8	6.1	26.8	14.3	63.4	27.8
Queue Length 50th (ft)	2	538	0	125	470	13	26	65	107	8
Queue Length 95th (ft)	m4	#677	m3	#296	#892	58	49	124	171	29
Internal Link Dist (ft)		2029			411		195			206
Turn Bay Length (ft)										
Base Capacity (vph)	90	1507	743	268	2111	982	380	660	288	379
Starvation Cap Reductn	0	0	0	0	470	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.88	0.06	0.67	1.03	0.14	0.13	0.43	0.52	0.05

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Existing Plus Project Conditions Weekend

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	1214	39	166	1550	131	42	3	260	139	11	7
Future Volume (vph)	3	1214	39	166	1550	131	42	3	260	139	11	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.9	4.9	4.0	4.9	4.9		4.5	4.5	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1762	1568	1752	1734	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.58	1.00	0.73	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1077	1568	1337	1734	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	1320	42	180	1685	142	46	3	283	151	12	8
RTOR Reduction (vph)	0	0	24	0	0	40	0	0	115	0	7	0
Lane Group Flow (vph)	3	1320	18	180	1685	102	0	49	168	151	13	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4		4	
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.1	49.9	49.9	17.8	67.1	67.1		35.4	35.4	18.5	18.5	
Effective Green, g (s)	1.1	49.9	49.9	17.8	67.1	67.1		35.4	35.4	18.5	18.5	
Actuated g/C Ratio	0.01	0.43	0.43	0.15	0.58	0.58		0.31	0.31	0.16	0.16	
Clearance Time (s)	3.5	4.9	4.9	4.0	4.9	4.9				4.0	4.0	
Vehicle Extension (s)	2.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	16	1507	674	268	2027	907		328	478	213	276	
v/s Ratio Prot	0.00	c0.38		c0.10	c0.48				c0.11		0.01	
v/s Ratio Perm			0.01			0.06		0.05		c0.11		
v/c Ratio	0.19	0.88	0.03	0.67	0.83	0.11		0.15	0.35	0.71	0.05	
Uniform Delay, d1	57.0	30.2	19.1	46.3	19.9	11.0		29.3	31.4	46.2	41.3	
Progression Factor	1.25	0.88	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	6.1	0.1	6.5	4.1	0.3		0.2	0.4	10.3	0.1	
Delay (s)	72.8	32.6	19.1	52.8	24.0	11.3		29.6	31.8	56.5	41.4	
Level of Service	E	C	B	D	C	B		C	C	E	D	
Approach Delay (s)		32.3			25.7			31.5			54.7	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			29.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			116.0				Sum of lost time (s)			17.4		
Intersection Capacity Utilization			72.1%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis Existing Plus Project Conditions Weekend

12: Lake Merced Blvd & Project Dwy

Timing Plan: Weekend

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	72	0	0	55	0
Future Volume (Veh/h)	0	72	0	0	55	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	78	0	0	60	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	120	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	120	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			96	
cM capacity (veh/h)	841	1082			1617	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	78	0	60			
Volume Left	0	0	60			
Volume Right	78	0	0			
cSH	1082	1700	1617			
Volume to Capacity	0.07	0.00	0.04			
Queue Length 95th (ft)	6	0	3			
Control Delay (s)	8.6	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		8.0				
Intersection Capacity Utilization		14.5%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

Cumulative Plus Project Conditions Weekend

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: Weekend

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	185	533	135	346	631	609	104	405	432	412	416
v/c Ratio	0.74	0.41	0.21	0.67	0.47	0.39	0.69	0.69	0.77	0.75	0.49
Control Delay	64.7	29.1	5.4	54.9	36.6	0.7	74.5	51.2	25.9	54.8	36.8
Queue Delay	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	64.7	29.1	5.4	54.9	36.8	0.7	74.5	51.2	26.0	54.8	36.8
Queue Length 50th (ft)	134	157	0	129	231	0	76	151	138	153	134
Queue Length 95th (ft)	204	215	43	#228	320	0	#146	195	#235	198	166
Internal Link Dist (ft)		569			362			724			336
Turn Bay Length (ft)	150		300	250			90		60	150	
Base Capacity (vph)	306	1300	645	515	1330	1544	166	936	560	580	1124
Starvation Cap Reductn	0	0	0	0	190	0	0	0	0	0	0
Spillback Cap Reductn	0	80	0	0	0	0	0	0	2	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.44	0.21	0.67	0.55	0.39	0.63	0.43	0.77	0.71	0.37

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

1: Lake Merced Blvd & John Daly Blvd

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	485	123	315	574	554	95	369	393	375	312	66
Future Volume (vph)	168	485	123	315	574	554	95	369	393	375	312	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9	4.0	4.0	4.0	4.0	4.0	4.2	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3402	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1511	3400	3505	1544	1752	3505	1548	3400	3402	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	185	533	135	346	631	609	104	405	432	412	343	73
RTOR Reduction (vph)	0	0	85	0	0	0	0	0	65	0	17	0
Lane Group Flow (vph)	185	533	50	346	631	609	104	405	367	412	399	0
Confl. Peds. (#/hr)	11		9	9		11	6		11	11		6
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			2			Free			8			
Actuated Green, G (s)	16.6	43.0	43.0	17.6	44.0	116.0	10.0	19.6	37.2	18.9	28.3	
Effective Green, g (s)	16.6	43.0	43.0	17.6	44.0	116.0	10.0	19.6	37.2	18.9	28.3	
Actuated g/C Ratio	0.14	0.37	0.37	0.15	0.38	1.00	0.09	0.17	0.32	0.16	0.24	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.2	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	4.0	2.5	2.5	4.0	
Lane Grp Cap (vph)	250	1299	560	515	1329	1544	151	592	496	553	829	
v/s Ratio Prot	0.11	0.15		0.10	c0.18		0.06	0.12	c0.11	c0.12	0.12	
v/s Ratio Perm			0.03			c0.39			0.13			
v/c Ratio	0.74	0.41	0.09	0.67	0.47	0.39	0.69	0.68	0.74	0.75	0.48	
Uniform Delay, d1	47.6	27.1	23.8	46.5	27.3	0.0	51.5	45.3	35.1	46.3	37.6	
Progression Factor	1.00	1.00	1.00	1.03	1.19	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.3	1.0	0.3	2.8	1.1	0.7	11.3	3.5	5.6	5.1	0.6	
Delay (s)	58.0	28.1	24.1	50.6	33.5	0.7	62.8	48.8	40.7	51.4	38.2	
Level of Service	E	C	C	D	C	A	E	D	D	D	D	
Approach Delay (s)		33.9			24.6			46.6			44.7	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			35.4				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			116.0				Sum of lost time (s)			17.1		
Intersection Capacity Utilization			74.6%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Plus Project Conditions Weekend

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: Weekend

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	123	1192	86	427	1369	162	17	387	4	87
v/c Ratio	0.58	0.70	0.11	0.62	0.69	0.79	0.05	0.48	0.05	0.52
Control Delay	62.5	30.9	8.8	66.6	13.9	75.1	37.4	9.6	53.8	29.2
Queue Delay	0.0	19.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.5	50.3	8.8	66.6	13.9	75.1	37.4	9.6	53.8	29.2
Queue Length 50th (ft)	87	397	20	158	116	118	10	60	3	15
Queue Length 95th (ft)	m147	524	m46	m0	246	#214	32	145	15	64
Internal Link Dist (ft)		253			2029		695			217
Turn Bay Length (ft)	105		250	190		110		430		
Base Capacity (vph)	211	1697	756	687	1979	226	556	807	166	471
Starvation Cap Reductn	0	530	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	1.02	0.11	0.62	0.69	0.72	0.03	0.48	0.02	0.18

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

2: Park Plaza Dr/Cliffside Dr & John Daly Blvd

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1097	79	393	1251	8	149	16	356	4	19	61
Future Volume (vph)	113	1097	79	393	1251	8	149	16	356	4	19	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00		1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1472	3400	3500		1752	1845	1568	1752	1584	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3505	1472	3400	3500		1752	1845	1568	1752	1584	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	1192	86	427	1360	9	162	17	387	4	21	66
RTOR Reduction (vph)	0	0	46	0	0	0	0	0	146	0	61	0
Lane Group Flow (vph)	123	1192	40	427	1369	0	162	17	241	4	26	0
Confl. Peds. (#/hr)			21			18			68			26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pt+ov	Prot	NA	
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)	14.0	53.0	53.0	23.4	62.4		13.7	21.5	48.9	1.2	9.0	
Effective Green, g (s)	14.0	53.0	53.0	23.4	62.4		13.7	21.5	48.9	1.2	9.0	
Actuated g/C Ratio	0.12	0.46	0.46	0.20	0.54		0.12	0.19	0.42	0.01	0.08	
Clearance Time (s)	4.0	4.9	4.9	4.0	4.9		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.0	4.0	2.5	4.0		2.5	2.0		2.5	2.0	
Lane Grp Cap (vph)	211	1601	672	685	1882		206	341	660	18	122	
v/s Ratio Prot	0.07	c0.34		0.13	c0.39		c0.09	0.01	c0.15	0.00	0.02	
v/s Ratio Perm			0.03									
v/c Ratio	0.58	0.74	0.06	0.62	0.73		0.79	0.05	0.37	0.22	0.21	
Uniform Delay, d1	48.2	25.9	17.6	42.3	20.3		49.7	38.9	22.9	56.9	50.2	
Progression Factor	1.08	1.15	1.91	1.51	0.66		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.8	2.7	0.1	0.8	1.3		17.1	0.0	0.1	4.5	0.3	
Delay (s)	55.0	32.5	33.7	64.5	14.6		66.9	38.9	23.1	61.5	50.5	
Level of Service	E	C	C	E	B		E	D	C	E	D	
Approach Delay (s)		34.6			26.5			36.1			51.0	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			31.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			116.0			Sum of lost time (s)			16.9			
Intersection Capacity Utilization			77.0%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative Plus Project Conditions Weekend

3: I-280/SR-1 ramps & John Daly Blvd

Timing Plan: Weekend

	→	↖	←	↗
Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	1855	549	1541	388
v/c Ratio	0.53	0.92	0.44	0.67
Control Delay	6.2	69.5	0.4	38.3
Queue Delay	0.7	0.0	0.0	0.0
Total Delay	6.9	69.5	0.4	38.3
Queue Length 50th (ft)	176	217	0	112
Queue Length 95th (ft)	205	#315	0	173
Internal Link Dist (ft)	411		837	
Turn Bay Length (ft)		250		
Base Capacity (vph)	3520	609	3505	588
Starvation Cap Reductn	1189	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.80	0.90	0.44	0.66

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

3: I-280/SR-1 ramps & John Daly Blvd

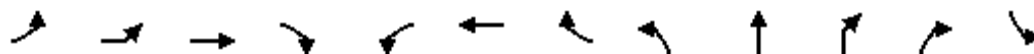
Timing Plan: Weekend

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↘↙	↑↑		↘↙
Traffic Volume (vph)	1284	515	533	1495	0	376
Future Volume (vph)	1284	515	533	1495	0	376
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.6		3.5	3.6		3.5
Lane Util. Factor	0.91		0.97	0.95		0.88
Frpb, ped/bikes	0.95		1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.96		1.00	1.00		0.85
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4603		3400	3505		2760
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	4603		3400	3505		2760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1324	531	549	1541	0	388
RTOR Reduction (vph)	4	0	0	0	0	95
Lane Group Flow (vph)	1851	0	549	1541	0	293
Confl. Peds. (#/hr)		140	140			
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	6		1
Permitted Phases						
Actuated Green, G (s)	91.7		21.2	120.0		21.2
Effective Green, g (s)	91.7		21.2	120.0		21.2
Actuated g/C Ratio	0.76		0.18	1.00		0.18
Clearance Time (s)	3.6		3.5	3.6		3.5
Vehicle Extension (s)	5.0		3.0	5.0		3.0
Lane Grp Cap (vph)	3517		600	3505		487
v/s Ratio Prot	c0.40		c0.16	0.44		0.11
v/s Ratio Perm						
v/c Ratio	0.53		0.92	0.44		0.60
Uniform Delay, d1	5.6		48.5	0.0		45.5
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.6		18.6	0.4		2.1
Delay (s)	6.1		67.1	0.4		47.6
Level of Service	A		E	A		D
Approach Delay (s)	6.1			17.9	47.6	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			15.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	7.1
Intersection Capacity Utilization			60.2%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Queues

Cumulative Plus Project Conditions Weekend

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp Timing Plan: Weekend



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL
Lane Group Flow (vph)	192	380	784	344	193	739	475	632	438	396	392	799
v/c Ratio	0.45	0.94	1.01	0.68	0.92	1.12	0.65	0.95	1.38	1.17	0.69	1.65
Control Delay	49.4	84.4	87.0	16.8	108.0	128.5	33.1	82.9	232.1	144.5	43.1	336.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	84.4	87.0	16.8	108.0	128.5	33.1	82.9	232.1	144.5	43.1	336.2
Queue Length 50th (ft)	172	424	~479	49	219	~320	317	318	~621	~439	306	~1129
Queue Length 95th (ft)	261	#659	#650	186	#401	#417	448	#436	#862	#673	442	#1383
Internal Link Dist (ft)			837			460			752			
Turn Bay Length (ft)	450	450						195		250	250	
Base Capacity (vph)	430	406	780	509	209	662	731	668	318	339	569	484
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.94	1.01	0.68	0.92	1.12	0.65	0.95	1.38	1.17	0.69	1.65

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



Lane Group	SBT	SBR
Lane Group Flow (vph)	326	61
v/c Ratio	0.67	0.07
Control Delay	56.1	6.1
Queue Delay	0.0	0.0
Total Delay	56.1	6.1
Queue Length 50th (ft)	298	8
Queue Length 95th (ft)	420	31
Internal Link Dist (ft)	236	
Turn Bay Length (ft)		
Base Capacity (vph)	484	876
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.67	0.07

Intersection Summary

HCM Signalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: Weekend

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	204	575	477	375	205	689	155	301	607	320	404	434
Future Volume (vph)	204	575	477	375	205	689	155	301	607	320	404	434
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.1	4.1	4.1		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91	0.86	0.81	0.91	0.86	0.86	1.00		0.97	0.91	0.91	0.95
Frpb, ped/bikes	1.00	1.00	0.99	0.78	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.99	0.85	1.00	1.00	0.85		1.00	0.96	0.85	0.85
Flt Protected	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1595	1507	2879	1118	1507	4752	1568		3400	1618	1427	1490
Flt Permitted	0.95	0.95	0.98	1.00	0.95	1.00	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1595	1507	2879	1118	1507	4752	1568		3400	1618	1427	1490
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92
Adj. Flow (vph)	212	599	497	391	214	718	161	314	632	333	421	472
RTOR Reduction (vph)	0	0	3	208	0	0	32	0	0	0	59	28
Lane Group Flow (vph)	192	380	781	136	193	739	443	0	632	438	337	364
Confl. Peds. (#/hr)				176	176							
Turn Type	Split	Split	NA	Perm	Split	NA	pt+ov		Split	NA	Prot	pt+ov
Protected Phases	2	2	2		4	4	4 3		1	1	1	1 4
Permitted Phases				2								
Actuated Green, G (s)	40.5	40.5	40.5	40.5	20.9	20.9	66.5		29.5	29.5	29.5	54.9
Effective Green, g (s)	40.5	40.5	40.5	40.5	20.9	20.9	66.5		29.5	29.5	29.5	54.9
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.14	0.14	0.44		0.20	0.20	0.20	0.37
Clearance Time (s)	4.5	4.5	4.5	4.5	4.1	4.1			4.5	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	430	406	777	301	209	662	695		668	318	280	545
v/s Ratio Prot	0.12	0.25	c0.27		0.13	c0.16	0.28		0.19	c0.27	0.24	0.24
v/s Ratio Perm				0.12								
v/c Ratio	0.45	0.94	1.01	0.45	0.92	1.12	0.64		0.95	1.38	1.20	0.67
Uniform Delay, d1	45.4	53.5	54.8	45.5	63.8	64.5	32.4		59.5	60.2	60.2	39.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	31.1	33.6	4.8	41.7	71.5	2.2		22.5	188.4	121.0	3.4
Delay (s)	48.8	84.6	88.3	50.3	105.5	136.0	34.5		82.0	248.7	181.2	43.3
Level of Service	D	F	F	D	F	F	C		F	F	F	D
Approach Delay (s)			75.3			97.6				134.3		
Approach LOS			E			F				F		
Intersection Summary												
HCM 2000 Control Delay			132.9									
HCM 2000 Volume to Capacity ratio			1.31									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			130.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

4: Junipero Serra Blvd/I-280/SR-1 ramps & John Daly Blvd & I-280 NB on-ramp

Timing Plan: Weekend



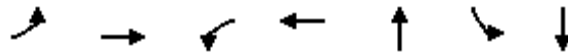
Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	767	306	65
Future Volume (vph)	767	306	65
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	1747	1490
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	1747	1490
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	799	319	68
RTOR Reduction (vph)	0	1	17
Lane Group Flow (vph)	799	325	44
Confl. Peds. (#/hr)			
Turn Type	Split	NA	pt+ov
Protected Phases	3	3	3 2
Permitted Phases			
Actuated Green, G (s)	41.5	41.5	86.5
Effective Green, g (s)	41.5	41.5	86.5
Actuated g/C Ratio	0.28	0.28	0.58
Clearance Time (s)	4.5	4.5	
Vehicle Extension (s)	4.0	4.0	
Lane Grp Cap (vph)	484	483	859
v/s Ratio Prot	c0.46	0.19	0.03
v/s Ratio Perm			
v/c Ratio	1.65	0.67	0.05
Uniform Delay, d1	54.2	48.2	13.8
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	302.0	4.0	0.0
Delay (s)	356.3	52.3	13.9
Level of Service	F	D	B
Approach Delay (s)		255.1	
Approach LOS		F	
Intersection Summary			

Queues

Cumulative Plus Project Conditions Weekend

5: Lake Merced Blvd & Southgate Ave

Timing Plan: Weekend



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	253	290	94	412	286	168	303
v/c Ratio	0.86	0.48	0.51	0.91	0.81	0.51	0.83
Control Delay	64.9	27.6	47.4	54.7	48.6	37.8	48.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.9	27.6	47.4	54.7	48.6	37.8	48.4
Queue Length 50th (ft)	143	133	51	203	136	85	136
Queue Length 95th (ft)	#226	182	86	#297	190	127	191
Internal Link Dist (ft)		324		313	110		573
Turn Bay Length (ft)			130			100	
Base Capacity (vph)	302	607	218	475	398	374	406
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.48	0.43	0.87	0.72	0.45	0.75

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

5: Lake Merced Blvd & Southgate Ave

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	188	41	74	164	161	17	115	93	133	115	124
Future Volume (vph)	200	188	41	74	164	161	17	115	93	133	115	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.93			0.94		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1752	1795		1752	1708			1735		1752	1701	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (perm)	1752	1795		1752	1708			1735		1752	1701	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	253	238	52	94	208	204	22	146	118	168	146	157
RTOR Reduction (vph)	0	8	0	0	39	0	0	29	0	0	44	0
Lane Group Flow (vph)	253	282	0	94	373	0	0	257	0	168	259	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	14.2	28.4		7.5	21.7			15.9		16.0	16.0	
Effective Green, g (s)	14.2	28.4		7.5	21.7			15.9		16.0	16.0	
Actuated g/C Ratio	0.17	0.33		0.09	0.25			0.19		0.19	0.19	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	289	594		153	431			321		326	317	
v/s Ratio Prot	c0.14	0.16		0.05	c0.22			c0.15		0.10	c0.15	
v/s Ratio Perm												
v/c Ratio	0.88	0.47		0.61	0.87			0.80		0.52	0.82	
Uniform Delay, d1	34.9	22.8		37.8	30.7			33.4		31.4	33.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	24.2	0.6		7.1	16.4			13.4		1.4	15.0	
Delay (s)	59.1	23.4		44.9	47.1			46.9		32.8	48.5	
Level of Service	E	C		D	D			D		C	D	
Approach Delay (s)		40.0			46.7			46.9			42.9	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			43.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			85.8			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			70.9%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

6: Palmcrest Dr/Westlake Center & Southgate Ave

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	82	200	61	0	192	96	37	30	27	81	57	161
Future Volume (vph)	82	200	61	0	192	96	37	30	27	81	57	161
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	103	250	76	0	240	120	46	38	34	101	71	201
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total (vph)	228	201	360	118	373							
Volume Left (vph)	103	0	0	46	101							
Volume Right (vph)	0	76	120	34	201							
Hadj (s)	0.28	-0.21	-0.15	-0.04	-0.22							
Departure Headway (s)	7.2	6.7	6.4	7.2	6.3							
Degree Utilization, x	0.45	0.37	0.64	0.24	0.65							
Capacity (veh/h)	475	509	529	405	541							
Control Delay (s)	14.8	12.4	19.7	12.4	20.2							
Approach Delay (s)	13.6		19.7	12.4	20.2							
Approach LOS	B		C	B	C							
Intersection Summary												
Delay			17.1									
Level of Service			C									
Intersection Capacity Utilization			56.0%	ICU Level of Service				B				
Analysis Period (min)			15									

Queues

Cumulative Plus Project Conditions Weekend

7: Park Plaza Dr & Southgate Ave

Timing Plan: Weekend



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	224	171	178	331	219	179
v/c Ratio	0.57	0.35	0.63	0.30	0.33	0.26
Control Delay	24.5	5.6	34.1	6.6	15.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	5.6	34.1	6.6	15.4	4.0
Queue Length 50th (ft)	63	0	53	42	49	0
Queue Length 95th (ft)	101	26	#106	85	94	26
Internal Link Dist (ft)	338			169	611	
Turn Bay Length (ft)						65
Base Capacity (vph)	606	654	298	1122	668	682
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.26	0.60	0.30	0.33	0.26

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

7: Park Plaza Dr & Southgate Ave

Timing Plan: Weekend



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	179	137	142	265	175	143
Future Volume (vph)	179	137	142	265	175	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	1845	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	1845	1845	1568
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	224	171	178	331	219	179
RTOR Reduction (vph)	0	133	0	0	0	114
Lane Group Flow (vph)	224	38	178	331	219	65
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	12.0	12.0	8.7	32.6	19.4	19.4
Effective Green, g (s)	12.0	12.0	8.7	32.6	19.4	19.4
Actuated g/C Ratio	0.22	0.22	0.16	0.61	0.36	0.36
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	392	351	284	1122	667	567
v/s Ratio Prot	c0.13		c0.10	c0.18	0.12	
v/s Ratio Perm		0.02				0.04
v/c Ratio	0.57	0.11	0.63	0.30	0.33	0.11
Uniform Delay, d1	18.5	16.5	20.9	5.0	12.4	11.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.1	4.3	0.7	1.3	0.4
Delay (s)	20.5	16.7	25.2	5.7	13.7	11.8
Level of Service	C	B	C	A	B	B
Approach Delay (s)	18.9			12.5	12.8	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

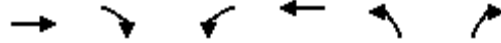
c Critical Lane Group

Queues

Cumulative Plus Project Conditions Weekend

8: Westlake Center & John Daly Blvd

Timing Plan: Weekend



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	989	323	392	1226	250	442
v/c Ratio	0.48	0.31	0.84	0.46	0.84	0.73
Control Delay	21.1	5.5	65.0	7.0	69.5	32.6
Queue Delay	28.1	0.4	0.0	0.5	0.0	0.6
Total Delay	49.2	5.9	65.0	7.5	69.5	33.3
Queue Length 50th (ft)	316	37	154	153	180	214
Queue Length 95th (ft)	386	m60	#226	191	#274	336
Internal Link Dist (ft)	362			253	183	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2061	1057	485	2667	350	613
Starvation Cap Reductn	689	357	0	884	0	0
Spillback Cap Reductn	1112	0	0	0	0	31
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.46	0.81	0.69	0.71	0.76

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

8: Westlake Center & John Daly Blvd

Timing Plan: Weekend

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑↑	↑	↑
Traffic Volume (vph)	910	297	361	1128	230	407
Future Volume (vph)	910	297	361	1128	230	407
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	989	323	392	1226	250	442
RTOR Reduction (vph)	0	135	0	0	0	71
Lane Group Flow (vph)	989	188	392	1226	250	371
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	NA	Perm	Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	67.5	67.5	15.9	87.4	19.7	35.6
Effective Green, g (s)	67.5	67.5	15.9	87.4	19.7	35.6
Actuated g/C Ratio	0.58	0.58	0.14	0.75	0.17	0.31
Clearance Time (s)	4.9	4.9	4.0	4.9	4.0	4.0
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	2059	921	470	2666	300	540
v/s Ratio Prot	c0.28		c0.11	0.35	c0.14	0.09
v/s Ratio Perm		0.12				0.14
v/c Ratio	0.48	0.20	0.83	0.46	0.83	0.69
Uniform Delay, d1	14.1	11.5	48.8	5.4	46.6	35.3
Progression Factor	1.38	3.44	1.07	1.13	1.00	1.00
Incremental Delay, d2	0.6	0.4	8.9	0.4	17.0	2.9
Delay (s)	20.1	40.0	61.3	6.5	63.5	38.2
Level of Service	C	D	E	A	E	D
Approach Delay (s)	25.0			19.8	47.4	
Approach LOS	C			B	D	
Intersection Summary						
HCM 2000 Control Delay			26.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			116.0		Sum of lost time (s)	12.9
Intersection Capacity Utilization			58.9%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

9: Lake Merced Blvd & Belmar Ave/Garage Dwy

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	1	30	28	0	101	19	614	42	93	564	39
Future Volume (Veh/h)	39	1	30	28	0	101	19	614	42	93	564	39
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	1	33	30	0	110	21	667	46	101	613	42
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)											804	
pX, platoon unblocked	0.87	0.87	0.87	0.87	0.87		0.87					
vC, conflicting volume	1678	1591	634	1602	1589	690	655			713		
vC1, stage 1 conf vol	836	836		732	732							
vC2, stage 2 conf vol	842	755		870	857							
vCu, unblocked vol	1705	1605	501	1617	1603	690	526			713		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	71	100	93	86	100	75	98			89		
cM capacity (veh/h)	144	230	492	218	246	443	899			882		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	76	140	734	756								
Volume Left	42	30	21	101								
Volume Right	33	110	46	42								
cSH	209	363	899	882								
Volume to Capacity	0.36	0.39	0.02	0.11								
Queue Length 95th (ft)	39	44	2	10								
Control Delay (s)	31.7	21.0	0.6	2.8								
Lane LOS	D	C	A	A								
Approach Delay (s)	31.7	21.0	0.6	2.8								
Approach LOS	D	C										
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization			92.0%		ICU Level of Service				F			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

10: Park Plaza Dr & Garage Dwy/Belmar Ave

Timing Plan: Weekend

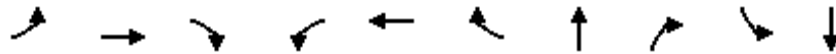
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	0	3	34	1	36	17	485	38	40	428	42
Future Volume (Veh/h)	19	0	3	34	1	36	17	485	38	40	428	42
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	0	3	37	1	39	18	527	41	43	465	46
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)								691			775	
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1197	1178	488	1160	1180	548	511			568		
vC1, stage 1 conf vol	574	574		584	584							
vC2, stage 2 conf vol	623	604		577	597							
vCu, unblocked vol	1188	1169	488	1151	1171	520	511			541		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	99	90	100	93	98			96		
cM capacity (veh/h)	322	353	578	360	361	539	1049			994		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	77	586	554								
Volume Left	21	37	18	43								
Volume Right	3	39	41	46								
cSH	341	433	1049	994								
Volume to Capacity	0.07	0.18	0.02	0.04								
Queue Length 95th (ft)	6	16	1	3								
Control Delay (s)	16.4	15.1	0.5	1.2								
Lane LOS	C	C	A	A								
Approach Delay (s)	16.4	15.1	0.5	1.2								
Approach LOS	C	C										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			53.5%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

Cumulative Plus Project Conditions Weekend

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Timing Plan: Weekend



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	1388	45	190	1774	150	51	298	160	22
v/c Ratio	0.04	0.96	0.06	0.73	0.87	0.16	0.15	0.50	0.74	0.08
Control Delay	67.7	43.7	0.9	66.3	28.7	6.4	25.9	18.6	65.7	27.6
Queue Delay	0.0	0.0	0.0	0.0	44.9	0.0	0.0	0.0	0.0	0.0
Total Delay	67.7	43.7	0.9	66.3	73.6	6.4	25.9	18.6	65.7	27.6
Queue Length 50th (ft)	2	577	0	140	564	16	26	93	114	8
Queue Length 95th (ft)	m3	#693	m2	#329	#945	60	52	161	183	31
Internal Link Dist (ft)		2029			411		195			206
Turn Bay Length (ft)										
Base Capacity (vph)	90	1446	718	262	2038	953	364	635	269	356
Starvation Cap Reductn	0	0	0	0	419	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.96	0.06	0.73	1.10	0.16	0.14	0.47	0.59	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

11: Poncetta Dr/Sheffield Drive & John Daly Blvd

Timing Plan: Weekend

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	3	1277	41	175	1632	138	44	3	274	147	12	8
Future Volume (vph)	3	1277	41	175	1632	138	44	3	274	147	12	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.9	4.9	4.0	4.9	4.9		4.5	4.5	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568		1762	1568	1752	1731	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.56	1.00	0.72	1.00	
Satd. Flow (perm)	1752	3505	1568	1752	3505	1568		1038	1568	1335	1731	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	1388	45	190	1774	150	48	3	298	160	13	9
RTOR Reduction (vph)	0	0	26	0	0	44	0	0	90	0	8	0
Lane Group Flow (vph)	3	1388	19	190	1774	106	0	51	208	160	14	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			3 4	3 4			4
Permitted Phases			2			6	3 4			4		
Actuated Green, G (s)	1.1	47.9	47.9	17.4	64.7	64.7		37.8	37.8	18.8	18.8	
Effective Green, g (s)	1.1	47.9	47.9	17.4	64.7	64.7		37.8	37.8	18.8	18.8	
Actuated g/C Ratio	0.01	0.41	0.41	0.15	0.56	0.56		0.33	0.33	0.16	0.16	
Clearance Time (s)	3.5	4.9	4.9	4.0	4.9	4.9				4.0	4.0	
Vehicle Extension (s)	2.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	16	1447	647	262	1954	874		338	510	216	280	
v/s Ratio Prot	0.00	c0.40		c0.11	c0.51				c0.13		0.01	
v/s Ratio Perm			0.01			0.07		0.05		c0.12		
v/c Ratio	0.19	0.96	0.03	0.73	0.91	0.12		0.15	0.41	0.74	0.05	
Uniform Delay, d1	57.0	33.1	20.2	47.0	23.0	12.2		27.7	30.4	46.3	41.1	
Progression Factor	1.26	0.90	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.6	13.0	0.1	9.6	7.7	0.3		0.2	0.5	12.8	0.1	
Delay (s)	73.4	42.8	20.3	56.6	30.6	12.5		27.9	30.9	59.1	41.1	
Level of Service	E	D	C	E	C	B		C	C	E	D	
Approach Delay (s)		42.2			31.7			30.5			56.9	
Approach LOS		D			C			C			E	
Intersection Summary												
HCM 2000 Control Delay	36.4			HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	116.0			Sum of lost time (s)			17.4					
Intersection Capacity Utilization	74.8%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis Cumulative Plus Project Conditions Weekend

12: Lake Merced Blvd & Project Dwy

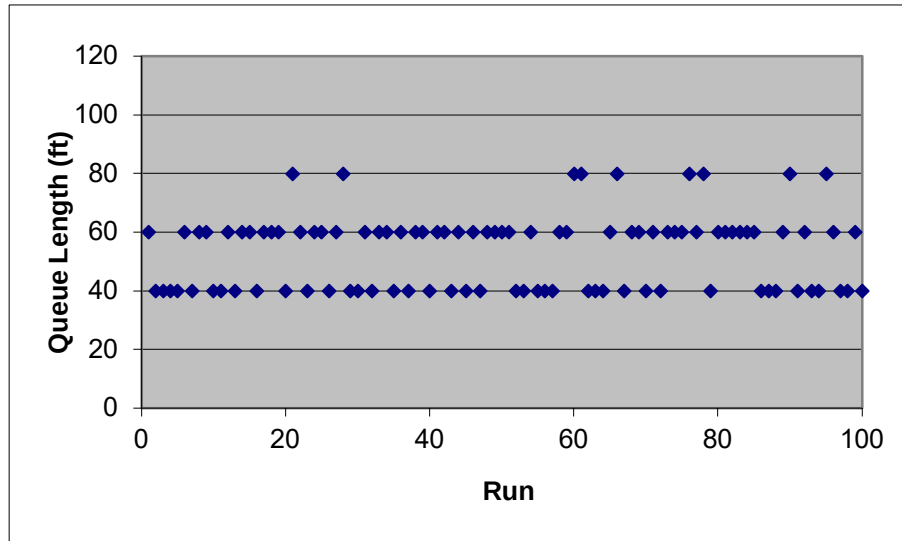
Timing Plan: Weekend

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	72	0	0	55	0
Future Volume (Veh/h)	0	72	0	0	55	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	78	0	0	60	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	120	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	120	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			96	
cM capacity (veh/h)	841	1082			1617	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	78	0	60			
Volume Left	0	0	60			
Volume Right	78	0	0			
cSH	1082	1700	1617			
Volume to Capacity	0.07	0.00	0.04			
Queue Length 95th (ft)	6	0	3			
Control Delay (s)	8.6	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		8.0				
Intersection Capacity Utilization		14.5%		ICU Level of Service		A
Analysis Period (min)		15				



Attachment L: Queueing Analysis Sheet

Garage



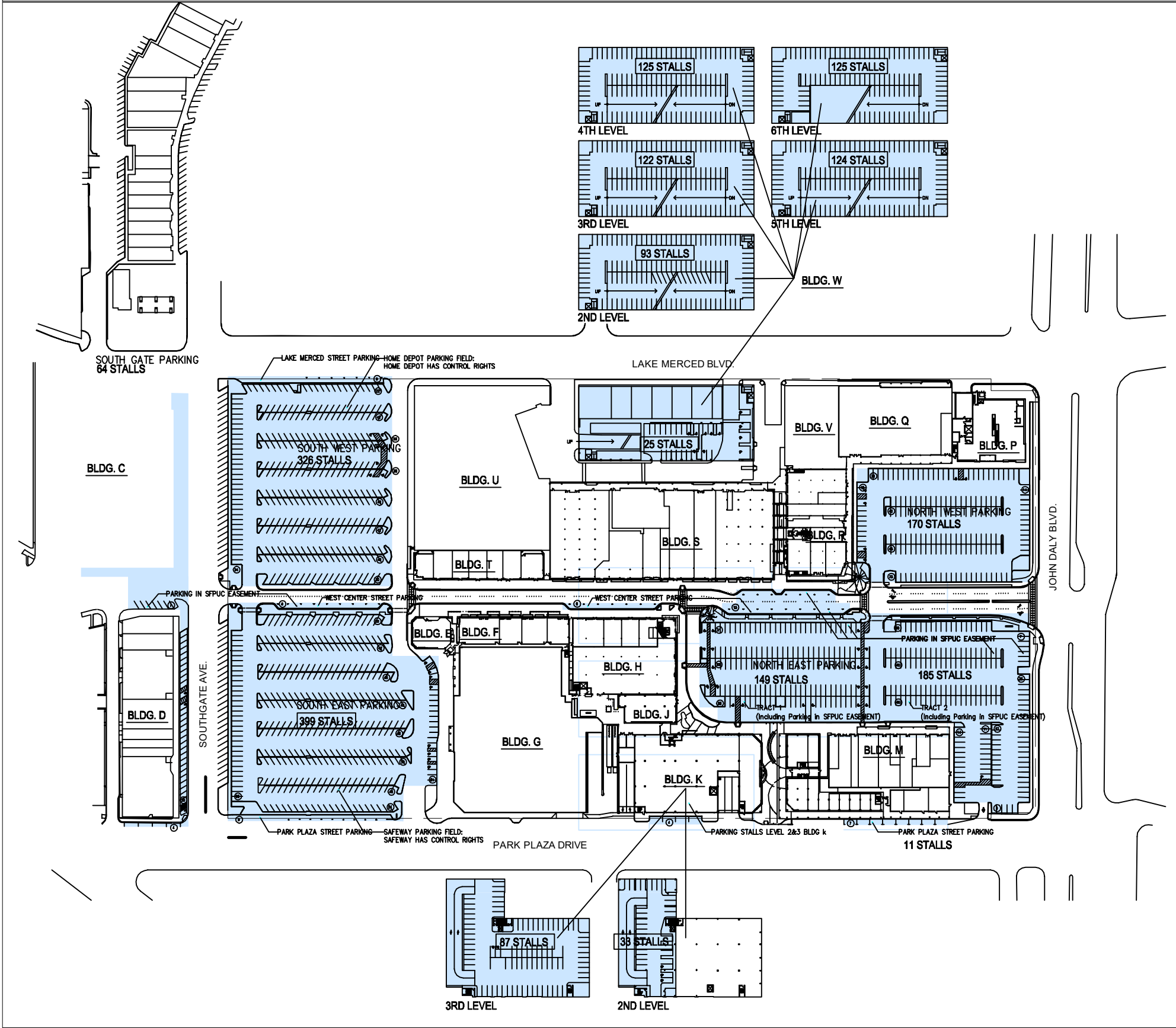
Max Q	100
Veh Length	20

Queue (ft)	Veh Queue	# of Runs	%	Cumulative
20	1	0	0.0%	0.0%
40	2	446	44.6%	44.6%
60	3	497	49.7%	94.3%
80	4	55	5.5%	99.8%
100	5	2	0.2%	100.0%

Note: The 95th percentile queue is **bolded** and highlighted.



Attachment M – PD-60A Parking Count



Westlake Shopping Center Daly City, California

PARKING COUNT BREAKDOWN (Proposed Site Plan with New Mixed Use Bldg C)			
SOUTHGATE PARKING			63
SOUTH WEST PARKING	Home Depot Parking Field	320	326
	Lake Merced Street Parking	6	
SOUTH EAST PARKING	Safeway Parking Field	380	399
	Park Plaza Street Parking	11	
	West Center Street Parking	8	
BLGD W PARKING	1st Level	25	614
	2nd Level	93	
	3rd Level	122	
	4th Level	125	
	5th Level	124	
	6th Level	125	
NORTH EAST PARKING	West Center Street Parking	19	353
	Tract 1	149	
	Tract 2	185	
NORTH WEST PARKING			170
PARK PLAZA PARKING			11
BLDG K PARKING	2nd Level	33	120
	3rd Level	87	
COMMERCIAL PARKING TOTAL:			2,056
TOTAL COMMERCIAL GLA		587,212 SF	
BLDG C PARKING			319
RESIDENTIAL PARKING TOTAL:			319
TOTAL RESIDENTIAL UNIT		214 UNITS	
GRAND TOTAL			2,375

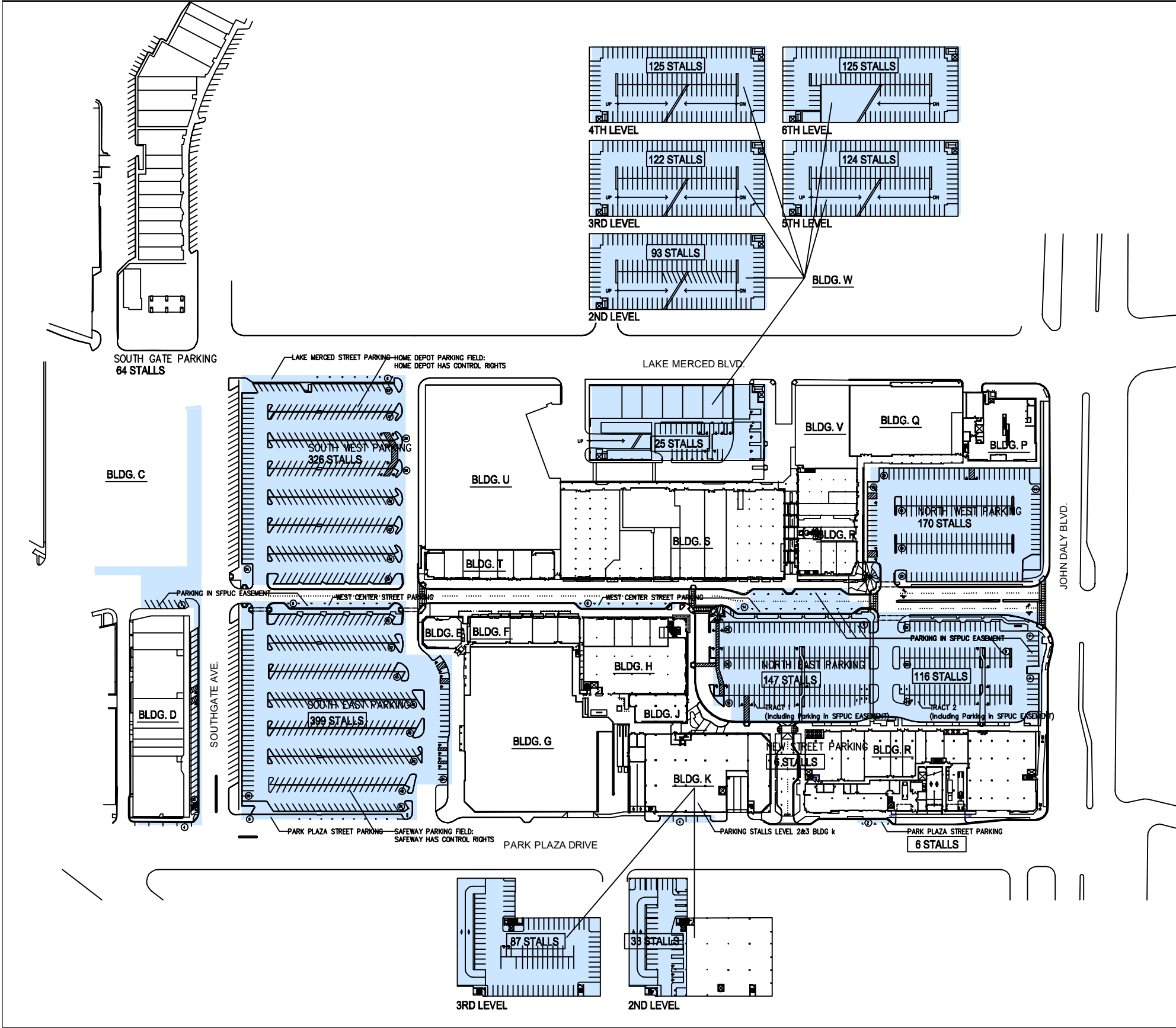
Legend

STALLS

Updated parking count due to change of plan / design

Parking Spaces Included

Proposed Parking Counts with New Mixed Use Bldg C



Westlake Shopping Center Daly City, California

PARKING COUNT BREAKDOWN			
(Proposed Site Plan with New Mixed Use Bldg R & Bldg C)			
SOUTHGATE PARKING			63
SOUTH WEST PARKING	Home Depot Parking Field	320	326
	Lake Merced Street Parking	6	
SOUTH EAST PARKING	Safeway Parking Field	380	399
	Park Plaza Street Parking	11	
	West Center Street Parking	8	
BLGD W PARKING	1st Level	25	614
	2nd Level	93	
	3rd Level	122	
	4th Level	125	
	5th Level	124	
	6th Level	125	
NORTH EAST PARKING	West Center Street Parking	19	282
	Tract 1	147	
	Tract 2	116	
NORTH WEST PARKING			170
PARK PLAZA PARKING			6
BLDG K PARKING	2nd Level	33	120
	3rd Level	87	
NEW STREET PARKING			4
COMMERCIAL PARKING TOTAL:			1,984
TOTAL COMMERCIAL GLA		568,008 SF	
BLDG R PARKING			260
BLDG C PARKING			319
RESIDENTIAL PARKING TOTAL:			579
TOTAL RESIDENTIAL UNIT		393 UNITS	
GRAND TOTAL			2,563

Legend

STALLS Updated parking count due to change of plan / design

 Parking Spaces Included

Proposed Parking Counts with New Mixed Use Bldg C & R

Attachment N – ULI Shared parking Outputs

Project: Westlake South Development
Description: Shared Parking with Westlake Shopping Center

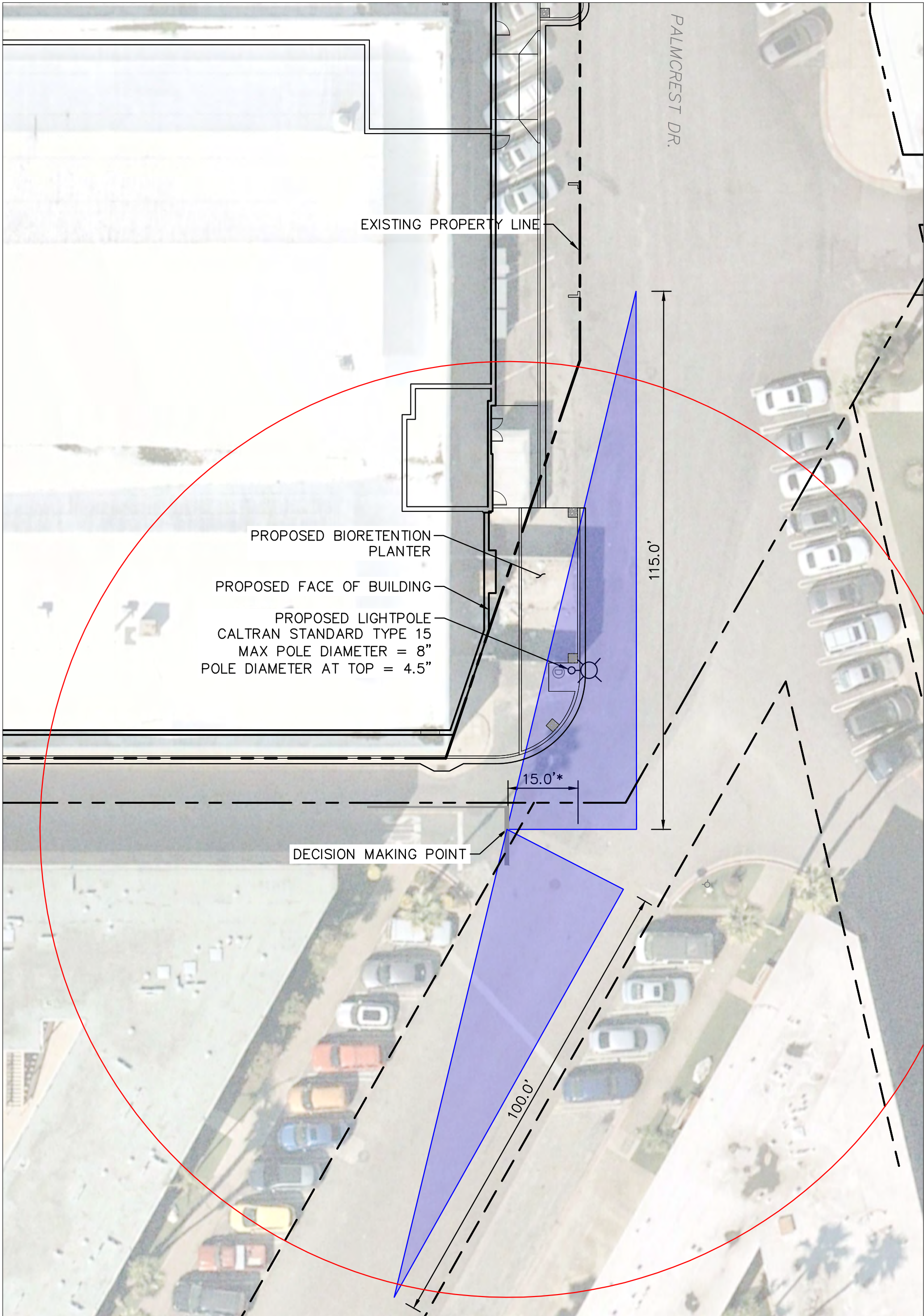
Shared Parking Demand Summary																		
Peak Month: DECEMBER -- Peak Period: 1 PM, WEEKEND																		
Land Use	Project Data		Weekday					Weekend					Weekday			Weekend		
			Base Ratio	Driving Adj	Non-Captive Ratio	Project Ratio	Unit For Ratio	Base Ratio	Driving Adj	Non-Captive Ratio	Project Ratio	Unit For Ratio	Peak Hr Adj	Peak Mo Adj	Estimated Parking	Peak Hr Adj	Peak Mo Adj	Estimated Parking
	Quantity	Unit											1 PM	December	Demand	1 PM	December	Demand
Retail																		
Retail (<400 ksf)	180,216	sf GLA	2.90	100%	100%	2.89	ksf GLA	3.20	100%	100%	3.19	ksf GLA	100%	100%	521	100%	100%	575
Employee			0.70	100%	100%	0.70		0.80	100%	100%	0.80		100%	100%	127	100%	100%	144
Supermarket/Grocery	71,857	sf GLA	4.00	100%	100%	3.99	ksf GLA	4.00	100%	100%	3.99	ksf GLA	90%	100%	258	100%	100%	287
Employee			0.75	100%	100%	0.75		0.75	100%	100%	0.75		100%	100%	54	100%	100%	54
Discount Stores/Superstores	39,050	sf GLA	3.40	100%	100%	3.39	ksf GLA	3.80	100%	100%	3.79	ksf GLA	100%	100%	133	95%	100%	141
Employee			0.85	100%	100%	0.85		0.95	100%	100%	0.95		100%	100%	34	100%	100%	38
Home Improvement Stores/Garden	109,000	sf GLA	3.10	100%	100%	3.09	ksf GLA	3.45	100%	100%	3.44	ksf GLA	99%	75%	250	100%	75%	282
Employee			0.80	100%	100%	0.80		0.90	100%	100%	0.90		100%	85%	75	100%	85%	84
Food and Beverage																		
Fine/Casual Dining	13,933	sf GLA	13.25	100%	92%	12.19	ksf GLA	15.25	100%	88%	13.46	ksf GLA	75%	100%	128	55%	100%	103
Employee			2.25	100%	100%	2.24		2.50	100%	100%	2.49		90%	100%	29	75%	100%	26
Fast Casual/Fast Food	21,425	sf GLA	12.40	100%	43%	5.32	ksf GLA	12.70	100%	40%	5.12	ksf GLA	100%	96%	110	100%	96%	106
Employee			2.00	100%	100%	1.99		2.00	100%	100%	1.99		100%	100%	43	100%	100%	43
Entertainment and Institutions																		
Family Entertainment	1,460	sf GLA	1.80	100%	10%	0.18	ksf GLA	2.50	100%	10%	0.25	ksf GLA	95%	48%	-	90%	60%	-
Employee			0.20	100%	100%	0.20		0.25	100%	100%	0.25		100%	58%	1	100%	70%	1
Health Club	11,400	sf GLA	6.60	100%	69%	4.54	ksf GLA	5.50	100%	10%	0.55	ksf GLA	70%	100%	37	30%	100%	2
Employee			0.40	100%	100%	0.40		0.25	100%	100%	0.25		75%	100%	4	50%	100%	1
Hotel and Residential																		
Residential, Suburban																0%		
Studio Efficiency	26	units	0.85	100%	100%	0.85	unit	0.85	100%	100%	0.85	unit	40%	100%	9	65%	100%	15
1 Bedroom	100	units	0.90	100%	100%	0.90	unit	0.90	100%	100%	0.90	unit	40%	100%	36	65%	100%	59
2 Bedrooms	263	units	1.65	100%	100%	1.65	unit	1.65	100%	100%	1.65	unit	40%	100%	174	65%	100%	282
3+ Bedrooms	4	units	2.50	100%	100%	2.50	unit	2.50	100%	100%	2.50	unit	40%	100%	4	65%	100%	7
Reserved		respaces	0.00	100%	100%	0.00	unit	0.00	100%	100%	0.00	unit	100%	100%	-	100%	100%	-
Visitor	393	units	0.10	100%	100%	0.10	unit	0.15	100%	100%	0.15	unit	20%	100%	8	20%	100%	12
Office																		
Office <25 ksf	17,858	sf GFA	0.30	100%	100%	0.30	ksf GFA	0.03	100%	100%	0.03	ksf GFA	45%	100%	3	80%	100%	1
Reserved		empl	0.00	100%	100%	0.00		0.00	100%	100%	0.00		100%	100%	-	100%	100%	-
Employee			3.50	100%	84%	2.95		0.35	100%	84%	0.30		85%	100%	45	80%	100%	5
Medical/Dental Office	3,203	sf GFA	3.00	100%	96%	2.87	ksf GFA	0.00	100%	100%	0.00	ksf GFA	90%	100%	9	0%	100%	-
Employee			1.60	100%	84%	1.35		0.00	100%	84%	0.00		100%	100%	5	0%	100%	-
Bank (Drive In Branch)	2,060	sf GFA	3.50	100%	60%	2.10	ksf GFA	3.00	100%	100%	3.00	ksf GFA	50%	100%	2	0%	100%	-
Employee			2.50	100%	84%	2.11		1.75	100%	84%	1.48		100%	100%	5	0%	100%	-
Additional Land Uses																		
													Customer/Visitor	1,458	Customer	1,509		
													Employee/Resident	643	Employee/Resident	758		
													Reserved	-	Reserved	-		
													Total	2,101	Total	2,267		
													Shared Parking Reduction	27%		24%		

Project: Westlake South Development
 Description: Shared Parking with Westlake Shopping Center

Monthly Comparison Summary								
Month	Weekday							
	Overall Pk		AM Peak Hr		PM Peak Hr		Eve Peak Hr	
	Time	Demand	Time	Demand	Time	Demand	Time	Demand
January	6 PM	1,718	11 AM	1,521	1 PM	1,703	6 PM	1,718
February	6 PM	1,704	11 AM	1,511	1 PM	1,691	6 PM	1,704
March	1 PM	1,877	11 AM	1,670	1 PM	1,877	6 PM	1,869
April	1 PM	1,883	11 AM	1,683	1 PM	1,883	6 PM	1,863
May	1 PM	1,978	11 AM	1,764	1 PM	1,978	6 PM	1,947
June	1 PM	1,936	11 AM	1,727	1 PM	1,936	6 PM	1,910
July	1 PM	1,898	11 AM	1,687	1 PM	1,898	6 PM	1,874
August	1 PM	1,908	11 AM	1,694	1 PM	1,694	6 PM	1,885
September	1 PM	1,831	11 AM	1,637	1 PM	1,831	6 PM	1,821
October	1 PM	1,891	11 AM	1,687	1 PM	1,891	6 PM	1,876
November	1 PM	1,921	11 AM	1,710	1 PM	1,921	6 PM	1,904
December	1 PM	2,101	11 AM	1,844	1 PM	2,101	6 PM	2,078
Late December	1 PM	1,922	11 AM	1,647	1 PM	1,922	6 PM	1,835

Monthly Comparison Summary								
Month	Weekend							
	Overall Pk		AM Peak Hr		PM Peak Hr		Eve Peak Hr	
	Time	Demand	Time	Demand	Time	Demand	Time	Demand
January	1 PM	1,832	11 AM	1,660	1 PM	1,832	6 PM	1,657
February	1 PM	1,822	11 AM	1,649	1 PM	1,822	6 PM	1,653
March	1 PM	2,027	11 AM	1,820	1 PM	2,027	6 PM	1,816
April	1 PM	2,042	11 AM	1,833	1 PM	2,042	6 PM	1,822
May	1 PM	2,148	11 AM	1,921	1 PM	2,148	6 PM	1,903
June	1 PM	2,102	11 AM	1,886	1 PM	2,102	6 PM	1,866
July	1 PM	2,056	11 AM	1,842	1 PM	2,056	6 PM	1,823
August	1 PM	2,065	11 AM	1,851	1 PM	2,065	6 PM	1,831
September	1 PM	1,982	11 AM	1,787	1 PM	1,982	6 PM	1,771
October	1 PM	2,044	11 AM	1,837	1 PM	2,044	6 PM	1,824
November	1 PM	2,080	11 AM	1,872	1 PM	2,080	6 PM	1,847
December	1 PM	2,267	11 AM	2,004	1 PM	2,267	6 PM	1,945
Late December	1 PM	2,064	11 AM	1,733	1 PM	2,064	6 PM	1,837

Attachment O – Sight Triangle



*PER HDM CHAPTER 400, SECTION 405.1 ON SIGHT DISTANCE.

SET BACK FOR THE DRIVER OF THE VEHICLE ON THE MINOR ROAD SHOULD BE A MINIMUM OF 10 FEET PLUS THE SHOULDER WIDTH OF THE MAJOR ROAD BUT NOT LESS THAN 15 FEET.

